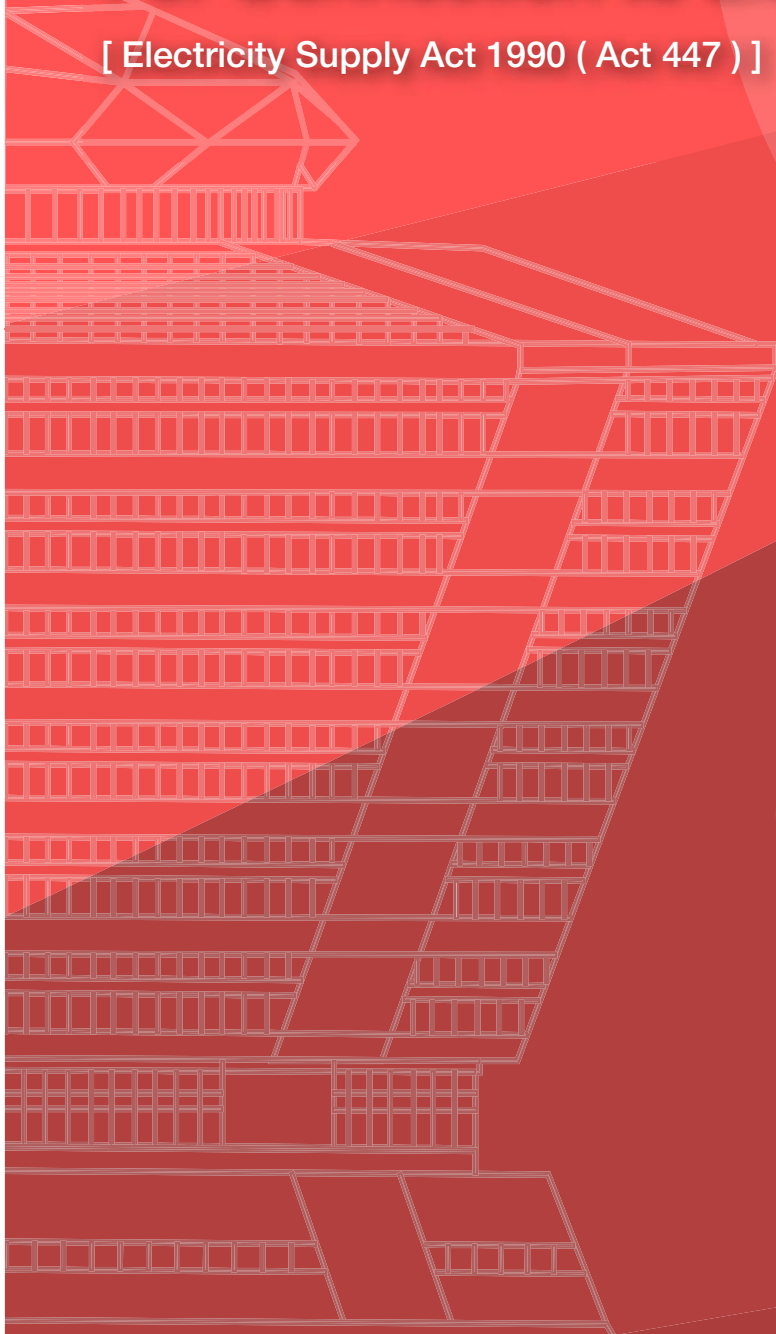


# Guidelines

## On Large Scale Solar Photovoltaic Plant For Connection to Electricity Networks

[ Electricity Supply Act 1990 ( Act 447 ) ]



## Registration Record

| <b>Reg. no</b> | <b>Reg. date</b>        | <b>Issuance /Amendments</b> | <b>Date of Approval by Commission</b> |
|----------------|-------------------------|-----------------------------|---------------------------------------|
| <b>1</b>       | <b>28 April 2016</b>    | <b>-</b>                    | <b>27 April 2016</b>                  |
| <b>2</b>       | <b>17 February 2017</b> | <b>Version 2</b>            | <b>As above</b>                       |
|                |                         |                             |                                       |
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**ELECTRICITY SUPPLY ACT 1990**  
**[Act 447]**

**GUIDELINES ON LARGE SCALE SOLAR PHOTOVOLTAIC  
PLANT FOR CONNECTION TO ELECTRICITY NETWORKS**

**GP/ST/ No. 1/2016**

IN exercise of the power conferred by Section 50C of the Electricity Supply Act 1990 [Act 447], the Commission issues the following guidelines:

**Citation and Commencement**

1. These Guidelines may be cited as the Guidelines On Large Scale Solar Power Plants For Connection to the Transmission and Distribution Electricity Networks.
2. These Guidelines shall come into operation on the date of registration of these Guidelines.

**Application of these Guidelines**

3. These Guidelines shall apply to:
  - i) any person who has been given the right by the Commission to develop large scale solar power plant and seeking connection to the transmission and distribution electricity network with a capacity at the connection point from 1MWac up to 50 MWac;
  - ii) the relevant licensee, whose network is to be connected with the LSS power plant;
  - iii) the Single Buyer or relevant distribution licensee who manage the contractual arrangement for the sales and purchase of the electricity through the network; and
  - iv) the Grid System Operator and distribution system operator.

These Guidelines are not applicable to large scale solar power plant which has been given the right through Sustainable Energy Development Authority (SEDA) to develop the plant under feed in tariff scheme.

## Interpretation

4. In these Guidelines, the term used shall, unless otherwise defined in the Guidelines or the context otherwise requires, have the same meaning as in the Act, regulation or Codes made under it. In addition, the following words and expressions shall have the meanings hereby assigned to them.

| Term                                   | Definition   |
|--|--|
| <b>Commercial Operation Date (COD)</b> | means the date on which (i) all testing of a Power Station or a Generating Unit or Power Park Module or a Grid System development or a User Development is completed, (ii) the plant is certified by the relevant party (e.g., Single Buyer, the GSO, TNB Transmission or a User) for commercial use with the Grid System and (iii) all relevant conditions precedent under the PPA have been satisfied or waived; |
| <b>Contract Year</b>                   | means, the date on which begins on the Commercial Operation Date of the Facility and ends on December 31 of the year in which the Commercial Operation Date of the Facility occurs, each subsequent period during the PPA term which begins January 1 and ends on December 31 of the same year and the period of twelve (12) months or less which begins on January 1 and ends on the last day of the PPA term;    |
| <b>Commission</b>                      | means the Energy Commission or Suruhanjaya Tenaga established under the Energy Commission Act 2001 (Act 610) and any successor thereof;  |
| <b>Distribution Network</b>            | means the system consisting (wholly or mainly) of electric lines which are owned or operated by a Distribution Licensee (Distributor) and used for the distribution of electricity from Grid Supply Points or Generating Units or Power Park Modules or other entry  |

| Term                          | Definition  |
|-------------------------------|---|
|                               | points to the point of delivery to Customers or other Distributors. "Distribution electricity network" means a system or part of a system at nominal voltage of less than 132 kilovolts of electric lines or cables, substations and associated equipment and buildings for transporting electricity to any person, regardless of whether a generating plant is connected to such system; |
| <b>Effective Date</b>         | means the date on which all relevant conditions precedent listed under the PPA have been satisfied or waived;   |
| <b>Energy Rate</b>            | means the rate as stated in the Power Purchase Agreement or any other rate as may be adjusted with the terms of the Power Purchase Agreement;   |
| <b>Facility</b>               | means a solar photovoltaic energy generating facility located at the site with a capacity of 1 to 50 MW <sub>ac</sub> and ancillary equipment and facilities as more specifically described in the Power Purchase Agreement and includes any modification thereto;  |
| <b>Financial Closing Date</b> | means the date on which the Financing Documents relating to the financing or refinancing for the total construction costs of the LSS have been entered into by IPP and the financing parties, and all of the conditions precedent for the initial drawdown under such financing documents have been satisfied by IPP or waived by the financing parties thereunder;                       |
| <b>Grid Owner</b>             | means the party that owns the high voltage backbone Transmission Network and is responsible for maintaining adequate Grid System capacity in accordance with the provisions of the Grid Code and License standards and registered as the Grid Owner under the Single Buyer Rules;   |

| Term  | Definition  |
|---|---|
| <b>Grid Code</b>                                | means the Grid Code for Peninsular or Grid Code for Sabah/Labuan which sets out the principles governing the relationship between the GSO, EC, Grid Owner, Single Buyer and all Users of the Grid System, as amended from time to time in accordance with applicable law; |
| <b>Grid System</b>                              | means the Transmission Network with directly connected Generating Unit including Power Park Module and Directly Connected Customers;  |
| <b>Initial Operation Date</b>                   | means the date on which Net Electrical Output is first generated and delivered from the Facility to the Grid System;  |
| <b>IPP Interconnection Facility</b>             | means the new 132kV substation owned by IPP as further described in the PPA to enable IPP to deliver solar PV energy from the Facility and to maintain the stability of the Grid System, as further described in the Technical Specifications;                            |
| <b>IPP Interconnector</b>                       | means the transmission line(s) or underground cable(s) (including any associated facilities) that interconnect the IPP Interconnection Facility and the Grid System, as further described in the Technical Specifications;  |
| <b>Large Scale Solar (LSS)</b>                  | means any solar photovoltaic plant with minimum size of 1MW <sub>ac</sub> and maximum of 50MW <sub>ac</sub> , connected to either the Transmission Network or Distribution Network in Peninsular Malaysia, Sabah or Labuan;   |
| <b>Maximum Annual Allowable Quantity (MAAQ)</b> | means the maximum annual allowable quantity (in kWh) determined as a product of the Established Capacity, the capacity factor and the number of hours in a year, as further described in the Power Purchase Agreement;  |
| <b>Malaysian Grid Code</b>                      | See <b>Grid Code</b> ;  |

| Term  | Definition   |
|---|--|
| <b>Net Electrical Output</b>                    | means for any period, the solar photovoltaic energy generated and delivered to the Grid System at the interconnection point from the Facility by IPP as measured in kWh by the TNB metering equipment or as otherwise determined in accordance with the provisions of the Power Purchase Agreement during such period;               |
| <b>Point of Common Coupling</b>                 | That point on the Transmission Network which is electrically closest to the User installation at which either Demands (Loads) are, or may be, connected;   |
| <b>Power Purchase Agreement (PPA)</b>           | means agreements between the TNB or SESB or Single Buyer or Distribution Licensee/Network Operators (as the case may be) and a Generators relating to the financial and technical conditions for the purchase of the Power Station output and technical conditions relating to its connection to and performance on the Grid System; |
| <b>Sabah Electricity Sdn Bhd (SESB)</b>         | means a limited liability company incorporated under the Companies Act, 1965 (Company Registration No. 462872-W);  |
| <b>Tenaga Nasional Berhad (TNB)</b>             | means a limited liability company incorporated under the Companies Act, 1965 (Company Registration No. 200866-W);  |
| <b>TNB's or SESB's Interconnection Facility</b> | means the existing TNB's or SESB's substation (including but not limited to any extension works required to be completed by the LSS developer at such TNB's or SESB's substation), as further described in the Technical Specifications;   |
| <b>Transmission Network</b>                     | The transmission lines, substations and other associated plant and apparatus operating at 66 kV or above in Peninsular Malaysia, Sabah and Labuan; and   |

| <b>Term</b>                                      | <b>Definition</b>                            |
|--|--|
| <b>Transmission System Reliability Standards</b> | means the Transmission Reliability Standard. |



## Implementation Mechanism

5. The implementation mechanism for selection of potential developers under LSS programme shall be through a Competitive Bidding framework, unless otherwise directed by the Minister. The Competitive bidding framework may include;
- i) a pre-qualification exercise to qualify potential bidders and suitable sites;
  - ii) a request for proposal for pre-qualified bidders to submit technical and commercial proposal to develop LSS power plant;
  - iii) evaluation criteria in the bid evaluation include but not limited to
    - The evaluation criteria will be in two part – pass / fail criteria and merit points system based on certain preferred requirements;
    - Solar rate offered, which will be normalized by some merit points system based on certain requirement to be specified in the Request for Proposal (RFP);
    - Compliance to technical and regulatory standards;
    - Compliance to the requirement of the RFP;
    - Compliance to the commercial requirements;
    - Financial capacity and reasonable financing arrangement;
    - O&M arrangement and the capacity to ensure continuous operation throughout the concession;
    - Reasonable implementation timeline meeting the Commission's schedule;
    - Selection of bidders will be based on the stacking order meeting all the above requirements up to the required capacity;
    - In the case where the capacity offered by the last successful bidder meeting the requirement exceeds the required capacity, then the Commission may offers the bidder a capacity lower than what has been proposed. If the bidder decline the offer, the Commission has the right to offer to the next bidder meeting the requirement based on the lower capacity and price of the last bidder;
  - iv) Final approval of the offered to be issued by the Commission;
  - v) A briefing session before the issuance of the RFP may be held by the Commission, as and when necessary; and
  - vi) Opening of bids may be held in front of all bidders to enhance its transparency.

## Capacity for Bid

6. The target capacity for the LSS program is 1000 MW<sub>ac</sub> by 2020 with annual capacity capped at 200MW<sub>ac</sub> for Peninsular and 50MW<sub>ac</sub> for Sabah/Labuan for 2017, 2018, 2019 and 2020.
7. This yearly target capacity cap may be reviewed periodically by the Commission based on the achievement of the overall off take of the capacity open for bidding, and the progress of the projects implemented by the successful bidders.

## Key Principles of LSS Framework

8. The key principles of LSS framework shall be as follows:
  - i) The participant of the LSS program must be a Local Company of which the Malaysian equity interest in such Local Company is at least 51% or a consortium of legal entities which includes a minimum of one Local Company and which has Malaysian equity interest in the consortium of at least 51%;
  - ii) The usage of land to be used for the LSS power plant may also be optimized for other economic activities (e.g.: agricultural) and not restricted only to solar energy generation, and will carry certain merit points;
  - iii) Each successful bidder is only allowed up to an aggregate of the annual solar capacity allocation as per **Table 1** below;

**Table 1: Annual Aggregate Capacity**

| Plant Location      | Aggregate Capacity |                    |
|---------------------|--------------------|--------------------|
|                     | 2017 – 2018        | 2019 – 2020        |
| Peninsular Malaysia | 50MW <sub>ac</sub> | 30MW <sub>ac</sub> |
| Sabah/Labuan        | 10MW <sub>ac</sub> | 10MW <sub>ac</sub> |

- iv) Subject to the discretion of the Commission, the capacity allocation may be divided into different categories and limited to a maximum quota as shown in the **Table 2** below;

**Table 2: Annual Capacity Allocation Category and Maximum Quota  
Peninsular**

| LSS Bidding Cycle 2017 – 2018 |   |   |  |
|-------------------------------|---|---|--|
| Category                      | 1 MW <sub>ac</sub> – 5 MW <sub>ac</sub> | 6 MW <sub>ac</sub> -29 MW <sub>ac</sub> | 30 MW <sub>ac</sub> -50 MW <sub>ac</sub> |
| Maximum Quota                 | [10 MW <sub>ac</sub> (5%)]              | [100 MW <sub>ac</sub> (50%)]            | [90 MW <sub>ac</sub> (45%)]              |

| LSS Bidding Cycle 2019 – 2020 |  |   |   |
|-------------------------------|--|---|---|
| Category                      | 1 MW <sub>ac</sub> – 5.99 MW <sub>ac</sub> | 6 MW <sub>ac</sub> -9.99 MW <sub>ac</sub> | 10 MW <sub>ac</sub> -30.00 MW <sub>ac</sub> |
| Maximum Quota                 | [36 MW <sub>ac</sub> (10%)]                | [144 MW <sub>ac</sub> (40%)]              | [180 MW <sub>ac</sub> (50%)]                |

**Sabah/Labuan**

| LSS Bidding Cycle 2017 – 2018 |   |   |
|-------------------------------|---|---|
| Category                      | 1 MW <sub>ac</sub> – 5 MW <sub>ac</sub> | 6 MW <sub>ac</sub> -10 MW <sub>ac</sub> |
| Maximum Quota                 | 10 MW <sub>ac</sub> (20%)               | 40 MW <sub>ac</sub> (80%)               |

| LSS Bidding Cycle 2019 – 2020 |  |  |
|-------------------------------|--|--|
| Category                      | 1 MW <sub>ac</sub> – 5.99 MW <sub>ac</sub> | 6 MW <sub>ac</sub> -10.00 MW <sub>ac</sub> |
| Maximum Quota                 | 20 MW <sub>ac</sub> (20%)                  | 80 MW <sub>ac</sub> (80%)                  |

- v) The plant capacity range for LSS power plant is 1MW<sub>ac</sub> – 50MW<sub>ac</sub> (Peninsular) 1MW<sub>ac</sub> – 10MW<sub>ac</sub> (Sabah/Labuan) at the point of interconnection with the electricity network;
- vi) The connection to the electricity network, whether to the transmission network or distribution network, shall be based on technical criteria and judgement through a comprehensive system study;
- vii) The Power Purchase Agreement (PPA) shall be based on take and pay, energy only under Build, Own and Operate (BOO) concession;

- viii) The solar rate offered by the bidder shall be site specific. The LSS power plant may include combine plants from several different sites and if all the facility is connected to one nodal point, then a single PPA shall be used;
- ix) The PPA duration is 21 years with firm energy price throughout;
- x) The offers by the bidders shall be based on the optimum output, final yield and specific yield of the proposed LSS power plant in accordance to its design and technology used. The Bidder shall declare the plant's energy production. This includes the declaration of the plant's Maximum Annual Allowable Quantity (MAAQ) in MWh which is determined based on the capacity of the plant, the final yield and specific yield and the number of hours in a year. Energy produced annually by the Facility is capped at the agreed MAAQ in terms of payment of the Energy Rate. If MAAQ is exceeded, lower rate is applicable, which be termed as the Excess Energy Rate; and
- xi) The solar rate shall be structured to reflect the followings:
- *A Levelised Price which consists of:*
    - *EPC : sen /kWh*
    - *Land cost: sen/kWh*
    - *Project development cost: sen/kWh*
    - *Financing cost: sen/kWh*
    - *O&M cost: sen/kWh*
    - *Interconnection cost: sen/kWh*

### **Implementation Timeline for LSS Program**

9. The competitive bidding exercise will be conducted under four (4) packages to coincide with the target commercial operation date (COD) of the LSS power plants. The Commission will notify the bidding schedules from time to time based on the need and the outcomes of each bidding exercise.

### **Potential Connection Points (Nodal Points)**

10. Certain locations have been identified as potential connections points (nodal points) to the electricity transmission and distribution networks operated by TNB or SESB to facilitate the potential LSS developer. These nodal points will be issued as part of RFQ or RFP documents. LSS developer shall perform power system study (PSS) for connection to the potential nodal points. Any

alternative connection point may be proposed but its acceptance is up to the discretion of the Commission after consultation with the Grid System Operator and the Distribution System Operator.

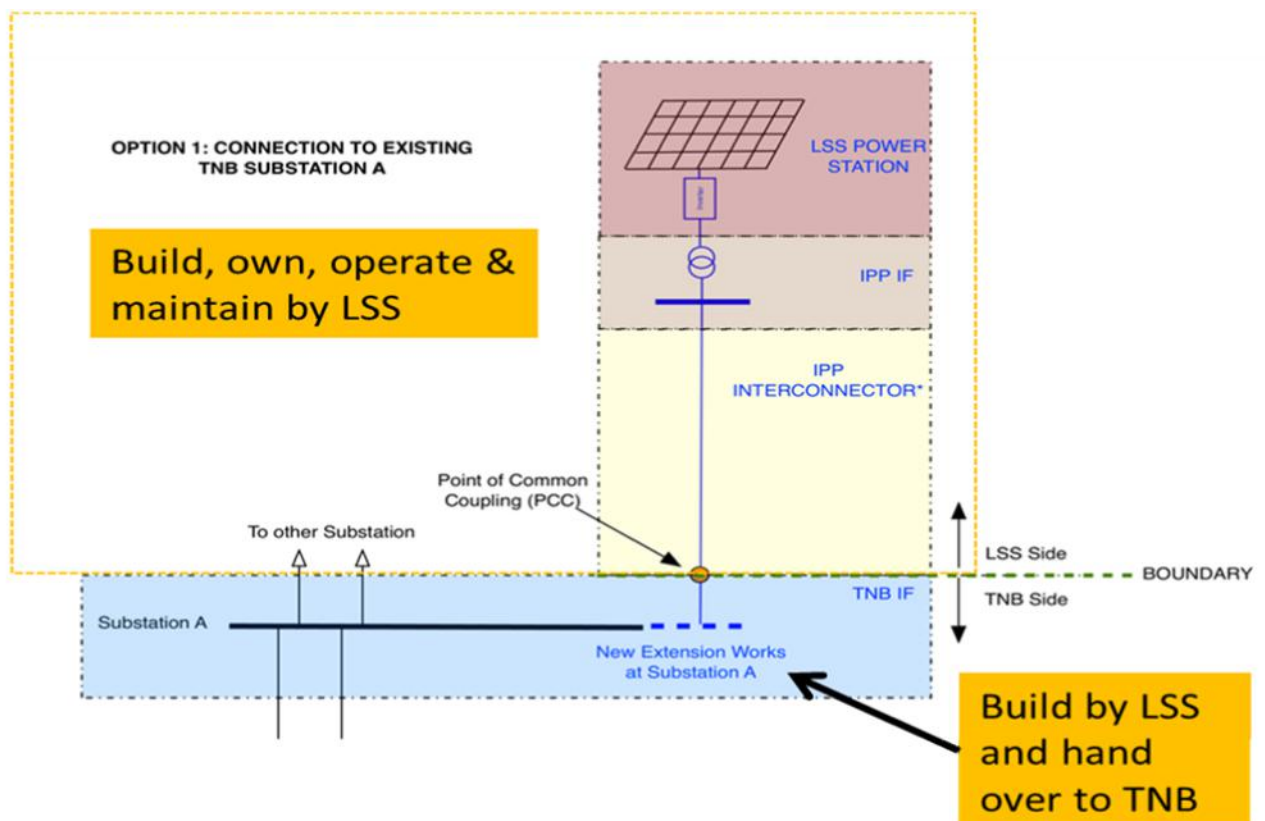
All cost associated with the connection of LSS and power system studies, shall be borne by the LSS developer. The demarcation of ownership of the plant and system is as depicted in **Figure 1**, **Figure 2** and **Figure 3**.

### Responsibility of the Bidders

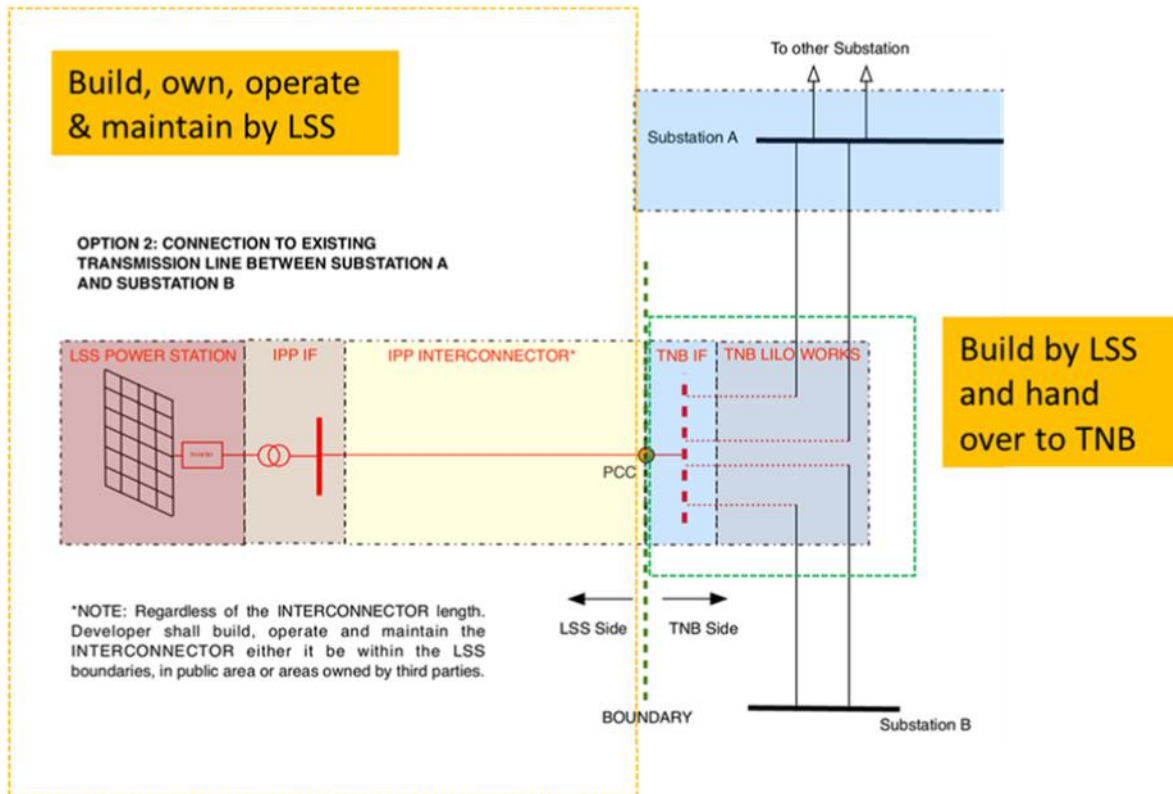
11. The Bidder is fully responsible to:

- i) acquire land or submit certified and executed Site/Lease Agreement over Land Title;
- ii) obtain right of way (ROW) and permits from relevant local authorities, the required Interconnection Facility (IF) and network reinforcement up to the Point of Common Coupling (PCC) as **Figure 1**, **Figure 2** and **Figure 3**; and
- iii) design, construct, test, commission and complete LSS power plant.

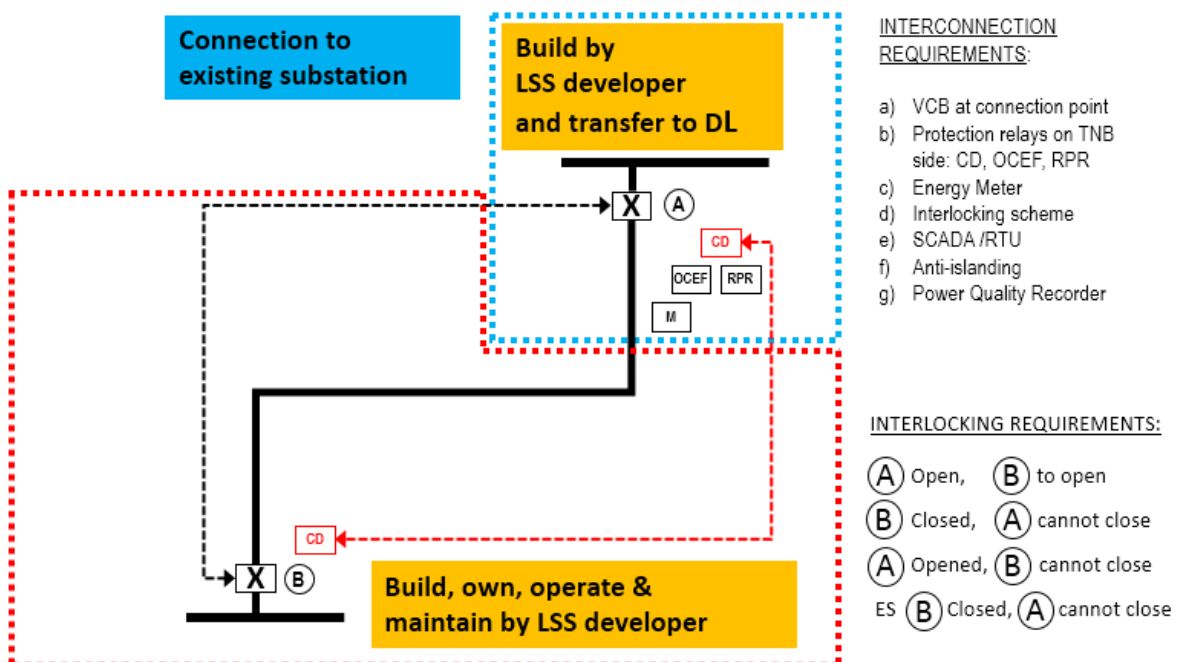
**Figure 1: Illustration of Asset Demarcation**



**Figure 2: Illustration of Asset Demarcation**



**Figure 3: Illustration of Asset Demarcation**



## Request for Proposal (RFP)

12. The Commission will issue to each successful RFQ Participant a notification advising that it has been short-listed and therefore invited to participate in the Request for Proposal (RFP) stage. Participants will receive the RFP documents including PPA, LSS Guidelines and Non-Disclosure Agreement (NDA) form.

The following documents which will a useful guide in preparing the RFP submissions are as attached in the Appendices:

- **APPENDIX A:** List of Abbreviations;
- **APPENDIX B:** LSS Program Process Flow Chart;
- **APPENDIX C:** Technical Specifications for Transmission-Connected LSS;
- **APPENDIX D:** Technical Specification for Distribution-Connected LSS;
- **APPENDIX E:** PPA for Transmission Connected LSS;
- **APPENDIX F:** PPA for Distribution Connected LSS (Peninsular); and
- **APPENDIX G:** PPA for Distribution Connected LSS (Sabah/Labuan)

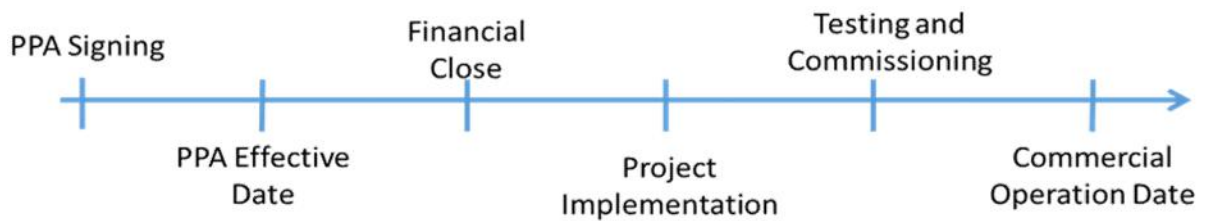
## Award of the Project

13. The Commission will issue a Conditional Letter of Award (CLOA) to successful bidders, and the successful bidder will enter into a PPA negotiation process with the distribution licensee or the Single Buyer based on the PPA that has been approved by the Commission. Upon successful negotiation, the Bidders must fulfill all Conditions Precedents (CPs) under the PPA, particularly on the Power System Study (PSS) Report and submission of certified and executed site agreement.

## Critical Milestones to Commercial Operation Date (COD)

14. As shown in **Figure 4** below, the critical milestones for successful completion of LSS power plant shall take place prior to commercial operation.

**Figure 4: Timelines from Post-PPA to COD**



### **Licensing Requirement**

15. All LSS power plants shall be licensed under Section 9 of the Electricity Supply Act 1990. For licensing purposes, the Guidelines on Licensing is available on the Commission's website [www.st.gov.my](http://www.st.gov.my), and an application shall be made through the on-line application at [oas.st.gov.my](http://oas.st.gov.my) link.

### **Dispute Resolution**

16. Any dispute in relation to the implementation this Guideline shall be resolved in accordance with the dispute resolution process and procedures as set out by the Act.

### **Notice by the Commission**

17. The Commission may issue written notices from time to time in relation to implementation of these Guidelines.

### **Amendment and Variation**

18. The Commission may at any time amend, modify, vary or revoke these Guidelines.

Dated: 27 April 2016

**DATUK IR. AHMAD FAUZI BIN HASAN**  
Chief Executive Officer  
for Energy Commission



## **APPENDIX A :**

### List of Abbreviations

## Appendix A

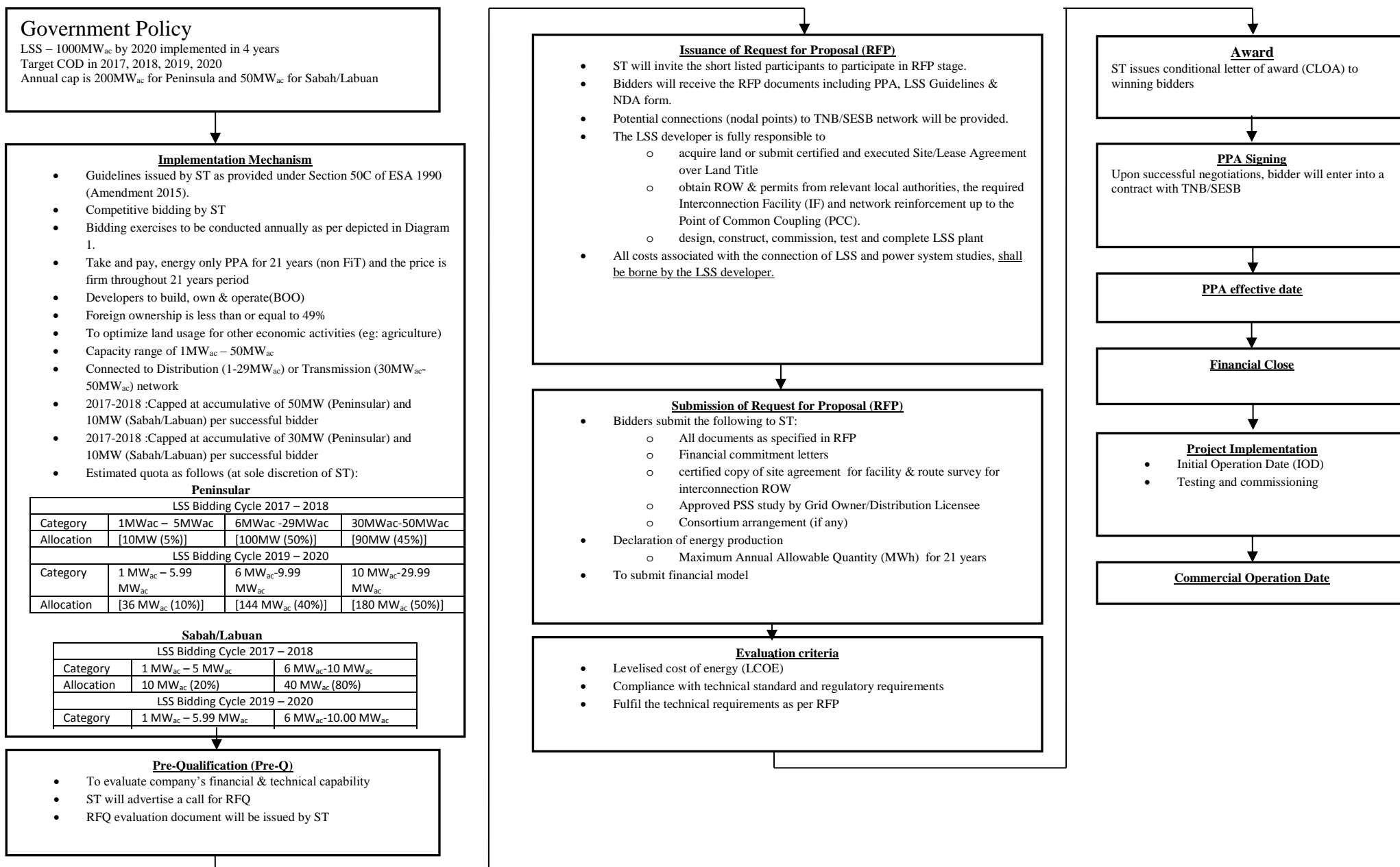
This section describes a list of abbreviations that appear in throughout this Guideline

| <b>Abbreviations</b> | <b>Description</b>                         |
|----------------------|--|
| BOO                  | Build, Own and Operate                     |
| COD                  | Commercial Operation Date                  |
| IF                   | Interconnection Facility                   |
| IOD                  | Initial Operation Date                     |
| IPP                  | Independent Power Producer                 |
| kV                   | kilo-Volt                                  |
| MAAQ                 | Maximum Annual Allowable Quantity (in kWh) |
| MW                   | Mega-Watt                                  |
| NDA                  | Non-Disclosure Agreement                   |
| PCC                  | Point- of- Common –Coupling                |
| PPA                  | Power Purchase Agreement                   |
| PSS                  | Power System Study                         |
| PV                   | Photovoltaic                               |
| RFP                  | Request for Proposal                       |
| RFQ                  | Request for Qualification                  |
| SB                   | Single Buyer                               |
| ST                   | Suruhanjaya Tenaga                         |
| TNB                  | Tenaga Nasional Berhad                     |
| SESB                 | Sabah Electricity Sendirian Berhad         |
| SEDA                 | Sustainable Energy Development Authority   |

## **APPENDIX B :**

### LSS Program Process Flow Chart

## Appendix B



## **APPENDIX C :**

Technical Specification For Transmission-Connected  
LSS

**Disclaimer:**

The “Guidelines for Transmission – Connected Large Scale Solar (LSS)” (“the Guidelines”) has been prepared for guidance and informational purpose only. It does not contain comprehensive information needed for the submission of the Request for Proposal and in designing the facilities needed for the LSS. Whilst all reasonable care has been taken in the preparation of the Guidelines, Commission, Single Buyer, Grid System Operator and/or Grid Owner does not make any representation, warranty or undertaking, expressed or implied, in or in relation to the completeness and or accuracy of information contained in the Guidelines. To this end, Commission, Single Buyer, Grid System Operator and/or Grid Owner disclaims all or any responsibility whatsoever to anyone for information contained in the Guidelines or for any representation or statement herein, whether expressed or implied, or for any responses given in response to any queries on or in relation to the Guidelines. All such persons expressly disavow any obligation or duty (whether in contract, tort or otherwise) to any prospective Solar Power Producer (“SPP”) and disclaim any and all liability based on or relating to any such information or representations or warranties (expressed or implied) contained in, or errors or omissions from, the Guidelines or based on or relating to the use of the Guidelines or any other written or oral communication transmitted to or information provided to or otherwise acquired by a prospective SPP.

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## Abbreviations

This section describes a list of abbreviations that appear in this document.

| <b>Abbreviations</b> | <b>Description</b>  |
|----------------------|---|
| AGP                  | Annual Generation Profile   |
| BOO                  | Build, Own and Operate  |
| COD                  | Commercial Operation Date   |
| CDGU                 | Centrally Despatched Generating Unit                                      |
| DAQ                  | Declared Annual Quantity  |
| DDQ                  | Declared Daily Quantity   |
| EMS                  | Energy Management System  |
| EPCC                 | Engineering, Procurement, Construction and Commissioning                  |
| EER                  | the Excess Energy Rate (in RM/kWh) for that billing period                |
| ER                   | the prevailing Energy Rate (in RM/kWh) applicable for that billing period |
| FAT                  | Factory Acceptance Test   |
| GSO                  | Grid System Operator  |
| IE                   | Independent Engineer  |
| IOD                  | Initial Operation Date  |
| IOM                  | Interconnection Operation Manual  |
| LSS                  | Large Scale Solar Photovoltaic Plant                                      |
| kV                   | Kilo-Volt   |
| kWh                  | Kilo-Watt hour  |
| MAAQ                 | Maximum Annual Allowable Quantity (in kWh)                                |
| MGC                  | Malaysian Grid Code   |
| MW <sub>ac</sub>     | Mega-Watt   |
| NDA                  | Non-Disclosure Agreement  |
| NEO                  | Net Electrical Output (in kWh)  |
| PCC                  | Point- of- Common –Coupling   |
| PPA                  | Power Purchase Agreement  |
| PSS                  | Power System Study  |
| PV                   | Photovoltaic  |
| RFP                  | Request for Proposal  |
| RFQ                  | Request for Qualification   |
| SB                   | Single Buyer  |
| SCADA                | Supervisory Control and Data Acquisition                                  |
| SCOD                 | Scheduled Commercial Operation Date                                       |
| ST                   | Commission  |
| SPP                  | Solar Power Producer  |
| SPP IF               | SPP Interconnection Facility  |
| TNB                  | Tenaga Nasional Berhad  |

TNB IF  
TSRS

TNB Interconnection Facility  
Transmission System Reliability Standard

## Glossary of Terms

In the Guidelines, words and expressions which are defined in the MGC or the Single Buyer Rules shall (unless it is otherwise defined in the Guidelines or the context requires otherwise) have the same meaning when used in the Guidelines. In addition, the following words and expressions shall have the meanings hereby assigned to them.

| Term                             | Definition   |
|----------------------------------|--|
| <b>Annual Generation Profile</b> | means the forecasted annual generation profile (in MW <sub>ac</sub> ) of the Facility's output for every hourly interval to be generated and delivered to the Grid System at the Interconnection Point from the Facility for each Contract Year;   |
| <b>Commencement Date</b>         | means the date notified by SPP to TNB on which the notice to proceed under the EPCC contract is issued;  |
| <b>Commercial Operation Date</b> | means the date on which (i) all testing of a Power Station or a Generating Unit or Power Park Module or a Grid System development or a User Development is completed, (ii) the plant is certified by the relevant party (e.g., Single Buyer, the GSO, TNB Transmission or a User) for commercial use with the Grid System and (iii) all relevant conditions precedent under the PPA have been satisfied or waived;           |
| <b>Contract Year</b>             | means the date on which begins on the Commercial Operation Date of the Facility and ends on December 31 of the year in which the Commercial Operation Date of the Facility occurs, each subsequent period during the term of the PPA which begins January 1 and ends on December 31 of the same year and the period of twelve (12) months or less which begins on January 1 and ends on the last day of the term of the PPA; |
| <b>Declared Daily Quantity</b>   | means on any given day of a Contract Year, the forecasted daily quantity (in MW <sub>ac</sub> ) of the Facility's output for every fifteen (15) minutes interval to be generated and delivered to the Grid System at the Interconnection Point from the Facility, as may be declared from time to time by SPP for such day pursuant to the requirements of the PPA;  |
| <b>Declared Annual Quantity</b>  | means the annual quantity (in MWh) of solar photovoltaic energy to be generated and delivered to the Grid System at the Interconnection Point from the Facility for each Contract Year which shall not exceed the Maximum Annual Allowable Quantity of the Facility;   |

| Term                          | Definition   |
|-------------------------------|--|
|                               |  |
| <b>Demand or Load</b>         | as defined in the <b>Grid Code</b> ;   |
| <b>Despatch Instruction</b>   | means an oral or written instruction or electronic signal communicated to SPP by the Grid System Operator or the control centre directing the Facility to commence, increase, decrease, maintain or cease the generation and delivery of solar photovoltaic energy into the Grid System, in accordance with the provisions of the PPA;                                       |
| <b>Distribution Network</b>   | as defined in the <b>Grid Code</b> ;   |
| <b>Effective Date</b>         | means the date on which all relevant conditions precedent listed under the PPA have been satisfied or waived;  |
| <b>Energy Rate</b>            | means the rate as stated in the Power Purchase Agreement or any other rate as may be adjusted with the terms of the PPA;   |
| <b>Established Capacity</b>   | means not less than 30MW <sub>ac</sub> but not more than 50MW <sub>ac</sub> ;  |
| <b>Facility</b>               | means a solar photovoltaic energy generating facility located at the site with a capacity of 30 MW <sub>ac</sub> to 50 MW <sub>ac</sub> and ancillary equipment and facilities as more specifically described in the PPA and includes any modification thereto;  |
| <b>Financial Closing Date</b> | means the date on which the financing documents relating to the financing or refinancing for the total construction costs of the LSS' project have been entered into by SPP and the financing parties, and all of the conditions precedent for the initial drawdown under such financing documents have been satisfied by SPP or waived by the financing parties thereunder; |
| <b>Grid Owner</b>             | means a part of TNB that owns the high voltage backbone Transmission Network and is responsible for maintaining adequate Grid System capacity in accordance with the provisions of the Grid Code and License standards and registered as the Grid Owner under the Single Buyer Rules;  |

| <b>Term</b>                              | <b>Definition</b>  |
|--|--|
| <b>Grid Code</b>                         | means the Malaysian Grid Code, as amended from time to time in accordance with applicable law;   |
| <b>Grid System</b>                       | means the Transmission Network with directly connected Generating Unit including Power Park Module and Directly Connected Customers;   |
| <b>Grid System Operator</b>              | as defined in the <b>Grid Code</b> ;   |
| <b>Half Hourly Quantity</b>              | means the forecasted quantity (in MW <sub>ac</sub> ) of the Facility's output to be generated and delivered to the Grid System at the Interconnection Point from the Facility for every half-hourly interval for the following twenty-four (24) hours or such other period as agreed with GSO, and updated at every half-hour on a rolling basis commencing from the Initial Operation Date; |
| <b>Initial Operation Date</b>            | means the date on which Net Electrical Output is first generated and delivered from the Facility to the Grid System;   |
| <b>Interconnection Point</b>             | means the demarcation line for ownership and maintenance as shown in section 3.5 of the Guidelines and more specifically described in the PPA;   |
| <b>Large Scale Solar</b>                 | means any solar photovoltaic plant with minimum size of 1MW <sub>ac</sub> and maximum of 50MW <sub>ac</sub> , connected to either the Transmission Network or Distribution Network in Peninsular Malaysia, Sabah or Labuan;  |
| <b>Maximum Annual Allowable Quantity</b> | means the maximum annual allowable quantity (in kWh) determined as a product of the Established Capacity, the capacity factor and the number of hours in a year, as further described in the PPA;  |
| <b>Malaysian Grid Code</b>               | See <b>Grid Code</b> ;   |
| <b>Net Electrical Output</b>             | means the solar photovoltaic energy generated and delivered to the Grid System at the Interconnection Point from the Facility by SPP as measured in kWh by the TNB Metering Equipment or as otherwise determined in accordance with the provisions of the Power Purchase Agreement during such period;   |
| <b>Power Park Module</b>                 | as defined in the <b>Grid Code</b> ;   |
| <b>Power Purchase Agreement</b>          | as defined in the <b>Grid Code</b> ;   |
| <b>Project Documents</b>                 | means, collectively, the Power Purchase Agreement, the EPCC contract, the operation and maintenance agreement, the site agreement and such other agreements as TNB and SPP shall from  |

| <b>Term</b>                         | <b>Definition</b>  |
|-------------------------------------|--|
|                                     | time to time mutually designate as a “Project Document”;   |
| <b>Prudent Utility Practice</b>     | as defined in the <b>Grid Code</b> ;   |
| <b>Single Buyer</b>                 | means the person authorized by the Commission to be responsible for the management of procurement of electricity and related services, which includes scheduling, procuring and settlement and registered as the Single Buyer in accordance with the Single Buyer Rules;   |
| <b>Single Buyer Rules</b>           | means a document that sets out the objectives, roles and functions of the Single Buyer and the roles of other participants as listed in the Single Buyer Rules in the Single Buyer market and the Commission;  |
| <b>Solar Power Producer</b>         | means the owners of the LSS or solar photovoltaic plant with minimum size of 1MW <sub>ac</sub> and maximum of 50MW <sub>ac</sub> , connected to either the Transmission Network or Distribution Network in Peninsular Malaysia, Sabah or Labuan;   |
| <b>SPP Interconnection Facility</b> | means the new 132kV substation owned by SPP to enable SPP to deliver solar photovoltaic energy from the Facility and to maintain the stability of the Grid System, as described in Section 3.4 hereunder and as further described in the PPA;  |
| <b>SPP Interconnector</b>           | means the overhead transmission line(s) or underground cable(s) (including any associated facilities) that interconnect the SPP Interconnection Facility and the Grid System, as described in Section 3.4 hereunder and as further described in the PPA;   |
| <b>SPP Works</b>                    | means the design, engineering, procurement, supply, manufacturing, construction, installation, erection, testing, commissioning, labour, services, facilities, equipment, supplies and materials to be furnished, supplied or performed by SPP at the TNB Interconnection Facility and if applicable including transmission lines and loop-in loop-out (LILO) works as further described in Appendix D of the PPA; |
| <b>Tenaga Nasional Berhad</b>       | means a limited liability company incorporated under the Companies Act, 1965 (Company Registration No. 200866-W);  |
| <b>TNB Interconnection Facility</b> | means the existing TNB’s substation (including but not limited to any extension works required to be completed by the SPP at such TNB’s substation) or new TNB’s substation, as described in Section 3.4   |

| Term  | Definition   |
|---|--|
|   | hereunder and as further described in the PPA;   |
| <b>TNB Metering Equipment</b>                           | means the main and back-up metering equipment and devices (including telemetering equipment and software) as further described in the PPA, owned by TNB for the measurement of net electrical output and electrical energy delivered to the Grid System at the applicable Interconnection Point from the Facility; |
| <b>Transmission Network</b>                             | The transmission lines, substations and other associated plant and apparatus operating at 132kV or above in Peninsular Malaysia, Sabah and Labuan; and   |
| <b>Transmission System Reliability Standards (TSRS)</b> | as defined in the <b>Grid Code</b> .   |

# 1. Introduction

---

The Guidelines have been prepared by ST and shall form part of the RFP document.

This edition of the Guidelines serves to provide guidance to the prospective SPP seeking connection to the Transmission Network in the Peninsular Malaysia. The Guidelines comprise of nine (9) sections covering the following topics:

- (i) Introduction;
- (ii) Scope and Limitation;
- (iii) Connection to The Grid System;
- (iv) Power System Study (PSS);
- (v) PPA Aspects;
- (vi) Appendix B of PPA Requirements;
- (vii) Requirement for Tests of the Facility;
- (viii) Operation of Transmission-Connected LSS; and
- (ix) Despatch Forecast.

The content of the Guidelines was prepared based on Prudent Utility Practice and experiences with the existing generators.



## 2. Scope and Limitation

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### 2.1. Description of Transmission-connected LSS

The LSS that is allowed to be connected to the Transmission Network shall be of the capacity of 30MW<sub>ac</sub> to 50MW<sub>ac</sub> via one Interconnection Point.

Therefore, if SPP owns more than one (1) LSS at different sites but connected to the TNB Interconnection Facility via one Interconnection Point, with cumulative capacity of 30MW<sub>ac</sub> to 50MW<sub>ac</sub> such LSS shall be connected to the Transmission Network as illustrated in Figure 1 below:

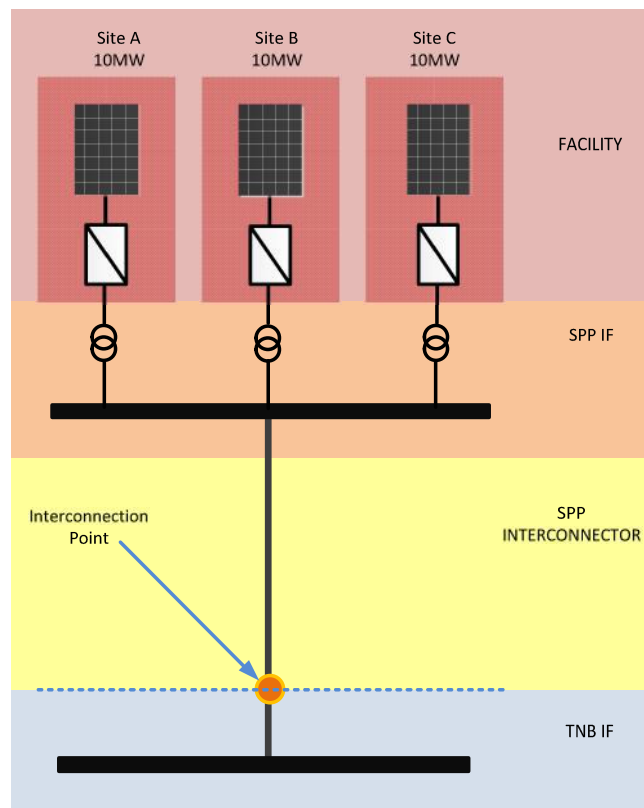


Figure 1: Example of Transmission-Connected LSS

## **2.2. Scope of the Guidelines**

The scope of the Guidelines is limited to LSS connected to Transmission Network in Peninsular Malaysia and does not cover the following:

- LSS connected to the Transmission Network and Distribution Network in Sabah and Labuan;
- LSS connected to the Distribution Network in Peninsular Malaysia; and
- LSS with energy storage system.

The Guidelines is not intended to cover all required authorizations, permits and/or licenses which the SPP is required to obtain from the relevant bodies and/or authorities for the purpose of the development of Transmission-connected LSS.

The SPP shall, at its own costs, be fully responsible for the inspection, examination, checking and verifying the accuracy, correctness and completeness of any and all data as to the site and its surroundings and the nature of the climatic, geological, soil and general conditions of the site as well as the nodes as identified by the Grid Owner in order to meet the requirements of its Power Purchase Agreement. The SPP shall also, at its own costs, be responsible to obtain, maintain and renew all authorizations, permits and licenses necessary for it to develop the Transmission-connected LSS and to otherwise perform its obligations under its Power Purchase Agreements or any other Project Documents and comply with all conditions and requirements as may be imposed or prescribed by any relevant bodies and/or authorities which has jurisdiction over the development of Transmission-connected LSS. The Grid Owner shall bear no responsibility for any error, inaccuracy or omission of any kind and no warranty or representation is given in respect thereof. Each SPP accepts full responsibility for conducting an independent analysis of the accuracy, correctness and completeness of any and all data and for gathering and presenting all necessary information.

## **2.3. Timeline and Other Data Requirement**

The indicative timeline for connection of the LSS to the Transmission Network and the requirement for submission of technical information during the submission of proposal are described in the Attachment A and Attachment B of the Guidelines respectively.

## 3. Connection to the Grid System

---

### 3.1. Background

In general, the connection can be made at any point of the Grid System to enable the export of power generated by the Transmission-connected LSS. However, the capacity of the Grid System to accept exported power from a Transmission-connected LSS will depend on the existing network infrastructure and current use of the system. The rating of overhead lines, cables and transformers will be an important factor in assessing the connection capacity available. Switchgear fault levels and protection settings may also be affected by the connection of a Transmission-connected LSS. In addition, the proximity of the transmission infrastructure to the Transmission-connected LSS is vital to ensure the cost associated with the grid connection would not be prohibitive for the developer to implement.

### 3.2. Connection Voltage Level

Currently the Grid System in Peninsular Malaysia consists of three voltage levels namely the 132kV, 275kV and 500kV. The 275kV and 500kV are mainly used for bulk transfer of electrical power from large generating power plants to substations located near demand centers.

It is envisaged that the power generated by the Transmission-connected LSS would be consumed locally, thus the connection shall be at the 132kV voltage level only. Aside from a lower associated equipment cost, the connection at 132kV voltage will ensure that the reliability and security of the bulk power highway are not affected.

### 3.3. Connection Schemes

There are two (2) possible connection schemes for Transmission-connected LSS:

- (i) Option 1: Connection Scheme to Existing Substation
- (ii) Option 2: Connection Scheme to Nearest Existing Transmission Line

The connection method to the Grid System can be either through overhead transmission line or underground cable. The capacity of the connection shall be appropriately designed to cater for power export to the Grid System. The scheme shall allow the connection to be fully switched thus ensuring the reliability and security of the Grid System.

Subject to the results of the PSS, the Grid Owner will decide the most appropriate point of connection and the voltage level. Please refer to the next section for the details on PSS.

### 3.3.1 Option 1: Connection Scheme to Existing Substation

The connection to the identified existing substation or TNB Interconnection Facility is permissible subject to the availability of space for the extension of busbars for new full bays, inclusive of the space for new control relay panel in the substation building. It shall be built, designed and constructed by the SPP in accordance with TNB's specifications which will be provided by the Grid Owner. The new bay/bays shall be handed over to the Grid Owner for the operation and maintenance of the equipment upon successful commissioning.

This type of connection is as illustrated in Figure 2 below.

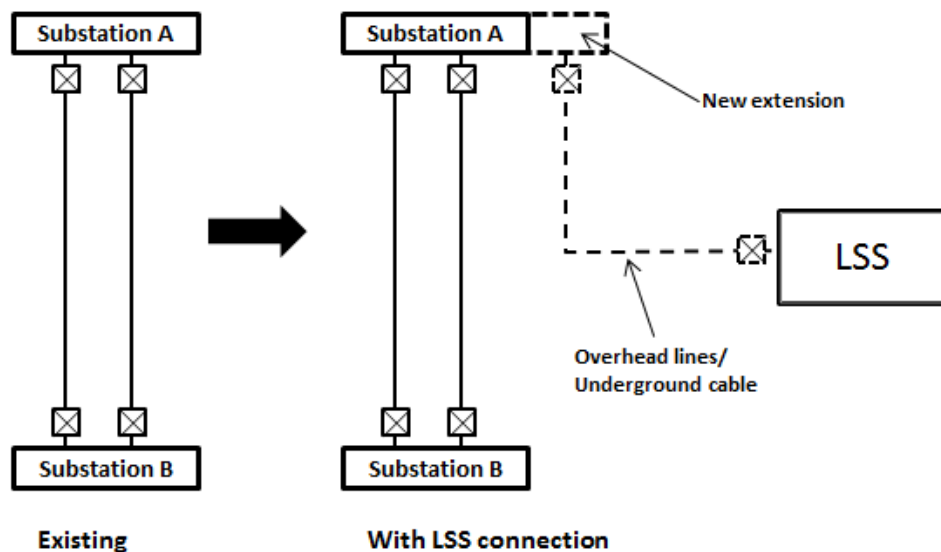


Figure 2: Option 1- Connection to the Existing Substation

### 3.3.2 Option 2: Connection Scheme to Nearest Existing Transmission Lines

In the event that the possible connection to the Grid System is to the nearest existing overhead transmission line or underground cable, a new switching station is required to facilitate a fully switched connection. The existing overhead transmission lines or underground cable circuits shall be looped-in-looped-out and connected via overhead transmission lines or underground cable into the newly established switching station. The newly established switching station or new TNB Interconnection Facility shall be built, designed and constructed by SPP in accordance with TNB's specifications. The specifications shall be obtained from the Grid Owner. The new TNB Interconnection Facility shall be handed over to the Grid Owner for the operation and maintenance of the equipment upon successful commissioning.

This type of connection is as illustrated in Figure 3.

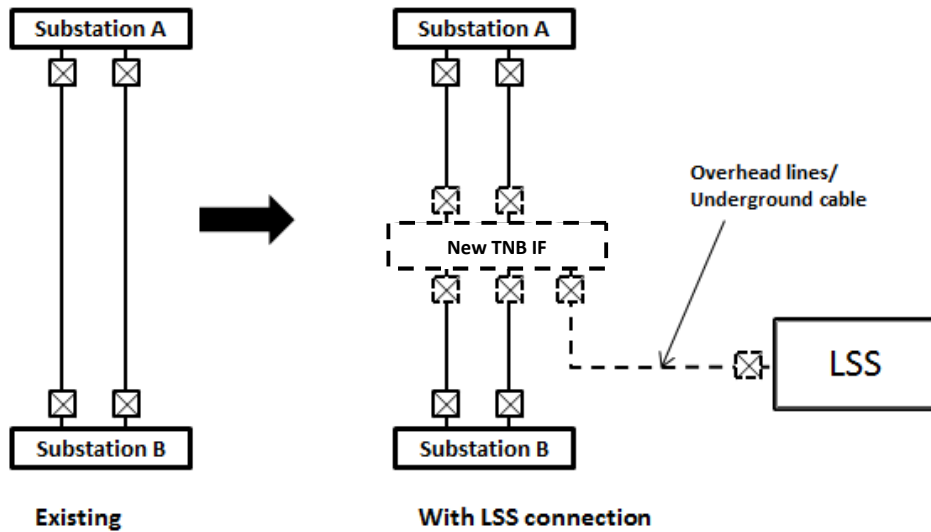


Figure 3: Option 2- Connection to Nearest Existing Transmission Lines

### 3.4. Scope of Works & Asset Demarcation

In accordance with Clause CC4.3 of the MGC, the SPP shall to propose the connection scheme to the Grid Owner for approval. The connection to the Grid System can be either through overhead transmission line or underground cable.

The SPP shall, at its own cost and expense, be fully responsible for the following:

- (a) the land acquisition and obtaining necessary permits from relevant local authorities, relating to the parcels of land required for the Facility, SPP Interconnection Facility, SPP Interconnector and SPP Works; and
- (b) the design, procurement, construction, commissioning, testing and completion of the followings:
  - (i) Facility
  - (ii) SPP Interconnection Facility;
  - (iii) SPP Interconnector; and
  - (iv) SPP Works which comprise the following:
    - a. For option 1:
      - i. Extension of main and reserve busbars work at existing TNB Interconnection Facility;
      - ii. Establishment of full bay/bays for the SPP Interconnector; and
      - iii. Including works in item (c) below.

- b. For option 2:
  - i. Establishment of the new TNB Interconnection Facility which includes but not limited to main and reserve busbars, full bay/bays for connection of the SPP Interconnector and full bay/bays for out-going feeders connecting the new TNB Interconnection Facility to the two (2) single/double circuit (as determined by TNB) transmission lines;
  - ii. Substation control building, including civil works, (M&E) works and associated facilities;
  - iii. Two (2) single/double circuit (as determined by TNB) transmission lines connecting the new TNB Interconnection Facility to the nearest transmission lines (including loop-in-loop-out (“LILLO”) works for connection of new TNB Interconnection Facility to nearest existing transmission line; and
  - iv. Including works in item (c) below.
  
- c. For both option 1 and option 2:
  - i. Secondary equipment such as DC supply, control and relay panel, protection, auxiliary power and control cabling (APC), telecontrol, telecommunication, ICT and associated works;
  - ii. Substation earthing system and associated works which includes soil resistivity tests;
  - iii. Underground mapping for any underground cable routes;
  - iv. Power quality (PQ) recorders and its associated equipment;
  - v. TNB Metering Equipment; and
  - vi. Modifications or replacement of existing telecontrol and/or telecommunication equipment if required and protection relays retrofitting works in existing TNB Interconnection Facility and in existing TNB’s substations at both remote ends of the new TNB Interconnection Facility if required.

Details of the scope of works shall be read together with Appendix D of the PPA.

SPP shall, at its cost and expense, be responsible for any damage to the existing installation during extension works within the substation caused by the SPP or its agents; including any inadvertent tripping at the existing TNB substation’s which lead to TNB’s customer to demand for compensation.

SPP is fully responsible to own, operate and maintain:

- (i) Facility;
- (ii) SPP Interconnection Facility; and
- (iii) SPP Interconnector up to the Interconnection Point.

Upon successful commissioning and testing of the SPP Works, SPP shall transfer to TNB and take all actions necessary to effect the transfer of all rights, title and interest to the completed SPP Works, free from encumbrances and as further described in the PPA. All costs associated with the connection of Transmission-connected LSS to the Grid System, shall be borne by the SPP.

The Interconnection Point will be at the cable sealing end at the substation (in the case of underground cable connection) and at the line dropper (in the case of overhead line connection). Illustration of asset demarcation is as shown in Figure 4 to Figure 7 below.

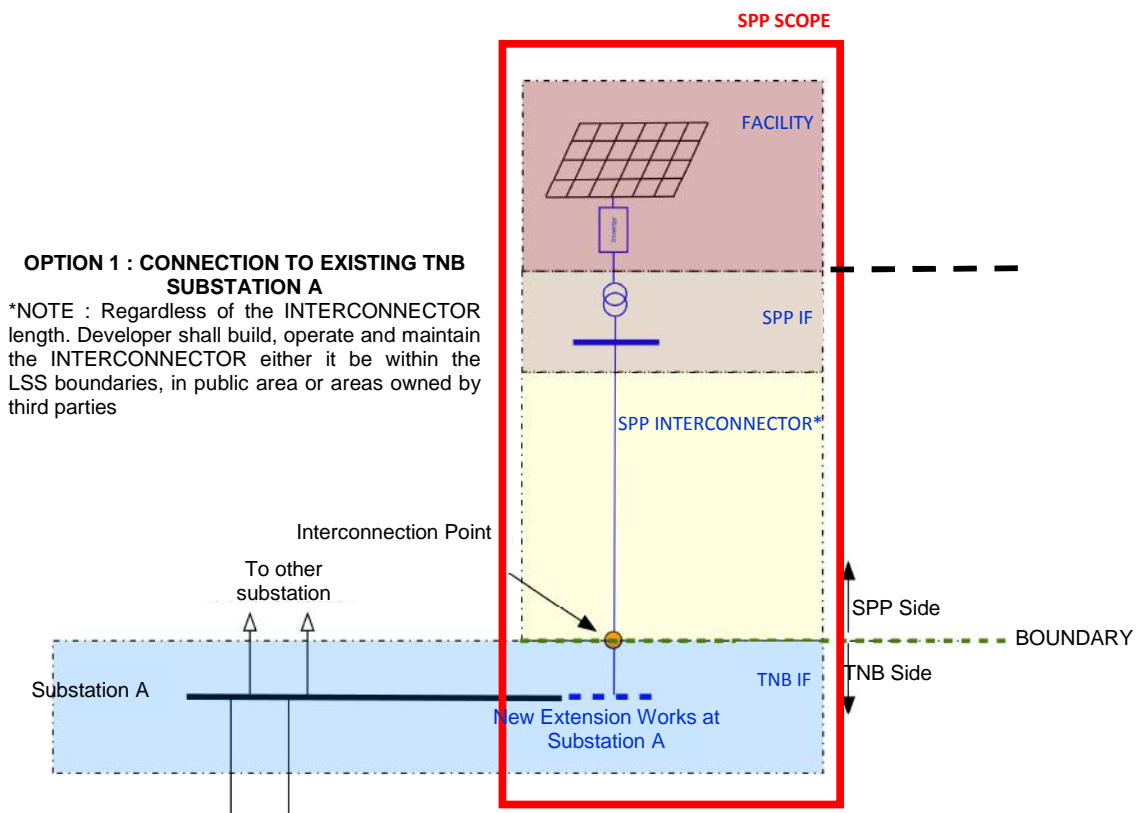


Figure 4: Scope of works & asset demarcation for Option 1

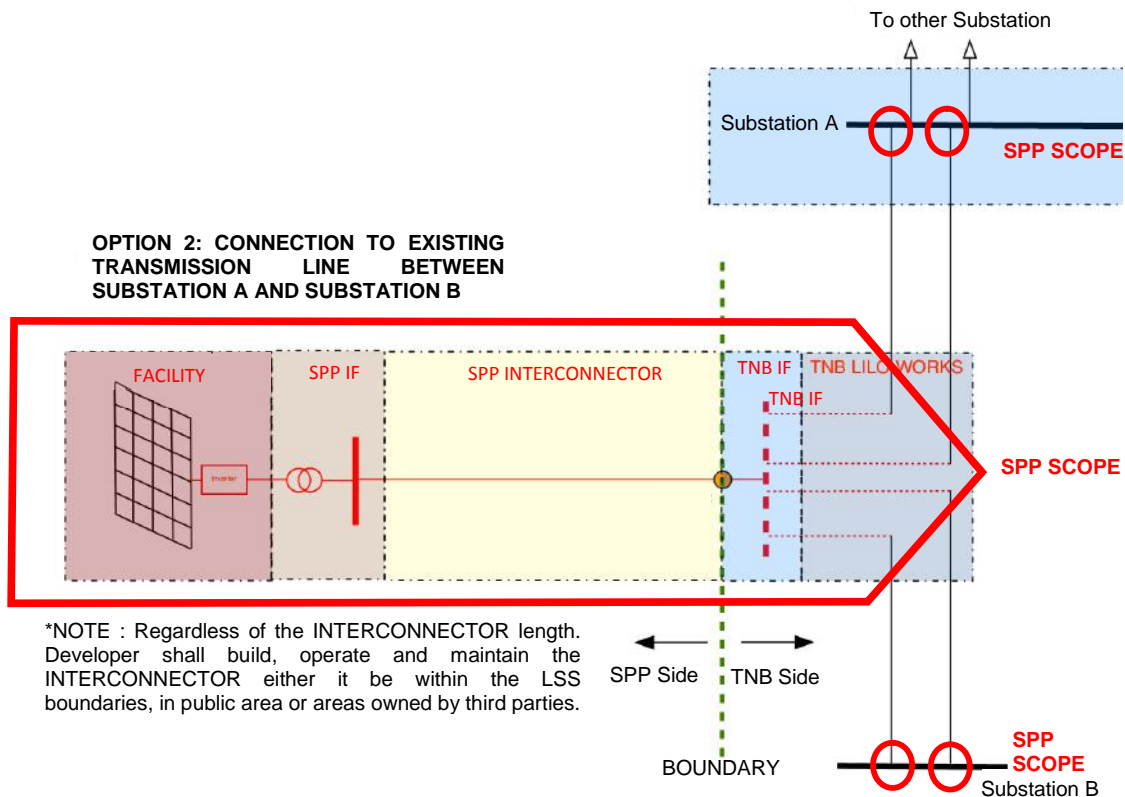


Figure 5: Scope of works & asset demarcation for Option 2

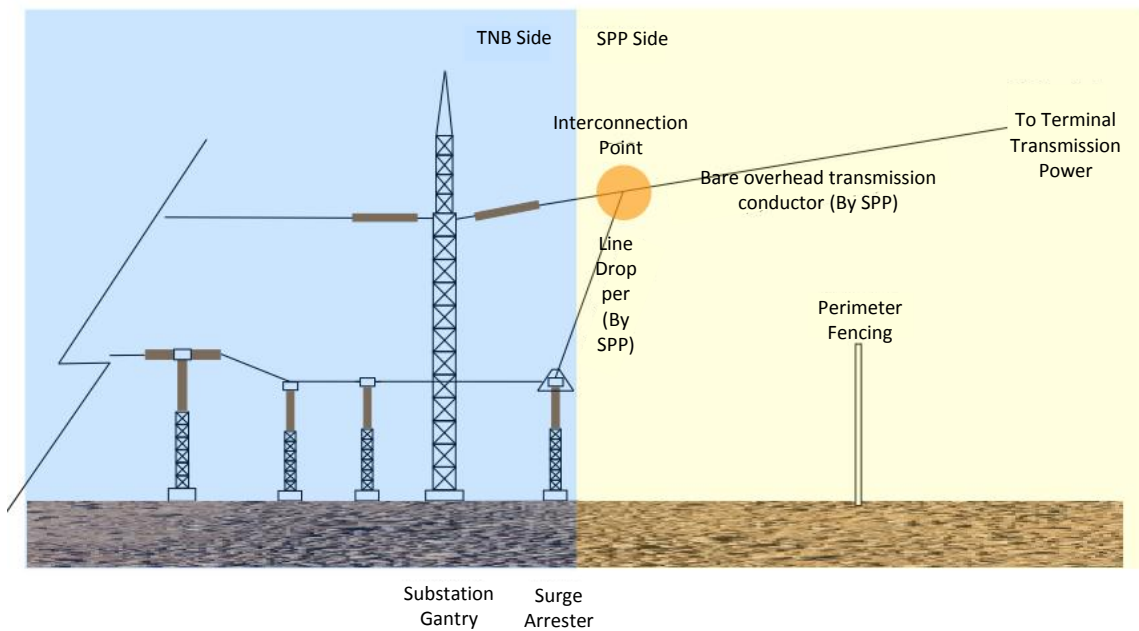


Figure 6: Interconnection Point for transmission line connection



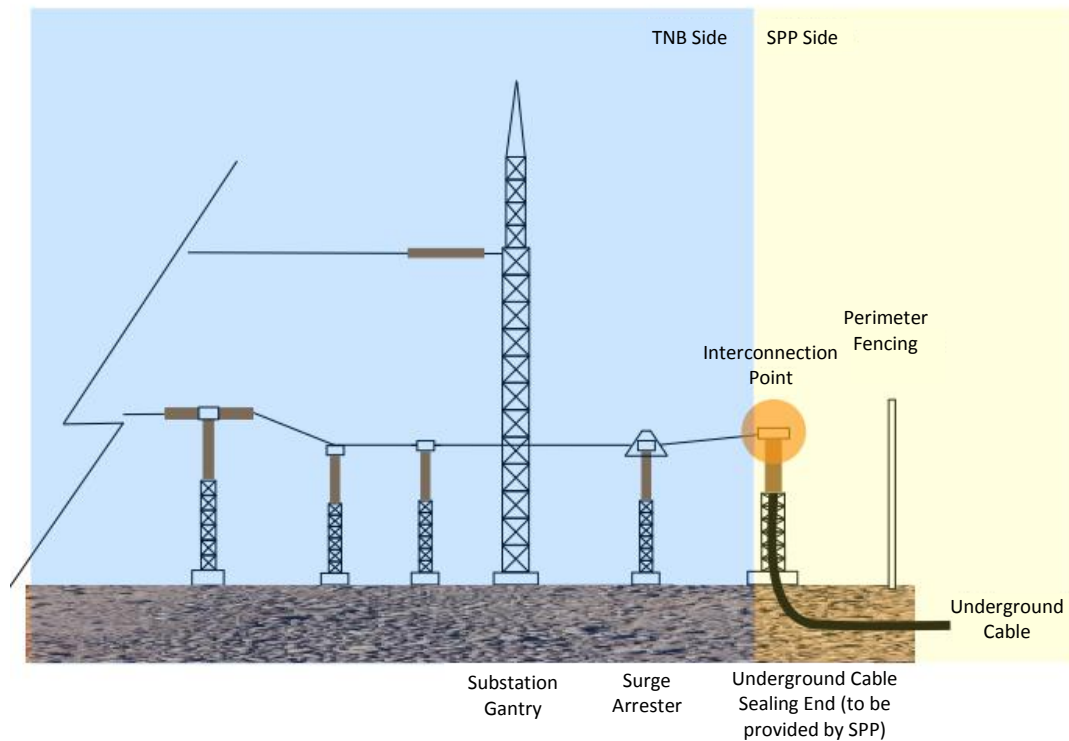


Figure 7: Interconnection Point for underground cable connection

TNB and SPP shall jointly prepare an Interconnection Operation Manual (IOM) which must be completed and signed off by both parties prior to the energizing of supply, the contents of which shall include but not limited to communications with respect to 132kV switching operations, boundaries, maintenance, authorized personnel and SPP's competent engineer (certified by ST). The IOM shall be reviewed by the parties involved from time to time and the parties may jointly revise the IOM by mutual written agreement. Upon such revision, the revised IOM shall apply.

### **3.5. Potential Zonal Nodes for Grid Connection**

For the purpose of facilitating the potential SPP, certain locations have been identified as possible zonal nodes for the grid connection. Please see Attachment C for the identified zonal nodes<sup>1</sup>.

SPP may connect their solar farm to the identified nodes or propose other nodes that deemed suitable to their solar farm site. Grid Owner will consider and provide approval (or disapproval) on the connection node.

The Grid Owner shall bear no responsibility for any error, inaccuracy or omission of any kind in respect of the nodes identified and proposed by the Grid Owner. Each SPP accepts full responsibility for conducting an independent analysis of the accuracy, correctness and completeness of any and all data and for gathering and presenting all necessary information.

<sup>1</sup>The identified zonal nodes may require acquisition of additional land by SPP to facilitate busbar extension. In general, spare bays at any existing substations are provisioned for future development.

## 4. Power System Study (PSS)

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### 4.1. Objectives of PSS

- (i) To identify connection scheme options (and configurations) for the Transmission-connected LSS to be connected to Grid System, taking into account the existing transmission infrastructure within the vicinity of the plant.
- (ii) To investigate the impact of the new interconnection to the Grid System as well as the impact of the Grid System to the operations of the plant.
- (iii) To assess the ability of the Transmission-connected LSS to comply with the technical requirements as stated in the Grid Code, specifically with the solar photovoltaic technology to be installed.

### 4.2. Scope of PSS

SPP, at its own cost and expense, is to conduct the PSS using simulation software available in the market such as Power System Simulator for Engineering (PSSE®) developed by Siemens PTI, USA. The Grid Owner is currently using PSSE® version 32.

PSS shall be conducted in two (2) stages:

- i. **Stage 1:** PSS using “generic” modeling of the Facility (including but not limited to the solar PV components), the SPP Interconnection Facility and the SPP Interconnector.

**Description:** Stage 1 of the PSS mainly verifies the impact on the existing Grid System, which can be analyzed based on relevant information of the Facility already known at the point of time.

**Submission:** Final report of Stage 1 PSS (revised for compliance to the Grid Owner’s recommendations) shall be submitted along with the RFP submission.

- ii. **Stage 2:** PSS using the actual modeling of the Facility (including but not limited to the solar PV components), the SPP Interconnection Facility and the SPP Interconnector taking into consideration the topology and converter type.

**Description:** Stage 2 of the PSS provides indicative evidence of the Transmission-connected LSS ability to comply with the MGC requirements based on the behavior of the Facility. Thus, the Facility (including but not limited to the solar PV components), the SPP Interconnection Facility and the SPP Interconnector needs to be modeled in greater details based on the design and technology used.

**Submission:** Final report of Stage 2 PSS (revised for compliance to the Grid Owner’s recommendations) shall be submitted no later than sixty (60) days prior to the Commencement Date for approval by the Grid Owner.

Both stages of the PSS are to include, but not limited to, the following scopes:

**Table 1: Scope of PSS**

| No | Item                          | Description / Requirements   | Criteria to benchmark |
|----|-------------------------------|--|-----------------------|
| 1  | <b>Power-flow Analysis</b>    | <ul style="list-style-type: none"> <li>• To evaluate the Grid System’s adequacy to accommodate the energy delivered by the Facility without violating the thermal loading of transmission elements (eg. overhead line, underground cable, transformer etc.) under both normal conditions and N-1 contingencies.</li> <li>• Power flow shall consider various operating conditions / scenarios to reflect the Facility’s intermittency behavior.</li> </ul>   | TSRS Clause 4.10      |
| 2  | <b>Contingency Analysis</b>   | <ul style="list-style-type: none"> <li>• To identify the performance of the Grid System with respect to the power-flow and voltage during loss of transmission element and to determine the need for reinforcements to allow the connection of the Facility to the Grid System.</li> </ul>   | TSRS Clause 4.11      |
| 3  | <b>Short Circuit Analysis</b> | <ul style="list-style-type: none"> <li>• To provide short circuit ratings data for the selection of equipment.</li> <li>• To identify mitigations to ensure short circuit fault level remains within limits.</li> <li>• To calculate the maximum short circuit fault current contribution from the Facility at the Interconnection Point in the event of single-phase fault to ground fault, phase to phase fault and bolted three-phase fault events.</li> <li>• IEC 60909 calculation method is to be used.</li> </ul> | TSRS Clause 4.7       |

| No | Item  | Description / Requirements   | Criteria to benchmark                                 |
|----|---|--|---|
| 4  | <b>Transient Stability Analysis</b>                   | <ul style="list-style-type: none"> <li>• To identify the Grid System’s capability to remain stable and maintain synchronism following a relatively large disturbance arising from loss of transmission elements or generation facilities.</li> </ul>   | TSRS Clauses 4.5 and 4.11                             |
| 5  | <b>Fault Ride-Through Capability</b>                  | <ul style="list-style-type: none"> <li>• To identify the fault ride-through capability of the Facility (monitored at the Interconnection Point) for faults that may occur in the Grid System including but not limited to (i) three phase fault for 150ms at the Interconnection Point; and (ii) single phase fault for 300ms at the Interconnection Point.</li> <li>• To identify solar photovoltaic inverters’ performance upon fault clearance.</li> <li>• To identify critical fault clearing time for ensuring the Grid System remains stable.</li> <li>• To verify the AC voltage recovery of the Facility under dynamic conditions and such scenarios as mutually agreed by TNB and SPP.</li> </ul> | TSRS Clause 4.6                                       |
| 6  | <b>Reactive Power Requirements</b>                    | <ul style="list-style-type: none"> <li>• To assess the profile of transmission voltage at the grid interconnection point and its vicinity</li> <li>• To determine the necessity (if any) to install reactive power compensation equipment to meet the requirements.</li> </ul>   | TSRS Clause 4.2                                       |
| 7  | <b>Quality of Service (Power Quality Requirement)</b> | <ul style="list-style-type: none"> <li>• To assess power quality (PQ) at the Interconnection Point during parallel operation of the Facility in the Grid System and to determine mitigations and/or modification to ensure the PQ at the Interconnection Point remains within the allowable limits as specified in the following standards:               <ol style="list-style-type: none"> <li>a) Voltage harmonics (Engineering Recommendation ER G5/4-1);</li> <li>b) Phase voltage unbalance (Engineering Recommendation P29);</li> <li>c) Voltage fluctuation and flicker</li> </ol> </li> </ul>   | Refer standards listed under Description/Requirements |

| No | Item | Description / Requirements  | Criteria to benchmark |
|----|------|---|-----------------------|
|    |      | <p>(Engineering Recommendation P28);</p> <p>d) Current harmonics (as per IEC 61727-2004 Table 1); and</p> <p>e) Direct current (DC) injection limits (as per IEEE 1547 Clause 8.3.1).</p> <ul style="list-style-type: none"> <li>The study shall utilize PQ data from the first field measurement test as further described in Appendix B of the PPA. Such test shall be conducted at the existing TNB's substation(s) depending on configuration of the Facility's connectivity to the Grid System (i.e.) either Option 1 or Option 2 as described in Section 3.3 of the Guidelines.</li> </ul> <p>To determine the necessity (if any) of modification to the design of the Facility and/or to install filters/compensation equipment to meet the PQ requirements.</p> |                       |

### 4.3. Guideline and Criteria to be used for PSS

The PSS is to be conducted in accordance with the MS 2572:2014 “Guidelines for power system steady state, transient stability and reliability studies”, Engineering Recommendation ER G5/4-1 (for harmonics), Engineering Recommendation P29 (for phase voltage unbalance) and Engineering Recommendation P28 (for voltage Fluctuations and flicker). The results of the PSS are to be benchmarked against relevant clauses in the MGC, TSRS and the standards as specified in Table 1 (Scope of PSS) above. Any violation to the codes and standards due to the Transmission-connected LSS’ connection to the Grid System are to be highlighted in the report and mitigation option is to be proposed accordingly.

A copy of the MGC and TSRS can be obtained from the official portal of the Commission. SPP shall obtain the other specified standards for the PSS at its own expense.

### 4.4. Grid System Data for the PSS

PSS is to be conducted by the SPP after obtaining the approval from Commission for the RFQ. Upon request by SPP, Grid System data will be provided by the Grid Owner subject to signing of Non-Disclosure Agreement (NDA) between the party that will perform the study and the Grid Owner. The Grid System data will be provided for the requested year of study in a format compatible with PSSE®, simulation software by Siemens PTI.

SPP should take note that fifteen (15) business days are required for the finalization of the terms and conditions of the NDA. The stamping cost for the NDA shall be fully borne by the SPP.

#### **4.5. Study Report Submission & Content**

Upon completion of the Stage 1 PSS, a report shall be prepared and submitted to the Grid Owner for their review of the grid connection scheme and point of connection. The Stage 1 PSS report shall, (at the minimum), encompass the following details:

- (i) Methodology of the study/analysis;
- (ii) Simulation models used (together with verification of models);
- (iii) Results and findings in form of table listing, plots, etc. are to be benchmarked against the criteria as stated in the MGC, TSRS and the relevant standards stipulated above in Table 1: Scope of PSS of section 4.2 in the Guidelines; and
- (iv) The PSS report shall include recommendations (if applicable) but not limited to any modification to the Facility's design, filters and/or compensation equipment.

The Grid Owner shall provide its decision on the connection scheme and reinforcement no later than forty-five (45) days after the date of submission of the Stage 1 PSS report by the SPP. Upon request by the Grid Owner, SPP shall clarify the findings of the Stage 1 PSS report. Any recommendations by the Grid Owner on the Stage 1 PSS report shall be complied with by SPP. Such recommendations made by the Grid Owner shall be included in the final Stage 1 PSS report and shall be submitted to Grid Owner for their written approval.

Submission of the final Stage 1 PSS report and RFP to the Commission is subject to the following conditions:

- (a) the SPP has received final and unconditional approval from the Grid Owner; and
- (b) the submission of the final Stage 1 PSS report and Request For Proposal must be accompanied by a letter evidencing that final and unconditional approval from the Grid Owner as referred to in Section 4.5 (a) above has been obtained.

#### **4.6. Validity Period of the Stage 1 PSS Report**

SPP may seek clarification with the Grid Owner in the event the SPP intent to utilize the same final Stage 1 PSS report for future bidding exercises, if any.

For such case, the Stage 1 PSS report, as approved by the Grid Owner shall be valid for three (3) years from the date of submission subjected to the following conditions:

- Same connection point / connection scheme / capacity
- Load levels at the vicinity of the studied site does not show major changes
- Generation plant-up within the vicinity of the studied site that may affect the system stability
- The adequacy of transmission facilities

#### **4.7. Submission of Transmission-connected LSS Simulation Models and Models Validation**

Generally, models are used to represent the full power system for simulation studies relating to planning and operation of the Grid System. Simulation studies are sometimes required where it is impractical to demonstrate capability through testing as the consequence to the overall Grid System is intolerable. Currently, all transmission components and generators connected to the Grid System are modeled based on what are installed at site.

Prior to the Effective Date, the successful SPP shall submit models of the Transmission-connected LSS to be connected to the Grid System together with the “Committed Project Data” and “Contracted Project Data” which are part of the requirements of Form A which is specified in section 4.8 below and further detailed in the PPA. At the minimum, the models shall represent the following behavior and/or control system:

##### **1. Steady-state models:**

- Aggregate generator model (lumped inverter)
- Single lumped unit transformer
- Equivalent reticulation impedance
- Single transformer

##### **2. Dynamic models:**

- Time varying irradiation profile
- DC power output of the PV panels for the given level of irradiation
- Maximum power point tracker (MPPT) control (if installed)
- Electrical control of the PV inverter
- Limiters applicable to the inverter

All submitted models are to be provided together with the relevant documentations, which includes the following:

- Description of the models and associated parameters to be used;
- User operation manuals, which detail out the operational procedures specific for the model such as data setting up etc.;
- User application guides;



- Model block diagrams; and
- Input data format and associated values of parameters.

All submitted models and associated parameters shall be validated or verified through site test and/or measurement. Responses of the models acquired from simulation shall reasonably in agreement with the corresponding actual response measured at site (within 10% error). In the event that the model does not produce the correct output, the model submission requirement will not be considered as complete until the errors are rectified. A specific section shall be included in the model documentation that discuss the results comparison between simulated and site test/measurement (to be shown in plots where applicable).

If it is not possible to represent the behavior or response of the Transmission-connected LSS using 'standard' models available in the simulation software (with 10% error), the SPP is to develop appropriate 'user defined' model. It is encouraged that the SPP to work collectively with the manufacturers to develop a 'standard' models for most commonly used solar PV technology.

Prior to the Initial Operation Date, the SPP shall submit the fully validated models together with the "Registered Data" which is further detailed in the PPA.

## 4.8. Data Submission

In accordance with the MGC, the successful SPP is to submit connection application form (Form A) to the Grid Owner. Prior to the Effective Date, duly filled connection application form is to be submitted together with relevant information on the Transmission-connected LSS. Details on the grid connection application form (Form A) can be obtained from the Grid Owner at the following contact details:

Transmission Planning Department  
 Transmission Division,  
 Level 1, Bangunan NLDC,  
 Tenaga Nasional Berhad,  
 129, Jalan Bangsar,  
 59200 Kuala Lumpur.

Attention : General Manager  
 Telephone : +603 - 2296 6812  
 Facsimile : +603 - 2282 4723

## 5. PPA Aspects

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This section highlights some of the salient points of the PPA.

### 5.1. Relevant Salient Terms of a Transmission-connected LSS PPA

a. Established Capacity

The Established Capacity must be not less than 30MW<sub>ac</sub> but not more than 50MW<sub>ac</sub>.

b. Facility Type

This is a solar photovoltaic facility.

c. Terms of the PPA

The period of the PPA shall be 21 years.

d. Type of Concession

The type of Concession is Build, Own and Operate (BOO) by the SPP itself.

e. Maximum Annual Allowable Quantity

The MAAQ (in kWh) is determined based on the capacity of the plant, the capacity factor and the number of hours in a year. Such MAAQ shall be approved by ST.

Energy produced annually by the Facility is capped at the agreed MAAQ in terms of payment of the Energy Rate. If MAAQ is exceeded, lower rate is applicable (Excess Energy Rate).

f. Energy beyond Established Capacity

Established Capacity shall depend on the bid submitted and subject to the approval of the Commission. Any energy produced above the Established Capacity shall be free of charge.

g. Type of PPA

An energy only PPA.

h. Extra Conditions Precedent to the Effectiveness of PPA\*

(i) Submission of PSS report \*\*

(ii) Submission of certified and executed site agreement\*\*\*

*Remarks:*

\*Both conditions may not be relevant if the PSS has been completed and submitted with RFP tender.

\*\*PSS shall be submitted together with submission of RFP.

\*\*\*Site agreement is preferred over Land Title as the estimated time for issuance of a Land Title is expected to be longer – may involve issue of conversion of type of land use etc.

## 5.2. Project Timeline

The indicative project timeline for a Transmission-connected LSS is shown in Attachment A of the Guidelines.

## 5.3. Delay Compensation

a. Failure to achieve Scheduled Commercial Operation Date (SCOD)

SPP shall compensate TNB an amount equal to Ringgit Malaysia calculated by multiplying the Established Capacity with RM2,000.00 per day for each day following the SCOD of the Facility until the earlier of;

(i) the COD;

(ii) the date the PPA is terminated by TNB in accordance with the provision of the Power Purchase Agreement; or

(iii) one hundred and eighty (180) days after the SCOD.

b. Abandonment of the project

If SPP abandons the project after the Effective Date, SPP shall forthwith compensate TNB an amount equal to Ringgit Malaysia calculated by multiplying the Established Capacity with RM2,000.00 and 180 days.

## 6. Appendix B of PPA Requirements

In general, the SPP shall adhere to the requirements as stipulated in the MGC and the TSRS. The Appendix B of the PPA details out the salient requirements extracted from the relevant clauses in the MGC or other standards which are summarized as follows:

Table 2: Appendix B of PPA requirement

| No | Requirements  | MGC/Other Standards corresponding clause   |
|----|---|--|
| 1  | <b>Grid Frequency Variation</b> – The Facility to remain operational in the range of frequency stipulated in the MGC.   | <ul style="list-style-type: none"> <li>MGC CC6.4.2.3</li> </ul>                        |
| 2  | <b>High Frequency MW Response</b> – The Facility shall have active power output frequency response capability in accordance to the limits stipulated in the MGC.  | <ul style="list-style-type: none"> <li>MGC CC6.4.2.3</li> </ul>                        |
| 3  | <b>Reactive Power Capability</b> – The Facility shall be capable to provide the reactive power at the connection as shown in the graph stipulated in the MGC.   | <ul style="list-style-type: none"> <li>MGC CC6.4.2.1</li> <li>MGC CC6.4.2.5</li> </ul> |
| 4  | <b>Grid Voltage Variation</b> – The Facility shall be capable of operating continuously for the voltage variations as stipulated in the MGC and TSRS.   | <ul style="list-style-type: none"> <li>MGC CC6.2.4</li> <li>TSRS Clause 4.2</li> </ul> |
| 5  | <b>Grid System Fault Level</b> – The Facility shall be capable to withstand the Grid System’s fault as stipulated in the TSRS.  | <ul style="list-style-type: none"> <li>TSRS Clause 4.7</li> </ul>                      |
| 6  | <b>Fault Detection and Clearing Limits</b> - The Facility shall be capable of operating continuously for faults in the Grid System cleared within the times stipulated in the TSRS.   | <ul style="list-style-type: none"> <li>TSRS Clause 4.6</li> </ul>                      |
| 7  | <b>High Speed and Delayed Auto-Reclosing</b> - The Facility shall remain operational on the Grid System without tripping and adverse behavior during and after the operation of the auto re-closing equipment in the Grid System. | <ul style="list-style-type: none"> <li>MGC CC6.3.4.11</li> </ul>                       |

| No | Requirements  | MGC/Other Standards corresponding clause   |
|----|---|--|
| 8  | <p><b>Restart and Delivery of Energy to Grid System</b> – SPP may provide auto-reclose facility for the SPP’s Interconnector. For such case, in the event of disconnection from the Grid System due to tripping of the SPP Interconnector, the Power Park Module’s interconnector shall be capable of restart and delivery of energy to the grid system upon successful auto-reclose or manual reclose of the SPP Interconnector. SPP shall notify the GSO prior to such delivery of energy from the Facility to the Grid System upon successful reclosing of the SPP Interconnector.</p>   |  |
| 9  | <p><b>Ramp Rate</b> – The Facility shall be capable of operating within the ramp rate as stipulated in the PPA during Despatch Instruction, normal load variation, start-up and shut down.</p>  | <ul style="list-style-type: none"> <li>• MGC CC6.4.12</li> </ul>   |
| 10 | <p><b>Protection System of Facility</b> – The SPP shall ensure sufficient protection systems in accordance with the requirements of the PPA and MGC to prevent or limit damage to its generation and auxiliary equipment.</p>   | <ul style="list-style-type: none"> <li>• MGC CC6.3.4</li> </ul>  |
| 11 | <p><b>Quality of Service</b> – The SPP shall ensure that the power quality (PQ) at the Interconnection Point shall not exceed the limits associated with PQ as follows:</p> <p>(a) Voltage Harmonics (Engineering Recommendation ER G5/4-1)</p> <p>(b) Phase voltage unbalance (Engineering Recommendation P29)</p> <p>(c) Voltage fluctuation and flicker (Engineering Recommendation P28)</p> <p>(d) Current harmonics ((as per IEC 61727-2004 Table 1); and</p> <p>(e) Direct current (DC) injection limits (as per IEEE 1547 Clause 8.3.1).</p> <p>SPP shall provide PQ recorders at the TNB Interconnection Facility. The SPP shall also install PQ recorders at the Facility for continuous PQ monitoring (i.e. harmonics, phase voltage unbalance, voltage</p> | <ul style="list-style-type: none"> <li>• PQ standards in TSRS</li> <li>• Engineering Recommendation (ER) G5/4-1, ER P29 &amp; ER P28.</li> <li>• Testing in accordance to IEC 61000-3 series (and its amendments).</li> <li>• Field measurement for voltage flicker shall use an equipment which meets the requirements of IEC 61000-4 series (and its amendments).</li> <li>• IEC 61727-2004 Table 1</li> <li>• IEEE 1547 Clause 8.3.1</li> </ul> |

| No | Requirements  | MGC/Other Standards corresponding clause   |
|----|---|--|
|    | fluctuation and flicker, current harmonics and direct current (DC) injection limits), accurate determination and reporting of any PQ issues within the Facility. SPP shall submit such PQ reports upon request by TNB.  |  |
| 12 | <b>Fault Ride Through</b> – The Facility shall be capable of fault ride through capability as stipulated in MGC.  | <ul style="list-style-type: none"> <li>• MGC CC6.4.15.2</li> </ul>   |
| 13 | <b>Philosophy of Plant Design &amp; Redundancy</b> – Submission of conceptual design report of the Facility by SPP.   | <ul style="list-style-type: none"> <li>• MGC OC2.9</li> </ul>  |
| 14 | <b>Scope of Tests</b> – SPP to carry out tests to verify the technical requirements as stated in the Appendix B of the PPA prior to the COD.  |  |
| 15 | SPP to submit test procedure for TNB’s acceptance no later than 360 days before the IOD.  |  |
| 16 | SPP to submit test reports within 24 hours after each test.   |  |
| 17 | <b>Verification of Facility Parameters &amp; Characteristics</b> – SPP to submit complete information on the Facility’s model parameters and machine response characteristic data which clearly define and trustworthily represent the characteristics of operation of each component of the Facility, over the whole range of its capability. In addition, SPP shall conduct tests to verify the characteristics and values of submitted parameters to be used by TNB and the GSO in the system security assessment studies. | <ul style="list-style-type: none"> <li>• PCA.5</li> </ul>  |
| 18 | <b>Machine Model Validation</b> - Refer to section 4.7 of the Guidelines – SPP to submit the validation report for TNB’s and GSO’s review. TNB’s and GSO’s comments, if any, shall be incorporated by SPP in the revised validation report which shall be submitted together with the fully validated machine models prior to the COD.  | <ul style="list-style-type: none"> <li>• Data Registration Code Schedule 1</li> <li>• Refer to section 4.7 of the Guidelines.</li> </ul> |

| No | Requirements   | MGC/Other Standards corresponding clause |
|----|--|--|
| 19 | <b>Factory Acceptance Tests (FAT) Reports &amp; Type Test Reports</b> – SPP to submit the type test reports on major plant equipment no later than 90 days prior to the Commencement Date. SPP to submit the FAT reports no later than 30 days before the IOD. |  |

## 7. Requirement for Tests of the Facility

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### 7.1. Introduction

The requirement for tests of the Facility is detailed in Appendix B of the PPA. This section contains brief summary of the required tests which shall be conducted in accordance to the “Testing Guidelines for Power Park Modules in TNB Grid System”.

The “Testing Guidelines for Power Park Modules in TNB Grid System” has been developed and progressively updated based on the experience of TNB, the Single Buyer and the GSO to demonstrate compliance by Power Park Modules with the requirements of the MGC PPA or other contractual agreements with TNB.

The MGC (latest version 1/2015) has defined Power Park Module as **“A collection of one or more Non-Synchronous Generating Units (registered as a Power Park Module under the Planning Code) that are powered by an Intermittent Power Source, joined together by a System with a single electrical point of connection directly to the Transmission System. The connection to the Transmission System may include a DC Converter”**. Associated with this, a Power Park Unit is defined as an individual Generating Unit within a Power Park Module.

Any entity that is contracted to supply, install and commission and/or operate electricity solar photovoltaic energy generating facility will be referred to as ‘SPP’ for the purpose of this “Testing Guidelines for Power Park Modules in TNB Grid System” and would be required to comply with all the provisions pertaining to tests in the guidelines.

- (a) The tests are to be successfully completed by new Power Park Unit installations prior to commercial operation of the units in the Grid System. The tests which may have a significant impact on the Grid System can only be undertaken at certain times of the day and year. Other Tests may also be subject to timing constraints. SPP is required to submit advanced notification to TNB and the GSO of such tests, including commissioning tests and compliance tests in accordance with the PPA or other contractual agreements.
- (b) The scope of tests includes commissioning tests to be undertaken by SPP during a planned outage, forced outage and/or upon modifications to the control systems or plant that may affect their performance in the Grid System or their connection to the Grid System. SPP are required to notify the GSO and TNB in advance of their plans for such modification and seek the GSO’s advice on the required tests. Upon the GSO’s instruction, SPP shall schedule the required tests upon completion of the plant modifications, prior to or during the re-commissioning of the Power Park Units in the Grid System.



- (c) The tests also include certain compliance tests as specified in the Grid Code to be undertaken by SPP from time to time during commercial operation and shall be scheduled accordingly. The GSO may also notify SPP to conduct compliance tests to prove the security of the system. Upon such notification by the GSO, the SPP shall then schedule the tests accordingly.
- (d) The final settings as accepted by TNB (including protection settings, etc.) shall be implemented and tested. SPP shall not adjust or modify the settings during the term of the PPA unless with the prior written consent from the GSO.

The “Testing Guidelines for Power Park Module in TNB Grid System” document contains the minimum requirements to be followed by the SPP in implementing the tests. These test requirements are neither to be used as an all-inclusive step-by-step testing manual nor as replacement for manufacturer supplied Power Park Unit test procedures. At appropriate time or as specified in the PPA, SPP shall submit detail procedures for each test listed in this document.

The requirements shall not restrict the SPP from proposing alternative test procedures. However, where the minimum test requirements in this testing guidelines document are unable to be implemented, the SPP shall provide the necessary justifications to TNB and the GSO and propose suitable alternative test recommendations for TNB and GSO approval.

## 7.2. List of Tests

Table 3: Summary of Tests under “Testing Guidelines for Power Park Module in TNB Grid System”

| NO | TEST   | TEST REQUIREMENT   | CODES/<br>STANDARDS   |
|----|--|--|---|
| 1  | <b>Grid Frequency Variation and High Frequency MW Response</b> | To verify that Power Park Module, the associated Power Park Units and auxiliary system are able to operate continuously over the frequency changes within the range 52.0Hz to 47.0Hz, subject to appropriate availability of solar irradiation/light at the instant when such variations are required. | <ul style="list-style-type: none"> <li>• MGC CC6.4.2.3</li> </ul>   |
| 2  | <b>Fault Detection and Clearing Time Limits</b>                | To measure the minimum signal levels that imitate fault protection and demonstrate that the operating times of the high voltage side circuit breaker (HVCB) after the fault being detected by the Facility’s protection relays are within the limits.  | <ul style="list-style-type: none"> <li>• MGC CC6.3.4</li> <li>• MGC CC6.3.5</li> <li>• TSRS</li> </ul>  |
| 3  | <b>Quality of Service</b>                                      | To demonstrate the interconnection of the Power Park Module with the Grid System, at any time, shall not cause any reduction in the quality of service at the Interconnection Point.   | <p>The maximum allowable limits at the Interconnection Point shall comply with the following standards:</p> <ul style="list-style-type: none"> <li>(a) Harmonics (EA Engineering Recommendation ER G5/4)</li> <li>(b) Phase voltage unbalance (EA Engineering Recommendation P29)</li> <li>(c) Voltage fluctuation and flicker (EA Engineering Recommendation P28)</li> <li>(d) Current harmonics (IEC 61727 – 2004)</li> <li>(e) DC Current Injection (IEEE 1547)</li> </ul> |

| NO | TEST   | TEST REQUIREMENT  | CODES/<br>STANDARDS   |
|----|--|---|---|
| 4  | <b>Facility Parameters &amp; Characteristics</b> | To verify the Power Park Module parameters associated with the submitted simulation models and also to verify the design characteristics. SPP shall provide the test procedure for TNB's acceptance.  |   |
| 5  | <b>Machine Models Validation Test</b>            | To verify the submitted simulation models and associated parameters able to replicate the response of actual tests with reasonable tolerance of error. Refer to section 4.7 of the Guidelines for further clarification. SPP shall provide the test procedure for TNB's acceptance. | Tolerance between the responses of Power Park Module from simulation and the corresponding actual tests shall within 10%. |
| 6  | <b>Grid Voltage Variation</b>                    | To demonstrate that Power Park Module is capable of operating continuously for grid system voltage variations within the prescribed range specified in MGC.   | <ul style="list-style-type: none"> <li>• MGC CC6.2.4</li> </ul>   |
| 7  | <b>Reactive Power Capability</b>                 | To demonstrate Power Park Module is able to provide the full extent of its Reactive Power capability, without being unduly compromised by conservative limiter settings.  | <ul style="list-style-type: none"> <li>• MGC CC6.4.2.1</li> </ul>   |
| 8  | <b>Ramp Rate</b>                                 | To demonstrate that Power Park Module is capable of meeting the ramp rates as declared in the PPA.  | -   |

## 8. Requirements for Power Plant Controller (PPC)

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### 8.1. Background

A typical PV solar generation plant is composed of multiple individual “generators” connected to the electrical network via power electronics (inverters), rather than synchronous machines. The PV plant’s response to grid system disturbances is not similar to the inherent electromechanical dynamics of synchronous machines. Through sophisticated control functions, however, the PV plant is able to contribute actively to grid stability and reliability and operate effectively in the grid.

### 8.2. Plant Level Control Functions

A key component of a grid-friendly PV power plant is a plant-level controller, or generally known as Power Plant Controller (PPC). It is designed to regulate active and reactive power output from the PV plant, such that it behaves as a single large generator. While the plant is composed of individual inverters, with each inverter performing its own energy production based on local solar array conditions, the function of the plant controller is to coordinate the power output to provide typical large power-plant features such as active power control and voltage regulation (through reactive power regulation). The PPC provides the following plant-level control functions:

- i. Dynamic voltage and/or power factor regulation of the solar plant at the Point of Common Coupling (PCC)
- ii. Frequency control to lower plant output in case of over-frequency situation
- iii. Active power control following variation in irradiance
- iv. Ramp-rate controls to ensure that the plant output does not ramp up or down faster than a specified ramp-rate limit, to the extent possible
- v. Start-up and shut-down control.

The PPC implements plant-level logic and closed-loop control schemes with real-time commands to the inverters to achieve fast and reliable regulation. It relies on the ability of the inverters to provide a rapid response to commands from the plant controller. The commands to the plant controller can be provided through the supervisory control and data acquisition system (SCADA) human-machine interface (HMI) or even through other interface equipment, such as a substation remote terminal unit (RTU).

Figure 8 illustrates a block-diagram overview of the control system and its interfaces to other devices in the plant. The PPC monitors system-level measurements and determines the desired operating conditions of various plant devices to meet the specified targets. It manages capacitor banks and/or reactor banks, if present. It manages all the inverters in the plant, ensuring that they are producing the active and reactive power necessary to meet the desired settings at the Point of Common Coupling (PCC).

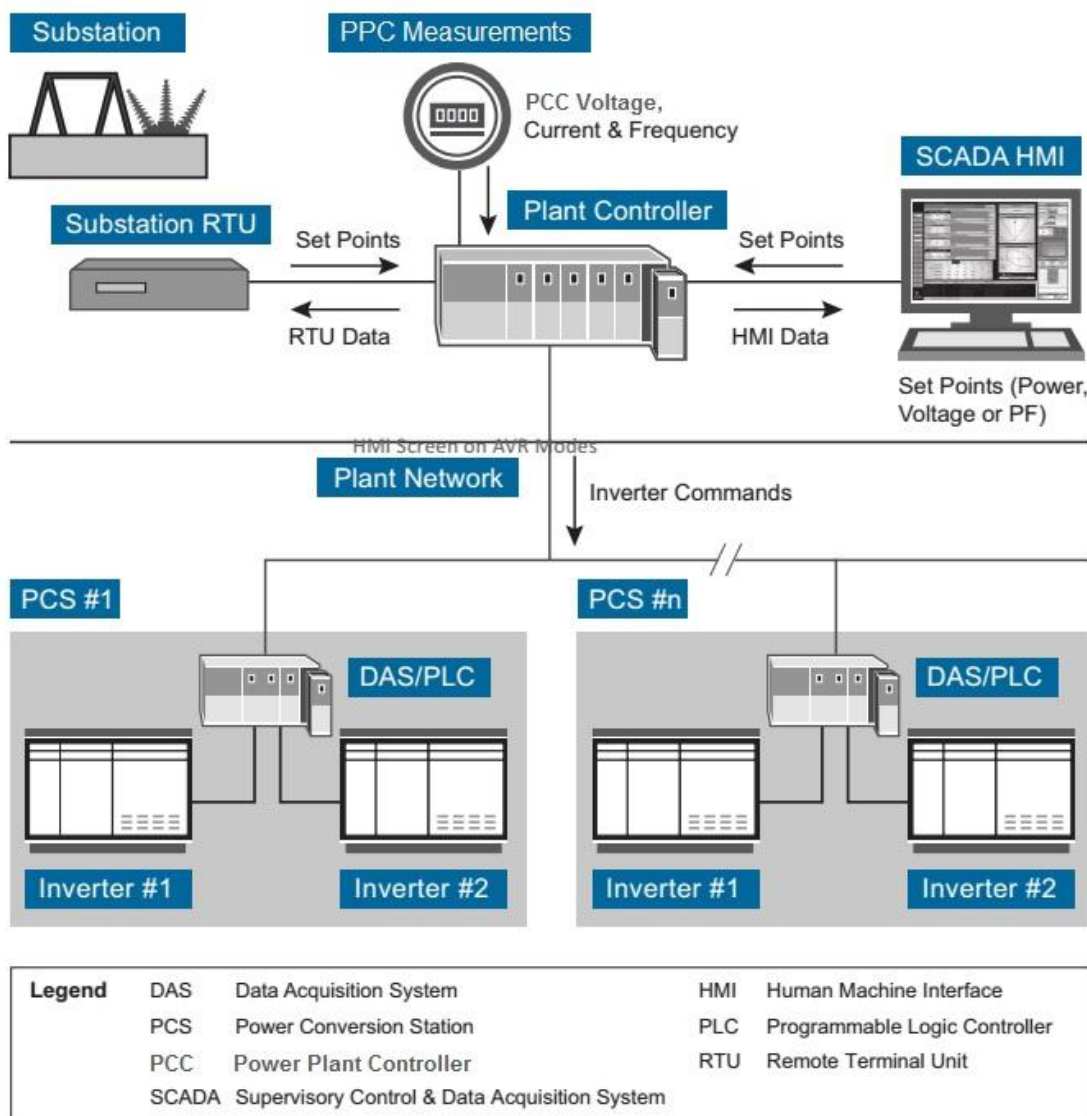


Figure 8: Plant Control System and Interfaces to Other Components

Advanced features such as voltage regulation, active power controls, ramp-rate controls, fault ride through, and frequency control within LSS power plants will provide intrinsic benefits of reliable plant operation in the Grid System. These “grid-friendly” capabilities, essential for

increased penetration of LSS power plants into the electric grid, are operational and available today for utility-scale PV plants ranging from several MW to several hundred MW. These advanced plant features enable solar PV plants to behave more like conventional generators and actively contribute to grid reliability and stability, providing significant values to utilities and GSO.

## 9. Operation of Transmission-connected LSS

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### 9.1. Despatch of the Transmission-connected LSS

The Transmission-connected LSS of 50MW<sub>ac</sub> is treated as CDGUs whereby the units are centrally despatched by the GSO in accordance with the MGC. However, for Transmission-connected LSS below 50MW<sub>ac</sub>, the GSO shall have the provision to issue Despatch Instruction i.e. directing the Facility to commence, increase, decrease, maintain or cease the generation and delivery of solar photovoltaic energy into the Grid System.

The Transmission-connected LSS shall be based on take and pay. The Transmission-connected LSS will be treated as a must run unit (not as per merit).

The Transmission-connected LSS shall be self-despatch up to its maximum output for any period with provisions for GSO not to accept delivery due to transmission or system security reasons.

### 9.2. Ramp Rate

The Transmission-connected LSS shall be able to automatically and manually control the ramp rate and limit the real power. This is to ensure stability of the system and prevent any power surge caused by sudden injection by the Facility.

The Transmission-connected LSS shall be capable to control the increase and decrease of power delivery within ramp rate of 15% per minute of rated capacity.

The Facility shall be able to regulate the ramp rate of the active power output for the following scenarios:

- (i) Despatch Instruction;
- (ii) Normal load variation;
- (iii) Facility startup; and
- (iv) Facility shutdown.

### 9.3. Emergency Conditions

The Transmission-connected LSS shall be despatchable at reduced load under certain emergency conditions as instructed by GSO.

The GSO shall also disconnect the Transmission-connected LSS under certain emergency conditions.

## **9.4. Telemetry**

The Transmission-connected LSS must have telemetry facility to NLDC SCADA via IEC60870-5-104 protocol. List of telemetry signals for monitoring shall include plant data and site weather data which are further described in Appendix D and Appendix E of the PPA. The telemetry facility shall be available at all times and have suitable independent back-up power source in case of grid shut-down or maintenance outages.

## **9.5. Meteorological Measuring Facilities (MMF)**

The SPP shall install at least one (1) set of pyranometer for every  $2\text{MW}_{\text{ac}}$  of plant size at appropriate locations within the site. In addition, at least one (1) set of full weather station shall be installed for every  $10\text{MW}_{\text{ac}}$  of plant size. The real-time data from the pyranometers and weather stations shall be transmitted to GSO Control Centre at all times via telemetry facility stipulated in section 8.5 of the Guidelines. SPP shall provide a secure communication link to the GSO Control Centre with online access to the MMF signals data at all times as further described in Appendix E of the PPA. Both pyranometers and weather stations must have an independent and backup power source.



## 10. Despatch Forecast

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Solar PV generation is significantly influenced by weather condition. In this respect, it is mandatory for the SPP to submit its solar PV generation forecast to assist the Single Buyer and the GSO in the planning, scheduling and grid operation in order to minimize risks of deviation in generation despatch.

### 10.1. Long-term forecast

SPP shall submit to the Single Buyer the Annual Generation Profile (AGP), Declared Annual Quantity (DAQ) and schedule maintenance program comprising:

- One (1) firm and four (4) indicative AGP, DAQ and schedule maintenance program.

The AGP and DAQ shall be submitted as follows:

- Sixty (60) days prior to COD for first Contract Year; and
- Sixty (60) days prior to 1st January of each Contract Year.

The schedule maintenance program shall be submitted as follows:

- Sixty (60) days prior to COD for first Contract Year; and
- Ninety (90) days prior to 1st January of each Contract Year.

### 10.2. Medium and short-term forecast

Throughout the term of the PPA, the SPP shall submit to Single Buyer the Declared Daily Quantity for:

- rolling 4-month ahead by 25<sup>th</sup> of each month;
- 9-day ahead (Saturday to Sunday) every Wednesday before 12:30 p.m.; and
- day-ahead by 10 a.m. for the following day.

### 10.3. Website and real-time online forecast

Beginning from the Initial Operation Date, SPP shall publish the details of the Half-Hourly Quantity on the real-time basis via SPP's website (accessible to the Grid System Operator and with web services facilities to enable automatic extraction of such data into the Grid System Operator's IT system via internet) or any other manner or form as may be prescribed from time to time by the Grid System Operator. SPP shall establish such SPP's website prior to the Initial Operation Date and notify TNB and the Grid System Operator of the same.

## Attachments

Attachment A1:

Timeline for Transmission-Connected LSS (pre PPA signing)

Attachment A2:

Timeline for Transmission-Connected LSS (post PPA signing)

Attachment B:

Data Requirement for Submission of RFP

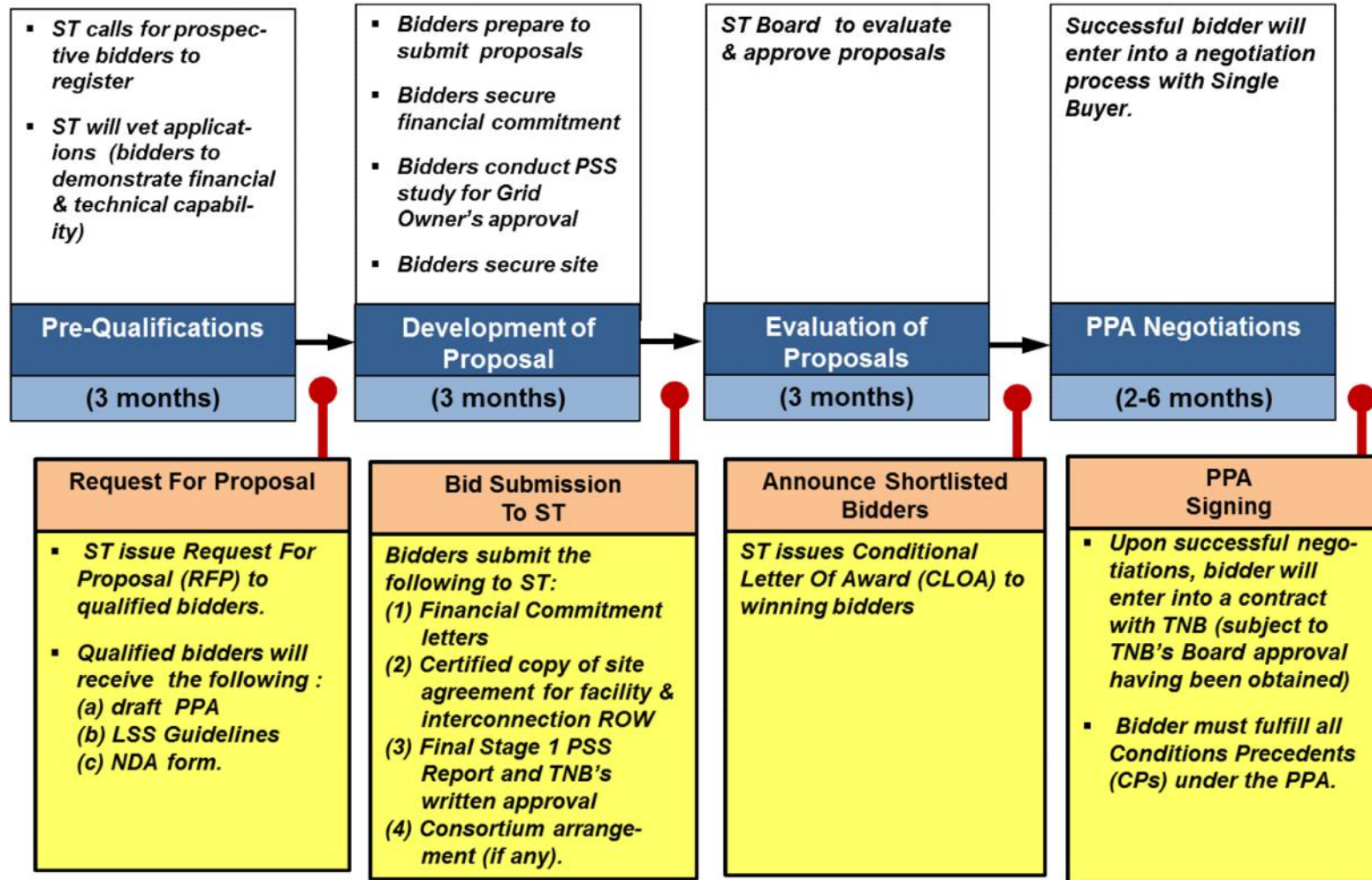
Attachment C1:

Potential Zonal Nodes

Attachment C2:

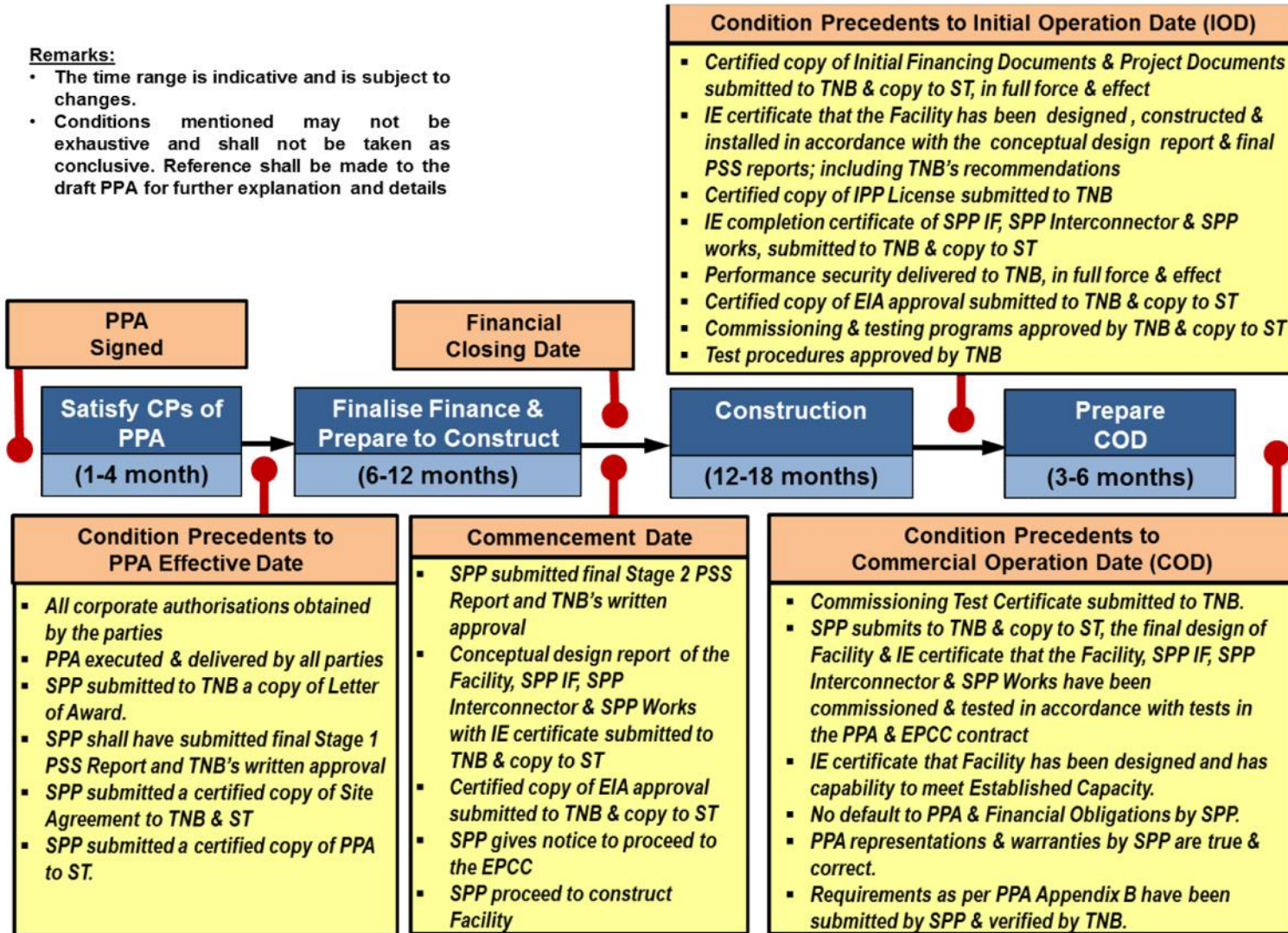
Geographical Location of Potential Zonal Nodes

## Attachment A1: Timeline for Transmission-Connected LSS (pre PPA signing)



- Remarks:**
- The time range is indicative and is subject to changes.
  - White box indicates main actions to be carried out by ST and prospective SPP
  - Yellow box indicates deliverables at the end of each activity

## Attachment A2: Timeline for Transmission-Connected LSS (post PPA signing)



## Attachment B: Data Requirement for Submission of RFP

### a. Data Requirement

The SPPs are required to furnish to ST the following technical information together with the submission of RFP proposal:

|   | Requirement |
|---|-------------|
| <b>Design</b>                           |             |
| SLD                                     | ✓           |
| Plant layout drawings                   | ✓           |
| Installed capacity                      | ✓           |
| Maximum output                          | ✓           |
| Maximum Annual Allowable Quantity [1]   | ✓           |
| Expected COD                            | ✓           |
| <b>Equipment</b>                        |             |
| Inverter datasheet                      | ✓           |
| PV panel/module datasheet               | ✓           |
| Site & location layout                  | ✓           |
| Proximity to nodal point                | ✓           |
| Declarations<br>Compliance to standards | ✓           |

<sup>1</sup> SLD shall be endorsed by the Professional Engineer

<sup>2</sup> Total rating of PV plant in MW<sub>c</sub>

<sup>3</sup> Maximum plant expected capacity in MW

<sup>1</sup> SLD shall be endorsed by the Professional Engineer and qualified Grid-Connected PV (GCPV) system designer

Applications will be processed in the order in which they are received. Incomplete applications will not be accepted and will be returned to the person submitting the application.

### b. Submission of Data

The technical information as specified in (a) above shall be submitted to ST's office at the following address:

Commission  
No. 12, Jalan Tun Hussein  
Precinct 2  
62100 Putrajaya.

Toll-Free Number : 1800- 2222-78  
Telephone : +603- 8870 8500  
Facsimile : +603- 8888 8637

## Attachment C1: Potential Zonal Nodes

| No. | Zone                | State           | Nearby existing Transmission facility (ies)                     |
|-----|---------------------|-----------------|---|
| 1   | Bandar Muadzam Shah | Pahang          | 132kV Tanjung Batu substation                                   |
| 2   | Maran               |                 | 132kV Maran substation  |
| 3   | Dungun              | Terengganu      | 132kV Santong substation  |
| 4   | Gong Badak          |                 | 132kV Batu Rakit substation                                     |
| 5   | Tumpat              | Kelantan        | Overhead line 132kV Rantau Panjang – Tanah Merah                |
| 6   | Rantau Panjang      |                 | 132kV Rantau Panjang substation                                 |
| 7   | Chenderiang         | Perak           | Overhead line 132kV Sultan Idris Hydro – Temoh                  |
| 8   |                     |                 | 132kV Temoh substation  |
| 9   |                     |                 | 132kV Bidor substation  |
| 10  | Bukit Selambau      | Kedah           | 132kV Bukit Selambau substation                                 |
| 11  | Pendang             |                 | 132kV Overhead line 132kV Gurun – Kota Sarang Semut             |
| 12  |                     |                 | 132kV Kota Sarang Semut substation                              |
| 13  | Kuala Nerang        |                 | Overhead line 132kV Pauh – Mergong                              |
| 14  | Bukit Kayu Hitam    | Perlis          | 132kV Bukit Kayu Hitam substation                               |
| 15  | Chuping             |                 | Overhead line 132kV Chuping – Bukit Kayu Hitam                  |
| 16  | Sendayan            | Negeri Sembilan | Overhead line 132kV Semarak – Bukit Kepayang                    |
| 17  | Linggi              |                 | Overhead line 132kV Telok Kemang / Pasir Panjang – Masjid Tanah |
| 18  | Jasin               | Melaka          | Overhead line 132kV Tangkak – Jasin                             |
| 19  | Gerisik             |                 | 132kV Gerisik substation  |
| 20  | Kota Tinggi         | Johor           | 132kV Pasak substation  |
| 21  | Pontian             |                 | 132kV Pekan Nenas substation                                    |

| No. | Zone         | State    | Nearby existing Transmission facility (ies) |
|-----|--------------|----------|---|
| 22  | Kukup        |          | 132kV Kukup substation                      |
| 23  | Kuala Langat | Selangor | 132kV Teluk Panglima Garang substation      |
| 24  | Gombak       |          | 132kV Batu Arang                            |
| 25  |              |          | 132kV Ladang Kundang                        |

Due to the physical characteristics of the transmission system, energy is lost as it is transmitted from generators to loads. Solar PV penetration at each nodal point would reduce or increase the system losses depending on the existing Transmission Network topology and distribution of system demand throughout the Transmission Network.

In order to capture the abovementioned statement in the evaluation of the proposal of bidders at various nodal points at varying penetration level, each nodal point shall be calculated using the following formula.

$$\mu_n = \text{System Loses@ Nodal Point}^n - \text{Reference Case System Losses}$$

$$\text{Nodal Factor}^n = 1 + [(\mu_n - \mu_{\max}) / \text{Reference Case System Losses}], \text{ where } n = \text{nodal point}$$

To illustrate the use of nodal factor, below is an example of 3 bidders participated in this competitive bidding exercise with the following proposals:

Bidder A, 50MW<sub>ac</sub> @PMU Ladang Kundang @30.10 sen/kWh,

Bidder B, 30MW<sub>ac</sub> @PMU Pekan Nanas @30.00 sen/ kWh and

Bidder C, 35MW<sub>ac</sub> @PMU Gerisek @30.05 sen/ kWh.

Based on nodal factor table, nodal factor for 50MW<sub>ac</sub>@PMU Ladang Kundang is 1.0004, nodal factor for 30MW<sub>ac</sub> @PMU Pekan Nanas is 1.0094 and nodal factor for 35MW<sub>ac</sub> @PMU Gerisek is 1.0053.

Therefore, to rank the proposals, the price of each bidder shall be adjusted using the respective nodal factor.

| Bidder | Offer Price (sen/kWh) | Initial Ranking | Nodal Factor | Adjusted Offer Price (sen/kWh) | Final Ranking |
|--------|-----------------------|-----------------|--------------|--------------------------------|---------------|
| A      | 30.10                 | 3               | 1.0004       | 30.1120                        | 1             |
| B      | 30.00                 | 1               | 1.0094       | 30.2820                        | 3             |
| C      | 30.05                 | 2               | 1.0053       | 30.2092                        | 2             |

The final ranking of bidder after considering the nodal factor as follows: Bidder C, Bidder A and followed by Bidder B. The Energy Rate in relation to the successful bidder i.e. Bidder C shall be the Offer Price.

## Attachment C2: Geographical Location of Potential Zonal Nodes





## **APPENDIX D :**

### **Technical Specification For Distribution-Connected LSS**

**Disclaimer:**

The Guidelines for Distribution – Connected Large Scale Solar (LSS) (“Guidelines”) has been prepared for guidance and informational purpose only. It does not contain comprehensive information needed for the submission of the Request for Proposal and in designing the facilities needed for the LSS. Whilst all reasonable care has been taken in the preparation of the Guidelines, Commission does not make any representation, warranty or undertaking, expressed or implied, in or in relation to the completeness and or accuracy of information contained in the Guidelines. To this end, Commission disclaims all or any responsibility whatsoever to anyone for information contained in the Guidelines or for any representation or statement herein, whether expressed or implied, or for any responses given in response to any queries on or in relation to the Guidelines. All such persons expressly disavow any obligation or duty (whether in contract, tort or otherwise) to any prospective LSS developer and disclaim any and all liability based on or relating to any such information or representations or warranties (expressed or implied) contained in, or errors or omissions from, the Guidelines or based on or relating to the use of the Guidelines or any other written or oral communication transmitted to or information provided to or otherwise acquired by a prospective LSS developer.

A prospective LSS developer shall be solely responsible for its interpretation of the information provided to or otherwise acquired by the prospective LSS developer. The prospective LSS developer certifies that it understands, accepts and agrees to the disclaimers on this page. Nothing contained in any other provision of the Guidelines, nor any statement made orally or in writing by any person or party shall have the effect of negating or superseding any of the disclaimers on this page.

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## Abbreviations

This section describes a list of abbreviations that appear in this document.

| <b>Abbreviations</b> | <b>Description</b>  |
|----------------------|---|
| AC                   | Alternating Current   |
| AVQC                 | Automatic Voltage and Reactive Power Control  |
| BOO                  | Build, Own and Operate  |
| CLOA                 | Conditional Letter of Award   |
| COD                  | Commercial Operation Date   |
| CT                   | Current Transformer   |
| DAQ                  | Declared Annual Quantity (in MWh) of Solar PV energy for each Contract Year which shall not exceed the MAAQ |
| DL                   | Distribution Licensee   |
| EMS                  | Energy Management System  |
| EER                  | the Excess Energy Rate (in RM/kWh) for that Billing Period  |
| ER                   | the prevailing Energy Rate (in RM/kWh) applicable for that Billing Period                                   |
| FAT                  | Factory Acceptance Test   |
| GCPV                 | Grid Connected Photovoltaic   |
| GIS                  | Gas Insulated Switchgear  |
| GSO                  | Grid System Operator  |
| IF                   | Interconnection Facility  |
| IOD                  | Initial Operation Date  |
| kV                   | kilo-Volt   |
| LSS                  | Large Scale Solar   |
| MAAQ                 | Maximum Annual Allowable Quantity (in kWh)  |
| MDC                  | Malaysian Distribution Code   |
| MW                   | Mega-Watt   |
| NEO                  | Net Energy Output (in kWh)  |
| PCC                  | Point- of- Common -Coupling   |
| PPA                  | Power Purchase Agreement  |
| PSS                  | Power System Study  |
| PV                   | Photovoltaic  |
| RCC                  | Regional Control Centre   |
| RFP                  | Request for Proposal  |
| RFQ                  | Request for Qualification   |
| RTU                  | Remote Terminal Unit  |
| SCADA                | Supervisory Control and Data Acquisition  |
| SCOD                 | Scheduled Commercial Operation Date   |
| SESB                 | Sabah Electricity Sdn Bhd   |
| ST                   | Commission  |
| THDI                 | Total Harmonic Distortion Current   |
| TNB                  | Tenaga Nasional Berhad  |
| VCB                  | Vacuum Circuit Breaker  |
| VT                   | Voltage Transformer   |

## Glossary of Terms

This section describes a list of terms that appear in this document.

| Term                                   | Definition  |
|--|---|
| <b>Anti Islanding</b>                  | During loss of mains, the inverter should cease to operate in islanded mode. Inverter should be equipped with anti-islanding protection;  |
| <b>Commercial Operation Date (COD)</b> | The date at which all testing of a Power Station or a Generating Unit or Power Park Module or a Grid System Development or a User Development is completed and the plant is certified by the relevant party for commercial use with the Grid System;  |
| <b>Connection Point</b>                | The point of common coupling where LSS is connected to the distribution system;   |
| <b>Contingency</b>                     | Under contingency condition, when one or more circuit elements are on outage – scheduled or non-scheduled;  |
| <b>Contract Year</b>                   | Means, the date on which begins on the Commercial Operation Date of the Increment and ends on December 31 of the year in which the Commercial Operation Date of the Increment occurs, each subsequent period during the Term which begins January 1 and ends on December 31 of the same year and the period of twelve (12) months or less which begins on January 1 and ends on the last day of the PPA Term; |
| <b>Contracted Capacity</b>             | Means the Capacity of Solar Photovoltaic energy to be generated and delivered to the Grid system at the interconnection point from the facility (as the case may be) for each contract year;  |
| <b>Distribution Licensee</b>           | The holder of a license to distribute issued by Commission under Section 9 of the Electricity Supply Act 1990;  |



| Term                                 | Definition  |
|--------------------------------------|---|
| <b>Distribution Network</b>          | The system consisting (wholly or mainly) of electric lines which are owned or operated by a Distribution Licensee (Distributor) and used for the distribution of electricity from Grid Supply Points or Generating Units or Power Park Modules or other entry points to the point of delivery to Customers or other Distributors. "Distribution electricity network" means a system or part of a system at nominal voltage of less than 132 kilovolts of electric lines or cables, substations and associated equipment and buildings for transporting electricity to any person, regardless of whether a generating plant is connected to such system; |
| <b>Distribution System</b>           | The system of electric lines with voltage levels below 66 kV, within the Area of Supply owned or operated by the Distributor/Embedded Distributor, for distribution of electricity from Grid Supply Points or Generating Units or other entry points to the point of delivery to Customers or other Distributors and includes any electrical plant and meters owned or operated by the Distributor/ Embedded Distributor in connection with the distribution of electricity;  |
| <b>Demand or Load</b>                | Means demand of MW/kW and MVar/kVar of electricity (i.e. both Active Power and Reactive Power), unless otherwise stated;  |
| <b>Facility</b>                      | means a solar photovoltaic energy generating facility located at the site with a capacity of 1MW <sub>ac</sub> to 30MW <sub>ac</sub> and ancillary equipment and facilities as more specifically described in the Power Purchase Agreement and includes any modification thereto;   |
| <b>Financial Closing Date</b>        | means the date on which the Financing Documents relating to the financing or refinancing for the total construction costs of the LSS have been entered into by IPP and the financing parties, and all of the conditions precedent for the initial drawdown under such financing documents have been satisfied by IPP or waived by the financing parties thereunder;   |
| <b>Interconnection Facility (IF)</b> | The components that interconnect the LSS and the distribution network. This includes the substation at the LSS, overhead lines or underground cables where the connection to the distribution network is made;  |

| Term                                     | Definition   |
|--|--|
| <b>Initial Operation Date (IOD)</b>      | The date on which the LSS installation first delivers Net Electrical Output (NEO) to the DL network for testing purposes;  |
| <b>Inverter</b>                          | A machine, device, or system that changes DC power to AC power;  |
| <b>Islanding</b>                         | A condition in which a portion of the utility system that contains both load and distributed resources remains energized while isolated from the remainder of the utility system;  |
| <b>Large Scale Solar (LSS)</b>           | Any solar PV Plant, with minimum size of 1MW <sub>ac</sub> and maximum of 50MW <sub>ac</sub> , connected to either transmission or distribution network in Peninsular Malaysia, Sabah or Labuan;   |
| <b>MAAQ</b>                              | means the maximum annual allowable quantity (in kWh) determined as a product of the Established Capacity, the capacity factor and the number of hours in a year, as further described in the Power Purchase Agreement;                                   |
| <b>Malaysian Distribution Code (MDC)</b> | The Distribution Code is a document containing a set of technical rules and Procedures that facilitate coordinated planning, coordinated design, coordinated development, and coordinated operation of the Distribution System;                          |
| <b>Medium Voltage</b>                    | A voltage equal to or exceeding 1 kV but not exceeding 50 kV;<br>A voltage normally exceeding 1kV but equal to or not exceeding 50,000 volts or 50 kV;   |
| <b>Net Energy Output (NEO)</b>           | Means for any period, the amount of solar energy generated and delivered to the DL at the metering point or as otherwise determined in accordance with provisions of PPA during such period;   |
| <b>Power Purchase Agreement (PPA)</b>    | Agreements between the Distribution Licensee (DL) and LSS Developer relating to the financial and technical conditions relating to the purchase of LSS output and technical conditions relating to its connection to and performance on the Grid System; |

| Term                            | Definition   |
|---------------------------------|--|
| <b>Prudent Utility Practice</b> | The exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced operator engaged in the same type of undertaking under the same or similar circumstances; |
| <b>Suruhanjaya Tenaga (ST)</b>  | Commission or Energy Commission established under the Energy Commission Act 2001 (Act 610);  |
| <b>Type Test</b>                | Test of one or more devices made to a certain design to demonstrate that the design meets certain specifications;  |
| <b>Power Factor</b>             | Power factor (PF) is calculated by dividing the Real Power, P, in the W unit by the Apparent Power, S, in the VA unit.   |

# 1. Introduction

---

This guidebook has been prepared jointly by Commission (ST), Tenaga Nasional Berhad (TNB) and Sabah Electricity Sdn Bhd (SESB) and is part of the Request for Proposal (RFP) document.

This edition of guidebook serves to provide guidance to the prospective Large Scale Solar (LSS) PV Plant developers seeking connection to the TNB/SESB's distribution network. Contents of this guideline differ from the Feed In Tariff (FIT) guideline due to larger capacity available for LSS.

The content of this guideline is prepared based on prudent utility practice, experiences during implementation of FiT program and international practices.

MW described in this guideline refers to the AC side of the LSS plant.

Developers, operators and other parties involved in the planning, installation, commissioning and operation of LSS power generation plant could utilise this guideline for:

- a) Process of connection application
- b) Technical requirements
- c) Commercial aspects

## 2. Scope and Limitation

---

Large Scale Solar (LSS) PV Plants described in this document refer to those connected to the distribution network at 33kV or 11kV. Technical administration of the connection is described in the current Malaysian Distribution Code.

The connected capacity range allowed for connection at a single point is between 1MW<sub>ac</sub> to less than 30MW<sub>ac</sub>. The available connections are listed in the nodal point list in this guideline.

This guidebook does not cover the followings:

- LSS connected to Peninsular Malaysia's Transmission network
- LSS with energy storage system

The Guidelines are not intended to cover all required authorizations, permits and/or licenses which the LSS developer is required to obtain from the relevant bodies and/or authorities for the purpose of the development of LSS.

The LSS developer shall, at its own costs, be fully responsible for the inspection, examination, checking and verifying the accuracy, correctness and completeness of any and all data as to the site and its surroundings and the nature of the climatic, geological, soil and general conditions of the site as well as the nodes as identified by the DL in order to meet the requirements of the Power Purchase Agreement. The LSS developer shall also, at its own costs, be responsible to obtain, maintain and renew all authorizations, permits and licenses necessary for it to develop the LSS and to otherwise

perform its obligations under the Power Purchase Agreements or any other Project Documents and comply with all conditions and requirements as may be imposed or prescribed by any relevant bodies and/or authorities which has jurisdiction over the development of LSS.

Each LSS developer shall accept full responsibility for conducting an independent analysis of the accuracy, correctness and completeness of any and all data and for gathering and presenting all necessary information. The ST/DL shall bear no responsibility for any error, inaccuracy or omission of any kind and no warranty or representation is given in respect thereof.

### 3. Overview of LSS Process

The general process for LSS application is as illustrated in Figure 1. All application shall be submitted to ST and will undergo a Pre-Qualification stage. The qualified applicants will be invited to submit a Request for Proposal (RFP). During the RFP stage, the LSS developer shall submit a power system study (PSS) application to the DL. The maximum capacity of connection at a single point is 30MW<sub>ac</sub>. The dates for Pre-Q, RFP, award and COD are subject to announcement by the relevant authorities.

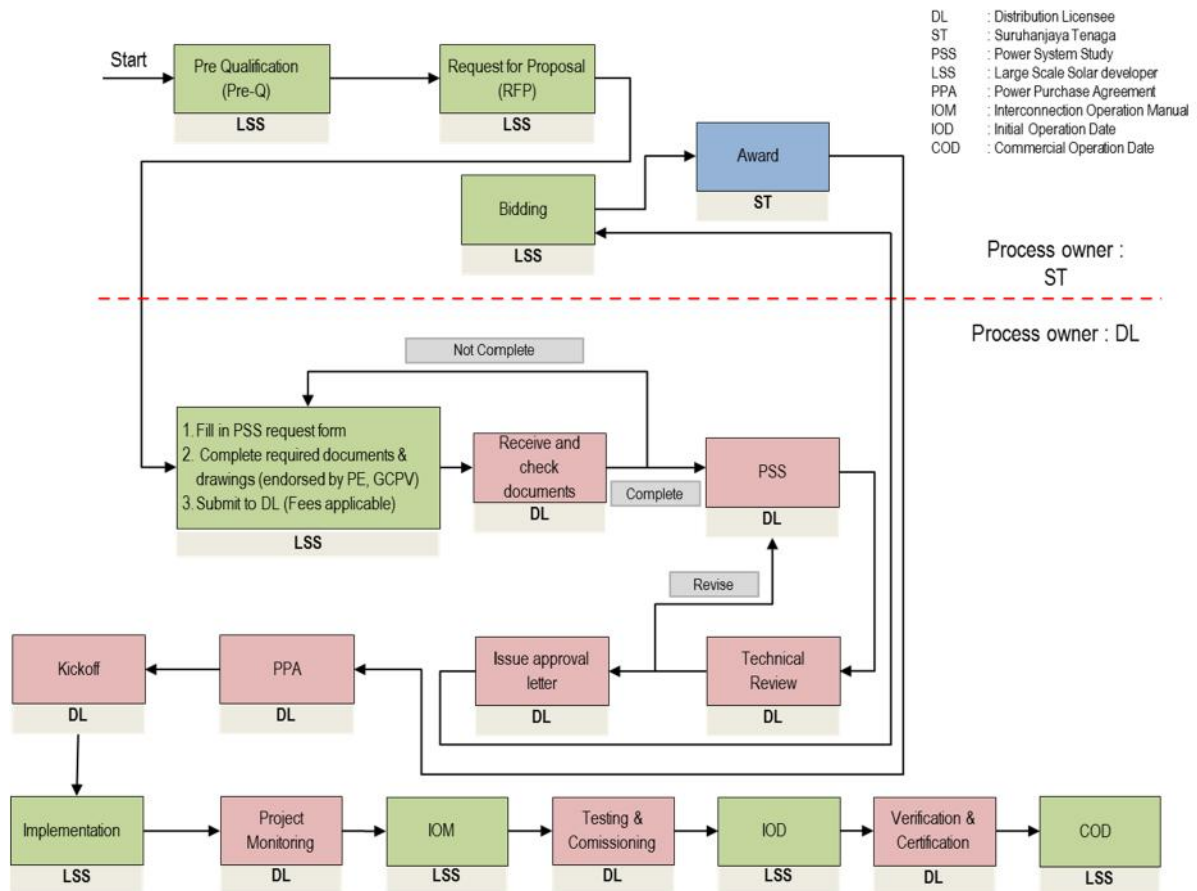


Figure 1: The overall process for LSS application

## 4. Connection to the Grid Distribution System

---

### 4.1 Background

The connection of the LSS plant shall be made only at the existing DL owned substation. The evaluation of connection requirements is subject to the terms and requirements in the latest version of Malaysian Distribution Code.

The limiting factors at the substation such as fault level, transformer daytime loading are important for the assessment of the connected generation capacity. Impacts such as substation loading and voltage rise due to power generation could determine the limit of capacity allowed for the LSS power generation.

### 4.2 Connection Voltage Level

The LSS plant can be connected to the 33kV and 11kV distribution voltage level.

Table 1 and Table 2 describe the range of connected capacity to the type of DL substation. The preferred connection of the LSS plant is to an indoor substation with adequate space availability to avoid complication due to land matters.

TNB

Table 1: Connected Capacity Range (TNB)

| Substation | 11kV PE | 11kV PMU/PPU | 33kV  |
|------------|---------|--------------|-------|
| Min        | ≥1MW    | >2MW         | >10MW |
| Max        | 2MW     | 10MW         | 30MW  |

SESB

Table 2: Connected Capacity Range (SESB)

| Substation | 11kV PE | 11kV PMU/PPU | 33kV |
|------------|---------|--------------|------|
| Min        | ≥1MW    | >2MW         | >5MW |
| Max        | 2MW     | 5MW          | 15MW |

### 4.3 Penetration Limit

Distribution network is operated in lateral feeders with off-point located strategically. To cater for the n-1 contingency requirement, feeders are loaded at only 50% of its thermal capacity. Therefore, to determine the capacity of connected LSS, the 50% feeder loading is to be adopted.

Output from LSS connected to distribution network shall be consumed locally. Therefore, the penetration limit of LSS to a substation is limited to the daytime loading level of the substation. The loading level shall be determined by the DL based on its record of recent substation demand trend. Estimation of future demand growth shall not be considered.

The penetration limits are as follows:

**Table 3: Penetration Limit for 11kV Feeder and Transformers**

| Network element                               | Limit                 |
|---|-----------------------|
| 11kV feeder                                   | 2MW                   |
| Transformers<br>(33/11kV, 132/11kV, 132/33kV) | 85% of daytime trough |

#### 4.4 Nodal Points

The connection to the distribution network is to be done only at the existing substations owned by the DL. The capacity of connection for each substation type is described in section 4.2.

For the purpose of facilitating the potential LSS developer, nodal points have been identified for connection to distribution network. The nodal points were selected based on the following considerations:

- a) Fault level
- b) Adequate daytime trough load

Other possible constraints include the availability of space for the new switchgear including the associated control panel and the metering room.

The list of possible nodal points is as shown in Attachment A. The list shall be used as a guide as actual feasibility depends on the findings of the PSS. The DL has the rights to review and update the list.



## 4.5 Connection Schemes

The interconnection feeder shall be using circuit breaker which shall be provided by the LSS developer. All costs including any modification/extension to the existing substation in order to accommodate connection of LSS to the grid shall be borne by the LSS developer.

Typical scope of works for the interconnection feeder is described in Table 4. However, the actual works shall be determined based on the actual site requirements.

Table 4 : Typical Scope of Works for Upgrading

| Upgrading at PE   | Upgrading at PPU/PMU  |
|---|---|
| <ul style="list-style-type: none"> <li>▪ Replace existing Ring Main Unit (RMU) to VCB</li> <li>▪ Remote Control Box (RCB)</li> <li>▪ Direct Current(DC) system</li> <li>▪ SCADA/RTU</li> <li>▪ Building works as necessary</li> <li>▪ Meter room</li> </ul> | <ul style="list-style-type: none"> <li>▪ Extension to existing switchgears (VCB/GIS)</li> <li>▪ Control Relay Panel (CRP)</li> <li>▪ SCADA/RTU</li> <li>▪ Arc protection (where applicable)</li> <li>▪ Building works as necessary</li> <li>▪ Meter room</li> </ul> |

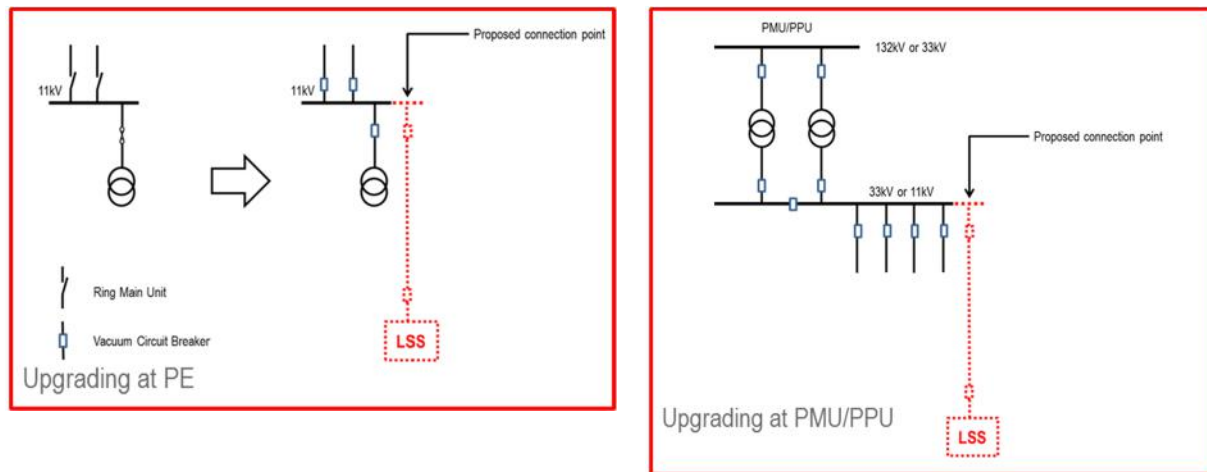


Figure 2: Upgrading of the Switchgears at PCC

## 4.6 Scope of Interconnection Facilities & Asset Demarcation

This section describes the feature of the interconnection feeder which connects the LSS plant to the DL substation. The connecting cable consists of underground or aerial cable to carry only the generated power and fibre optics cable for differential protection relay and interlocking communications.

All costs including any modification/extension to the existing substation in order to accommodate connection of LSS to the grid shall be borne by the LSS developer.

The LSS developer is responsible in acquiring the right of way for the underground or aerial cable route and any related land acquisitions.

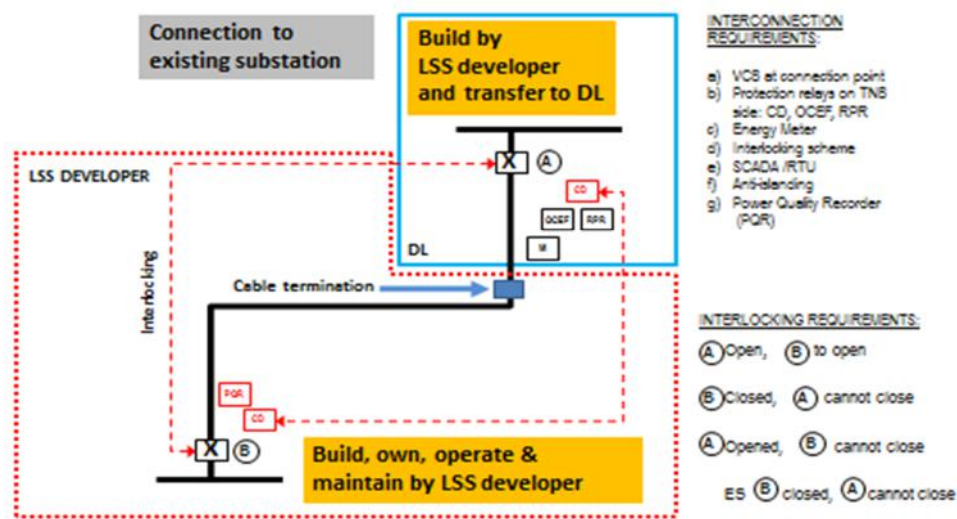


Figure 3: DL-LSS Interconnection Feeder Scheme

Scope of work by LSS developer

- Supply of interconnection facilities for LSS and DL side (refer to Figure 3)
- The interconnection works shall be designed, built, owned, operated and maintained by the LSS developer
- All works for interconnection is under the responsibility of LSS developer
- Interconnecting power cable capacity and fibre optics based on PSS
- The equipment is to match existing specifications
- Protection scheme
- Energy meters and dedicated metering room
- Interlocking scheme
- SCADA requirements
- Anti islanding shall be provided at the LSS plant
- Install and maintain PQ Recorder at LSS plant
- Other requirements as stated in the PSS
- Submission of drawings and manuals

## 5. Power System Study (PSS)

### 5.1 Objectives of PSS

- a) To identify connection scheme options (and configurations) for the LSS plant to be connected to the distribution network.
- b) To investigate the impact of the LSS power generation to the distribution network
- c) To assess LSS compliance with the technical requirements in the current Malaysian Distribution Codes (MDC)

### 5.2 Scope of PSS

DL will perform the PSS using any one of the simulation softwares – PSS ADEPT, PSS Sincal, PSSE by Siemens, DigSilent by Powerfactory

Scope of PSS includes:

- Adequacy – penetration limit
- Power flow analysis
- Short circuit analysis
- Redundancy study
- Operational constraints & limitations
- Interconnection method & scope of work

In evaluating the LSS connection, the operational flexibility of the network is not to be compromised.

### 5.3 PSS Information Requirements

LSS developers are required to furnish the following technical information as in Table 5 together with the proposal.

Table 5: PSS Information Requirements

|  | Requirement |
|--|-------------|
| <b>Design</b>                          |             |
| Single Line Diagram (SLD)              | ✓           |
| Plant layout drawings                  | ✓           |
| Installed capacity                     | ✓           |
| Maximum output                         | ✓           |
| Maximum Annual Allowable Quantity [MW] | ✓           |
| Expected COD                           | ✓           |
| <b>Equipment</b>                       |             |
| Inverter datasheet                     | ✓           |
| PV panel module datasheet              | ✓           |
| Site & location layout                 | ✓           |
| Proximity to nodal point               | ✓           |
| Declarations compliance to standards   | ✓           |

<sup>1</sup> SLD shall be endorsed by the Professional Engineer

<sup>2</sup> Total rating of PV plant in MW

<sup>3</sup> Maximum plant expected capacity in MW

- All applications will be processed in the order in which they are received. Incomplete applications will not be accepted and will be returned to the person submitting the application.
- DL will issue invoice for application processing fee. The payment of invoice can be made at any DL payment outlet and a copy of payment receipt must be sent to the DL.
- Application processes and the relevant forms and fees are subject to change without prior notice.

## 5.4 PSS Fees

The applicable fees for PSS are shown in Table 6 based on the proposed connected capacity.

**Table 6 : PSS Fees According to Capacity Range**

| Capacity    | Fee (subject to GST) | Delivery days |
|-------------|----------------------|---------------|
| 1MW         | RM20,000             | 30 days       |
| >1MW, ≤10MW | RM40,000             | 40 days       |
| ≤30MW       | RM60,000             | 40 days       |

The 'day one' for PSS delivery days shall begin upon receipt of the proof of payment to DL.

Upon completion of the study, a review meeting shall be held between DL and LSS developer to conclude the findings and recommendations of the PSS. DL shall issue an official report of the agreed findings and recommendations.

## 5.5 Submission of PSS Application

All applications for connection of LSS plant to the distribution network shall be submitted to the respective DL offices:

|      |  |
|------|--|
| TNB  | Customer Service Department,<br>16 <sup>th</sup> Floor, Wisma TNB,<br>19, Jalan Timur,<br>46200 Petaling Jaya, Selangor<br>Telephone : 03-7967 9000<br>Email : re@tnb.com.my |
| SESB | Sustainable Energy Department,<br>Level 4, Wisma SESB,<br>Jalan Tunku Abdul Rahman,<br>88673 Kota Kinabalu, Sabah<br>Telephone : 08-8282699                                  |

## **5.6 PSS Validity**

The PSS report is valid only for 1 cycle of bidding process. No extension of PSS report is allowed.

## **5.7 Guideline and Criteria to be used for PSS**

The PSS results are to comply with relevant requirements in the MDC. A copy of the MDC can be obtained from the official portal of ST ([www.st.gov.my](http://www.st.gov.my)).

Any violation to the codes and standards pertaining to the LSS connection are to be highlighted and mitigation action(s) shall be recommended accordingly in the report.

## 6. Technical Requirements

### 6.1 General

The technical requirements are outlined in this guideline to ensure that the connection of LSS to the distribution system is harmonised with the existing system characteristics.

#### 6.1.1 Voltage range

Distribution network voltage fluctuates in response to the feeder length and the load level. Table 7 describes the limits to be complied for the planning of the interconnection.

Table 7 : Steady State Voltage Limits

| Nominal Voltage (kV) | Steady state voltage limits |
|----------------------|-----------------------------|
| 11                   | ±5%                         |
| 33                   | ±5%                         |

#### 6.1.2 Voltage fluctuation

The maximum voltage fluctuation range allowed due to varying solar radiation is 6%. This requirement differs from that for voltage flicker.

#### 6.1.3 Frequency

LSS developer shall maintain plant frequency to operate in synchronism with distribution system. Nominal system frequency is 50 Hz with normal range of ±1% which is between 49.5Hz and 50.5Hz. The LSS plant is also to withstand short time operation within the range 47Hz and 52 Hz according to requirement 6.2.2.

#### 6.1.4 Current Harmonics

Total Harmonic Distortion Current Distortion (THD) shall be <5 % at inverter rated output. The point of measurement is at the Point of Common Coupling.

Each individual harmonic shall be limited to the percentages listed in table below (Current distortion limits reference to IEC 61727-2003 Table 1). Even harmonics in these ranges shall be less than 25 % of the lower odd harmonic limits listed.

Table 8 : Distortion limit for Odd Harmonics

| Odd harmonics | Distortion limit (%) |
|---------------|----------------------|
| 3 – 9         | < 4.0                |
| 11 – 15       | < 2.0                |
| 17 – 21       | < 1.5                |
| 23 – 33       | < 0.6                |

Table 9 : Distortion Limit for Even Harmonics

| Even harmonics | Distortion limit (%) |
|----------------|----------------------|
| 2 – 8          | < 1.0                |
| 10 – 32        | < 0.5                |

### 6.1.5 Voltage Fluctuation and Harmonics

Table 10 highlights the acceptable permissible values for voltage fluctuation and harmonics. The point of measurement is at the Connection Point normally at the DL substation.

Table 10 : Acceptable Permissible Values at PCC for Voltage Fluctuation and Harmonics

| Type Of Disturbance | Indices   | Acceptable permissible values at Connection Point | Reference Document                  |
|---------------------|---|---|-------------------------------------|
| Voltage Flicker     | Absolute Short Term Flicker Severity ( $P_{st}$ ) | 1.0 (at 132kV and below)                          | UK's Engineering Recommendation P28 |
|                     | Absolute Long Term Flicker Severity ( $P_{lt}$ )  | 0.8 (at 132kV and below)                          |                                     |
| Harmonic Distortion | Total Harmonic Distortion Voltage (THDV) %        | 4 % at 11kV                                       | Engineering Recommendation ER G5/4  |
|                     |   | 3% at 33kV  |                                     |
| Voltage Unbalance   | Negative Phase Sequence Voltage %                 | 2% for 1 minute                                   | UK's Engineering Recommendation P29 |

### 6.1.6 DC injection

LSS plant shall not inject DC current more than 1 % of the rated inverter output current under any operation condition.

### 6.1.7 Power factor

The allowed power factor of LSS plant range is 0.85 lagging to 0.9 leading as shown in Figure 4. The reactive power output is to be achieved at generation level as shown level as shown in part 6.2.4.

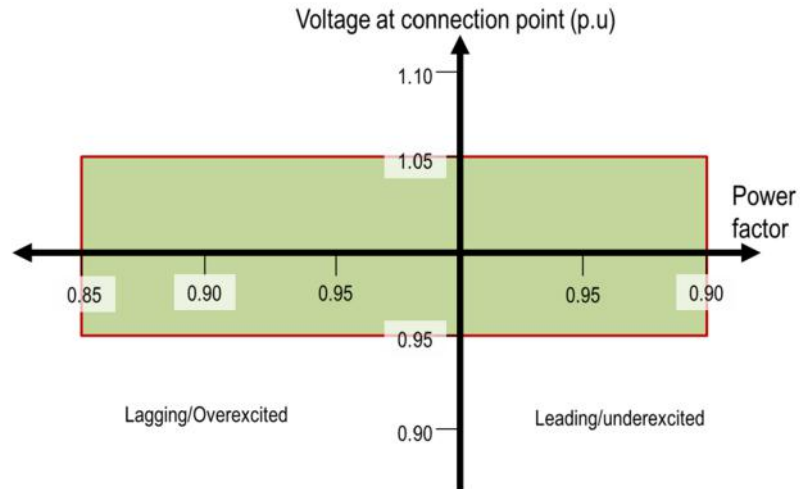


Figure 4: Voltage versus power factor curve

### 6.1.8 Transient Overvoltages

Typical Basic Impulse Insulation Levels (BIL) of the distribution system is as given in Table 11. The LSS Plant and its apparatus shall be compatible with the insulation levels of the distribution system.

Table 11 : Basic Impulse Insulation Levels (BIL)

| System Voltage (kV) | BIL (kV) |
|---------------------|----------|
| 11                  | 75       |
| 33                  | 170      |

### 6.1.9 System fault level

Table 12 below shows the rated equipment to be used to withstand the maximum sub-transient three phase symmetrical short circuit fault levels. Under MDC, DL is limited to plan for not exceeding 90% of the equipment rated design.

Table 12 : Short Circuit Withstand Rating for Power Equipment

| Nominal Voltage [kV] | Rated Voltage [kV] | Fault Current [kA] |
|----------------------|--------------------|--------------------|
| 33                   | 36                 | 25                 |
| 11                   | 12                 | 20/25              |



### **6.1.10 Synchronisation**

Synchronisation devices shall be provided and maintained by the LSS developer. During operation, synchronisation is at the LSS plant side by matching with the distribution system parameters as mentioned below:

- a) Interlocking logics are satisfied
- b) Frequency difference <0.2 Hz
- c) Voltage magnitude difference < 10%
- d) Voltage angle difference < 10 degrees

Inverter shall be capable of synchronising with the grid automatically within the specified reconnection time.

### **6.1.11 Inverter**

The LSS plant may use any type of inverters as long as the inverters can comply with the RFP and technical requirements for connection to distribution network as outlined in the current Distribution Code.

### **6.1.12 Standard compliance**

The LSS plant and its interconnection shall comply with the following standards MS1837, IEC 61727, IEEE 1547.

## 6.2 Network Support

The LSS plant shall provide support to the network to ensure that the system is stable by:

- a) To not disconnect
- b) To support network voltage by feeding reactive power

### 6.2.1 Low Voltage Ride Thru

During disturbance at transmission system, distribution system will experience temporary low voltage/sag. The LSS plant is expected to continuously operate during distribution system voltage fluctuation as shown in Figure 5.

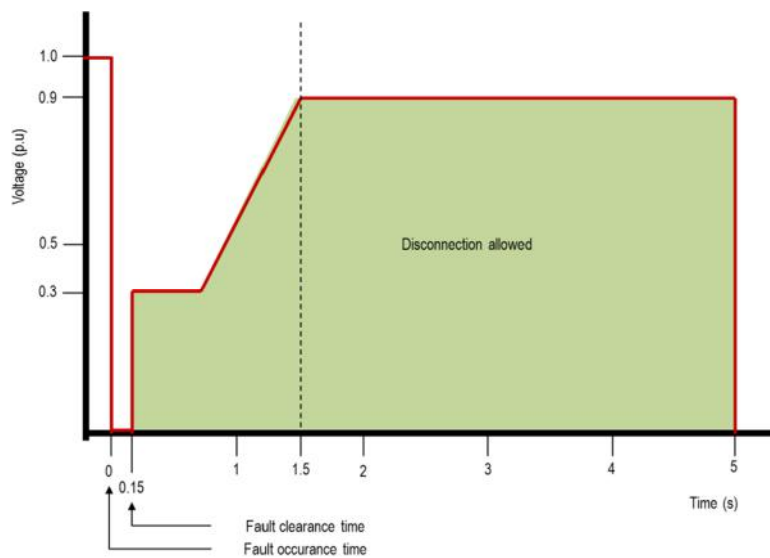


Figure 5: Low Voltage Ride Through Curve

## 6.2.2 Frequency disturbance

The LSS plant is expected to be uninterrupted within the frequency range of 47Hz to 50.5Hz.

During frequency disturbance, when the frequency increases more than 50.5Hz, the LSS plant shall reduce its power output as shown in Figure 6.

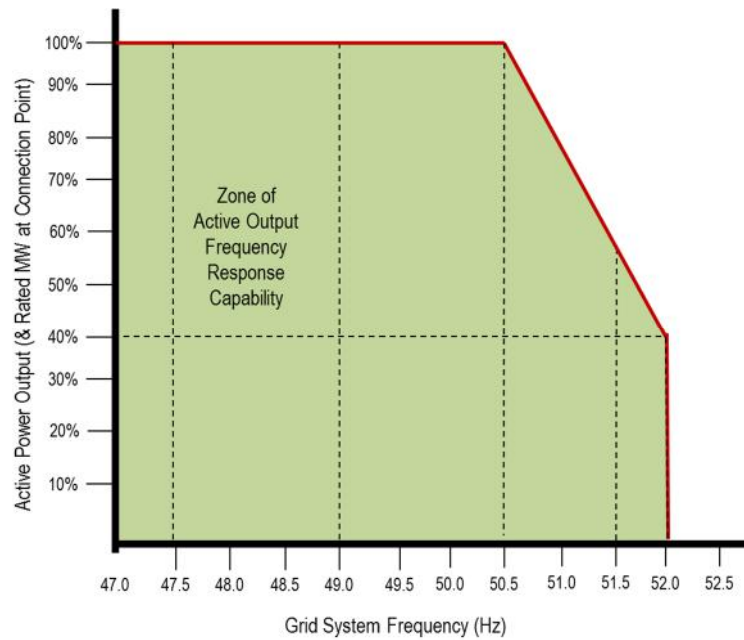


Figure 6: Frequency Disturbance Curve

## 6.2.3 Power output management

The LSS plant shall have the capability to manage its power generation as follows:-

- The LSS plant shall be able to reduce its power output or disconnect from the distribution system during system contingencies.
- LSS plant shall reduce its generation output to avoid voltage rise above the limit.
- The LSS developer shall monitor and ensure that the power generation of the plant does not exceed the contracted capacity.
- The inverter shall have the capability to perform active/reactive power control for voltage regulation.

### 6.2.4 Reactive power

The LSS plant shall be able to deliver the reactive power requirement at the connection point as shown in Figure 7. Full range of reactive power 0.85 lagging to 0.9 leading shall be achieved at 20% output.

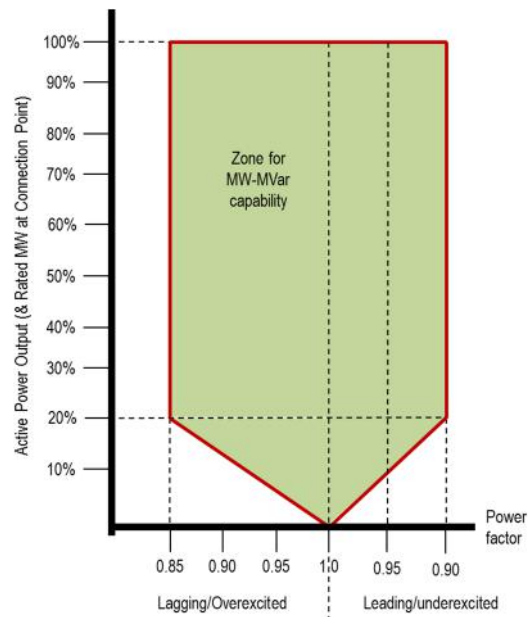


Figure 7: Active power output versus power factor curve

### 6.2.5 Droop curve

The LSS plant shall be fitted with a droop controller or equivalent control device to provide frequency response under normal operational conditions as in 6.1.3.

## 6.3 Protection Requirements

The LSS plant protection scheme is under the LSS developer's responsibility and the LSS developer shall declare the protection scheme and settings to the DL.

### 6.3.1 Connection point feeder protection at DL

The protection interfacing requirements are as follows:

- a) Unit Protection (Current Differential)
- b) OCEF / Non Directional OCEF
- c) Interlocking scheme
- d) Reverse Power Relay

Where applicable, the following protection schemes may be required:

- a) Arc protection
- b) Busbar protection
- c) Automatic transfer scheme

### 6.3.2 Feeder requirements at LSS plant

The LSS feeder shall be equipped with the following equipment:

- a) Current Differential Relay shall match with 6.3.1
- b) PQ recorder

The PQ recorder shall measure THDI, voltage fluctuation and flicker. Data storage capacity for the PQ recorder is to last at least for 1 month. The sampling rate shall be at least 128 samples per cycle.

### 6.3.3 Fault clearing time

The fault clearing time for 11kV and 33kV network is as depicted in Table 13.

Table 13 : Fault Clearing Time

| Type of fault                   | 11kV, 33kV |
|---------------------------------|------------|
| Substation & transformer faults | 150ms      |
| Overhead line & cable faults    | 600ms      |

### 6.3.4 Interlocking of the interconnection feeder

The interlocking facilities shall operate in the following manner, referring to Figure 8 below.

- A open – B to open
- B close position – A cannot close
- A open position – B cannot close
- Earth Switch (ES) B ON – A cannot close

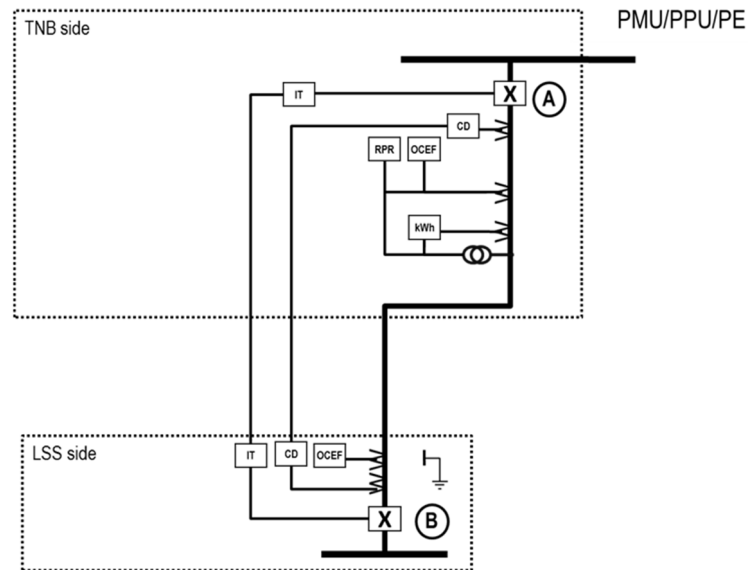


Figure 8: Interlocking of the interconnection feeder with DL

### 6.3.5 Protection equipment

The protection relay and PQR equipment to be used is subject to the approval by DL.

### **6.3.6 Protection coordination study**

LSS developer shall carry out the internal protection coordination to mitigate internal and external fault.

- a) For any internal fault, the LSS plant shall not cause problems to the utility system and its customers. The failure of the LSS plant equipment includes:
  - Failure of protection equipment
  - Failure of control equipment
  - Loss of control power
  - Interconnection power and fibre optics cables
  
- b) For any distribution network fault outside the LSS plant, the LSS plant shall be protected from any damaging effect.

LSS plant shall be disconnected from the grid during any of the above conditions.

### **6.3.7 Anti islanding**

During loss of mains, the inverter shall cease to operate in islanded mode. The anti-islanding protection is required to mitigate the following events:

- a) Safety
- b) Power quality
- c) Inverter technical limit

#### ***6.3.7.1 Anti islanding detection***

Inverters shall have the following anti-islanding capabilities:

- Under Voltage
- Over Voltage
- Under Frequency
- Over Frequency
- 1 additional active/passive anti-islanding detection

#### ***6.3.7.2 Isolation time***

Upon detection of the loss of mains, LSS plant shall be isolated within the time as shown in 6.2.1.

### 6.3.8 Reconnection time

The reconnection time of the LSS plant to the distribution network shall be more than 5 minutes after DL connection has been stabilised.

### 6.3.9 Earthing scheme

- a) The LSS plant earthing scheme shall not cause maloperation to the DL protection scheme
- b) The zero sequence components between the DL network and LSS plant shall be isolated. The LSS plant step up transformer(s) shall have delta ( $\Delta$ ) configuration on DL side as illustrated in Figure 9 to ensure the plant does not contribute zero sequence current to DL network during fault.

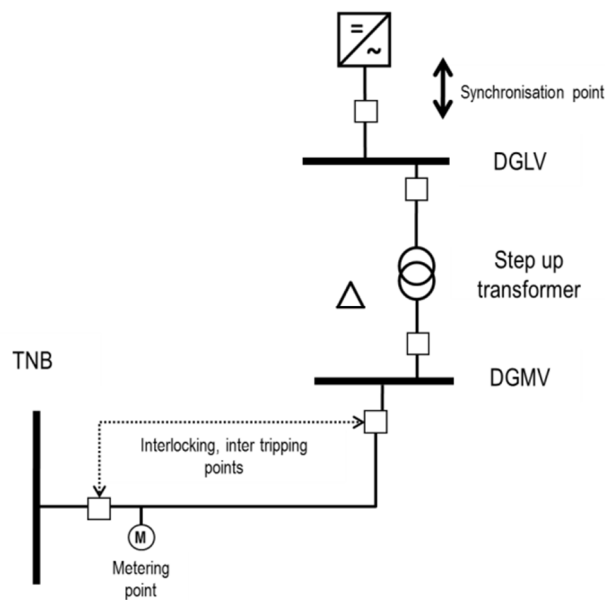


Figure 9: Step up Transformer Earthing Scheme

## 6.4 Meteorological Monitoring Facilities (MMF) and Pyranometer

The LSS developer shall provide the following:

- a) Install Meteorological Measuring Facilities (MMF) and pyranometer at the site.
- b) 1 set (MMF & pyranometer / solar cell sample) per 1MW
- c) Meteorological station has an independent and backup power source.
- d) LSS must maintain historical data of readings for throughout the term.
- e) Minimum data resolution: Every 15 minutes.
- f) Submit meteorological report to ST/DL as and when required



## **6.5 Operational Requirements**

### **6.5.1 Preparation of Interconnection Operation Manual (IOM)**

The documents to be prepared for each interconnection shall address the followings:

- a) Interconnection Facilities
- b) Communication
- c) Switching Procedures
- d) Fault Reporting
- e) Outage Program
- f) System Emergency / Collapse
- g) Sequence Of Operation
- h) Boundaries and Ownership

### **6.5.2 Contingencies**

During contingency, the LSS plant may be isolated until the system is normalised. Contingencies include scheduled and unscheduled outages:

- a) Network upgrading
- b) Maintenance
- c) Shutdown
- d) Breakdown

### **6.5.3 Declared Annual Quantity (DAQ)**

The LSS developer shall declare annual output to the DL. Format of the declaration forms could be referred to the relevant forms in Schedule 5 of MDC.

## 6.6 SCADA

The provision of SCADA is mandatory for all LSS plant interconnection. All cost for the SCADA facility shall be borne by the LSS developer including RTU cubicle and associated cards and SCADA ready switchgears. SCADA equipment to be used is subject to the approval by DL.

The following parameters are to be made available for monitoring to the Regional Control Centre (RCC).

- a) Frequency (Hz)
- b) Voltage (V)
- c) Current (A)
- d) Real Power Energy flow (kW or MW)
- e) Reactive Power Energy flow (kVAR or MVar)
- f) Energy meters
- g) Circuit Breaker status
- h) Relay indications

All interfacing wirings shall be prepared by the LSS developer with DL supervision.

## 6.7 Ownership and Boundaries

All equipment which are to be transferred to DL, shall comply with DL specifications. The ownership boundary of the LSS developer is up to and including the cable termination at the Connection Point at DL Distribution System.

### 6.7.1 Boundaries

Determinations of boundaries are as shown in Table 14.

Table 14 : Boundaries and Ownership Between DL and LSS developer

| Item                  | Ownership | Control | Operation | Maintenance |
|-----------------------|-----------|---------|-----------|-------------|
| <b>DL substation</b>  |           |         |           |             |
| Primary               | DL        | DL      | DL        | DL          |
| Secondary             |           |         |           |             |
| ▪ OCEF + RPR          | DL        | DL      | DL        | DL          |
| ▪ CD + communication  | LSS       | LSS     | LSS       | LSS         |
| ▪ Interlocking        | LSS       | LSS     | LSS       | LSS         |
| <b>LSS substation</b> |           |         |           |             |
| Primary               | LSS       | LSS     | LSS       | LSS         |
| Secondary             |           |         |           |             |
| ▪ OCEF + RPR +CD      | LSS       | LSS     | LSS       | LSS         |
| ▪ PQR                 | LSS       | LSS     | LSS       | LSS         |

OCEF – Overcurrent Earth Fault, CD – Current Differential, RPR – Reverse Power Relay, PQR – Power Quality Recorder

The LSS developer shall own and be responsible for the costs of operation and maintenance of all installations located within their boundary.

### 6.7.2 Transfer of interconnection facilities

Upon the completion of the interconnection facilities, the LSS developer shall transfer the interconnection facilities beyond his or its ownership boundary to the DL and take all actions necessary to transfer to the DL of all rights, title and interests to the interconnection facilities so that the DL shall become the owner of such interconnection facilities.

The DL shall be responsible for the operation and maintenance of the interconnection facilities.

### 6.7.3 Defects in interconnection facilities

If the DL discovers that the interconnection facilities or any part of the IF that has been transferred to it –

- a) Was not designed, constructed, installed and tested in accordance with prudent utility practices; or
- b) Contains any defect in its design, materials or workmanship

The LSS developer shall, at his or its own cost, make all necessary repairs or replacements so that the interconnection facilities conform to the requirements of prudent utility practices and shall be free from any such defect.

The obligation of the LSS developer shall not apply in respect of any non-conformance or defect arising:

- a) From the DL's failure to operate and maintain the interconnection facilities in accordance with the operation and maintenance manuals referred to in paragraph 6.5 and prudent utility practices;
- b) From the effects of ordinary wear and tear or erosion or corrosion which such facilities were not designed for; or
- c) After an initial period of twelve months from the COD, and in respect of any part of such facilities that was repaired or replaced during such IOD, after a period of twelve months from the date of completion of such repair or replacement.

## 7. Metering

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### 7.1 General

All energy meters used for measuring the import and export of electricity shall comply with DL's specifications. DL shall determine the point at which every supply line shall terminate in any premise in view of ease of accessibility to DL's personnel.

The LSS developer shall provide meter panel according to DL's specifications for the installation of meter and their accessories. DL may change any meter and its accessories or their positions in any premise as deemed necessary at any time for purposes of maintenance and meter reading.

### 7.2 Energy Meter

The main and check meters are to be installed by DL to measure the energy import and export. The energy meters are shall be procured from DL. The cost will be inclusive of supply and installation for both meters.

The energy meters shall be mounted on the metering cubicle. The dimension and specifications of the meter cubicle are to comply with the latest DL electricity supply application guideline. All drawings shall be endorsed by a Professional Engineer.

### 7.3 Metering Point

Energy meter is to be installed at the connection point in a dedicated meter room at DL substation. The LSS developer shall provide a Switch Socket Outlet (13 Amps) at the meter room.

### 7.4 Communication Signal

DL uses wireless mode of communication between energy meter and DL data centre. Location of the meter room must have adequate reception of the wireless signal to enable data transmission. LSS developer shall provide signal booster equipment whenever the communication signal is weak.

## 7.5 Metering Voltage Transformer (For 11 kV and 33 kV)

The details for the Inductive type VTs is shown in Table 15.

Table 15 : Metering Voltage Transformer

| Ratio          | $\frac{V_s / \sqrt{3} V}{110 / \sqrt{3} V}$<br>* where $V_s$ is the voltage at metering point |
|----------------|---|
| Class          | 0.5   |
| Burden         | 100 VA, sharing can be allowed provided separate fusing is provided                           |
| Voltage factor | 1.9 for 8 hours   |
| Unit           | 3 nos. for each feeder  |
| Standards      | IEC 60044-2 (1997)  |

## 7.6 Metering Current Transformer (For 11 kV and 33 kV)

The details for the metering current transformer are shown in Table 16.

Table 16 : Metering Current Transformer

| Ratio     | $I_s / 5A$<br>* where $I_s$ is the primary ratio of the metering CT |
|-----------|---|
| Class     | Class 0.2   |
| Burden    | 15 VA   |
| Unit      | 3 Nos. for each feeder  |
| Standards | IEC 60044-1 (1996)  |

## 7.7 Meter Application and Approval

The LSS developer shall liaise with the respective DL on the requirements for meter application and approval.

Test certificate and wiring diagram of the current transformers and voltage transformers shall be supplied by LSS developer. The CTs and VTs shall have a valid test certificate from an accredited laboratory. The LSS developer shall send the CT to the DL for calibration and all costs shall be borne by the LSS developer.

## **7.8 Meter Reading**

The LSS developer shall read the revenue meter with DL (joint inspection) on a monthly basis and not later than 7 days after reading the revenue meter, the LSS developer shall prepare and submit an invoice to DL for payment.

The LSS developer may at any time submit a written request to the DL to inspect or test the energy meters. If the meters are found to be defective or inaccurate, both DL and the LSS developer shall recalculate and agree on the amount payable during the period of inaccuracy. However, if the meter is accurate, the cost for energy meter testing shall be borne by the LSS developer.

## **7.9 Metering Panel/Cubicle**

The meter panel/cubicle shall be designed by LSS developer and endorsed by DL. LSS developer shall prepare the wiring for the meter and conduct the relevant test as per the DL requirements.

The LSS developer shall maintain the meter panel/cubicle and its accessories except for the energy meter and test terminal block.

## **8. Testing and Commissioning for IOD**

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### **8.1 General**

The LSS developer shall notify DL in writing once the LSS plant installation and the interconnection facilities is ready to be commissioned. The LSS developer shall submit all the documents for IOD as stated below:

- a) A certificate from an Independent Engineer approved by ST stating that the interconnection facilities have been designed and constructed in accordance with prudent utility practices.
- b) Copies of approved as-built drawing of the interconnection facilities
- c) Copies of IOM approved by DL
- d) Test results of the Interconnection Facilities
- e) A copy of metering scheme approval
- f) Transfer documents for DL substation and land if applicable
- g) Permanent generation license from ST
- h) Approval letters from authorities on right of ways for poles and/or cable routes
- i) Written confirmation from DL on the completion of site work without any outstanding issues

The submission of a complete IOD document as per IOD checklist in Attachment B shall be made not less than 60 days of the proposed IOD. The commissioning notification shall be issued upon receipt of the complete IOD documents.

### **8.2 Interconnection Operation Manual (IOM)**

The purpose of the IOM is to outline the duties and responsibilities of both parties at the interconnection between DL and the LSS plant. The IOM is also to set out the necessary procedures to be followed to ensure safety to the operating personnel and to avoid any damage to the equipment at the interconnection point. The LSS developer shall prepare the IOM for the interconnection and jointly agreed by the DL.

The IOM has to be completed before the commissioning process could be considered.

### **8.3 Testing for Interconnection Facilities**

Testing shall be carried out during the shutdown stage which involves the connection of the LSS plant to DL network. Such test includes and not limited to the following:

- Electrical protection scheme
- Protection coordination study
- Cable and/or overhead test result
- SCADA
- VCB and DC system

All tests shall be carried out by a qualified tester and with a valid calibration certificate.



## 8.4 Commissioning Tests for IOD

There are 2 levels of testing required:

- a) Inverter compliance tests
- b) Interconnection compliance tests

The scope of testing during IOD shall cover:

- a) The LSS plant shall cease to energise during loss of mains. Anti-islanding test must comply with the following time:
  - Disconnection time:  $\leq 2s$  and
  - Reconnection time:  $> 5min$
- b) Functional tests of all equipment
- c) Any resetting of factory-set parameters at site requires testing to be redone.

All test results shall be certified by service engineer to be submitted to DL.

## 8.5 Power Quality Measurements

### 8.5.1 Pre/Post Initial Operation Date (IOD)

Power quality measurements are to be done at the point of connection to ascertain the existing power quality before commissioning and after the connection of LSS plant. The recording period shall be 7 days before commissioning to capture the base voltage regulation profile without LSS plant and 7 days after commissioning with the LSS plant connected.

Measurement shall capture the following parameters and not limited to:

- a) Total harmonic distortion (THD) voltage
- b) Unbalanced voltage
- c) Flicker voltage

### 8.5.2 Permanent Power Quality Measurements

The LSS developer shall install a permanent power quality recorder at the LSS circuit breaker and to submit the PQ report as and when requested by DL.

## 9. Commercial Operation Date (COD)

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### 9.1 Verification for COD

The verification for COD shall be conducted after IOD and the minimum duration shall be not be less than 7 days. The verification tests shall be performed by an Independent Engineer approved by ST and witnessed by DL. The verification test parameters include the following:

- a) Grid Frequency Variation
- b) Reactive Power
- c) Grid system voltage variation
- d) Grid system fault level
- e) Protection System
- f) Voltage support (AVQC)
- g) Equivalent control device to speed governor (Droop curve)
- h) Frequency MW Response
- i) Power Quality
- j) Fault ride through (LVRT)
- k) Inverter functional verifications

The COD verification requirements are as suggested in Attachment C and the verification methods are depicted in Table 17.

**Table 17 : Interconnection Facility Verification Methods**

| Test method       |   |
|-------------------|---|
| Factory test      | Valid test certificate/results from the factory                 |
| Site test         | Electrical and functional tests of the interconnection facility |
| Site verification | Confirmation against approved drawings or specification         |

### 9.2 Confirmation for COD

The LSS developer shall submit to ST and DL the report for COD confirmation. The report shall consist of:

- a) Verification report
- b) PQ report

Upon receipt of the reports, ST shall issue a letter of confirmation on COD to the LSS developer and DL to initiate payment.

## 10. Safety and Performance Sustainability Requirements

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The safety requirements to be adopted by the LSS developer and DL for work or testing at the interconnection facilities shall include the following:

- a) The LSS developer shall provide the single line diagrams of the interconnection facilities at the respective side of the connection point;
- b) The LSS developer shall have their own safety rules and/or safety instructions which comply with the Electricity Supply Act and prudent utility practices.
- c) The LSS developer shall designate a competent personnel registered with ST to operate the interconnection facilities within their boundary.

The LSS developer shall at its own cost conduct the testing of LSS plant (including the Interconnection Facility) and thereafter, submit the report of such testing, which report shall be certified by the Independent Engineer, to ST and DL on the 10<sup>th</sup> and 15<sup>th</sup> year of the contractual Term.

# 11. Commercial

## 11.1 Power Purchase Agreement (PPA)

The PPA is an agreement between DL and LSS developer. The agreement is based on Energy PPA only. It will be commenced for 21 years from the COD (Term).

## 11.2 LSS Plant Capacity

The established capacity allowed for connection to distribution network shall be in the range of 1MW<sub>ac</sub> to less than 30MW<sub>ac</sub> only. Type of concession is Build, Own and Operated (BOO) by the LSS developer.

Capacity factor must be declared and validated by the Independent Engineer approved by ST. At any point, the LSS developer shall not install solar panels more than the maximum Contracted Capacity. The contracted capacity will be dependent on the approved CLOA.

## 11.3 Maximum Annual Allowable Quantity (MAAQ)

The MAAQ (in kWh) is to be proposed by the LSS developer based on the Capacity of the Plant, the capacity factor and the number of hours in a year. Such MAAQ and any related documents shall be certified by the Independent Engineer approved by ST.

Energy produced annually by the LSS plant is capped at the agreed MAAQ in terms of payment of the Energy Rate. If MAAQ is exceeded, lower rate is applicable (Excess Energy Rate) as stipulated in the PPA.

## 11.4 Energy Beyond Contracted Capacity

Contracted Capacity (MW) shall depend on the bid submitted and subject to the approval of the ST. Any energy produced on a half hourly basis beyond the Contracted Capacity shall be free of charge.

## 11.5 PPA Timeline

Figure 10 illustrates the generic timeline for LSS PPA from the effective date of CLOA.



Figure 10: Timeline for LSS Plant

The Financial Closing Date shall occur on or before 6 months prior to the IOD.

## 11.6 PPA Submission

The successful LSS developer is required to submit the PPA to DL within 90 days upon receiving CLOA from ST.

Below are the lists of documents required for submission (not limited to):-

- a) PPA.
- b) Conditional Letter of Award.
- c) LSS plant installation.
- d) Interconnection and Communication facilities.
- e) Power system study (PSS) report.
- f) Declaration of MAAQ.
- g) Permanent generation licence by ST is condition precedence (CP) to IOD and will be part of IOD checklist.
- h) Submission of certified and executed Site/Lease Agreement over Land Title as the estimated time for issuance of a Land Title is expected to be longer – may involve issue of conversion of type of land use etc.
- i) Corporate Authorisations.

## 11.7 Billing and Payment

### 11.7.1 Test Energy

Test energy refers to the energy generated and delivered from the date of IOD until COD. During this period, LSS Developer needs to perform all relevant tests and shall be verified by the Independent Engineer approved by ST.

### 11.7.2 Energy Rate

LSS developer shall submit proposed energy rate during the bidding process. The final energy rate will be awarded by ST in the CLOA.

The energy rate will be effective during the PPA contract period. Any changes to the energy rate are not permitted except upon ST approval.

### 11.7.3 Change of ownership

The successful LSS developer shall not change the ownership of the LSS plant without the approval from ST.

However, if the approval granted by ST, the existing LSS developer shall terminate the existing PPA with the DL. The new owner shall submit new PPA to the DL and the effective period shall be the remaining years of the CLOA.

## 11.7.4 Billing

The LSS Developer shall read the energy meter on a monthly basis and prepare an invoice stating the amount of solar net energy output (NEO) and the amount payable by DL to the LSS developer. The LSS developer shall submit to DL the following documents:

- a) Invoice (refer to Attachment D).
- b) A photo of the meter with the kWh reading.

## 11.7.5 Payment

### 11.7.5.1 Test Energy

No energy payment shall be applicable for any test energy generated during the testing and commissioning of the Interconnection Facility.

### 11.7.5.2 Annual energy generation less than or equal to MAAQ

DL will pay the LSS developer on the prevailing energy rate. The calculation will be as below:

$$\text{Payment (RM)} = \text{NEO} \times \text{ER}$$

### 11.7.5.3 Annual energy generation exceeding MAAQ

DL will pay the LSS developer on the special energy rate that will be approved by ST.

$$\text{Payment (RM)} = \text{NEO} \times \text{EER}$$

The rate for ER and EER shall refer to PPA.

Note:

DAQ = Declared Annual Quantity (MWh)

ER = the prevailing Energy Rate (in RM/kWh) applicable for that Billing Period

EER = the Excess Energy Rate (in RM/kWh) for that Billing Period

MAAQ = Maximum Annual Allowable Quantity (in kWh)

NEO = Net Energy Output (in kWh)



Figure 11: Calculation of Energy Payment

### 11.7.5.4 Penalty

Penalty may be imposed in when there is a consequence of non-delivery of energy to DL based on capacity and energy commitment by LSS Developer. The details will be stipulated in the PPA.

## **11.8 Delay Compensation**

### **11.8.1 Failure to achieve Scheduled Commercial Operation Date (SCOD)**

LSS developer shall pay to DL compensation for each day beginning from the expiry of the SCOD until the earlier of;

- a) the COD of the LSS plant; or
- b) the date of PPA termination by DL in accordance with the provision of PPA; or
- c) 180 days after the SCOD

The calculated amount of compensation shall be specified in the PPA.

### **11.8.2 Abandonment of the project**

If the LSS developer abandons the project after the Effective Date, the LSS developer shall compensate DL an amount equal to RM as stipulated in the PPA.

# ATTACHMENTS

## ATTACHMENT Lists of Nodal Points

| Perlis |    |   |       |
|--------|----|---|-------|
| PMU    | 33 | 1 | 9.7MW |

| Kedah |    |   |         |
|-------|----|---|---------|
| PMU   | 33 | 8 | 133.3MW |

| Pulau Pinang |    |    |         |
|--------------|----|----|---------|
| PMU          | 33 | 15 | 378.7MW |

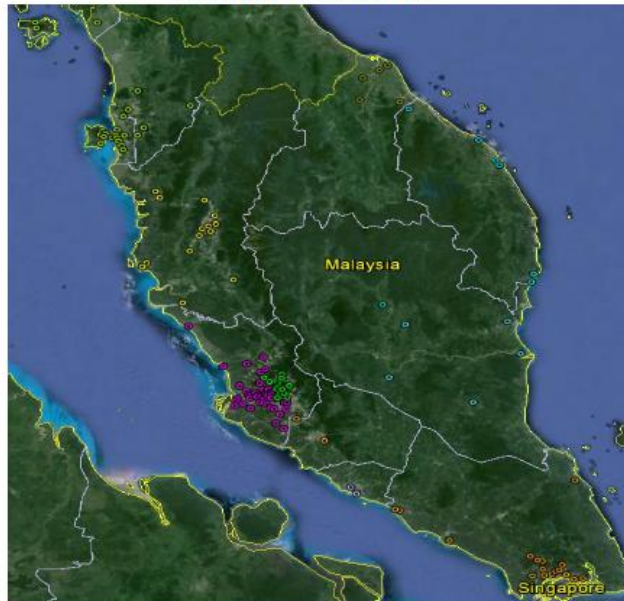
| Perak |    |    |         |
|-------|----|----|---------|
| PMU   | 33 | 11 | 193.3MW |
| PMU   | 11 | 2  | 23.3MW  |

| Selangor |    |    |          |
|----------|----|----|----------|
| PMU      | 33 | 44 | 1117.2MW |
| PMU      | 11 | 4  | 45.9MW   |

| Putrajaya&Cyberjaya |    |   |        |
|---------------------|----|---|--------|
| PMU                 | 33 | 3 | 69.8MW |

| Kuala Lumpur |    |    |          |
|--------------|----|----|----------|
| PMU          | 33 | 28 | 1361.2MW |

### SUMMARY OF DISTRIBUTION SYSTEM NODAL POINTS FOR LSS CONNECTIONS



| Kelantan |    |   |        |
|----------|----|---|--------|
| PMU      | 33 | 3 | 63.8MW |
| PMU      | 11 | 1 | 9.7MW  |

| Terengganu |    |   |        |
|------------|----|---|--------|
| PMU        | 33 | 2 | 31.3MW |
| PMU        | 11 | 2 | 33.7MW |

| Pahang |    |   |        |
|--------|----|---|--------|
| PMU    | 33 | 1 | 21.1MW |
| PMU    | 11 | 3 | 33.1MW |

| Johor |    |    |         |
|-------|----|----|---------|
| PMU   | 33 | 13 | 313.6MW |
| PMU   | 11 | 4  | 54.1MW  |

| Negeri Sembilan |    |   |        |
|-----------------|----|---|--------|
| PMU             | 33 | 2 | 52.8MW |

| Melaka |    |   |        |
|--------|----|---|--------|
| PMU    | 33 | 2 | 32.8MW |
| PMU    | 11 | 2 | 22.4MW |



## PENINSULAR MALAYSIA

| No. | Substation Name                      | State  | Connection Point | Allowable Connected Capacity MW <sub>ac</sub> |
|-----|--------------------------------------|--------|------------------|---|
| 1   | Kangar                               | Perlis | 33kV             | 9.70  |
| 2   | Aman Jaya                            | Kedah  | 33kV             | 14.80   |
| 3   | Alor Star (GIS)                      |        | 33kV             | 28.10   |
| 4   | Gurun East                           |        | 33kV             | 10.10   |
| 5   | Guthrie                              |        | 33kV             | 19.10   |
| 6   | Mergong                              |        | 33kV             | 18.70   |
| 7   | Tanjung Pauh                         |        | 33kV             | 12.60   |
| 8   | Sungai Petani Industrial             |        | 33kV             | 18.50   |
| 9   | Teluk Ewa                            |        | 33kV             | 11.40   |
| 10  | Air Terjun (Tanjung Tokong-TTKG)     |        | Pulau Pinang     | 33kV  |
| 11  | Bayan Baru                           | 33kV   |                  | 33.00   |
| 12  | Bayan Lepas                          | 33kV   |                  | 34.00   |
| 13  | Bukit Mertajam                       | 33kV   |                  | 17.70   |
| 14  | Bukit Minyak                         | 33kV   |                  | 26.90   |
| 15  | Bukit Tambun                         | 33kV   |                  | 19.90   |
| 16  | Bukit Tengah                         | 33kV   |                  | 25.50   |
| 17  | Butterworth North                    | 33kV   |                  | 23.50   |
| 18  | Farlim                               | 33kV   |                  | 22.90   |
| 19  | Penang (Gelugor) Power Station (New) | 33kV   |                  | 36.50   |
| 20  | Prai GIS                             | 33kV   |                  | 25.50   |
| 21  | Prai Industrial Estate               | 33kV   |                  | 20.40   |
| 22  | Seberang Jaya                        | 33kV   |                  | 21.20   |
| 23  | Sungai Kecil                         | 33kV   |                  | 19.80   |
| 24  | Sungai Pinang                        | 33kV   | 23.80            |   |
| 25  | Bidor                                | Perak  | 33kV             | 10.20   |
| 26  | Gopeng Road                          |        | 33kV             | 27.90   |
| 27  | Greentown                            |        | 33kV             | 11.90   |

| No. | Substation Name     | State | Connection Point | Allowable Connected Capacity MW <sub>ac</sub> |       |
|-----|---------------------|-------|------------------|---|-------|
| 28  | Hutan Melintang     | Perak | 33kV             | 13.50   |       |
| 29  | Kelebang            |       | 11kV             | 13.10   |       |
| 30  | Kelebang            |       | 33kV             | 11.30   |       |
| 31  | Kinta Valley Resort |       | 33kV             | 10.80   |       |
| 32  | Lumut Maritime      |       | 33kV             | 27.10   |       |
| 33  | Lumut               |       | 33kV             | 25.90   |       |
| 34  | Menglembu           |       | 33kV             | 20.90   |       |
| 35  | Pengkalan           |       | 33kV             | 20.50   |       |
| 36  | Tasik               |       | 11kV             | 10.20   |       |
| 37  | Taiping Industrial  |       | 33kV             | 13.30   |       |
| 38  | Bandar Botanic      |       | Selangor         | 33kV  | 32.10 |
| 39  | Bukit Beruntung     |       |                  | 33kV  | 11.50 |
| 40  | Bukit Changgang     |       |                  | 33kV  | 13.60 |
| 41  | Bukit Kapar         |       |                  | 11kV  | 11.90 |
| 42  | Bukit Kapar         | 33kV  |                  | 47.40   |       |
| 43  | Balakong            | 33kV  |                  | 25.20   |       |
| 44  | Bukit Raja (GIS)    | 33kV  |                  | 22.10   |       |
| 45  | Beranang            | 33kV  |                  | 15.80   |       |
| 46  | Batu Tiga           | 33kV  |                  | 17.70   |       |
| 47  | Banting             | 33kV  |                  | 20.70   |       |
| 48  | Connaught Bridge    | 11kV  |                  | 10.60   |       |
| 49  | Connaught Bridge    | 33kV  |                  | 11.20   |       |
| 50  | Cheras Jaya         | 33kV  |                  | 62.30   |       |
| 51  | HICOM               | 33kV  |                  | 29.10   |       |
| 52  | Ingerback           | 33kV  |                  | 22.20   |       |
| 53  | Kampung Chempaka    | 33kV  |                  | 19.30   |       |
| 54  | Kota Damansara      | 33kV  |                  | 49.90   |       |
| 55  | Kajang              | 11kV  |                  | 11.60   |       |

| No. | Substation Name                    | State    | Connection Point | Allowable Connected Capacity MW <sub>ac</sub> |
|-----|------------------------------------|----------|------------------|---|
| 56  | Kajang                             | Selangor | 33kV             | 23.20   |
| 57  | Kota Kemuning                      |          | 33kV             | 30.90   |
| 58  | Kuala Lumpur International Airport |          | 33kV             | 15.20   |
| 59  | Kampung Subang                     |          | 33kV             | 15.10   |
| 60  | Kuala Selangor                     |          | 33kV             | 16.50   |
| 61  | Jalan Meru                         |          | 11kV             | 11.80   |
| 62  | Jalan Meru                         |          | 33kV             | 35.70   |
| 63  | Maxharta                           |          | 33kV             | 20.10   |
| 64  | North Klang Straits                |          | 33kV             | 18.90   |
| 65  | New Rawang                         |          | 33kV             | 21.50   |
| 66  | New Subang Uda                     |          | 33kV             | 15.40   |
| 67  | New Sea Park                       |          | 33kV             | 24.90   |
| 68  | National University (GIS)          |          | 33kV             | 41.60   |
| 69  | Puchong Jaya                       |          | 33kV             | 22.20   |
| 70  | Puchong Perdana                    |          | 33kV             | 30.20   |
| 71  | Pulau Indah                        |          | 33kV             | 44.20   |
| 72  | Petaling Jaya South                |          | 33kV             | 27.50   |
| 73  | Pandamaran                         |          | 33kV             | 16.70   |
| 74  | Proton                             |          | 33kV             | 57.20   |
| 75  | Sungai Besar                       |          | 33kV             | 11.90   |
| 76  | Subang DCA                         |          | 33kV             | 19.30   |
| 77  | Shah Alam Bandar                   |          | 33kV             | 12.40   |
| 78  | Shah Alam East                     |          | 33kV             | 30.90   |
| 79  | Shah Alam South                    |          | 33kV             | 22.50   |
| 80  | Shah Alam West                     |          | 33kV             | 18.70   |
| 81  | Subang Jaya Town Centre (GIS)      |          | 33kV             | 22.80   |
| 82  | Serdang Raya                       |          | 33kV             | 33.70   |
| 83  | Taman Jaya                         |          | 33kV             | 24.10   |

| No. | Substation Name          | State                 | Connection Point | Allowable Connected Capacity MW <sub>ac</sub> |
|-----|--------------------------|-----------------------|------------------|---|
| 84  | Temasya                  | Selangor              | 33kV             | 11.60   |
| 85  | Teluk Panglima Garang    |                       | 33kV             | 32.20   |
| 86  | Abu Bakar Baginda        | Putrajaya & Cyberjaya | 33kV             | 20.70   |
| 87  | Cyberjaya North (GIS)    |                       | 33kV             | 39.20   |
| 88  | Serdang Power Station    |                       | 33kV             | 9.90  |
| 89  | Ampang (GIS)             | Kuala Lumpur          | 33kV             | 22.10   |
| 90  | Bukit Jalil              |                       | 33kV             | 23.70   |
| 91  | Bukit Mahkamah           |                       | 33kV             | 14.30   |
| 92  | Bandar Tun Razak         |                       | 33kV             | 27.20   |
| 93  | Danau Desa               |                       | 33kV             | 11.30   |
| 94  | Damansara Height         |                       | 33kV             | 21.20   |
| 95  | Galloway                 |                       | 33kV             | 17.20   |
| 96  | Harta Kemuncak           |                       | 33kV             | 36.50   |
| 97  | Jalan Imbi               |                       | 33kV             | 21.20   |
| 98  | Kuala Lumpur City Centre |                       | 33kV             | 28.90   |
| 99  | Kampung Lanjut           |                       | 33kV             | 35.70   |
| 100 | KL Pavilion              |                       | 33kV             | 17.40   |
| 101 | Kuala Lumpur East        |                       | 33kV             | 48.40   |
| 102 | Kuala Lumpur North       |                       | 33kV             | 23.80   |
| 103 | Kuala Lumpur South (GIS) |                       | 33kV             | 38.20   |
| 104 | Manjalara                |                       | 33kV             | 18.70   |
| 105 | Mid Valley               |                       | 33kV             | 11.10   |
| 106 | Pandan Maju              |                       | 33kV             | 34.00   |
| 107 | Pantai                   |                       | 33kV             | 16.20   |
| 108 | Pudu Ulu                 | 33kV                  | 26.30            |   |
| 109 | Sri Damansara            | 33kV                  | 39.10            |   |
| 110 | Segambut                 | 33kV                  | 28.90            |   |
| 111 | SPPK Cheras              | 33kV                  | 39.10            |   |

| No. | Substation Name                       | State           | Connection Point | Allowable Connected Capacity MW <sub>ac</sub> |
|-----|---------------------------------------|-----------------|------------------|---|
| 112 | Sentul Raya                           | Kuala Lumpur    | 33kV             | 26.30   |
| 113 | TNB HQ                                |                 | 33kV             | 12.70   |
| 114 | Vision City                           |                 | 33kV             | 18.50   |
| 115 | Wangsa Maju                           |                 | 33kV             | 22.60   |
| 116 | Arab Malaysian Industrial Development | Negeri Sembilan | 33kV             | 17.10   |
| 117 | Tuanku Jaafar Industrial              |                 | 33kV             | 35.70   |
| 118 | Cheng                                 | Melaka          | 33kV             | 17.85   |
| 119 | Ujung Pasir                           |                 | 33kV             | 14.96   |
| 120 | Masjid Tanah                          |                 | 11kV             | 11.365  |
| 121 | Malim Jaya                            |                 | 11kV             | 11.05   |
| 122 | Gelang Patah                          | Johor           | 33kV             | 26.30   |
| 123 | Kulai                                 |                 | 11kV             | 11.90   |
| 124 | Kluang (New)                          |                 | 33kV             | 12.07   |
| 125 | Kangkar Tebrau                        |                 | 33kV             | 15.30   |
| 126 | Mersing                               |                 | 33kV             | 12.20   |
| 127 | Pusat Bandar Johor Bahru              |                 | 33kV             | 22.90   |
| 128 | Pasir Gudang Town Centre              |                 | 33kV             | 43.10   |
| 129 | Perling                               |                 | 33kV             | 24.60   |
| 130 | Permas Jaya                           |                 | 33kV             | 20.80   |
| 131 | Sungai Abong                          |                 | 33kV             | 12.70   |
| 132 | Skudai                                |                 | 33kV             | 42.50   |
| 133 | Senai                                 |                 | 11kV             | 12.50   |
| 134 | Tanjung Agas                          |                 | 11kV             | 17.80   |
| 135 | Tebrau                                |                 | 33kV             | 31.40   |
| 136 | Tanjung Laboh                         |                 | 11kV             | 11.90   |
| 137 | Tampoi Industry                       |                 | 33kV             | 20.90   |
| 138 | Ulu Tiram                             |                 | 33kV             | 28.90   |
| 139 | Bandar Indera Mahkota                 | Pahang          | 11kV             | 12.60   |

| <b>No.</b> | <b>Substation Name</b> | <b>State</b> | <b>Connection Point</b> | <b>Allowable Connected Capacity MW<sub>ac</sub></b> |
|------------|------------------------|--------------|-------------------------|---|
| 140        | Bandar Indera Mahkota  | Pahang       | 33kV                    | 21.10   |
| 141        | Pekan                  |              | 11kV                    | 11.20   |
| 142        | Temerloh Industrial    |              | 11kV                    | 9.30  |
| 143        | Batu Rakit             | Terengganu   | 33kV                    | 16.70   |
| 144        | Chendering             |              | 11kV                    | 10.50   |
| 145        | Kuala Terengganu       |              | 11kV                    | 23.20   |
| 146        | Seberang Jertih        |              | 33kV                    | 14.60   |
| 147        | Kota Bharu             | Kelantan     | 11kV                    | 9.69  |
| 148        | Kota Bharu             |              | 33kV                    | 23.80   |
| 149        | Lemal                  |              | 33kV                    | 9.55  |
| 150        | Panchor                |              | 33kV                    | 30.45   |

## SABAH

| No. | Substation Name | Connection Point | Allowable Connected Capacity MW <sub>ac</sub> |
|-----|-----------------|------------------|---|
| 1   | PPU Tshun Nyen  | 33kV             | 15.00   |
| 2   | PPU Sim-Sim     | 33kV             | 10.00   |
| 3   | PPU Leila       | 33kV             | 8.00  |
| 4   | PPU Permai      | 33kV             | 5.50  |
| 5   | PMU Kota Belud  | 33kV             | 7.19  |
| 6   | PMU Beaufort    | 33kV             | 14.00   |
| 7   | PPU Sipitang    | 33kV             | 6.47  |
| 8   | PPU Lakut       | 33kV             | 7.72  |
| 9   | PPU Sri Menanti | 33kV             | 15.00   |
| 10  | PPU Kubota      | 33kV             | 15.00   |
| 11  | PPU Pegalan     | 33kV             | 8.61  |
| 12  | PMU Keningau    | 33kV             | 8.31  |
| 13  | PMU Kepyayan    | 11kV             | 5.00  |
| 14  | PMU Alam Mesra  | 11kV             | 5.00  |
| 15  | PMU Penampang   | 11kV             | 5.00  |
| 16  | PMU KKUI        | 11kV             | 4.845   |
| 17  | PMU Inanam      | 11kV             | 3.40  |
| 18  | PMU Karamunsing | 11kV             | 0.6885  |
| 19  | PPU Sepanggar   | 11kV             | 4.08  |
| 20  | PMU UMS         | 11kV             | 5.00  |
| 21  | PMU Tg Lipat    | 11kV             | 5.00  |
| 22  | PMU Minintod    | 11kV             | 2.295   |
| 23  | PMU Lok Kawi    | 11kV             | 4.505   |
| 24  | PPU Starcity    | 11kV             | 5.00  |
| 25  | PPU KKIA        | 11kV             | 2.975   |
| 26  | PPU Kimanis     | 11kV             | 0.5345  |
| 27  | PPU Lakut       | 11kV             | 5.00  |

| <b>No.</b> | <b>Substation Name</b> | <b>Connection Point</b> | <b>Allowable Connected Capacity MW<sub>ac</sub></b> |
|------------|------------------------|-------------------------|---|
| 28         | PPU Kinarut            | 11kV                    | 2.125   |
| 29         | PMU Kota Belud         | 11kV                    | 5.00  |
| 30         | PMU Tuaran             | 11kV                    | 5.00  |
| 31         | PPU Kundasang          | 11kV                    | 4.08  |
| 32         | PMU Kudat              | 11kV                    | 2.075   |
| 33         | PPU Matunggong         | 11kV                    | 0.34  |
| 34         | PPU Kota Marudu        | 11kV                    | 0.40  |
| 35         | PPU Pitas              | 11kV                    | 1.615   |
| 36         | PPU Bangat             | 11kV                    | 5.00  |
| 37         | PPU Kiamsam            | 11kV                    | 1.53  |
| 38         | PPU Patau-Patau        | 11kV                    | 5.00  |
| 39         | PPU Ranca-Ranca        | 11kV                    | 4.59  |
| 40         | PPU Wilayah Rehab      | 11kV                    | 5.00  |
| 41         | PPU Manikar            | 11kV                    | 1.87  |
| 42         | PPU Pulau Enoe         | 11kV                    | 0.765   |
| 43         | PMU Beaufort           | 11kV                    | 3.42  |
| 44         | PPU Limbawang          | 11kV                    | 2.04  |
| 45         | PPU Kayul              | 11kV                    | 0.53  |
| 46         | PPU Menumbuk           | 11kV                    | 0.51  |
| 47         | PPU Sipitang           | 11kV                    | 4.08  |
| 48         | PMU Keningau           | 11kV                    | 5.00  |
| 49         | PPU Pegalan            | 11kV                    | 2.08  |
| 50         | PPU Nabawan            | 11kV                    | 0.68  |
| 51         | PPU Tambunan           | 11kV                    | 1.36  |
| 52         | PMU Tenom              | 11kV                    | 2.995   |
| 53         | PPU Tshun Nyen         | 11kV                    | 5.00  |
| 54         | PPU Leila              | 11kV                    | 3.825   |
| 55         | PPU Sim-Sim            | 11kV                    | 5.00  |



| <b>No.</b> | <b>Substation Name</b> | <b>Connection Point</b> | <b>Allowable Connected Capacity MW<sub>ac</sub></b> |
|------------|------------------------|-------------------------|---|
| 56         | PPU Mowtas             | 11kV                    | 4.505   |
| 57         | PPU Permai             | 11kV                    | 3.825   |
| 58         | PPU Labuk              | 11kV                    | 2.38  |
| 59         | PPU Batu Sapi          | 11kV                    | 2.38  |
| 60         | PPU Beluran            | 11kV                    | 1.105   |
| 61         | PMU Kunak              | 11kV                    | 5.00  |
| 62         | PPU Kinabatangan       | 11kV                    | 4.08  |
| 63         | PPU Pasir Putih        | 11kV                    | 2.72  |
| 64         | PPU Sri Menanti        | 11kV                    | 5.00  |
| 65         | PPU Kubota             | 11kV                    | 5.00  |
| 66         | PPU Wakuba             | 11kV                    | 0.425   |
| 67         | PPU Balung             | 11kV                    | 1.02  |
| 68         | PMU Semporna           | 11kV                    | 5.00  |
| 69         | PMU Sebatik            | 11kV                    | 0.425   |
| 70         | PMU Warisan            | 11kV                    | 0.935   |

# ATTACHMENT IOD Checklist

## CHECKLIST FOR INITIAL OPERATION DATE (IOD) FOR RENEWABLE ENERGY PROJECT

|  |                       |                          |
|--|-----------------------|--------------------------|
| SOLAR POWER PRODUCER (SSP):  |                       |                          |
| LOCATION OF DEVELOPMENT:   |                       |                          |
| NET EXPORT CAPACITY:   | _____ kW <sub>e</sub> | CLOA NO. _____           |
| M&E CONSULTANT:  | _____                 | M&E CONTACT NO. _____    |
| M&E EMAIL ADD:   | _____                 |                          |
| 1. Notification letter for IOD (not less than 60 days) to TNB attached with complete documents   |                       | <input type="checkbox"/> |
| 2. A certificate from an Independent Engineer (approved by ST) stating that interconnection facilities have been designed and constructed in accordance with Prudent Utility Practices |                       | <input type="checkbox"/> |
| 3. Attach a copy of as-built drawing of RE installation and interconnection facilities   |                       | <input type="checkbox"/> |
| 4. Attach a final copies of Interconnection Operation Manual (IOM) agreed by TNB   |                       | <input type="checkbox"/> |
| 5. Attach the acceptance test result, Factory Acceptance Test and laboratory test result for anti-islanding of installation to TNB   |                       | <input type="checkbox"/> |
| 6. Attach the details and test results of interconnection facilities:  |                       |                          |
| a) Electrical protection scheme  |                       | <input type="checkbox"/> |
| b) Protection coordination study for DG Plant  |                       | <input type="checkbox"/> |
| c) Cable test result (if applicable)   |                       | <input type="checkbox"/> |
| d) Overhead test result (if applicable)  |                       | <input type="checkbox"/> |
| e) SCADA   |                       | <input type="checkbox"/> |
| f) VCB dan DC system test results  |                       | <input type="checkbox"/> |
| g) Calibration certificate for testing equipments used   |                       | <input type="checkbox"/> |
| h) G & H forms (requested by Electricity Supply Act 1990)  |                       | <input type="checkbox"/> |
| 7. Metering Installation:  |                       |                          |
| a) A copy of Borang Maklumat Awal Perangkaan Besar approval letter   |                       | <input type="checkbox"/> |
| b) A copy of payment receipt for purchasing the meter(s)   |                       | <input type="checkbox"/> |
| 8. Handover document for substation & land (if any):   |                       |                          |
| a) Borang A and Borang TNB 229   |                       | <input type="checkbox"/> |
| b) Pre-comp plan (substation lot etc)  |                       | <input type="checkbox"/> |
| c) Bank Guarantee RM 20k   |                       | <input type="checkbox"/> |
| 9. Copies of all authorities approval letters:   |                       |                          |
| a) CLOA from ST  |                       | <input type="checkbox"/> |
| b) Permanent Generation License By Suruhanjaya Tenaga (ST)   |                       | <input type="checkbox"/> |
| c) Approved Certificate as an Independent Engineer from ST   |                       | <input type="checkbox"/> |
| d) Right of Ways for poles and/or cable routes By Local Authorities  |                       | <input type="checkbox"/> |
| 10. Attach schedule of RE generation (kWh) on hourly basis from IOD to COD (not less than 7 days)  |                       | <input type="checkbox"/> |
| 11. Written confirmation by TNB station and Protection Head on the satisfactory of site works and none outstanding issues  |                       | <input type="checkbox"/> |

Herewith, we verify that the above documents have been submitted and received by TNB

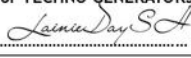
| Prepared by:<br>Independent Engineer (appointed by ST) | Checked by:<br>(TNB - RE&GT) | Verified by:<br>(TNB - RE&GT) |
|--|------------------------------|-------------------------------|
| .....  | .....                        | .....                         |
| Name:<br>Date:   | Name:<br>Date:               | Name:<br>Date:                |

## ATTACHMENT C COD Testing Requirements

In general, the LSS shall adhere to the requirements as stipulated in the MDC. The salient requirements extracted from the relevant clauses in the MDC or other standards are summarised as follows:

|     | Test  | Requirement in MV connection guideline        | Procedure                                   | Expected passing result          |
|-----|---|---|---|----------------------------------|
| 1.  | Grid frequency variation                                  | 6.1.3   | Factory test                                | Pass                             |
| 2.  | Reactive Power  | 6.2.4   | Factory test                                | Pass                             |
| 3.  | Grid system voltage variation                             | 6.1.1   | Factory test                                | Pass                             |
| 4.  | Grid system fault level                                   | 6.1.10<br>and Power System Study              | Site verification based on nameplate rating | Compliance to Power System Study |
| 5.  | Protection System   | 6.3.1<br>6.3.2<br>6.3.3<br>6.3.4<br>6.3.6     | Site verification                           | Compliance to coordination study |
| 6.  | Voltage Support (AVQC)                                    | 6.2.3   | Factory test                                | Pass                             |
| 7.  | Equivalent control device to speed governor (Droop curve) | 6.2.5<br>6.1.3                                | Factory test                                | Pass                             |
| 8.  | Frequency MW Response                                     | 6.2.2   | Factory test                                | Pass                             |
| 9.  | Power Quality   | 6.1.5   | Site test                                   | Pass                             |
| 10. | Fault ride through (LVRT)                                 | 6.2.1   | Factory test                                | Pass                             |
| 11. | Inverter functional verifications                         | 6.3.7.1<br>6.3.7.2<br>6.3.8<br>6.1.4<br>6.1.5 | Site test                                   | Pass                             |

# ATTACHMENT Example of Invoice Layout

| <b>Nama FIAH, Alamat dan No Pendaftaran GST</b><br>TECHNO GENERATORS SDN BHD<br>Lot 21-3, KLCC, Kuala Lumpur<br><small>GST NO : 000123456789</small>   |   |  |                               |  |
|--|---|--|-------------------------------|--|
| <b>To : TENAGA NASIONAL BERHAD</b><br>Pengurus Besar (Pembangunan Tenaga Lestari)<br>Jabatan Perkhidmatan Pengguna<br>ian Pembahagian, TNB<br>6, Wisma TNB,<br>Jalan Timur,<br>46200 Petaling Jaya<br>Selangor |   | <b>TAX INVOICE</b><br>Invoice No : ABCD1234<br>Date : 14 March 2016<br>Billing Period : 1 - 29 Feb 2016<br>(29 days) |                               |  |
| <b>Nama Pelanggan dan Alamat</b>   |   | <b>No Serial Invois Cukai</b>  | <b>Perkataan INVOIS CUKAI</b> | <b>Tarikh Invois Cukai dikeluarkan</b> |
| No   | Descriptions  | Unit (kWh)   | Rate (RM/kWh)                 | Amount (RM)                            |
|  | Sales of electricity<br>Reading from 1 - 29 Feb 2016 (29 days),<br><br>Current reading<br>29,073,164<br>(-) Previous reading<br>28,568,097<br><hr/> 505,067 | 505,067  | 0.3184                        | 160,813.33                             |
| Please make payment to<br>RHB Bank Berhad<br>21160-3456-97643<br><br>For TECHNO GENERATORS SDN BHD<br>                        |   |  | Total without GST             | 160,813.33                             |
|  |   | add  | GST (6%)                      | 9,648.80                               |
|  |   |  | Total                         | 170,462.13                             |

Butir-butir perkhidmatan/ pembekalan

Jumlah tidak termasuk cukai

Jumlah dikenakan GST

Jumlah termasuk GST

## **APPENDIX E :**

PPA for Transmission Connected LSS

**[NOTE: THIS POWER PURCHASE AGREEMENT MAY BE FURTHER REVISED UPON THE FINALISATION OF THE CAPACITY OF THE FACILITY.]**

## POWER PURCHASE AGREEMENT

**THIS POWER PURCHASE AGREEMENT** is made on the [●] day of [●] 20[●];

### **BETWEEN:**

- (1) **TENAGA NASIONAL BERHAD (TNB)**, a limited liability company incorporated under the Companies Act, 1965 (Company Registration No. 200866-W) and having its registered office at Pejabat Setiausaha Syarikat, Tingkat 2, Ibu Pejabat Tenaga Nasional Berhad, No. 129, Jalan Bangsar, 59200 Kuala Lumpur, Wilayah Persekutuan;

### **AND**

- (2) [●] (**SPP**), a private limited liability company incorporated under the Companies Act, 1965 (Company Registration No. [●]) and having its registered office at [●];

(each, a **Party** and, collectively, the **Parties**).

### **WHEREAS:**

- (A) SPP proposes to design, construct, own, operate and maintain a solar photovoltaic energy generating facility with a capacity of **[not less than 30MWac but not more than 50MWac]** MWac proposed to be located in [●] to generate and deliver solar photovoltaic energy to TNB.
- (B) SPP wishes to sell to TNB, and TNB wishes to purchase from SPP, the Net Electrical Output generated by the Facility and delivered to TNB in accordance with the terms and conditions set out in this Agreement.

### **IT IS HEREBY AGREED:**

#### **1. DEFINITIONS**

##### **1.1 Defined Terms**

In this Agreement, the following terms shall have the meanings set out against them below:

**Abandons** means (i) during the period beginning on the Commencement Date and ending on the Commercial Operation Date, the failure by SPP to perform any material part of the construction works on the Project and the Independent Engineer is unable to confirm in writing within fifteen (15) days of being requested to do so by TNB that there is a reasonable prospect of SPP

achieving the Commercial Operation Date before ***[to insert a specified date which is 180 days from the Scheduled Commercial Operation Date]***; and (ii) during the period beginning on the Commercial Operation Date and ending on the expiration of the Term, the failure by SPP to operate the Facility for a continuous period of more than six (6) months unless:

- (a) TNB is in breach of a material obligation under this Agreement; or
- (b) the Facility was during such period the subject of repair, rehabilitation or repowering; or
- (c) SPP is excused from doing so pursuant to the provisions of Clause 18 or as a result of the occurrence of an event of the type contemplated in Clause 4.4(a) and Clause 4.4(c);

and ***Abandon, Abandonment*** and ***Abandoned*** shall be construed accordingly;

***Access Rights***

means all rights necessary to construct, install, commission, energise, test, operate, maintain, upgrade, replace and remove any part of the Project and the TNB Metering Equipment including all rights of way, easements and continuing access rights;

***Agreed Program***

shall have the meaning given to it in Clause 10.2(b);

***Agreement***

means this Power Purchase Agreement and the appendices and exhibits attached to it;

***Annual Generation Profile***

means the forecasted annual generation profile (in MWac) of the Facility's output for every hourly interval to be generated and delivered to the Grid System at the Interconnection Point from the Facility for each Contract Year;

***Billing Period***

means (i) the period beginning on the Initial Operation Date and ending on the last day of the month following the month in which that date occurs, (ii) each one (1) month period thereafter during the Term, and (iii) the period beginning on the first (1<sup>st</sup>) day of the month in which the Term expires and ending on the day the Term expires;

***Billing Statement***

shall have the meaning given to it in Clause 6;

|  |  |
|--|--|
| <b><i>Business Day</i></b>                     | means any day on which commercial banks are open for business in Kuala Lumpur, Wilayah Persekutuan but excludes public holidays in Kuala Lumpur, Wilayah Persekutuan and Sundays;  |
| <b><i>Capital Improvement Threshold</i></b>    | shall have the meaning given to it in Clause 22.1(e);  |
| <b><i>Change-in-Law</i></b>                    | means, in each case after the date of this Agreement, the enactment, introduction, adoption or making of any new Law, any change in, variation, repeal or modification of any existing Law, the commencement of any Law which has not yet come into effect, or any change in the interpretation or application of any Law;   |
| <b><i>Commencement Date</i></b>                | means the date notified by SPP to TNB on which the notice to proceed under the EPCC Contract is issued;  |
| <b><i>Commercial Operation Date or COD</i></b> | means the day following all the conditions precedent as set forth in Clause 3.3 of this Agreement having been satisfied or waived, starting from 00:00 hours;  |
| <b><i>Contract Year</i></b>                    | means, the period which begins on the Commercial Operation Date and ends on December 31 of the year in which the Commercial Operation Date occurs, each subsequent period during the Term which begins on January 1 and ends on December 31 of the same year and the period of twelve (12) months or less which begins on January 1 and ends on the last day of the Term;  |
| <b><i>Control</i></b>                          | means the power (whether directly or indirectly and whether by the ownership of share capital, the possession of voting power, contract or otherwise) to appoint and/or remove all or such of the members of the board of directors or other governing body of a person as are able to cast a majority of the votes capable of being cast by the members of that board or otherwise to control or have the power to control the policies and affairs of that person; and for the purposes of this definition, a person (the <b>relevant person</b> ) "Controls" a person if (i) it can exercise the requisite power by acting in concert with one (1) or more other persons pursuant to an agreement or understanding (whether formal or informal) and (ii) the relevant person owns twenty per cent (20%) or more of the securities of the person who is Controlled having ordinary voting power for the election of the members of the board of directors or other governing body of that person, or if that person has no such board of directors or other governing body, twenty per cent (20%) or more of the ownership interests in that |



person; and “Controls”, “Controlling” and “Controlled” shall be construed accordingly;

**Control Centre** means the control centre for the Grid System located at Ibu Pejabat TNB, Jalan Bangsar, 59200 Kuala Lumpur, Wilayah Persekutuan or such other similar centre as may be designated in writing by GSO from time to time by not less than five (5) days’ notice (except in the event of an Emergency Condition when GSO shall give such notice (if any) as is appropriate in the circumstances) to SPP as being the primary control centre for the Facility;

**Corporate Authorisation** means any authorisation, resolution, approval or consent required under the constituent documents or other internal procedures of a Party;

**Critical Milestones** means those events specifically described in Clause 3.5, the occurrence of which are necessary for TNB to have assurance that the Commercial Operation Date will occur by the Scheduled Commercial Operation Date;

**Declared Daily Capacity** means on any given day of a Contract Year, the forecasted daily capacity (in MWac) of the Facility’s output for every fifteen (15) minutes interval to be generated and delivered to the Grid System at the Interconnection Point from the Facility, as may be declared from time to time by SPP for such day pursuant to Clause 11.5;

**Declared Annual Quantity** means the annual quantity (in MWh) of solar photovoltaic energy declared by SPP to be generated and delivered to the Grid System at the Interconnection Point from the Facility for each Contract Year which shall be at least the minimum annual quantity as set out in Attachment A to Appendix G but not exceeding the Maximum Annual Allowable Quantity;

**Default Rate** means a rate equal to one per cent (1%) above the base rate per annum then in effect at the principal office of Malaysian Banking Berhad or its successor-in-title;

**Design Limits** means the design limits of the Facility as set out or incorporated by reference in Appendix B;

**Despatch** means the issuance of a Despatch Instruction and Despatches and Despatched shall be construed accordingly;

**Despatch Instruction** means an oral or written instruction or electronic signal communicated to SPP by the Grid System Operator or the Control Centre directing the Facility to commence,

increase, decrease, maintain or cease the generation and delivery of solar photovoltaic energy into the Grid System, in accordance with the provisions of this Agreement;

**Effective Date** means the date on which all conditions precedent listed in Clause 3.1 have been satisfied or waived;

**EIA Approval** means all the requisite approvals required from the Department of Environment under the Environmental Quality Act 1974 in respect of the Project pursuant to the submission of an Environmental Impact Assessment Report by SPP in relation thereto;

**Electrical Service Engineer** means a person who holds a certificate of competency as an electrical service engineer issued under the Electricity Regulations 1994;

**Emergency Condition** means a condition or situation that is (i) described or regarded as such in the Grid Code or (ii) in the judgement of the Grid System Operator, based on Prudent Utility Practices, either (a) presents an imminent physical threat of danger to life or property, or (b) threatens the safety, integrity, stability or security of the Grid System, or (c) could reasonably be expected to cause a significant disruption on the Grid System, or (d) could reasonably be expected to adversely affect the provision of safe, adequate and reliable electricity supply to end users, including other utilities with which the Grid System is interconnected;

**Energy Payment** means a payment determined in accordance with Appendix G to be made by TNB to SPP for Net Electrical Output generated and delivered from the Facility;

**Energy Rate** means RM[●] per kWh or such other rate as may be adjusted in accordance with the terms of this Agreement;

**EPCC Contract** means all contracts to be entered into between SPP and the EPCC Contractor in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works;

**EPCC Contractor** means any firm or firms retained by SPP to provide services (other than consultancy or project management services) in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the SPP Interconnection

Facility, the SPP Interconnector and the SPP Works;

|  |   |
|--|---|
| <b><i>Established Capacity</i></b>           | means [ <b><i>not less than 30MWac but not more than 50MWac</i></b> ]MWac or as may be revised in accordance with Clause 12.2;  |
| <b><i>Event of Default</i></b>               | means the occurrence of any of the events described in Clause 19.1 or 19.4, as the case may be;   |
| <b><i>Excess Energy</i></b>                  | shall have the meaning given to it in Clause 5.2(c);  |
| <b><i>Excess Energy Rate</i></b>             | means RM[●] per kWh;  |
| <b><i>Facility</i></b>                       | means a solar photovoltaic energy generating facility located at the Site with a capacity of [●]MWac and ancillary equipment and facilities as more specifically described in Appendix A and includes any Modification thereto;   |
| <b><i>Federal Government of Malaysia</i></b> | means the Ministry of Energy, Green Technology and Water or any other ministry as may from time to time be in charge of energy;   |
| <b><i>Financial Closing Date</i></b>         | means the date on which the Financing Documents relating to the financing or refinancing for the total construction costs of the Project have been entered into by SPP and the Financing Parties, and all of the conditions precedent for the initial drawdown under such Financing Documents have been satisfied by SPP or waived by the Financing Parties thereunder;   |
| <b><i>Financial Model</i></b>                | means the financial model (as at the date of the Letter of Award) and embodied in its financial model software setting out the basis on which the financing of the Project and the costs of and revenue from the Project have been calculated by SPP (including without limitation the assumptions used, the cell logic network for the financial model software and accompanying documentation necessary to operate the financial model) recorded on a CD-Rom or other electronic storage medium, as confirmed by the Suruhanjaya Tenaga to be the basis for the award of the Project to SPP and in which the Energy Rate has been derived, a hard copy of which is set out in Appendix I; |
| <b><i>Financing Documents</i></b>            | means the loan agreements (including agreements for any subordinated debt), notes, bonds, indenture, guarantees, security agreements, hedging agreements and any other documents relating to the financing or refinancing and security arrangements for the Project which have been or are to be entered into by SPP,   |

excluding any agreements relating to Sponsors' Gross Equity Contribution;

**Financing Parties** means the Persons, in accordance with the Financing Documents, providing financing, hedging or other form of banking or bond facilities (including any refinancing in respect thereof) for the Project and includes any agent(s) or trustee under such banking or bond facilities;

**Force Majeure Event** shall have the meaning given to it in Clause 18.1;

**Government Authorisation** means any authorisation, consent, concession, decree, permit, waiver, privilege, exemption and approval from, or filing with, or notice to, any Government Entity;

**Government Entity** means any national, state or local government of Malaysia and any ministry, department, instrumentality, agency, authority, commission or any such other entity of any national, state or local government of Malaysia;

**Grid Code** means the Malaysian Grid Code, as amended from time to time in accordance with applicable Law;

**Grid System** means the bulk power network controlled or used by the GSO for the purpose of transmitting and distributing electricity to end users and that portion of the SPP Works to be transferred to TNB hereunder;

**Grid System Operator or GSO** shall have the meaning given to it in the Grid Code;

**Independent Engineer** means an established reputable consulting engineering firm or professional engineers, registered with the Board of Engineers Malaysia and who shall not be the Owner's Engineer, retained by SPP and approved by the Suruhanjaya Tenaga, the Financing Parties and TNB as the independent engineer in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the Site, the SPP Interconnection Facility, the SPP Interconnector, the SPP Works and associated facilities;

**Initial Contract Year** shall have the meaning given to it in Clause 11.1(b);

**Initial Financing Documents** means the loan agreements (including agreements for any subordinated debt), notes, bonds, indenture, guarantees, security agreements, hedging agreements and any other documents relating to the financing and security arrangements for the Project which are entered into between the Financing Parties and SPP and

reflecting accurately the Financial Model, excluding any agreements relating to Sponsors' Gross Equity Contribution;

**Initial Operation Date** means the date on which Net Electrical Output is first generated and delivered from the Facility to the Grid System;

**Interconnection Point** means the demarcation line for ownership and maintenance as more specifically described and shown in Appendix D;

**kVArh** means kilovolt-ampere-reactive-hour;

**kW** means kilowatt;

**kWh** means kilowatt-hour;

**Law** means any law, legislation, statute, rule, order, treaty, regulation, directive, guideline, request or requirement, announcement or published practice or any interpretation thereof which is enacted, issued, promulgated or made by any Government Entity or by any court or tribunal, including any Government Authorisation;

**Letter of Award** means the letter of award to be issued by the relevant Government Entity responsible for the award of the Project to SPP, a copy of which is to be set out in Appendix K;

**Maximum Annual Allowable Quantity** shall have the meaning given to it in Appendix G;

**Meteorological Measuring Facilities** means all of the facilities (which is part of the ancillary equipment and facilities of the Facility), in accordance with the requirements of Appendix E and as more specifically described in Appendix A, that are necessary in accordance with Prudent Utility Practices to enable SPP and TNB to monitor and record the meteorological conditions at the Site;

**Modification** means an addition or modification to, or change in, or replacement or renewal of plant, equipment, machinery or facilities used by SPP for purposes of, or incidental to, the generation and delivery of solar photovoltaic energy to the Grid System (other than in the ordinary course of operation of any part thereof) and which is in accordance with Prudent Utility Practices and endorsed in writing by TNB;

|                               |  |
|-------------------------------|--|
| <b>MW</b>                     | means megawatt;  |
| <b>MWac</b>                   | means megawatt in alternating current;   |
| <b>MWh</b>                    | means megawatt hour;   |
| <b>Net Electrical Output</b>  | means the solar photovoltaic energy generated and delivered to the Grid System at the Interconnection Point from the Facility by SPP as measured in kWh by the TNB Metering Equipment or as otherwise determined in accordance with the provisions of Clause 14 during such period;  |
| <b>Non-Acceptance Payment</b> | shall have the meaning given to it in Appendix G;  |
| <b>Non-Delivery Payment</b>   | shall have the meaning given to it in Appendix G;  |
| <b>Non-Delivery Rate</b>      | means the Energy Rate;   |
| <b>O&amp;M Agreement</b>      | means the agreement to be made between SPP and the O&M Contractor to operate and maintain the Facility;  |
| <b>O&amp;M Contractor</b>     | means an appropriately qualified operation and maintenance contractor retained by SPP to provide services in connection with the operation and maintenance of the Facility;  |
| <b>Owner's Engineer</b>       | means an established reputable consulting engineering firm or professional engineers, registered with the Board of Engineers Malaysia, retained by SPP as SPP's engineer in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the Site, the SPP Interconnection Facility, the SPP Interconnector, the SPP Works and associated facilities;                  |
| <b>Person</b>                 | means any individual, corporation, partnership, joint venture, trust, unincorporated organisation or Government Entity;  |
| <b>Project</b>                | means, collectively, the financing, design, engineering, procurement, construction, installation, testing, commissioning, ownership, operation and maintenance of the Facility, the Site, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector, the SPP Works and associated facilities irrespective of whether construction has been completed or the Commercial Operation Date has been |

|   |   |
|---|---|
|   | achieved, as more specifically described in Appendix A, and any Modification thereto;   |
| <b><i>Project Documents</i></b>                   | means, collectively, this Agreement, the EPCC Contract, the O&M Agreement, the Site Agreement and such other agreements as TNB and SPP shall from time to time mutually designate as a "Project Document";  |
| <b><i>Prudent Utility Practices</i></b>           | means the practices, methods and standards generally followed by the electricity supply industry in Malaysia, during the applicable period, with respect to the design, construction, testing, operation and maintenance of solar photovoltaic generating and transmission equipment of the type used by the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, which practices, methods and standards generally conform to applicable Laws, the operation and maintenance standards recommended by the Facility's equipment suppliers and manufacturers, the operation and maintenance standards recommended by the equipment suppliers and manufacturers of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, the internationally accepted standards relating to solar photovoltaic generating facilities and the Grid Code; |
| <b><i>Revised Established Capacity</i></b>        | shall have the meaning given to it in Clause 12.2;  |
| <b><i>Ringgit Malaysia or RM</i></b>              | means the lawful currency of Malaysia;  |
| <b><i>Rolling 24 Hours Forecast</i></b>           | means the forecasted capacity(in MWac) of the Facility's output to be generated and delivered to the Grid System at the Interconnection Point from the Facility for every fifteen (15) minutes interval for the following twenty-four (24) hours or such other period as may be notified by the GSO to SPP in writing, and updated at every half-hour on a rolling basis commencing from the Initial Operation Date until the expiry of the Term pursuant to Clause 10.2(g);  |
| <b><i>Scheduled Commercial Operation Date</i></b> | means [●] or in each case (if applicable) such other date determined in accordance with Clause 10.3(a) or Clause 18.2(b), starting from 00:00 hours;  |
| <b><i>Site</i></b>                                | means the parcel of land upon which the Project is to be constructed and located, as more specifically described in Appendix H;   |
| <b><i>Site Agreement</i></b>                      | means the agreement in which SPP is granted ownership rights or lease over the Site throughout the Term;  |

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| <b><i>Sponsors' Equity Repayment</i></b>           | shall have the meaning given to it in Appendix J;   |
| <b><i>Sponsors' Gross Equity Contributions</i></b> | shall have the meaning given to it in Appendix J;   |
| <b><i>SPP Interconnection Facility</i></b>         | means the new 132kV substation and associated facilities to be designed, constructed, owned, operated and maintained by SPP as further described in Appendix D to enable SPP to deliver solar photovoltaic energy from the Facility and to maintain the stability of the Grid System;   |
| <b><i>SPP Interconnector</i></b>                   | means the [transmission line(s)/underground cable(s)] and associated facilities to be designed, constructed, owned, operated and maintained by SPP as further described in Appendix D that interconnect the SPP Interconnection Facility and the Grid System;   |
| <b><i>SPP Licence</i></b>                          | means the licence required to be obtained by SPP pursuant to Section 9 of the Electricity Supply Act 1990 to enable SPP to own and operate the Facility and deliver and sell solar photovoltaic energy to TNB;  |
| <b><i>SPP Works</i></b>                            | means the design, engineering, procurement, supply, manufacturing, construction, installation, erection, testing, commissioning, labour, services, facilities, equipment, supplies and materials to be furnished, supplied or performed by SPP at the TNB Interconnection Facility and if applicable including transmission lines and loop-in loop-out (LILO) works as further described in Appendix D; |
| <b><i>Suruhanjaya Tenaga</i></b>                   | means the Suruhanjaya Tenaga established under the Energy Commission Act 2001 and any successor thereof;  |
| <b><i>Term</i></b>                                 | means the period of this Agreement as specified in Clause 2.1 and any extension of that period as may be determined in accordance with Clauses 18.2(c) or 22.1(d);  |
| <b><i>Test Energy</i></b>                          | shall mean the Net Electrical Output in connection with the commissioning of the Facility prior to the Commercial Operation Date;   |
| <b><i>Test Energy Payment</i></b>                  | means a payment determined in accordance with Appendix G to be made by TNB to SPP for the Test Energy generated and delivered from the Facility;  |
| <b><i>Test Energy Rate</i></b>                     | means RM[●] per kWh;  |



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| <b><i>TNB Interconnection Facility</i></b> | means the existing or new TNB's substation as further described in Appendix D;   |
| <b><i>TNB Licence</i></b>                  | means the licence granted to TNB under the Electricity Supply Act, 1990 to enable TNB to own and operate electricity generating facilities and supply electrical energy to other Persons;  |
| <b><i>TNB Metering Equipment</i></b>       | means the main and back-up metering equipment and devices (including telemetering equipment and software) as further described in Appendix C owned by TNB for the measurement of Net Electrical Output and electrical energy delivered from the Grid System at the applicable Interconnection Point to the Facility; |
| <b><i>TNB Technical Specifications</i></b> | means the technical specifications in respect of the SPP Works and TNB Metering Equipment as may be specified by TNB;  |
| <b><i>Walk Away Date</i></b>               | means the date listed against each Walk Away Event in Appendix L as the date by which the Walk Away Event must be achieved; and  |
| <b><i>Walk Away Events</i></b>             | means those events marking the completion of certain critical steps in achieving the Commercial Operation Date on or before the Scheduled Commercial Operation Date, in accordance with the terms of this Agreement, as identified in Appendix L.  |

## 1.2 Construction of Certain Terms and Phrases

Unless the context of this Agreement otherwise requires:

- (a) words of any gender include the other gender;
- (b) words using the singular or plural number also include the plural or singular number, respectively;
- (c) the terms "hereof", "herein", "hereunder", "hereby", "hereto" and similar words refer to this entire Agreement and not any particular Clause, Exhibit, Appendix or any other subdivision of this Agreement;
- (d) a reference to a "Clause", "Exhibit", or "Appendix" are to a clause, exhibit or appendix to this Agreement;
- (e) the words "include" or "including" shall be deemed to be followed by "without limitation" or "but not limited to" whether or not they are followed by such phrases or words of like import;
- (f) references to any statute or statutory provision shall be construed as a reference to the same as it may have been, or may from time to time be,

amended, modified or re-enacted;

- (g) all references to the generation and/or delivery of solar photovoltaic energy shall include the provision of the following services ancillary to such generation and delivery in accordance with the Grid Code, the Design Limits and Prudent Utility Practices:
  - (i) reactive power; and
  - (ii) voltage regulation;
- (h) references to “this Agreement” or any other agreement or document shall be construed as a reference to such agreement or document as amended, modified or supplemented and in effect from time to time and shall include a reference to any document which amends, modifies or supplements it, or is entered into, made or given pursuant to or in accordance with its terms;
- (i) whenever this Agreement refers to “day”, such day shall mean a 24-hour period beginning and ending at 00:00 hours and whenever this Agreement refers to a number of days, such number shall refer to calendar days unless Business Days are specified. All accounting terms used in this Agreement and not expressly defined shall have the meanings given to them under generally accepted accounting principles of Malaysia applied on a consistent basis;
- (j) this Agreement shall not be construed adversely to a Party solely because that Party was responsible for preparing it; and
- (k) in the event of a conflict between the provisions of the main body of this Agreement and any provision in the Appendices, the provisions of the main body of this Agreement shall prevail.

## 2. TERM

### 2.1 Term

This Agreement shall take effect on the Effective Date and continue in effect for a term (the **Term**) which expires on the day before the twenty-first (21st) anniversary of the Commercial Operation Date (including such day), unless otherwise extended in accordance with Clauses 18.2(c) or 22.1(d) or terminated in accordance with the provisions of this Agreement.

### 2.2 Expiry of the Term or Earlier Termination

Upon the expiry of the Term or the earlier termination of this Agreement, TNB shall have the right to disconnect the TNB Interconnection Facility from the Facility, the SPP Interconnection Facility and/or the SPP Interconnector.

### 3. CONDITIONS PRECEDENT AND CRITICAL MILESTONES

#### 3.1 Conditions Precedent to the Effectiveness of this Agreement

This Agreement shall be effective upon satisfaction of the following conditions, namely that:

- (a) all Corporate Authorisations which are required to have been obtained by the Parties in connection with the execution and delivery of this Agreement have been obtained and are in full force and effect and a statement in writing to that effect by the respective solicitors of the Parties has been delivered to the other Party;
- (b) this Agreement has been executed and delivered by each of the Parties;
- (c) SPP has submitted to TNB a copy of the Letter of Award;
- (d) SPP has submitted to TNB a copy of the approved power system study report conducted on the Project based on generic model (the **Stage 1 Power System Study Report**) as approved by TNB in writing pursuant to Clause 9.4;
- (e) SPP has submitted to TNB and the Suruhanjaya Tenaga, one (1) certified copy of the executed Site Agreement which is in full force and effect and all conditions precedent to its effectiveness are satisfied or waived thereunder; and
- (f) SPP has submitted to the Suruhanjaya Tenaga, one (1) certified copy of this Agreement.

#### 3.2 Conditions Precedent to the Initial Operations

The Initial Operation Date and the right of SPP to commence generation of solar photovoltaic energy at the Facility and to supply, deliver and sell Test Energy shall only occur upon satisfaction or waiver by TNB of the following conditions, namely that:

- (a) each of the Project Documents (other than this Agreement) is in full force and effect and all conditions precedent to their effectiveness (except for conditions relating to this Agreement) are satisfied or waived thereunder;
- (b) the Initial Financing Documents are in full force and effect and all conditions precedent to their effectiveness have been satisfied or waived thereunder;
- (c) SPP has submitted to TNB, with a copy to the Suruhanjaya Tenaga, the conceptual design report of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works accompanied by a certificate from the Independent Engineer as set out in Clause 3.4(a);
- (d) SPP has submitted to TNB, with a copy to the Suruhanjaya Tenaga, one (1) certified copy of each of the Initial Financing Documents and the Project Documents (other than this Agreement and the Site Agreement);

- (e) SPP has submitted to TNB (i) a certified copy of the SPP Licence and (ii) a copy of the approved final power system study report conducted on the Project based on comprehensive models provided by the manufacturer of the solar photovoltaic energy panels and other components which will be used in the Facility (the **Stage 2 Power System Study Report**) as approved by TNB in writing pursuant to Clause 9.4;
- (f) SPP has submitted to TNB, with a copy to the Suruhanjaya Tenaga, a certificate from the Independent Engineer that the SPP Works have been designed, manufactured, supplied, constructed, installed and tested in accordance with the requirements of this Agreement;
- (g) the performance security as set out in Clause 8 has been delivered to TNB and is in full force and effect;
- (h) SPP has submitted to TNB, with a copy to the Suruhanjaya Tenaga, (i) a certified copy of the EIA Approval (if the Department of Environment requires the submission of an Environmental Impact Assessment Report by SPP); or (ii) a written confirmation from the Department of Environment that the EIA Approval is not required;
- (i) the commissioning and testing programs as set out in Clause 10.2(a) have been submitted by SPP to TNB, with a copy to the Suruhanjaya Tenaga, and approved by TNB which approval shall not be unreasonably withheld or delayed; and
- (j) the test procedures as set out in Clause 10.2(d) has been submitted by SPP to TNB, and approved by TNB which approval shall not be unreasonably withheld or delayed.

### 3.3 Conditions Precedent to Commercial Operations

The Commercial Operation Date and the right of SPP to supply, deliver and sell Net Electrical Output and the obligation of TNB to accept and to purchase Net Electrical Output from the Facility or to make Energy Payments to SPP shall not occur until the following conditions have been satisfied:

- (a) SPP has submitted to TNB a copy of the "Commissioning Test Certificate" or similar document to the like effect issued by the Suruhanjaya Tenaga as contemplated by the SPP Licence in respect of the Facility being operational;
- (b) SPP has submitted to TNB, with a copy to the Suruhanjaya Tenaga, the final design of the Facility and a certificate from the Independent Engineer stating that the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works have been tested and commissioned in accordance with the tests contained in this Agreement and the EPCC Contract;
- (c) SPP has submitted to TNB, with a copy to the Suruhanjaya Tenaga, a certificate from the Independent Engineer confirming that the Facility has the capacity and capability to meet the declared capacity of the Facility and the test results which show that SPP can meet the declared capacity of the

Facility as certified by the Independent Engineer;

- (d) no default by SPP of:
  - (i) any material provision of this Agreement; or
  - (ii) any provision of the Financing Documents whereby the breach could reasonably be expected to have a material adverse effect on the ability of SPP to perform its obligations or availability of the rights of TNB under this Agreement,shall have occurred and be continuing;
- (e) the representations and warranties by SPP in this Agreement are true and correct in all material respects as if made on the Commercial Operation Date; and
- (f) all the documentation, data, information and certified test results set out in Appendix B have been submitted by SPP to TNB, with a copy to the Suruhanjaya Tenaga, and verified by TNB as being in conformance with the requirements of Appendix B within the time frames set out therein.

#### 3.4 **Timeframe to meet Certain Conditions to the Commencement of Generation of Electricity**

SPP shall:

- (a) not later than sixty (60) days prior to the Commencement Date, submit to TNB, with a copy to the Suruhanjaya Tenaga, the conceptual design report of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works together with the Independent Engineer's certificate stating that (i) the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, when constructed in accordance with such design drawings, will conform to the description set forth in Appendix A, Appendix D and Appendix E respectively in all material respects and have the capacity to meet the operational characteristics set out in Appendix B, (ii) it is technically feasible for the Commercial Operation Date to occur on or before the Scheduled Commercial Operation Date, and (iii) the Facility should have a useful life no shorter than the Term;
- (b) not later than the Financial Closing Date for the Initial Financing Documents, submit to TNB, with a copy to the Suruhanjaya Tenaga, one (1) certified copy of each of the Initial Financing Documents;
- (c) not later than the Financial Closing Date for the Initial Financing Documents, submit to TNB, with a copy to the Suruhanjaya Tenaga, one (1) certified copy of each of the Project Documents (other than this Agreement and the Site Agreement);
- (d) not later than one (1) month prior to the Initial Operation Date, submit to TNB (i) a certified copy of the SPP Licence and (ii) the Stage 2 Power System

Study Report as approved by TNB; and

- (e) prior to the Commencement Date, submit to TNB, with a copy to the Suruhanjaya Tenaga, (i) a certified copy of the EIA Approval (if the Department of Environment requires the submission of an Environmental Impact Assessment Report by SPP); or (ii) a written confirmation from the Department of Environment that the EIA Approval is not required.

### 3.5 Critical Milestones

The Parties shall co-operate to procure that the following critical milestones are met:

- (a) the Financial Closing Date shall occur on or before [●];
- (b) the Commencement Date shall occur no later than [●];
- (c) each of the Project Documents shall be in full force and effect and all conditions precedent to their effectiveness (except for conditions relating to this Agreement) shall be satisfied or waived thereunder no later than [●]; and
- (d) the Initial Operation Date shall occur no earlier than ***[to insert a specified date which is no earlier than 180 days prior to the Scheduled Commercial Operation Date]***.

The failure to meet any of the milestones set out in this Clause 3.5 shall not in itself amount to an Event of Default by SPP pursuant to Clause 19.1(b).

### 3.6 Consequences of non-fulfilment of Conditions Precedent

If any of the conditions precedent set out in Clause 3.1 above has not been satisfied in full before the date being six (6) months after the date of execution of this Agreement or such other date as may be otherwise agreed to by the Parties, then for so long as any condition precedent remains unsatisfied, either Party may terminate this Agreement by delivering to the other Party a notice in writing. In the event of termination of this Agreement under this Clause 3.6, this Agreement shall cease to have any further force or effect and neither Party shall have any obligation or liability (save in respect of any antecedent breach) to the other Party whether at Law, hereunder or otherwise.

## 4. SALE AND PURCHASE OBLIGATIONS

### 4.1 Sale and Purchase of Test Energy

Starting on the Initial Operation Date until the Commercial Operation Date, TNB shall accept all Test Energy and pay SPP for such Test Energy in accordance with Clause 5.1.

#### 4.2 Sale and Purchase of Net Electrical Output

Starting on the Commercial Operation Date and continuing throughout the Term:

- (a) SPP shall deliver and sell to TNB and TNB shall accept and purchase the Net Electrical Output which is generated by the Facility; and
- (b) TNB shall pay SPP for such Net Electrical Output in accordance with Clause 5.2.

#### 4.3 Title and Risk of Loss

Title to and the risk of loss of any solar photovoltaic energy generated from the Facility and transmitted to TNB in accordance with this Agreement shall pass to TNB at the Interconnection Point.

#### 4.4 Exceptions to TNB's Obligation to Accept Net Electrical Output

Notwithstanding any other provisions of this Agreement, TNB shall not be obliged to accept Net Electrical Output from the Facility if any of the events or circumstances described below occurs. TNB shall notify SPP immediately after the events or circumstances leading to the matters below have ceased to exist. Those matters are:

- (a) an Emergency Condition occurs within the Grid System and/or any constraint or interruption in the Grid System as a result of which the Grid System is unable to accept Net Electrical Output from the Facility. The non-obligation of TNB to accept and pay for Net Electrical Output from the Facility due to such occurrence(s) shall not exceed one hundred and sixty eight (168) hours in each Contract Year. TNB shall give SPP advance notice of such occurrence(s) to the extent practicable in the circumstances then prevailing and shall give SPP a full explanation of such occurrence(s) promptly after it occurs;
- (b) the Facility delivers to TNB Net Electrical Output which does not conform to the electrical characteristics described in Appendix B. TNB shall notify SPP of this condition. TNB shall not be obliged to accept solar photovoltaic energy from the Facility until the condition is corrected or until SPP demonstrates to the reasonable satisfaction of TNB that SPP is operating in accordance with the operating standards set out in Appendix B;
- (c) TNB interrupts the acceptance of solar photovoltaic energy from the Facility to conduct necessary maintenance of the TNB Metering Equipment or the Grid System. The non-obligation of TNB to accept and pay for Net Electrical Output from the Facility due to such interruption(s) shall not exceed the following periods:
  - (i) forty two (42) hours in each Contract Year for any maintenance to be carried out from 10.00 am to 4.00 pm; and
  - (ii) one hundred and twenty six (126) hours in each Contract Year for any maintenance to be carried out from 4.01 pm to 9.59 am.

In such instances, TNB shall give SPP as much advance notice as possible, but in no event less than seventy two (72) hours' prior notice of any such planned maintenance;

- (d) the Facility delivers to TNB Net Electrical Output which is not solely driven by solar photovoltaic technology or the Facility and/or the Project comprises energy storage devices;
- (e) the Facility has delivered to TNB Net Electrical Output in a Contract Year which exceed the Maximum Annual Allowable Quantity of such Contract Year; or
- (f) the Net Electrical Output delivered by the Facility over any half (1/2) hour period exceeds the Established Capacity other than instances of unusually high solar irradiance.

#### 4.5 **Consequence of TNB's failure to Accept Net Electrical Output**

Starting on the Commercial Operation Date and continuing throughout the Term, otherwise than due to the events or circumstances described in Clause 4.4, if TNB fails to accept the Net Electrical Output as may be generated and delivered by SPP, then TNB shall pay SPP the Non-Acceptance Payment for such period TNB fails to accept the Net Electrical Output as calculated in accordance with Appendix G, to the extent that the Facility, including the SPP Interconnection Facilities and SPP Interconnector, is capable of delivering solar photovoltaic energy in accordance with this Agreement and provided always the aggregate of Net Electrical Output and equivalent Net Electrical Output payable by TNB shall not exceed the Maximum Annual Allowable Quantity.

#### 4.6 **SPP's Obligations to Comply with Despatch Instruction**

- (a) During an Emergency Condition referred to in Clause 4.4(a), SPP shall comply with the following requirements:
  - (i) SPP shall comply with the Despatch Instruction to reduce the level of energy production from the Facility; and
  - (ii) the Grid System Operator shall have the right to disconnect the Grid System and/or the TNB Interconnection Facility from the Facility, the SPP Interconnection Facility and/or the SPP Interconnector.
- (b) SPP shall at all times ensure that the Facility is capable of receiving and complying with each Despatch Instruction, failing which the Grid System Operator shall have the right to disconnect the Grid System and/or the TNB Interconnection Facility from the Facility, the SPP Interconnection Facility and/or the SPP Interconnector.

#### 4.7 **Suspension of SPP Sale Obligation**

- (a) Notwithstanding any provisions to the contrary in this Agreement and in addition to Clause 18, SPP shall not be obliged to sell and deliver Net



Electrical Output from the Facility pursuant to this Clause 4 for so long as SPP cannot, consistent with Prudent Utility Practices, generate and deliver Net Electrical Output from the Facility because of an Emergency Condition.

- (b) SPP shall give TNB advance notice of the occurrence of any of the events provided in Clause 4.7(a) to the extent practicable under the circumstances or as soon thereafter as practicable.

#### 4.8 Prudent Utility Practices

All actions required or taken under this Agreement by either Party (including under this Clause 4 and Clause 11.6) shall be consistent with the Design Limits and Prudent Utility Practices.

### 5. PURCHASE PRICE

#### 5.1 Test Energy Payments

TNB shall, subject to the terms of this Agreement in particular TNB's rights to set off, make Test Energy Payment to SPP for Test Energy generated and delivered from the Facility at the times stipulated in Clause 6 and in the amounts calculated in accordance with Appendix G.

#### 5.2 Energy Payments

- (a) Starting from the Commercial Operation Date, TNB shall, subject to the terms of this Agreement in particular TNB's rights to set-off and the provisions of Clause 5.2(d) hereunder, make Energy Payments to SPP at the times stipulated in Clause 6 and in amounts calculated in accordance with Appendix G.
- (b) The price for the calculation of Energy Payments in respect of the Net Electrical Output generated and delivered by SPP and purchased and accepted by TNB shall be the Energy Rate provided always that the total Net Electrical Output generated in each Contract Year shall not exceed the Maximum Annual Allowable Quantity of such Contract Year.
- (c) In the event SPP sells and delivers and TNB purchases and accepts any Net Electrical Output in a Contract Year in excess of the Maximum Annual Allowable Quantity of such Contract Year (the **Excess Energy**), TNB shall, subject to the provisions of Clause 5.2(d) hereunder, instead make Energy Payments to SPP for such Excess Energy based on the Excess Energy Rate.
- (d) The Parties recognise that the Letter of Award expressly provides that the capacity of the Facility is fixed at the Established Capacity. SPP specifically acknowledges and agrees that SPP shall not install or resize the Facility above the Established Capacity in compliance with the provisions of the Letter of Award. For the avoidance of doubt, TNB shall not be obligated to accept or if accepted, pay for the Net Electrical Output delivered by the Facility over any half (1/2) hour period which exceeds the Established

Capacity.

## 6. BILLING AND PAYMENT

### 6.1 Billing Statements

- (a) On the first (1<sup>st</sup>) day of each Billing Period, SPP shall download half (1/2) hourly meter reading for the immediately preceding Billing Period using the telemetering device connected to the main metering equipment comprising the TNB Metering Equipment. SPP shall prepare and deliver to TNB within thirty (30) days of downloading such half (1/2) hourly meter reading, a hardcopy and a softcopy of a statement in a format mutually agreed by the Parties (a **Billing Statement**) setting out details of the meter reading and SPP's calculation of the Test Energy Payment and Energy Payment due to SPP in respect of the Facility for the immediately preceding Billing Period. SPP shall, together with the Billing Statement, deliver such documents as may be required by TNB in such format as TNB shall direct.
- (b) If SPP is unable to download such half (1/2) hourly meter reading from the main metering equipment comprising the TNB Metering Equipment, then SPP shall in writing request from TNB such downloaded half (1/2) hourly meter reading from the main metering equipment comprising the TNB Metering Equipment. If, within five (5) days from the receipt of the written request from SPP, TNB is unable to provide SPP such downloaded half (1/2) hourly meter reading from the main metering equipment comprising the TNB Metering Equipment, SPP shall manually read the main metering equipment comprising the TNB Metering Equipment jointly with TNB. SPP shall give TNB five (5) days' written notice prior to the reading of such main metering equipment comprising the TNB Metering Equipment.
- (c) If the main metering equipment comprising the TNB Metering Equipment cannot be manually read by SPP within five (5) days of any day on which SPP and TNB are due to read the TNB Metering Equipment, SPP shall download such meter reading from the back-up metering equipment comprising the TNB Metering Equipment. If SPP is unable to download such half (1/2) hourly meter reading from the back-up metering equipment comprising the TNB Metering Equipment, then SPP shall in writing request from TNB such downloaded half (1/2) hourly meter reading from the back-up metering equipment comprising the TNB Metering Equipment. If, within five (5) days from the receipt of the written request from SPP, TNB is unable to provide SPP such downloaded half (1/2) hourly meter reading from the back-up metering equipment comprising the TNB Metering Equipment, then SPP shall manually read the back-up metering equipment comprising the TNB Metering Equipment jointly with TNB for the purposes of SPP preparing a Billing Statement. SPP shall give TNB five (5) days' written notice prior to the reading of such back-up metering equipment comprising the TNB Metering Equipment.
- (d) If, for any reason, such half (1/2) hourly meter reading cannot be obtained from the TNB Metering Equipment in the manner set out in this Clause 6.1,

then the provisions of Clause 14.4 shall apply for the purpose of SPP preparing a Billing Statement in respect of the Facility for the immediately preceding Billing Period subject that all relevant losses and auxiliary consumptions (if any) as may be mutually agreed by the Parties shall be taken into account.

## 6.2 Payment

- (a) TNB shall, within thirty (30) days of receipt of the Billing Statement, pay to SPP the Test Energy Payment, Energy Payment and/or the Non-Acceptance Payment (if any) invoiced in such Billing Statement:
  - (i) less any amount due to TNB from SPP (including but not limited to the Non-Delivery Payment); and
  - (ii) less any amount in the Billing Statement disputed by TNB in good faith and which is to be settled under Clause 6.3.
- (b) Any amounts other than those specified in Clause 6.2(a), due to either Party under this Agreement shall be paid or objected to within thirty (30) days following receipt by the other Party of an itemised statement from the Party to whom such amounts are due setting out, in reasonable detail, the basis for such payment.
- (c) If any undisputed amount is not paid when due, there shall be due and payable to the other Party interest thereon, calculated on a simple basis at the Default Rate, from the date such amount became due (including such date) until the date such amount is paid in full (excluding such date).
- (d) TNB shall have the option, in any statement it provides to SPP pursuant to this Clause 6.2, to require payment from SPP of any amount due to TNB or to require SPP to treat such amount due to TNB as a credit against any amount that TNB may then be owing to SPP under the terms of this Agreement.

## 6.3 Payment Disputes

- (a) If either Party disputes the accuracy of a statement provided pursuant to Clause 6.2, the Parties shall use their best efforts to resolve the dispute in accordance with Clause 21.1. Any adjustment which the Parties may subsequently agree to make shall be made by a credit or additional charge on the next statement delivered. If the Parties are unable to resolve the dispute in this manner, any amount disputed may be withheld pending final resolution of the dispute in accordance with the procedures described in Clause 21.2.
- (b) Notwithstanding any provisions to the contrary in this Agreement, if TNB disputes in good faith the calculation of any Test Energy Payment, Energy Payment and/or Non-Acceptance Payment (if any), TNB may withhold payment of the disputed amount pending the final resolution of the dispute.

- (c) Upon resolution of a disputed amount, the amount shall be due and payable to the appropriate Party, with interest thereon, calculated on a simple basis at the Default Rate, from the date on which such amount became due hereunder if no dispute had arisen (including such date) until such amount is paid in full (excluding such date).
- (d) The existence of a dispute as to any statement provided under this Clause 6 shall not relieve either Party from complying with any other provision of this Agreement.

#### 6.4 No Set-Off

Except as otherwise provided in this Agreement, all payments by either Party to the other Party under this Agreement shall be made free of any restriction or condition and without deduction on account of any amount claimed from the other Party which is disputed in good faith by that Party.

#### 6.5 Currency and Timing of Payment

Notwithstanding anything in this Agreement to the contrary, (i) all payments to be made by either Party under this Agreement shall be made in Ringgit Malaysia, and (ii) any payment that becomes due and payable on a day that is not a Business Day shall be deemed due and payable on the next succeeding Business Day.

#### 6.6 Records

SPP shall keep properly stored and maintained at its offices at the Site or as required by Law at its registered office, for a minimum of seven (7) years or for such additional time as may be required by Law, such records as are required by this Agreement to be maintained and all documents and materials relating to or substantiating any charges to be paid by or to SPP under this Agreement. Upon reasonable prior notice to SPP, TNB shall have the right to inspect, examine, audit and copy such records, documents and materials.

### 7. NOT USED

### 8. DELAY COMPENSATION

#### 8.1 Failure to Achieve the Scheduled Commercial Operation Date

If, due to the default of SPP or its contractors or agents under this Agreement, the Commercial Operation Date does not occur on or before the Scheduled Commercial Operation Date, SPP shall compensate TNB an amount equal to Ringgit Malaysia [***Quantum of compensation is calculated by multiplying the Established Capacity with RM1,000.00***] per day for each day commencing on and including the Scheduled Commercial Operation Date until but excluding the earlier of (i) the Commercial Operation Date; (ii) the date on which this Agreement is terminated by TNB in accordance with the provisions of this Agreement; and (iii) one hundred and eighty (180) days after the Scheduled Commercial Operation Date.

## 8.2 Abandonment of the Project

If SPP Abandons the Project after the Effective Date, SPP shall forthwith compensate TNB an amount equal to Ringgit Malaysia [***Quantum of compensation is a function of the Established Capacity, RM1,000.00 and 180 days, i.e. the Established Capacity (in MW) x RM1,000.00 x 180 days***].

## 8.3 No Penalty

The Parties agree that the precise level of actual damages that would be suffered by TNB arising out of or in relation to the delay or Abandonment described in this Clause 8 would be difficult to ascertain with certainty. The Parties further agree that any sum payable under this Clause 8 is not a penalty, and is genuine, fair and reasonable. Such payment represents a genuine, good faith and reasonable estimate of fair compensation for the losses to TNB that may reasonably be anticipated from such failure, and shall, without duplication, but subject to Clause 19.6, be the sole and exclusive remedy and measure of damages with respect to any failure by SPP to meet such obligations. Accordingly, SPP agrees to waive raising as a defence the compensations payable under this Clause 8 as not being genuine, fair or reasonable.

## 8.4 Maximum Amount of Compensation

The aggregate of compensation payable by SPP under this Clause 8 shall not exceed Ringgit Malaysia [***Quantum of compensation is a function of the Established Capacity, RM1,000.00 and 180 days, i.e. the Established Capacity (in MW) x RM1,000.00 x 180 days***].

## 8.5 Establishment of Security

SPP shall secure payment of the compensation specified in this Clause 8 by providing to TNB, not later than the earlier of (i) seven (7) days from the Financial Closing Date and (ii) two hundred and ten (210) days after the Effective Date, an irrevocable bank guarantee issued by a commercial bank reasonably acceptable to TNB in the form set out in Exhibit 1 for an amount equal to Ringgit Malaysia [***Quantum of compensation is a function of the Established Capacity, RM1,000.00 and 180 days, i.e. the Established Capacity (in MW) x RM1,000.00 x 180 days***] which bank guarantee shall permit drawings by TNB thereunder to satisfy the performance obligations of SPP under this Clause 8. The bank guarantee shall remain valid until the expiration of one hundred and ninety (190) days after the Scheduled Commercial Operation Date. If SPP fails to furnish a bank guarantee to TNB within the time frame and valid for the duration set out in this Clause 8.5 or such other date as may be otherwise agreed to by the Parties then TNB may terminate this Agreement by giving notice to SPP whereupon this Agreement shall cease to have any further force and effect and neither Party shall have any claim against the other under it save for any claim arising from any antecedent breach.

## 8.6 No Termination

Save where SPP has Abandoned the Project and without prejudice to TNB's rights to terminate this Agreement in accordance with the provisions of this Agreement, TNB shall not be entitled to terminate this Agreement during any period in respect of

which SPP is obliged to pay or is paying due pursuant to this Clause 8.

## **9. PRE-OPERATION PERIOD**

### **9.1 Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

- (a) SPP shall design, engineer, procure, construct, install, energise, test and commission the Facility, the SPP Interconnection Facility and the SPP Interconnector in accordance with Prudent Utility Practices and the terms and conditions of this Agreement. SPP shall design, engineer, procure, construct, install, energise, test and commission the SPP Works in accordance with the TNB Technical Specifications and the terms and conditions of this Agreement.
- (b) Unless expressly stated in this Agreement, any review, verification, acceptance, endorsement or approval by TNB or the Grid System Operator of any material, documents, designs, drawings, schedules, design data, control and protection settings, test procedures, test results, test reports or other information submitted by SPP concerning the Facility, the SPP Interconnection Facility, the SPP Interconnector or the SPP Works under this Agreement, or any presence of TNB to witness any test performed on the Facility, the SPP Interconnection Facility, the SPP Interconnector or the SPP Works shall not be deemed to constitute an endorsement of the Facility, the SPP Interconnection Facility, the SPP Interconnector or the SPP Works nor a warranty or other assurance by TNB of the safety, durability or reliability of the Facility, the SPP Interconnection Facility, the SPP Interconnector or the SPP Works.

### **9.2 Notice of Commencement Date**

SPP shall provide TNB with at least fifteen (15) days' prior notice of the proposed Commencement Date, and written confirmation that the Commencement Date has occurred within five (5) days after it occurs.

### **9.3 Conceptual Design Report of Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

- (a) SPP shall at all times refer and consult with the designated representative(s) of TNB in respect of the design of the SPP Works. TNB shall notify SPP of its designated representative(s) no later than sixty (60) days from the date of execution of this Agreement.
- (b) Not later than sixty (60) days prior to the Commencement Date, SPP shall submit to TNB the conceptual design report of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works together with the Independent Engineer's certificate stating that (i) the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works when constructed in accordance with such design drawings will conform to the description set forth in Appendix A, Appendix D and Appendix E

respectively in all material respects and have the capacity to meet the operational characteristics set out in Appendix B, (ii) it is technically feasible for the Commercial Operation Date to occur on or before the Scheduled Commercial Operation Date and (iii) the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works should have a useful life no shorter than the Term.

- (c) TNB may at its own cost, review the conceptual design report of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works and based on such review recommend modifications, revisions and improvements, if needed or desirable, in accordance with Prudent Utility Practices. TNB shall revert to SPP with its recommendations (if any) within forty five (45) days of being furnished the conceptual design report of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works pursuant to Clause 9.3(b).
- (d) SPP shall comply with the recommendations made by TNB in respect of the conceptual design report of the SPP Works. No later than fourteen (14) Business Days prior to the Commencement Date, SPP shall submit to TNB the revised conceptual design report of the SPP Works (in such format as TNB shall direct) for TNB's approval.
- (e) SPP may comply with the recommendations made by TNB in respect of the conceptual design report of the Facility, the SPP Interconnection Facility and the SPP Interconnector. However, if the aforesaid recommendations relate to the safe operation of the Facility, the SPP Interconnection Facility and the SPP Interconnector with the Grid System, SPP shall comply with the aforesaid recommendations. No later than fourteen (14) Business Days prior to the Commencement Date, SPP shall submit to TNB such revised conceptual design report of the Facility, the SPP Interconnection Facility and the SPP Interconnector for TNB's acceptance.

9.4 **Conduct of Stage 1 Power System Study Report and Stage 2 Power System Study Report**

- (a) SPP shall at all times refer and consult with the designated representative(s) of TNB in respect of the conduct of the Stage 1 Power System Study Report and the Stage 2 Power System Study Report. TNB shall notify SPP of its designated representative(s) no later than sixty (60) days from the date of execution of this Agreement.
- (b) Prior to the execution of this Agreement, SPP shall have submitted to TNB the Stage 1 Power System Study Report conducted in accordance with Appendix B of this Agreement. Not less than sixty (60) days prior to the Commencement Date, SPP shall submit to TNB the Stage 2 Power System Study Report conducted in accordance with Appendix B of this Agreement.
- (c) TNB may, at its own cost, recommend modifications, revisions and improvements, if needed or desirable, to the Stage 1 Power System Study Report and the Stage 2 Power System Study Report in accordance with Prudent Utility Practices. TNB shall revert to SPP with its recommendations

(if any) within forty five (45) days of being furnished the Stage 1 Power System Study Report and the Stage 2 Power System Study Report pursuant to Clause 9.4(b).

- (d) SPP shall comply with the recommendations made by TNB in respect of the Stage 1 Power System Study Report and the Stage 2 Power System Study Report. No later than thirty (30) days prior to the Effective Date, SPP shall re-submit to TNB the Stage 1 Power System Study Report after taking into the recommendations (if any) made by TNB for its written approval. No later than the Commencement Date, SPP shall re-submit to TNB the Stage 2 Power System Study Report after taking into the recommendations (if any) made by TNB for its written approval.
- (e) SPP shall implement any changes or modifications to the design of the Facility, the SPP Interconnection Facility and/or the SPP Interconnector in respect of the resubmitted Stage 1 Power System Study Report and Stage 2 Power System Study Report which have been approved by TNB pursuant to Clause 9.4(d).

**9.5 Facility's 132kV Transformer(s), SPP Interconnection Facility, the SPP Interconnector and the SPP Works Protection Scheme, Relay Type and Settings**

- (a) Not less than sixty (60) days before the Commencement Date, SPP shall provide TNB and the Grid System Operator with the protection schemes and relay type in relation to the Facility's 132kV transformer(s), the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.
- (b) Within forty five (45) days of receiving such material, TNB shall give SPP written notification of whether such protection schemes and relay type are acceptable to TNB.
- (c) If such protection schemes or relay type are not acceptable, TNB shall provide detailed information (within the same forty five (45) days' period) as to why such protection schemes or relay type are not acceptable and SPP shall comply with any reasonable request made by TNB consistent with Prudent Utility Practices in relation to such protection schemes and relay type.
- (d) Not less than one hundred and twenty (120) days prior to the Initial Operation Date, SPP shall provide TNB all protection data, related primary data, capability curves, relay terminal drawings and relay settings in relation to the Facility's 132kV transformer(s), the SPP Interconnection Facility and the SPP Interconnector. TNB may at its own cost, review such material (including but not limited to relay settings) and based on such review recommend modifications, revisions and improvements, if needed or desirable, in accordance with Prudent Utility Practices. TNB shall revert to SPP with its recommendations (if any) within sixty (60) days of being furnished such material.
- (e) Not less than one hundred and twenty (120) days prior to the Initial Operation Date, SPP shall provide TNB all protection data, related primary



data, capability curves and relay terminal drawings in relation to the SPP Works. SPP shall request from TNB the relay settings in relation to the SPP Works. TNB shall, upon such SPP's request, give SPP written notification of the relay settings in relation to the SPP Works and SPP shall implement such relay settings.

- (f) Upon SPP having completed a specification compliance audit (the **SCA**), a site acceptance test (the **SAT**) and a pre-commissioning inspection and testing audit procedure (the **PIAT**) on the SPP Works in accordance with Clause 9.7 and Clause 9.8 but no later than fourteen (14) Business Days prior to the conduct of the reliability and safety verification (the **RSV**) pursuant to Clause 9.8(e), SPP shall submit to TNB the relay settings as installed at the Facility's 132kV transformer(s), the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. SPP shall also submit the printouts of final relay settings of the Facility's 132kV transformer(s), the SPP Interconnection Facility, the SPP Interconnector and the SPP Works with endorsement by the Electrical Service Engineer for TNB's acceptance.

#### 9.6 Construction Period

- (a) TNB may at its own cost and upon reasonable prior notice to SPP visit the Site to view the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. TNB shall at all times be subject to SPP's safety rules and regulations and shall exercise such visiting rights in a manner that will not interfere with, hinder or delay construction progress of the Facility, the SPP Interconnection Facility, the SPP Interconnector or the SPP Works. SPP shall at all times comply with TNB's safety rules and regulations during the construction, testing and commissioning of the SPP Works.
- (b) SPP shall provide TNB with copies of any periodic reports provided to the Financing Parties describing the progress of construction of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. In addition to providing TNB with copies of periodic reports provided by the EPCC Contractor to SPP and any periodic reports provided by SPP to the Financing Parties, SPP shall also simultaneously furnish TNB with a work programme relating to the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works specifying the sequence in which SPP proposes to construct, install, test and commission the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.
- (c) SPP shall obtain the prior written consent of TNB if SPP wishes to make or permit to be made any Modification to:
- (i) the design or construction of the Facility if such Modification could reasonably be expected to have a material adverse effect on TNB's rights under this Agreement or on the Grid System; or
  - (ii) the design or construction of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works that has been submitted to TNB pursuant to Clause 9.3.

- (d) Within sixty (60) days of receiving any request from SPP to make or permit to be made any Modification to the Facility, the SPP Interconnection Facility, the SPP Interconnector and/or the SPP Works, TNB shall revert to SPP whether or not TNB consents to SPP's request. For the avoidance of doubt, any consent given by TNB shall not in any way whatsoever affect or operate as a waiver or estoppel of any claims, rights or actions of whatsoever nature otherwise available to TNB under the terms of this Agreement.

### Completion of SPP Works Construction

#### 9.7 Inspection of the SPP Works

- (a) SPP shall inform TNB the completion of the construction of the SPP Works. Upon reasonable prior notice given by TNB to SPP, TNB may inspect the SPP Works together with SPP to verify that the design and construction of the SPP Works conform to Appendix D and the conceptual design relating thereto that has been reviewed by TNB pursuant to Clause 9.3 and Prudent Utility Practices. SPP shall conduct the SCA on the SPP Works in accordance with TNB SCA Guidelines. SPP shall invite TNB to witness the SCA and TNB may send its representatives for joint inspection. TNB may, during such joint inspection, examine and audit such records, documents and materials relating to the design, construction and testing of the SPP Works and SPP shall give TNB such access and assistance as TNB may reasonably require for the purposes of such joint inspection. Each Party shall bear its own costs of such joint inspection.
- (b) Within seven (7) days after such joint inspection, TNB shall submit its comments and recommendations to SPP in respect of such joint inspection.
- (c) SPP shall, at its own cost and expense, comply with any recommendation of TNB with respect to the design and construction of the SPP Works with the provisions of Appendix D and the conceptual design report relating thereto that has been reviewed by TNB pursuant to Clause 9.3 and in accordance with the TNB Technical Specifications. SPP shall at its own cost and expense comply with any recommendation of TNB with respect to the design and construction of the SPP Interconnection Facility and the SPP Interconnector if such recommendation reasonably relates to ensuring compliance of the SPP Interconnection Facility and the SPP Interconnector with the provisions of Appendix D and the conceptual design report relating thereto that has been reviewed by TNB pursuant to Clause 9.3 and Prudent Utility Practices.
- (d) SPP shall at its own cost and expense undertake all necessary works to comply with any such recommendation of TNB with respect to the design and construction of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.
- (e) SPP shall provide TNB with seven (7) days' prior notice of its completion of such works whereupon TNB may re-inspect the SPP Interconnection Facility, the SPP Interconnector and the SPP Works to verify that the changes made by SPP comply with such recommendations.

**9.8 Testing of the SPP Works Upon Completion of Inspection and Interfacing Verification in respect of the SPP Works, the SPP Interconnection Facility and the SPP Interconnector**

- (a) Upon mutual agreement by the Parties that the SPP Works conform to Appendix D, the conceptual design report and the detailed design reviewed by TNB pursuant to Clause 9.3 and Clause 9.5 respectively and the TNB Technical Specifications, SPP shall submit to TNB the testing schedule, the type and sequence of tests (including but not limited to the SAT), the testing procedures and the format for the test results of the SPP Works in accordance with the TNB SAT Guidelines, no later than thirty (30) days prior to the conduct of such tests including SAT.
- (b) SPP shall provide TNB with thirty (30) days' prior written notice of the proposed conduct of such tests (including but not limited to the SAT) on the SPP Works. TNB shall be entitled to witness the conduct of such tests. The test results in respect of the SAT on the SPP Works shall be certified by the Electrical Service Engineer appointed by SPP.
- (c) SPP shall conduct the PIAT on the SPP Works in accordance to TNB PIAT Guidelines. SPP shall provide TNB with fourteen (14) days' prior written notice of the proposed conduct of the PIAT on the SPP Works. SPP shall invite TNB to witness the PIAT on the SPP Works and TNB may send its representatives for witness of such PIAT on the SPP Works.
- (d) Upon SPP having completed the SCA, SAT and PIAT on the SPP Works in accordance with Clause 9.7 and this Clause 9.8 but prior to the conduct of the RSV on the SPP Works, SPP shall invite TNB for a joint conduct of the interfacing verification in respect of the SPP Works, the SPP Interconnection Facility and SPP Interconnector. TNB may, during such joint conduct, examine and audit such records, documents and materials relating to the design, construction and testing of the SPP Works, the SPP Interconnection Facility and SPP Interconnector and SPP shall give TNB such access and assistance as TNB may reasonably require for the purposes of such joint conduct. Each Party shall bear its own costs of such joint conduct.
- (e) SPP shall conduct RSV on the SPP Works in accordance to TNB RSV Guidelines. SPP shall provide TNB with fourteen (14) Business Days' prior written notice of the proposed conduct of the RSV on the SPP Works and SPP shall furnish TNB with the reports for SCA, SAT and PIAT conducted on the SPP Works pursuant to Clause 9.7 and this Clause 9.8.
- (f) In the event the SPP Works fail to meet TNB's requirements for SCA, SAT and/or PIAT pursuant to the conduct of the RSV, the RSV shall be repeated at a convenient time mutually agreed between TNB and SPP.
- (g) If the RSV conducted pursuant to Clause 9.8(f) still fails, SPP shall make all necessary rectifications of the SPP Works. SPP shall obtain TNB's prior written consent if such rectifications of the SPP Works could reasonably be expected to have a material adverse effect on TNB's rights under this Agreement or on the Grid System.

- (h) Each Party shall bear its own respective cost and expense for conducting the SAT, the PIAT and the RSV under this Clause 9.8.
- (i) SPP shall submit to TNB a copy of the as-built drawings for the SPP Interconnection Facility, the SPP Interconnector and the SPP Works not later than ninety (90) days from the Initial Operation Date.
- (j) SPP shall also furnish TNB with the Independent Engineer's certificate stating that the SPP Interconnection Facility, the SPP Interconnector and the SPP Works have been designed, manufactured, supplied, constructed, installed and tested in accordance to the requirements of this Agreement (including but not limited to the recommendations made by TNB pursuant to Clause 9.3(d), Clause 9.3(e) and Clause 9.4(e)) and Prudent Utility Practices and are ready to be energized.
- (k) All testing works in relation to the SPP Works shall be conducted by a tester who is registered with and certified by TNB with the required voltage level certification (the **Tester**). SPP shall comply with the following requirements:
  - (i) nominate the Tester from the list of TNB's registered Testers and obtain TNB's consent for the selection and appointment of the Tester. For the avoidance of doubt, all costs relating to, incidental or consequent to the engagement of the Tester shall be borne by SPP;
  - (ii) no later than sixty (60) days prior to the commencement of the testing works in relation to the SPP Works, notify TNB in writing of the appointed Tester; and
  - (iii) obtain the prior written consent from TNB (which shall not be unreasonably withheld) prior to any replacement of the appointed Tester.

**9.9 Commissioning of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

- (a) The commissioning of the SPP Works may commence subject to:
  - (i) the successful completion of the conduct of the RSV on the SPP Works pursuant to Clause 9.8(e);
  - (ii) SPP shall have submitted to TNB, a certificate from the Independent Engineer that the SPP Works have been designed, manufactured, supplied, constructed, installed and tested in accordance with the requirements of this Agreement pursuant to Clause 9.8(j);
  - (iii) SPP shall have submitted to TNB the final relay settings of the SPP Works for TNB's acceptance pursuant to Clause 9.5(f); and
  - (iv) SPP shall have submitted advance notification of commissioning and test programs to TNB and the Grid System Operator. SPP shall have obtained written confirmation from the Grid System Operator that

the energization and commissioning of the SPP Works may commence.

- (b) The commissioning of the SPP Interconnection Facility and SPP Interconnector may commence subject to:
- (i) the successful commissioning of the SPP Works pursuant to Clause 9.9(a);
  - (ii) SPP shall have submitted to TNB, a certificate from the Independent Engineer that the SPP Interconnection Facility and the SPP Interconnector have been designed, manufactured, supplied, constructed, installed and tested in accordance with the requirements of this Agreement;
  - (iii) SPP shall have submitted to TNB, the final relay settings of the Facility's 132kV transformer(s), the SPP Interconnection Facility and the SPP Interconnector to TNB that have been accepted by TNB pursuant to Clause 9.5(f); and
  - (iv) SPP shall have submitted advance notification of commissioning and test programs to TNB and the Grid System Operator. SPP shall have obtained written confirmation from the Grid System Operator that the energization and commissioning of the SPP Interconnection Facility and the SPP Interconnector may commence.
- (c) The procedures for the shutdown and commissioning of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works including backfeed from the Grid System shall comply with the procedures as may be given by TNB and/or the Grid System Operator in writing to SPP.

## **10. INITIAL OPERATION DATE**

### **10.1 Relay Settings of the Facility**

- (a) The design of the Facility's protection system including the relay setting of the Facility, as further described in Appendix B of this Agreement, shall not be dependent on the protection system of the SPP Interconnector, SPP Interconnection Facility and/or the SPP Works.
- (b) All the relay settings in relation to the Facility referred to in Clause 10.1(a) shall have been installed by SPP, tested and certified by Electrical Service Engineer.

### **10.2 Notice of Testing Schedules, Proposed Initial Operation Date and Confirmation of the Initial Operation Date**

- (a) Not later than ninety (90) days before the Initial Operation Date, SPP shall submit to TNB the proposed commissioning and testing programs and the proposed test procedures of the Facility which shall consist of but not

limited to the following:

- (i) commissioning and testing programs of the Facility for all tests required to comply with the Grid Code, the provisions of this Agreement and the EPCC Contract and such other tests intended to be carried out by SPP which shall include the effect to the Grid System (if any) for each test, the test loads inclusive of load patterns for each test, the proposed testing start and end times, and the testing period for each test;
  - (ii) the test procedures for all tests of the Facility required to comply with the Grid Code and the provisions of this Agreement, which shall include the name, description and purpose of each test, the test codes and standards used for each test and the acceptance (pass/fail) criteria for each test; and
  - (iii) the proposed hourly delivery schedule of Test Energy from the Facility.
- (b) Within thirty (30) days of receiving the proposed commissioning and testing programs of the Facility from SPP, TNB shall give SPP written notification of whether such proposed programs are acceptable to TNB. If such proposed programs are not acceptable, TNB shall provide detailed information (within the same thirty (30) days' period) as to why the proposed programs are not acceptable and SPP shall comply with any requests of TNB to provide acceptable commissioning and testing programs of the Facility. Within thirty (30) days of receiving such request, SPP shall submit to TNB the revised commissioning and testing programs of the Facility (the **Agreed Program**).
- (c) Not earlier than one hundred (100) days but no later than sixty (60) days before the Initial Operation Date, SPP shall submit to TNB and the Grid System Operator the tentative commissioning and testing schedules of the Facility, prepared in accordance with the Agreed Program described in Clause 10.2(b). SPP shall submit the commissioning and testing schedules of the Facility as approved by the Grid System Operator to TNB and the Grid System Operator not less than seven (7) days prior to the commencement of each test specified in the approved commissioning and testing schedules of the Facility.
- (d) Within sixty (60) days of receiving the proposed test procedures of the Facility from SPP, TNB shall give SPP written notification of whether such proposed test procedures are acceptable to TNB. If such proposed test procedures are not acceptable, TNB shall provide detailed information (within the same sixty (60) day period) as to why the proposed test procedures are not acceptable and SPP shall comply with any requests of TNB to provide acceptable test procedures of the Facility. Within thirty (30) days of receiving such request, SPP shall submit to TNB the revised test procedures of the Facility for TNB's approval.
- (e) SPP shall, within twenty-four (24) hours after the completion of each test specified in the testing procedures of the Facility, submit to TNB and the

Grid System Operator the preliminary test results in respect of each test conducted in conformance with the Grid Code and the provisions of this Agreement. Within seven (7) days after the completion of each test in relation to the Facility, SPP shall submit to TNB and the Grid System Operator the test results with complete results of each of the tests conducted in conformance with the Grid Code and the provisions of this Agreement.

- (f) SPP shall provide TNB with (i) at least three (3) months' prior notice of the proposed Initial Operation Date, and (ii) written confirmation that the Initial Operation Date has occurred within five (5) days of it occurring.
- (g) Beginning from the Initial Operation Date and continuing for the Term, SPP shall publish the details of the Rolling 24 Hours Forecast via SPP's website (accessible to the Grid System Operator and with web services facilities to enable automatic extraction of such data into the Grid System Operator's IT system via internet) or any other manner or form as may be prescribed from time to time by the Grid System Operator. SPP shall establish such SPP's website prior to the Initial Operation Date and notify TNB and the Grid System Operator of the same.

### 10.3 Consequences of Delay by TNB

- (a) If, otherwise than due to any default, delay or omission on the part of SPP under this Agreement and subject to the SPP Interconnection Facility, the SPP Interconnector and the SPP Works having been completed by SPP, the Commercial Operation Date is delayed by:
  - (i) the failure of TNB to inspect or endorse without reasonable cause the interconnection protective devices referred to in Clause 10.4 within fourteen (14) days of receipt by TNB of the certificate by the Independent Engineer issued in accordance with Clause 13.1(c); or
  - (ii) the failure of TNB to accept the required generation to enable the testing of the Facility,then the Scheduled Commercial Operation Date shall be extended by one (1) day for each day the Commercial Operation Date is delayed as a result of the occurrence of an event referred to in sub-Clauses (i) or (ii) above.
- (b) If, due to the failure of TNB to inspect or endorse without reasonable cause the interconnection protective devices referred to in Clause 10.4 within fourteen (14) days of receipt by TNB of the certificate by the Independent Engineer issued in accordance with Clause 13.1(c), the Commercial Operation Date fails to occur within thirty (30) days of the Scheduled Commercial Operation Date, TNB shall pay SPP the actual interest incurred by SPP during the construction of the Facility under the Financing Documents as a result of the delay of the Commercial Operation Date, for the period from the date after the expiry of fourteen (14) days from receipt by TNB of the certificate by the Independent Engineer until the date TNB inspects or rejects with reasonable cause or approves the interconnection

protective devices, as the case may be, provided always that TNB shall not be liable to pay the interest as aforesaid if SPP fails to provide TNB with the details of such interest with the relevant supporting documents.

#### 10.4 Commencement of Initial Operation Date

No generation of solar photovoltaic energy from the Facility in an interconnected mode with the Grid System, whether for testing purposes or otherwise, may take place and the Initial Operation Date may not occur until (i) acceptance by TNB of all the relay settings as installed by SPP, tested and certified by Electrical Service Engineer and final relay settings printout with endorsement by Electrical Service Engineer pursuant to Clause 9.5(f) in relation to the Facility's 132kV transformer(s), the SPP Interconnection Facility, SPP Interconnector and SPP Works, (ii) all protection relay settings in relation to the Facility have been installed by the SPP, tested and certified by the Electrical Service Engineer pursuant to Clause 10.1; and (iii) the Grid System Operator has confirmed in writing, within a reasonable period, that the operation of the Facility with the Grid System may commence.

### 11. COMMERCIAL OPERATION DATE

#### 11.1 Notice of Proposed Commercial Operation Date

- (a) SPP shall provide TNB with at least thirty (30) days' prior notice of the proposed Commercial Operation Date. If the Commercial Operation Date does not occur on the proposed Commercial Operation Date, SPP shall provide TNB not less than two (2) Business Days' prior notice of the new proposed Commercial Operation Date. SPP shall also provide TNB not less than one (1) Business Day's prior notice before the Commercial Operation Date actually occurs and until such notice is given in accordance with this Clause 11.1(a), SPP shall be deemed not to have achieved the Commercial Operation Date.
- (b) At least ninety (90) days prior to the proposed Commercial Operation Date, SPP shall furnish TNB with the Declared Annual Quantity for the Contract Year in which the Commercial Operation Date occurs (the **Initial Contract Year**), the Annual Generation Profile and the proposed schedule of planned outages. In addition to furnishing the Declared Annual Quantity for the Initial Contract Year, if the Commercial Operation Date occurs in any of the months of October, November and December, SPP shall also simultaneously furnish TNB with the Declared Annual Quantity, the Annual Generation Profile and the proposed and indicative schedules of planned outages for the Contract Year immediately following the Initial Contract Year.
- (c) Except as otherwise provided in Clause 11.1(b), SPP shall, at least thirty (30) days prior to the Commercial Operation Date, and thereafter not later than ninety (90) days before the end of each Contract Year, submit the Declared Annual Quantity, the Annual Generation Profile and the proposed and indicative schedules of planned outages in accordance with paragraph F1.2.1 of Appendix F.



### 11.2 Notice of Confirmation of the Commercial Operation Date

SPP shall provide TNB with written confirmation that the Commercial Operation Date has occurred within twenty-four (24) hours after it occurs. The said confirmation shall be provided together with the Independent Engineer's certificate stating that the Facility has the capacity and capability to meet the declared capacity of the Facility and the test results which show that SPP can meet the declared capacity of the Facility.

### 11.3 Advanced Commercial Operation Date

If SPP notifies TNB that the Commercial Operation Date can be achieved earlier than the Scheduled Commercial Operation Date, TNB may agree to an earlier Commercial Operation Date from which Energy Payments shall be payable in accordance with this Agreement.

### 11.4 Performance Test Report and Project Completion Report

- (a) Not later than sixty (60) days after the occurrence of the Commercial Operation Date, SPP shall submit to TNB a hardcopy and a softcopy of the performance test report relating to the Facility as prepared by the EPCC Contractor.
- (b) Not later than one hundred and eighty (180) days after the occurrence of the Commercial Operation Date, SPP shall submit to TNB a hardcopy and a softcopy of the project completion report relating to the Project as prepared by the EPCC Contractor.

### 11.5 Declaration of the Declared Daily Capacity

- (a) No later than twenty-fifth (25th) day of each month or such other time as TNB shall otherwise notify, throughout the Term, SPP shall declare to TNB the Declared Daily Capacity for the following four (4) rolling months' period (the **4 Month Ahead Declared Daily Capacity**) in such manner or form as may be prescribed from time to time by TNB.
- (b) At 12.30 pm every Wednesday or such other time as TNB shall otherwise notify, throughout the Term, SPP shall declare to TNB the Declared Daily Capacity for a period of nine (9) days beginning from the coming Saturday to the next Sunday (the **Week Ahead Declared Daily Capacity**) in such manner or form as may be prescribed from time to time by TNB.
- (c) At 10.00 am every day or such other time as TNB shall otherwise notify, throughout the Term, SPP shall declare to TNB the Declared Daily Capacity for the following day (the **Day Ahead Declared Daily Capacity**) in such manner or form as may be prescribed from time to time by TNB.
- (d) SPP may redeclare the Declared Daily Capacity at any time to take into account of any deration or change in the Declared Daily Capacity.

### 11.6 Emergency Operation

During an Emergency Condition referred to in Clause 4.4(a), SPP shall comply and assist in the compliance with the following requirements:

- (a) At the Control Centre's request, SPP shall use its best efforts to deliver solar photovoltaic energy during an Emergency Condition. During an Emergency Condition, SPP shall comply with instructions under the direction of the Control Centre until the Grid System has returned to normal. SPP shall cooperate with the Control Centre in establishing emergency plans, including a recovery from a local or widespread electrical blackout, voltage reduction to effect load curtailment and other plans which may be necessary.
  - (i) Restoration requires an orderly plan for the safe and rapid restoration of the electric network. Generation shall be carefully regulated to maintain the supply/demand balance. Lines or substations may need to be switched out of service temporarily.
  - (ii) If the Facility has been isolated from the Grid System, it shall be allowed to reconnect only under the direction of the Control Centre. The Facility shall be ready to pick up load as soon as possible.
  - (iii) The SPP Interconnection Facility and the SPP Interconnector shall be re-connected to the Grid System only under the direction of the Control Centre.
- (b) During an Emergency Condition, SPP shall consult the Control Centre before changing its generation schedule. If this is not possible, SPP shall notify the Control Centre as soon as practicable after changing its schedule. Any such change in the generation schedule shall be based only upon the need to ensure the safety of the Facility and personnel.
- (c) SPP shall maintain contact with the Control Centre during an Emergency Condition.
- (d) Automatic voltage regulators shall be maintained in operation during an Emergency Condition unless the Control Centre requires manual adjustments to be made.

### 11.7 Back-up Electricity Supply

Starting from the Commercial Operation Date, TNB may, upon SPP's request, provide the Facility with a supply of back-up electricity at a tariff on a sen/kWh basis to be reasonably determined by TNB pursuant to the Electricity Supply Act 1990.

## 12. OPERATION, MAINTENANCE AND TESTING

### 12.1 Operation and Maintenance of the Facility

SPP shall comply with the provisions of Appendix F in respect of the operation and

maintenance of the Facility.

## 12.2 Consequence of SPP's Failure to Meet the Established Capacity

- (a) Prior to the Commercial Operation Date, SPP shall cause performance tests to be conducted on the Facility (including but not limited to the determination of the capacity and capability of the Facility). No later than the Commercial Operation Date, SPP shall submit to TNB, with a copy to the Suruhanjaya Tenaga, a certificate from the Independent Engineer confirming that the Facility has the capacity and capability to meet the declared capacity of the Facility and the test results which show that SPP can meet the declared capacity of the Facility as certified by the Independent Engineer. In the event the capacity of the Facility as certified by the Independent Engineer is less than the Established Capacity, then the Established Capacity shall be revised downwards to reflect the actual capacity of the Facility as certified by the Independent Engineer.
- (b) On the day before the tenth (10th) anniversary of the Commercial Operation Date or such later date as may be notified by TNB to SPP in writing (the **Performance Test Date**), SPP shall cause performance tests to be conducted on the Facility (including but not limited to the determination of the capacity and capability of the Facility). No later than thirty (30) days after the Performance Tests Date, SPP shall submit to TNB, with a copy to the Suruhanjaya Tenaga, a certificate from the Independent Engineer confirming the capacity and capability of the Facility and the test results which show that SPP can meet the capacity and capability of the Facility as certified by the Independent Engineer. In the event the capacity of the Facility as certified by the Independent Engineer is less than the Established Capacity, then the Established Capacity shall be revised downwards to reflect the actual capacity of the Facility as certified by the Independent Engineer.
- (c) In the event of a failure by SPP to comply with its obligations under Clause 12.2(b) above, the Established Capacity shall be revised downwards so that the Established Capacity shall be the lower of:
- (i) seventy five per cent (75%) of the then prevailing Established Capacity; and
  - (ii) seventy five per cent (75%) of the highest level of energy production from the Facility as measured by the TNB Metering Equipment during a period of thirty (30) days immediately preceding the Performance Test Date.
- (d) The Established Capacity as revised in accordance with this Clause 12.2 (the **Revised Established Capacity**) shall be used for the purpose of (a) the determination of the Maximum Annual Allowable Quantity and the Declared Annual Quantity and (b) the calculation of the payments as described in Appendix G, for the remainder of the Term, unless revised in accordance with this Agreement.

- (e) Upon any downwards revision of the Established Capacity pursuant to Clause 12.2(b), SPP may, at its costs and expenses, rectify and re-establish the capacity and capability of the Facility, and cause a performance re-test to be conducted on the Facility. SPP shall submit to TNB, with a copy to the Suruhanjaya Tenaga, a certificate from the Independent Engineer confirming the revised capacity and capability of the Facility and the re-test results. The Revised Established Capacity shall then be updated to reflect the actual capacity of the Facility (subject to the maximum limit of ●MWac) as certified by the Independent Engineer (the **Updated Revised Established Capacity**) and the Updated Revised Established Capacity shall then be the Established Capacity (subject to the maximum limit of ●MWac) of the Facility effective from the date on which such certificate from the Independent Engineer was submitted to TNB.

### 12.3 Consequence of SPP's Failure to Deliver Net Electrical Output

- (a) If, otherwise than due to (i) an Emergency Condition; (ii) an interruption due to a Force Majeure Event affecting SPP; or (iii) any default or omission on the part of TNB, the total Net Electrical Output delivered by the Facility in a Contract Year is less than seventy per cent (70%) of the Declared Annual Quantity of such Contract Year, then SPP shall pay TNB the Non-Delivery Payment calculated in accordance with Appendix G.
- (b) TNB shall be entitled to set off any outstanding amount due to it under this Clause 12.3(a) against any sums due and payable to SPP under the terms of this Agreement. The Parties agree that the precise level of actual damages that would be suffered by TNB arising out of or in relation to the event described in this Clause 12.3 would be difficult to ascertain with certainty. The Parties further agree that any sum payable under this Clause 12.3(b) is not a penalty, and is genuine, fair and reasonable. Such payment represents a genuine, good faith and reasonable estimate of fair compensation for the losses to TNB.

### 12.4 Pollution Control

SPP shall construct and operate the Facility in accordance with all provisions of any of the Laws and Government Authorisations relating to pollution control and environmental standards.

### 12.5 Operations Log

Without limiting the generality of the provisions of Clause 6.6 and Clause 15.6, SPP shall keep an accurate daily operations log for the Facility which shall include all information relating to the Declared Annual Quantity, the Declared Daily Capacity and any significant events relating to the operation and maintenance of the Facility. TNB shall be entitled to review SPP's log at any time upon giving reasonable notice. TNB shall be entitled to request copies of documents or other information relating to the Declared Annual Quantity and the Declared Daily Capacity at any time and from time to time from SPP and SPP shall promptly furnish copies of the requested documents and information.

**13. SPP INTERCONNECTION FACILITY, SPP INTERCONNECTOR AND SPP WORKS****13.1 SPP INTERCONNECTION FACILITY, SPP INTERCONNECTOR AND SPP Works**

- (a) SPP shall design, construct, install and test the SPP Interconnection Facility, SPP Interconnector and SPP Works at its expense in accordance with Prudent Utility Practices and the specifications set out in Appendix D.
- (b) SPP shall complete the construction, installation and testing of the SPP Works not later than thirty (30) days before the Initial Operation Date.
- (c) Upon completion of the construction, installation and testing but prior to the energising and commissioning of the SPP Interconnection Facility, SPP Interconnector and SPP Works, SPP shall submit a certificate from the Independent Engineer confirming that (i) the SPP Interconnection Facility, SPP Interconnector and SPP Works have been designed, constructed and installed in accordance with the specifications set out in Appendix D, (ii) the completion of all tests and requirements in accordance with Clause 9.8 have been carried out, and (iii) the SPP Interconnection Facility, SPP Interconnector and SPP Works can be safely operated in parallel with the Grid System. Upon receipt of such certificate from the Independent Engineer and verifying the test procedures and results on the basis of which such certificate was given, TNB shall synchronise the SPP Interconnection Facility, SPP Interconnector and SPP Works with the Grid System.
- (d) SPP shall transfer to TNB and take all actions necessary to effect the transfer of all rights, title and interest to the completed SPP Works, including title to the land on which the SPP Works is located in accordance with Clause 13.2(b) where applicable, free from encumbrances, on or before the Initial Operation Date so that TNB shall become the owner thereof. All costs relating to, incidental or consequent upon such transfer shall be borne by SPP. Upon such transfer, all property and title in such completed and transferred SPP Works shall pass to TNB. Subject to Clause 13.3, TNB shall thereafter be responsible for the operation and maintenance of the same.

**13.2 Land, Easements and Rights of Way**

- (a) SPP shall, at its cost and expense, acquire all necessary ownership rights, leases, title and/or interest including Access Rights relating to the parcels of land on which the SPP Interconnection Facility and the SPP Interconnector shall be constructed and located pursuant to Clause 13.1.
- (b) In respect of the SPP Works involving land, SPP shall acquire and transfer to TNB all ownership rights and title including all Access Rights relating to the parcels of land on which the SPP Works shall be constructed and located pursuant to Clause 13.1.
- (c) TNB shall co-operate with SPP to ensure that the SPP Interconnection Facility, the SPP Interconnector and the SPP Works are constructed and installed in the manner and by the date set out in Clause 13.1(b).

- (d) SPP shall reimburse TNB for its reasonable expenses incurred in providing such co-operation as may be requested by SPP.

### 13.3 Warranties and Indemnities

- (a) SPP expressly warrants to TNB as follows:
  - (i) that the SPP Works shall be designed, constructed and installed in accordance with Prudent Utility Practices and the requirements and specifications set out in Appendix D and free from defects in materials and workmanship; and
  - (ii) that all equipment and items installed in the SPP Works shall be installed, and all work shall be performed, in accordance with Prudent Utility Practices, the requirements set out in Appendix D and other requirements of the equipment manufacturers or suppliers.
- (b) The warranties given in Clause 13.3(a) above shall continue for a period of twenty-four (24) months from the date of transfer of the SPP Works to TNB pursuant to Clause 13.1(d). If any part of the SPP Works is replaced or repaired during such twenty-four (24) month period or any extension of it, then equivalent warranties on the parts so replaced or repaired shall continue for a period of twenty-four (24) months from the date of the completion of such replacement or repair, provided always that no warranty shall extend beyond a period of forty-eight (48) months from the date of transfer of the SPP Works to TNB pursuant to Clause 13.1(d).
- (c) SPP further represents and warrants that the SPP Works shall be free from latent engineering or design defects and in the event any latent engineering or design defect results in a failure or degradation of durability or performance of the SPP Works, SPP shall without charge to TNB take such remedial action as may be necessary to rectify the defect. The warranties given in this Clause 13.3(c) shall continue for a period of sixty (60) months from the date of transfer of the SPP Works pursuant to Clause 13.1(d).
- (d) SPP undertakes that it will take such action as TNB may reasonably require to enforce any warranties given to SPP by the EPCC Contractor in respect of the SPP Works.
- (e) If due to any defect in (a) the SPP Interconnection Facility and/or the SPP Interconnector or (b) the SPP Works (which amounts to a breach by SPP of any of the warranties set out in this Clause 13.3) and as a result the Grid System is unable to accept Net Electrical Output from the Facility, SPP shall not be entitled to any Energy Payment and/or Non-Acceptance Payment during such period notwithstanding that the Facility is otherwise capable of generating solar photovoltaic energy.

**13.4 Protective Devices**

Each Party shall be responsible for protecting its own facilities from possible damage caused by electrical disturbances or other problems arising from the operation or non-operation of the other Party's facilities.

**14. METERING****14.1 Metering Devices**

- (a) SPP shall, at its own cost and expense, install or procure the installation of the TNB Metering Equipment as set out in Appendix C.
- (b) Subject to Clause 14.4, the TNB Metering Equipment shall be used to measure the transfer of electric energy across the Interconnection Point from SPP to TNB or from TNB to SPP, as the case may be.
- (c) The specifications for the TNB Metering Equipment shall be as set out in Appendix C. The TNB Metering Equipment shall be sealed and the seal shall not be broken for any reason whatsoever except when the TNB Metering Equipment is to be inspected and tested or adjusted in accordance with Clause 14.3 or Clause 14.4.
- (d) SPP shall not permit any of its employees, agents, contractors or subcontractors of any tier to tamper with the TNB Metering Equipment without TNB's prior written consent.
- (e) At all times, SPP agrees to keep the location associated with the TNB Metering Equipment clean, clear and accessible to TNB and its authorised agents.

**14.2 Pre-Operational Testing of TNB Metering Equipment**

- (a) The pre-operational testing of the TNB Metering Equipment shall be carried out in accordance with the provisions of Appendix C.
- (b) Upon the installation of the TNB Metering Equipment, SPP shall, not later than thirty (30) days after the conduct of the site tests and without any outstanding works subsisting, transfer to TNB and take all actions necessary to effect the transfer of all rights, title and interest of the TNB Metering Equipment and provide to TNB at all times the Access Rights to the TNB Metering Equipment. SPP expressly warrants to TNB that:
  - (i) the TNB Metering Equipment shall be designed, tested and installed in accordance with Prudent Utility Practices and the requirements and specifications set out in Appendix C and free from defects in materials and workmanship; and
  - (ii) that all equipment and items relating to the TNB Metering Equipment shall be installed, and all work shall be performed, in accordance with Prudent Utility Practices, the requirements set out

in Appendix C and other requirements of the equipment manufacturers or suppliers.

- (c) The warranties given in Clause 14.2(b) above shall continue for a period of twenty-four (24) months from the date of transfer of the TNB Metering Equipment. If any part of the TNB Metering Equipment is replaced or repaired during such twenty-four (24) month period or any extension of it, then equivalent warranties on the parts so replaced or repaired shall continue for a period of twenty-four (24) months from the date of the completion of such replacement or repair, provided always that no warranty shall extend beyond a period of thirty-six (36) months from the date of transfer of the TNB Metering Equipment to TNB.
- (d) SPP further represents and warrants that the TNB Metering Equipment shall be free from latent engineering or design defects and in the event any latent engineering or design defect results in a failure or degradation of durability or performance of the TNB Metering Equipment, SPP shall without charge to TNB take such remedial action as may be necessary to rectify the defect. The warranties given in this Clause 14.2(d) shall continue for a period of sixty (60) months from the date of transfer of the TNB Metering Equipment pursuant to Clause 14.2(b) (the **Latent Defects Liability Period**) without any extension of the Latent Defects Liability Period in respect of any remedial works taken to rectify the defect.

#### 14.3 Inspection of Metering Equipment

- (a) TNB shall inspect and test the TNB Metering Equipment at TNB's cost and expense on a regular schedule determined by TNB in accordance with Prudent Utility Practices and Appendix C. TNB shall provide SPP with reasonable advance written notice of any inspection and tests to be conducted. TNB shall permit a representative of SPP to witness and verify all inspections and tests.
- (b) Upon two (2) weeks' prior written notice from SPP, TNB shall perform additional inspections or tests of any of the TNB Metering Equipment. SPP and TNB shall agree on a mutually convenient time for such inspections or tests and TNB shall permit a qualified representative of SPP to witness and verify such inspections and tests. The results of any such test on the TNB Metering Equipment shall be deemed final and conclusive. The actual expense of any such additional inspection or testing shall be borne by SPP unless, upon such inspection or testing, such Metering Equipment is found to register inaccurately by more than +/- 1%, in which event the expense of such additional inspection or testing shall be borne by TNB.
- (c) If, as a result of the inspection and tests conducted pursuant to Clause 14.3(a) or Clause 14.3(b) above, any of the TNB Metering Equipment is found to be defective or inaccurate, reasonable steps shall be taken by TNB to adjust, repair, replace and/or re-calibrate such Metering Equipment at TNB's cost unless the provisions of Clauses 14.2(c) and 14.2(d) apply.



**14.4 Adjustments for Inaccurate Meters**

If the TNB Metering Equipment fails to register, or if the measurement made by the TNB Metering Equipment is found upon testing to be inaccurate by more than +/- 1%, an adjustment shall be made correcting all measurements by the inaccurate or defective metering device for billing purposes for both the amount of the inaccuracy and the period of the inaccuracy in the following manner:

- (a) if the Parties cannot agree on the amount of the adjustment necessary to correct the measurements made by the TNB Metering Equipment, the Parties shall agree the amount of the necessary adjustment on the basis of deliveries of solar photovoltaic energy from the Facility to the Grid System during periods of similar operating conditions when the TNB Metering Equipment was registering accurately;
- (b) if the Parties cannot determine or agree on the actual period during which the inaccurate measurements were made, the period during which the measurements are to be adjusted shall be one half (1.5) of the period from the last previous test of the relevant part of the TNB Metering Equipment to the test that found such part of the TNB Metering Equipment to be defective or inaccurate; and
- (c) if the adjustment period so determined covers a period of deliveries for which payments have already been made by TNB, TNB shall use the corrected measurements as determined in accordance with this Clause 14.4 to re-calculate the amount due for the period of the inaccuracy and shall subtract the previous payments by TNB for such period from such re-calculated amount. If the difference is a positive number, that difference shall be paid by TNB to SPP and if the difference is a negative number, that difference shall be paid by SPP to TNB. Payment of such difference by the owing Party shall be made within fifteen (15) Business Days of receipt by the other Party of a statement to that effect. In the event there are payments due from SPP to TNB, TNB shall have the right to set off such sums from payments due to SPP from TNB.

**15. REPRESENTATIONS AND WARRANTIES; ADDITIONAL COVENANTS OF SPP AND TNB****15.1 Representations and Warranties of SPP**

SPP represents and warrants to TNB that as at the date of this Agreement:

- (a) SPP is a private limited liability company duly organised and validly existing under the laws of Malaysia and SPP has all requisite power and authority to conduct its business, to own its properties and to execute, deliver and perform its obligations under this Agreement.
- (b) The execution, delivery and performance by SPP of this Agreement has been duly authorised by all necessary action, including applicable Corporate Authorisations, and does not and will not (i) require any consent or approval of SPP's Board of Directors or shareholders, other than those that have been

obtained, or (ii) result in a breach of, or constitute a default under, any provisions of SPP's constitution or incorporation documents, any indenture, contract or agreement to which it is a party or by which it or its assets may be bound, or violate any Law, order, writ, judgment, injunction, decree, determination or award presently in effect having applicability to SPP.

- (c) This Agreement constitutes a legal, valid and binding obligation of SPP.
- (d) There is no pending action or proceeding affecting SPP before any court, Government Entity or arbitrator that is likely to affect materially and adversely the financial condition or operations of SPP and the ability of SPP to perform its obligations hereunder, or that purports to affect the legality, validity or enforceability of this Agreement.

### 15.2 Representations and Warranties of TNB

TNB represents and warrants to SPP that as at the date of this Agreement:

- (a) TNB is a public limited liability company duly organised and validly existing under the laws of Malaysia and TNB has all requisite power and authority to conduct its business, to own its properties and to execute, deliver, and perform its obligations under, this Agreement.
- (b) The execution, delivery and performance by TNB of this Agreement has been duly authorised by all necessary action, including Applicable Corporate Authorisations, and does not and will not (i) require any consent or approval of TNB's Board of Directors other than those that have been obtained, or (ii) result in a breach of, or constitute a default under any provisions of TNB's constitution or enabling documents, any indenture, contract or agreement to which it is a party or by which it or its assets may be bound, or violate any Law, order, writ, judgment, injunction, decree, determination or award presently in effect having applicability to TNB.
- (c) This Agreement constitutes a legal, valid and binding obligation of TNB.
- (d) There is no pending action or proceeding affecting TNB before any court, Government Entity or arbitrator that is likely to affect materially and adversely the financial condition or operations of TNB and the ability of TNB to perform its obligations hereunder, or that purports to affect the legality, validity or enforceability of this Agreement.

### 15.3 Full Control and Possession of the Site

SPP represents and warrants to TNB that throughout the Term:

- (a) SPP shall have full control and possession of the Site, including all necessary ownership rights, leases, title and/or interest of the Site and all Access Rights over the Site to construct, install, commission, energise, test, operate, maintain, upgrade, replace and/or remove any part of the Project; and

- (b) SPP shall comply with the provisions of all statutes, ordinances, by-laws, regulations and rules for the time being in force affecting the Site or any constructions, improvements, installations, additions or alterations thereon or SPP's occupation on the Site and forthwith to satisfy all requirements of the municipality or any other local authority with respect to the Site.

#### 15.4 Permits: Compliance with Laws

- (a) Each Party shall, at its own expense, acquire and maintain in effect, from any and all Government Entities with jurisdiction over such Party and/or the Facility, all Government Authorisations.
- (b) SPP shall, as required by applicable Laws in force as at the Effective Date, complete or have completed all inspections and environmental impact studies, in each case necessary (i) for the operation and maintenance of the Facility, and (ii) for SPP to perform its obligations under this Agreement.
- (c) SPP shall, at all times, comply with the terms and conditions of the SPP Licence and all Laws applicable to it and/or to the Facility, including but not limited to all environmental laws in effect at any time during the Term. SPP shall not be regarded as being in breach of its obligations hereunder with respect to any relevant Change in Law if TNB has failed to perform its obligations under Clause 22 in respect thereof.
- (d) TNB shall, at all times, comply with the terms and conditions of the TNB Licence and all Laws applicable to it.

#### 15.5 Continuity of Existence

Each Party shall preserve and keep in full force and effect its corporate existence and all Government Authorisations necessary for the proper conduct of its business.

#### 15.6 Books and Records

Each Party shall keep proper books of records and account, in which full and correct entries shall be made of all dealings or transactions of or in relation to such Party's business and affairs in accordance with generally accepted accounting principles consistently applied.

#### 15.7 Certificates

Each Party shall be entitled to deliver or cause to be delivered from time to time to the other Party certifications of its officers, accountants, engineers or agents as such Party may reasonably request in connection with the performance of the other Party's obligations under this Agreement.

#### 15.8 Qualified Personnel

SPP shall, during the Term and as required by Law, only employ appropriately trained, qualified and registered (if applicable) personnel for the purposes of operating and maintaining the Facility and co-ordinating operations with the Grid

System.

#### 15.9 Operate, Maintain or Tamper with the other Party's Equipment

Each Party shall not permit any of its employees, agents, contractors or subcontractors of any tier to operate, maintain or tamper with the other Party's equipment on their respective sides of the Interconnection Point without the prior written consent of the other Party which shall not be unreasonably withheld, except in situations when such actions are taken to prevent immediate injury, death or property damage, and each Party shall use its best efforts to provide the other Party with advance notice of the need for such actions.

#### 15.10 Designs, Drawings and Specifications

SPP shall promptly submit to TNB copies of the designs, drawings and specifications relating to the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.

#### 15.11 Other Businesses

SPP shall not undertake, participate or otherwise be involved whether directly or indirectly in any business or opportunity other than the construction and operation and maintenance of the Facility and the sale of solar photovoltaic energy generated by the Facility to TNB under this Agreement.

#### 15.12 Delivery of the Financial Model

On or before the execution of this Agreement, SPP shall deliver a soft copy of the Financial Model to TNB (on CD-Rom or other electronic storage medium).

#### 15.13 Refinancing of the Project

- (a) SPP may, during the Term and with the prior written approval of TNB and the Suruhanjaya Tenaga (such approval not to be unreasonably withheld or delayed), arrange for the Project to be refinanced for the purposes of reducing the cost of financing of the Project.
- (b) In the event of any refinancing of the Project, SPP shall submit to TNB one (1) certified copy of the Financing Documents relating to such refinancing within seven (7) days after the Financial Closing Date in connection with the refinancing of the Project occurs.

#### 15.14 Amendments to the Project Documents

- (a) Once a Project Document has been entered into by the parties thereto, no change, variation, modification or amendment to the terms of that Project Document which could reasonably be expected to have a material adverse effect on TNB's rights under this Agreement shall be permitted without the express written consent of TNB (such consent not to be unreasonably withheld or delayed).

- (b) If, subject to Clause 15.14(a), SPP enters into any agreement, contract and/or document to change, vary, modify or amend the terms of the Project Document, SPP shall submit to TNB one (1) certified copy of such agreement, contract and/or document within seven (7) days after their being entered into by the parties thereto.

#### 15.15 Carbon Credits

It is expressly agreed and acknowledged by the Parties that the value of any credits or financial benefits which are available or may become available for reductions of "green house gas" emissions (the **Carbon Credits**) earned from the generation of solar photovoltaic energy by the Facility shall be solely for the benefit of TNB and passed through entirely to TNB. SPP hereby undertakes with TNB that it will, at TNB's costs and expenses, take such action as TNB may require in order to qualify for the Carbon Credits and to establish a mechanism for the passing through of such Carbon Credits to TNB. All costs and expenses to be incurred by SPP to qualify for the Carbon Credits shall be pre-agreed with TNB prior to their incurrence.

### 16. TAXES AND FINES

#### 16.1 Taxes and Fees

SPP shall pay all present and future taxes (whether national, state or local) imposed in connection with the ownership, operation and maintenance of the Facility, and, except as otherwise specified below, shall pay all other duties, impositions, assignments, levies, fees, costs and expenses (reasonably incurred) of any kind (whether or not to a Government Entity) necessary to assure the performance of its obligations under this Agreement.

#### 16.2 Fines

- (a) Save as provided in Clause 16.2(c) below, any fines, penalties or other costs incurred by SPP or its agents, employees or subcontractors for non-compliance by SPP, its agents, employees, or subcontractors with the requirements of any Laws or Government Authorisations shall not be reimbursed by TNB but shall be the sole responsibility of SPP.
- (b) If such fines, penalties or other costs are assessed against TNB by any Government Entity or court of competent jurisdiction due to the non-compliance by SPP with any Law or Government Authorisation SPP shall indemnify and hold harmless TNB against any and all losses, liabilities, damages and claims suffered or incurred because of the failure of SPP to comply therewith. SPP shall also reimburse TNB for any and all legal or other expenses (including lawyers' fees) reasonably incurred by TNB in connection with such losses, liabilities, damages and claims.
- (c) If such fines, penalties or other costs are assessed against SPP by any Government Entity or court of competent jurisdiction due to the non-compliance by TNB with any Law or Government Authorisation TNB shall indemnify and hold harmless SPP against any and all losses, liabilities,

damages and claims suffered or incurred because of the failure of TNB to comply therewith. TNB shall also reimburse SPP for any and all legal or other expenses (including lawyers' fees) reasonably incurred by SPP in connection with such losses, liabilities, damages and claims.

## **17. INSURANCE**

### **17.1 Insurance Required for the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

SPP undertakes to TNB that it shall maintain or procure to be maintained in effect the following insurance policies and coverage with respect to the Facility and where applicable, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works:

- (a) all insurances required by Law;
- (b) such insurance as is appropriate and customary for a prudent photovoltaic energy independent power producer; and
- (c) without prejudice to sub-Clause (b) above, all insurances as required under the Financing Documents.

### **17.2 Availability of Coverage**

If any of the insurances referred to in Clause 17.1(a) through (c) are not available on reasonable commercial terms, SPP shall provide to TNB detailed information as to the maximum amount of available coverage that it is able to purchase and shall be required to obtain TNB's consent (which consent shall not be unreasonably withheld or delayed) as to the adequacy of such coverage under the circumstances prevailing at the time.

### **17.3 Scope of Insurance**

SPP shall where applicable cause the insurers providing the coverage described in Clause 17.1 to amend or endorse each such policy:

- (a) to include TNB, its directors, officers and employees as additional insureds;
- (b) to provide that such insurance is primary with respect to the interest of TNB, its directors, officers and employees, and that any other insurance maintained by TNB is in excess and not contributory to the insurance provided under Clause 17.1;
- (c) to include a waiver of all rights of subrogation against TNB, its directors, officers and employees;
- (d) to contain a severability of interest provision; and

- (e) to provide for at least sixty (60) days' written notice to TNB prior to the cancellation, termination, non-renewal or material change of any such insurance coverage.

#### 17.4 Premium and Reports

- (a) SPP shall ensure that TNB, its directors, officers or employees shall not in any way be liable for the payment of any premiums required to be made to maintain the insurance policies set out in Clause 17.1.
- (b) SPP shall, if requested by TNB, use its best endeavours to procure for TNB's use any reports prepared by its insurers (whether in respect of compliance or claims) in respect of any insurance policies maintained in respect of the Facility or SPP.

#### 17.5 Evidence of Insurance

SPP shall cause such insurers or the agents thereof to provide TNB with certificates of insurance evidencing the policies described in Clause 17.1. Failure to provide such certificates shall not relieve SPP of its obligation to maintain the insurance coverage described in this Agreement, nor shall failure to obtain or maintain such insurance or recover any amount from such insurance relieve, or in any way reduce, any obligation or liability imposed on SPP elsewhere in this Agreement. SPP shall forthwith upon receipt thereof provide to TNB certificates of insurance coverage or insurance policies for the construction period and operation period as required by this Clause 17. These certificates shall be made available to TNB within thirty (30) days of inception or renewal.

#### 17.6 Application of Proceeds

SPP shall apply the proceeds of any such insurance policies received following a claim by SPP for loss or damage to the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with the requirements of the Financing Documents (so long as they are in effect) and otherwise to repair and/or reinstate the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. The time taken for the disbursement of the proceeds from any such insurance shall not in any way affect or delay the rectification, reinstatement and/or indemnification of any such loss or damage.

### 18. FORCE MAJEURE

#### 18.1 Force Majeure Event Defined

For the purposes of this Agreement, a Force Majeure Event shall mean an event, condition, or circumstance or its effect which:

- (a) is beyond the reasonable control of and occurs without fault or negligence on the part of the Party claiming it as a Force Majeure Event; and

- (b) causes a delay or disruption in the performance of any obligation under this Agreement despite all reasonable efforts of the Party claiming it as a Force Majeure Event to prevent it or mitigate its effects.

Subject to satisfying the foregoing criteria, Force Majeure Events include without limitation, the following:

- (i) strikes or lockouts and/or other work stoppages or industrial action (other than those solely affecting the Party claiming the same as a Force Majeure Event);
- (ii) acts of public enemies or terrorists or acts of war, whether or not war is declared, acts of force by a foreign nation or embargo;
- (iii) public disorders, insurrection, rebellion, sabotage, riots or violent demonstrations;
- (iv) explosions, fire, earthquakes, landslides, subsidence, sabotage, and/or other natural calamities and acts of God;
- (v) unusually severe weather conditions;
- (vi) expropriation or compulsory acquisition by any Government Entity;
- (vii) failure to obtain or renew any Government Authorisations; and
- (viii) any Force Majeure Event affecting the performance of any Person that is a party to the EPCC Contract or other contract between SPP and such Person relating to the construction, operation or maintenance of the Facility, the SPP Interconnection Facility and the SPP Interconnector.

#### 18.2 Effect of Force Majeure Event

- (a) Subject to the limitations set out in this Agreement, if either Party is rendered unable by reason of a Force Majeure Event to perform, wholly or in part, any obligation set out in this Agreement, then upon that Party giving notice as specified in Clause 18.3 and full particulars of the Force Majeure Event, those obligations of that Party shall be suspended or excused to the extent their performance is affected by the Force Majeure Event.
- (b) The Scheduled Commercial Operation Date shall be extended by one (1) day for each day the Commercial Operation Date is delayed by a Force Majeure Event.
- (c) The Term shall be extended by one (1) day for each day in the event that (i) the Facility is unavailable after its Commercial Operation Date due to any Force Majeure Event affecting the Facility, the SPP Interconnection Facility and the SPP Interconnector and (ii) SPP is not entitled under its insurance to receive insurance proceeds which replace any Energy Payments not received by SPP for such period.



**18.3 Notice of Force Majeure and Consequences**

If a Force Majeure Event occurs, the Party affected by it shall:

- (a) as soon as reasonably practicable, give the other Party written notice of the Force Majeure Event, including full information about it and the actions and time estimated to be necessary to resume performance of the affected Party's obligations under this Agreement;
- (b) afford the other Party reasonable access to its facilities for obtaining further information about the event;
- (c) use, at its own cost, all reasonable efforts to remedy its inability to perform and to resume full performance of its obligations under this Agreement as soon as practicable (provided that such Party shall not be required by this Clause 18.3(c) to settle any strikes on terms that are adverse to such Party and not commercially reasonable);
- (d) keep the other Party reasonably apprised of such efforts; and
- (e) provide written notice when it resumes the performance of its obligations under this Agreement.

**18.4 Limitations**

- (a) The Party claiming relief under Clause 18.2 shall suspend or be excused from performance of its obligations under this Agreement to the minimum extent practicable in the circumstances.
- (b) Any relief of a Party's obligations under this Agreement given by Clause 18.2 shall be subject to any limitations explicitly set out in this Agreement.
- (c) The Parties shall only be able to claim the benefit of Clause 18.2 to excuse their obligations under this Agreement for any Force Majeure Event that occurs, or is in effect, after the Effective Date.
- (d) Obligations of the Parties that are required to be completely performed before the occurrence of a Force Majeure Event shall not be excused as a result of it occurring.
- (e) Neither Party shall be relieved of any obligations under this Agreement solely because of increased costs or other adverse economic consequences that may be incurred through the performance of such obligations of the Parties.
- (f) Notwithstanding anything in this Clause 18, a Force Majeure Event in relation to either Party shall not include:
  - (i) normal wear and tear or random flaws in materials and equipment or breakdowns in equipment; or

- (ii) any full or partial curtailment in the electric output of the Facility that is caused, or arises from, the acts or omissions of any third party including any vendor, materials supplier, customer, or supplier of SPP, except (to the extent) such acts or omissions are themselves caused by any event, circumstance or combination of events or circumstances which constitute a Force Majeure Event.

#### 18.5 Force Majeure Event Occurring Pre-COD and affecting SPP

If a Force Majeure Event affecting SPP occurs before the Commercial Operation Date and delays the occurrence of the Commercial Operation Date past the Scheduled Commercial Operation Date, SPP shall not in any way be entitled to make any claims from TNB during the continuance of such Force Majeure Event affecting SPP. The Scheduled Commercial Operation Date shall be extended by one (1) day for each day the Commercial Operation Date is delayed as a result of the occurrence of a Force Majeure Event affecting SPP.

#### 18.6 Force Majeure Event Occurring Pre-COD and affecting TNB

If a Force Majeure Event affecting TNB occurs before the Commercial Operation Date and delays the occurrence of the Commercial Operation Date past the Scheduled Commercial Operation Date, TNB shall pay SPP (i) the costs of servicing debt (drawn down and expended by SPP in accordance with the terms of the Financing Documents) after the date such Force Majeure Event occurred (but not including the Sponsors' Gross Equity Contributions, the Sponsors' Equity Repayment or any cost relating thereto) and (ii) unavoidable costs reasonably incurred for the duration of the Force Majeure Event affecting TNB (not including costs arising from any default due to SPP or Force Majeure Event affecting SPP) that is substantiated by SPP with sufficient and appropriate evidence to the satisfaction of TNB, to the extent SPP is not entitled under its insurances to receive insurance proceeds which reimburse it for such costs incurred, provided that the total liability of TNB in respect of any payment under this Clause 18.6 shall not in any event exceed Ringgit Malaysia [*Quantum of payment is calculated by dividing the Maximum Annual Allowable Quantity with 365 days and multiplying with the Energy Rate*] for each day during the continuance of the Force Majeure Event.

#### 18.7 Force Majeure Event Occurring Post-COD and affecting SPP

If a Force Majeure Event affecting SPP occurs or continues after the Commercial Operation Date, TNB shall make Energy Payments to SPP only to the extent that solar photovoltaic energy is delivered in accordance with this Agreement, except if there is a Force Majeure Event affecting TNB in which event the provisions of Clause 18.8 shall apply.

#### 18.8 Force Majeure Event Occurring Post-COD and affecting TNB

If a Force Majeure Event affecting TNB occurs after the Commercial Operation Date and for the duration such Force Majeure Event persists, TNB shall continue to pay Non-Acceptance Payments to SPP only to the extent that the Facility is capable of generating and delivering solar photovoltaic energy in accordance with this Agreement.

**18.9 Right to Terminate**

- (a) If a Force Majeure Event prevents either Party from substantially performing any material obligation under this Agreement for a period which exceeds one hundred and eighty (180) days either Party may terminate this Agreement by giving thirty (30) days' written notice of termination, unless the provisions of sub-Clause (b) below apply.
- (b) If a Force Majeure Event which prevents either Party from substantially performing any material obligation under this Agreement cannot be remedied within one hundred and eighty (180) days with the use of reasonable diligence, then that period shall be extended for a further period of one hundred and eighty (180) days.
- (c) If the Party affected is unable to remedy the Force Majeure Event by the end of the further period of one hundred and eighty (180) days, the Parties shall consult as to what steps shall be taken with a view to mitigating or remedying the consequences of the relevant Force Majeure Event, having regard to all the circumstances. Such circumstances shall include consideration of how far the Party affected is able to demonstrate to the reasonable satisfaction of the other Party that:
  - (i) it is diligently applying reasonable efforts to execute a plan to overcome the effects of the Force Majeure Event and resume performance of its obligations under this Agreement; and
  - (ii) the Force Majeure Event can be overcome within a reasonable time after the expiration of the further period of one hundred and eighty (180) days.
- (d) Following consultation or consultations, the Parties shall determine whether and on what terms the further period of one hundred and eighty (180) days should be extended or whether and on what terms this Agreement should be terminated.
- (e) If the Parties agree to extend the second period then the provisions of sub-Clauses (c) through (f) shall apply mutatis mutandis at the end of such extension.
- (f) If the Parties are unable to agree to extend the further period of one hundred and eighty (180) days, either Party may terminate this Agreement by giving thirty (30) days' written notice of termination. In the event of termination of this Agreement under this Clause 18.9, this Agreement shall cease to have any further force or effect and neither Party shall have any obligation or liability (save in respect of any antecedent breach) to the other Party whether at law, hereunder or otherwise.

**18.10 The Suruhanjaya Tenaga's Rights**

If the Suruhanjaya Tenaga exercises its statutory right to operate the Facility the provisions of this Clause 18 shall continue to apply. TNB shall continue to make

Energy Payments and/or Non-Acceptance Payments (if any) to SPP for Net Electrical Output in accordance with this Agreement to the extent that the Facility, including the SPP Interconnection Facilities and SPP Interconnector, is capable of delivering solar photovoltaic energy and to the extent such payments to SPP are permitted by Law. So long as consistent with the terms of the Financing Documents or the rights of the Financing Parties thereunder, any payment made by TNB to the Suruhanjaya Tenaga or at the Suruhanjaya Tenaga's direction pursuant to any applicable Law shall for the purposes of this Agreement be deemed to be a payment made to SPP in accordance with the terms herein and to that extent in full discharge of TNB's obligation to SPP hereunder.

#### 18.11 Survival of Provisions

The provisions of this Clause 18 shall survive the termination or expiry of this Agreement.

### 19. DEFAULT AND TERMINATION

#### 19.1 SPP Events of Default

Each of the following events shall constitute an Event of Default by SPP, unless excused under another provision of this Agreement:

- (a) SPP fails to make a payment of any amount of substantial nature which is due and payable under this Agreement within sixty (60) days after receipt of notice of non-payment from TNB;
- (b) SPP fails to comply with or operate in conformity with any obligation of this Agreement (other than a payment obligation) and such failure, if capable of remedy, continues uncured for a period of ninety (90) days, after receipt of notice of such failure from TNB;
- (c)
  - (i) SPP is dissolved or liquidated, other than for the purpose of a voluntary dissolution or liquidation as part of a reorganisation or reincorporation;
  - (ii) SPP applies for or consents to a receiver, manager, custodian, trustee or liquidator being appointed over or taking possession of all or a substantial part of its assets;
  - (iii) SPP admits in writing its inability to pay its debts as they fall due;
  - (iv) SPP makes a general assignment or an arrangement or composition with or for the benefit of its creditors;
  - (v) SPP commences a voluntary case or files a petition seeking to take advantage of any law relating to bankruptcy, insolvency, reorganisation of its debts, winding-up or composition or re-adjustment of its debts;

- (vi) SPP fails to dispute in a timely manner, or acquiesces in writing to, any petition filed against it in an involuntary case under any bankruptcy or similar law; or
- (vii) SPP takes any action for the purpose of effecting any of the events described in paragraphs (c) (i) through (v) above;
- (d) the Facility delivers to TNB Net Electrical Output which is not solely driven by solar photovoltaic technology or the Facility and/or the Project comprises energy storage devices;
- (e) the Commercial Operation Date fails to occur within one hundred and eighty (180) days from the Scheduled Commercial Operation Date;
- (f) SPP Abandons the Project after the Effective Date and fails to resume activities within a period of time agreeable to TNB;
- (g) the Site Agreement is terminated;
- (h) any warranty, representation or covenant made by SPP in this Agreement is false or inaccurate in any material respect;
- (i) the SPP Licence is suspended or revoked or terminated or expired due to SPP's default, and SPP has not caused the SPP Licence to be reinstated or renewed either (i) within the shorter of three hundred and sixty-five (365) days and the legally permissible period for such reinstatement or renewal or (ii) after having exhausted all available administrative or legal appeals and applications for such reinstatement or renewal; or
- (j) any of the following events occur prior to the fifth (5<sup>th</sup>) anniversary of the Commercial Operation Date, without the prior written approval of the Federal Government of Malaysia:
  - (i) SPP sells, conveys, transfers or otherwise disposes of the Project or any material part or any interest in the Project to any other Person or enters into an agreement to do so; or
  - (ii) any Shareholder sells, transfers or otherwise disposes of any share of SPP or [●] (including for this purpose the assignment of the beneficial interest therein the creation of any charge or other security interest over, such share or the renunciation or assignment of any right to receive or to subscribe for such share) or any interest in such share or enters into an agreement to do so; or
  - (iii) there is a change in Control of SPP;

and for the purposes of this paragraph (j):

- (iv) "interest in a share" shall have the meaning assigned to such phrase in Section 6A of the Companies Act 1965;

- (v) “[●]” means [●] (Company Registration No. [●]); and
- (vi) “Shareholder” means a Person who, legally or beneficially, owns or Controls any share of SPP or [●] or any interest in such share.

### 19.2 Right to Claim Compensation

- (a) (i) If SPP fails to comply with or operate in conformity with any of the operating standards or characteristics set out in Appendix B, SPP shall forthwith compensate TNB an amount equal to Ringgit Malaysia Ten Thousand (RM10,000.00) for each such failure.
- (ii) If SPP fails to rectify each failure to comply with or operate in conformity with any of the operating standards or characteristics set out in Appendix B within a period of thirty (30) days from the notification date of such failure or such longer period as may be mutually agreed between SPP and TNB, each failure to rectify within the period as aforesaid shall be treated as a separate failure to comply with or operate in conformity with any of the operating standards or characteristics set out in Appendix B in which event SPP shall forthwith compensate TNB an amount equal to Ringgit Malaysia Ten Thousand (RM10,000.00) for each failure to rectify.
- (b) TNB shall be entitled to set off any outstanding amount due to it under this Clause 19.2 against any sums due and payable to SPP under the terms of this Agreement. The Parties agree that the precise level of actual damages that would be suffered by TNB arising out of or in relation to the event described in this Clause 19.2 would be difficult to ascertain with certainty. The Parties further agree that any sum payable under this Clause 19.2 is not a penalty, and is genuine, fair and reasonable. Such payment represents a genuine, good faith and reasonable estimate of fair compensation for the losses to TNB that may reasonably be anticipated from such failure to comply with or operate in conformity with any of the operating standards or characteristics set out in Appendix B but without prejudice to TNB’s other rights and remedies under this Agreement in particular Clauses 19.1, 19.5 and 19.6. Accordingly, SPP agrees to waive raising as a defence the compensations payable under this Clause 19 as not being genuine, fair or reasonable.

### 19.3 Walk Away Events

- (a) Appendix L contains a list of Walk Away Events against which there appears a Walk Away Date. Each respective Walk Away Date will be used to monitor progress in achieving the Commercial Operation Date on or before the Scheduled Commercial Operation Date.
- (b) In the event that a Walk Away Event is not satisfied by SPP by the relevant Walk Away Date, for whatever reason (including a Force Majeure Event), TNB shall, notwithstanding any provisions to the contrary in this Agreement, be entitled, at any time, to terminate this Agreement by delivering to SPP a fourteen (14) days’ notice in writing.

- (c) In the event the Letter of Award is revoked by the Suruhanjaya Tenaga at any time before the Financial Closing Date, TNB shall be entitled to terminate this Agreement with immediate effect by delivering to SPP a notice in writing.
- (d) In the event of termination of Agreement under this Clause 19.3, neither Party shall have any obligation or liability (save in respect of any antecedent breach) to the other whether at law, hereunder or otherwise and the rights of the Parties hereunder shall terminate and be of no force or effect.

#### 19.4 TNB Events of Default

Each of the following events shall constitute an Event of Default by TNB, unless excused under another provision of this Agreement:

- (a) TNB fails to make a payment of any amount of substantial nature which is due and payable under this Agreement within sixty (60) days after receipt of notice of non-payment from SPP;
- (b) TNB fails to comply with or operate in conformity with any obligation of this Agreement (other than a payment obligation) and such failure, if capable of remedy, continues uncured for a period of ninety (90) days, after receipt of notice of such failure from SPP; or
- (c)
  - (i) TNB is dissolved or liquidated, other than voluntary dissolution or liquidation as part of a reorganisation or reincorporation;
  - (ii) TNB applies for or consents to a receiver, manager, custodian, trustee or liquidator being appointed over or taking possession of all or a substantial part of its assets;
  - (iii) TNB admits in writing its inability to pay its debts as they fall due;
  - (iv) TNB makes a general assignment or an arrangement or composition with or for the benefit of its creditors;
  - (v) TNB commences a voluntary case or files a petition seeking to take advantage of any law relating to bankruptcy, insolvency, reorganisation of its debts, winding-up or composition or re-adjustment of its debts;
  - (vi) TNB fails to dispute in a timely manner, or acquiesces in writing to, any petition filed against it in an involuntary case under any bankruptcy or similar law; or
  - (vii) TNB takes any action for the purpose of effecting any of the events described in paragraphs (c) (i) through (v) above.

**19.5 Right To Terminate; Additional Rights**

- (a) If an Event of Default occurs (other than an Event of Default falling within Clauses 19.1(b) and Clause 19.4(b) that cannot be cured with the exercise of reasonable diligence within the period of ninety (90) days therein), the non-defaulting Party may terminate this Agreement by giving fourteen (14) days' written notice to the other Party.
- (b) If an Event of Default which falls within Clauses 19.1(b) or 19.4(b) cannot be cured with the exercise of reasonable diligence within the period of ninety (90) days specified therein, then that period shall be extended for a further period of one hundred and eighty (180) days. If the Event of Default continues uncured at the end of such further period, then the non-defaulting Party may terminate this Agreement immediately by written notice to the defaulting Party.
- (c) This right of termination shall be in addition to all other rights and remedies available to the non-defaulting Party, at law or in equity or otherwise, for the breach of this Agreement by the other Party. Such rights and remedies may include compensation for monetary damages, injunctive relief and specific performance.
- (d) Nothing in this Clause 19 herein shall give any Party the right to terminate this Agreement for a breach of any obligation under this Agreement save and except the Event of Default as stated in Clauses 19.1 and 19.4 above and where there is a claim of breach of this Agreement, the non-defaulting Party shall have other rights and remedies at law or in equity against the defaulting Party including monetary compensation, injunctive relief and specific performance.
- (e) The provisions of Clauses 19.5(c) and 19.5(d) shall survive termination of this Agreement.

**19.6 Consequences of Termination**

- (a) If TNB terminates this Agreement as a result of an Event of Default by SPP, TNB shall have the option but not the obligation, exercisable by prior notice in writing within sixty (60) days of the termination of this Agreement, to purchase the Project in the manner and for the purchase price determined in accordance with the provisions of Appendix J. In the event that the option is exercised, SPP shall sell the Project to TNB.
- (b) If SPP terminates this Agreement as a result of an Event of Default by TNB, SPP shall have the option but not the obligation, exercisable by prior notice in writing within sixty (60) days of the termination of this Agreement, to sell the Project to TNB, in the manner and for the purchase price determined in accordance with the provisions of Appendix J. In the event that the option is exercised, TNB shall, subject to all rights, title and interest in the Site (including the access rights) are capable of being transferred to TNB (or its nominees) free of encumbrances, purchase the Project from SPP.



- (c) SPP shall ensure that the Financing Parties specifically acknowledge and are bound by TNB's rights set out in Clauses 19.6(a) and 19.6(b).
- (d) The provisions of this Clause 19.6 and Appendix J shall survive termination of this Agreement.

#### 19.7 Step-in Rights

- (a) TNB shall have the right, but under no circumstances the obligation to assume partial or complete (as TNB may decide) operational responsibility for the Facility (in the capacity of an operator only) in the place and instead of SPP in order to continue operation of the Facility or complete any necessary repairs so as to assure uninterrupted generation of solar photovoltaic energy from the Facility.
- (b) Such step-in rights shall arise upon the occurrence and continuance of an Event of Default with respect to SPP which could reasonably be expected to materially adversely affect SPP's ability to operate and maintain the Facility in accordance with this Agreement.
- (c) TNB shall not exercise such step in rights until any applicable cure period specified has expired, unless at any earlier time the Financing Parties request TNB to step in under any right that has arisen under the Financing Documents. For so long as the Financing Documents remain in effect, TNB shall not exercise step-in rights hereunder if the operation of the Facility has been assumed by any Financing Party or any approved assignee or designee of the Financing Parties within the applicable cure period.
- (d) SPP shall ensure that the Financing Parties specifically acknowledge and are bound by such step-in rights of TNB.
- (e) In no event shall TNB's election to operate the Facility be deemed to be a transfer of title or a transfer of SPP's obligations as owner thereof. During any period when TNB shall be operating the Facility, TNB shall, in lieu of paying Energy Payments to SPP, pay all maintenance, repairs and other operating costs thereof together with all regularly scheduled debt service payments under the Financing Documents (in each case prorated for the amount attributable to such period), and the Parties shall cooperate with each other and execute and deliver such documents as may be necessary or desirable to accomplish the foregoing.
- (f) TNB shall have the right at any time, but not exceeding six (6) months from the time TNB exercises its step-in rights, to return the operational responsibility for the Facility to SPP, provided that TNB shall return the Facility to SPP in a condition no worse than that immediately prior to the assumption of the operational responsibility for the Facility by TNB, ordinary wear and tear excepted.

### 19.8 The Suruhanjaya Tenaga's Rights

So long as consistent with the terms of the Financing Documents or the rights of the Financing Parties thereunder, if the Suruhanjaya Tenaga exercises its statutory right to operate the Facility the provisions of this Clause 19 shall continue to apply and TNB shall continue to make Energy Payments and/or Non-Acceptance Payments (if any) to SPP for Net Electrical Output in accordance with this Agreement to the extent that the Facility, including the SPP Interconnection Facilities and SPP Interconnector, is capable of delivering solar photovoltaic energy and to the extent such payments to SPP are permitted by Law. Any payment made by TNB to the Suruhanjaya Tenaga or at the Suruhanjaya Tenaga's direction pursuant to any applicable Law shall for the purposes of this Agreement be deemed to be a payment made to SPP in accordance with the terms herein and to that extent in full discharge of TNB's obligation to SPP hereunder.

## 20. INDEMNIFICATION AND LIABILITY

### 20.1 Indemnification

- (a) Neither Party shall be liable to the other for any claims, judgments, liabilities, losses, costs, expenses or damages of any kind or character (including loss of use of property), which are the consequence of damage to or destruction of property or personal injury (including death) resulting from the performance of this Agreement, unless:
- (i) otherwise specifically provided in this Agreement, or
  - (ii) the damage or injury arises out of or is caused by the breach of this Agreement by a Party or by the negligence or misconduct of a Party's own officers, directors, employees, agents, contractors or subcontractors.
- (b) The exclusion stipulated in the preceding paragraph shall include the design, construction, maintenance or operation of property, facilities or equipment owned or used by the other Party, or the use or misuse of or contact with the solar photovoltaic energy delivered hereunder.
- (c) Each Party shall indemnify and hold the other Party, and its officers, directors, agents, employees, contractors, and subcontractors, harmless from and against any and all claims, judgments, losses, liabilities, costs, expenses (including reasonable lawyers' fees) and damages of any nature whatsoever for personal injury, death or property damage to third parties, caused by any act or omission of the indemnifying Party or the indemnifying Party's own officers, directors, affiliates, agents, employees, contractor or subcontractors that arises out of or are in any manner connected with the performance of this Agreement, except:
- (i) workers compensation claims by any officers, directors, agents, employees, contractors and subcontractors of the Party seeking indemnification hereunder; and

- (ii) to the extent such injury, death or damage is attributable to the negligence or misconduct of, or breach of this Agreement by, the Party seeking indemnification hereunder.
- (d) If either Party receives a claim from a third party (not being a Party) in respect of which it is entitled to the benefit of an indemnity under this Clause 20.1 it shall notify the other Party within fifteen (15) days of receipt of the claim and shall not settle or pay the claim without the prior approval of the other Party (which approval shall not be unreasonably withheld or delayed).
- (e) If the Party giving an indemnity wishes to contest or dispute a claim, it may conduct the proceedings in the name of the indemnified Party, if it provides the indemnified Party security against any costs involved to the reasonable satisfaction of that Party.
- (f) SPP shall defend, indemnify and hold TNB, and its officers, directors, agents, employees, contractors and subcontractors, harmless from and against any and all claims, judgments, liabilities, losses, costs, expenses (including reasonable lawyers' fees) and damages under every applicable environmental law or regulation arising out of the condition of the Site, SPP's construction, ownership or operation of the Facility, the SPP Interconnection Facility and the SPP Interconnector or the construction of the SPP Works, including the discharge, dispersal, release, storage, treatment, generation, disposal or escape of pollutants or other toxic or hazardous substances from the Facility, the SPP Interconnection Facility and the SPP Interconnector, the contamination of the soil, air, surface water or ground water at or around the Site or any pollution abatement, replacement, removal, or other decontamination or monitoring obligations with respect thereto, except to the extent such damages are attributable to the negligence or misconduct of, or breach of this Agreement by TNB, its officers, directors, agents, employees, contractors or subcontractors.
- (g) Notwithstanding any provision in this Agreement to the contrary, in no event shall TNB or the Grid System Operator be liable for damage or destruction of property, facilities or equipment operated by SPP as a result of any review, verification, acceptance, endorsement or approval of any material, documents, studies, designs, drawings, schedules, design data, control and protection settings, test procedures, test results, test reports or other information submitted by SPP concerning the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works under this Agreement, or any presence of TNB or the Grid System Operator to witness any test performed on the Facility, the SPP Interconnection Facility and the SPP Interconnector during the Term.

## 20.2 Consequential Damages

Neither Party shall be liable to the other Party for any indirect, incidental, consequential or punitive damages as a result of the performance or non-performance of the obligations imposed pursuant to this Agreement, including failure to deliver or purchase solar photovoltaic energy hereunder, irrespective of

the causes of such damages, including fault or negligence. The Parties hereby agree that the compensation provided for in this Agreement shall not constitute such indirect, incidental, consequential or punitive damages.

### 20.3 Survival

The obligations under this Clause 20 arising in connection with any event or circumstances occurring before the termination or expiration of this Agreement shall survive such termination or expiration.

## 21. DISPUTE RESOLUTION

### 21.1 Senior Officers

- (a) SPP and TNB shall each designate in writing to the other Party a representative who shall be authorised to resolve a Dispute (as defined in this paragraph) in an equitable manner and unless otherwise expressly provided in this Agreement, to exercise the authority of the Party which appointed him to make decisions by mutual agreement. For the purposes of this Clause 21, a **Dispute** shall mean any dispute, controversy, claim or difference of whatever nature and howsoever arising under, out of or in connection with this Agreement, including the breach, termination or validity thereof.
- (b) If the designated representatives are unable to resolve any Dispute arising under this Agreement, the Dispute shall be referred by the representatives, respectively, to a senior officer designated by SPP and to a senior officer designated by TNB for resolution.
- (c) The Parties agree to attempt to resolve all Disputes arising hereunder promptly, equitably and in a good faith manner. The Parties further agree to provide each other with reasonable access during normal business hours to any and all non-privileged records, information and data pertaining to any such Dispute.
- (d) If any decision on a Dispute is mutually agreed by the designated representatives of the Parties pursuant to Clauses 21.1(a) or 21.1(b), such decision shall be final and conclusive as to such Dispute.

### 21.2 Arbitration

- (a) If any Dispute cannot be resolved between the Parties pursuant to Clause 21.1 above within three (3) months (or such further periods as the Parties may agree) after it arises or, if either Party fails to designate a representative or to participate in any attempt to resolve any Dispute pursuant to Clause 21.1, then such Dispute shall be settled exclusively and finally by arbitration. Either Party may serve formal notice that a Dispute exists (the **Dispute Notice**) upon the other. The Dispute Notice shall specify the nature of the Dispute, the points in issue and the Party's intention to refer the Dispute to arbitration. If the Parties fail to resolve the Dispute within a further period

of fifteen (15) days from the date upon which the Dispute Notice was served, either Party may request that the Dispute be referred to arbitration by written notice referring to this Clause 21.2 to that effect to the other Party (the **Arbitration Notice**). For the avoidance of doubt, any Dispute that cannot be resolved between the Parties, including any matter relating to the interpretation of this Agreement, shall be submitted to arbitration irrespective of the magnitude of the Dispute, the amount in Dispute or whether such Dispute would otherwise be considered justifiable for rule or resolution by any court or arbitral tribunal. This Agreement and the rights and obligations of the Parties shall remain in full force and effect and the performance of this Agreement shall continue pending the award in such arbitration proceeding, which award shall determine the Dispute between the Parties, including whether and when termination of this Agreement shall become effective.

- (b) Each arbitration shall be conducted in accordance with the Rules for Arbitration of the Regional Centre for Arbitration at Kuala Lumpur (the **Centre**), except as such rules conflict with the provisions of this Clause 21.2 in which event the provisions of this Clause 21.2 shall prevail.
- (c) Each arbitration shall be conducted in Kuala Lumpur, Malaysia, and the Parties hereby agree to exclude any right of application to any court or tribunal of competent jurisdiction in connection with any question of law arising in the course of any arbitration.
- (d) The language to be used in each arbitration shall be the English language.
- (e) Any decision or award of each arbitral tribunal appointed pursuant to this Clause 21.2 shall be final and binding upon the Parties. The Parties waive to the extent permitted by law any rights to appeal or any review of such award by any court or tribunal of competent jurisdiction. The Parties agree that any arbitration award made may be enforced by the Parties against assets of the relevant Party wherever they are located or may be found, and a judgment upon any arbitration award may be entered into by any court having jurisdiction thereof.
- (f) Each arbitral tribunal shall consist of three (3) arbitrators. Only persons with experience in commercial agreements and in particular the implementation and interpretation of power purchase agreements shall be appointed as arbitrators. No arbitrator shall be a present or former employee or agent of or consultant or counsel to either Party or any affiliate of either Party unless both Parties consent in writing to such appointment.
- (g) One (1) arbitrator shall be appointed by each Party (together, to be referred as the **Appointed Arbitrator**) within forty-five (45) days of receipt of the Arbitration Notice. If a Party fails to appoint an arbitrator within such forty-five (45) days' period, the other Party may request that such arbitrator be appointed by the Director of the Centre. The Appointed Arbitrators shall appoint a third arbitrator within thirty (30) after their appointment as Appointed Arbitrators or failing agreement by the Appointed Arbitrators, the

third arbitrator shall be appointed in accordance with the Rules for Arbitration at the Centre. The third arbitrator shall act as Chairman.

- (h) At any oral hearing of evidence in connection with any arbitration, each Party or its legal counsel shall have the right to examine its witnesses and to cross-examine the witnesses of the opposing Party. No evidence of any witness shall be presented in written form unless the opposing Party shall have an opportunity to cross-examine such witness, except as the Parties may otherwise agree in writing or except under extraordinary circumstances where the interests of justice require a different procedure.
- (i) For the avoidance of doubt, all disputes arising under or in connection with this Agreement shall be resolved in accordance with Clause 21 and nothing contained in this Agreement shall be construed as permitting either Party to commence proceedings in any court in any jurisdiction.

## **22. CHANGE-IN-LAW**

### **22.1 Change-in-Law Adjustment**

- (a) If there is a Change-in-Law which requires SPP to make any material capital improvement or other material modification to the Facility, the SPP Interconnection Facility, the SPP Interconnector and/or the SPP Works (to the extent Change-in Law occurring pre-Commercial Operation Date affecting SPP Works), the cost of which is in excess of the Capital Improvement Threshold in any calendar year, which material capital improvement or other material modification is required for the purpose of enabling SPP to fulfil its obligations under this Agreement in compliance with such Change-in-Law, TNB and SPP shall, promptly after receipt of the appropriate certificate as described below, determine, in good faith, any extension of the Term or any adjustment to the Energy Rate to reflect such cost in excess of the Capital Improvement Threshold as may be reasonably incurred by SPP in making such material capital improvement or other material modification and the date from which such adjustment is to be effective. If the Parties cannot reach agreement the matter shall be determined in accordance with Clause 21.
- (b) In the circumstances described in Clause 22.1(a), SPP shall submit to TNB with a copy to the Suruhanjaya Tenaga a certificate setting out in detail reasonably satisfactory to TNB the costs of such capital improvement or other modification, including operational and financing costs, if any, related thereto after having consulted TNB pursuant to Clause 22.1(c).
- (c) As soon as practicable after SPP becomes aware of any Change-in-Law which could reasonably be expected to give rise to an adjustment under this Clause 22.1, SPP shall consult with TNB regarding the extent of the modification which needs to be undertaken, the implementation of the modifications, the period of unavailability of the Facility (if any) and the required expenditure and shall use all reasonable efforts to minimise such expenditure consistent with Prudent Utility Practices, the Grid Code and SPP's obligations under this

Agreement.

- (d) After receipt by TNB of the Suruhanjaya Tenaga's written approval of
- (i) the costs of the material capital improvement or material modification to the Facility, the SPP Interconnection Facility, the SPP Interconnector and/or the SPP Works, as the case may be;
  - (ii) such extension of Term or adjustment to the Energy Rate as may be applicable; and
  - (iii) the inclusion of any adjustments to the Energy Rate as part of TNB's tariff rates to its customers in a manner consistent with such adjustments,

the Term and/or the Energy Rate shall be adjusted in a manner approved by the Suruhanjaya Tenaga provided always that any adjustments to the Energy Rate shall only be effective from the date TNB's tariff rates to its customers as aforesaid are effective.

- (e) For purpose of Clause 22.1(a), the Capital Improvement Threshold shall be Ringgit Malaysia Five Hundred Thousand (RM500,000.00).
- (f) For purposes of this Clause 22.1, a change in the Grid Code shall be treated as if it were a Change-in-Law.
- (g) SPP's inability to perform its obligations during the period required by SPP to effect the changes or modification to the Facility, the SPP Interconnection Facility, the SPP Interconnector and/or the SPP Works necessitated by any Change-in-Law shall not be a breach of this Agreement to the extent such inability is a direct consequence of the Change-in-Law.

## **23. MISCELLANEOUS**

### **23.1 Transfers and Assignment**

- (a) Except as required by the Financing Parties under the Financing Documents or as provided under Clauses 23.1 and 23.2, SPP shall not sell, convey, transfer or otherwise dispose of the Project or any material part or any interest in the Project to any other Person without the prior written consent of TNB and the Suruhanjaya Tenaga, which consent shall not be unreasonably withheld or delayed. For purposes of this Clause 23, any transfer of the controlling interest directly held in SPP to any Person who is not a shareholder of SPP on the Effective Date shall be deemed to be a transfer subject to the terms of this Clause 23.1.
- (b) If the Financing Documents so require, TNB shall:
- (i) provide its consent to assignments and acknowledgement of rights of the Financing Parties (including cure rights and the rights of the

Financing Parties under the Financing Documents to be substituted for SPP upon the occurrence of any default provided that the Financing Parties shall notify TNB in writing before exercising such rights) as shall be necessary or reasonably appropriate in order to obtain financing for the Project in a timely manner provided that such rights shall be subject to the terms of this Agreement and not inconsistent with TNB's rights hereunder;

- (ii) make payments to SPP directly into a collateral security account established under the Financing Documents (subject to any claims or rights TNB may have against SPP under this Agreement);
  - (iii) in the event of a default and provided that a prior written notice has been given to TNB, accept as a substitute for SPP under this Agreement, the agent for the Financing Parties, any designee or transferee of such agent or any purchaser of SPP or the Project upon a foreclosure sale conducted on behalf of the Financing Parties of SPP's interest in the Project or of the issued share capital of SPP; and
  - (iv) subject to a prior written notice already been given to TNB, afford the Financing Parties an opportunity to remedy any Event of Default by SPP within the relevant cure period hereunder before terminating this Agreement.
- (c) SPP acknowledges:
- (i) that any assignment or transfer to a secured party pursuant to the Financing Documents shall not relieve SPP of its obligations to TNB under this Agreement; and
  - (ii) no such assignee or transferee shall be liable for the performance of SPP's obligations under this Agreement; and
  - (iii) any exercise by any such assignee or transferee shall be subject to the terms of this Agreement.

### 23.2 Successors and Assigns

This Agreement shall be binding upon and shall inure to the benefit of the Parties and their respective successors and permitted assigns.

### 23.3 Notices

Except as otherwise specified in this Agreement, any notice, demand for information or documents required or authorised by this Agreement to be given to a Party shall be given in writing and shall be sufficiently given if delivered by registered mail, courier or hand delivered against written receipt, or if transmitted and clearly received by facsimile transmission addressed as set out below, or if sent to such Party by registered mail, courier or hand delivery to such other address as such Party may designate for itself by notice given in accordance with this Clause 23.3. Any such notice shall be effective only if given by such Party (and not on its behalf by an



agent) and upon actual delivery or receipt thereof. All notices given by facsimile shall be confirmed in writing, delivered or sent as aforesaid, but the failure to so confirm shall not vitiate the original notice. The address for the delivery of notices and bills to each Party and the respective telephone and facsimile numbers are as follows:

(a) For SPP:

[●]  
Attention: [●]  
Telephone: [●]  
Facsimile: [●]

(b) For TNB:

Pejabat Setiausaha Syarikat  
Tingkat 2, Ibu Pejabat Tenaga Nasional Berhad  
No. 129, Jalan Bangsar  
59200 Kuala Lumpur  
Wilayah Persekutuan

Attention: President and Chief Executive Officer  
Telephone: 03-2295 6247  
Facsimile: 03-2283 3686

With a copy to : General Manager (Power Contract Management)

Single Buyer Department  
Regulatory Economics and Planning Division  
Tenaga Nasional Berhad  
Level 6, Menara PNS  
Tower 7, Avenue 7  
Bangsar South City  
No. 8, Jalan Kerinchi  
59200 Kuala Lumpur  
Wilayah Persekutuan

Telephone: 03-2245 8000  
Facsimile: 03-2240 2909

#### 23.4 Choice of Law

This Agreement shall be governed by, and construed in accordance with, the laws of Malaysia. Subject to the provisions of Clause 21.2, the Parties hereby submit to the exclusive jurisdiction of courts located in, and the venue is hereby stipulated to be Kuala Lumpur, Wilayah Persekutuan.

#### 23.5 Entire Agreement

This Agreement constitutes the entire understanding between the Parties and supersedes any and all previous understandings between the Parties with respect to

the subject matter hereof.

#### 23.6 Further Assurances

If either Party determines in its reasonable discretion that any further instruments or other things are necessary or desirable to carry out the terms of this Agreement, the other Party shall, at the expense of the requesting Party, execute and deliver all such instruments and assurances and do all things reasonably necessary or desirable to carry out the terms of this Agreement.

#### 23.7 Waiver

No waiver by either Party of the performance of any obligation under this Agreement or with respect to any default or any other matter arising in connection with this Agreement shall be deemed a waiver with respect to any subsequent performance, default or matter.

#### 23.8 Modification or Amendment

No modification, amendment or waiver of any provisions of this Agreement shall be valid unless it is in writing and signed by both Parties.

#### 23.9 Exclusion

The Parties agree to exclude the application of Section 75 of the Contracts Act 1950.

#### 23.10 Severability

If any term or provision of this Agreement or the application thereof to any Person or circumstances shall to any extent be declared invalid or unenforceable by any Malaysian authority or court of competent jurisdiction, the remainder of this Agreement or the application of such term or provision to Persons or circumstances other than those as to which it is declared invalid or unenforceable shall not be affected thereby, and each other term and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

#### 23.11 Counterparts

This Agreement may be executed in counterparts all of which shall constitute one agreement binding on both Parties and shall have the same force and effect as an original instrument, notwithstanding that both Parties may not be signatories to the same original or the same counterpart.

#### 23.12 Confidential Information

This Agreement and any information provided by either Party to the other Party pursuant to this Agreement and labelled "CONFIDENTIAL" shall be utilised by the receiving Party solely in connection with the purposes of this Agreement and shall not be disclosed by the receiving Party to any third party, except with the providing Party's consent, and upon request of the providing Party shall be returned thereto. Notwithstanding the above, the Parties acknowledge and agree that such

information may be disclosed on a "need to know" basis to the Financing Parties and major equipment to the Facility and other third parties as may be necessary for TNB and SPP to perform their obligations under this Agreement. To the extent that such disclosures are necessary, the Parties also agree that they shall endeavour in disclosing such information to seek to preserve the confidentiality of such disclosures. This provision shall not prevent either Party from providing any confidential information received from the other Party to any court or government authority as may be required by such court or government authority, provided that, if feasible, the disclosing Party shall have given prior notice to the other Party of such required disclosure and, if so requested by such other Party, shall have used all reasonable efforts to oppose the requested disclosure, as appropriate under the circumstances, or to otherwise make such disclosures pursuant to a protective order or other similar arrangement for confidentiality. This provision shall continue for a period of three (3) years following early termination or expiration of this Agreement.

#### 23.13 Independent Contractors

The Parties are independent contractors. Nothing contained in this Agreement shall be deemed to create an association, joint venture, partnership or principal/agent relationship between the Parties or to impose any partnership obligation or liability on either Party. Neither Party shall have any right, power or authority to enter into any agreement or commitment, act on behalf of, or otherwise bind the other Party in any way.

#### 23.14 Third Parties

This Agreement is intended solely for the benefit of the Parties. Save as otherwise expressly stated, nothing in this Agreement shall be construed to create any duty or liability to or standard of care owing to any other Person.

#### 23.15 Headings

The headings contained in this Agreement are solely for the convenience of the Parties and should not be used or relied upon in any manner in the construction or interpretation of this Agreement.

#### 23.16 Language

- (a) The official text of this Agreement shall be in the English language.
- (b) Except as otherwise specifically provided to the contrary, all documents, notices, waivers and all other communications, written or otherwise, between the Parties in connection with this Agreement shall be in the English language.

#### 23.17 Time of the Essence

Time, wherever mentioned in this Agreement shall be of the essence.

**23.18 Stamp Duties**

This Agreement shall be duly stamped and all stamp duties in relation thereto shall be borne by SPP.

**23.19 Goods and Services Tax**

- (a) All amounts stated in this Agreement are exclusive of the goods and services tax, unless otherwise clearly stated that they are intended to be goods and services tax inclusive.
- (b) The Parties acknowledge and agree that if the goods and services tax is imposed on any supplies made by any Party under this Agreement, such Party shall have the right to increase the consideration payable on the supply by an amount equal to the goods and services tax imposed. Such Party shall be entitled to recover the increased amount from the other Party as if the same were part of the consideration of the supply. The consideration for such supply shall be increased by an amount calculated as follows:

$$\text{GST Amount} = A \times R$$

Where:

A is the consideration payable for the supply; and

R is the applicable rate of goods and services tax prevailing at the time of supply (expressed as a percentage).

- (c) The other Party shall pay the GST Amount at the same time and in the same manner as the consideration for the supply provided under this Agreement.
- (d) The amount of goods and services tax payable shall be identified in the tax invoice, which shall be in the form of a full or simplified tax invoice as per the prevailing goods and services tax guide at the material time.
- (e) Notwithstanding anything in this Agreement to the contrary, the Parties acknowledge and agree that any imposition of any goods and services tax on either Party shall not, in any manner whatsoever, result in an adjustment to the Energy Rate.
- (f) A Party shall provide the relevant documents to the other Party as may reasonably be required for the purposes of ensuring that the other Party is in compliance with goods and services tax legislation.

[END OF CLAUSES]

**IN WITNESS WHEREOF**, the Parties to this Agreement have hereunto affixed their hands and seals the day and year first above written.

**THE COMMON SEAL OF** )  
**TENAGA NASIONAL BERHAD** was hereunto )  
affixed in the presence of: )  
)  
)  
)  
)  
)  
)  
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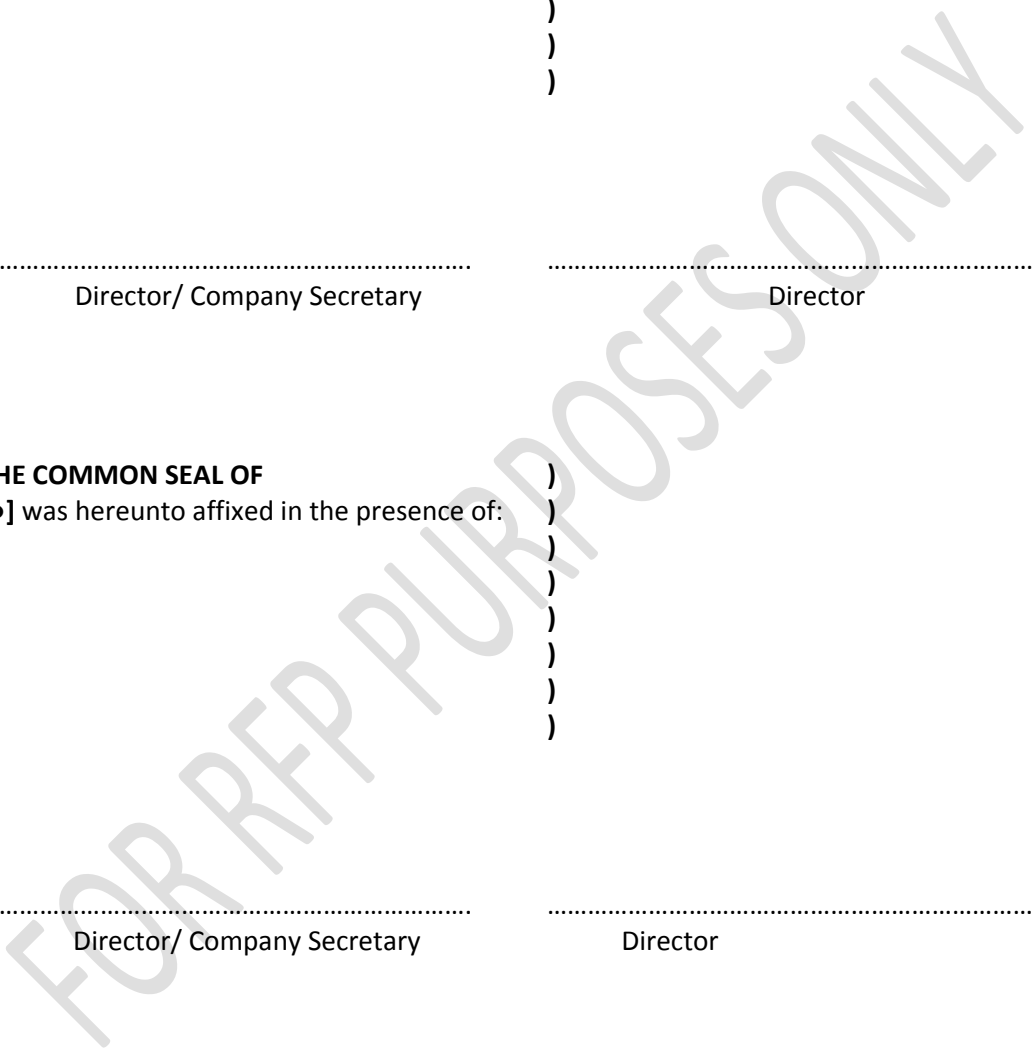
.....  
Director/ Company Secretary

.....  
Director

**THE COMMON SEAL OF** )  
**[●]** was hereunto affixed in the presence of: )  
)  
)  
)  
)  
)  
)  
)

.....  
Director/ Company Secretary

.....  
Director



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DATED [●] DAY OF [●] 20[●]

BETWEEN

TENAGA NASIONAL BERHAD  
(COMPANY REGISTRATION NO: 200866-W)

AND

[●]  
(COMPANY REGISTRATION NO: [●])

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POWER PURCHASE AGREEMENT

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FOR REF PURPOSES ONLY

**APPENDIX A**

**PROJECT DESCRIPTION AND DESIGN CONDITIONS**

FOR RFP PURPOSES ONLY

**A1. General****A1.1 Definitions**

All capitalized terms shall have the meaning given to them in Clause 1.1 of this Agreement except as otherwise defined herein.

**A2. GENERAL DESCRIPTION**

[SPP to insert the general description of the Project which include but not limited to:

1. A summary of its significant components, such as photovoltaic panels, DC collection system, current inverters, meteorological measuring facilities, solar irradiance instrumentation and any other related electrical equipment.
2. A drawing showing the general arrangement of the Facility i.e. the Facility's topology.]

**A2.1 Site Conditions**

Refer to Appendix H for details.

**A2.2 Environmental Requirements**

SPP shall be responsible for investigating the need for and obtaining all necessary consents, permits, licenses and approvals for executing the design, supply, construction and commissioning of the Facility and equally in meeting with all relevant legal and environmental requirements or guidelines specified in the Environmental Quality Act 1974.

**A3. MAIN EQUIPMENT DESCRIPTIONS****A3.1 Photovoltaic Modules and Array****A3.1.1 General Description****A3.1.2 Manufacturer and Model Name****A3.1.3 Photovoltaic Module Type****A3.1.4 Efficiency****A3.1.5 Total Photovoltaic Modules Count****A3.1.6 Array Design, Configuration and Mounting**

**A3.1.7 Annual Output and Capacity Degradation (in %)****A3.1.8 Warranty****A3.1.9 Technical Specifications**

Refer to Attachment 1 [SPP to provide the specification sheet of the product to be attached to this Appendix A.]

**A3.2 Balance of System****A3.2.1 Meteorological Measuring Facilities ("MMF")****A3.2.1.1 General Description****A3.2.1.2 Pyranometer****A3.2.1.3 Temperature Sensor****A3.2.1.4 Wind Sensor****A3.2.1.5 Humidity Sensor****A3.2.1.6 Barometric Pressure Sensor****A3.2.1.7 Rain Gauge****A3.2.1.8 Data Logging and Telemetry System****A3.2.2 Solar Tracking System****A3.2.2.1 General Description****A3.2.2.2 Manufacturer and Model Name****A3.2.3 Combiner Boxes****A3.2.3.1 General Description****A3.2.3.2 Manufacturer and Model Name****A3.2.4 Cables****A3.2.4.1 General Description****A3.2.4.2 Cable Protection**

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Refer to Attachment 2 [SPP to provide the specification sheet of the product to be attached to this Appendix A.]

**A3.2.6 Transformers****A3.2.6.1 Low Voltage (LV) Transformer****A3.2.6.2 High Voltage (HV) Transformer****A3.2.7 Protection System****A3.2.7.1 Direct Current (DC) Protection System****A3.2.7.2 Alternating Current (AC) Protection System****A3.2.8 Monitoring and Control System****A3.2.8.1 Supervisory Control and Data Acquisition System (SCADA)****A3.2.8.2 Plant Controller System****A3.2.8.3 Local Control Room****A3.2.8.4 Remote Operation Centre**

**A3.2.9 SPP Interconnection Facility and SPP Interconnector**

Refer to Appendix D for details.

**A4. OPERATIONAL PHILOSOPHY**

**A4.1 Operation and Maintenance**

**A4.2 Emergency Shutdown System**

**A5. TECHNICAL LIMITS OF FACILITY**

Refer to Appendix B for details.

**A6. PROJECT CODES AND STANDARDS**

**A6.1** Compliance with all relevant Malaysian laws, regulations, codes and standards are mandatory for the Project.

**A6.2** The following codes and standards or their equivalent will also be utilized in the design and construction of the Facility:

[SPP to insert the relevant Project codes and standards.]

**A6.3** Unless a higher or stricter standard or requirement is expressly provided in this Agreement and/or Appendices, the Malaysian standards and regulations shall prevail in the event of a conflict between the Malaysian standards and regulations and any recognised international codes and standards, including those codes and standards set out in A6.2 above, utilised by SPP in the design and construction of the Facility.



**ATTACHMENT 1 TO APPENDIX A**

FOR RFP PURPOSES ONLY

**ATTACHMENT 2 TO APPENDIX A**

FOR RFP PURPOSES ONLY

**APPENDIX B**

**FACILITY TECHNICAL REQUIREMENTS AND OPERATING REQUIREMENTS**

FOR REF PURPOSES ONLY

**B1.0 GENERAL**

All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except where as otherwise defined herein.

Parallel operation of the Facility on the Grid System requires that TNB and SPP meet certain minimum requirements for performance, operation and safety. This Appendix B describes the minimum technical and operational requirements which SPP shall comply with under the terms of this Agreement. SPP shall work closely with TNB from an early stage of the Project to ensure that these requirements are met and that the design features of the Facility is compatible with the Grid System requirements.

In connection with the design, construction, operation and maintenance of the Facility, all SPP's installations shall adhere to all applicable national and local codes, rules and Laws, relevant sections of International Electrotechnical Commission (IEC) Standards, relevant sections of Institute of Electrical and Electronics Engineers (IEEE) and relevant Engineering Recommendations (ER). In the absence of any such standards or any recognised international standards, Prudent Utility Practices or OEM standards shall, subject to the prior written consent of TNB and the Grid system Operator (GSO), be applied by SPP.

SPP shall conform to all applicable provisions stated in the Grid Code (MGC), TNB Transmission System & Reliability Standard (Version 2.0 (Edition 1.0) dated January 2006) as amended from time to time by TNB ("TSRS"). In the event that the connection of the Facility to the Grid System leads to the non-compliance of the Grid Code and/or TSRS requirements, SPP shall be responsible to rectify the non-compliance at its own cost to ensure the Facility is fully in compliance of the Grid Code and/or TSRS requirements, without relying and affecting the operation of other plants and/or facilities that are connected to the Grid System and/or user's system. The Facility shall not be allowed to be connected to the Grid System until such compliance is met. As such, SPP shall make good any non-compliance at the earliest opportunity or within reasonable time with the prior consent of TNB and the GSO.

The Facility (all parts of the plant inclusive of principal and balance of plant) shall be designed, constructed, and tested such that it shall be capable of delivering solar photovoltaic energy to the Grid System up to the Established Capacity and shall also be capable of providing reactive power for voltage regulation within or under the conditions of the Grid System as stipulated in this Appendix B, without tripping or exposing itself to risk of damage.

SPP shall ensure that the finalized control and protection settings as implemented on the Facility and as tested prior to the Commercial Operation Date are maintained throughout the Term, unless otherwise determined by the GSO.

SPP shall inform TNB and the GSO in advance of its intention to modify any component of the Facility, the SPP Interconnection Facility and/or the SPP Interconnector that may affect the Facility's capability to meet the aforesaid requirements. SPP shall obtain the prior written consent from TNB and the GSO before implementing such modifications.

**B2.0 POWER SYSTEM STUDY (PSS)****B2.1 Objectives of Power System Study**

SPP shall conduct power system studies (PSS) pursuant to Clause 9.4 of this Agreement to determine the following but not limited to:

- (i) the identification of connection scheme options (and configurations) for the Facility to be connected to Grid System, taking into account the existing transmission infrastructure within the vicinity of the Facility;
- (ii) the investigation of the impact of the new interconnection to the Grid System, as well as the impact of the Grid System to the operations of the Facility; and
- (iii) the assessment of the Facility's capability to comply with the Grid Code requirements, specifically with the solar photovoltaic technology to be installed.

**B2.2 Scope of Power System Study**

SPP shall conduct the PSS using simulation software available in the market such as Power System Simulator for Engineering (PSSE®) developed by Siemens PTI, USA. TNB and the GSO are currently using PSSE® version 32. The PSS shall be conducted in two (2) stages; the Stage 1 Power System Study Report and the Stage 2 Power System Study Report pursuant to Clause 9.4 of this Agreement:

- (i) **Stage 1 Power System Study Report:** PSS conducted using "generic" modeling of the Facility (including but not limited to the solar PV components), the SPP Interconnection Facility and the SPP Interconnector.

**Description:** PSS mainly verifies the impact on the existing Grid System, which can be analyzed based on relevant information of the Facility available at the point of time.

- (ii) **Stage 2 Power System Study Report:** PSS conducted using the actual modeling of the Facility (including but not limited to the solar PV components), the SPP Interconnection Facility and the SPP Interconnector taking into consideration the topology and converter type.

**Description:** PSS provides indicative evidence of the Facility's ability to comply with the Grid Code requirements based on the behavior of the Facility. Thus, the Facility (including but not limited to the solar PV components), the SPP Interconnection Facility and the SPP Interconnector needs to be modelled in greater details based on the design and technology to be used for the Facility, the SPP Interconnection Facility and the SPP Interconnector.

The PSS for both **Stage 1 Power System Study Report** and **Stage 2 Power System Study Report** shall include, but not limited to, the scope of studies tabulated below:

| No. | PSS scope of studies                 | Description / Requirements   | Criteria to benchmark                |
|-----|--------------------------------------|--|--------------------------------------|
| 1   | <b>Power-flow Analysis</b>           | <ul style="list-style-type: none"> <li>• To evaluate the Grid System's adequacy to accommodate the energy delivered by the Facility without violating the thermal loading of transmission elements (eg. overhead line, underground cable, transformer etc.) under both normal conditions and N-1 contingencies.</li> <li>• Power flow shall consider various operating scenarios to reflect the Facility's intermittent behavior.</li> </ul>   | TSRS Clause 4.10                     |
| 2   | <b>Contingency Analysis</b>          | <ul style="list-style-type: none"> <li>• To identify the performance of the Grid System with respect to the power-flow and voltage during loss of transmission element and to determine the need for reinforcements to allow the connection of the Facility to the Grid System.</li> </ul>   | TSRS Clause 4.11                     |
| 3   | <b>Short Circuit Analysis</b>        | <ul style="list-style-type: none"> <li>• To provide short circuit ratings data for the selection of equipment.</li> <li>• To identify mitigations to ensure short circuit fault level remains within limits.</li> <li>• To calculate the maximum short circuit fault current contribution from the Facility at the Interconnection Point in the event of single-phase fault to ground fault, phase to phase fault and bolted three-phase fault events.</li> <li>• IEC 60909 calculation method is to be used.</li> </ul> | TSRS Clause 4.7                      |
| 4   | <b>Transient Stability Analysis</b>  | <ul style="list-style-type: none"> <li>• To identify the Grid System's capability to remain stable and maintain synchronism following a relatively large disturbance arising from loss of transmission elements or generation facilities.</li> </ul>   | TSRS Clauses 4.5 and 4.11            |
| 5   | <b>Fault Ride-Through Capability</b> | <ul style="list-style-type: none"> <li>• To identify the fault ride-through capability of the Facility (monitored at the Interconnection Point) for faults that may occur in the Grid System including but not limited to (i) three phase fault for 150ms at the Interconnection Point; and (ii) single phase fault for 300ms at the Interconnection Point.</li> <li>• To identify solar photovoltaic inverters' performance upon fault clearance.</li> </ul>  | TSRS Clause 4.6<br>MGC<br>CC6.4.15.2 |

| No. | PSS scope of studies               | Description / Requirements   | Criteria to benchmark                                   |
|-----|------------------------------------|--|---|
|     |                                    | <ul style="list-style-type: none"> <li>• To identify critical fault clearing time for ensuring the Grid System remains stable.</li> <li>• To verify the AC voltage recovery of the Facility under dynamic conditions and such scenarios as mutually agreed by TNB and SPP.</li> </ul>  |   |
| 6   | <b>Reactive Power Requirements</b> | <ul style="list-style-type: none"> <li>• To assess the profile of transmission voltage at the grid interconnection point and its vicinity.</li> <li>• To determine the necessity (if any) to install reactive power compensation equipment to meet the requirements.</li> </ul>  | TSRS Clause 4.2   |
| 7   | <b>Power Quality Requirements</b>  | <ul style="list-style-type: none"> <li>• To assess power quality (PQ) at the Interconnection Point during parallel operation of the Facility in the Grid System and to determine mitigations and/or modification to ensure the PQ at the Interconnection Point remains within the allowable limits as specified in the following standards:               <ol style="list-style-type: none"> <li>a) Voltage harmonics (Engineering Recommendation ER G5/4-1);</li> <li>b) Phase voltage unbalance (Engineering Recommendation P29);</li> <li>c) Voltage fluctuation and flicker (Engineering Recommendation P28);</li> <li>d) Current harmonics (as per IEC 61727-2003 Table 1); and</li> <li>e) Direct current (DC) injection limits (as per IEEE 1574 Clause 8.3.1).</li> </ol> </li> <li>• The study shall utilize data from the first field measurement test as further described in paragraph B3.11. Such test shall be conducted at the existing TNB's substation(s) depending on configuration of the Facility's connectivity to the Grid System (i.e. either option 1 or option 2 as described in Appendix D).</li> <li>• To determine the necessity (if any) of modification to the design of the Facility and/or to install filters/compensation equipment to meet the PQ requirements.</li> </ul> | Refer standards listed under Description/ Requirement 5 |

**B2.3 Guideline and Criteria to be used for PSS**

The PSS for both **Stage 1 Power System Study Report** and **Stage 2 Power System Study Report** is to be conducted in accordance with the MS 2572:2014 "Guidelines for power system steady state, transient stability and reliability studies", Engineering Recommendation ER G5/4-1 (for harmonics), Engineering Recommendation P29 (for phase voltage unbalance) and Engineering Recommendation P28 (for voltage fluctuations and flicker). The results of the PSS are to be benchmarked against relevant clauses in the Grid Code and TSRS. Any violation to the codes and standards due to the connection of the Facility to the Grid System are to be highlighted in the report and mitigation option is to be proposed accordingly.

**B2.4 Grid System data for the PSS**

SPP shall obtain the necessary data of the Grid System from TNB for the conduct of the PSS for both **Stage 1 Power System Study Report** and **Stage 2 Power System Study Report**. Upon request by SPP and the signing of the non-disclosure agreement (NDA) between the party(ies) that will perform the PSS studies and TNB, the Grid System data will be provided. The Grid System data will be provided for the requested year(s) of interest for such PSS studies in a format compatible with PSSE® (simulation software by Siemens PTI).

SPP shall take note that at least fifteen (15) Business Days are required for the finalization of the terms and conditions of the NDA. The stamping cost for the NDA shall be fully borne by SPP.

**B2.5 Methodology for Stage 1 Power System Study Report and Stage 2 Power System Study Report**

Upon completion of the PSS for **Stage 1 Power System Study Report** and **Stage 2 Power System Study Report** pursuant to Clause 9.4 of this Agreement, the reports shall be submitted to TNB for their review and approval of, but not limited to, the proposed grid connection scheme and point of connection. The reports shall at least encompass the following details:

- (i) Methodology of the study/analysis;
- (ii) Simulation models used (together with verification of models);
- (iii) Results and findings in form of table listing, plots, etc. are to be benchmarked against the criteria as stated in the MGC and TSRS; and
- (iv) Recommendations if applicable shall include but not limited to any modification to the Facility's design, filters and/or compensation equipment.

Prior to making a decision on the connection scheme and reinforcement, TNB may request SPP to clarify on its findings of the PSS for **Stage 1 Power System Study Report** and **Stage 2 Power System Study Report** TNB shall provide its decision on the connection scheme and reinforcement pursuant to Clause 9.4 of this Agreement. Submission of the final reports for **Stage 1 Power System Study Report** and **Stage 2 Power System Study Report** is subject to SPP has received final and unconditional approval from TNB pursuant to Clause 9.4 of this Agreement.



**B2.6 Submission of Facility Simulation Models and Models Validation**

Generally, models are used to represent the full power system for simulation studies relating to planning and operation of the Grid System. Simulation studies are sometimes required where it is impractical to demonstrate capability through testing as the consequence to the overall Grid System is intolerable. Currently, all transmission components and generators connected to the Grid System are modeled based on what are installed at Site.

SPP shall submit models of the Facility to be connected to the Grid System. At the minimum, the models shall represent the following behavior and/or control system:

- 1. Steady-state models:**
  - Aggregate generator model (lumped inverter)
  - Single lumped unit transformer
  - Equivalent reticulation impedance
  - Single transformer
- 2. Dynamic models:**
  - Time varying irradiation profile
  - DC power output of the PV panels for the given level of irradiation
  - Maximum power point tracker (MPPT) control (if installed)
  - Electrical control of the PV inverter
  - Limiters applicable to the inverter

All submitted models are to be provided together with the relevant documentations, which includes the following:

- Description of the models and associated parameters to be used;
- User operation manuals, which detail out the operational procedures specific for the model such as data setting up etc.;
- User application guides;
- Model block diagrams; and
- Input data format and associated values of parameters.

All submitted models and associated parameters shall be validated or verified through site test and/or measurement. Responses of the models acquired from simulation shall reasonably in agreement with the corresponding actual response measured at Site (within 10% error). In the event that the model does not produce the correct output, the model submission requirement will not be considered as complete until the errors are rectified. A specific section shall be included in the model documentation that discuss the results comparison between simulated and site test/measurement (to be shown in plots where applicable).

If it is not possible to represent the behavior or response of the Facility using 'standard' models available in the simulation software (with 10% error), SPP is to develop appropriate 'user defined' model. It is encouraged that SPP to work

collectively with the manufacturers to develop a 'standard' models for most commonly used solar PV technology.

### **B2.7 Data Submission**

In accordance with the Grid Code, SPP shall submit connection application form (Form A) to TNB. Duly filled connection application form is to be submitted together with relevant information on the Facility.

## **B3.0 TECHNICAL REQUIREMENTS**

### **B3.1 Grid Frequency Variation**

The frequency of the Grid System shall be nominally 50Hz and shall be controlled within the limits of 49.5Hz to 50.5Hz. The system frequency could rise to 52.0Hz or fall to 47Hz in exceptional circumstances. The Facility shall be capable of operating the range of frequency below and as stipulated in the Grid Code CC6.4.2.3, also shown in a table below.

| <b>Frequency Range</b> | <b>Requirement</b>   |
|------------------------|--|
| 47.0Hz* – 50.5Hz       | Continuous operation is required and independent of system frequency.  |
| 50.5Hz – 52.0Hz*       | Operation at active power output (MW) <u>above 40% rated MW</u> is required and the high frequency MW response shall be according to specified equivalent droop requirement. |

\* For avoidance of doubt, the frequency protection of the Facility shall not have trip settings between 47.0Hz and 52.0Hz inclusive.

From time to time, the GSO may require SPP to demonstrate the responses and capability of the Facility under the Grid System's frequency variation.

### **B3.2 Reactive Power**

The Facility shall be capable of delivering reactive power at the Interconnection Point over the entire operating range of the Facility at any point of the power factor range between 0.85 lagging to 0.95 leading in accordance with the figure specified in the Grid Code Clause CC6.4.2.5.

SPP shall provide the reactive power capability curve of the Facility (without unduly compromised limiter settings) at the Interconnection Point, including applicable limiter characteristics for review and acceptance by the GSO. The Facility shall be capable of generating reactive power to supply the Grid System upon a Despatch Instruction from the Control Centre and/or the GSO, in accordance with such agreed reactive power capability curve of the Facility.

Provision shall be made to monitor and record the reactive power output of the Facility, at any time during its operation and such data shall be made available to the GSO upon request. From time to time, the GSO may require SPP to demonstrate the reactive power capability of the Facility in accordance with the agreed reactive power capability curve.

SPP shall ensure the internal reactive power requirements of the Facility are fully compensated.

### **B3.3 Grid Voltage Variation**

Voltage at the Interconnection Point shall normally remain within the range of the Transmission System Voltage Variations as stipulated in Grid Code Clause CC 6.2.4 unless abnormal condition prevails.

The Facility's 132kV generator step-up transformer(s) (GSU) shall be equipped with on-load tap changer(s). The Facility shall be capable of operating continuously within the stipulated range of grid voltage variations.

### **B3.4 Grid System's Fault Level**

The Facility (including but not limited to the AC/DC system, transformers, GSU and inverters) shall be capable to withstand the Grid System's fault level as stipulated in the TSRS 2006 Clause 4.7 (Short Circuit Limits).

### **B3.5 Fault Detection and Clearing Limits**

Faults on the Facility's side of the Interconnection Point can both endanger the Grid System and damage equipment within the Facility. Such faults must be cleared within the times stipulated in the TSRS 2006 Clause 4.6 to minimize these risks. At the same time, the Facility's protection relays must be set to differentiate between such faults and other transient conditions.

The Facility shall be capable of operating continuously for faults in the Grid System cleared within the times stipulated in the TSRS Clause 4.6.

### **B3.6 High Speed and Delayed Auto-Reclosing**

The Grid System is equipped with high speed and delayed auto re-closing facilities to mitigate the impact of transmission line faults on the Grid System. The Facility shall remain operational on the Grid System without tripping and adverse behaviour during and after the operation of the auto re-closing equipment in accordance with the Grid Code Clause CC6.3.4.11, which also stipulates the general requirement of the single shot high speed single-pole and single shot delayed three-pole auto re-closing on the Grid System.

#### **B3.6.1 Re-Start and Delivery of Energy to the Grid System**

In the event of tripping of the SPP Interconnector from the Grid System and upon successful reclosing of the SPP Interconnector, the Facility shall be capable to restart and delivers energy to the Grid System up to the Established Capacity or maximum achievable MW output level of the Facility subject to the prevailing meteorological conditions of the Site.

SPP shall notify the GSO prior to such delivery of energy from the Facility to the Grid System upon successful reclosing of the SPP interconnector (including successful automatic reclosing, if the SPP Interconnector is provided with auto-reclosing facilities).

### **B3.7 Speed Governor or Equivalent Control Device**

The Facility shall be fitted with fast acting proportional turbine speed governor or an equivalent control device to enable the Facility to contribute in restoring the Grid System frequency to normal (close to nominal frequency) following a change in the generation-load balance. Under such dynamic response, the Facility shall operate stably throughout the entire operating range of the Facility and over the whole range of Grid System frequency variation described in paragraph B2.2 of this Appendix B. The control device shall be put on operation at all times unless advised otherwise by the GSO.

The droop must be adjustable and capable of being set with an overall droop of any value between 3% and 5% in accordance with the Grid Code Clause CC6.4.4.5. At appropriate times prior to the Initial Operation Date, SPP shall seek a written advice from the GSO, the values of droop setting for the Facility.

At any time during the Term, if the GSO determines that changes to the droop settings of the Facility is required, the GSO shall advise SPP on the required change of settings of the devices and SPP shall implement the change of settings for the devices in the Facility accordingly. SPP shall not adjust the droop settings of the devices in the Facility without the prior consent of the GSO.

The droop deadband shall be adjustable and capable of being set to a minimum value no larger than 0.05 Hz (for the avoidance of doubt,  $\pm 0.025\text{Hz}$ ).

Provision shall be made to monitor the operation of such control device, at any time during its operation and such data shall be made available to the GSO upon request.

### **B3.8 High Frequency MW Response**

The Facility shall be designed and operated to provide high frequency MW response, which is controlled by using the control device as specified in paragraph B3.7 above.

In the event of an increase in Grid System frequency exceeding 50.5Hz the Facility shall be capable of reducing its MW output according to the droop setting of the Facility without tripping of the Facility and such reduction of MW output shall be sustainable thereafter, and in compliance to the Grid Code Clause CC6.4.2.3. .

SPP shall monitor the high frequency MW Response of the Facility at any time during its operation and such data shall be made available to the GSO upon request.

### **B3.9 Ramp Rate**

Ramp rate(s) of the Facility shall not exceed 15% of rated capacity per minute. The Facility shall be able to regulate the ramp rate of the active power output for the following scenarios:

- (i) Despatch Instruction;
- (ii) Normal load variation;
- (iii) Facility startup; and
- (iv) Facility shutdown.

Ramp rate(s) of the Facility shall be declared by SPP in the form as set out in paragraph A1 of Attachment A of this Appendix B.

### **B3.10 Protection System of the Facility**

The Facility shall have sufficient protection systems in accordance with the requirements of this Agreement and Grid Code Clause CC6.3.4 to prevent or limit damage to its generators, inverters and auxiliary equipment. The protection systems shall guard the safety of the Facility and the Grid System from damage or instability arising from inappropriate operations, faults, disturbances or contingencies both within and external to the Facility. The protection systems shall disconnect the Facility from the Grid System in the event of loss of AC supply to the installation and shall also prevent the Facility from energising a de-energised Grid System's circuit or network.

The protection system of the Facility shall not be dependent on the protection system of the SPP Interconnector and the SPP Interconnection Facility which includes protection system of the 132-kV side of each GSU. The Facility's protection shall utilize either a low or medium voltage circuit breaker of the Facility or the inverter controls to isolate faults within the protection zones of the Facility. The Facility's protection system shall be stable during any fault or disturbance in the Grid System.

Complete protection functions shall be provided for DC-side protection including overpower, overvoltage, undervoltage, overcurrent (overload and reverse current) and detection of DC grounding.

Complete protection functions shall also be provided for AC-side protection including overvoltage, undervoltage, overcurrent, frequency rise, frequency drop, detection of AC grounding and detection of DC current mixing. Each GSU for connection to transmission grid voltage shall be protected by standard power transformer protection schemes, including transformer differential, restricted and standby earth-fault, backup overcurrent or distance and over-excitation protection.

Furthermore, protection against islanding operation shall also be provided, either by inverter control (voltage and frequency window detection), passive method (rate of change of frequency, voltage phase jump or monitoring three phase drop) or active method (frequency shift, active frequency drift, impedance measurement or reactive power fluctuation).

The above protection functions may be integrated into the inverter control function or as separate protection unit as appropriate. Such functional allocation shall exhibit protection dependability principle.

Transient overvoltage protection on the AC and DC sides of the Facility shall be provided using metal oxide surge arrester or varistor or AC-side filter as necessary.

The Facility's protection operation shall disconnect rapidly the AC and DC circuit breakers and/or imposing inverter's gate blocking, as appropriately configured.

The Facility shall have the fault ride-through capability and to provide 90% of the active power in less than thirty (30) seconds, according to the pre-fault conditions and depending on the solar radiation, after fault clearance on the Facility or the Grid System's network, by verifying the normal conditions of AC and DC supply. Automatic restarting procedure shall be enabled after inadvertent tripping due to high-voltage AC system switching operation of the SPP Interconnection Facility, the SPP Interconnector, the TNB Interconnection Facility and/or Grid System or instantaneous voltage sag and the Facility shall be able to rapidly increase the power output to maximum within one (1) minute, depending on the solar irradiation levels.

In the event of disconnection or isolation of the Facility from the transmission grid, either at the high voltage circuit breakers (HVCB) or low voltage circuit breakers (LVCB) of the GSU and upon subsequent normalisation or closing of such HVCB and/or LVCB, automatic restarting of the Facility is not permitted without the prior consent of the GSO. Any features for automatic restarting in the event of islanding shall be disabled at all times. Testing or enabling of such islanding features shall not be carried out without the prior approval or instruction from the GSO.

SPP shall provide TNB and the GSO with the protection schemes and relay type in relation to the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, pursuant to Clause 9.5 of this Agreement and the application of relaying schemes and their settings within the Facility shall be reviewed by TNB.

Facility protection and its control system within the Facility shall be coordinated such that the protective system shall only react if the control system could not respond to changes within the specified limits. Protective relays within the Facility shall also be coordinated to the optimum advantage of the Grid System. Such coordination studies shall be provided for review and acceptance by the TNB.

The coordination between the Facility control and protection functions shall be exhibited by actual tests as and when required. Such tests shall be carried under steady-state and dynamic conditions.

Verification of fault ride-through dynamic test at Site is not required. However, SPP shall submit type test report, manufacturer test or/and certificates of the photovoltaic inverters, including the settings of the photovoltaic inverters to TNB and the GSO.

SPP shall ensure that the protective apparatus in the Facility are in service whenever the Facility is connected to or is operated in parallel with the Grid System. No deviation for any period of time for an emergency or maintenance shall be permitted without the prior written consent of the GSO.

SPP shall design the protection system of the Facility to meet the following requirements but not limited to:

- (i) The protection system shall ensure that all equipment in the Facility is fully protected and that faulty equipment will be removed from service as quickly as possible with minimum disturbance to the Grid System and to other equipment.
- (ii) The protection and related equipment shall be arranged such that all the Facility equipment or zone is fully protected by functions within the Facility or cable terminal. The zone(s) of each protection scheme shall overlap with the zone of the adjacent protection scheme to eliminate unprotected areas.
- (iii) The protection system shall ensure that any equipment in the Facility which is operating in an abnormal way is promptly removed from service.
- (iv) The protection system shall clear only the faulted area(s), equipment or zones to minimize the impact to the remaining system and the disturbance to the other related systems as far as possible.
- (v) The protection equipment shall have high degree of security and reliability. It shall operate quickly and accurately in all possible operating modes without any malfunctions (refusal to operate or incorrect action) and shall be designed to prevent unnecessary shut-down of the Facility's systems because of faulty protection equipment.
- (vi) The protection system for each equipment or zone within the Facility shall include main, back up and redundant protection to ensure a high degree of

reliability to minimize the risk of total loss of protection for each equipment or zone within the Facility.

- (vii) Coordination between the Facility's protection and/or control systems and the AC protection to the Grid System shall be maintained under all operating conditions and operating modes. The coordination of the protection settings and control functions shall be reviewed and corrected if any parameters or settings of the control and protection systems have been modified or optimized during commissioning of the Facility's protection system.
- (viii) The functions and parameters of the Facility's protection and control systems shall be coordinated to minimize the risk of tripping and/or damage to the Facility's equipment. If necessary, the Facility's controls shall be used to aid in suppressing the development of the fault thereby improving the transient performance of the Facility and minimizing the risk of shutdown of a part of the Facility or the entire Facility.
- (ix) The accuracy and dynamic range of the related measuring equipment shall be coordinated with the protection settings or control system functions. The measuring equipment outputs shall be supervised to ensure that measuring equipment failures do not cause protection mal-operations.
- (x) SPP shall ensure that in the event of a fault occurring within the Facility during any communication failures between the Facility and the Grid System, the Facility's protection system shall minimize the disturbance to and impact on SPP's high voltage AC systems and the Grid System and ensure safety of SPP's high voltage AC systems and the Grid System. SPP shall quantify the differences between Facility's protection, transformers (including GSU) protection and cables protection with and without communications.
- (xi) SPP shall distinguish between different fault states and reasonably arrange different protection levels such as warning, alarm, clearing equipment and shutdown.
- (xii) Where the Facility protection is required to trip a high voltage AC circuit breaker, each protection shall have two tripping paths, one to each of the two trip coils of the high voltage AC circuit breaker.
- (xiii) Warning, alarm and tripping signals generated from each protection shall be individually reported to the station supervision system.
- (xiv) Each trip and close coil of all circuit breakers shall be equipped with monitoring circuit of tripping circuits.
- (xv) After a Facility has been de-energized and isolated, the protection system for the equipment within the zone of the non-operating equipment shall not initiate unnecessary trip signals and switching sequences to the energized part within Facility or other equipment which may be in operation.



- (xvi) SPP shall provide protection which limits the stresses on the Facility's system and the equipment as much as possible, including the stresses which may occur during the process of any switching operations in the Grid system. All protection settings of equipment of zone within Facility shall be coordinated in accordance with the design stress withstand of the equipment.
- (xvii) SPP's shall ensure that potential resonances in Grid system, shall not cause malfunction of the Facility protection system, or cause protection operation outside of the fault zone.

At any time during the Term, the Facility's protection settings shall not be modified by SPP unless with the prior written consent of TNB and the GSO.

### **B3.11 Quality of Service**

The connection of the Facility with the Grid System shall not cause any reduction in the quality of service at the Interconnection Point at any time. The maximum allowable limits for PQ at the Interconnection Point shall comply with the following standards:

- (i) Voltage harmonics (Engineering Recommendation ER G5/4-1);
- (ii) Phase voltage unbalance (Engineering Recommendation P29);
- (iii) Voltage fluctuation and flicker (Engineering Recommendation P28);
- (iv) Current harmonics (as per IEC 61727-2003 Table 1); and
- (v) Direct current (DC) injection limits (as per IEEE 1574 Clause 8.3.1).

SPP shall carry out field measurement tests at the Interconnection Point to measure PQ parameters, including but not limited to voltage harmonics (up to the 50<sup>th</sup> order), phase voltage unbalance, voltage fluctuation and flicker, current harmonics and DC injection.

Prior to the Effective Date, the first field measurement test for PQ at the Interconnection Point shall be conducted at the existing TNB substation(s) depending on the configuration of the Facility's connectivity to the Grid System (i.e. either option 1 or option 2 as described in Appendix D). The test results of the first field measurement test shall be used as the basis for the Stage 1 Power System Study and the Stage 2 Power System Study.

Prior to the Initial Operation Date, SPP shall implement any changes or modifications to the design of the Facility, the SPP Interconnection Facility and/or the SPP Interconnector pursuant to Clauses 9.4(d) and 9.4(e) of this Agreement to meet the PQ requirements at the Interconnection Point.

Prior to the Commercial Operation Date, the second field measurement test for PQ at the Interconnection Point shall be conducted at the TNB Interconnection Facility in accordance with the PQ standards above to validate compliance, with the Facility being in synchronised operation with the Grid System. SPP shall submit to TNB test reports of the second field measurement test for acceptance by TNB.

If the validation test results for the second field measurement test are found to be non-compliant to the above PQ standards, SPP shall implement any necessary rectification of the Facility and/or the SPP Interconnection Facility and/or the SPP Interconnector, including installation of appropriate filters and/or compensation equipment, and shall conduct any field measurement re-test(s) for PQ at the Interconnection Point to validate compliance to the PQ standards. The cost of such rectification works and any such field measurement re-test(s) shall be fully borne by SPP. SPP shall provide TNB with reasonable advance notice of such rectification works and any such field measurement re-test(s). SPP shall also submit to TNB test reports of any such field measurement re-test(s) prior to the Commercial Operation Date, for acceptance by TNB.

During the Term, TNB shall notify SPP of any event(s) of non-compliance of the PQ at the Interconnection Point and SPP shall assess and implement any rectification of the Facility and/or the SPP Interconnection Facility and/or the SPP Interconnector, including installation of appropriate filters and/or compensation equipment, and shall conduct field measurement tests (including any re-test(s)) to validate compliance to the PQ standards. The cost of such assessment and rectification works and field measurement tests (including any re-test(s)) shall be fully borne by the SPP. SPP shall provide TNB with reasonable advance notice of such rectification works and field measurement tests (including any re-test(s)). SPP shall submit to TNB reports of such field measurement test (including any re-test(s)) for TNB's acceptance.

The first field measurement test, the second field measurement test (including any re-test(s)) and all field measurement tests (including any re-tests(s)) during the Term shall be carried out to measure the weekly profile of PQ with measurements taken for every ten (10) minutes period for minimum one week duration. All field measurements tests for PQ shall be conducted using a measuring device meeting the requirements of IEC 61000-4-30 (and its amendments) for a class A device. All field measurement tests for harmonics (up to the 50<sup>th</sup> order) shall use a separate wide-band voltage transducer (50Hz to 2500Hz) with an overall error of less than one per cent (1%).

### **B3.12 Power Quality Recorders**

SPP shall provide and install PQ recorders to be located at both the TNB Interconnection Facility and at appropriate locations within the Facility and/or the SPP Interconnection Facility.

#### **B3.12.1 Power Quality Recorders at the Facility and/or SPP Interconnection Facility**

The PQ recorders at the Facility and/or the SPP Interconnection Facility shall be capable of continuous monitoring for the following PQ parameters including but not limited to voltage harmonics (up to the 50<sup>th</sup> order), phase voltage unbalance, voltage fluctuation and flicker, current harmonics and DC injection.

SPP shall utilise the PQ recorders for monitoring and analysis of any PQ issues within the Facility and/or the SPP Interconnection Facility. Upon request by TNB, SPP shall provide copies of such PQ analysis reports and PQ data records. Such data

provided to TNB shall be in the standard PQDif Data Format or COMTRADE format where appropriate.

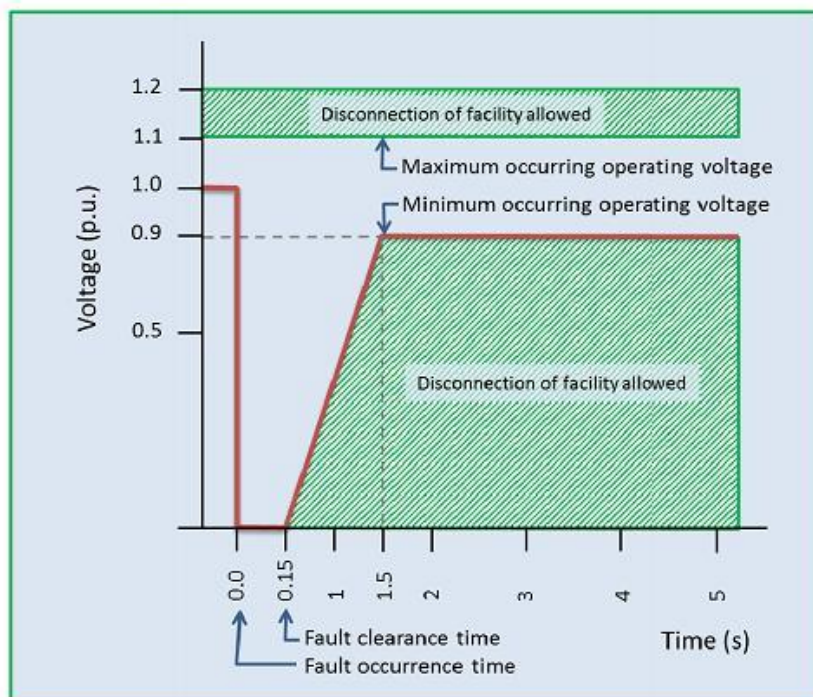
### B3.12.2 Power Quality Recorder at the TNB Interconnection Facility

The PQ recorders at the TNB Interconnection Facility (including associated equipment and facilities) shall be capable of continuous monitoring of PQ at the Interconnection Point, as further described in Appendix D.

### B3.13 Fault Ride-Through

The Facility shall be capable of operating through Grid System fault and disturbance which is termed as fault ride through capability without tripping of the Facility in accordance with the Grid Code Clause CC6.4.15.2. During the fault ride through, the Facility will inject a reactive (overexcited) current to support the grid voltage according to the figure below which is stipulated in Grid Code Clause CC6.4.15.2. Upon the return of the grid voltage within the normal operating voltage dead band, the Facility shall maintain the reactive current injection for minimum duration of 500ms. Within the normal operating voltage dead band, the Facility shall be capable to meet the reactive power requirements in paragraph B3.2 of this Appendix B and voltage support requirements in paragraph B3.3 of this Appendix B.

Power Park Module Fault Ride Through Requirements



### B3.14 The Philosophy of Plant Design and Redundancy

The Facility shall be designed with appropriate redundancy to avoid tripping of the entire Facility in the event of a single generating unit tripping and/or single mode failure within any of the following:

- (i) Solar photovoltaic panels
- (ii) Solar photovoltaic Inverters
- (iii) Central inverters
- (iv) AC equipment
- (v) DC equipment
- (vi) Power server / switchboard
- (vii) Cooling system
- (viii) Auxiliary equipment
- (ix) Power supply for control and auxiliary equipment

#### **B3.14.1 Conceptual Design of the Facility**

SPP shall include but not limited to, the following documents and data in the conceptual design report of the Facility which shall be submitted to TNB pursuant to Clause 9.3(b) of this Agreement:

- (i) Facility operational philosophy;
- (ii) Technical design data for major plant equipment (i.e. solar photovoltaic inverters, solar photovoltaic panels, power servers/switchboard, power transformers, GSU, high voltage circuit breakers, etc.);
- (iii) Tripping matrix (including the operational limits and settings of the Facility's solar photovoltaic inverters); and
- (iv) Manufacturer's test report and/or certificates of the Facility's solar photovoltaic panels and solar photovoltaic inverters.

#### **B4.0 REQUIREMENT ON COMPLIANCE TESTS**

##### **B4.1 Requirement for SPP to carry out compliance tests**

SPP shall organise to conduct tests specified under paragraph B4.2 at the Facility to prove compliance on the technical requirements as stated in this Appendix B and shall meet the Facility technical limits as stated in Attachment A to this Appendix B.

The tests shall be witnessed and certified by the Independent Engineer. All costs related to the tests shall be borne by SPP.

TNB and the GSO shall be invited by SPP to witness the tests and may send their representatives.

SPP shall ensure that all tests stated under this section can be repeated fully by independent third party testers during the commercial operation of the Facility.

##### **B4.2 Scope of Tests**

The following tests shall be conducted in accordance to the provisions of this Agreement to prove compliance to requirements stated in the following sections of this Appendix B, as appropriate:

- (i) B3.1 Grid Frequency Variation

- (ii) B3.2 Reactive Power
- (iii) B3.3 Grid Voltage Variation
- (iv) B3.5 Fault Detection and Clearing Limits
- (v) B3.8 High Frequency MW Response
- (vi) B3.9 Ramp Rate
- (vii) B3.11 Quality of Service
- (viii) B3.12.2 Power Quality Recorder at the TNB Interconnection Facility
- (ix) B5.3 Facility Parameters and Characteristics
- (x) B5.4 Machine Model Validation

#### **B4.3 Procedure of Tests**

SPP shall submit the proposed site test procedures for TNB's review in accordance with the provisions of this Agreement. The test procedures shall be based on the latest revision of TNB Testing Guidelines for Power Park Modules (as amended from time to time).

Where the tests required under this paragraph are not addressed in the TNB Testing Guidelines for Power Park Modules, SPP shall propose to TNB appropriate test procedures based on the relevant standards and guidelines in accordance with the provisions of this Agreement for TNB's review and acceptance. In the absence of any such standards or guidelines, Prudent Utility Practices or OEM standards shall, subject to the prior written consent of the TNB, be applied by SPP.

#### **B4.4 Requirement to submit test reports**

SPP shall submit to TNB and the GSO the preliminary test results and the certified test report for their verification, in accordance with the timeframes as set out in Clause 10.2 of this Agreement.

### **B5.0 REQUIREMENT TO SUBMIT AND VALIDATE DATA**

#### **B5.1 Requirements**

SPP shall submit complete information and data with appropriate simulation models which clearly define and represent the characteristics of operation of each of the following components of the Facility, over the whole range of its capability:

- (i) GSU;
- (ii) Power converter/ generator module;
- (iii) Electric control module;
- (iv) Linearized model of solar photovoltaic panels output curve;
- (v) Linearized solar irradiance profile;
- (vi) Solar Irradiance;
- (vii) Power plant auxiliary loads;
- (viii) High voltage cables/overhead lines connecting the high voltage side of the GSU to the Interconnection Facilities; and
- (ix) Reticulation network representation.

The submission is to enable TNB to conduct appropriate simulation studies for purposes related to planning and operation of the Grid System including interconnection with the other power systems within Peninsular Malaysia and with the neighbouring countries. SPP shall submit the models for simulation studies which are compatible with the latest version of PSS<sup>®</sup>E. The simulation software package currently used by TNB is PSS<sup>®</sup>E Version 32 (a trademark of Siemens Power Technologies Inc., USA).

The root mean square (RMS) simulation studies include, but are not limited to:

- (i) Power flow;
- (ii) Short circuit; and
- (iii) Transient stability.

All characteristics and models shall operate in stable and accurate manner under all frequency range stipulated in paragraph B2.1 (Grid Frequency Variations), including consideration on the following:

- (i) Large frequency variations upwards (increasing) up to 52Hz.
- (ii) Large frequency variations downwards (decreasing) up to 47.0Hz.
- (iii) Grid System faults.
- (iv) Splitting of the Grid System into islands.

All simulation models submitted for stability studies must be in the form of fully validated models for PSS<sup>®</sup>E type simulation, or generic equal models based on the capability and behaviour of the Facility for PSS<sup>®</sup>E type simulation. The generic model may be acceptable if SPP provides supporting document from vendor to demonstrate the generic model is sufficient to represent the actual inverter capability.

The models shall be provided complete with the following documentations:

- (i) Model software source codes (flecs) as well as object (binary) codes;
- (ii) Description of the models including the engineering of model derivations;
- (iii) User operation manuals;
- (iv) User application guides;
- (v) Model block diagrams;
- (vi) Values of parameters;
- (vii) Input data format; and
- (viii) Criteria for acceptable operation (threshold parameter values).

The models shall represent closely the on-site response and setting.

#### Solar Photovoltaic Generation System

The fully validated control block diagram representation of the PSS<sup>®</sup>E type simulation model (including all limiters) shall be submitted to TNB together with:

1. Explanation of all the symbols used;
2. Clearly labelled sub-systems of control and protection;

3. Input-output relationships, by giving:
  - a. Equations;
  - b. Characteristics/chart/look-up table; and
  - c. Other input/output relationship (if any); and
4. Indication whether the parameters in the block diagram can be measured on the actual system.

All simulation models for dynamic stability studies using PSS<sup>®</sup>E software package shall be able to list data (i.e. locations and values) associated with equipment models by using PSS<sup>®</sup>E documentation activity DOCU. The models shall also support the data checking mode of activity DOCU. In this respect, the models shall include acceptability criteria for checking the data validity and shall display such value of acceptability criteria whenever activity DOCU is invoked. The models shall also be able to be exported to a dynamic raw data format that can be read by PSS<sup>®</sup>E. The model shall support this mode via activity DYDA.

The above models and documentation shall be submitted to TNB and the GSO in CD-ROM media (read only). One hardcopy of the same is also required to be submitted. SPP shall, prior to such submission, validate all information and data including parameter data, control block diagrams and software program code of this document including its sub-sections.

Due dates and versions for data submission and simulation models (data referred to herein is as specified in Form A: Generators for Grid System Connection Process) are as follows:

| Due dates                                    | Type of data to be submitted                      |
|--|---|
| Prior to the effectiveness of this Agreement | Committed Project Data<br>Contracted Project Data |
| Prior to the Initial Operation Date          | Registered Data                                   |

Unless notified otherwise by TNB, SPP shall re-submit the data and simulation models once every 5 (five) years or whenever SPP makes any change in the system of the Facility which has influence over such Facility's steady state and dynamic characteristics.

## **B5.2 Data Format**

The submissions of information and models are to be made by using the format in Form A: Generators for Grid Connection Process, under the Planning Code Appendix A of the Grid Code.

SPP shall also integrate and submit all the above data for the Facility into the PSS<sup>®</sup>E load flow raw data file ("raw data") and PSS<sup>®</sup>E dynamic raw data file ("dyr data") which are ready to be used for studies on operation and planning of the Grid System by TNB and the GSO using PSS<sup>®</sup>E.

Data for the Facility shall also include reactive power capability curve of the Facility, written in the format compatible to PSS<sup>®</sup>E activity GCAP. For this purpose, at least ten (10) pairs of data on the P-Q capability curve shall be provided for the Facility.

### **B5.3 Facility Parameters and Characteristics**

SPP shall conduct tests on the Facility to verify the Facility's characteristics and values of submitted parameters for the whole configuration from the solar photovoltaic cells/modules up to the low voltage terminals of the GSU, to be used by TNB and the GSO in the system security assessment studies

The actual quantities and characteristics measured on the Facility at the Site shall closely meet the submitted data. SPP shall derive the Facility's parameters from the basic raw data which shall also be submitted TNB and the GSO in softcopy form.

### **B5.4 Machine Model Validation**

The SPP shall submit models of the Facility to be connected to the Grid System. At the minimum, the models shall represent the following behavior and/or control system:

1. Steady-state models:
  - Aggregate generator model (lumped inverter);
  - Single lumped unit transformer;
  - Equivalent reticulation impedance; and
  - Single transformer.
2. Dynamic models:
  - Time varying irradiation profile;
  - DC power output of the PV panels for the given level of irradiation;
  - Maximum power point tracker (MPPT) control (if installed);
  - Electrical control of the PV inverter; and
  - Limiters applicable to the inverter.

All submitted models are to be provided together with the relevant documentations, which includes the following:

- Description of the models and associated parameters to be used;
- User operation manuals, which detail out the operational procedures specific for the model such as data setting up etc.;
- User application guides;
- Model block diagrams; and
- Input data format and associated values of parameters.

All submitted models and associated parameters shall be validated or verified through site test and/or measurement. Responses of the models acquired from simulation shall reasonably in agreement with the corresponding actual response measured at Site (within 10% error). In the event that the model does not produce the correct output, the model submission requirement will not be considered as complete until the errors are rectified. A specific section shall be included in the



model documentation that discuss the results comparison between simulated and site test/measurement (to be shown in plots where applicable).

If it is not possible to represent the behavior or response of the Facility using 'standard' models available in the simulation software (with 10% error), the SPP is to develop appropriate 'user defined' model. The SPP is encouraged to work collectively with the manufacturers to develop 'standard' models for most commonly used solar PV technology.

SPP shall submit the validation report for the review of TNB and the GSO. The comments of TNB and the GSO, if any, shall be incorporated by SPP in the revised validation report which shall be submitted together with the fully validated machine models prior to the Commercial Operation Date.

#### **B5.5 Factory Acceptance Tests (FAT) Reports and Type Tests Reports**

SPP shall submit type test report on major plant equipment (i.e. solar photovoltaic panels, generator, power transformers (including GSU), generator circuit breakers, solar photovoltaic inverters, power servers, etc.) together with the conceptual design report of the Facility and IPP Interconnection Facility pursuant to Clause 9.3(b) of this Agreement.

SPP shall also submit the factory acceptance test (FAT) reports on the major plant equipment (i.e. solar photovoltaic panels, power transformers (including GSU), high voltage circuit breakers, solar photovoltaic inverters, power servers, etc.) as early as possible after the completion of all such FAT tests; but no later than thirty (30) days prior to the Initial Operation Date. For the avoidance of doubt, such FAT reports shall not replace the obligations of SPP to carry out compliance tests on the Facility.

**ATTACHMENT A TO APPENDIX B****A1 Ramp Rate**

The ramp rates for the Facility when operating at any load levels from 0MW to the Established Capacity and in accordance with the requirements of paragraph B3.8 in this Appendix B are as follows:

|                       | <b>Load range</b> | <b>Ramp rate (MW/min)</b> |
|-----------------------|-------------------|---------------------------|
| Despatch Instruction  |                   |                           |
| Normal Load Variation |                   |                           |
| During Startup        |                   |                           |
| During Shutdown       |                   |                           |

The above ramp rates shall be applicable for both loading up and deloading.

FOR REP PURPOSES ONLY

**APPENDIX C**

**ENERGY ACCOUNTING AND METERING EQUIPMENT**

FOR REP PURPOSES ONLY

**C1.0 DEFINITIONS**

C1.1 All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.

**C2.0 ENERGY ACCOUNTING****C2.1 Metering Location & Arrangement**

C2.1.1 The Net Electrical Output (in kWh) delivered to TNB shall be measured by the TNB Metering Equipment. The TNB Metering Equipment shall be located within the TNB Interconnection Facility to be connected to the Facility.

**C2.2 Metering Equipment**

C2.2.1 The TNB Metering Equipment as described in C3.0 and C2.4.2 and other related equipment shall be supplied and installed by SPP in accordance with Prudent Utility Practices and this Appendix C.

**C2.3 Pre-operational Testing**

C2.3.1 Prior to the installation of the kWh and kVArh meters comprising the TNB Metering Equipment, SPP shall deliver such meters for accuracy calibration tests (the **Tests**) to either a TNB testing laboratory for such purpose or an independent test laboratory accredited with ISO/IEC 17025:2005 endorsed in writing by TNB.

C2.3.2 If the Tests are conducted in a TNB testing laboratory, SPP shall, at its own cost and expense, witness the Tests and verify the Test results.

C2.3.3 If the Tests are conducted in an accredited independent testing laboratory as described in C2.3.1, the representatives of SPP and TNB shall witness and verify the Test results. Copies of the Test results shall be submitted to TNB as soon as practicable but in any event not later than fourteen (14) days after such Tests being conducted.

C2.3.4 All costs associated with the Tests, including any costs incurred by TNB in witnessing the Tests and verifying the Test results, shall be borne by SPP.

C2.3.5 The Tests shall be carried out in compliance with the relevant IEC/BS Standards. After satisfactory accuracy calibration tests, SPP shall deliver such meters to TNB Metering Petaling Jaya for programming purposes and such meters shall thereafter be sealed by TNB and installed by SPP at the designated location in the TNB Interconnection Facility. SPP shall give TNB fourteen (14) days prior written notice of the installation of such tested meters in the TNB Interconnection Facility and TNB may witness such installation. Upon the installation of such meters, site tests shall be undertaken by TNB at SPP's expense prior to the commissioning of the TNB Metering Equipment.

C2.3.6 The testing of any current transformers, voltage transformers or metering equipment during installation and energisation of such TNB Metering Equipment shall be undertaken by SPP at its own costs and expense. The costs and expense incurred in respect of any witnessing of such tests as aforesaid by TNB shall be fully borne by SPP.

#### **C2.4 Meter Readings**

C2.4.1 In order to verify the quantity of solar photovoltaic energy delivered by SPP to TNB in each Billing Period, a half (1/2) hourly meter reading shall be obtained in accordance with the provisions of Clause 6.1 of this Agreement.

C2.4.2 No later than thirty (30) days prior to the Initial Operation Date, SPP shall provide GPRS/GSM communication medium for remote meter reading (RMR) purposes with compatible modems and SIM Card. SPP to ensure the adequacy of signal strength in the metering room for effective GPRS/GSM communication of RMR.

C2.4.3 SPP shall seek TNB's comments on the telecommunication service provider, communication medium and minimum signal strength to be used for RMR.

#### **C2.5 Metering Room**

C2.5.1 The energy meter shall be installed on a metering kiosk which shall be housed in a metering room at a mutually agreed location in the TNB Interconnection Facility. The specification of the metering kiosk and metering room shall be in accordance with TNB Electricity Supply Application Handbook.

C2.5.2 No later than ninety (90) days prior to the Commencement Date, SPP shall submit the proposed layout diagram for the metering kiosk and the metering room for TNB's endorsement.

C2.5.3 The metering room shall operate on a "2-key System" whereby TNB and SPP shall each keep a set of key(s) to the metering room. For the avoidance of doubt, the metering room shall only be accessed when both the representatives of SPP and TNB are present.

C2.5.4 SPP may, at its own cost and expense, install such equipment relating to downloading of meter data at TNB Interconnection Facility. TNB shall provide, upon prior reasonable notice, access to SPP for the installation and maintenance of such equipment which relates to the downloading of meter data.

#### **C2.6 Meter Inspection and Testing**

C2.6.1 The TNB Metering Equipment shall be tested by TNB on a regular schedule determined by TNB in accordance with Prudent Utility Practices. The costs and expense for any additional inspections and tests shall be borne by SPP or TNB in accordance with Clause 14.3 of this Agreement. The test results of the TNB

Metering Equipment, upon being obtained pursuant to Clause 14.3 of this Agreement, shall be deemed to be final and conclusive.

### **C3.0 TNB METERING EQUIPMENT**

#### **C3.1 Scope**

C3.1.1 The TNB Metering Equipment and the associated transfer and custody of information systems for purchases of solar photovoltaic energy as specified in this Appendix C shall be supplied and installed by SPP.

C3.1.2 The TNB Metering Equipment shall consist of one main and one back-up system, which shall have the same configuration. The TNB Metering Equipment comprising of the main and back-up metering equipment shall each have separate sets of current transformer (**CT**) and inductive voltage transformer (**IVT**).

C3.1.3 Current transformers and inductive voltage transformers shall be supplied and installed at the agreed location by SPP and shall be used exclusively for metering purposes only. Equipment data will be as indicated below:

| <b><u>Current Transformers (CT)</u></b> |   |
|---|---|
| Ratio                                   | [SPP to provide and to be agreed by TNB/1A                                  |
| Accuracy Class                          | 0.2   |
| Rated Burden                            | 30VA  |
| Quantity                                | one for each phase in each of the main and back-up system, for each circuit |
| Standard                                | IEC 61869 - 2   |

**Note:**

The ratio of the CT in the table above has not, as at the date of this Agreement, been furnished by SPP to TNB. SPP shall furnish such ratio of the CT to TNB within one hundred and fifty (150) days from the date of this Agreement and shall, in consultation with the EPCC Contractor and TNB, agree and finalise the ratio of the CT and furnish the finalized ratio to TNB within two hundred and fifty (250) days from the date of this Agreement. Upon finalization of the aforesaid data, the same shall be annexed to this Appendix C and be deemed to form an integral part thereof.

| <b><u>Inductive Voltage Transformer (IVT)</u></b> |   |
|---|---|
| Ratio   | $\frac{500 \text{ kV}}{\sqrt{3}}$ / $\frac{110 \text{V}}{\sqrt{3}}$ or $\frac{275 \text{kV}}{\sqrt{3}}$ / $\frac{110 \text{V}}{\sqrt{3}}$ or $\frac{132 \text{ kV}}{\sqrt{3}}$ / $\frac{110 \text{V}}{\sqrt{3}}$ as appropriate |
| Accuracy Class                                    | 0.2   |
| Rated Burden                                      | 50VA minimum  |
| Quantity  | one for each phase in each of the main and back-up system, for each circuit   |
| Type  | IVT   |
| Connection  | Star-star with neutral earthed on primary and secondary side  |
| Standard  | IEC 61869 - 3   |

C3.1.4 The metering devices and software required to operate the TNB Metering Equipment are listed below.

(1) **Energy Meters**

| <b><u>Energy Meters</u></b> |  |
|-----------------------------|--|
| Accuracy Class for kWh      | 0.2  |
| Accuracy Class for kVArh    | 2  |
| Quantity                    | two for each circuit, one each for the main and back-up system for every circuit |
| Standard                    | MS 62052-11<br>MS 62053-22<br>MS 62053-23  |

(2) **Mandatory Features for Energy Meters**

- a) Features of the energy meters must comply with TNB Technical Specification No. KEJ11208:2015. As the TNB Technical Specification document is subject to revision, SPP shall also comply with any revision to the TNB Technical Specification
- b) Two communication facilities (RS232 port and RS485 port), are required to transfer metering data from site to RMR data centre via communication medium mentioned in C2.4.2.
- c) The energy meters shall be provided with meter configuration and reading software.
- d) For the purpose of TNB remote meter reading system, the energy meter shall be Itron Enterprise Edition (IEE) compliant.

- e) The energy meters including software shall be provided with thirty six (36) months' manufacturer's warranty.

(3) **Portable Test Equipment**

This equipment is to be purchased by SPP and transferred to TNB and shall be used as a metering standard for onsite meter accuracy test purposes.

| <b><u>Portable Test Equipment</u></b> |     |
|---------------------------------------|-----|
| Quantity                              | One |

**Note:**

Features of the portable test equipment must comply with TNB Specification No. KEJ11132:2011. As the TNB Technical Specification document is subject to revision, SPP shall also comply with any revision to the TNB Technical Specification.

- C3.1.5 The CT and VT secondary leads shall be multi-core armoured cable for each main and back-up in any one circuit. Minimum wire size for these leads shall be 7/0.85 mm and in accordance with BS 6346 for 600/1000 volt-grade cable. A separate and enclosed cable conduit/ trunking shall be installed to route the wires to the metering kiosk. The metering kiosk shall be located in a mutually agreed location in the metering room as described in C2.5. The final layout diagram for the metering kiosk shall be provided by SPP for approval by TNB after written confirmation by SPP to TNB of the type of metering devices to be provided by SPP.

A marshalling cubicle shall be provided for the CT and VT connections complete with terminal blocks and fuses. The cubicle shall be sealed by TNB.

- C3.1.6 All of the cables, cable routing, marshalling cubicle, metering kiosk and related metering accessories, such as fuses and terminal blocks shall be provided by SPP.
- C3.1.7 SPP shall, prior to the Commercial Operation Date, provide TNB with spare CT and IVT (3-units each). A secured room which has been installed with a locking system shall be provided by SPP near to the metering room as described in C2.5 for the storage of such spare CT and IVT.
- C3.1.8 The final metering set-up shall be demonstrated to be working especially on the RMR facility and agreed upon by TNB prior to actual installation thereof to ensure that it is in accordance with the requirements of the RMR Data Centre.



**APPENDIX D**

**DESIGN AND TECHNICAL REQUIREMENTS OF THE SPP INTERCONNECTION FACILITY, SPP  
INTERCONNECTOR, TNB INTERCONNECTION FACILITY AND SPP WORKS**

FOR REF PURPOSES ONLY

**D1.0 GENERAL****D1.1 Definitions**

All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.

**D1.2 SPP Interconnection Facility and SPP Interconnector**

- (a) SPP shall complete the design, engineering, procurement, supply, manufacturing, construction, installation, erection, testing, energising, commissioning, labour, services, facilities, equipment, supplies, materials and any other permanent structures in relation to the SPP Interconnection Facility and SPP Interconnector as described below in accordance with this Appendix D and all relevant TNB Technical Specification including but not limited to substations, civil works, earthing transformers, local transformers, power transformers, protection, telecontrol, telecommunication and Transmission Lines.
- (b) SPP shall, at its cost and expense, acquire all necessary ownership and all access rights relating to the land on which the SPP Interconnection Facility and SPP Interconnector shall be constructed and located.
- (c) The SPP Interconnection Facility and SPP Interconnector shall comprise the following:

***[Note: The details of this paragraph D1.2 will be specified for the actual Project. The configuration shall be either Option 1 or Option 2 as shown in Figure 1 and Figure 2 below. The layout diagram shall show all other connections to the busbar at the [●] substation, including but not limited to generators, overhead lines, underground cables, reactors, transformers etc.]***

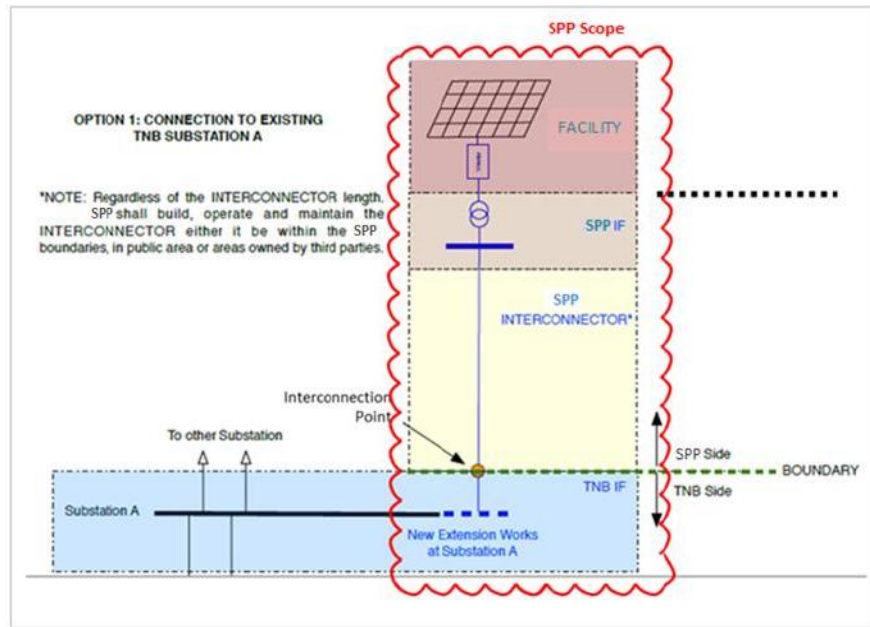


Figure 1: Option 1 – Connection to existing TNB substation A

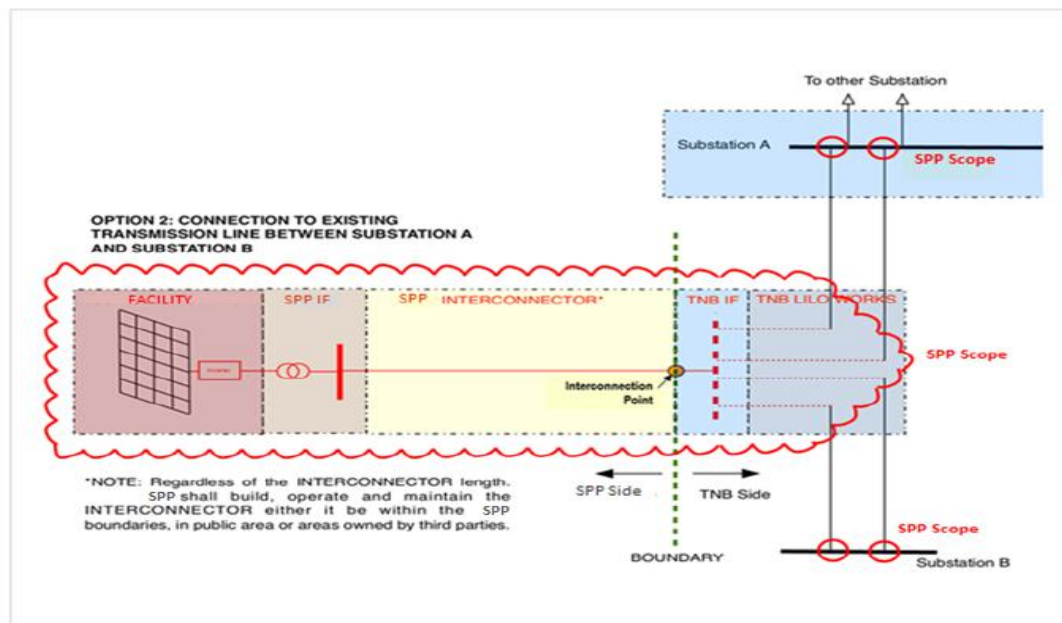


Figure 2: Option 2 – Connection to existing transmission lines between existing TNB substation A and TNB substation B

**D1.3 SPP Works**

- (a) SPP shall complete the design, engineering, procurement, supply, manufacturing, construction, installation, erection, testing, labour, services, facilities, equipment, supplies, materials and any other permanent structures in relation to the SPP Works as described below in accordance with this Appendix D, all relevant TNB Technical Specification

(including but not limited to substations, civil works, earthing and local transformers, power transformers, protection, telecontrol, telecommunication and transmission lines), all relevant TNB ICT Telecommunication Guidelines, the Transmission Design Philosophy and Guidelines (Protection and Control) and the TNB Protection Accepted Relay List at the existing TNB Interconnection Facility and if applicable, at the new TNB Interconnection Facility (including the substation control building and associated facilities) and Transmission Lines (including the associated loop-in loop-out (LILO) works), and as further described below.

- (b) SPP shall, in the name of TNB, at its cost and expense, acquire all necessary ownership and all access rights relating to the land on which the SPP Works shall be constructed and located, if applicable.
- (c) The SPP Works shall comprise of the following:
- (i) For Option 1 (refer also Figure 1):
- the establishment of the [●] feeder bay/bays at the existing TNB Interconnection Facility connecting to the Facility;
  - the termination of the 132kV transmission lines/ underground cables of the SPP Interconnector at the existing TNB Interconnection Facility as described in paragraph D1.3(c)(i) above;
  - global positioning system (GPS) equipment/system;
  - works associated with the secondary equipment such as direct current (DC) supply, control and relay panel, busbar protection, auxiliary power and control cabling (APC), telecontrol, telecommunication, information and communication technology (ICT), power quality recorder and GPS; and
  - TNB Metering Equipment and associated works inclusive of but not limited to the installation of dedicated metering CT and dedicated metering IVT for the new feeder bay/bays at the existing TNB Interconnection Facility connecting to the Facility and as further described in Appendix C.

***[Note: The scope of the [●] will be finalised upon the confirmation of the location of the Site and the connection to the Grid System.]***

OR

- (ii) For Option 2 (refer also Figure 2):
- the establishment of the new TNB Interconnection Facility which includes but not limited to full bay/bays for connection to the Facility and full bay/bays for out-going

feeders connecting to the single/double circuit [132kV, [●] MVA per circuit] transmission line (the "Transmission Lines");

- the two (2) double circuits [132kV, 282 MVA per circuit] transmission line of approximately [●] kilometres in length connecting the new TNB Interconnection Facility to the nearest transmission lines (including LILO works);
- the termination of the Transmission Lines as described in paragraph D1.3(c)(ii) above at the new TNB Interconnection Facility;
- ground improvement works for the new TNB Interconnection Facility area, including building site;
- civil works and soil investigation works;
- construction of internal maintenance road;
- construction of access road leading to the works site;
- construction of a new 132kV substation control building, which space will cater for [●] full bays not limited to [●] bay/bays for connection to the Facility and [●] out-going feeder bay(s) connecting to the Transmission Lines;
- mechanical and electrical (M&E) works for the new TNB Interconnection Facility, including M&E works for the substation control building;
- substation earthing system;
- GPS equipment/system;
- works associated with the secondary equipment such as direct current (DC) supply, control and relay panel, busbar protection, auxiliary power and control cabling (APC), telecontrol, telecommunication, information and communication technology (ICT), power quality recorder and GPS;
- telecontrol, telecommunication and protection relay retrofitting works in existing TNB substations at the remote end of the new TNB Interconnection Facility; and
- TNB Metering Equipment and associated works inclusive of but not limited to the installation of dedicated metering CT and dedicated metering IVT for the feeder bay/bays at the new TNB Interconnection Facility connecting to the Facility and as further described in Appendix C.

***[Note: The scope of the [●] will be finalised upon the confirmation of the location of the Site and the connection to the Grid System.]***

- (d) SPP shall, at its cost and expense, be responsible for any damage to the existing installation caused by the SPP during extension works and/or relay retrofitting works within the TNB Interconnection Facility.

#### **D1.4 Owner's Engineer**

- (a) SPP shall notify TNB in writing of its designated Owner's Engineer not later than one hundred and twenty (120) days prior to the Commencement Date.
- (b) In the event SPP intends to replace the Owner's Engineer, SPP shall, no later than seven (7) Business Days prior to replacing the Owner's Engineer, notify TNB in writing of the same.

### **D2.0 DESIGN GUIDELINES AND REQUIREMENTS**

#### **D2.1 Design Philosophy**

- (a) The following design factor shall be considered during the design of the SPP Interconnection Facility, SPP Interconnector and SPP Works for effective and reliable operation under all reasonably expected system conditions.
- Personnel and public safety
  - Voltage and power factor control
  - Transfer limits
  - Equipment ratings
  - Technical losses
  - Short circuit conditions
  - Transient and steady state stability limitations
  - Normal and emergency loading
  - System protection and other control requirements
  - Synchronising facilities
  - System earthing
  - Abnormal frequency and voltage operation
  - Waveform distortion, harmonics, and flicker
  - Lightning surges
  - Atmospheric conditions
  - Environmental factors
  - Telecommunication requirements
- (b) The operating voltage at the SPP Interconnection Facility, SPP Interconnector and SPP Works shall be dependent on TNB's transmission voltage. The transmission voltage is 132 kV.

- (c) The design of the SPP Interconnection Facility, SPP Interconnector and SPP Works shall be capable of operation over the normal operating range, voltage, stability and loading limits. The SPP Interconnection Facility, SPP Interconnector and SPP Works shall be capable of handling the load output of the Facility at 132 kV.
- (d) In the event that any modifications, changes or replacements are required to be made to the existing TNB's substation(s) which is connected to the SPP Interconnection Facility, SPP Interconnector and SPP Works as a consequence of the generation of electrical energy from the Facility in an interconnected mode with the Grid System, SPP shall undertake the necessary modifications, changes or replacements to such existing TNB's substation(s) at its own costs and expense.

## **D2.2 Additional Design Factors for SPP Interconnector and SPP Works**

The following design factors shall also be considered in addition to the design factor as listed in paragraph D2.1(a):

- (i) Line Route Survey (shortest and economical)
- (ii) Wayleave requirements
- (iii) Land acquisition/land buyout
- (iv) Right-of-way width according to voltage
- (v) Conductor ratings
- (vi) No of bundle conductors
- (vii) OPGW / Earthwire requirements
- (viii) Type of towers
- (ix) Tower earthing
- (x) Type of Crossings
- (xi) Line Lightning Performance Study
- (xii) Type of insulator and insulation level

## **D2.3 Coordination and Planning**

- (a) SPP shall at all times refer and consult with designated representative(s) of TNB in respect of the design of the SPP Interconnection Facility, SPP Interconnector and SPP Works.
- (b) SPP shall submit to TNB a site plan indicating component layout and a single-line electrical diagram of the Facility. This plan shall include the generating plant, PV module, inverter, other associated equipment, SPP Interconnection Facility, SPP Interconnector and SPP Works.
- (c) The conceptual design of the SPP Interconnection Facility, SPP Interconnector and SPP Works shall also be prepared by SPP and submitted to TNB in accordance with Clause 9.3 of this Agreement. This conceptual design report shall conform to TNB Technical Specifications as described in paragraph D3.1 below.
- (d) The design, purchase and installation of the SPP Interconnection Facility, SPP Interconnector and SPP Works shall be in accordance with the

conceptual design report of the SPP Interconnection Facility, SPP Interconnector and SPP Works.

- (e) TNB shall have the right to review the design of the SPP Works to ensure their reliability.
- (f) SPP shall submit to designated representative(s) of TNB a work programme in accordance with Clause 9.6(b) of this Agreement for comments which shall contain the following:
  - (i) the relevant milestone events with the corresponding milestone dates and the order in which SPP proposes to construct the SPP Interconnection Facility, SPP Interconnector and SPP Works (including design, manufacture, delivery to Site, erection, testing and commissioning);
  - (ii) the program in which SPP proposes to carry out the acquisition of the Site necessary to construct, install, operate and maintain the SPP Interconnection Facility, SPP Interconnector and SPP Works;
  - (iii) the times when submission and comments of SPP's drawings are required;
  - (iv) the time (or times, as the detailed design can be provided in stages) by which the detailed design of the SPP Works are to be submitted by SPP to TNB for its comments; and
  - (v) the times by which SPP requires TNB to furnish any TNB's drawings.
- (g) SPP shall submit an initial program within (30) days from the date of effectiveness of this Agreement.
- (h) SPP shall thereafter submit the detailed program within (90) days from the date of effectiveness of the Agreement.
- (i) The comments by TNB of the program shall not relieve SPP from any obligation under the Agreement.
- (j) No material alteration to the program shall be made unless such material alteration to the program is due to the comments of TNB. Any alteration to the program thereto shall be furnished by SPP to TNB.
- (k) If the progress of the construction of the SPP Interconnection Facility, SPP Interconnector and SPP Works does not conform to the program, TNB may instruct SPP at SPP's cost and expense to submit a revised program showing modifications necessary to ensure the completion of the works by the Initial Operation Date.



**D2.4 Type Test, Inspection, Site Testing, Operation and Maintenance**

- (a) All equipment, apparatus, materials and all things to be provided under this Agreement for the SPP Interconnection Facility, SPP Interconnector and SPP Works at SPP's cost and expense be type tested and certified at an accredited testing laboratory. This is to ensure that it shall meet the technical, functional, performance and interface requirements.
- (b) The type test shall be witnessed by TNB's representatives. The type test procedure shall be submitted by SPP to TNB for its review sixty (60) days prior to the conduct of such type test. These procedures shall serve as a guideline of the type test to be conducted.
- (c) SPP shall submit to TNB a copy of the test certificate and reports as soon as practicable but in any event not later than thirty (30) days after such test being conducted.
- (d) Inspection and testing of the SPP Interconnection Facility, SPP Interconnector and SPP Works upon the completion of its construction at Site shall be undertaken in accordance with Clauses 9.7 and 9.8 of this Agreement.
- (e) Upon the SPP Interconnection Facility, SPP Interconnector and SPP Works being placed into service, SPP shall ensure that the Facility is operated and maintained within its Design Limits and in accordance with Prudent Utility Practices.
- (f) In the event that TNB reasonably believes that the Facility does not have sufficient safety and protection system in place in accordance with Prudent Utility Practices such that the continued operation of the Facility would pose an imminent danger to or could reasonably be expected to pose a danger to any part of the Grid System, TNB may perform an inspection of the Facility either (i) immediately, in the event of an imminent danger (including the simultaneous disconnection of the Facility from the Grid System) or (ii) upon having served forty-eight (48) hours prior written notice to SPP, with reasons therefore, in all other circumstances (but without the simultaneous disconnection of the Facility from the Grid System).
- (g) Each Party shall bear its own costs and expense that may be incurred in connection with such inspection of the Facility by TNB. TNB shall not be liable to SPP for any damage caused to the Facility in the event of an immediate disconnection of the Facility in accordance with paragraph D2.4(f) above.
- (h) Operation of the intertie and/or synchronising circuit breaker at the TNB Interconnection Facility shall be restricted to specific direction of the Control Centre. Procedures governing operation of these breakers shall be developed by TNB.

- (i) The TNB Interconnection Facility shall include manually operable isolating switch(es), with visible break, to isolate the Facility from the Grid System, provided that there will not be a visible break for such switch(es) if gas insulated switchgear is installed. Each switch shall be installed at a location accessible to TNB and shall be capable of being locked or tagged open.

### D3.0 TECHNICAL SPECIFICATION OF SPP INTERCONNECTION

#### D3.1 General

The technical specification for the interconnection's equipment shall comply with TNB Technical Specification and the documents enclosed therewith. Subject to the effectiveness of this Agreement in accordance with Clause 3.1 of this Agreement, the TNB Technical Specification and the documents enclosed therewith which indicate TNB's requirements shall be furnished by TNB to SPP no later than thirty (30) days upon written request by SPP. As the TNB Technical Specification and the documents enclosed therewith are subject to revision by issuance of addendum, TNB shall provide copies of the addendum to SPP as they are issued.

#### D3.2 Interconnection Point

The Interconnection Point shall be at the point of first physical contact between the underground cables from SPP's generator transformer and TNB's equipment which is at the termination clamp of the cable sealing end of the [●] substation as shown in Figure 3(a) and (b) below.

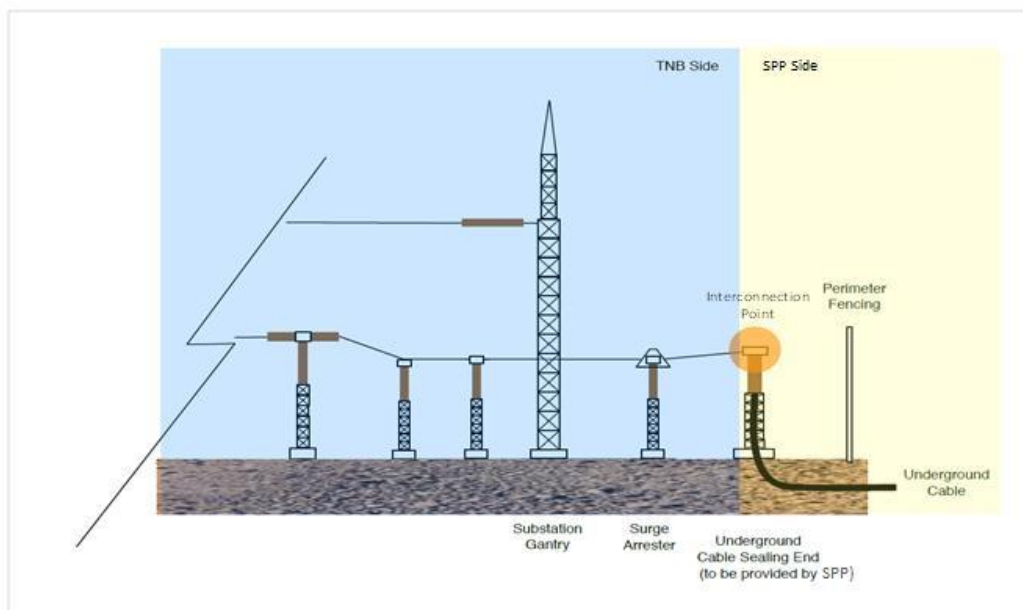
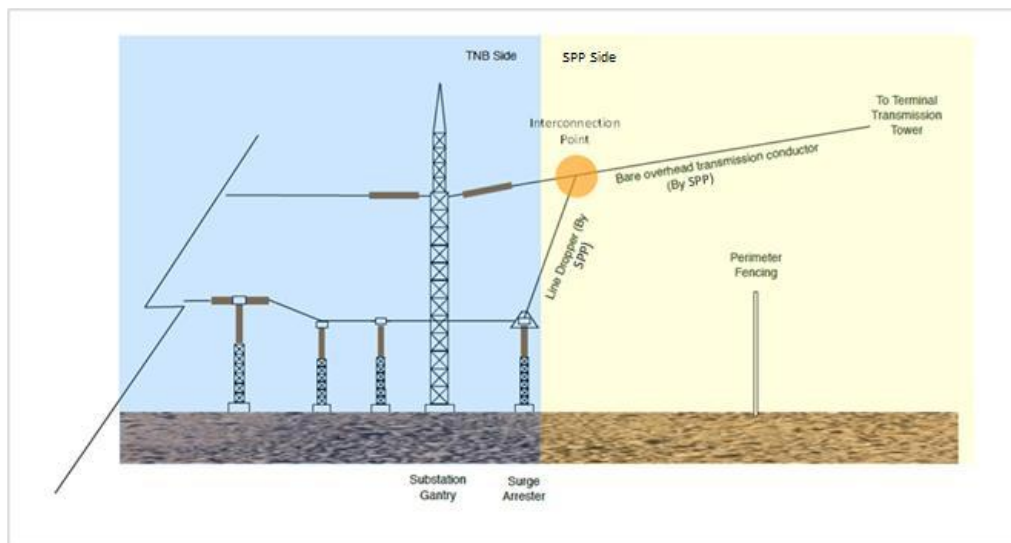


Figure 3(a): Interconnection Point

OR

The Interconnection Point shall be at the point of first physical contact between the overhead line from SPP's generator transformer and TNB's equipment inside the TNB Interconnection Facility. The location of the Interconnection Point is as shown in Figure 3(b) below.



**Figure 3(b): Interconnection Point**

#### **D4.0 PROTECTION**

##### **D4.1 General Protection System**

- (1) Protective devices at the Interconnection Point between the SPP Interconnection Facility and the TNB Interconnection Facility shall be in accordance with the latest Transmission Design Philosophy and Guidelines (Protection and Control). The protection of the Facility, the SPP Interconnection Facility and SPP Interconnector beyond the Interconnection Point is the sole responsibility of SPP, provided that the design shall conform to Prudent Utility Practices.
- (2) The protection shall be designed to separate the Facility, SPP Interconnection Facility and SPP Interconnector from the Grid System for faults within the zone of protection and faults or other disturbances within the Facility which are not isolated by SPP's internal protection system.
- (3) The main and back-up protection device/relays to be used for the SPP Interconnector shall be in accordance with the latest TNB Protection Accepted Relay List.
- (4) All control and protection scheme implemented at the SPP Interconnection Facility and SPP Interconnector shall be in accordance with Prudent Utility Practice.

- (5) Protection schemes and equipment for the SPP Interconnection Facility and SPP Interconnector which are an extension of existing TNB's system shall likewise be of style and scaling similar to the existing scheme or system. Characteristics of relays, control scheme such as voltage selection, synchronizing scheme, and busbar protection scheme etc., and all connections of equipment to be associated with existing equipment shall be such that they are fully compatible with and can operate satisfactorily in conjunction with the existing equipment.
- (7) For connection to system voltage of 132kV, the higher voltage windings of three phase transformers connected to the Grid System shall be star connected with the star point solidly earthed. The zero sequence current from SPP's facilities shall not be allowed to be transferred to the Grid System.
- (8) SPP shall undertake all the necessary modifications, changes or retrofitting to match the protection scheme at existing TNB's substation(s) connected with the SPP Interconnection Facility, SPP Interconnector and SPP Works.
- (9) SPP shall obtain endorsement from TNB on the protection scheme and type of relays to be used at the SPP Works.
- (10) SPP shall obtain endorsement from TNB on the protection scheme and type of relays to be used at the SPP Interconnection Facility and SPP Interconnector which shall match with the protection scheme and type of relays as used in TNB Interconnection Facility connected with the SPP Interconnection Facility and SPP Interconnector.

#### **D4.2 Basic Criteria Requirement**

The main protection system design criterions to be considered for the SPP Interconnection Facility, SPP Interconnector and SPP Works are fast, dependable, secure, selective, sensitive, simple and economic. Other engineering design considerations to be adhered to are maintainable, available, safe and in compliance with statutory and regulatory requirements. The details of the criteria are as set forth in the latest Transmission Design Philosophy and Guidelines (Protection and Control).

#### **D4.3 Fault Clearing Time Requirement**

The maximum fault clearing time requirement for the SPP Interconnection Facility, SPP Interconnector and SPP Works shall follow the maximum fault clearing time table as described in the latest TNB Transmission Design Philosophy and Guidelines (Protection and Control).

#### **D4.4 Reliability Requirement**

- (1) The protection system shall be blocked for any malfunction in a single failure of the relay element.

- (2) The protection system shall not mal-operate due to the following phenomena:
- Radio noise;
  - Surge during primary equipment switching and lightning;
  - DC voltage fluctuation or fault on DC supply circuit;
  - DC earth fault;
  - Capacitive coupling on DC circuit;
  - Mixture of DC and AC circuits;
  - Abnormal phenomena on capacitor voltage transformer (Ferro Resonance);
  - Fault current with harmonic distortion;
  - Induced voltage and/or current on transmission line;
  - Current transformer saturation; and
  - Telecommunication system disturbance or fault.
- (3) Both main and backup protection relays shall not lose their functions simultaneously due to the following:
- A single hardware failure of the relay or the peripheral equipment;
  - Any relay malfunction; and
  - Any disturbance happening inside the relay.

#### D4.5 Protection Scheme Requirement

- (1) The protection scheme at the SPP Interconnection Facility, SPP Interconnector and SPP Works shall be generally divided into two relaying classes, which are described below in Table 1:

| Relaying Class | Functions and Characteristics   |
|----------------|---|
| Main           | The protection equipment that is given the priority to initiate fault clearance or an action to terminate an abnormal condition in a power system.  |
| Backup         | The protection equipment that is intended to operate when a system fault is not cleared, or abnormal condition not detected, in the required time because of failure or inability of other protection to operate, or failure of the appropriate circuit breaker(s) to trip. |

Table 1

- (2) The numerical unit protection as main protection scheme shall be used in the SPP Interconnection Facility, SPP Interconnector and SPP Works for the Transmission Lines and shall have, without limitation, as described in the latest Transmission Design Philosophy and Guidelines.
- (3) All transformers connected at the SPP Interconnection Facility, SPP Interconnector and SPP Works shall be provided with main protections

which has different operating principles in accordance with Section 9: Transformer Protection of the latest Transmission Design Philosophy and Guidelines. All other interconnecting equipment, e.g. power cable to LV switchgear, etc. to the transformer shall be protected by their relevant protection system.

- (4) The busbar at both the SPP Interconnection Facility and TNB Interconnection Facility shall be adequately protected in accordance with Section 13: Busbar Protection of the latest Transmission Design Philosophy and Guidelines.
- (5) The back-up protection relays shall be used in the SPP Interconnection Facility and SPP Interconnector and shall have, without limitation, the functionality as described in the latest Transmission Design Philosophy and Guidelines.
- (6) The bus coupler and bus section at both the SPP Interconnection Facility and TNB Interconnection Facility shall be able to perform bus separation function in accordance with Section 10: Bus Coupler and Bus Section Protections of the latest Transmission Design Philosophy and Guidelines.
- (7) The SPP Interconnector and SPP Works shall comply with the latest Transmission Design Philosophy and Guidelines (Protection and Control) and the following:
  - (a) Type of protective relay shall be in accordance with the latest TNB Protection Accepted Relay List.
  - (b) SPP shall provide direct optical fibre links (complying with ITU-T G.652D single-mode optical fibre standard) or PCM Multiplexer with 2 pairs shielded twisted pair armoured cables with individual pair screened for main unit protection scheme in accordance with TNB ICT Telecommunication Guideline.
- (8) The current and voltage transformers for the SPP Interconnection Facility, SPP Interconnector and SPP Works shall be designed in accordance with the latest TNB Transmission Design Philosophy and Guidelines (Protection and Control).
- (9) Unless otherwise specified, SPP shall provide TNB with the detailed calculations showing that the CT dimension and characteristics are adequate for the protection system application in the SPP Interconnection Facility, SPP Interconnector and SPP Works. Such detailed calculations shall be subject to TNB's review and endorsement.
- (10) TNB shall furnish the SPP the list (i) the latest Transmission Design Philosophy and Guidelines (Protection and Control), (ii) the latest TNB ICT Telecommunication Guideline (iii) the latest TNB Protection Accepted Relay List, subject to the effectiveness of this Agreement in accordance with Clause 3.1 of this Agreement, but no later than thirty (30) days upon receipt by TNB of SPP's written request.

**D4.6 Inter Tripping Requirements**

- (1) The SPP Interconnection Facility and SPP Interconnector shall be provided with facilities to initiate various transfers of tripping signal such as direct transfer tripping released by breaker failure, busbar protection etc. Direct transfer intertrip facilities shall not be integrated with current differential relay.
- (2) Inherent differential intertripping shall be provided. The inherent intertripping shall be issued when current differential function/element operated to emphasise/ensure successful remote end intertrip.

**D4.7 Circuit Breaker Failure Protection Requirements**

Circuit breaker fail protection shall be provided by SPP for all 132kV circuit breakers at the SPP Interconnection Facility, SPP Interconnector and SPP Works which shall comply with Chapter 14: Circuit Breaker Failure Protection of the latest Transmission Design Philosophy and Guidelines (Protection and Control).

**D4.8 Auto Reclose and Synchronizing Scheme Requirements**

- (1) For overhead line feeders at the SPP Interconnection Facility, SPP Interconnector and SPP Works shall be equipped with auto re-close facilities to enhance system stability and increase overall system availability after clearance off transient fault. The auto re-close and synchronizing scheme shall be designed to coordinate with auto re-close scheme at the TNB Interconnection Facility in accordance with TNB requirement which shall comply with Chapter 17: Auto Re-closing and Synchronising Scheme of the latest Transmission Design Philosophy and Guidelines.
- (2) All backup protection relays/elements shall not initiate auto re-close. All main protection relays shall be able to initiate auto re-close cycle.
- (3) Manual synchronizing facilities shall be provided for all 132kV circuit breakers.
- (4) Suitable running voltage references may be obtained from the busbar voltage transformer.

**D4.9 DC System Requirements**

- (1) The SPP Interconnection Facility, SPP Interconnector and SPP Works shall be designed with a reliable source of auxiliary power for the secondary equipment including protection and control functions which shall comply with Chapter 31: Substation DC System of the latest Transmission Design Philosophy and Guidelines.

- (2) Protection D.C circuits for each bay with duplicate trip coils shall provide a level of redundancy, i.e. two protection circuits. A single failure of D.C circuit should not disable the protection functions.
- (3) Busbar protection and circuit breaker failure schemes should be provided with an independent D.C circuit.
- (4) Each protection D.C circuits shall be independent and separate from other DC circuit. Each bay at the SPP Interconnection Facility shall be provided with independent and separate DC circuits for protection.

#### **D4.10 Protection Settings Requirements**

- (1) All the protection settings calculation and coordination for the SPP Interconnection Facility, SPP Interconnector and SPP Works shall be done by SPP.
- (2) All Protection setting and coordination of the SPP Interconnection Facility, SPP Interconnector and SPP Works including all pertinent data shall be made available to TNB for review.
- (3) SPP shall implement and test the relay setting at the SPP Interconnection Facility, SPP Interconnector and SPP Works pursuant to Clause 9.5 of this Agreement.
- (4) Protection devices and equipment for the SPP Interconnection Facility, SPP Interconnector and SPP Works (including the communication facilities for the protection system) shall be consistent and compatible with TNB's local system configuration.

#### **D4.11 Operations and Maintenance Requirements**

- (1) Maintenance of the protection equipment at the Interconnection Point shall be coordinated between TNB and SPP. The maintenance test procedure shall be consistent with Prudent Utility Practices.
- (2) For all tripping involving the 132kV circuit breakers interconnected with the SPP Interconnection Facility, SPP Interconnector and SPP Works, an investigation to determine the cause of the protection device operation shall be carried out and coordinated between TNB and SPP.
- (3) For trippings at the SPP Interconnection Facility and SPP Interconnector that contribute to major disturbances to the Grid System, a joint investigation by TNB and SPP shall also be carried out.
- (4) TNB reserves the right to inspect, at any time all of the protection devices, including protection relays, circuit breakers, etc. at the SPP Interconnection Facility and SPP Interconnector upon reasonable notice to SPP.



- (5) SPP shall not work upon or alter any busbar protection or circuit breaker failure without the prior written approval of the GSO. The GSO shall be informed of the details of the work to be done (when required) before the start of the work and such work shall be in accordance with the requirements of OC2 of the Grid Code.

## **D5.0 TELECONTROL**

### **D5.1 General**

The telecontrol system in a typical TNB substation facilitates the network level control and monitoring of the plant within the substation by the National Load Despatch Center (NLDC) through the provision of remote terminal unit (RTU) and associated SCADA interfacing facilities, or through a substation control system (SCS). A telecontrol system comprising of an SCS additionally provides station and bay level control and monitoring.

The paragraphs in this section specifies the technical requirements for the provision of the telecontrol system of the TNB Interconnection Facility as well as the TNB substations affected as a consequence of the generation and transportation of electrical energy from the Facility in an interconnected mode with the Grid System.

The telecontrol requirements in this section are based on the manner in which the Facility is connected to the Grid System as defined by the clauses in paragraph D1.0 of this Appendix D which are summarised as follows;

- (i) Bay Extension: Extension and modification of the existing telecontrol system in the existing TNB Interconnection Facility to facilitate transfer of energy through the new SPP Interconnector. (Please refer to Figure 1 in paragraph D1.2)
- (ii) New TNB Interconnection Facility: Establishment of a complete telecontrol system at the new TNB Interconnection Facility. (Please refer to Figure 2 in paragraph D1.2)
- (iii) LILO Relay Retrofit: Extension and modification of the existing telecontrol system in existing TNB's substations at the remote end of the TNB Interconnection Facility impacted by the LILO works on the Transmission Lines to facilitate the transfer of energy from the Facility. The extension and modification of the existing telecontrol system shall be to accommodate the retrofitting of the protection relays that may arise from the Transmission Lines' LILO works. (Please refer to Figure 2 in paragraph D1.2)

All telecontrol associated works shall comply with all the relevant technical requirements for telecontrol system and associated equipment are specified in the latest version of the following TNB Technical Specifications: -

| Doc No      | Title   | Current Revision | Revision Date              |
|-------------|---|------------------|----------------------------|
| TTS-TK-RTU  | Remote Terminal Unit (RTU)                        | 0                | 22 <sup>nd</sup> June 2010 |
| TTS-TK-NCC  | Network Control Center (SCADA Requirements)       | 2                | 16 <sup>th</sup> Apr 2013  |
| TTS-TK-SIP  | Supervisory Interface Panel (SIP)                 | 0                | 19 <sup>th</sup> Apr 2010  |
| TTS-TK-AXQ  | Telecontrol Auxiliary Equipment                   | 0                | 15 <sup>th</sup> Sep 2015  |
| TTS-TK-SGW  | IEC 61850 Based SCADA Gateway                     | 0                | 16 <sup>th</sup> Mar 2010  |
| TTS-TK-SLOI | IEC 61850 Based Station Level Operator Interface  | 0                | 16 <sup>th</sup> Mar 2010  |
| TTS-TK-ESM  | IEC 61850 Managed Ethernet Switch For Telecontrol | 0                | 7 <sup>th</sup> Jul 2015   |

## D5.2 Telecontrol requirements for new TNB Interconnection Facility

Establishment of a complete and new telecontrol system shall be required for the new TNB Interconnection Facility.

The telecontrol scope of work for the new TNB Interconnection Facility includes the provision of all required facilities for the supervisory control and monitoring of the TNB Interconnection Facility by the Control centre, in accordance with the Transmission SCADA signal list as specified in the latest TNB Transmission Technical Specification Network Control Centre SCADA Requirements (TTS-TK-NCC).

The scope shall include, but not limited to, the following: -

- (a) Supply, install and configure one complete set of fully functional TNB approved RTU configured for communication with the Control Centre using IEC 60870-5-101 protocol via 2 nos. of V.28 ports in main/standby or redundant channel configuration and IEC 60870-5-104 protocol on TCP/IP ethernet transport with 2 nos. of ethernet RJ-45 complete with surge protectors. The RTU shall be powered from substation 110Vdc supply. The RTU shall be equipped with GPS receiver for RTU time synchronization, complete with surge protectors. All RTU configuration and diagnostic software shall be provided.
- (b) Supply and install one complete set of supervisory interface panel(s) (SIP).
- (c) Supply and install one complete set of wall-mounted communications interface box (H: 310mm X W: 255mm X L: 180mm) for end-point termination to TNB telecommunication system, complete with disconnect type terminal blocks, cable ducting, labels and other accessories as required.
- (d) Supply and install all the cables necessary between the RTU and SIP(s) and all associated equipment as required, complete with all hardware necessary for cable installation work such as cable glands, ferrules,

markers, wiring, connectors, cable trays, cable ladders, cable ducts and other accessories as required.

- (e) Supply and install all the cables between the SIP(s) and the equipment in the substation, complete with all hardware necessary for cable installation work such as cable glands, ferrules, markers, wiring, connectors, cable trays, cable ladders, cable ducts and other accessories as required.

**D5.3 Telecontrol requirements for bay extension or relay retrofitting works at the existing TNB Interconnection Facility and/or in existing TNB's substations at the remote end of the new TNB Interconnection Facility**

The telecontrol requirement for bay extension or relay retrofitting works in the existing TNB Interconnection Facility is dependent on the type of telecontrol system installed at the TNB Interconnection Facility and/or in existing TNB's substations at the remote end of the new TNB Interconnection Facility, either RTU-based or SCS-based telecontrol system.

**D5.3.1 Substation with RTU-Based Telecontrol System**

For an RTU-based substation, the scope of work shall include the expansion, modification and reconfiguration of the existing telecontrol system comprising of the RTU, SIP and all associated supervisory interfacing facilities, as necessary to facilitate the network-level monitoring and control of the new bays or relays, and associated plant.

The scope shall include but not limited to, the following: -

- (a) Expand, modify and configure the existing RTU, as necessary with all required hardware and software to complete, such as panels, sub-racks, etc for the RTU to function. For supervisory control, the interfacing scheme shall be the same as in the existing plant.
- (b) Expand and modify the existing SIP(s) including the supply and installation of all hardware such as terminal blocks, labels, wiring, connectors, and other accessories as necessary. For bay extension works, a complete set of new SIP(s) shall be provided. For relay retrofitting works, the existing SIP may be modified to include new terminal rails, blocks and accessories if there are no space constraints within the existing panel, otherwise a complete set of new SIP(s) shall be provided.
- (c) Supply and install all cables necessary between the RTU and SIP(s), and all associated equipment as required, complete with all hardware necessary for cable installation work such as cable glands, ferrules, markers, wiring, connectors, cable trays, cable ladders, cable ducts and other accessories as required.
- (d) Supply and install all the cables between the SIP(s) and substation as required, complete with all hardware necessary for cable installation

work such as cable glands, ferrules, markers, wiring, connectors, cable trays, cable ladders, cable ducts and other accessories as required.

### **D5.3.2 Substation with SCS-Based Telecontrol System**

For an SCS-based substation, the scope of work shall include the expansion, modification and reconfiguration of the existing SCS system, as necessary to facilitate the network-level, station-level and bay-level monitoring and control of the new bays or relays and associated plant. The majority of the SCS installed in TNB Interconnection Facility comprises mainly of older legacy-based SCS with its own proprietary protocol. The new generation of SCS is based on the IEC 61850-based SCS.

#### **A. Telecontrol Requirements for Bay Extension in Legacy SCS substations**

All legacy SCS have been declared obsolete by their manufacturers. Therefore for legacy SCS substation, the addition of new bays shall require the supply and installation of a new IEC61850-based SCS for the new bays, which shall integrate with the existing legacy SCS to provide network level, station level and bay level control and monitoring of the new bays and station level monitoring of the existing plant.

The telecontrol scope of work shall include:

- (i) Implementation of new IEC61850 SCS for the new bays. This shall include, but not limited to, the following : -
  - (a) Supply, install and configure one complete set of TNB approved IEC 61850 bay controller IED and I/O IED, inclusive of input and output modules for the safe, secure and reliable network, station and bay level control and monitoring of the each of the new bay, as necessary with all required hardware and software for bay level to fully function. It shall include all necessary switches and circuits to facilitate coordination between bay, station and network level control. The bay controller IED and I/O IED shall be installed in the respective control and relay panels.
  - (b) Supply, install and configure one complete set of TNB approved IEC 61850 based substation station level operator Interface (SLOI) to facilitate safe, secure and reliable station level control and monitoring of the new bays, and station level monitoring of the existing plant in the substation. It shall come complete with a complete set of operator's desk console.
  - (c) Supply, install and configure one complete set of TNB approved IEC 61850 based substation SCADA gateway (SGW) for network level control and monitoring of the new bays. The SGW shall be configured for: -

- network control centre communication using IEC 60870-5-101 protocol with 2 nos. of V.28 ports in main/standby or redundant complete with surge protectors; and
  - network control centre communication using IEC 60870-5-104 protocol on TCP/IP ethernet transport with 2 nos. of Ethernet RJ-45 complete with surge protectors.
- (d) One complete set of wall-mounted communications interface box (H: 310mm X W: 255mm X L: 180mm) shall be provided for end-point termination to TNB's telecommunication system, complete with disconnect type terminal blocks, cable ducting, labels and other accessories as required.
- (e) Supply, install and configure one complete set of TNB approved IEC 61850 based substation proxy server (PSVR) to allow the integration of systems and peripheral devices such as existing legacy SCS that do not support IEC 61850 communication. It shall support communication to such systems and devices via, as a minimum and not limited to, the following protocols: -
- IEC 60870-5-101 communication
  - IEC 60870-5-104 communication
- (f) Supply, install and configure one complete set of TNB approved IEC 61850 based substation time server (STS) using SNTP for time synchronizing of all of the above IEC61850 telecontrol devices.
- (g) Supply, install and configure station level IEC 61850 local area network (LAN) with TNB approved IEC 61850 based substation managed ethernet switches (ESM) in RSTP ring topology communication.
- (h) Supply and install all the cables necessary for interfacing between Bay Controller IED, I/O IED, SLOI, SGW, PSVR, STS and IEC 61850 LAN, its peripheral devices, and all associated equipment as required, such as fibre optic cable, CAT5/CAT5e cable, power cable complete with all hardware necessary for cable installation work such as cable glands, ferrules, markers, wiring, cable connectors, cable trays, cable ladders, cable ducts as required.
- (i) All the equipment supplied shall be housed in panels complete with all the required hardware and software, as necessary, such as sub-racks, panel, etc to fully function. All equipment shall be powered from 110VDC station.
- (j) All equipment provided shall be equipped with adequate surge protectors to protect the equipment from surges arising from its power cable, communication cables and antenna cables, where appropriate.

- (k) Supply one complete set of tools and software necessary to engineer, configure and maintain the SLOI, SGW, PSVR, STS, ESM and all other associated equipment.
- (ii) Expansion, modification, re-engineering and configuration of the legacy SCS to facilitate integration with the new IEC61850 SCS.

**B. Telecontrol Requirements for Relay Retrofit in Legacy SCS substations**

For relay-retrofitting works, existing I/O spare capacity may be used for the new signals if available. Otherwise, if new hardware is required for the new signals, the existing legacy SCS shall be expanded with new additional legacy I/O modules if available or with the SCS manufacturer's compatible I/O unit which has the capability of being integrated into the legacy SCS. Therefore, the telecontrol scope of work for relay-retrofitting works in a legacy SCS substation shall be to expand, modify and reconfigure the existing SCS as necessary, which shall include as a minimum, the supply and installation of all required equipment, modules, cabling and interfacing necessary to facilitate network level, station level and bay level control and monitoring of the substation.

**D6.0 REQUIREMENTS FOR CONTROL CENTRE**

**D6.1 General**

SPP shall exchange all the signals required for power system operations with the Control Centre. This shall include the control and monitoring systems of the Facility (including the Meteorological Measuring Facilities (MMF)), the SPP Interconnection Facility, the SPP Interconnector and TNB Interconnection Facility.

Power system data and signals exchanged directly between the Facility (including the MMF), the SPP Interconnection Facility, the SPP Interconnector and TNB Interconnection Facility and the Control Centre shall be via redundant direct telecommunication channels using the IEC 60870-5-104 protocol.

SPP shall submit proposed signal lists of the control and monitoring systems of the Facility (including the MMF), the SPP Interconnection Facility, the SPP Interconnector and TNB Interconnection Facility for TNB's review. The proposed signal lists shall be included in the conceptual design report pursuant to Clause 9.3(b) of this Agreement and shall be submitted in accordance to the timeframes therein. The final signal lists shall be discussed and mutually agreed between SPP and TNB.

**D6.2 Control Centre Data Interfacing Standards for Energy Management System**

- (1) SPP shall provide all the relevant control and signalling logics described in the latest "NLDC Interfacing Guidelines for EMS" and the latest TNB Transmission Technical Specification Network Control Centre SCADA

Requirements (TTS-TK-NCC) specification document for the Control Centre automated functions stated in paragraph D6.1 above.

- (2) To avoid the reporting of repetitive limit alarms when measured values are at or near operation boundaries the Facility, the SPP Interconnection Facility and SPP Interconnector and TNB Interconnection Facility shall support hysteresis processing of the relevant measured values.

### **D6.3 Data Requirements for SPP Interconnection Facility, SPP Interconnector and SPP Works**

The signals required for monitoring and control of the SPP Interconnection Facility, the SPP Interconnector and the TNB Interconnection Facility shall be provided in accordance with the latest TNB Transmission Technical Specification Network Control Centre SCADA Requirements (TTS-TK-NCC) specification document. SPP shall request from TNB the latest TNB Transmission Technical Specification Network Control Centre SCADA Requirements (TTS-TK-NCC) specification document.

## **D7.0 TELECOMMUNICATION REQUIREMENTS OF THE FACILITY, SPP INTERCONNECTION FACILITY AND TNB INTERCONNECTION FACILITY**

### **D7.1 General**

The telecommunication requirements in this section are based on the manner in which the Facility is connected to the Grid System as defined by the clauses in paragraph D1.0 of this Appendix D which are summarised as follows:

- (i) Bay extension: Extension and modification of the existing telecommunication system in the existing TNB Interconnection Facility to facilitate transfer of energy through the SPP Interconnector. (Please refer to Figure 1 in paragraph D1.2)
- (ii) New TNB Interconnection Facility: Establishment of a complete telecommunication system at the new TNB Interconnection Facility. (Please refer to Figure 2 in paragraph D1.2)
- (iii) LILO relay retrofit: Extension and modification of the existing telecommunication cables and system in existing TNB's substations at the remote end of the TNB Interconnection Facility impacted by the LILO works on the Transmission Lines to facilitate the transfer of energy from SPP. The extension and modification of the existing telecommunication cables and system shall be to accommodate the retrofitting of the protection relays and other signalling requirements that may arise from the Transmission Lines' LILO works. (Please refer to Figure 2 in paragraph D1.2)

Telecommunication equipment supplied shall be in compliance with the latest TNB ICT Telecommunication Guidelines.

Subject to the effectiveness of this Agreement in accordance with Clause 3.1 of this Agreement, TNB shall furnish to SPP the said above documents no later than thirty (30) days upon receipt of SPP's written request.

#### **D7.2 Telecommunication Transmission Media**

Transmission media shall be by way of optical fibre cables. Two (2) numbers of fibre optic cables (complying with ITU-T G.652D single-mode optical fibre standard), each consisting of 48 core single mode fibres, shall be installed by SPP between the telecommunication room in the Facility, the telecommunication room in the SPP Interconnection Facility, the telecommunication room in the TNB Interconnection Facility and up to the new LILO point for successful performance of the Control Centre functions mentioned in D6.0 above.

Optical fibre properties shall comply with the TNB ICT Telecommunication Guidelines. The installation of fibre optic cables, joint closures, patch panels, and accessories shall comply with the TNB ICT Telecommunication Guidelines.

#### **D7.3 Telecommunication Room**

SPP shall provide telecommunication room at the Facility, the SPP Interconnection Facility and TNB Interconnection Facility. The telecommunication rooms for the TNB Interconnection Facility shall comply with the latest version of TNB ICT Telecommunication Guidelines.

#### **D7.4 Telecommunication Equipment**

Telecommunication equipment used for the TNB Interconnection Facility shall comply with the latest version of TNB ICT Telecommunication Guidelines. Equipment that is required to interface with TNB's existing equipment shall match such existing equipment pursuant to paragraph D2.1(d) of this Appendix D.

SPP shall propose telecommunication equipment configurations for approval by TNB based on the following but not limited to:

(i) utility synchronous digital hierarchy (SDH) equipment and teleprotection equipment (TPE);

or

(ii) synchronous digital hierarchy (SDH) equipment, access multiplexer equipment and teleprotection equipment (TPE)

Telecommunication equipment shall be provided by SPP in the telecommunication rooms at the Facility, at the SPP Interconnection Facility and at the TNB Interconnection Facility.

Any modification, changes or replacements to the telecommunication equipment required at the existing TNB Interconnection Facility and/or in existing TNB's substations at the remote end of the new TNB Interconnection Facility shall be provided by SPP pursuant to paragraph D2.1(d) of this Appendix D.



**D7.4.1 Routers and Switches**

48V DC powered routers with a minimum of three (3) ethernet interfaces shall be provided for connectivity with TNB telecommunication network at the Facility, SPP Interconnection Facility and TNB Interconnection Facility.

Minimum 24 ports 48V DC powered switches with RJ45 interfaces shall be provided for telecontrol, telemetry, power quality recording and other operational services at the Facility, SPP Interconnection Facility and TNB Interconnection Facility.

Routers and switches shall be installed on a separate 42U height rack or cabinet.

**D7.4.2 DC Chargers and Batteries**

Dual 48V DC chargers and batteries of sufficient capacity to power the load, charge batteries and for future expansion shall be provided at the Facility, SPP Interconnection Facility and TNB Interconnection Facility and in compliance with the latest version of TNB ICT Telecommunication Guidelines. Sealed lead acid batteries shall be installed in an air-conditioned room.

**D7.5 Telecommunication services to be made available:****D7.5.1 Teleprotection**

Digital protection signalling equipment shall be provided for command type protection schemes in compliance with the latest TNB ICT Telecommunication Guideline. Each protection relay shall be provided with either one of the following cables, pursuant to paragraph D4.5(7) of this Appendix D:

- (i) 2 pairs shielded twisted pair armoured cables with individual screening of each pair;

or,

- (ii) fibre optic patch cords protected by armoured PVC sheath flexible corrugated conduit.

**D7.5.2 Telecontrol**

Provision of telecontrol telecommunication service shall comply with TNB Technical Specification and Transmission design practices.

**D7.5.3 Control Centre Operations**

Highly secured and reliable data communications are required for control centre operational functions in D6.0 above. Telecommunication channels shall be provided between the Facility, SPP Interconnection Facility and the Control Centre and to other control centres as specified by the Grid System Operator. Communication shall be routed through the secured TNB's telecommunication

network. The Facility, SPP Interconnection Facility and the TNB's telecommunication network shall be physically and logically segregated for secure cyber operations and ease of operations and maintenance.

#### **D7.5.4 Voice Communication**

Highly reliable voice communication is required for load despatching and switching. The voice communication link shall be established between the Facility, SPP Interconnection Facility and the Control Centre.

The voice communication services to be made available at the Facility's control room, the SPP Interconnection Facility's control room and TNB Interconnection Facility's control room are as follows:

- (a) One 'hot-line' telephone connection using TNB's telecommunication network connecting the Facility's control room, SPP Interconnection Facility's control room and the Control Centre and other control centres as specified by the Grid System Operator.
- (b) One dedicated telephone connection using public telecommunication network connecting the Facility's control room, SPP Interconnection Facility's control room and the Control Centre.

#### **D7.6 Installation, Testing and Commissioning of Telecommunication Cables and Equipment**

Installation, testing and commissioning of the telecommunication cables and equipment shall comply with the latest version of TNB ICT Telecommunication Guidelines and manufacturer's recommendation.

#### **D7.7 Maintenance of the Telecommunication Cables and Equipment**

SPP shall maintain all telecommunication cables and equipment installed within the Facility and SPP Interconnection Facility. Fibre optic cables connectivity between the Facility, the SPP Interconnection Facility and TNB Interconnection Facility shall also be maintained by SPP. In the event of any disruption of telecommunication services, SPP shall take immediate actions to restore the telecommunication services within eight (8) hours.

TNB shall not be responsible for the maintenance of SPP's telecommunication cables and equipment (including associated equipment and accessories) as envisaged under D7.0 which is owned and maintained by SPP. However, TNB shall be entitled to require maintenance reports to be submitted by SPP periodically.

### **D8.0 POWER QUALITY REQUIREMENTS**

#### **D8.1 Power Quality Performance at the Interconnection Point**

The connection of the Facility's generation system inclusive of its associated auxiliary system) with the Grid System, at any time, shall not cause any reduction in

the quality of service at the Interconnection Point(s). Detail performance requirements and field measurement tests for power quality at the Interconnection Point are described more fully in paragraph B3.11 in Appendix B of this Agreement.

#### **D8.2 Power Quality Recorders at the TNB Interconnection Facility**

SPP shall provide and install power quality (PQ) recorders for PQ monitoring of each feeder bay of the SPP Interconnector at the TNB Interconnection Facility and shall meet the requirements of IEC 61000-4-30 (and its amendments) for a class A device. The PQ recorders shall be located in the control panel for each feeder bay of the SPP Interconnector at the TNB Interconnection Facility.

SPP shall provide remote communications to the PQ recorders but not limited to signal cabling from the PQ recorders to the telecommunications equipment in the TNB Interconnection Facility. SPP shall also provide GPS based time synchronization for the PQ recorders.

The PQ recorders shall be capable of continuous monitoring of the Interconnection Point for the following PQ parameters including but not limited to voltage harmonics (up to the 50<sup>th</sup> order), phase voltage unbalance, voltage fluctuation and flicker, current harmonics, and DC injection. The PQ recorders shall have event triggering capability, be provided with Global Positioning System (GPS) based time synchronised and shall be made remotely accessible via TNB network at all times. The PQ recorders shall be able to display all the signals above including all the event trigger signals. SPP shall provide TNB with a licensed copy of the PQ recorders' interfacing software.

#### **D8.3 Current Transformer (CT) and Inductive Voltage Transformer (IVT) requirement for Power Quality Recorders at the TNB Interconnection Facility**

SPP shall provide CT core of class 0.2 and IVT secondary winding of class 0.2 for instrumentation at each feeder bay of the SPP Interconnector at the TNB Interconnection Facility, in order to accommodate the higher accuracy requirement of the PQ recorders.

The PQ recorders at the TNB Interconnection Facility shall be connected to such CT core and IVT secondary winding meant for instrumentation.

#### **D9.0 ENERGY ACCOUNTING AND METERING EQUIPMENT REQUIREMENTS**

The Net Electrical Output (in kWh) delivered to TNB shall be measured by the TNB Metering Equipment as more specifically described in Appendix C of this Agreement. The TNB Metering Equipment shall be located within the TNB Interconnection Facility to be connected to the Facility.

The TNB Metering Equipment shall consist of one main and one back-up system, which shall have the same configuration.

**D9.1 Current Transformer (CT) and Inductive Voltage Transformer (IVT) requirement for TNB Metering Equipment**

SPP shall install separate sets of CT and “IVT for main and back-up system of the TNB Metering Equipment at the feeder bay of the SPP Interconnector and as more specifically described in paragraph C3.0 in Appendix C of this Agreement.

CT and IVT shall be supplied and installed shall be used exclusively for metering purposes only.

SPP shall, upon expiry of the warranty period as set out in Clause 14.2(c) of this Agreement and pursuant to paragraph C3.1.7 in Appendix C of this Agreement, handover and deliver such spare CT and IVT (3-units each) to TNB at such site designated by TNB.

FOR REF PURPOSES ONLY

**APPENDIX E**

**TECHNICAL REQUIREMENTS OF THE METEOROLOGICAL MEASURING FACILITIES**

FOR RFP PURPOSES ONLY

**E1.0 GENERAL****E1.1 Definitions**

All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.

**E1.2 General**

E1.2.1 SPP shall install the Meteorological Measuring Facilities ("MMF"), which shall comprise of the following but not limited to:

- (a) at least one (1) set of pyranometer for every 10MW of plant size at appropriate locations suitably distributed within the solar photovoltaic arrays area of the Facility;
- (b) at least one (1) set of full weather station for every 10MW of plant size at appropriate locations suitably distributed within the solar photovoltaic arrays area of the Facility;
- (c) a secure communication link to the Control Centre in order to provide TNB with online access to the MMF signals data described in paragraph E1.4.1 at all times; and
- (d) both main and backup power supplies for the MMF and the secure communication link to the Control Centre,

for the purpose of monitoring meteorological conditions including but not limited to solar irradiance at the Facility.

E1.2.2 The MMF and secure communication link to Control Centre shall be available at all times including periods of shutdown and outage of the Facility, the SPP Interconnection Facility, the SPP Interconnector and/or the TNB Interconnection Facility and during any periods of disconnection of the Facility, the SPP Interconnection Facility, the SPP Interconnector and/or the TNB Interconnection Facility from the Grid System.

E1.2.3 SPP shall include the MMF and associated equipment in the conceptual design report of the Facility pursuant to Clause 9.3(b) of this Agreement, which shall be in accordance to the requirements of this Appendix E and shall include but not limited to the elevation of the meteorological collection devices as well as the location, elevation and orientation angles of the solar panels.

**E1.3 Backup power supplies for the Meteorological Measuring Facilities (MMF) and secure communication link**

E1.3.1 The backup power source for the MMF and the secure communication link to the Control Centre shall be independent of supply from the Grid System. The backup power source must be capable of providing power continuously to the MMF and secure communication link to Control Centre until the primary power source is reasonably expected to be restored.

**E1.4 Data and signals requirement of the Meteorological Measuring Facilities (MMF)**

E1.4.1 No later than the Initial Operation Date and throughout the Term, SPP shall provide to TNB, with online access to the MMF data on real time basis via the secure communication link to the Control Centre. The MMF real time data collected by the supervisory control and data acquisition (SCADA) of the Facility shall include the following but not limited to:

- total global horizontal irradiance or direct normal insolation;
- global irradiation on the module plane;
- total global radiation;
- air ambient temperature;
- wind speed;
- wind direction;
- standard deviation of wind direction;
- relative humidity;
- precipitation;
- barometric pressure; and
- any other data that would be reasonably applicable, which shall be mutually agreed by both Parties.

E1.4.2 For any month in which the above information in paragraph E1.4.1 and/or online access to the Control Centre for such information becomes unavailable to TNB, SPP shall notify the Control Centre and take immediate actions to restore the availability of such information and/or online access to the Control Centre. SPP shall also provide a report to TNB no later than twenty-four (24) hours of the occurrence of such unavailability, describing the nature of such unavailability and remedial actions to restore the availability of information and/or online access to the Control Centre. Upon TNB's request, SPP shall promptly provide to TNB any additional and supporting documentation necessary for TNB to audit and verify any matters set forth in the report. TNB shall exercise reasonable efforts to notify SPP of any deficiency by SPP in meeting the requirements of paragraph E1.4.1 provided that any failure by TNB to provide such deficiency notice shall not result in any additional liability to TNB under this Agreement. During unavailability of the above information in paragraph E1.4.1 and/or online access to the Control Centre for such information becomes unavailable to TNB, SPP shall transmit data to TNB through alternate means of communication (i.e., cellular communications from onsite personnel, facsimile, or equivalent mobile e-

mail) and as agreed by TNB and/or the Grid System Operator.

E1.4.3 For any occurrence in which SPP's telecommunications system is not available or does not provide quality data from the MMF and TNB notifies SPP of the deficiency or SPP becomes aware of such occurrence, SPP shall transmit data to TNB through alternate means of communication (i.e., cellular communications from onsite personnel, facsimile, or equivalent mobile e-mail) and as agreed by TNB and the Grid System Operator until the telecommunications link is re-established. SPP shall take immediate actions to restore the availability of the SPP's telecommunication system.

E1.4.4 SPP shall maintain at least a minimum of one hundred and eighty (180) days' historical data for all data required pursuant to paragraph E1.4.1, which shall be available on a minimum time interval of half hour basis or a half-hourly average basis. SPP shall provide such data to TNB and/or the Grid System Operator within five (5) Business Days of TNB's and/or the Grid System Operator's request.

**E1.5 Maintenance of the Meteorological Measuring Facilities (MMF)**

E1.5.1 SPP shall maintain and ensure the continuous availability of the secure communication link in order to provide TNB with access to the data required in paragraph E1.4.1 at all times.

E1.5.2 SPP shall maintain the MMF, the secure communication link and associated equipment necessary to provide accurate data to TNB. SPP shall promptly repair and replace as necessary any component of the MMF, the secure communication link and associated equipment and shall notify TNB and/or the Control Centre as soon as SPP becomes aware of any occurrence of equipment failure or that the data being provided to TNB is faulty or incorrect.

E1.5.3 If TNB notifies SPP that the MMF data being provided to TNB is faulty or incorrect, the SPP shall maintain, repair or replace such equipment immediately but no later than five (5) days of receipt of such notice.



**APPENDIX F**

**OPERATION AND MAINTENANCE**

FOR REF PURPOSES ONLY

**F1.0 General**

All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.

**F1.1 Operation and Maintenance of the Facility**

F1.1.1 SPP shall operate and maintain the Facility in accordance with (i) the requirements of this Agreement, (ii) the operating and maintenance standards recommended by the EPCC Contractor in the relevant manuals provided to it, (iii) the Design Limits and (iv) Prudent Utility Practices.

F1.1.2 The operation of the intertie and/or synchronizing circuit breaker shall occur under the direction of the GSO.

F1.1.3 SPP shall operate the Facility in parallel with the Grid System during the Term.

F1.1.4 All solar photovoltaic energy delivered by SPP to TNB from the Facility shall have, at the Interconnection Point, the solar photovoltaic energy characteristics as set forth in Appendix B.

F1.1.5 Throughout the Term, SPP shall maintain (i) a maintenance log setting forth, inter alia, all maintenance and inspection works performed on the Facility, (ii) an operations log in accordance with Clause 12.5 of this Agreement and (iii) any other records customarily maintained by solar power producers and operators of solar photovoltaic energy generating facilities.

**F1.2 Planned Outages**

F1.2.1 At least ninety (90) days prior to the Commercial Operation Date, and thereafter not later than ninety (90) days before the end of each Contract Year, SPP shall submit (i) a proposed schedule (the "Proposed Maintenance Schedule") of the planned outages, the Declared Annual Quantity and the Annual Generation Profile for the following one (1) Contract Year and (ii) an indicative schedule (the "Indicative Maintenance Schedule") of the planned outages, the Declared Annual Quantity and the Annual Generation Profile for four (4) Contract Years following the one (1) Contract Year to which the Proposed Maintenance Schedule applies. The Proposed Maintenance Schedule and the Indicative Maintenance Schedule shall include the number of planned outages and the reasons therefor and the earliest and latest start dates, times and durations of such planned outages, including a specification of the maintenance requiring shutdown of the Facility, so that TNB can coordinate and finalize its programmes/schedules for the inspection and preventive maintenance of its generation, transmission, relay and control communication facilities of the Grid System. The Proposed Maintenance Schedule shall also state clearly (i) the expected capacity of the Facility (in MW) and (ii) the expected energy quantity reduction of the Facility (in MWh), throughout such planned outage duration.

- F1.2.2 In accordance with the requirements of the Grid System and Prudent Utility Practices, SPP shall use its best endeavours to coordinate planned outages with the GSO, including providing TNB with at least seventy-two (72) hours' notice prior to removing the Facility from service for planned outage, which notice shall include the anticipated start date, time and duration of such planned outage.
- F1.2.3 The maintenance of common interconnecting lines shall be mutually coordinated between SPP and TNB and scheduled to minimize the number of outages required.
- F1.2.4 SPP has full responsibility for the maintenance of the Facility, the SPP Interconnection Facility and the SPP Interconnector, its generation and protection equipment.
- F1.2.5 Complete maintenance records shall be maintained by SPP and SPP shall make available such records for TNB's review during normal business hours upon receipt of twenty-four (24) hours' written notice from TNB.

### **F1.3 Annual Maintenance and Inspection Report**

- F1.3.1 Not later than thirty (30) days after the beginning of each Contract Year, SPP shall submit to the Grid System Operator a summary of all maintenance and inspection works performed in the preceding Contract Year and of all conditions experienced or observed during such Contract Year that may have a material adverse effect on or may materially impair the short or long-term operation of the Facility at the operational levels contemplated by this Agreement.
- F1.3.2 The summary shall also include SPP's proposals for correcting or preventing recurrences of such conditions and for performing such other maintenance and inspections works as are required by Prudent Utility Practices. The Grid System Operator may provide comments concerning such proposals, provided that the Grid System Operator's making or failing to make comments with respect to the operation or maintenance of the Facility shall not be deemed to constitute an endorsement of the operation and maintenance of the Facility nor a warranty or other assurance by the Grid System Operator of the safety, durability or reliability of the Facility nor the satisfaction of the performance requirements of this Agreement by SPP.

### **F1.4 Access to the Facility and Site**

- F1.4.1 Without prejudice to any of TNB's other rights of access to the Facility, the SPP Interconnection Facility, the SPP Interconnector and the Site as set out in this Agreement, SPP authorises and empowers TNB and its authorised employees, representatives and/or agents to have access to the Facility, the SPP Interconnection Facility, the SPP Interconnector and the Site, upon reasonable prior notice (given the circumstances then prevailing) and subject to SPP's safety rules and regulations, for the purpose of examining, repairing or removing any or TNB's property including but not limited to the TNB Metering

Equipment.

- F1.4.2 In the event that TNB reasonably believes that the Facility, the SPP Interconnection Facility and/or the SPP Interconnector does not have sufficient safety and protection systems in place in accordance with this Agreement and Prudent Utility Practices such that the continued operation of the Facility would pose an imminent danger to any part of the Grid System, TNB may undertake an inspection of the Facility, the SPP Interconnection Facility and/or the SPP Interconnector either (i) immediately, in the event of an imminent danger (including the simultaneous disconnection of the Facility, the SPP Interconnection Facility and/or the SPP Interconnector from the Grid System) or (ii) upon having served forty-eight (48) hours' prior written notice to SPP, with reasons therefor, in all other circumstances (but without the simultaneous disconnection of the Facility, the SPP Interconnection Facility and/or the SPP Interconnector from the Grid System).
- F1.4.3 Each Party shall bear its own costs and expense that may be incurred in connection with such inspection of the Facility, the SPP Interconnection Facility and/or the SPP Interconnector by TNB. TNB shall not be liable to SPP for any damage caused to the Facility, the SPP Interconnection Facility and/or the SPP Interconnector by in the event of an immediate disconnection of the Facility, the SPP Interconnection Facility and/or the SPP Interconnector in accordance with F1.4.2(i) above.

FOR REF PURPOSES ONLY

**APPENDIX G**

**CALCULATION OF TEST ENERGY PAYMENT, ENERGY PAYMENT, NON-ACCEPTANCE  
PAYMENT AND NON-DELIVERY PAYMENT**

FOR REP PURPOSES ONLY

**G1.0 Definitions**

All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.

**G1.1 Calculations of Test Energy Payments, Energy Payments, Non-Acceptance Payments and Non-Delivery Payments**

The Test Energy Payment, Energy Payments, the Non-Acceptance Payments and the Non-Delivery Payments under this Agreement shall be calculated in accordance with the terms of this Appendix G. This Appendix G shall be read in conjunction with and subject to the provisions of Clauses 4, 5, 6 and 12 of this Agreement.

**G1.2 Test Energy Payment**

Commencing from the Initial Operation Date until the Commercial Operation Date, the Test Energy Payment for each Billing Period shall be calculated in accordance with the formulae set out below:

|  |                                     |
|--|-------------------------------------|
| <b>TEST ENERGY PAYMENT<br/>(FOR TEST ENERGY DELIVERED)</b> | <b>TEP = NEO<sub>TE</sub> x TER</b> |
|--|-------------------------------------|

Where:

TEP = the Test Energy Payment (in RM) for such Test Energy delivered in such Billing Period;

NEO<sub>TE</sub> = the Net Electrical Output (in kWh) delivered from the Facility pursuant to any Test Energy delivered in such Billing Period; and

TER = the Test Energy Rate (in RM/kWh).

**G1.3 Energy Payment****(A) Energy Payment for the Billing Period**

Without duplication of any payment made pursuant to G1.2, commencing from the Commercial Operation Date, the Energy Payment for each Billing Period shall be calculated in accordance with the formulae set out below:

|                       |  |
|-----------------------|--|
| <b>ENERGY PAYMENT</b> | <b>EP = (NEO<sub>T1i</sub> x ER) + (NEO<sub>T2i</sub> x EER)</b> |
|-----------------------|--|

(B) The terms used in G1.3(A) above shall have the meanings set out below:

- EP** = the Energy Payment (in RM) in such Billing Period;
- NEO<sub>i</sub>** = the total Net Electrical Output (in kWh) delivered in such Billing Period provided always that such total Net Electrical Output is subject to the provisions of Clause 5.2(d);
- NEO<sub>T1i</sub>** = the Net Electrical Output (in kWh) delivered for such Billing Period not exceeding MAAQ of such Contract Year calculated based on the following conditions:
- (a)  $NEO_{T1i} = NEO_i$ , when  $ANEO_m + ENEO \leq MAAQ$ ; or
  - (b)  $NEO_{T1i} = MAAQ - ANEO_{m-1} - ENEO$ , when  $ANEO_m + ENEO > MAAQ$  and  $ANEO_{m-1} + ENEO \leq MAAQ$ ; or
  - (c)  $NEO_{T1i} = 0$ , when  $ANEO_{m-1} + ENEO > MAAQ$ ;
- NEO<sub>T2i</sub>** = the Net Electrical Output (in kWh) delivered for such Billing Period exceeding MAAQ of such Contract Year calculated based on the following conditions:
- (a)  $NEO_{T2i} = 0$ , when  $ANEO_m + ENEO \leq MAAQ$ ; or
  - (b)  $NEO_{T2i} = ANEO_m - MAAQ - ENEO$ , when  $ANEO_m + ENEO > MAAQ$  and  $ANEO_{m-1} + ENEO \leq MAAQ$ ; or
  - (c)  $NEO_{T2i} = NEO_i$ , when  $ANEO_{m-1} + ENEO > MAAQ$ ;
- MAAQ** = the Maximum Annual Allowable Quantity (in MWh) calculated as follows:
- (a)  $MAAQ = [the\ annual\ quantity\ for\ the\ first\ twelve\ (12)\ months\ from\ COD\ as\ submitted\ by\ SPP\ as\ part\ of\ its\ bid\ submission\ to\ the\ Suruhanjaya\ Tenaga\ and\ as\ confirmed\ by\ the\ Suruhanjaya\ Tenaga\ to\ be\ the\ basis\ for\ the\ award\ of\ the\ Project\ to\ SPP] \times n \div N$ , when the capacity of the Facility as certified by the Independent Engineer is not less than the Established Capacity;
  - (b)  $MAAQ = [the\ annual\ quantity\ for\ the\ first\ twelve\ (12)\ months\ from\ COD\ as\ submitted\ by\ SPP\ as\ part\ of\ its\ bid\ submission\ to\ the\ Suruhanjaya\ Tenaga\ and\ as\ confirmed\ by\ the\ Suruhanjaya\ Tenaga\ to\ be\ the\ basis\ for\ the\ award\ of\ the\ Project\ to\ SPP] \times (n \times Revised\ Established\ Capacity) \div (N \times Established\ Capacity)$ , when the Established Capacity is revised downwards to reflect the actual capacity of the Facility as certified by the Independent Engineer pursuant to Clause 12.2;

- ER** = the prevailing Energy Rate (in RM/kWh) applicable for that Billing Period;
- EER** = the Excess Energy Rate (in RM/kWh) for that Billing Period;
- ANEO<sub>m</sub>** = the aggregate of NEO<sub>i</sub> for each Billing Period (in kWh) in such Contract Year including such Billing Period;
- ANEO<sub>m-1</sub>** = the aggregate of NEO<sub>i</sub> for each Billing Period (in kWh) in such Contract Year excluding such Billing Period;
- ENEO** = the aggregate of ENEO<sub>p</sub> (in kWh) in such Contract Year, including such period P, where TNB has failed to accept the Net Electrical Output as referred to in Clause 4.5 and Clause 18.8;
- ENEO<sub>p</sub>** = as defined in G1.4
- i** = an index representing each of the preceding Billing Period *i* in such Contract Year;
- n** = the actual number of days in the prevailing Contract Year; and
- N** = (a) 365, for all years; or  
(b) 366, for a leap year.

**G1.4 Non-Acceptance Payment**

The Non-Acceptance Payment shall be calculated as follows:

|                               |                                    |
|-------------------------------|------------------------------------|
| <b>NON-ACCEPTANCE PAYMENT</b> | <b>NAP = ER x ENEO<sub>p</sub></b> |
|-------------------------------|------------------------------------|

Where:

- NAP** = the Non-Acceptance Payment (in RM) pursuant to Clause 4.5 and Clause 18.8;
- ER** = the prevailing Energy Rate (in RM/kWh) applicable for that Billing Period; and
- ENEO<sub>p</sub>** = the equivalent Net Electrical Output (in kWh) during such period *P* where TNB has failed to accept the Net Electrical Output as referred to in Clause 4.5 and Clause 18.8, calculated based on the following conditions:
- (a)  $ENEO_p = AEQ \times P \times 2$ , when  $ENEO_{p-1} + ANEO_{T1} \leq MAAQ$ ;



(b)  $ENEOP_p = 0$ , when  $ENEOP_{p-1} + ANEO_{T1} > MAAQ$

for avoidance of doubt, the payment of  $\sum[ANEO_{T1} + ENEOP_p]$  should not exceed the MAAQ;

**AEQ** = the average Net Electrical Output (in kWh) assumed for such period as referred to in Clause 4.5 and Clause 18.8 calculated as follows:

$$\frac{SNEO}{NH};$$

**P** = the period (in hour(s)) where TNB has failed to accept the Net Electrical Output as referred to in Clause 4.5 and Clause 18.8 provided always that such total Net Electrical Output is subject to the provisions of Clause 5.2(d);

**SNEO** = the summation of Net Electrical Output (in kWh) (which is measured over half-hourly basis) delivered over a period of (as the case may be):

(a) thirty (30) full days (as measured between 0:00 am to 23:59 pm) immediately preceding such period TNB fails to accept the Net Electrical Output; or

(b) where the period is less than thirty (30) full days, the number of full days from the Commercial Operation Date to the day that TNB first failed to accept the Net Electrical Output (as referred to in Clause 4.5 and Clause 18.8) excluding the day that TNB first failed to accept,

provided always that such total Net Electrical Output is subject to the provisions of Clause 5.2(d);

**NH** = equal (as the case may be):

(a) 1440, being the number of half (1/2) hourly meter readings over a period of thirty (30) full days immediately preceding such period TNB fails to accept the Net Electrical Output as referred to in Clause 4.5 and Clause 18.8; or

(b) where the period is less than thirty (30) full days, 48 multiplied by the number of full days from the Commercial Operation Date to the day that TNB first failed to accept the Net Electrical Output (as referred to in Clause 4.5 and Clause 18.8) excluding the day that TNB first failed to accept;

**ANEO<sub>T1</sub>** = the aggregate Net Electrical Output (in kWh) delivered up to the period before period *P* in such Contract Year;

**ENEOP** = the aggregate of  $ENEOP_p$  (in kWh) in such Contract Year, including such period *P*, where TNB has failed to accept the Net Electrical

Output as referred to in Clause 4.5 and Clause 18.8; and

**ENEO<sub>P-1</sub>** = the aggregate of ENEO<sub>P</sub> (in kWh) in such Contract Year, excluding such period *P*, where TNB has failed to accept the Net Electrical Output as referred to in Clause 4.5 and Clause 18.8.

### G1.5 Non-Delivery Payment

The Non-Delivery Payment shall be calculated as follows:

|                             |  |
|-----------------------------|--|
| <b>NON-DELIVERY PAYMENT</b> | <b>NDP = NDR x [(0.7 x DAQ x 1000) – TNEO]</b> |
|-----------------------------|--|

Where:

NDP = the Non-Delivery Payment (in RM) pursuant to Clause 12.3;

NDR = the Non-Delivery Rate (in RM/kWh);

DAQ = the Declared Annual Quantity (in MWh) of such Contract Year, subject to the provisions of Clause 12.2; and

TNEO = the total NEO<sub>i</sub> (in kWh) in such Contract Year.

**Attachment A to Appendix G  
Minimum Annual Quantity**

| <b>Contract Year</b> | <b>Minimum Annual Quantity<br/>(MWh)</b> |
|----------------------|--|
| <b>1</b>             |  |
| <b>2</b>             |  |
| <b>3</b>             |  |
| <b>4</b>             |  |
| <b>5</b>             |  |
| <b>6</b>             |  |
| <b>7</b>             |  |
| <b>8</b>             |  |
| <b>9</b>             |  |
| <b>10</b>            |  |
| <b>11</b>            |  |
| <b>12</b>            |  |
| <b>13</b>            |  |
| <b>14</b>            |  |
| <b>15</b>            |  |
| <b>16</b>            |  |
| <b>17</b>            |  |
| <b>18</b>            |  |
| <b>19</b>            |  |
| <b>20</b>            |  |
| <b>21</b>            |  |
| <b>22</b>            |  |

[Note: If the COD is not on the SCOD, this Attachment A shall be updated by mutual agreement between the Parties and confirmed by the Suruhanjaya Tenaga, pro-rated based on the number of actual days in that Contract Year.]

**APPENDIX H**

**DESCRIPTION OF SITE**

FOR RFP PURPOSES ONLY

**H1.0 General**

**H1.1** All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.

**H2.0 Description of Site**

**[SPP to insert the description of Site which includes the location of the Facility, the Site plan and the layout of the Project]**

**H3.0 Topographical Features**

**[SPP to insert the description of topographical features at the Site]**

**H4.0 Climatology**

**[SPP to insert the description of climatology at the Site]**

**H5.0 Site Conditions**

The following data are indicative of the Site:

|   |   |
|---|---|
| Ambient Temperature Range                       | : |
| Relative Humidity Range                         | : |
| Average Annual Rainfall                         | : |
| Average Annual Number of Rainy Days             | : |
| Average Annual Isokeraunic Level                | : |
| Wind Speed Range                                | : |
| Seismic Acceleration Level (Vertical)           | : |
| Seismic Acceleration Level (Horizontal)         | : |
| Mean Annual Global Horizontal Irradiance (GHI)  | : |
| Mean Annual Diffuse Horizontal Irradiance (DHI) | : |
| Cloud Cover                                     | : |
| Latitude  | : |
| Longitude                                       | : |
| Elevation                                       | : |

**APPENDIX I**

**INITIAL FINANCIAL MODEL**

FOR RFP PURPOSES ONLY

**APPENDIX J**

**CONSEQUENCES OF TERMINATION**

FOR REP PURPOSES ONLY

**J.1 Definitions**

- (a) All capitalised terms shall have the same meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.
- (b) When used herein, the defined terms set forth below shall have the following meanings:

**“Adjusted Transfer Amount”** means the Transfer Amount as adjusted pursuant to section J.2.6(b) as required;

**“Auditor”** means a firm of auditors to be selected in accordance with the provisions of section J.3 of this Appendix J;

**“Calculation Date”** means the date of termination of this Agreement as specified in the Purchase Notice;

**“Corporate Tax”** means, for any Financial Year, the aggregate income tax payable by SPP on its income for that Financial Year, whether in Malaysia or elsewhere, excluding any provision for deferred taxation as determined in accordance with Section 6 of the Income Tax Act 1967;

**“Financial Year”** means the accounting period used by SPP in respect of the operations of SPP as agreed by its Board of Directors and as presented to its annual general meeting, irrespective of whether that accounting period is a calendar year or not;

**“Interest on Sponsors Gross Equity Contribution”** means the aggregate amount determined by applying the Default Rate to each amount comprising the Sponsors Gross Equity Contribution for the period from the date of injection of such amount of the Sponsors Gross Equity Contribution to the Calculation Date;

**“Outstanding Indebtedness”** means the lesser of:-

- (i) the aggregate amount at the Calculation Date of all amounts owing to the Financing Parties (other than any amounts owing to the shareholders of SPP and their respective Affiliates) as incurred under the Initial Financing Documents and as amortised in accordance thereunder and reflected in the Financial Model; and
- (ii) the aggregate amount at the Calculation Date of all amounts owing to the Financing Parties (other than any amounts owing to the shareholders of SPP and their respective Affiliates) as incurred under the Financing Documents;

including any reasonable costs and fees related to accelerated repayment and other financing termination costs, but excluding any costs and fees relating to the Sponsors Gross Equity Contribution, as certified by the Auditor at the Calculation Date;

**“Purchase Notice”** means a notice given by TNB pursuant to Clause 19.6(a) or a notice given by SPP pursuant to Clause 19.6(b) of this Agreement;



**“Retained Sum”** means an amount certified by the Auditor as being the aggregate of the cash balances at bank and in hand and liquid securities held by SPP and to be retained by SPP after the Calculation Date;

**“Sponsors Gross Equity Contribution”** means an amount certified by the Auditor as at the Calculation Date as being the lesser of:-

- (i) the aggregate of all registered and paid-up share capital issued by SPP and any share premia received by SPP, the subscription price received by SPP for all loan stocks, bonds and redeemable preference shares issued by SPP to its shareholders and their respective Affiliates, all loans (whether secured, unsecured or subordinated) received by SPP from its shareholders and their respective Affiliates and all other forms of capital contributed on or before the Calculation Date by the shareholders of SPP and their respective Affiliates for financing the Project, as committed by SPP, its shareholders and their respective Affiliates at the Financial Closing Date in accordance with the Initial Financing Documents; and
- (ii) the aggregate of all registered and paid-up share capital issued by SPP and any share premia received by SPP, the subscription price received by SPP for all loan stocks, bonds and redeemable preference shares issued by SPP to its shareholders and their respective Affiliates, all loans (whether secured, unsecured or subordinated) received by SPP from its shareholders and their respective Affiliates and all other forms of capital contributed on or before the Calculation Date by the shareholders of SPP and their respective Affiliates for financing the Project, as outstanding as at the Calculation Date;

**“Sponsors Equity Repayment”** means an amount certified by the Auditor as being equal to the aggregate of:-

- (i) the sum of all dividend, distribution, interest, profit, fee, premium, charges and other payments in respect of the Sponsors Gross Equity Contribution, actually paid by or on behalf of SPP; and
- (ii) the sum of all re-payment, pre-payment, redemption, re-purchase, return, and other payments in respect of the Sponsors Gross Equity Contribution, actually paid by or on behalf of SPP;

**“Taxes”** means any form of taxation, duty, levy, impost, charge or other similar contribution created or imposed by any state, federal or local government in Malaysia, including any related penalty, interest, fine or surcharge that become payable by SPP as a result of the purchase of the Project by TNB, but excluding any Corporate Tax;

**“Total Project Costs”** means the aggregate amount of the expenditure incurred and paid by SPP in connection with the Project up to the date which is one (1) year after the Commercial Operation Date and includes all development costs, procurement costs (but excluding such procurement costs relating to the operation and maintenance of the Facility actually incurred and paid by SPP after the Commercial

Operation Date), construction costs and financing costs (excluding the financing costs actually incurred and paid by SPP after the Commercial Operation Date);

**“Transfer Amount”** means the relevant amount payable by TNB for the transfer by SPP to TNB of the Project, the Site (including the access rights) and all the rights and interests related thereto, as specified in section J.2.5 below, pursuant to, and calculated in accordance with, this Appendix J, prior to the adjustment pursuant to section J.2.6;

**“Transfer Costs”** means an amount equal to all reasonable costs and expenses of SPP which are incurred or suffered as a result of the purchase of the Project by TNB, including any termination payments or novation fees on contracts in connection with the Project whose terms are reasonable and customary for private power projects such as the Project or were specifically approved by TNB, and all Taxes, any reasonable breakage costs and fees, any registration fees and other reasonable and necessary termination costs that become payable by SPP as a result of the purchase of the Project by TNB, but excluding the Outstanding Indebtedness; and

**“Transfer Date”** means the date determined pursuant to section J.2.6(a) below.

## **J.2 Purchase Price of Project**

### **J.2.1 Purchase after termination for an SPP Event of Default**

- (a) If TNB terminates this Agreement pursuant to Clause 19.5 of this Agreement and it has given a Purchase Notice pursuant to Clause 19.6(a) of this Agreement, TNB shall pay an amount equal to:
- (i) the Outstanding Indebtedness if the Sponsors Gross Equity Contribution as at the date which is one year after the Commercial Operation Date amounts to 20% or more of the Total Project Costs and ninety-five per cent (95%) of the Outstanding Indebtedness if the Sponsors Gross Equity Contribution as at the date which is one year after the Commercial Operation Date amounts to less than 20% of the Total Project Costs; **plus**
  - (ii) the “A” Purchase Price as set out in Attachment A of this Appendix J; **plus**
  - (iii) the Transfer Costs; **less**
  - (iv) the Retained Sum.
- (b) Upon payment in full by TNB of the amount set out in section J.2.1(a), all SPP’s rights, title and interest in the Project and the Site (including the access rights) shall simultaneously be transferred by SPP to TNB (or its nominees) free from any encumbrance whatsoever.

### **J.2.2 Purchase after termination for a TNB Event of Default**

- (a) If SPP terminates this Agreement pursuant to Clause 19.5 of this Agreement and TNB is required to purchase the Project pursuant to Clause 19.6(b) of this Agreement, TNB shall pay an amount equal to:

Pre-Commercial Operation Date

- (i) the Outstanding Indebtedness; **plus**
- (ii) the Sponsors Gross Equity Contribution; **plus**
- (iii) the Interest on Sponsors Gross Equity Contribution; **plus**
- (iv) the Transfer Costs; **less**
- (v) the Retained Sum.

Post-Commercial Operation Date

- (i) the Outstanding Indebtedness; **plus**
  - (ii) the "B" Purchase Price as determined in accordance with Attachment A of this Appendix J; **plus**
  - (iii) the Transfer Costs; **less**
  - (iv) the Retained Sum.
- (b) Upon payment in full by TNB of the amount set out in section J.2.2(a), all SPP's rights, title and interest in the Project and the Site (including the access rights) shall simultaneously be transferred by SPP to TNB (or its nominees) free from any encumbrance whatsoever.

**J.2.3 Transfer of Project**

- (a) On the Transfer Date, upon payment by TNB of the Adjusted Transfer Amount, all SPP's rights, title and interest in the Project and the Site (including the access rights) shall simultaneously be transferred by SPP to TNB (or its nominees) free from any encumbrance whatsoever.
- (b) When SPP transfers all rights, title and interests in the Project and the Site (including the access rights) to TNB (or its nominees) pursuant to section J.2.1 or J.2.2 of this Appendix J, the transfer shall (to the extent practicable) include all of SPP's right, title and interest in:-
- (i) all raw materials, consumables and spare parts;
  - (ii) all tangible personal property;
  - (iii) all buildings and fixtures;

- (iv) computerised and non-computerised records, reports, data, files and information;
  - (v) all drawings, test results and operation and maintenance manuals;
  - (vi) all warranties of equipment, materials and work;
  - (vii) all contract rights and insurance policies;
  - (viii) all work in progress under contracts with vendors, suppliers, contractors and subcontractors;
  - (ix) all rights with respect to any insurance proceeds payable to or for the account of SPP, but unpaid at the date of termination of this Agreement, in respect of SPP's right, title and interest in the Project;
  - (x) all user rights, licences, sub-licences or other rights in respect of all patents, trademarks, registered designs, design rights, applications for any of the foregoing, copyrights, trade or business names, inventions, processes, know-how and other industrial property rights purported to be used or required by or in respect of the Facility; and
  - (xi) for the avoidance of doubt, the Facility, the SPP Interconnection Facility, the SPP Interconnector, the SPP Works, all plant, equipment and machinery including all power generation and transmission plant, equipment and machinery.
- (c) SPP shall sign all assignments, agreements, licences, sub-licences and other documents in a form required by TNB and procure relevant third parties to sign such documents so as to transfer all rights, title and interest in the Project and the Site (including the access rights) to TNB (or its nominees) free of encumbrances and SPP shall take all reasonable steps and actions considered by TNB to be necessary or desirable to procure that these rights, title and interest in the Project and the Site (including the access rights) are transferred to TNB (or its nominees) free of encumbrances.

#### **J.2.4 Redemption of Encumbrance over the Project**

- (a) Where the Outstanding Indebtedness is payable pursuant to section J.2.1 or J.2.2, it shall be paid by TNB directly to the Financing Parties (other than the shareholders of SPP and their respective Affiliates) whose receipt shall be a good discharge for TNB and the Outstanding Indebtedness shall thereby be deemed to have been paid to SPP. Payment of the Outstanding Indebtedness shall, where required by TNB, be in exchange for a transfer or assignment to TNB (or its nominees) of all rights, title and interests in the Initial Financing Documents (other than those in respect of the Sponsors Gross Equity Contribution), documented and evidenced to the satisfaction of TNB.
- (b) Where required by TNB, SPP shall procure that the Financing Parties discharge all securities and other encumbrances given on or over the Project and the Site (including the access rights) in exchange for the payment of the Outstanding

Indebtedness. For this purpose, SPP shall procure that the Financing Parties sign all re-assignments, discharge of charge, agreements, and other documents in a form required by TNB so as to transfer all rights, title and interest in the Project and the Site (including the access rights) to TNB (or its nominees) free of encumbrances and SPP shall procure that the Financing Parties shall take all steps and actions considered by TNB to be necessary or desirable to procure that all rights, title and interest in the Project and the Site (including the access rights) are transferred to TNB (or its nominees) free of encumbrances.

#### **J.2.5 Transfers Amount**

- (a) Within thirty (30) days of the Purchase Notice, SPP shall provide to TNB and the Auditor for verification, a statement setting out the following information as at the Calculation Date:
- (i) the actual outstanding principal amount of the debt facilities provided by the Financing Parties pursuant to the Financing Documents;
  - (ii) the sum of all dividend, distribution, interest, profit, fee, premium, charges and other payments paid by SPP in respect of the Sponsors Gross Equity Contribution;
  - (iii) the sum of all repayment, redemption, re-purchase, return, and other payments made by SPP in respect of the Sponsors Gross Equity Contribution;
  - (iv) its calculation of the amount due to SPP pursuant to this Appendix J, together with detailed workings; and
  - (v) all supporting information (including those reasonably requested by TNB) to enable TNB to verify the amounts referred to in section J.2.5(a)(i) to (a)(iv) above.
- (b) The Parties shall use reasonable endeavours to agree the Transfer Amount and the Adjusted Transfer Amount. In the event the Parties are unable to reach agreement on the Transfer Amount and the Adjusted Transfer Amount within thirty (30) days after the date of submission of the material referred to in section J.2.5(a) above, the determination of the Transfer Amount and the Adjusted Transfer Amount shall be resolved in accordance with Clause 21 of this Agreement.

#### **J2.6 Adjustment**

- (a) The Parties shall agree a date for the transfer of the Project, the Site (including the access rights) and other rights and interests of SPP pursuant to this Appendix J, failing which the date for such transfer shall be thirty (30) days after the Adjusted Transfer Amount is agreed between the Parties or is resolved in accordance with Clause 21 of this Agreement.
- (b) The Transfer Amount shall be adjusted as follows:

- (i) where TNB has paid any amount to SPP during the period between the Calculation Date and the Transfer Date, the Transfer Amount shall be reduced by such amount to avoid any double counting; or
- (ii) where TNB has not paid any amount to SPP during the period between the Calculation Date and the Transfer Date, there shall be added the amount representing the carrying costs of the Transfer Amount.

### **J.3 The Auditor**

- (a) The Auditor shall be appointed by agreement between the Parties or failing agreement by the President for the time being of the Malaysian Institute of Accountants upon an application made by any Party. The Auditor's cost and expenses shall be borne as to 50% by SPP and 50% by TNB.
- (b) SPP shall procure that the Auditor has access to all the books and records of SPP for the purposes of enabling the Auditor to make the relevant certifications and decisions.
- (c) The Parties shall use their respective best endeavours to ensure that the Auditor certifies the amount of the Outstanding Indebtedness, the "B" Purchase Price, the Sponsors Gross Equity Contribution, the Interest on Sponsors Gross Equity Contribution, the Retained Sum or the Transfer Costs as required for the purposes of section J.2. The Auditor shall act as an expert and not as an arbitrator to the intent that the Auditor's certification or decision in the absence of manifest error shall be final and binding upon the Parties.

## Attachment A to Appendix J

Determination of Purchase Prices**JA.1 Purchase according to Section J.2.1**

The "A" Purchase Price shall be equal to ten Ringgit (RM 10).

**JA.2 Purchase according to Section J.2.2**

To determine the "B" Purchase Price, the following equation shall be used:

"B" Purchase Price = QR + SEC – SER, provided that if it results in a negative number, the "B" Purchase Price shall be zero.

Where:

SEC = the sum of all Sponsors Gross Equity Contribution paid to SPP prior to the Calculation Date.

SER = the sum of all Sponsors Equity Repayment paid on or prior to the Calculation Date.

QR = the quarterly return on the SEC, calculated in accordance with the following formula:

$$QR = \sum_{n=1}^N \left\{ \left[ (SEC_n - SER_n) \times (1 + X\%)^{(N-n)/4} \right] - (SEC_n - SER_n) \right\}$$

Where:

SEC<sub>n</sub> = (i) the sum of all Sponsors Gross Equity Contribution paid to SPP within calendar quarter *n*, or

(ii) zero (0), if the cumulative sum of all Sponsors Gross Equity Contribution paid to SPP in each of the full calendar quarters prior to (and including) calendar quarter *n* is greater than SEC.

SER<sub>n</sub> = the sum of all Sponsors Equity Repayment paid within calendar quarter *n*.

*n* = an index, from 1 through to N, representing each of the full calendar quarters occurring since the Effective Date.

N = the aggregate number of full calendar quarters occurring between the Effective Date and the Calculation Date (both dates inclusive).

X = the lower of:

- (a) nine per cent (9%), and
- (b) Project returns as in the Financial Model.

For this purpose, a calendar quarter means a period of three (3) months ending on 31 March, 30 June, 30 September and 31 December.

FOR REP PURPOSES ONLY



**APPENDIX K**

**LETTER OF AWARD**

FOR RFP PURPOSES ONLY

**APPENDIX L**

**WALK AWAY EVENTS**

FOR REP PURPOSES ONLY

## WALK AWAY EVENTS

| Walk Away Event                                       | Walk Away Date |
|---|----------------|
| Occurrence of Financial Closing Date                  | [•]            |
| Issuance of Notice to Proceed under the EPCC Contract | [•]            |

FOR REP PURPOSES ONLY

**EXHIBIT 1**

**FORM OF BANK GUARANTEE**

FOR REF PURPOSES ONLY

## FORM OF BANK GUARANTEE

TO: **TENAGA NASIONAL BERHAD (Company No: 200866-W)**  
*[Address]*

## WHEREAS:

- (A) By a power purchase agreement dated [●] (**the “Power Purchase Agreement”**) entered into between **TENAGA NASIONAL BERHAD (Company No: 200866-W)** (“**TNB**”) and [●] (**Company No. [●]**) (**the “Seller”**), the Seller has agreed to design, construct, own, operate and maintain a solar photovoltaic energy generating facility with a capacity of [●]MWac to be located in [●] to generate and deliver solar photovoltaic energy to TNB upon the terms and conditions contained in the Power Purchase Agreement.
- (B) Under Clause 8 of the Power Purchase Agreement, the Seller is obliged to provide a bank guarantee to TNB as security for the due performance by the Seller of its obligations under the Power Purchase Agreement.

In consideration of TNB accepting our obligations herein contained in discharge of the Seller’s obligation to provide such bank guarantee, we, *[Full name and address of bank]* hereby irrevocably and unconditionally agree to pay to you an amount up to Ringgit Malaysia [●] (RM) only (**the “Guaranteed Amount”**) and accordingly covenant with you and agree as follows:

1. Upon receipt of a written demand made by you upon us from time to time or at any time and without being entitled or obliged to make any enquiry either of you or of the Seller, and without the need for you to take legal action against or to obtain the consent of the Seller, and notwithstanding any objection by the Seller and without any further proof or conditions and without any right of set-off or counterclaim, we shall forthwith pay to you the amount or amounts specified in such demand or demands, not exceeding in aggregate the Guaranteed Amount; it being confirmed that you may make as many separate demands hereunder as you think fit. Such payment or payments shall be made by transfer to an account in your name at such bank in such place as you shall direct. You shall not be obliged to exercise any other right or remedy you may have before making a demand under this Bank Guarantee.
2. Your demand shall be conclusive evidence of our liability to pay you and of the amount of the sum or sums which we are liable to pay to you. Our obligation to make payment under this Bank Guarantee shall be a primary, independent and absolute obligation and we shall not be entitled to delay or withhold payment for any reason. Our obligations hereunder shall not be affected by any act, omission, matter or thing which but for this provision might operate to release or otherwise exonerate us from our obligations hereunder in whole or in part, including without limitation and whether or not known to us or you:
  - (a) any time or waiver granted to the Seller or any other person;

- (b) the taking, variation, compromise, renewal or release of or refusal or neglect to perfect or enforce any rights, remedies or securities against the Seller or any other person;
  - (c) any legal limitation, disability or incapacity relating to the Seller or any other person;
  - (d) any dispute between you and the Seller or any allegation that the Seller has claims against you or any objection or representation made to us by the Seller;
  - (e) any variation of or amendment to the Power Purchase Agreement or any other document or security so that references to the Power Purchase Agreement in this Bank Guarantee shall include each such variation and amendment to the Power Purchase Agreement;
  - (f) any unenforceability, invalidity or frustration of any obligations of the Seller or any other person under the Power Purchase Agreement or any other document or security: and
  - (g) any other fact, circumstance, provision of statute or rule of law which might, were our liability to be secondary rather than primary, entitle us to be released in whole or in part from our undertaking.
3. This Bank Guarantee shall continue to remain valid and full force and effect until [●], being the date after the expiration of one hundred and ninety (190) days from the Scheduled Commercial Operation Date of the Facility. If you give us a written and signed notice on or before the date of expiration of this Bank Guarantee or any subsequent extension thereof pursuant to the stipulation to extend the Bank Guarantee, we shall: (i) automatically extend the Bank Guarantee for the period requested from the original date of expiration of this Bank Guarantee or from the expiration date of the extension(s) which may have been subsequently made as indicated in the request for extension, or (ii) pay you the undrawn amount of this Bank Guarantee.
4. Any payment made hereunder shall be made free and clear of, and without deduction or set-off for or on account of any liability whatsoever including, without limitation, any present or future taxes, duties, charges, fees, deductions or withholdings of any nature whatsoever and by whomsoever imposed.
5. The benefit of this Bank Guarantee and all rights and powers hereunder may be assigned by you.
6. Capitalised expressions used in this Bank Guarantee, which are not otherwise defined herein, shall have the meanings attributed to them in the Power Purchase Agreement.
7. This Bank Guarantee shall be governed by and construed in accordance with the laws of Malaysia and we hereby agree to submit to the exclusive jurisdiction of the Courts of Malaysia over any claim arising out of this Bank Guarantee.

**IN WITNESS WHEREOF** this Bank Guarantee has been executed on the [●] day of [●] 201[●]

The Common Seal of )  
[Bank] was hereunto )  
affixed in the presence of: )

OR

Signed, Sealed and Delivered by )  
for and on behalf of )  
[Bank] in the presence of: )

FOR REP PURPOSES ONLY

## **APPENDIX F :**

PPA for Distribution Connected LSS (Peninsular)



**[DRAFT POWER PURCHASE AGREEMENT FOR LARGE SCALE SOLAR PHOTOVOLTAIC INSTALLATIONS OF 1MW – 30MW CONNECTING TO THE MEDIUM VOLTAGE DISTRIBUTION NETWORK.]**

**POWER PURCHASE AGREEMENT**

**THIS POWER PURCHASE AGREEMENT** is made on the [●] day of [●] 20[●];

**BETWEEN:**

- (1) **TENAGA NASIONAL BERHAD (TNB)**, a limited liability company incorporated under the Companies Act, 1965 (Company Registration No. 200866-W) and having its registered office at Pejabat Setiausaha Syarikat, Tingkat 2, Ibu Pejabat Tenaga Nasional Berhad, No. 129, Jalan Bangsar, 59200 Kuala Lumpur, Wilayah Persekutuan;

**AND**

- (2) [●] (**SPP**), a private limited liability company incorporated under the Companies Act, 1965 (Company Registration No. [●]) and having its registered office at [●];

(each, a **Party** and, collectively, the **Parties**).

**WHEREAS:**

- (A) SPP proposes to design, construct, own, operate and maintain a solar photovoltaic energy generating facility with a capacity of [**not less than 1MWac but not more than 30MWac**] MWac to be located in [●] for connection to TNB's medium voltage Distribution Network at [**insert node**].
- (B) SPP wishes to sell to TNB and TNB wishes to purchase from SPP, the Net Energy Output generated by the Facility and delivered to TNB in accordance with the terms and conditions set out in this Agreement.

**IT IS HEREBY AGREED:**

**1 DEFINITIONS**

**1.1 Defined Terms**

In this Agreement, the following terms shall have the meanings set out against them below:

**Abandons** means (i) during the period beginning on the Effective Date and ending on the Commercial Operation Date, the failure by SPP to perform any material part of the construction works on the Project and the Independent Engineer is unable to confirm in writing within fifteen (15) days of being requested to do so by TNB that there is a

reasonable prospect of SPP achieving the Commercial Operation Date before **[to insert a specified date which is 180 days from the Scheduled Commercial Operation Date]**; and (ii) during the period beginning on the Commercial Operation Date and ending on the expiration of the Term, the failure by SPP to operate the Facility for a continuous period of more than six (6) months unless:

- (a) TNB is in breach of a material obligation under this Agreement; or
- (b) the Facility was during such period the subject of repair, rehabilitation or repowering; or
- (c) SPP is excused from doing so pursuant to the provisions of Clause 14 (*Force Majeure*) or as a result of the occurrence of an event of the type contemplated in Clauses 4.5(a) and 4.5(c) (*Exceptions to TNB's Obligation to Accept Net Energy Output*);

and **Abandon, Abandonment** and **Abandoned** shall be construed accordingly;

**Access Rights**

means all rights necessary to construct, install, commission, energise, test, operate, maintain, upgrade, replace and remove any part of the Project and the TNB Metering Equipment including all rights of way, easements and continuing access rights;

**Agreed Program**

shall have the meaning given to it in Clause 7.5 (*Testing and Commissioning*);

**Agreement**

means this Power Purchase Agreement and the appendices and exhibits attached to it;

**Billing Period**

means (i) the period beginning on the Initial Operation Date and ending on the last day of the month following the month in which that date occurs, (ii) each one (1) month period thereafter during the Term, and (iii) the period beginning on the first (1<sup>st</sup>) day of the month in which the Term expires and ending on the day the Term expires;

**Billing Statement**

shall have the meaning given to it in Clause 5.1 (*Billing Statements*);

**Business Day**

means any day on which commercial banks are open for business in Kuala Lumpur, Wilayah Persekutuan but excludes public holidays in Kuala Lumpur, Wilayah Persekutuan and Sundays;

|   |  |
|---|--|
| <b>Capital Improvement Threshold</b>    | shall have the meaning given to it in Clause 19.1 ( <i>Change-in-Law Adjustment</i> );   |
| <b>Change-in-Law</b>                    | means, in each case after the date of this Agreement, the enactment, introduction, adoption or making of any new Law, any change in, variation, repeal or modification of any existing Law, the commencement of any Law which has not yet come into effect, or any change in the interpretation or application of any Law;   |
| <b>Commercial Operation Date or COD</b> | means the day following all the conditions precedent as set forth in Clause 3.3 ( <i>Conditions Precedent to Commercial Operations</i> ) of this Agreement having been satisfied or waived, starting from 00:00 hours;   |
| <b>Connection Point</b>                 | means the point of common coupling where the large scale solar is connected to the Distribution Network;   |
| <b>Contract Year</b>                    | means, the period which begins on the Commercial Operation Date and ends on December 31 of the year in which the Commercial Operation Date occurs, each subsequent period during the Term which begins on January 1 and ends on December 31 of the same year and the period of twelve (12) months or less which begins on January 1 and ends on the last day of the Term;  |
| <b>Contracted Capacity</b>              | means [●] MW <sub>ac</sub> ;   |
| <b>Control</b>                          | means the power (whether directly or indirectly and whether by the ownership of share capital, the possession of voting power, contract or otherwise) to appoint and/or remove all or such of the members of the board of directors or other governing body of a person as are able to cast a majority of the votes capable of being cast by the members of that board or otherwise to control or have the power to control the policies and affairs of that person; and for the purposes of this definition, a person (the “ <b>relevant person</b> ”) “ <b>Controls</b> ” a person if (i) it can exercise the requisite power by acting in concert with one (1) or more other persons pursuant to an agreement or understanding (whether formal or informal) and (ii) the relevant person owns twenty per cent (20%) or more of the securities of the person who is Controlled having ordinary voting power for the election of the members of the board of directors or other governing body of that person, or if that person has no such board of directors or other governing body, twenty per cent (20%) or more of the ownership interests in that person; and “ <b>Controls</b> ”, “ <b>Controlling</b> ” and “ <b>Controlled</b> ” shall be construed accordingly; |
| <b>Corporate</b>                        | means any authorisation, resolution, approval or consent   |

|                                     |  |
|-------------------------------------|--|
| <b>Authorisation</b>                | required under the constituent documents or other internal procedures of a Party;  |
| <b>Critical Milestones</b>          | means those events specifically described in Clause 3.5 ( <i>Critical Milestones</i> ), the occurrence of which are necessary for TNB to have assurance that the Commercial Operation Date will occur by the Scheduled Commercial Operation Date;  |
| <b>Declared Annual Quantity</b>     | means the annual quantity (in MWh) of solar photovoltaic energy declared by SPP to be generated and delivered to the Distribution Network at the Connection Point from the Facility for each Contract Year which shall be at least the minimum annual quantity as set out in Attachment A to Appendix G but not exceeding the Maximum Annual Allowable Quantity; |
| <b>Default Rate</b>                 | means a rate equal to one per cent (1%) above the base lending rate per annum then in effect at the principal office of Malayan Banking Berhad or its successor-in-title;  |
| <b>Design Limits</b>                | means the design limits of the Facility as set out or incorporated by reference in Appendix B;   |
| <b>Distribution Code</b>            | means the Malaysian Distribution Code, as amended from time to time in accordance with applicable Law;   |
| <b>Distribution Network</b>         | means that part of the Grid System of electric lines or cables, substations and associated equipment and buildings for transporting electricity at nominal voltage of less than 132 kV;  |
| <b>Effective Date</b>               | means the date on which all conditions precedent listed in Clause 3.1 ( <i>Conditions Precedent to the Effectiveness of this Agreement</i> ) have been satisfied or waived;  |
| <b>EIA Approval</b>                 | means all the requisite approvals required from the Department of Environment under the Environmental Quality Act 1974 in respect of the Project pursuant to the submission of an Environmental Impact Assessment Report by SPP in relation thereto;   |
| <b>Electrical Services Engineer</b> | means a person who holds a certificate of competency as an electrical services engineer issued under the Electricity Regulations 1994;   |
| <b>Emergency Condition</b>          | means a condition or situation that is (i) described or regarded as such in the Grid Code or (ii) in the judgement of the Grid System Operator, based on Prudent Utility Practices, either (a) presents an imminent physical threat of danger to life or property, or (b) threatens the safety,  |

integrity, stability or security of the Grid System, or (c) could reasonably be expected to cause a significant disruption on the Distribution Network, or (d) could reasonably be expected to adversely affect the provision of safe, adequate and reliable electricity supply to end users, including other utilities with which the Grid System is interconnected;

**Energy Payment** means a payment determined in accordance with Appendix G to be made by TNB to SPP for Net Energy Output generated and delivered from the Facility at the Connection Point;

**Energy Rate or ER** means RM[●] per kWh or such other rate as may be adjusted in accordance with the terms of this Agreement;

**EPCC Contract** means all contracts to be entered into between SPP and the EPCC Contractor in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works;

**EPCC Contractor** means any firm or firms retained by SPP to provide services (other than consultancy or project management services) in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility and the SPP Interconnection Facility, the SPP Interconnector and the SPP Works;

**Event of Default** means the occurrence of any of the events described in Clauses 15.1 (*SPP Event of Default*) or 15.2 (*TNB Event of Default*), as the case may be;

**Excess Energy** means such Net Energy Output generated and delivered by SPP and accepted by TNB in excess of the Maximum Allowable Quantity in any Contract Year;

**Excess Energy Rate or EER** means RM0.08 per kWh;

**Facility** means the solar photovoltaic energy generating facility located at the Site with a capacity of [●] MW<sub>ac</sub> and ancillary equipment and facilities as more specifically described in Appendix A and includes any Modification thereto;

**Financial Closing Date** means the date on which the Financing Documents relating to the financing for the total construction costs of the Project have been entered into by SPP and the Financing Parties, and all of the conditions precedent for

the initial drawdown under such Financing Documents have been satisfied by SPP or waived by the Financing Parties thereunder;

- Financial Model** means the financial model (as at the date of the Letter of Award) setting out the basis on which the financing of the Project and the costs of and revenue from the Project have been calculated by SPP (including the assumptions used, the cell logic network for the financial model software and accompanying documentation necessary to operate the financial model) recorded on a CD-Rom or other electronic storage medium, as confirmed by Suruhanjaya Tenaga to be the basis for the award of the Project to SPP and in which the Energy Rate has been derived, a hard copy of which is set out in Appendix I;
- Financing Documents** means the loan agreements (including agreements for any subordinated debt), notes, bonds, indenture, guarantees, security agreements, hedging agreements and any other documents relating to the financing or refinancing and security arrangements for the Project which have been or are to be entered into by SPP, excluding any agreements relating to Sponsors' Gross Equity Contribution;
- Financing Parties** means the Persons, in accordance with the Financing Documents, providing financing, hedging or other form of banking or bond facilities (including any refinancing in respect thereof) for the Project and includes any agent(s) or trustee under such banking or bond facilities;
- Force Majeure Event** shall have the meaning given to it in Clause 14.1 (*Force Majeure Event Defined*);
- Government Authorisation** means any authorisation, consent, concession, decree, permit, waiver, privilege, exemption and approval from, or filing with, or notice to, any Government Entity;
- Government Entity** means any national, state or local government of Malaysia and any ministry, department, instrumentality, agency, authority, commission or any such other entity of any national, state or local government of Malaysia;
- Grid Code** means the Malaysian Grid Code, as amended from time to time in accordance with applicable Law;
- Grid System** means the bulk power network controlled or used by the Grid System Operator for the purpose of transmitting and distributing electricity to end users;
- Grid System Operator** or **GSO** shall have the meaning given to it in the Grid Code;

|  |   |
|--|---|
| <b>Independent Engineer</b>                      | means an established reputable consulting engineering firm or professional engineers, registered with the Board of Engineers Malaysia and who shall not be the Owner's Engineer, retained by SPP and approved by the Suruhanjaya Tenaga, the Financing Parties and TNB as the independent engineer in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the Site, the SPP Interconnection Facility, the SPP Interconnector, the SPP Works and associated facilities; |
| <b>Initial Contract Year</b>                     | means the Contract Year in which the Commercial Operation Date occurs;  |
| <b>Initial Financing Documents</b>               | means the loan agreements (including agreements for any subordinated debt), notes, bonds, indenture, guarantees, security agreements, hedging agreements and any other documents relating to the financing and security arrangements for the Project which are entered into between the Financing Parties and SPP, excluding any agreements relating to Sponsors' Gross Equity Contribution;  |
| <b>Initial Operation Date</b>                    | means the date on which Net Energy Output is first generated and delivered from the Facility to the Distribution Network;   |
| <b>kV</b>  | means kilovolt;   |
| <b>kVArh</b>                                     | means kilovolt-ampere-reactive-hour;  |
| <b>kW</b>  | means kilowatt;   |
| <b>kWh</b>                                       | means kilowatt-hour;  |
| <b>Law</b>                                       | means any law, legislation, statute, rule, order, treaty, regulation, directive, guideline, request or requirement, announcement or published practice or any interpretation thereof which is enacted, issued, promulgated or made by any Government Entity or by any court or tribunal, including any Government Authorisation;  |
| <b>Letter of Award</b>                           | means the letter of award to be issued by Suruhanjaya Tenaga to SPP for the award of the Project, a copy of which is to be set out in Appendix K;   |
| <b>Maximum Annual Allowable Quantity or MAAQ</b> | shall have the meaning given to it in Appendix G;   |

|   |  |
|---|--|
| <b><i>Meteorological Measuring Facilities</i></b> | means all of the facilities as described in Appendix E that are necessary in accordance with Prudent Utility Practices to enable SPP and TNB to monitor and record the meteorological conditions at the Site;  |
| <b><i>Modification</i></b>                        | means an addition or modification to, or change in, or replacement or renewal of plant, equipment, machinery or facilities used by SPP for purposes of, or incidental to, the generation and delivery of solar photovoltaic energy to the Distribution Network (other than in the ordinary course of operation of any part thereof) and which is in accordance with Prudent Utility Practices and approved in writing by TNB;          |
| <b><i>MW</i></b>                                  | means megawatt;  |
| <b><i>MW<sub>ac</sub></i></b>                     | means megawatt in alternate current;   |
| <b><i>MWh</i></b>                                 | means megawatt hour;   |
| <b><i>Net Energy Output</i></b>                   | means the solar photovoltaic energy generated and delivered to the Distribution Network at the Connection Point from the Facility by SPP as measured in kWh by the TNB Metering Equipment or as otherwise determined in accordance with the provisions of Clause 10.5 ( <i>Adjustments for Inaccurate Meters</i> ) during such period;   |
| <b><i>Non-Acceptance Payment</i></b>              | means the amount payable by TNB to SPP pursuant to Clause 8.4 ( <i>Consequence of TNB's Failure to Accept Net Energy Output</i> ) for failing to accept energy delivered from the Facility by SPP other than as permitted under Clauses 4.5 ( <i>Exceptions to TNB's Obligations to Accept Net Energy Output</i> ) and 14 ( <i>Force Majeure</i> ) due to reasons not attributable to SPP as calculated in accordance with Appendix G; |
| <b><i>Non-Delivery Payment</i></b>                | means the amount payable by SPP to TNB pursuant to Clause 8.5 ( <i>Consequences of SPP Failure to Deliver Net Energy Output</i> ) for failing to deliver at least 70% of the Declared Annual Quantity other than as permitted under Clauses 4.6 ( <i>Suspension of Sale Obligation</i> ) and 14 ( <i>Force Majeure</i> ) due to reasons not attributable to TNB as calculated in accordance with Appendix G;                           |
| <b><i>O&amp;M Agreement</i></b>                   | means the agreement to be made between SPP and the O&M Contractor to operate and maintain the Facility;  |
| <b><i>O&amp;M Contractor</i></b>                  | means an appropriately qualified operation and maintenance contractor retained by SPP to provide services in connection with the operation and maintenance of the Facility;  |



|  |  |
|--|--|
| <b>Owner's Engineer</b>                    | means an established reputable consulting engineering firm or professional engineers, registered with the Board of Engineers Malaysia, retained by SPP as SPP's engineer in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the Site, the SPP Interconnection Facility, the SPP Interconnector, the SPP works and associated facilities;  |
| <b>Person</b>                              | means any individual, corporation, partnership, joint venture, trust, unincorporated organisation or Government Entity;  |
| <b>Project</b>                             | means, collectively, the financing, design, engineering, procurement, construction, installation, testing, commissioning, ownership, operation and maintenance of the Facility, the Site, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector, the SPP Works and associated facilities irrespective of whether construction has been completed or the Commercial Operation Date has been achieved, as more specifically described in Appendix A, and any Modification thereto;   |
| <b>Project Documents</b>                   | means, collectively, this Agreement, the EPCC Contract, the O&M Agreement, the Site Agreement and such other agreements as TNB and SPP shall from time to time mutually designate as a "Project Document";   |
| <b>Prudent Utility Practices</b>           | means the practices, methods and standards generally followed by the electricity supply industry in Malaysia, during the applicable period, with respect to the design, construction, testing, operation and maintenance of electricity generating and transmission equipment of the type used by the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, which practices, methods and standards generally conform to applicable Laws, the operation and maintenance standards recommended by the relevant equipment suppliers and manufacturers, the internationally accepted standards relating to solar photovoltaic generating facilities and the Distribution Code; |
| <b>Ringgit Malaysia or RM</b>              | means the lawful currency of Malaysia;   |
| <b>Scheduled Commercial Operation Date</b> | means [to insert a date which is specified in the Letter of Award] or in each case (if applicable) such other date determined in accordance with Clauses 7.9 (Consequences of Delay by TNB) or 14.3(b) (Effect of force Majeure Event),  |

starting from 00:00 hours;

|   |   |
|---|---|
| <b>Site</b>                                 | means the parcel of land upon which the Project is to be constructed and located, as more specifically described in Appendix H;   |
| <b>Site Agreement</b>                       | means the agreement or document in which SPP is granted the right to occupy and use the Site for the Project including right of ownership, lease, tenant, licence and such other rights for occupation throughout the Term;   |
| <b>Sponsors' Equity Repayment</b>           | shall have the meaning given to it in Appendix J;   |
| <b>Sponsors' Gross Equity Contributions</b> | shall have the meaning given to it in Appendix J;   |
| <b>SPP Interconnection Facility</b>         | means all of the facilities to be designed, constructed, owed, operated and maintained by SPP to enable SPP to deliver solar photovoltaic energy from the Facility and to maintain the stability of the Distribution Network;   |
| <b>SPP Interconnector</b>                   | means the transmission line(s) or underground cables and associated facilities to be designed, constructed, owned, operated and maintained by SPP that interconnect the SPP Interconnection Facility and the TNB Interconnection Facility;  |
| <b>SPP Licence</b>                          | means the licence required to be obtained by SPP pursuant to Section 9 of the Electricity Supply Act 1990 to enable SPP to own and operate the Facility and deliver and sell solar photovoltaic energy to TNB;  |
| <b>SPP Works</b>                            | means the design, engineering, procurement, supply, manufacturing, construction, installation, erection, testing, commissioning, labour, services, facilities, equipment, supplies and materials to be furnished, supplied or performed by SPP at the TNB Interconnection Facility; |
| <b>Suruhanjaya Tenaga</b>                   | means Suruhanjaya Tenaga established under the Energy Commission Act 2001 and any successor thereof;  |
| <b>Taxes</b>                                | means any tax, charge, impost, tariff, duty or fee of any kind which is charged, imposed or levied by any Government Entity, including any value added tax, customs duties, sales tax, stamp duty, withholding tax, excise tax, property tax or registration or licence fee;        |
| <b>Term</b>                                 | means the period of this Agreement as specified in Clause 2.1 ( <i>Term</i> ) and any extension as may be determined in   |

accordance with Clause 14.3(c) (*Effect of Force Majeure*) and 19.1(c) (*Change-in-Law Adjustment*);

|                                     |  |
|-------------------------------------|--|
| <b>Test Energy</b>                  | means the Net Energy Output generated in connection with the commissioning of the Facility prior to the Commercial Operation Date;   |
| <b>Test Energy Payment</b>          | means a payment determined in accordance with Appendix G to be made by TNB to SPP for the Test Energy generated and delivered from the Facility;   |
| <b>Test Energy Rate</b>             | means RM0.08 per kWh;  |
| <b>TNB Interconnection Facility</b> | means the existing TNB's substation (including the SPP Works);   |
| <b>TNB Licence</b>                  | means the licence granted to TNB under the Electricity Supply Act 1990 to enable TNB to own and operate electricity generating facilities and supply electrical energy to other Persons; and   |
| <b>TNB Metering Equipment</b>       | means the main and back-up metering equipment and devices (excluding the current transformers, the metering cubicle and its wiring) as further described in Appendix C owned by TNB for the measurement of Net Energy Output and electrical energy delivered from the Distribution Network at the applicable Connection Point to the Facility. |

## 1.2 Construction of Certain Terms and Phrases

Unless the context of this Agreement otherwise requires:

- (a) words of any gender include the other gender;
- (b) words using the singular or plural number also include the plural or singular number, respectively;
- (c) the terms "hereof", "herein", "hereunder", "hereby", "hereto" and similar words refer to this entire Agreement and not any particular Clause, Exhibit, Appendix or any other subdivision of this Agreement;
- (d) a reference to a "Clause", "Exhibit", or "Appendix" are to a clause, exhibit or appendix to this Agreement;
- (e) the words "include" or "including" shall be deemed to be followed by "without limitation" or "but not limited to" whether or not they are followed by such phrases or words of like import;
- (f) references to any statute or statutory provision shall be construed as a reference to the same as it may have been, or may from time to time be, amended, modified or re-enacted;

- (g) all reference to the generation and/or delivery of solar photovoltaic energy shall include the provision of the following services ancillary to such generation and delivery in accordance with the Distribution Code, the Design Limits and Prudent Utility Practices;
  - (i) reactive power; and
  - (ii) voltage regulation;
- (h) references to “this Agreement” or any other agreement or document shall be construed as a reference to such agreement or document as amended, modified or supplemented and in effect from time to time and shall include a reference to any document which amends, modifies or supplements it, or is entered into, made or given pursuant to or in accordance with its terms;
- (i) whenever this Agreement refers to “day”, such day shall mean a 24-hour period beginning and ending at 00:00 hours and whenever this Agreement refers to a number of days, such number shall refer to calendar days unless Business Days are specified. All accounting terms used in this Agreement and not expressly defined shall have the meanings given to them under generally accepted accounting principles of Malaysia applied on a consistent basis; and
- (j) in the event of a conflict between the provisions of the main body of this Agreement and any provision in the Appendices, the provisions of the main body of this Agreement shall prevail.

## **2 TERM**

### **2.1 Term**

This Agreement shall take effect on the Effective Date and continue in effect for a term (the **Term**) which expires on the day before the twenty-first (21<sup>st</sup>) anniversary of the Commercial Operation Date (including such day), unless otherwise extended in accordance with Clauses 14.3(c) (*Effect of Force Majeure Event*) and 19.1(c) (*Change-in-Law Adjustment*) or earlier terminated in accordance with the provisions of this Agreement.

### **2.2 Expiry or Earlier Termination**

Upon the expiry of the Term or earlier termination of this Agreement, TNB shall have the right to disconnect the TNB Interconnection Facility (including the SPP Works) from the Facility, the SPP Interconnection Facility and the SPP Interconnector.

## **3 CONDITIONS PRECEDENT AND CRITICAL MILESTONES**

### **3.1 Conditions Precedent to the Effectiveness of this Agreement**

This Agreement shall be effective upon satisfaction of the following conditions:

- (a) all Corporate Authorisations which are required to have been obtained by the Parties in connection with the execution and delivery of this Agreement have been obtained and are in full force and effect and a statement in writing to that effect by the respective solicitors of the Parties has been delivered to the other Party;
- (b) this Agreement has been executed and delivered by each of the Parties;
- (c) SPP has submitted to TNB a copy of the Letter of Award and a certified copy of the Site Agreement;
- (d) SPP has submitted to Suruhanjaya Tenaga a certified copy of each of this Agreement and the Site Agreement; and
- (e) SPP has submitted to TNB a copy of the approved power system study report conducted on the Project (the **Power System Study Report**) as approved by TNB.

If any of the conditions above has not been satisfied in full before the date being three (3) months from the date of this Agreement, either Party may terminate this Agreement by delivering to the other Party a notice in writing. In the event of termination under this Clause 3.1 (*Conditions Precedent to the Effectiveness of this Agreement*), this Agreement shall cease to have any further force or effect and neither Party shall have any obligation or liability (save in respect of any antecedent breach) to the other Party whether at law, hereunder or otherwise.

### 3.2 Conditions Precedent to the Initial Operation Date

The Initial Operation Date and the right of SPP to commence generation and deliver Test Energy and the obligation of TNB to accept Test Energy shall not occur until the following conditions have been satisfied:

- (a) SPP has submitted to TNB, with a copy to Suruhanjaya Tenaga, a certified copy of each of the Project Documents (other than this Agreement and the Site Agreement) accompanied by a confirmation that the Project Documents (other than this Agreement) are in full force and effect, all conditions to their effectiveness are satisfied or waived thereunder and no default of any material provisions thereunder has occurred or is continuing;
- (b) SPP has submitted to TNB, with a copy to Suruhanjaya Tenaga, a certified copy of each of the Initial Financing Documents accompanied by a confirmation that the Initial Financing Documents are in full force and effect, all conditions to their effectiveness are satisfied or waived thereunder and no default of any material provisions thereunder has occurred or is continuing;
- (c) SPP has submitted to TNB a certified copy of the SPP Licence;
- (d) SPP has submitted to TNB, with a copy to Suruhanjaya Tenaga, a certificate from the Independent Engineer that the SPP Interconnection Facility, the

SPP Interconnector and the SPP Works have been designed, manufactured, supplied, constructed, installed, tested and commissioned in accordance with this Agreement as set out in Clause 7.5 (*Testing and Commissioning of Interconnection Facilities*);

- (e) SPP has submitted to TNB, with a copy to Suruhanjaya Tenaga, the full set of documentation for Initial Operation Date and the proposed commissioning, start-up and testing programs and relay settings are agreed by TNB in accordance with Clause 7.6 (*Initial Operation Date*);
- (f) the performance security as set out in Clause 6.5 (*Establishment of Security*) has been delivered to TNB and is in full force and effect;
- (g) SPP has submitted to TNB, with a copy to Suruhanjaya Tenaga, (i) a certified copy of the EIA Approval (if the Department of Environment requires the submission of an Environmental Impact Assessment Report by SPP); or (ii) a written confirmation from the Department of Environment that EIA Approval is not required; and
- (h) no default by SPP of any material provision of this Agreement, the conditions to the Letter of Award or SPP Licence has occurred or is continuing.

### 3.3 Conditions Precedent to Commercial Operations

The Commercial Operation Date and the right of SPP to supply and deliver Net Energy Output and the obligation of TNB to accept Net Energy Output and make Energy Payments shall not occur until the following conditions have been satisfied:

- (a) SPP has submitted to TNB a copy of the "Commissioning Test Certificate" or similar document to the like effect issued by Suruhanjaya Tenaga as contemplated by the SPP Licence in respect of the Facility being operational;
- (b) SPP has submitted to TNB, with a copy to Suruhanjaya Tenaga, the final design of the Facility and a certificate from the Independent Engineer stating that the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works have been tested and commissioned in accordance with this Agreement as set out in Clause 8.1 (*Commercial Operation Date*) and the EPCC Contract and that the Facility has the capacity and capability to meet the Contracted Capacity and the test results showing that effect;
- (c) no default by SPP of any material provision of this Agreement, the conditions to the Letter of Award, the SPP Licence, the Project Documents or the Financing Documents has occurred or is continuing; and
- (d) the representations and warranties by SPP in this Agreement are true and correct in all material respects as if made on the Commercial Operation Date.

### 3.4 Timeframe to meet Certain Conditions to the Commencement of Generation of Electricity

SPP shall:

- (a) not later than the Financial Closing Date for the Initial Financing Documents, submit to TNB, with a copy to the Suruhanjaya Tenaga, one (1) certified copy of each of the Initial Financing Documents;
- (b) not later than the Financial Closing Date for the Initial Financing Documents, submit to TNB, with a copy to the Suruhanjaya Tenaga, one (1) certified copy of each of the Project Documents (other than this Agreement and the Site Agreement);
- (c) not less than fifteen (15) months prior to the Initial Operation Date, submit to TNB the conceptual design report for the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with Clause 7.2 (*Conceptual Design*);
- (d) not less than twelve (12) months prior to the Initial Operation Date, submit to TNB, the shop drawings for components of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with Clause 7.3 (*Shop Drawings*); and
- (e) not less than sixty (60) days before the Initial Operation Date, submit to TNB, the full set of documentation for the Initial Operation Date as set out in Clause 7.6 (*Initial Operation Date*); and
- (f) not later than the Initial Operation Date, submit to TNB a copy of the SPP Licence.

### 3.5 Critical Milestones

The Parties shall co-operate to procure that the following critical milestones are met:

- (a) the conceptual design for the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall be submitted to TNB on or before [***insert a date which is no later than 6 months from the date of the Letter of Award / 15 months prior to Initial Operation Date***];
- (b) the Financial Closing Date shall occur on or before [***to insert a date which is at latest 6 months prior to Initial Operation Date or such longer period as required for on Site installations of the Facility***];
- (c) the Initial Operation Date shall occur on or before [***to insert a date which is no later than 18 months from the date of the Letter of Award / no earlier than 30 days prior to the Scheduled Commercial Operation Date***].

The failure to meet any of the milestones set out above shall not in itself amount to an Event of Default by SPP.

#### **4 SALE AND PURCHASE OBLIGATION**

##### **4.1 Sale and Purchase of Test Energy**

- (a) Starting on the Initial Operation Date until the Commercial Operation Date, TNB shall accept all Test Energy generated by the Facility.
- (b) The price for calculation of Test Energy Payment in respect of Test Energy generated and delivered by SPP shall be at the Test Energy Rate.
- (c) TNB shall make Test Energy Payment for such Test Energy at the times stipulated in Clause 5 (*Billing and Payment*) and in amounts calculated in accordance with Appendix G.

##### **4.2 Sale and Purchase of Net Energy Output and Excess Energy**

- (a) Starting on the Commercial Operation Date and continuing throughout the Term, SPP shall deliver and sell to TNB and TNB shall accept and purchase the Net Energy Output which is generated by the Facility up to the Maximum Annual Allowable Quantity.
- (b) The price for calculation of Energy Payments in respect of Net Energy Output generated and delivered by SPP and accepted by TNB, up to the Maximum Annual Allowable Quantity, shall be at the Energy Rate.
- (c) Any Net Energy Output generated by the Facility in excess of the Maximum Annual Allowable Quantity may be, but without any obligation, accepted by TNB (*Excess Energy*).
- (d) The price for calculation of Energy Payments in respect of Excess Energy generated and delivered by SPP and accepted by TNB shall be at the Excess Energy Rate.
- (e) TNB shall make Energy Payments for such Net Energy Output and Excess Energy at the times stipulated in Clause 5 (*Billing and Payment*) and in amounts calculated in accordance with Appendix G.

##### **4.3 Output Exceeding Contracted Capacity**

- (a) The Parties recognise the Letter of Award expressly provides that the Contracted Capacity is fixed and SPP is not permitted to install or resize the Facility above the Contracted Capacity. In the event any instantaneous output (in MW) from the Facility exceeds the Contracted Capacity in any half (1/2) hourly period, TNB shall not be obligated to accept the output, or if accepted, not required to pay for the Net Energy Output delivered by the Facility over that half (1/2) hourly period.



- (b) SPP shall install protection schemes to reasonably prevent any instantaneous output (in MW) from the Facility exceeding the Contracted Capacity. SPP shall keep TNB indemnified for all losses, costs, expenses or damages from any damage to or destruction of property or personal injury (including death) resulting from delivery of such excess capacity.

#### 4.4 Title and Risk of Loss

Title to and the risk of loss of any solar photovoltaic energy generated from the Facility and transmitted to TNB in accordance with this Agreement shall pass to TNB at the Connection Point.

#### 4.5 Exceptions to TNB's Obligation to Accept Net Energy Output

Notwithstanding any other provisions of this Agreement, TNB shall not be obliged to accept Net Energy Output if any of the events or circumstances described below occur:

- (a) an Emergency Condition occurs within the Distribution Network as a result of which the Distribution Network is unable to accept Net Energy Output. TNB shall give SPP advance notice of such occurrence(s) to the extent practicable in the circumstances then prevailing and shall give SPP a full explanation of such occurrence(s) promptly after it occurs;
- (b) the Facility delivers to TNB Net Energy Output which does not conform to the electrical characteristics described in Appendix B. TNB shall notify SPP of this condition. TNB shall not be obliged to accept solar photovoltaic energy from the Facility until the condition is corrected or until SPP demonstrates to the reasonable satisfaction of TNB that SPP is operating in accordance with the operating standards set out in Appendix B;
- (c) TNB interrupts the acceptance of solar photovoltaic energy from the Facility to conduct necessary maintenance of the TNB Metering Equipment or the Distribution Network. In such instances, TNB shall give SPP as much advance notice as possible, but in no event less than seventy two (72) hours' prior notice of any such planned maintenance;
- (d) the Facility delivers to TNB Net Energy Output which is not solely driven by solar photovoltaic technology, for example output from energy storage devices, hybrid generating devices with other fuel sources or concentrated solar thermal technology;
- (e) any constraint or interruption in the Distribution Network;
- (f) the Facility has delivered to TNB Net Energy Output in a Contract Year exceeding the Maximum Annual Allowable Quantity of such Contract Year;  
or
- (g) the instantaneous output (in MW) delivered by the Facility exceeds the Contracted Capacity.

#### 4.6 Suspension of SPP Sale Obligation

- (a) Notwithstanding any provisions to the contrary in this Agreement and in addition to Clause 14 (*Force Majeure*), SPP shall not be obliged to sell and deliver Net Energy Output pursuant to this Clause 4 (*Sale and Purchase Obligation*) for so long as SPP cannot, consistent with Prudent Utility Practices, generate and deliver Net Energy Output because of an Emergency Condition.
- (b) SPP shall give TNB advance notice of the occurrence of any such Emergency Condition to the extent practicable under the circumstances or as soon thereafter as practicable.

#### 4.7 Prudent Utility Practices

All actions required or taken under this Agreement by either Party shall be consistent with the Design Limits and Prudent Utility Practices.

### 5 BILLING AND PAYMENT

#### 5.1 Billing Statements

- (a) On the first (1<sup>st</sup>) day of each Billing Period, SPP shall download half (1/2) hourly meter reading for the immediately preceding Billing Period using the telemetering device connected to the main metering equipment comprising the TNB Metering Equipment. SPP shall prepare and deliver to TNB within seven (7) days of downloading such half (1/2) hourly meter reading, a hardcopy and a softcopy of a statement in a format mutually agreed by the Parties (a **Billing Statement**) setting out details of the meter reading and SPP's calculation of the Test Energy Payment and Energy Payment due to SPP in respect of the Facility for the immediately preceding Billing Period. SPP shall, together with the Billing Statement, deliver such documents as may be required by TNB in such format as TNB shall direct.
- (b) If SPP is unable to download such half (1/2) hourly meter reading from the main metering equipment comprising the TNB Metering Equipment, then SPP shall in writing request from TNB such downloaded half (1/2) hourly meter reading from the main metering equipment comprising the TNB Metering Equipment. If, within five (5) days from the receipt of the written request from SPP, TNB is unable to provide SPP such downloaded half (1/2) hourly meter reading from the main metering equipment comprising the TNB Metering Equipment, SPP shall manually read the main metering equipment comprising the TNB Metering Equipment jointly with TNB. SPP shall give TNB five (5) days' written notice prior to the reading of such main metering equipment comprising the TNB Metering Equipment.
- (c) If the main metering equipment comprising the TNB Metering Equipment cannot be manually read by SPP within five (5) days of any day on which SPP and TNB are due to read the TNB Metering Equipment, SPP shall download such meter reading from the back-up metering equipment comprising the TNB Metering Equipment. If SPP is unable to download such half (1/2) hourly

meter reading from the back-up metering equipment comprising the TNB Metering Equipment, then SPP shall in writing request from TNB such downloaded half (1/2) hourly meter reading from the back-up metering equipment comprising the TNB Metering Equipment. If, within five (5) days from the receipt of the written request from SPP, TNB is unable to provide SPP such downloaded half (1/2) hourly meter reading from the back-up metering equipment comprising the TNB Metering Equipment, then SPP shall manually read the back-up metering equipment comprising the TNB Metering Equipment jointly with TNB for the purposes of SPP preparing a Billing Statement. SPP shall give TNB five (5) days' written notice prior to the reading of such back-up metering equipment comprising the TNB Metering Equipment.

- (d) If, for any reason, such half (1/2) hourly meter reading cannot be obtained from the TNB Metering Equipment in the manner set out in this Clause 5.1 (*Billing Statements*), then the provisions of Clause 10.5 (*Adjustments for Inaccurate Meters*) shall apply for the purpose of SPP preparing a Billing Statement in respect of the Facility for the immediately preceding Billing Period subject that all relevant losses and auxiliary consumptions (if any) as may be mutually agreed by the Parties shall be taken into account.

## 5.2 Payment

- (a) TNB shall, within thirty (30) days of receipt of the Billing Statement, pay to SPP the Test Energy Payment, Energy Payment and/or Non-Acceptance Payment (if any) invoiced in such Billing Statement:
  - (i) less any amount due to TNB from SPP (including but not limited to the Non-Delivery Payment); and
  - (ii) less any amount in the Billing Statement disputed by TNB in good faith and which is to be settled in accordance with Clause 5.3 (*Payment Disputes*).
- (b) Any amounts, other than those specified in Clause 5.2(a), due to either Party under this Agreement shall be paid or objected to within thirty (30) days following receipt by the other Party of an itemised statement from the Party to whom such amounts are due setting out, in reasonable detail, the basis for such payment.
- (c) If any undisputed amount is not paid when due, there shall be due and payable to the other Party interest thereon, calculated on a simple basis at the Default Rate, from the date such amount became due (including such date) until the date such amount is paid in full (excluding such date).
- (d) TNB shall have the option, in any statement it provides to SPP pursuant to this Clause 5.2 (*Payment*), to require payment from SPP of any amount due to TNB or to require SPP to treat such amount due to TNB as a credit against any amount that TNB may then be owing to SPP under the terms of this Agreement.

### 5.3 Payment Disputes

- (a) If either Party disputes the accuracy of a statement provided pursuant to this Clause 5 (*Billing and Payment*), the Parties shall use their best efforts to resolve the dispute in accordance with Clause 18.1 (*Senior Officers*). Any adjustment which the Parties may subsequently agree to make shall be made by a credit or additional charge on the next statement delivered. If the Parties are unable to resolve the dispute in this manner, any amount disputed may be withheld pending final resolution of the dispute in accordance with the procedures described in Clause 18.2 (*Arbitration*).
- (b) Notwithstanding any provisions to the contrary in this Agreement, if TNB disputes in good faith the calculation of any Test Energy Payment, Energy Payment and/or Non-Acceptance Payment (if any), the procedure set out in this Clause 5.3 (*Payment Disputes*) shall apply to such a dispute and TNB may withhold payment of the disputed amount pending the final resolution of the dispute.
- (c) Upon resolution of a disputed amount, the amount shall be due and payable to the appropriate Party, with interest thereon, calculated on a simple basis at the Default Rate, from the date on which such amount became due hereunder if no dispute had arisen (including such date) until such amount is paid in full (excluding such date).
- (d) The existence of a dispute as to any statement provided under this Clause 5.3 (*Payment Disputes*) shall not relieve either Party from complying with any other provision of this Agreement.

### 5.4 No Set-Off

Except as otherwise provided in this Agreement, all payments by either Party to the other Party under this Agreement shall be made free of any restriction or condition and without deduction on account of any amount claimed from the other Party which is disputed in good faith by that Party.

### 5.5 Currency and Timing of Payment

Notwithstanding anything in this Agreement to the contrary, (i) all payments to be made by either Party under this Agreement shall be made in Ringgit Malaysia; and (ii) any payment that becomes due and payable on a day that is not a Business Day shall be deemed due and payable on the next succeeding Business Day.

### 5.6 Records

SPP shall keep properly stored and maintained such records as are required by this Agreement to be maintained and all documents and materials relating to or substantiating any charges to be paid by or to SPP under this Agreement at its offices at the Site or as required by Law at its registered office, for a minimum of seven (7) years or for such additional time as may be required by Law. Upon reasonable prior notice to SPP, TNB shall have the right to inspect, examine, audit and copy such records, documents and materials.

## 6 DELAY COMPENSATION

### 6.1 Failure to Achieve the Scheduled Commercial Operation Date

If, due to the default of SPP or its contractors or agents under this Agreement, the Commercial Operation Date does not occur on or before the Scheduled Commercial Operation Date, SPP shall compensate TNB an amount equal to Ringgit Malaysia [*Quantum of compensation is a function of the Contracted Capacity and RM1,000, i.e. the Contracted Capacity (in MW) x RM1,000.00*] per day for each day commencing on and including the Scheduled Commercial Operation Date until but excluding the earlier of (i) the Commercial Operation Date; (ii) the date on which this Agreement is terminated by TNB in accordance with the provisions of this Agreement; and (iii) one hundred and eighty (180) days after the Scheduled Commercial Operation Date.

### 6.2 Abandonment of the Project

If SPP Abandons the Project after the Effective Date, SPP shall forthwith compensate TNB an amount equal to Ringgit Malaysia [*Quantum of compensation is a function of the Contracted Capacity, RM1,000 and 180 days, i.e. the Contracted Capacity (in MW) x RM1,000.00 x 180 days*].

### 6.3 No Penalty

The Parties agree that the precise level of actual damages that would be suffered by TNB arising out of or in relation to the delay or Abandonment described in this Clause 6 (*Delay Compensation*) would be difficult to ascertain with certainty. The Parties further agree that any sum payable under this Clause 6 (*Delay Compensation*) is not a penalty, and is genuine, fair and reasonable. Such amount represents a genuine, good faith and reasonable estimate of fair compensation for the losses to TNB that may reasonably be anticipated to suffer from such failure, and shall, without duplication, but subject to Clause 15.4 (*Consequences of Termination*), be the sole and exclusive remedy and measure of damages with respect to any failure by SPP to meet such obligations. Accordingly, SPP agrees to waive raising as a defence the compensations payable under this Clause 6 (*Delay Compensation*) as not being genuine, fair or reasonable.

### 6.4 Maximum Amount of Compensation

The aggregate of compensation payable by SPP under this Clause 6 (*Delay Compensation*) shall not exceed Ringgit Malaysia [*Quantum of compensation is a function of the Contracted Capacity, RM1,000 and 180 days, i.e. the Contracted Capacity (in MW) x RM1,000.00 x 180 days*].

### 6.5 Establishment of Security

SPP shall secure payment of the compensation specified in this Clause 6 (*Delay Compensation*) by providing to TNB, not later than the earlier of (i) seven (7) days from the Financial Closing Date and (ii) two hundred and ten (210) days after the

Effective Date, an irrevocable bank guarantee issued by a commercial bank reasonably acceptable to TNB in the form set out in Exhibit 1 for an amount equal to Ringgit Malaysia [*Quantum of compensation is a function of the Contracted Capacity, RM1,000 and 180 days, i.e. the Contracted Capacity (in MW) x RM1,000.00 x 180 days*] which bank guarantee shall permit drawings by TNB thereunder to satisfy the performance obligations of SPP under this Clause 6 (*Delay Compensation*). The bank guarantee shall remain valid until the expiration of one hundred and ninety (190) days after the Scheduled Commercial Operation Date. If SPP fails to furnish a bank guarantee to TNB within the time frame and valid for the duration set out in this Clause 6.5 (*Establishment of Security*) or such other date as may be otherwise agreed to by the Parties then TNB may terminate this Agreement by giving notice to SPP whereupon this Agreement shall cease to have any further force and effect and neither Party shall have any claim against the other under it save for any claim arising from any antecedent breach.

#### **6.6 No Termination**

Save where SPP has Abandoned the Project, TNB shall not be entitled to terminate this Agreement during any period in respect of which SPP is obliged to pay, is paying or has paid compensation due pursuant to this Clause 6 (*Delay Compensation*).

### **7 DESIGN, CONSTRUCTION, TESTING AND COMMISSIONING**

#### **7.1 General**

- (a) SPP shall design, engineer, procure, construct, install, energise, test and commission the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with Prudent Utility Practices, the specifications and characteristics set forth in Appendices A, B, D and E, and the terms and conditions of this Agreement.
- (b) SPP shall within sixty (60) days from the Effective Date submit to TNB the proposed work programme and schedule relating to the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works and coordinate with TNB the submissions, testing and approval requirements as required in accordance with this Clause 7 (*Design, Construction, Testing and Commissioning*) and Prudent Utility Practices.
- (c) SPP shall, at its cost and expense, acquire all necessary ownership rights, leases, title and/or interest including Access Rights to the parcels of land on which the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility and the SPP Interconnector shall be constructed and located.

#### **7.2 Conceptual Design**

- (a) SPP shall not less than fifteen (15) months prior to the Initial Operation Date, submit to TNB the conceptual design report for the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the

SPP Interconnector and the SPP Works consisting of the single line diagram, protection schemes, relay types and settings, and such other information in such form as TNB shall direct in accordance with Prudent Utility Practices, together with the Independent Engineer's certificate stating that:

- (i) the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works when constructed in accordance with such design drawings will conform to the description set forth in Appendices A, D and E in all material respects and have the capacity to meet the operational characteristics set out in Appendix B;
  - (ii) it is technically feasible for the Commercial Operation Date to occur on or before the Scheduled Commercial Operation Date; and
  - (iii) the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works should have a useful life no shorter than the Term.
- (b) TNB may at its own cost review the conceptual design report of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works and recommend modifications, revisions and improvements, if needed or desirable in accordance with Prudent Utility Practices. TNB shall revert to SPP with its recommendations (if any) within sixty (60) days of receiving such conceptual design report.
- (c) Where any recommendations made by TNB are in respect of the Meteorological Measuring Facilities, the SPP Interconnection Facility, SPP Interconnector, the SPP Works or for the safe operation of the Facility with the Distribution Network in accordance with Prudent Utility Practices, SPP shall comply with the aforesaid recommendations and make the necessary changes to the conceptual design.

### 7.3 Shop Drawings

- (a) SPP shall not less than twelve (12) months prior to the Initial Operation Date submit to TNB the shop drawings for components of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works together with all protection data, related primary data, capability curves and relay terminal drawings and such other information in such form as TNB shall direct in accordance with Prudent Utility Practices.
- (b) TNB may at its own cost review the shop drawings for components of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works and recommend modifications, revisions and improvements, if needed or desirable in accordance with Prudent Utility Practices. TNB shall revert to SPP with its recommendations (if any) within sixty (60) days of receiving such shop drawings and component data and information.
- (c) TNB shall be entitled to require factory acceptance test for components of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection

Facility, the SPP Interconnector and the SPP Works in accordance with Prudent Utility Practices prior to their delivery to Site.

- (d) SPP shall provide TNB with no less than fourteen (14) days prior notice before the commencement of each factory acceptance test. TNB shall be entitled to witness the conduct of such tests and SPP shall within twenty-four (24) hours after the completion of each test submit to TNB the preliminary test results in respect of each test conducted. The test results shall be certified by the Electrical Service Engineer appointed by SPP.

#### **7.4 Construction Period**

- (a) SPP shall throughout the construction period keep TNB informed of the work programme and schedule relating to the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works and update TNB from time to time the progress and changes to the work programme and schedule.
- (b) SPP shall provide TNB with copies of any periodic reports provided to the Financing Parties describing the progress of construction of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.
- (c) SPP shall obtain the prior written consent of TNB for any proposed Modification to:
  - (i) the design or construction of the Facility if such Modification could reasonably be expected to have a material adverse effect on TNB's rights under this Agreement or on the Distribution Network; or
  - (ii) the design or construction of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works that has been submitted to TNB pursuant to Clause 7.2 (*Conceptual Design*) or Clause 7.3 (*Shop Drawings*).
- (d) TNB shall revert to SPP within sixty (60) days of receiving any Modification request from SPP.
- (e) TNB may, at its own cost and upon reasonable prior notice to SPP, visit the Site to view the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. TNB shall at all times be subject to SPP's safety rules and regulations.

#### **7.5 Testing and Commissioning of Interconnection Facilities**

- (a) SPP shall complete the construction, installation and testing of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works no later than sixty (60) days before the Initial Operation Date.
- (b) SPP shall comply with such testing programs and testing procedures for the SPP Interconnection Facility, the SPP Interconnector and the SPP Works as TNB may direct in accordance with Prudent Utility Practices.



- (c) Upon completion of the construction, installation and testing of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works but prior to their energising and commissioning, SPP shall submit a certificate from the Independent Engineer confirming that (i) the SPP Interconnection Facility, the SPP Interconnector and the SPP Works have been designed, constructed and installed in accordance with the specifications set out in Appendix D, (ii) all tests required under this Agreement and in accordance with Prudent Utility Practices have been carried out, and (iii) the SPP Interconnection Facility, the SPP Interconnector and the SPP Works can be safely operated in parallel with the Distribution Network.
- (d) Upon receipt of such certificate from the Independent Engineer and verifying the test procedures and results on the basis of which such certificate was given, TNB shall synchronise the SPP Interconnection Facility and SPP Interconnector with the Distribution Network.

#### **7.6 Initial Operation Date**

- (a) Upon completion of the construction, installation and testing of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, SPP shall submit to TNB a notice of the proposed Initial Operation Date, which shall be not less than sixty (60) days from the date of submission of the notice, together with a full set of documentation for the Initial Operation Date which shall consist of:
  - (i) a copy of the as built drawings for SPP Interconnection Facility, the SPP Interconnector and the SPP Works together with the Independent Engineer's certificate stating the design and construction of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works conform to Appendix D and the conceptual design relating thereto as approved by TNB;
  - (ii) a copy of the Interconnection Operation Manual (IOM) as agreed by TNB;
  - (iii) the factory acceptance test results and pre-commissioning test results for the components of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works as specified by TNB including any anti-islanding, electrical protection scheme, protection coordination study, cable tests, communication facilities, metering facilities tests, and calibrations for testing equipment;
  - (iv) the commissioning, start-up and testing programs for the Facility which shall consist of the commissioning and testing programs, testing schedule, test procedures, test loads and test loads patterns for all tests required to comply with the Distribution Code and the provisions of this Agreement and EPCC Contract;
  - (v) the relay settings as proposed by the manufacturer of the Facility's solar photovoltaic generators and transformers together with the calculations and relevant data thereto; and

- (vi) such other documentation as TNB shall direct in accordance with Prudent Utility Practices.
- (b) If any proposed commissioning, start-up and testing programs and relay settings are not acceptable to TNB, TNB shall within thirty (30) days provide SPP detailed information as to why the proposed commissioning, start-up and testing programs and relay settings are not acceptable to TNB and SPP shall comply with any such revisions as may be required by TNB in accordance with Prudent Utility Practices. SPP shall re-submit such revisions for TNB's approval before commencement of the proposed commissioning, start-up and testing programs (the **Agreed Program**).
- (c) SPP shall provide TNB with no less than fourteen (14) days prior notice before the commencement of each test. TNB shall be entitled to witness the conduct of such tests and SPP shall within twenty-four (24) hours after the completion of each test submit to TNB the preliminary test results in respect of each test conducted. The test results shall be certified by the Electrical Service Engineer appointed by SPP.
- (d) Notwithstanding any provision in this Agreement, no generation of solar photovoltaic energy from the Facility in an interconnected mode with the Distribution Network may take place and the Initial Operation Date may not occur until (i) all the interconnection protective devices in relation to the Facility have been installed by SPP and been inspected and approved by TNB, (ii) all the relay types and relay settings in relation to the Facility been installed by SPP and been approved by TNB, and (iii) the Grid System Operator has confirmed in writing, within a reasonable period, that the operation of the Facility with the Distribution Network may commence.

#### **7.7 No Endorsement**

Unless expressly stated in this Agreement, any review, verification, acceptance, endorsement or approval by TNB or the Grid System Operator of any material, documents, designs, drawings, schedules, design data, control and protection settings, test procedures, test results, test reports or other information submitted by SPP concerning the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, or any presence of TNB to witness any test performed on the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall not be deemed to constitute an endorsement of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works nor a warranty or other assurance by TNB of the safety, durability or reliability of the Facility or the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.

#### **7.8 Compliance**

Notwithstanding any provision in this Agreement, SPP shall comply with all instructions, recommendations, procedures and directions which may be given by TNB at any time during the design, construction, testing and commissioning of the Facility where such instructions, recommendations, procedures and directions are in accordance with Prudent Utility Practices, the Distribution Code or for the safe operation of the Facility with the Distribution Network.

### 7.9 Consequences of Delay by TNB

If, otherwise than due to any default or omission on the part of SPP under this Agreement and subject to the SPP Interconnection Facility, the SPP Interconnector and the SPP Works having been completed by SPP and the Facility is otherwise completed and ready for commercial operation barring the testing and commissioning required, the Commercial Operation Date is delayed, then the Scheduled Commercial Operation Date shall be extended by one day for each day the Commercial Operation Date is delayed and TNB shall pay SPP the actual interest incurred by SPP under the Financing Documents for the period of delay.

### 7.10 Advance Commercial Operation Date

If SPP notifies TNB that the Commercial Operation Date can be achieved earlier than the Scheduled Commercial Operation Date, TNB may agree to an earlier Commercial Operation Date from which Energy Payments shall be payable in accordance with this Agreement.

## 8 COMMERCIAL OPERATIONS

### 8.1 Commercial Operation Date

- (a) SPP shall provide TNB with at least thirty (30) days' prior notice of the proposed Commercial Operation Date. SPP shall provide TNB with written confirmation that the Commercial Operation Date has occurred within twenty-four (24) hours after it occurs. The said confirmation shall be provided together with the Independent Engineer's certificate stating that the Facility has been tested and commissioned in accordance with the Agreed Program and the Facility has the capacity and capability to meet the Contracted Capacity with the test results showing that effect.
- (b) Not later than sixty (60) days after the occurrence of the Commercial Operation Date, SPP shall submit to TNB a hardcopy and a softcopy of the performance test report and the project completion report relating to the Facility as prepared by the EPCC Contractor.

### 8.2 Declarations of Annual and Monthly Quantity

- (a) Together with the notice of the proposed Commercial Operation Date, SPP shall furnish TNB with the Declared Annual Quantity for the Contract Year in which the Commercial Operation Date occurs (the **Initial Contract Year**). In addition to furnishing the Declared Annual Quantity for the Initial Contract Year, if the Commercial Operation Date occurs in any of the months of October, November and December, SPP shall also simultaneously furnish TNB with the Declared Annual Quantity for the Contract Year immediately following the Initial Contract Year.
- (b) For each subsequent Contract Year, SPP shall submit the Declared Annual Quantity for each Contract Year to TNB not less than sixty (60) days prior to

January 1 of that Contract Year together with the schedule of any planned outages expected for that Contract Year.

- (c) No later than twenty-fifth (25<sup>th</sup>) day of each month or such other time as TNB shall otherwise require, throughout the Term, SPP shall update and re-declare to TNB the updated quantity of solar photovoltaic energy expected for the next calendar month and each subsequent month until the end of that Contract Year together with any changes to the schedule of any planned outages.
- (d) SPP shall update and re-declare to TNB any expected changes to the quantity of solar photovoltaic energy in the event of any unplanned outages or Emergency Condition as soon as practicable. SPP shall provide TNB with at least seven (7) days' prior notice for any proposed change to any planned outages.
- (e) SPP shall submit the declarations in this Clause 8.2 (*Declarations of Annual and Monthly Quantity*) in such manner and with such additional details and information as may be prescribed from time to time by TNB and/or the Grid System Operator in accordance with Prudent Utility Practices.

### **8.3 Operation and Maintenance of the Facility**

SPP shall at all times operate and maintain the Facility in accordance with Prudent Utility Practice, the Distribution Code and the terms and conditions of this Agreement specifically the provisions of Appendix F.

### **8.4 Consequence of TNB Failure to Accept Net Energy Output**

If, otherwise than due to (i) an interruption due to a Force Majeure Event affecting TNB; or (ii) the events or circumstances described in Clause 4.5 (*Exceptions to TNB's Obligation to Accept Net Energy Output*), TNB fails to accept the Net Energy Output as may be generated and delivered by SPP, then TNB shall pay SPP the Non-Acceptance Payment calculated in accordance with Appendix G.

### **8.5 Consequences of SPP Failure to Deliver Net Energy Output**

If, otherwise than due to (i) an Emergency Condition; (ii) an interruption due to a Force Majeure Event affecting SPP; or (iii) any default or omission on the part of TNB, the total Net Energy Output delivered by the Facility in a Contract Year is less than seventy per cent (70%) of the Declared Annual Quantity of such Contract Year, then SPP shall pay TNB the Non-Delivery Payment calculated in accordance with Appendix G.

### **8.6 Consequences of SPP Failure to Meet Operating Standards**

- (a) If SPP fails to comply with or operate in conformity with any of the operating standards or characteristics set out in Appendix B, SPP shall forthwith compensate TNB an amount equal to Ringgit Malaysia Ten Thousand (RM10,000.00) for each failure.
- (b) If SPP continues to fail to rectify any failure to comply with any of the

operating standards or characteristics set out in Appendix B within thirty (30) days from the notification date or such longer period as may be mutually agreed between SPP and TNB, each failure to rectify within the said period shall be treated as a separate failure and SPP shall forthwith compensate TNB an amount equal to Ringgit Malaysia Ten Thousand (RM10,000.00) for each failure to rectify.

#### **8.7 Revalidation Report**

SPP shall, at its own cost, on the tenth (10<sup>th</sup>) and fifteenth (15<sup>th</sup>) anniversary of the Commercial Operation Date submit to TNB an Independent Engineer's certificate certifying that the Facility continues to have the capacity and capability to meet the Contracted Capacity and conform to the electrical characteristics and meet the operational standards as set out in Appendix B, together with the test results showing that effect. If the capacity of the Facility as certified by the Independent Engineer is less than 70% of the Contracted Capacity, then SPP shall at its own cost carry out the necessary repairs and maintenance to reinstate the capacity of the Facility to at least 70% of the Contracted Capacity.

#### **8.8 Back-up Electricity Supply**

Any back-feed of electricity from the Distribution Network to the Facility, at any time prior to or from the Commercial Operation Date, shall be at a commercial tariff on a sen/kWh basis to be determined by TNB pursuant to the Electricity Supply Act 1990.

#### **8.9 Inadvertent Net Active Power Flow**

SPP shall install the necessary equipment at the Facility to prevent any inadvertent nett active power flows at the Connection Point from the Facility to the Distribution Network and vice versa. Notwithstanding any provisions to the contrary in this Agreement, TNB and the GSO shall have the right to disconnect the SPP Interconnection Facility, the SPP Interconnector and the SPP Works during any incidence of inadvertent nett active power flow.

#### **8.10 Operations Log**

SPP shall keep an accurate daily operations log which shall include all information relating to the Declared Annual Quantity, the generation profiles of the Facility and any significant events relating to the operation and maintenance of the Facility. TNB shall be entitled to review SPP's log at any time upon giving reasonable notice.

#### **8.11 Permitted Set Offs**

TNB shall be entitled to set off any outstanding amount due to it under this Clause 8 (*Commercial Operations*) against any sums due and payable to SPP under the terms of this Agreement.

#### **8.12 No Penalty**

The Parties agree that the precise level of actual damages that would be suffered by TNB arising out of or in relation to the event described in Clauses 8.5 (*Consequences of SPP Failure to Deliver Net Energy Output*) and 8.6 (*Consequences of SPP Failure to*

*Meet Operating Standards*) would be difficult to ascertain with certainty. The Parties further agree that any sum payable under Clauses 8.5 (*Consequences of SPP Failure to Deliver Net Energy Output*) and 8.6 (*Consequences of SPP Failure to Meet Operating Standards*) are not penalties, and is genuine, fair and reasonable. Such amount represents a genuine, good faith and reasonable estimate of fair compensation for the losses to TNB that may reasonably be anticipated from such failure. Accordingly, SPP agrees to waive raising as a defence the compensations payable under this Clause 8 (*Commercial Operations*) as not being genuine, fair or reasonable.

## 9 SPP WORKS

### 9.1 Transfer of SPP Works

SPP shall transfer to TNB and take all actions necessary to effect the transfer of all rights, title and interest to the completed SPP Works including the parcels of land on which the SPP Works shall be constructed and located and the Access Rights thereto free from encumbrances, on or before the Initial Operation Date so that TNB shall become the owner thereof. All costs relating to, incidental or consequent upon such transfer shall be borne by SPP. Upon such transfer, all property and title in such completed and transferred SPP Works shall pass to TNB. Subject to Clause 9.2 (*Warranties and Indemnities*), TNB shall thereafter be responsible for the operation and maintenance of the same.

### 9.2 Warranties and Indemnities

- (a) SPP expressly warrants to TNB as follows:
- (i) that the SPP Works shall be designed, constructed and installed in accordance with Prudent Utility Practices and the requirements and specifications as approved by TNB and free from defects in materials and workmanship; and
  - (ii) that all equipment and items installed in the SPP Works shall be installed, and all work shall be performed, in accordance with Prudent Utility Practices, the requirements as approved by TNB and other requirements of the equipment manufacturers or suppliers.
- (b) The warranties given in this Clause 9.2 (*Warranties and Indemnities*) shall continue for a period of twenty-four (24) months from the date of transfer of the SPP Works. If any part of the SPP Works is replaced or repaired during such twenty-four (24) month period or any extension of it, then equivalent warranties on the parts so replaced or repaired shall continue for a period of twenty-four (24) months from the date of the completion of such replacement or repair, provided always that no warranty shall extend beyond a period of forty-eight (48) months from the date of transfer.
- (c) SPP further represents and warrants that the SPP Works shall be free from latent engineering or design defects and in the event any latent engineering or design defect results in a failure or degradation of durability or performance of the SPP Works, SPP shall without charge to TNB take such

remedial action as may be necessary to rectify the defect. The warranties given in this Clause 9.2 (*Warranties and Indemnities*) shall continue for a period of sixty (60) months from the date of transfer of the SPP Works.

- (d) SPP undertakes that it will take such action as TNB may reasonably require to enforce any warranties given by the EPCC Contractor to SPP in respect of the SPP Works.
- (e) If due to any defect in (i) the SPP Interconnection Facility and/or the SPP Interconnector or (ii) the SPP Works which amounts to a breach by SPP of any of the warranties set out in this Clause 9.2 (*Warranties and Indemnities*) and as a result the Distribution Network is unable to accept Net Energy Output, SPP shall not be entitled to any Energy Payment and/or Non-Acceptance Payment during such period notwithstanding the Facility is otherwise capable of generating solar photovoltaic energy.

## **10 METERING**

### **10.1 Metering Equipment**

- (a) SPP shall, at its own cost and expense, install or procure the installation of the TNB Metering Equipment as set out in Appendix C.
- (b) Subject to Clause 10.5 (*Adjustments for Inaccurate Meters*), the TNB Metering Equipment shall be used to measure the transfer of electric energy across the Connection Point from SPP to TNB or from TNB to SPP, as the case may be.
- (c) The specifications for the TNB Metering Equipment shall be as set out in Appendix C. The TNB Metering Equipment shall be sealed and the seal shall not be broken for any reason whatsoever except when the TNB Metering Equipment is to be inspected and tested or adjusted in accordance with Clauses 10.4 (*Inspection of Metering Equipment*) and 10.5 (*Adjustments for Inaccurate Meters*).
- (d) SPP shall not permit any of its employees, agents, contractors or subcontractors of any tier to tamper with the TNB Metering Equipment without TNB's prior written consent.
- (e) At all times, SPP agrees to keep all locations associated with the TNB Metering Equipment clean, clear and, upon reasonable advance notice and at a mutually convenient time, accessible to TNB and its authorised agents.

### **10.2 Pre-Operational Testing of TNB Metering Equipment**

- (a) Upon the installation of the TNB Metering Equipment, SPP shall, not later than thirty (30) days after the conduct of the site tests and without any outstanding works subsisting, transfer to TNB and take all actions necessary to effect the transfer of all rights, title and interest of the TNB Metering Equipment and provide to TNB at all times the Access Rights to the TNB Metering Equipment.

### 10.3 Warranties and Indemnities

- (a) SPP expressly warrants to TNB that:
- (i) the TNB Metering Equipment shall be designed, tested and installed in accordance with Prudent Utility Practices and the requirements and specifications set out in Appendix C and free from defects in materials and workmanship; and
  - (ii) all equipment and items relating to the TNB Metering Equipment shall be installed, and all work shall be performed, in accordance with Prudent Utility Practices, the requirements set out in Appendix C and other requirements of the equipment manufacturers or suppliers.
- (b) The warranties given in this Clause 10.3 (*Warranties and Indemnities*) shall continue for a period of twenty-four (24) months from the date of transfer of the TNB Metering Equipment. If any part of the TNB Metering Equipment is replaced or repaired during such twenty-four (24) month period or any extension of it, then equivalent warranties on the parts so replaced or repaired shall continue for a period of twenty-four (24) months from the date of the completion of such replacement or repair, provided always that no warranty shall extend beyond a period of thirty-six (36) months from the date of transfer of the TNB Metering Equipment to TNB.
- (c) SPP further represents and warrants that the TNB Metering Equipment shall be free from latent engineering or design defects and in the event any latent engineering or design defect results in a failure or degradation of durability or performance of the TNB Metering Equipment, SPP shall without charge to TNB take such remedial action as may be necessary to rectify the defect. The warranties given in this Clause 10.3 (*Warranties and Indemnities*) shall continue for a period of sixty (60) months from the date of transfer of the TNB Metering Equipment.

### 10.4 Inspection of Metering Equipment

- (a) TNB shall inspect and test the TNB Metering Equipment at TNB's cost and expense on a regular schedule determined by TNB in accordance with Prudent Utility Practices. TNB shall provide SPP with reasonable advance written notice of any inspection and tests to be conducted. TNB shall permit a representative of SPP to witness and verify all inspections and tests.
- (b) Upon two (2) weeks' prior written notice from SPP, TNB shall perform additional inspections or tests of any of the TNB Metering Equipment. SPP and TNB shall agree on a mutually convenient time for such inspections or tests and TNB shall permit a qualified representative of SPP to witness and verify such inspections and tests. The results of any such test on the TNB Metering Equipment shall be deemed final and conclusive. The actual expense of any such additional inspection or testing shall be borne by SPP unless, upon such inspection or testing, the TNB Metering Equipment is



found to register inaccurately by more than +/- 1%, in which event the expense of such additional inspection or testing shall be borne by TNB.

- (c) If, as a result of the inspection and tests conducted pursuant to this Clause 10.4 (*Inspection of Metering Equipment*), any of the TNB Metering Equipment is found to be defective or inaccurate, reasonable steps shall be taken by TNB to adjust, repair, replace and/or re-calibrate such TNB Metering Equipment at TNB's own expense unless the provisions of Clause 10.3 (*Warranties and Indemnities*) apply.

#### **10.5 Adjustments for Inaccurate Meters**

If any of the TNB Metering Equipment fails to register, or if the measurement made by any of the TNB Metering Equipment is found upon testing to be inaccurate by more than +/- 1% an adjustment shall be made correcting all measurements by the inaccurate or defective metering device for billing purposes for both the amount of the inaccuracy and the period of the inaccuracy, in the following manner:

- (a) if the Parties cannot agree on the amount of the adjustment necessary to correct the measurements made by the TNB Metering Equipment, the Parties shall agree the amount of the necessary adjustment on the basis of deliveries of solar photovoltaic energy from the Facility to the Distribution Network during periods of similar operating conditions when the TNB Metering Equipment was registering accurately;
- (b) if the Parties cannot determine or agree on the actual period during which the inaccurate measurements were made, the period during which the measurements are to be adjusted shall be one half (1 ½) of the period from the last previous test of the relevant part of the TNB Metering Equipment to the test that found such part of the TNB Metering Equipment to be defective or inaccurate; and
- (c) if the adjustment period so determined covers a period of deliveries for which payments have already been made by TNB, TNB shall use the corrected measurements as determined in accordance with this Clause 10.5 (*Adjustments for Inaccurate Meters*) to re-calculate the amount due for the period of the inaccuracy and shall subtract the previous payments by TNB for such period from such re-calculated amount. If the difference is a positive number, that difference shall be paid by TNB to SPP and if the difference is a negative number, that difference shall be paid by SPP to TNB. Payment of such difference by the owing Party shall be made within fifteen (15) Business Days of receipt by the other Party of a statement to that effect. In the event there are payments due from SPP to TNB, TNB shall have the right to set off such sums from payments due to SPP from TNB.

### **11 REPRESENTATIONS AND WARRANTIES; ADDITIONAL COVENANTS OF SPP AND TNB**

#### **11.1 Representations and Warranties of SPP**

SPP represents and warrants to TNB that as at the date of this Agreement:

- (a) SPP is a private limited liability company duly organised and validly existing under the laws of Malaysia and SPP has all requisite power and authority to conduct its business, to own its properties and to execute, deliver and perform its obligations under this Agreement.
- (b) The execution, delivery and performance by SPP of this Agreement has been duly authorised by all necessary action, including applicable Corporate Authorisations, and does not and will not (i) require any consent or approval of SPP's Board of Directors or shareholders, other than those that have been obtained, or (ii) result in a breach of, or constitute a default under, any provisions of SPP's constitution or incorporation documents, any indenture, contract or agreement to which it is a party or by which it or its assets may be bound, or violate any Law, order, writ, judgment, injunction, decree, determination or award presently in effect having applicability to SPP.
- (c) This Agreement constitutes a legal, valid and binding obligation of SPP.
- (d) There is no pending action or proceeding affecting SPP before any court, Government Entity or arbitrator that is likely to affect materially and adversely the financial condition or operations of SPP and the ability of SPP to perform its obligations hereunder, or that purports to affect the legality, validity or enforceability of this Agreement.

#### **11.2 Representations and Warranties of TNB**

TNB represents and warrants to SPP that as at the date of this Agreement:

- (a) TNB is a public limited liability company duly organised and validly existing under the laws of Malaysia and TNB has all requisite power and authority to conduct its business, to own its properties and to execute, deliver, and perform its obligations under this Agreement.
- (b) The execution, delivery and performance by TNB of this Agreement has been duly authorised by all necessary action, including applicable Corporate Authorisations, and does not and will not (i) require any consent or approval of TNB's Board of Directors other than those that have been obtained, or (ii) result in a breach of, or constitute a default under any provisions of TNB's constitution or enabling documents, any indenture, contract or agreement to which it is a party or by which it or its assets may be bound, or violate any Law, order, writ, judgment, injunction, decree, determination or award presently in effect having applicability to TNB.
- (c) This Agreement constitutes a legal, valid and binding obligation of TNB.
- (d) There is no pending action or proceeding affecting TNB before any court, Government Entity or arbitrator that is likely to affect materially and adversely the financial condition or operations of TNB and the ability of TNB to perform its obligations hereunder, or that purports to affect the legality, validity or enforceability of this Agreement.

**11.3 Full Control and Possession of the Site**

SPP represents and warrants to TNB that throughout the Term:

- (a) SPP shall have full control and possession of the Site, including all necessary ownership rights, leases, title and/or interest of the Site and all Access Rights over the Site to construct, install, commission, energise, test, operate, maintain, upgrade, replace and/or remove any part of the Project; and
- (b) SPP shall comply with the provisions of all statutes, ordinances, by-laws, regulations and rules for the time being in force affecting the Site or any constructions, improvements, installations, additions or alterations thereon or SPP's occupation on the Site and forthwith to satisfy all requirements of the municipality or any other local authority with respect to the Site.

**11.4 Permits: Compliance with Laws**

- (a) Each Party shall, at its own expense, acquire and maintain in effect, from any and all Government Entities with jurisdiction over such Party and/or the Facility, all Government Authorisations.
- (b) SPP shall, as required by applicable Laws in force as at the Effective Date, complete or have completed all inspections and environmental impact studies, in each case necessary (i) for the operation and maintenance of the Facility, and (ii) for SPP to perform its obligations under this Agreement.
- (c) SPP shall, at all times, comply with the terms and conditions of the SPP Licence and all Laws applicable to it and/or to the Facility, including all environmental laws in effect at any time during the Term. SPP shall not be regarded as being in breach of its obligations hereunder with respect to any relevant Change-in-Law if TNB has failed to perform its obligations under Clause 19 (*Change-in-Law*) in respect thereof.
- (d) TNB shall, at all times, comply with the terms and conditions of the TNB Licence and all Laws applicable to it.

**11.5 Continuity of Existence**

Each Party shall preserve and keep in full force and effect its corporate existence and all Government Authorisations necessary for the proper conduct of its business.

**11.6 Books and Records**

Each Party shall keep proper books of records and account, in which full and correct entries shall be made of all dealings or transactions of or in relation to such Party's business and affairs in accordance with generally accepted accounting principles consistently applied.

**11.7 Certificates**

Each Party shall deliver or cause to be delivered from time to time to the other Party certifications of its officers, accountants, engineers or agents as such Party may reasonably request in connection with the performance of the other Party's obligations under this Agreement.

#### **11.8 Qualified Personnel**

SPP shall, during the Term and as required by Law, only employ appropriately trained, qualified and registered (if applicable) personnel for the purposes of operating and maintaining the Facility and co-ordinating operations with the Distribution Network.

#### **11.9 Operate, Maintain or Tamper with the other Party's Equipment**

Each Party shall not permit any of its employees, agents, contractors or subcontractors of any tier to operate, maintain or tamper with the other Party's equipment on their respective sides of the interconnection facilities without the prior written consent of the other Party which shall not be unreasonably withheld, except in situations when such actions are taken to prevent immediate injury, death or property damage, and each Party shall use its best efforts to provide the other Party with advance notice of the need for such actions.

#### **11.10 Designs, Drawings and Specifications**

SPP shall promptly submit to TNB copies of the designs, drawings and specifications relating to the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.

#### **11.11 Other Businesses**

SPP shall not undertake, participate or otherwise be involved whether directly or indirectly in any business or opportunity other than the construction and operation and maintenance of the Facility and the sale of solar photovoltaic energy generated by the Facility to TNB under this Agreement.

#### **11.12 Delivery of the Financial Model**

On or before the execution of this Agreement, SPP shall deliver one (1) soft copy (on CD-Rom or other electronic storage medium) of the Financial Model to TNB.

#### **11.13 Refinancing of the Project**

- (a) SPP may, during the Term, with the prior written approval of TNB and Suruhanjaya Tenaga (such approval not to be unreasonably withheld or delayed), arrange for the Project to be refinanced for the purposes of reducing the cost of financing of the Project.
- (b) In the event of any refinancing of the Project, SPP shall submit to TNB one (1) certified copy of the Financing Documents relating to such refinancing within seven (7) days after the Financial Closing Date in connection with the refinancing of the Project occurs.

#### 11.14 Amendments to the Project Documents

- (a) Once a Project Document has been entered into by the parties thereto, no change, variation, modification or amendment to the terms of that Project Document which could reasonably be expected to have a material adverse effect on TNB's rights under this Agreement shall be permitted without the express written consent of TNB (such consent not to be unreasonably withheld or delayed).
- (b) If subject to subparagraph (a) above, SPP enters into any agreement, contract and/or document to change, vary, modify or amend the terms of the Project Document, SPP shall submit to TNB a certified copy of such agreement, contract and/or document within seven (7) days after their being entered into by the parties hereto.

#### 11.15 Green Technology Benefits

It is expressly agreed and acknowledged by the Parties that the value of any benefits, credits or incentives which are available or may become available for reductions of "green house gas" emissions or adoption of green and renewable technology (the **Green Technology Benefits**) gained from the generation of solar photovoltaic energy by the Facility shall be solely for the benefit of TNB and passed through entirely to TNB. SPP hereby undertakes with TNB that it will, at TNB's costs and expenses, take such action as TNB may require in order to qualify for the Green Technology Benefits and to establish mechanism for the passing through of such Green Technology Benefits to TNB. All costs and expenses to be incurred by SPP to qualify for the Green Technology Benefits shall be pre-agreed with TNB prior to their incurrence.

### 12 TAXES AND FINES

#### 12.1 Taxes and Fees

SPP shall pay all present and future taxes (whether national, state or local) imposed in connection with the ownership, operation and maintenance of the Facility, and, except as otherwise specified below, pay all other duties, impositions, assignments, levies, fees, costs and expenses (reasonably incurred) of any kind (whether or not to a Government Entity) necessary to assure the performance of its obligations under this Agreement.

#### 12.2 Fines

- (a) Save as provided in subparagraph (c) below, any fines, penalties or other costs incurred by SPP or its agents, employees or subcontractors for non-compliance by SPP, its agents, employees, or subcontractors with the requirements of any Laws or Government Authorisations shall not be reimbursed by TNB but shall be the sole responsibility of SPP.
- (b) If such fines, penalties or other costs are assessed against TNB by any Government Entity or court of competent jurisdiction due to the non-

compliance by SPP with any Law or Government Authorisation, SPP shall indemnify and hold harmless TNB against any and all losses, liabilities, damages and claims suffered or incurred because of the failure of SPP to comply therewith. SPP shall also reimburse TNB for any and all legal or other expenses (including lawyers' fees) reasonably incurred by TNB in connection with such losses, liabilities, damages and claims.

- (c) If such fines, penalties or other costs are assessed against SPP by any Government Entity or court of competent jurisdiction due to the non-compliance by TNB with any Law or Government Authorisation, TNB shall indemnify and hold harmless SPP against any and all losses, liabilities, damages and claims suffered or incurred because of the failure of TNB to comply therewith. TNB shall also reimburse SPP for any and all legal or other expenses (including lawyers' fees) reasonably incurred by SPP in connection with such losses, liabilities, damages and claims.

## **13 INSURANCE**

### **13.1 Insurance Required**

SPP shall maintain or procure to be maintained in effect the following insurance policies and coverage with respect to the Facility and where applicable, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works:

- (a) all insurances required by Law;
- (b) such insurance as is appropriate and customary for a prudent photovoltaic energy independent power producer; and
- (c) all insurances as required under the Financing Documents.

### **13.2 Availability of Coverage**

If any of the insurances referred to in Clause 13.1 (*Insurance Required*) are not available on reasonable commercial terms, SPP shall provide TNB detailed information as to the maximum amount of available coverage that it is able to purchase and shall be required to obtain TNB's consent (which consent shall not be unreasonably withheld or delayed) as to the adequacy of such coverage under the circumstances prevailing at the time.

### **13.3 Scope of Insurance**

SPP shall, where applicable, cause the insurers providing the coverage described in Clause 13.1 (*Insurance Required*) to amend or endorse each such policy:

- (a) to include TNB, its directors, officers and employees as additional insureds;
- (b) to provide that such insurance is primary with respect to the interest of TNB, its directors, officers and employees, and that any other insurance maintained by TNB is in excess and not contributory to the insurance

provided under Clause 13.1 (*Insurance Required*);

- (c) to include a waiver of all rights of subrogation against TNB, its directors, officers and employees;
- (d) to contain a severability of interest provision; and
- (e) to provide for at least sixty (60) days' written notice to TNB prior to the cancellation, termination, non-renewal or material change of any such insurance coverage.

#### **13.4 Premium and Reports**

- (a) SPP shall ensure that TNB, its directors, officers or employees shall not in any way be liable for the payment of any premiums required to be made to maintain the insurance policies set out in Clause 13.1 (*Insurance Required*).
- (b) SPP shall, if requested by TNB, use its best endeavours to procure for TNB's use any reports prepared by its insurers (whether in respect of compliance or claims) in respect of any insurance policies maintained in respect of the Facility or SPP.

#### **13.5 Evidence of Insurance**

SPP shall cause such insurers or the agents thereof to provide TNB with certificates of insurance evidencing the policies described in Clause 13.1 (*Insurance Required*). Failure to provide such certificates shall not relieve SPP of its obligation to maintain the insurance coverage described in this Agreement, nor shall failure to obtain or maintain such insurance or recover any amount from such insurance, relieve, or in any way reduce, any obligation or liability imposed on SPP elsewhere in this Agreement. SPP shall forthwith upon receipt thereof provide to TNB certificates of insurance coverage or insurance policies for the construction period and operation period as required by this Clause 13 (*Insurance*). These certificates shall be made available to TNB within thirty (30) days of inception or renewal.

#### **13.6 Application of Proceeds**

SPP shall apply the proceeds of any such insurance policies received following a claim by SPP for loss or damage to the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with the requirements of the Financing Documents (so long as they are in effect) and otherwise to repair and/or reinstate the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. The time taken for the disbursement of the proceeds from any such insurance shall not in any way affect or delay the rectification, reinstatement and/or indemnification of any such loss or damage.

### **14 FORCE MAJEURE**

#### **14.1 Force Majeure Event Defined**

For the purposes of this Agreement, a Force Majeure Event shall mean an event,

condition, or circumstance or its effect which:

- (a) is beyond the reasonable control of and occurs without fault or negligence on the part of the Party claiming it as a Force Majeure Event; and
- (b) causes a delay or disruption in the performance of any obligation under this Agreement despite all reasonable efforts of the Party claiming it as a Force Majeure Event to prevent it or mitigate its effects.

Subject to satisfying the foregoing criteria, Force Majeure Events include without limitation, the following:

- (i) strikes or lockouts and/or other work stoppages or industrial action (other than those solely affecting the Party claiming the same as a Force Majeure Event);
- (ii) acts of public enemies or terrorists or acts of war, whether or not war is declared, acts of force by a foreign nation or embargo;
- (iii) public disorders, insurrection, rebellion, sabotage, riots or violent demonstrations;
- (iv) explosions, fire, earthquakes, landslides, subsidence, sabotage, and/or other natural calamities and acts of God;
- (v) unusually severe weather conditions;
- (vi) expropriation or compulsory acquisition by any Government Entity;
- (vii) failure to obtain or renew any Government Authorisations; and
- (viii) any Force Majeure Event affecting the performance of any Person that is a party to the EPCC Contract or other contract between SPP and such Person relating to the construction, operation or maintenance of the Facility, the SPP Interconnection Facility and the SPP Interconnector.

#### **14.2 Notification and Obligation to Remedy**

If a Force Majeure Event occurs, the Party affected by it shall:

- (a) as soon as reasonably practicable, give the other Party written notice of the Force Majeure Event, including full information about it and the actions and time estimated to be necessary to resume performance of the affected Party's obligations under this Agreement;
- (b) afford the other Party reasonable access to its facilities for obtaining further information about the event;
- (c) use, at its own cost, all reasonable efforts to remedy its inability to perform and to resume full performance of its obligations under this Agreement as soon as practicable (provided that such Party shall not be required by this Clause 14.2(c) (*Notification and Obligation to Remedy*) to settle any strikes



on terms that are adverse to such Party and not commercially reasonable);

- (d) keep the other Party reasonably apprised of such efforts; and
- (e) provide written notice when it resumes the performance of its obligations under this Agreement.

#### **14.3 Effect of Force Majeure Event**

- (a) Subject to the limitations set out in this Agreement, if either Party is rendered unable by reason of a Force Majeure Event to perform, wholly or in part, any obligation set out in this Agreement, then upon that Party giving notice as specified in Clause 14.2 (*Notification and Obligation to Remedy*) and full particulars of the Force Majeure Event, those obligations of that Party shall be suspended or excused to the extent their performance is affected by the Force Majeure Event.
- (b) If a Force Majeure Event occurs before the Commercial Operation Date and delays the occurrence of the Commercial Operation Date past its Scheduled Commercial Operation Date, the Scheduled Commercial Operation Date shall be extended by one (1) day for each day the Commercial Operation Date is delayed by a Force Majeure Event.
- (c) If a Force Majeure Event occurs after the Commercial Operation Date, the Term shall be extended by one (1) day for each day (i) the Facility is unavailable after its Commercial Operation Date due to any Force Majeure Event, and (ii) SPP is not otherwise compensated under its insurance to receive insurance proceeds which replace any Energy Payments not received by SPP for such period.

#### **14.4 Limitations**

- (a) The Party claiming relief under Clause 14.3 (*Effect of Force Majeure Event*) shall suspend or be excused performance of its obligations under this Agreement to the minimum extent practicable in the circumstances.
- (b) Any relief of a Party's obligations under this Agreement given by Clause 14.3 (*Effect of Force Majeure Event*) shall be subject to any limitations explicitly set out in this Agreement.
- (c) The Parties shall only be able to claim the benefit of Clause 14.3 (*Effect of Force Majeure Event*) to excuse their obligations under this Agreement for any Force Majeure Event that occurs, or is in effect, after the Effective Date.
- (d) Obligations of the Parties that are required to be completely performed before the occurrence of a Force Majeure Event shall not be excused as a result of it occurring.
- (e) Neither Party shall be relieved of any obligations under this Agreement solely because of increased costs or other adverse economic consequences that may be incurred through the performance of such obligations of the Parties.

- (f) Notwithstanding anything in Clause 14 (*Force Majeure*), a Force Majeure Event in relation to either Party shall not include:
- (i) normal wear and tear or random flaws in materials and equipment or breakdowns in equipment; and/or
  - (ii) any full or partial curtailment in the electric output of the Facility that is caused, or arises from, the acts or omissions of any third party including any vendor, materials supplier, customer, or supplier of SPP, except (to the extent) such acts or omissions are themselves caused by an event or circumstance which constitutes a Force Majeure Event.

#### **14.5 Right to Terminate**

- (a) If a Force Majeure Event prevents either Party from substantially performing any material obligation under this Agreement for a period which exceeds one hundred and eighty (180) days, either Party may terminate this Agreement by giving thirty (30) days' written notice of termination, unless the provisions of sub-clause (b) below apply.
- (b) If a Force Majeure Event which prevents either Party from substantially performing any material obligation under this Agreement cannot be remedied within one hundred and eighty (180) days with the use of reasonable diligence, then that period shall be extended for a further period of one hundred and eighty (180) days.
- (c) If the Party affected is unable to remedy the Force Majeure Event by the end of the further period of one hundred and eighty (180) days, the Parties shall consult as to what steps shall be taken with a view to mitigating or remedying the consequences of the relevant Force Majeure Event, having regard to all the circumstances. Such circumstances shall include consideration of how far the Party affected is able to demonstrate to the reasonable satisfaction of the other Party that:
  - (i) it is diligently applying reasonable efforts to execute a plan to overcome the effects of the Force Majeure Event and resume performance of its obligations under this Agreement; and
  - (ii) the Force Majeure Event can be overcome within a reasonable time after the expiration of the further period of one hundred and eighty (180) days.
- (d) Following consultation or consultations, the Parties shall determine whether and on what terms the further period of one hundred and eighty (180) days should be extended or whether and on what terms this Agreement should be terminated.
- (e) If the Parties agree to extend the second period then the provisions of sub-clauses (c) through (f) shall apply mutatis mutandis at the end of such extension.

- (f) If the Parties are unable to agree to extend the further period of one hundred and eighty (180) days, either Party may terminate this Agreement by giving thirty (30) days' written notice of termination. In the event of termination under this Clause 14.5 (*Right to Terminate*), this Agreement shall cease to have any further force or effect and neither Party shall have any obligation or liability (save in respect of any antecedent breach) to the other Party whether at Law, hereunder or otherwise.

#### **14.6 Survival of Provisions**

The provisions of this Clause 14 (*Force Majeure*) shall survive the termination or expiry of this Agreement.

### **15 DEFAULT AND TERMINATION**

#### **15.1 SPP Events of Default**

Each of the following events shall constitute an Event of Default by SPP, unless excused under another provision of this Agreement:

- (a) SPP fails to make a payment of any undisputed amount which is due and payable under this Agreement within sixty (60) days after receipt of notice of non-payment from TNB;
- (b) SPP fails to comply with or operate in conformity with any obligation of this Agreement (other than a payment obligation) and such failure, if capable of remedy, continues uncured for a period of ninety (90) days, after receipt of notice of such failure from TNB;
- (c) (i) SPP is dissolved or liquidated, other than for the purpose of a voluntary dissolution or liquidation as part of a reorganisation or reincorporation;
- (ii) SPP applies for or consents to a receiver, manager, custodian, trustee or liquidator being appointed over or taking possession of all or a substantial part of its assets;
- (iii) SPP admits in writing its inability to pay its debts as they fall due;
- (iv) SPP makes a general assignment or an arrangement or composition with or for the benefit of its creditors;
- (v) SPP commences a voluntary case or files a petition seeking to take advantage of any law relating to bankruptcy, insolvency, reorganisation of its debts, winding-up or composition or re-adjustment of its debts;
- (vi) SPP fails to dispute in a timely manner, or acquiesces in writing to, any petition filed against it in an involuntary case under any bankruptcy or similar law; or

- (vii) SPP takes any action for the purpose of effecting any of the events described in paragraphs (c) (i) through (v) above;
- (d) the Facility delivers to TNB Net Energy Output which is not solely driven by solar photovoltaic technology, for example output from energy storage devices, hybrid generating devices with other fuel sources, concentrated solar thermal technology;
- (e) the Commercial Operation Date fails to occur within one hundred and eighty (180) days of the Scheduled Commercial Operation Date (unless otherwise excused or extended under this Agreement);
- (f) SPP Abandons the Project after the Effective Date and fails to resume activities within a period agreeable to TNB;
- (g) the Site Agreement is terminated or SPP is convicted for carrying out any crime or illegal activities under the Laws at the Site or in the vicinity of the Site;
- (h) the SPP Licence is suspended or revoked or terminated or expired due to SPP's default, and SPP has not caused the SPP Licence to be reinstated or renewed either (i) within the shorter of three hundred and sixty-five (365) days and the legally permissible period for such reinstatement or renewal; or (ii) after having exhausted all available administrative or legal appeals and applications for such reinstatement or renewal;
- (i) any of the following events occur prior to the fifth (5<sup>th</sup>) anniversary of the Commercial Operation Date, without the prior written approval of Suruhanjaya Tenaga:
- (i) SPP sells, conveys, transfers or otherwise disposes of the Project or any material part or any interest in the Project to any other Person or enters into an agreement to do so; or
- (ii) any Shareholder sells, transfers or otherwise disposes of any share of SPP or [●] (including for this purpose the assignment of the beneficial interest therein the creation of any charge or other security interest over, such share or the renunciation or assignment of any right to receive or to subscribe for such share) or any interest in such share or enters into an agreement to do so; or
- (iii) there is a change in Control of SPP;
- and for the purposes of this paragraph (i):
- (iv) "interest in such share" shall have the meaning assigned to such phrase in Section 6A of the Companies Act 1965;
- (v) "[●]" means [●] (Company Registration No. [●]); and

- (vi) "Shareholder" means a Person who, legally or beneficially, owns or Controls any share of SPP or [●] or any interest in such share.

### 15.2 TNB Events of Default

Each of the following events shall constitute an Event of Default by TNB, unless excused under another provision of this Agreement:

- (a) TNB fails to make a payment of any undisputed amount which is due and payable under this Agreement within sixty (60) days after receipt of notice of non-payment from SPP;
- (b) TNB fails to comply with or operate in conformity with any obligation of this Agreement (other than a payment obligation) and such failure, if capable of remedy, continues uncured for a period of ninety (90) days, after receipt of notice of such failure from SPP; or
- (c)
  - (i) TNB is dissolved or liquidated, other than voluntary dissolution or liquidation as part of a reorganisation or reincorporation;
  - (ii) TNB applies for or consents to a receiver, manager, custodian, trustee or liquidator being appointed over or taking possession of all or a substantial part of its assets;
  - (iii) TNB admits in writing its inability to pay its debts as they fall due;
  - (iv) TNB makes a general assignment or an arrangement or composition with or for the benefit of its creditors;
  - (v) TNB commences a voluntary case or files a petition seeking to take advantage of any law relating to bankruptcy, insolvency, reorganisation of its debts, winding-up or composition or re-adjustment of its debts;
  - (vi) TNB fails to dispute in a timely manner, or acquiesces in writing to, any petition filed against it in an involuntary case under any bankruptcy or similar law; or
  - (vii) TNB takes any action for the purpose of effecting any of the events described in paragraphs (c) (i) through (v) above.

### 15.3 Right To Terminate; Additional Rights

- (a) If an Event of Default occurs (other than an Event of Default falling within Clause 15.1(b) and Clause 15.2(b) that cannot be cured with the exercise of reasonable diligence within the period of ninety (90) days therein), the non-defaulting Party may terminate this Agreement by giving fourteen (14) days' written notice to the other Party.
- (b) If an Event of Default which falls within Clause 15.1(b) or Clause 15.2(b) that cannot be cured with the exercise of reasonable diligence within the period of ninety (90) days specified therein, then that period shall be extended for a

further period of one hundred and eighty (180) days. If the Event of Default continues uncured at the end of such further period, then the non-defaulting Party may terminate this Agreement immediately by written notice to the defaulting Party.

- (c) The right of termination shall be in addition to all other rights and remedies available to the non-defaulting Party, at law or in equity or otherwise. Such rights and remedies may include compensation for monetary damages, injunctive relief and specific performance.
- (d) Nothing in this Clause 0 (*Default and Termination*) shall give any Party the right to terminate this Agreement for a breach of any obligation save and except for an Event of Default as stated in Clauses 15.1 (*SPP Events of Default*) and 15.2 (*TNB Events of Default*).
- (e) The provisions of Clauses 15.3(c) and 15.3(d) shall survive termination of this Agreement.

#### **15.4 Consequences of Termination**

- (a) If TNB terminates this Agreement as a result of an Event of Default by SPP, TNB shall have the option but not the obligation, exercisable by notice in writing within sixty (60) days of the termination of this Agreement, to purchase the Project in the manner and for the purchase price determined in accordance with the provisions of Appendix J. In the event that the option is exercised, SPP shall sell the Project to TNB.
- (b) If SPP terminates this Agreement as a result of an Event of Default by TNB, SPP shall have the option but not the obligation, exercisable by notice in writing within sixty (60) days of the termination of this Agreement, to sell the Project to TNB, in the manner and for the purchase price determined in accordance with the provisions of Appendix J. In the event that the option is exercised, TNB shall purchase the Project from SPP.
- (c) SPP shall ensure that the Financing Parties specifically acknowledge and are bound by TNB's rights set out in this Clause 15.4 (*Consequences of Termination*).
- (d) The provisions of this Clause 15.4 (*Consequences of Termination*) and Appendix J shall survive termination of this Agreement.

#### **16 Suruhanjaya Tenaga's Rights**

SPP acknowledges Suruhanjaya Tenaga has a statutory right to step in and operate the Facility and if Suruhanjaya Tenaga exercises such statutory rights at any time, TNB shall, so long as consistent with the terms of the Financing Documents or the rights of the Financing Parties thereunder, be entitled to make Energy Payments and/or Non-Acceptance Payments to Suruhanjaya Tenaga or at Suruhanjaya Tenaga's direction and such payments shall for the purposes of this Agreement be deemed a payment made to SPP in full discharge of TNB's obligation to SPP hereunder.

## 17 INDEMNIFICATION AND LIABILITY

### 17.1 Indemnification

- (a) Neither Party shall be liable to the other for any claims, judgments, liabilities, losses, costs, expenses or damages of any kind or character (including loss of use of property), which are the consequence of damage to or destruction of property or personal injury (including death) resulting from the performance of this Agreement, unless:
- (i) otherwise specifically provided in this Agreement; or
  - (ii) the damage or injury arises out of or is caused by the breach of this Agreement by a Party or by the negligence or misconduct of a Party's own officers, directors, employees, agents, contractors or subcontractors.
- (b) The exclusion stipulated in the preceding paragraph shall include the design, construction, maintenance or operation of property, facilities or equipment owned or used by the other Party, or the use or misuse of or contact with the solar photovoltaic energy delivered hereunder.
- (c) Each Party shall indemnify and hold the other Party, and its officers, directors, agents, employees, contractors, and subcontractors, harmless from and against any and all claims, judgments, losses, liabilities, costs, expenses (including reasonable lawyers' fees) and damages of any nature whatsoever for personal injury, death or property damage to third parties, caused by any act or omission of the indemnifying Party or the indemnifying Party's own officers, directors, affiliates, agents, employees, contractors or subcontractors that arises out of or are in any manner connected with the performance of this Agreement, except:
- (i) workers compensation claims by any officers, directors, agents, employees, contractors and subcontractors of the Party seeking indemnification hereunder; and
  - (ii) to the extent such injury, death or damage is attributable to the negligence or misconduct of, or breach of this Agreement by, the Party seeking indemnification hereunder.
- (d) If either Party receives a claim from a third party (not being a Party) in respect of which it is entitled to the benefit of an indemnity under this Clause 17.1 (*Indemnification*) it shall notify the other Party within fifteen (15) days of receipt of the claim and shall not settle or pay the claim without the prior approval of the other Party (which approval shall not be unreasonably withheld or delayed).
- (e) If the Party giving an indemnity wishes to contest or dispute a claim, it may conduct the proceedings in the name of the indemnified Party, if it provides the indemnified Party security against any costs involved to the reasonable satisfaction of that indemnified Party.

- (f) SPP shall defend, indemnify and hold TNB, and its officers, directors, agents, employees, contractors and subcontractors, harmless from and against any and all claims, judgments, liabilities, losses, costs, expenses (including reasonable lawyers' fees) and damages under every applicable environmental law or regulation arising out of the condition of the Site, SPP's construction, ownership or operation of the Facility, SPP Interconnection Facility and the SPP Interconnector or the construction of the SPP Works, including the discharge, dispersal, release, storage, treatment, generation, disposal or escape of pollutants or other toxic or hazardous substances from the Facility, the SPP Interconnection Facility, the SPP Interconnector, the contamination of soil, air, surface water or ground water at or around the Site or any pollution abatement, replacement, removal, or other decontamination or monitoring obligations with respect thereto, except to the extent such damages are attributable to the negligence or misconduct of, or breach of this Agreement by TNB, its officers, directors, agents, employees, contractors or subcontractors.
- (g) Notwithstanding any provision in this Agreement to the contrary, in no event shall TNB or the Grid System Operator be liable for damage or destruction of property, facilities or equipment operated by SPP as a result of any review, verification, acceptance, endorsement or approval of any material, documents, designs, drawings, schedules, design data, control and protection settings, test procedures, test results, test reports or other information submitted by SPP concerning the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works under this Agreement or any presence of TNB or the Grid System Operator to witness any test performed on the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works at any time during the Term.

### 17.2 Consequential Damages

Neither Party shall be liable to the other Party for any indirect, incidental, consequential or punitive damages as a result of the performance or non-performance of the obligations imposed pursuant to this Agreement, including failure to deliver or purchase solar photovoltaic energy hereunder, irrespective of the causes of such damages, including fault or negligence. The Parties hereby agree that the compensation provided for in this Agreement shall not constitute such indirect, incidental, consequential or punitive damages.

### 17.3 Survival

The obligations under this Clause 17 (*Indemnification and Liability*) arising in connection with any event or circumstances occurring before the termination or expiration of this Agreement shall survive such termination or expiration.

## 18 DISPUTE RESOLUTION



**18.1 Senior Officers**

- (a) SPP and TNB shall each designate in writing to the other Party a representative who shall be authorised to resolve a Dispute (as defined in this paragraph) in an equitable manner and unless otherwise expressly provided in this Agreement, to exercise the authority of the Party which appointed him to make decisions by mutual agreement. For the purposes of this Clause 18 (*Dispute Resolution*), a **Dispute** shall mean any dispute, controversy, claim or difference of whatever nature and howsoever arising under, out of or in connection with this Agreement, including the breach, termination or validity thereof.
- (b) If the designated representatives are unable to resolve any Dispute arising under this Agreement, the Dispute shall be referred by the representatives, respectively, to a senior officer designated by SPP and to a senior officer designated by TNB for resolution.
- (c) The Parties agree to attempt to resolve all Disputes arising hereunder promptly, equitably and in a good faith manner. The Parties further agree to provide each other with reasonable access during normal business hours to any and all non-privileged records, information and data pertaining to any such Dispute.
- (d) If any decision on a Dispute is mutually agreed by the designated representatives of the Parties pursuant to Clauses 18.1(a) or 18.1(b), such decision shall be final and conclusive as to such Dispute.

**18.2 Arbitration**

- (a) If any Dispute cannot be resolved between the Parties pursuant to Clause 18.1 (*Senior Officers*) above within three (3) months (or such further periods as the Parties may agree) after it arises or, if either Party fails to designate a representative or to participate in any attempt to resolve any Dispute pursuant to Clause 18.1 (*Senior Officers*), then such Dispute shall be settled exclusively and finally by arbitration. Either Party may serve formal notice that a Dispute exists (the **Arbitration Notice**) upon the other. The Arbitration Notice shall specify the nature of the Dispute, the points in issue and the Party's intention to refer the Dispute to arbitration. If the Parties fail to resolve the Dispute within a further period of fifteen (15) days from the date upon which the Arbitration Notice was served, either Party may request that the Dispute be referred to arbitration by written notice referring to this Clause 18.2 (*Arbitration*) to that effect to the other Party (the **Referral Notice**). For the avoidance of doubt, any Dispute that cannot be resolved between the Parties, including any matter relating to the interpretation of this Agreement, shall be submitted to arbitration irrespective of the magnitude of the Dispute, the amount in Dispute or whether such Dispute would otherwise be considered justifiable for rule or resolution by any court or arbitral tribunal. This Agreement and the rights and obligations of the Parties shall remain in full force and effect and the performance of this Agreement shall continue pending the award in such arbitration proceeding, which award shall determine the Dispute between the Parties, including

whether and when termination of this Agreement shall become effective.

- (b) Each arbitration shall be conducted in Kuala Lumpur before a single arbitrator and in accordance with the Rules for Arbitration of the Regional Centre for Arbitration at Kuala Lumpur (the **Centre**), except as such rules conflict with the provisions of this Clause 18.2 (*Arbitration*) in which event the provisions of this Clause 18.2 (*Arbitration*) shall prevail.
- (c) The Parties shall mutually agree on the single arbitrator within thirty (30) days of the receipt of the Referral Notice. Only persons with experience in commercial agreements and in particular the implementation and interpretation of power purchase agreements shall be appointed as the arbitrator. No arbitrator shall be a present or former employee or agent of or consultant or counsel to either Party or any affiliate of either Party unless both Parties consent in writing to such appointment. If the Parties cannot agree on the single arbitrator, the arbitrator shall be appointed in accordance with the Rules for Arbitration at the Centre.
- (d) The language to be used shall be the English language.
- (e) Any decision or award of each arbitral tribunal appointed pursuant to this Clause 18.2 (*Arbitration*) shall be final and binding upon the Parties. The Parties waive to the extent permitted by law any rights to appeal or any review of such award by any court or tribunal of competent jurisdiction. The Parties agree that any arbitration award made may be enforced by the Parties against assets of the relevant Party wherever they are located or may be found, and a judgment upon any arbitration award may be entered into by any court having jurisdiction thereof.
- (f) At any oral hearing of evidence in connection with any arbitration, each Party or its legal counsel shall have the right to examine its witnesses and to cross-examine the witnesses of the opposing Party. No evidence of any witness shall be presented in written form unless the opposing Party shall have an opportunity to cross-examine such witness, except as the Parties may otherwise agree in writing or except under extraordinary circumstances where the interests of justice require a different procedure.
- (g) For the avoidance of doubt, all disputes arising under or in connection with this Agreement shall be resolved in accordance with Clause 18 (*Dispute Resolution*) and nothing contained in this Agreement shall be construed as permitting either Party to commence proceedings in any court in any jurisdiction.

## **19 CHANGE-IN-LAW**

### **19.1 Change-in-Law Adjustment**

- (a) If there is a Change-in-Law which requires SPP to make any material capital improvement or other material modification to the Facility, the SPP Interconnection Facility, the SPP Interconnector and/or the SPP Works (to the extent Change-in Law occurring pre-Commercial Operation Date

affecting SPP Works), the cost of which is in excess of the Capital Improvement Threshold in any calendar year, which material capital improvement or other material modification is required for the purpose of enabling SPP to fulfil its obligations under this Agreement in compliance with such Change-in-Law, SPP shall as soon as practicable consult with TNB regarding the extent of the modification required, the implementation of the modifications, the period of unavailability (if any) and the required expenditure.

- (b) The Parties shall in, good faith, minimise the required expenditure consistent with Prudent Utility Practices, the Distribution Code and SPP's obligations under this Agreement and agree upon any extension of the Term or any adjustment to the Energy Rate to reflect such cost in excess of the Capital Improvement Threshold for submission to Suruhanjaya Tenaga for approval. SPP and TNB shall use their respective best efforts to limit the remedy to an extension of Term only and only in the event it is not commercially feasible to do so, resort to an adjustment to the Energy Rate. If the Parties cannot reach agreement, the matter shall be determined in accordance with Clause 18 (*Dispute Resolution*).
- (c) After receipt by SPP and TNB of the written approval from Suruhanjaya Tenaga of:
  - (i) the costs of the material capital improvement or material modification to the Facility, the SPP Interconnection Facility, the SPP Interconnector and/or the SPP Works, as the case may be;
  - (ii) such extension of the Term or adjustment to the Energy Rate; and
  - (iii) the inclusion of any adjustments to the Energy Rate as part of TNB's tariff rates to its customers in a manner consistent with such adjustments;the Term or the Energy Rate, as the case may be, shall be adjusted in the manner as approved by Suruhanjaya Tenaga.
- (d) For purpose of this Clause 19 (*Change-in-Law*), the Capital Improvement Threshold shall be Ringgit Malaysia Two Hundred and Fifty Thousand (RM250,000.00).
- (e) For purposes of this Clause 19 (*Change-in-Law*), a change in the Distribution Code shall be treated as if a Change-in-Law.
- (f) SPP's inability to perform its obligations during the period required by SPP to effect the changes or modification to the Facility the SPP Interconnection Facility, the SPP Interconnector and/or the SPP Works necessitated by any Change-in-Law shall not be a breach of this Agreement to the extent such inability is a direct consequence of the Change-in-Law.

**20 MISCELLANEOUS****20.1 Transfers and Assignment**

- (a) Except as required by the Financing Parties under the Financing Documents or as permitted under this Agreement under Clause 20.1 (*Transfers and Assignment*) or Clause 20.2 (*Successors and Assigns*), SPP shall not sell, convey, transfer or otherwise dispose of the Project or any material part or any interest in the Project to any other Person without the prior written consent of TNB and Suruhanjaya Tenaga. For purposes of this Clause 20.1 (*Transfers and Assignment*), any transfer of the controlling interest in SPP to any Person who is not a direct or indirect shareholder of SPP on the Effective Date shall be deemed to be a transfer subject to the terms of this Clause 20.1 (*Transfers and Assignment*).
- (b) If the Financing Documents so require, TNB shall:
- (i) provide its consent to assignments and acknowledgement of rights of the Financing Parties (including cure rights and the rights of the Financing Parties under the Financing Documents to be substituted for SPP upon the occurrence of any default provided that the Financing Parties shall notify TNB in writing before exercising such rights) as shall be necessary or reasonably appropriate in order to obtain financing for the Project in a timely manner provided that such rights shall be subject to the terms of this Agreement and not inconsistent with TNB's rights hereunder;
  - (ii) make payments to SPP directly into a collateral security account established under the Financing Documents (subject to any claims or rights TNB may have against SPP under this Agreement);
  - (iii) in the event of a default and provided that a prior written notice has been given to TNB, accept as a substitute for SPP under this Agreement, the agent for the Financing Parties, any designee or transferee of such agent or any purchaser of SPP or the Project upon a foreclosure sale conducted on behalf of the Financing Parties of SPP's interest in the Project or of the issued share capital of SPP; and
  - (iv) subject to a prior written notice already been given to TNB, afford the Financing Parties an opportunity to remedy any Event of Default by SPP within the relevant cure period hereunder before terminating this Agreement.
- (c) SPP acknowledges that:
- (i) any assignment or transfer to a secured party pursuant to the Financing Documents shall not relieve SPP of its obligations to TNB under this Agreement;
  - (ii) no such assignee or transferee shall be liable for the performance of SPP's obligations under this Agreement; and

- (iii) any exercise by any such assignee or transferee shall be subject to the terms of this Agreement.

## 20.2 Successors and Assigns

This Agreement shall be binding upon and shall inure to the benefit of the Parties and their respective successors and permitted assigns.

## 20.3 Notices

Except as otherwise specified in this Agreement, any notice, demand for information or documents required or authorised by this Agreement to be given to a Party shall be given in writing and shall be sufficiently given if delivered by registered mail, courier or hand delivered against written receipt, or if transmitted and clearly received by facsimile transmission addressed as set out below, or if sent to such Party by registered mail, courier or hand delivery to such other address as such Party may designate for itself by notice given in accordance with this Clause 20.3 (*Notices*). Any such notice shall be effective only if given by such Party (and not on its behalf by an agent) and upon actual delivery or receipt thereof.

All notices given by facsimile shall be confirmed in writing, delivered or sent as aforesaid, but the failure to so confirm shall not vitiate the original notice. The address for the delivery of notices and bills to each Party and the respective telephone and facsimile numbers are as follows:

- (a) For SPP:

[•]

Attention: [•]  
 Telephone: [•]  
 Facsimile: [•]

- (b) For TNB:

Ibu Pejabat TNB  
 No. 129, Jalan Bangsar  
 59200 Kuala Lumpur  
 Wilayah Persekutuan

Attention: President and Chief Executive Officer  
 Telephone: 03-2296 5566  
 Facsimile: 03-2284 0223

With a copy to: [•]

Attention: [•]  
 Telephone: [•]  
 Facsimile: [•]

**20.4 Choice of Law**

This Agreement shall be governed by, and construed in accordance with, the laws of Malaysia. Subject to the provisions of Clause 18.2 (*Arbitration*), the Parties hereby submit to the exclusive jurisdiction of courts located in Kuala Lumpur, Wilayah Persekutuan.

**20.5 Entire Agreement**

This Agreement constitutes the entire understanding between the Parties and supersedes any and all previous understandings between the Parties with respect to the subject matter hereof.

**20.6 Further Assurances**

If either Party determines in its reasonable discretion that any further instruments or other things are necessary or desirable to carry out the terms of this Agreement, the other Party shall, at the expense of the requesting Party, execute and deliver all such instruments and assurances and do all things reasonably necessary or desirable to carry out the terms of this Agreement.

**20.7 Waiver**

No waiver by either Party of the performance of any obligation under this Agreement or with respect to any default or any other matter arising in connection with this Agreement shall be deemed a waiver with respect to any subsequent performance, default or matter.

**20.8 Modification or Amendment**

No modification, amendment or waiver of any provisions of this Agreement shall be valid unless it is in writing and signed by both Parties.

**20.9 Exclusion**

The Parties agree to exclude the application of Section 75 of the Contracts Act 1950.

**20.10 Severability**

If any term or provision of this Agreement or the application thereof to any Person or circumstances shall to any extent be declared invalid or unenforceable by any Malaysian authority or court of competent jurisdiction, the remainder of this Agreement or the application of such term or provision to Persons or circumstances other than those as to which it is declared invalid or unenforceable shall not be affected thereby, and each other term and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

**20.11 Counterparts**

This Agreement may be executed in counterparts all of which shall constitute one agreement binding on both Parties and shall have the same force and effect as an original instrument, notwithstanding that both Parties may not be signatories to the

same original or the same counterpart.

#### **20.12 Confidential Information**

- (a) This Agreement and any information provided by either Party to the other Party pursuant to this Agreement and labelled "CONFIDENTIAL" shall be utilised by the receiving Party solely in connection with the purposes of this Agreement and shall not be disclosed by the receiving Party to any third party, except with the providing Party's consent, and upon request of the providing Party shall be returned thereto.
- (b) Notwithstanding subparagraph (a) above, the Parties acknowledge and agree that such information may be disclosed on a "need to know" basis to the Financing Parties, potential financiers of the Project, suppliers and potential suppliers of major equipment to the Facility and other third parties as may be necessary for TNB and SPP to perform their obligations under this Agreement. To the extent that such disclosures are necessary, the Parties also agree that they shall endeavour in disclosing such information to seek to preserve the confidentiality of such disclosures.
- (c) Nothing in this Clause 20.12 (*Confidential Information*) shall prevent either Party from providing any confidential information received from the other Party to any court or government authority as may be required by such court or government authority, provided that, if feasible, the disclosing Party shall have given prior notice to the other Party of such required disclosure and, if so requested by such other Party, shall have used all reasonable efforts to oppose the requested disclosure, as appropriate under the circumstances, or to otherwise make such disclosures pursuant to a protective order or other similar arrangement for confidentiality.
- (d) The provisions in this Clause 20.12 (*Confidential Information*) shall continue for a period of three (3) years following early termination or expiration of this Agreement.

#### **20.13 Independent Contractors**

The Parties are independent contractors. Nothing contained in this Agreement shall be deemed to create an association, joint venture, partnership or principal/agent relationship between the Parties or to impose any partnership obligation or liability on either Party. Neither Party shall have any right, power or authority to enter into any agreement or commitment, act on behalf of, or otherwise bind the other Party in any way.

#### **20.14 Third Parties**

This Agreement is intended solely for the benefit of the Parties. Save as otherwise expressly stated, nothing in this Agreement shall be construed to create any duty or liability to or standard of care owing to any other Person.

#### **20.15 Headings**

The headings contained in this Agreement are solely for the convenience of the Parties and should not be used or relied upon in any manner in the construction or interpretation of this Agreement.

#### 20.16 Language

- (a) The official text of this Agreement shall be in the English language.
- (b) Except as otherwise specifically provided to the contrary, all documents, notices, waivers and all other communications, written or otherwise, between the Parties in connection with this Agreement shall be in the English language.

#### 20.17 Time of the Essence

Time, wherever mentioned in this Agreement shall be of the essence.

#### 20.18 Stamp Duties

This Agreement shall be duly stamped and all stamp duties in relation thereto shall be borne by SPP.

#### 20.19 Goods and Services Tax

- (a) All amounts stated in this Agreement are exclusive of goods and services tax (**GST**) unless clearly stated otherwise.
- (b) The Parties acknowledge and agree that if GST is imposed on any supplies made by any Party under this Agreement such Party shall have the right to increase the consideration payable on the supply by an amount equal to the GST imposed calculated as follows:

$$\text{GST Amount} = A \times R$$

Where:

A is the consideration payable for the supply; and

R is the applicable rate of GST prevailing at the time of supply (expressed as a percentage).

- (c) The other Party shall pay the GST Amount at the same time and in the same manner as the consideration for the supply provided.
- (d) The amount of GST payable shall be identified in a tax invoice drawn up in accordance with the requirements of the Goods and Services Tax Act 2014.
- (e) The Parties acknowledge and agree that notwithstanding any imposition of any GST on either Party, the Energy Rate shall not be subject to any adjustment whatsoever.



[END OF CLAUSES]

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**IN WITNESS WHEREOF**, the Parties to this Agreement have hereunto affixed their hands and seals the day and year first above written.

**THE COMMON SEAL OF** )  
**TENAGA NASIONAL BERHAD** was hereunto )  
affixed in the presence of: )  
)  
)  
)  
)  
)  
)

.....  
Director/ Company Secretary

.....  
Director

**THE COMMON SEAL OF** )  
[•] was hereunto affixed in the presence of: )  
)  
)  
)  
)  
)  
)  
)

.....  
Director

.....  
Director

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**LIST OF EXHIBITS**

**EXHIBIT 1**

**FORM OF BANK GUARANTEE**

FOR RFP PURPOSES ONLY

DATED [●] DAY OF [●] 20[●]

BETWEEN

TENAGA NASIONAL BERHAD  
(COMPANY REGISTRATION NO: 200866-W)

AND

[●]  
(COMPANY REGISTRATION NO: [●])

---

POWER PURCHASE AGREEMENT

LARGE SCALE SOLAR FOR CONNECTION TO  
MEDIUM VOLTAGE DISTRIBUTION NETWORK

---

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APPENDIX A

PROJECT DESCRIPTION AND DESIGN CONDITIONS

FOR RFP PURPOSES ONLY

**A1.0 GENERAL**

All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except where as otherwise defined herein.

**A2.0 GENERAL DESCRIPTION**

[SPP to insert the general description of the Project which includes:

1. A summary of its significant components, such as photovoltaic panels, DC collection system, current inverters, meteorological measuring facilities, solar irradiance instrumentation and any other related electrical equipment.
2. A drawing showing the general arrangement of the Facility.]

**A3.0 MAIN EQUIPMENT DESCRIPTIONS****A3.1 Photovoltaic Modules and Array****A3.2 Meteorological Measuring Facilities****A3.3 Inverter****A3.4 Current Transformer****A3.5 Voltage Transformer****A3.6 Performance Monitoring and Communication System**

**APPENDIX B**

**TECHNICAL REQUIREMENTS**

FOR RFP PURPOSES ONLY

**B1.0 GENERAL**

All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except where as otherwise defined herein.

Parallel operation of the Facility on the Distribution Network requires both TNB and SPP to meet certain minimum requirements for performance, operation and safety. This Appendix B describes the minimum technical and operational requirements which SPP shall comply with under the terms of this Agreement. SPP shall work closely with TNB from an early state of the Project to ensure that these requirements are met and that the design features of the Facility is compatible with the Distribution Network requirements.

In connection with the design, construction, operation and maintenance of the Facility, all SPP installations shall adhere to all applicable national and local codes, rules and Laws. In the absence of any such standards, Prudent Utility Practices or OEM standards shall, subject to the prior written consent of TNB, be applied by SPP.

SPP shall conform to all applicable provisions stated in the Distribution Code and TNB Technical Guidebook on Grid-interconnection of Photovoltaic Power Generation System to LV and MV Networks ("PV Interconnection Guidebook"). SPP shall not be allowed to be connected to the Distribution Network until such compliance is met.

**B2.0 DESIGN REQUIREMENTS****B2.1 Grid Voltage Variation**

The Distribution Network voltage fluctuates in response to the feeder length and the load level. The limits to be complied with for the planning of the interconnection shall be  $\pm 5\%$ .

**B2.2 Facility Voltage Fluctuation**

The maximum voltage fluctuation range allowed due to varying solar radiation is 6%. This requirement differs from that for voltage flicker.

**B2.3 Grid Frequency Variation**

SPP shall maintain plant frequency to operate in synchronism with the Distribution Network. Nominal system frequency is 50 Hz with normal range of  $\pm 1\%$  which is between 49.5Hz and 50.5Hz. The Facility is required to withstand short time operation within the range 47Hz and 52 Hz.

**B2.4 Current Harmonics**

Total Harmonic Distortion Current Distortion (THD) shall be <5 % at inverter rated output. The point of measurement is at the combiner box of the inverters.

Each individual harmonic shall be limited to the percentages listed in the table below (Current distortion limits reference to IEC 61727-2003 Table 1). Even harmonics in these ranges shall be less than 25 % of the lower odd harmonic limits listed.

| Odd harmonics | Distortion limit (%) |
|---------------|----------------------|
| 3 – 9         | < 4.0                |
| 11 – 15       | < 2.0                |
| 17 – 21       | < 1.5                |
| 23 – 33       | < 0.6                |

| Even harmonics | Distortion limit (%) |
|----------------|----------------------|
| 2 – 8          | < 1.0                |
| 10 – 32        | < 0.5                |

**B2.5 Voltage Fluctuation and Harmonics / Power Quality**

The acceptable permissible values for voltage fluctuation and harmonics are detailed in the table below. The point of measurement is at the Connection Point, normally at the TNB Interconnection Facility.

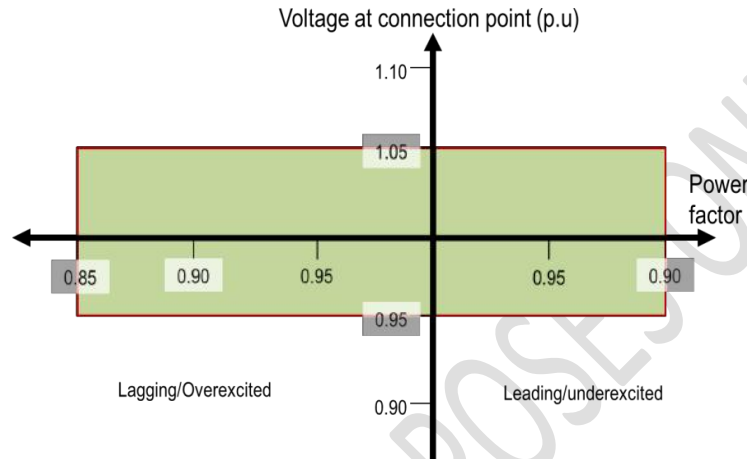
| Type Of Disturbance | Indices   | Acceptable permissible values at Connection Point | Reference Document                         |
|---------------------|---|---|--|
| Voltage Flicker     | Absolute Short Term Flicker Severity ( $P_{st}$ ) | 1.0 (at 132kV and below)                          | <b>UK's Engineering Recommendation P28</b> |
|                     | Absolute Long Term Flicker Severity ( $P_{lt}$ )  | 0.8 (at 132kV and below)                          |  |
| Harmonic Distortion | Total Harmonic Distortion Voltage (THDV) %        | 4 % at 11kV                                       | <b>Engineering Recommendation ER G5/4</b>  |
|                     |   | 3% at 33kV  |  |
| Voltage Unbalance   | Negative Phase Sequence Voltage %                 | 2% for 1 minute                                   | <b>UK's Engineering Recommendation P29</b> |

**B2.6 DC Injection**

The Facility shall not inject DC current more than 1% of the rated inverter output current under any operating condition.

**B2.7 Power Factor**

The allowed power factor of Facility range is 0.85 lagging to 0.9 leading as shown in the figure below.

**B2.8 Transient Over-voltages**

Typical Basic Impulse Insulation Levels (BIL) of the Distribution Network is as given in the table below. The Facility and its apparatus shall be compatible with the insulation levels of the Distribution Network.

| System Voltage (kV) | BIL (kV) |
|---------------------|----------|
| 11                  | 75       |
| 33                  | 170      |

**B2.9 System Fault Level**

The table below shows the rated equipment to be used to withstand the maximum sub-transient three phase symmetrical short circuit fault levels. Under MDC, TNB is limited to plan for not exceeding 90% of the equipment rated design.

| Nominal Voltage [kV] | Rated Voltage [kV] | Fault Current [kA] |
|----------------------|--------------------|--------------------|
| 33                   | 36                 | 25                 |
| 11                   | 12                 | 20/25              |

### B2.10 Synchronisation

Synchronisation devices shall be provided and maintained by SPP. During operation, synchronisation is at the Facility side by matching with the Distribution Network parameters as mentioned below:

- a) Interlocking logics are satisfied
- b) Frequency difference  $< 0.2$  Hz
- c) Voltage magnitude difference  $< 10\%$
- d) Voltage angle difference  $< 10$  degrees

Inverter shall be capable of synchronising with the grid automatically within the specified reconnection time.

### B2.11 Inverter

Any type of inverters is allowed to be used as long as the inverters comply with the RFP and the technical requirements for connection to Distribution Network as outlined in Distribution Code.

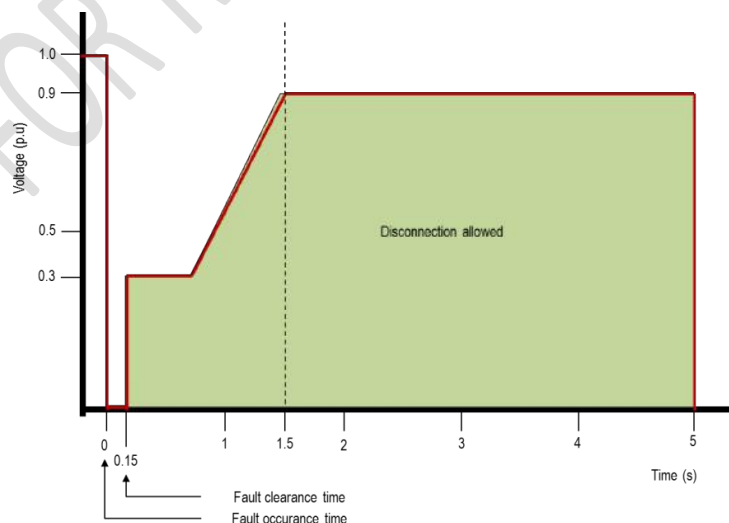
### B2.12 Standard compliance

The Facility and its interconnection shall comply with the following standards MS 1837, IEC 61727, IEEE 1547.

## B3.0 NETWORK SUPPORT

### B3.1 Fault Ride Through

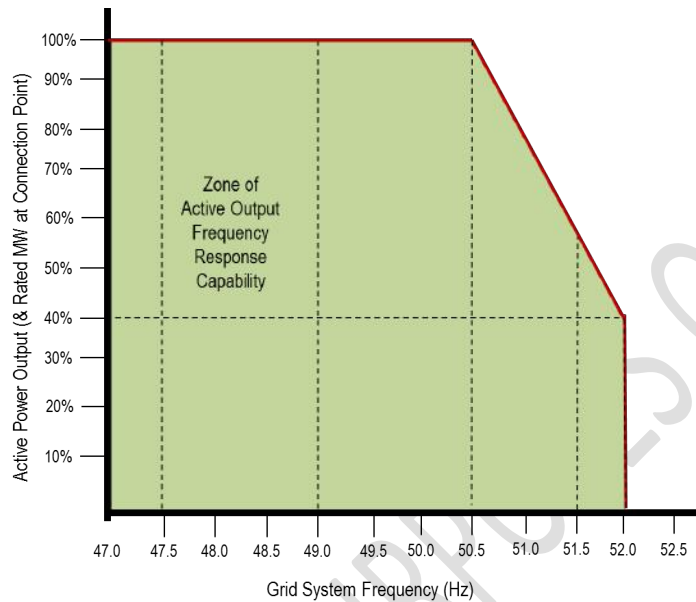
During disturbance, the Distribution Network will experience temporary low voltage/sag. The Facility is expected to continuously operate during distribution system voltage fluctuation as shown in the figure below.



### B3.2 Frequency MW Response

The Facility is expected to be uninterrupted within the frequency range of 47Hz to 50.5Hz.

During frequency disturbance, when the frequency increases more than 50.5Hz, the Facility shall reduce its power output as shown in the figure below:



### B3.3 Voltage Support (AVQC)

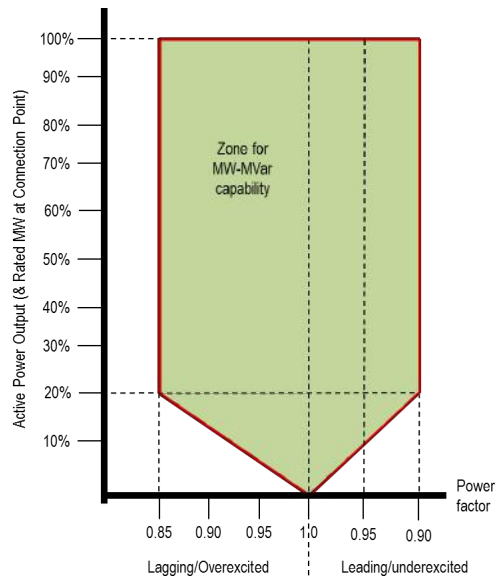
The Facility shall have the capability to manage its power generation as follows:

- The Facility shall be able to reduce its power output or disconnect from the distribution system during system contingencies.
- The Facility shall reduce its generation output to avoid voltage rise above the limit.
- SPP shall monitor and ensure that the power generation of the plant does not exceed the Contracted Capacity.
- The inverter shall have the capability to perform active/reactive power control for voltage regulation.

### B3.4 Reactive Power

The Facility shall be able to deliver reactive power requirement at the Connection Point as shown in the figure below. Full range of reactive power 0.85 lagging to 0.9 leading shall be achieved at 20% output.





### B3.5 Droop Curve

The Facility shall be fitted with a droop controller or equivalent control device to provide frequency response under normal operational conditions.

### B4.0 PROTECTION REQUIREMENTS

The Facility protection scheme is under SPP's responsibility. The Facility shall have sufficient protection systems to prevent or limit damage to its generation and auxiliary equipment. The protection systems shall provide for adequate contingencies both within and external to the Facility.

SPP shall ensure the Facility's protective apparatus are properly maintain and in working order at all times during which the Facility is connected to or is in parallel operation with the Distribution Network. Any changes to the approved settings of the protection systems shall be referred to TNB for its prior approval.

Sufficient redundancy shall be included in the protection system so that failure of any single component in the protection system or communication channel that form part of the protection system, will not prevent isolation of faults from the system within the required time. In the event of failure of the main protection scheme, a back-up protection scheme shall operate.

All protection schemes must be consistent and compatible with TNB's configuration and existing protection schemes.

#### B4.1 Feeder Protection at Connection Point

The protection interfacing requirements are as follows:

- a) Unit Protection (Current Differential)
- b) Overcurrent and Earth Fault (OCEF) / Non Directional OCEF
- c) Interlocking scheme
- d) Reverse Power Relay

Where applicable, the following protection schemes may be required:

- a) Arc protection
- b) Busbar protection
- c) Automatic transfer scheme

#### **B4.2 Feeder Requirements at SPP Interconnection Facility**

The SPP feeder shall be equipped with the following equipment:

- a) Current Differential Relay matching with the protection interfacing requirements at TNB Interconnection Facility
- b) Power Quality (PQ) recorder

The PQ recorder shall measure THDI, voltage fluctuation and flicker. Data storage capacity for the PQ recorder is to last at least for 1 month. The sampling rate shall be at least 128 samples per cycle.

#### **B4.3 Fault Clearing Time**

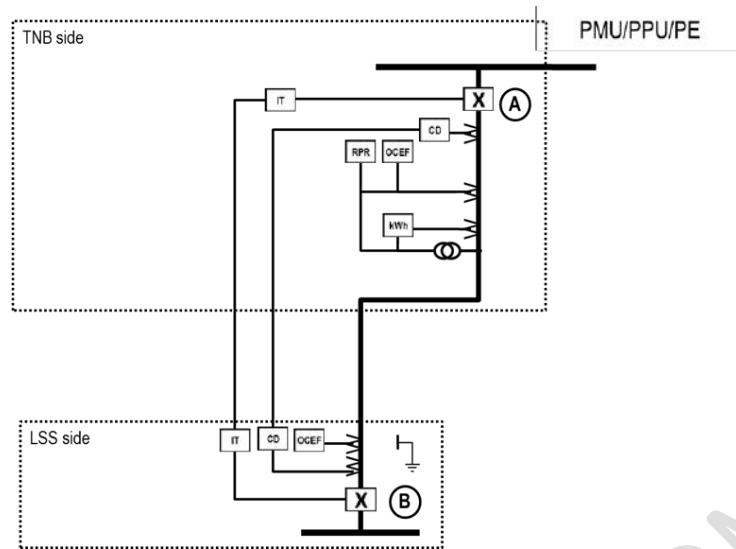
The fault clearing times for 11kV and 33kV network is as depicted in the table below or such other requirements as may be prescribed by the Distribution Code or TNB in accordance with Prudent Utility Practices.

| <b>Type of fault</b>            | <b>11kV, 33kV</b> |
|---------------------------------|-------------------|
| Substation & transformer faults | 150ms             |
| Overhead line & cable faults    | 600ms             |

#### **B4.4 Interlocking of the Interconnection Feeder**

The interlocking facilities shall operate in the following manner, referring to the figure below.

- A open – B to open
- B close position – A cannot close
- A open position – B cannot close
- Earth Switch B ON – A cannot close



#### B4.5 Protection equipment

The protection relay and PQR equipment to be used is subject to the approval of TNB.

#### B4.6 Protection coordination study

SPP shall carry out the internal protection coordination to mitigate internal and external fault.

- a) For any internal fault, the Facility shall not cause problems to the utility system and its customers. The failure of the Facility equipment includes:
- Failure of protection equipment
  - Failure of control equipment
  - Loss of control power
  - Interconnection power and fibre optics cables

- b) For any Distribution Network fault outside the Facility, the Facility shall be protected from any damaging effect.

The Facility shall be disconnected from the Distribution Network during any of the above conditions and any reverse power flow exceeding the prescribed relay settings.

#### **B4.7 Anti-Islanding**

During loss of mains, the inverter shall cease to operate in islanded mode. The anti-islanding protection is required to mitigate the following events:

- a) Safety
- b) Power quality
- c) Inverter technical limit

##### *Anti islanding detection*

Inverters shall have the following anti-islanding capabilities:

- Under Voltage
- Over Voltage
- Under Frequency
- Over Frequency
- 1 additional active/passive anti-islanding detection

### Isolation time

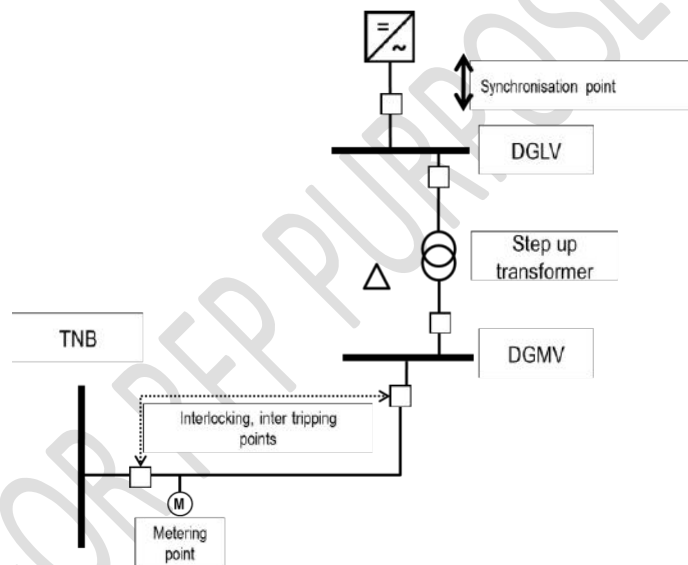
Upon detection of the loss of mains, the Facility shall be isolated within the time as shown in B2.9.

### B4.8 Reconnection time

The reconnection time of the Facility to the Distribution Network shall be more than 5 minutes after TNB connection has been stabilised.

### B4.9 Earthing scheme

- a) The Facility earthing scheme shall not cause maloperation to the TNB's protection scheme.
- b) The zero sequence components between the Distribution Network and the Facility shall be isolated. The Facility step up transformer(s) shall have delta ( $\Delta$ ) configuration at TNB's Interconnection Facility side as illustrated in the figure below to ensure the Facility does not contribute zero sequence current to Distribution Network during fault.



### B5.0 REQUIREMENT ON COMPLIANCE TESTS

#### B5.1 Requirement for SPP to carry out compliance tests

SPP shall organise to conduct tests specified in B4 to prove compliance on the technical requirements stated in this Appendix B.

The tests shall be certified by the Independent Engineer and witnessed by TNB's representatives. All costs related to the tests shall be borne by SPP.

SPP shall ensure that all tests stated under this section can be repeated fully by independent third party testers during the commercial operation of the Facility.

**B5.2 Verification tests for COD**

The verification for COD shall be conducted after the Initial Operation Date and the minimum duration shall be not less than 7 days. The verification tests shall be performed by the Independent Engineer. The verification test parameters and verification methods include the following:

|   | <b>Requirement</b>                   | <b>Procedure</b>  | <b>Expected Result</b>           |
|---|--------------------------------------|-------------------|----------------------------------|
| Grid Frequency Variation                                  | B2.3                                 | Factory test      | Pass                             |
| Reactive Power  | B3.4                                 | Factory test      | Pass                             |
| Grid Voltage Variation                                    | B2.1                                 | Factory test      | Pass                             |
| Grid System Fault Level                                   | B2.9                                 | Site verification | Compliance to Power System Study |
| Protection System   | B4.1<br>B4.2<br>B4.3<br>B4.4<br>B4.6 | Factory test      | Compliance to Coordination Study |
| Voltage Support (AVQC)                                    | B3.3                                 | Factory test      | Pass                             |
| Equivalent Control Device to Speed Governor (Droop Curve) | B3.5<br>B2.3                         | Factory test      | Pass                             |
| Frequency MV Response                                     | B3.2                                 | Factory test      | Pass                             |
| Power Quality   | B2.5                                 | Site test         | Pass                             |
| Fault Ride Through (LVRT)                                 | B3.1                                 | Factory test      | Pass                             |
| Inverter Functional Verifications                         | B4.7<br>B4.8<br>B2.4<br>B2.5         | Site test         | Pass                             |

| <b>Test method</b> |   |
|--------------------|---|
| Factory test       | Valid test certificate/results from the factory                 |
| Site test          | Electrical and functional tests of the interconnection facility |
| Site verification  | Confirmation against approved drawings or specification         |

**B5.3 Procedures of Tests**

SPP shall submit the proposed site test procedures for TNB's consent no later than sixty days (60) days prior to the Initial Operation Date. The test procedures shall be as prescribed by TNB from time to time in accordance with Prudent Utility Practices.

**B5.4 Confirmation for COD**

SPP shall submit the tests results and certified test reports consisting of (i) a Verification Report and (ii) a Power Quality Report in accordance with the requirements of this Agreement and in such format as TNB may specify.

SPP shall submit the factory acceptance test reports on the major plant and equipment (i.e. solar photovoltaic panels, power transformers, circuit breakers, inverters, power servers etc.) as early as possible after completion of such FAT tests; but no later than sixty (60) days prior to the Initial Operation Date.

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FOR RFP PURPOSES ONLY

**APPENDIX C**

**ENERGY ACCOUNTING AND TNB METERING EQUIPMENT**

FOR RFP PURPOSES ONLY



**C1.0 DEFINITIONS**

C1.1 All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except as otherwise defined herein.

**C2.0 ENERGY ACCOUNTING****C2.1 Metering Location & Arrangement**

C2.1.1 The Net Energy Output (kWh) delivered to TNB shall be measured by the TNB Metering Equipment. The TNB Metering Equipment shall be located within the TNB Interconnection Facility.

**C2.2 TNB Metering Equipment**

C2.2.1 The TNB Metering Equipment shall comply with TNB's standard practice and specifications.

C2.2.2 The TNB Metering Equipment shall be procured from TNB. The cost will be inclusive of supply and installation.

C2.2.3 SPP shall provide metering panel/cubicle in accordance with TNB's specifications for installation of the TNB Metering Equipment and their accessories. TNB may change any TNB Metering Equipment and its accessories or their positions as may be necessary for the purpose of maintenance and meter reading.

C2.2.4 The TNB Metering Equipment shall be mounted on the metering cubicle. The dimension and specifications of the metering cubicle shall comply with the latest TNB Electricity Supply Application Guideline. All drawings shall be endorsed by the Independent Engineer.

C2.2.5 Where applicable, the meter panel/cubicle shall be designed by SPP and approved by TNB. SPP shall maintain the metering panel/cubicle and its accessories other than the TNB Metering Equipment.

C2.2.6 The TNB Metering Equipment shall be housed in a dedicated metering room whenever required by TNB. SPP shall submit the proposed layout diagram for such metering room for TNB's endorsement where applicable.

C2.2.7 SPP shall install wireless mode of communication for remote meter reading between the TNB Metering Equipment and TNB's data centre. Location of the TNB Metering Equipment, or metering room where applicable, must have adequate reception of the wireless signal to enable data transmission. SPP shall provide signal booster equipment whenever the communication signal is weak.

**C3.0 TNB Metering Equipment**

C3.0.1 The TNB Metering Equipment shall consist of one main and one back-up system, which shall have the same configuration. The TNB Metering Equipment comprising

of the main and back-up metering equipment shall each have separate sets of current transformer (CT) and inductive voltage transformer (VT).

- C3.0.2 The CT and VT shall be installed at the Connection Point circuit breaker. SPP shall ensure that both the CT and VT are calibrated in accordance with TNB's specification and procedure.

### C3.1 Current Transformer

|                |  |
|----------------|--|
| Accuracy Class | 0.2  |
| Ratio          | To be approved by TNB prior to Initial Operation Date  |
| Rated Burden   | 30 VA  |
| Quantity       | One (1) for each phase with single secondary, one secondary for the main and the other for the back-up system, for each circuit. |
| Standard       | BS 7626 or IEC 60044-1   |

### C3.2 Voltage Transformer

|                |  |
|----------------|--|
| Accuracy Class | 0.5  |
| Ratio          | To be approved by TNB prior to Initial Operation Date  |
| Rated Burden   | 100 VA   |
| Voltage Factor | 1.9 for 8 hours  |
| Quantity       | One (1) for each phase and one each for the main and the other for the back-up system, for each circuit. |
| Standard       | BS 3941, IEC186  |

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APPENDIX D

DESIGN OF THE SPP INTERCONNECTION FACILITY, THE SPP INTERCONNECTOR  
AND THE SPP WORKS

FOR RFP PURPOSES ONLY

**D1.0 GENERAL**

All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except where as otherwise defined herein.

**D2.0 DESIGN OF THE SPP INTERCONNECTION FACILITY, THE SPP INTERCONNECTOR AND THE SPP WORKS****D2.1 Design of the SPP Interconnection Facility, SPP Interconnector and SPP Works**

The proposed design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall comprise all the major features as described in the Power System Study Report), including details of the following:

- Net export capacity or rated MW<sub>ac</sub>
- Connection Point
- Voltage level at the Connection Point
- Length, size and type of cable to be connected from the SPP Interconnection Facility to the Connection Point
- Circuit breaker requirements
- Direct current system (DC)
- Supervisory Control and Data Acquisition System (SCADA)

**D2.2 Coordination and Planning**

The engineering design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall conform to the requirements of TNB's standards and practices and the provisions of this Agreement.

The detailed engineering design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall be submitted by the consultant appointed by SPP to TNB for approval. Where the design submitted is unacceptable to TNB, TNB will notify the consultant of the non-acceptance together with the reasons therefor. The consultant shall thereafter re-submit the amended design to TNB.

SPP shall procure, construct and install the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with the approved engineering design.

At least two (2) coordination meetings between TNB and SPP in respect of the construction and installation of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall be held at the following times:

- (i) Prior to commencement of construction and installation of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works; and
- (ii) Prior to testing and commissioning of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.

**D2.3 Design Criteria for the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

The following factors (amongst others) shall be taken into consideration during design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works for effective and reliable operation under all reasonably expected systems and conditions:

- Personnel and public safety
- Voltage
- Power factor
- Transfer limits
- Equipment ratings
- Technical losses
- Short circuit conditions
- Power quality
- System protection and other control requirements
- Synchronizing facilities
- Anti-Islanding
- System earthing

TNB shall have the right to review the design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works to ensure reliability and safety of the connection of the SPP Interconnection Facility to the TNB Interconnection Facility.

The operating range at the Connection Point shall comply with the requirements of the Distribution Code.

The SPP Interconnection Facility shall be equipped with interlocking facilities to prevent undesired operation that could present safety hazard.

**D2.4 Equipment and Items to be installed at the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

The equipment provided by SPP for the construction and installation of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works may undergo quality inspection.

**D2.5 Supervisory Control and Data Acquisition System (SCADA)**

SPP plant may be equipped with SCADA facilities to provide monitoring for its own use at the Facility. The provision of SCADA is mandatory at the Connection Point in accordance with TNB standard practices and guidelines.

**D3.0 TESTING AND COMMISSIONING FOR IOD****D3.1 General**

The SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall be subject to testing and commissioning in accordance with Prudence Utility Practices.

All testing and commissioning shall be performed by a competent testing service provider appointed by SPP. All test equipment to be utilised for such purposes shall have a valid calibration certificate.

All testing and commissioning results shall be certified by the Independent Engineer and to be submitted to TNB.

### **D3.2 IOD Checklist**

SPP shall submit to TNB the full set of documentation for the Initial Operation Date pursuant to Clause 7.6 (*Initial Operation Date*) and the IOD Checklist as may be prescribed by TNB from time to time at least sixty (60) days prior to the proposed Initial Operation Date.

### **D3.3 Interconnection Operation Manual**

The Interconnection Operation Manual (IOM) forming part of the documentation for the Initial Operation Date outline the duties and responsibilities of both parties at the Connection Point. The IOM is also to set out the necessary procedures to be followed to ensure safety to the operating personnel and to avoid any damage to the equipment at the Connection Point. SPP shall prepare the IOM for the interconnection for approval of TNB before the Initial Operation Date.

The IOM shall address each of the following interconnection:

- SPP Interconnection Facility and SPP Interconnector
- Communication
- Switching procedures
- Fault reporting
- Outage program
- System emergency / collapse
- Sequence of operation
- Boundaries and ownership

### **D3.4 Initial Operation Date**

Submission of all the documents required for the Initial Operation Date pursuant to Clause 3.2(c) (*Conditions Precedent to the Initial Operating Date*) of this Agreement shall be made to TNB (with a copy to Suruhanjaya Tenaga) not less than sixty (60) days prior to the Initial Operating Date.

### **D3.5 Testing for the Interconnection Facilities**

Testing shall be carried out during the shutdown stage which involves the connection of the Facility to Distribution Network. Such test includes and not limited to the following:

- Electrical protection scheme
- Protection coordination study
- Cable and/or overhead test result
- SCADA

- VCB and DC system

All tests shall be carried out by a qualified tester and with a valid calibration certificate

### **D3.6 Commissioning Tests for IOD**

There are 2 levels of testing required:

- a) Inverter compliance tests
- b) Interconnection compliance tests

The scope of testing during IOD shall cover:

- a) The Facility shall cease to energise during loss of mains. Anti-islanding test must comply with the following time:
  - Disconnection time:  $\leq 2$ s and
  - Reconnection time:  $> 5$ min
- b) Functional tests of all equipment
- c) Any resetting of factory-set parameters at site requires testing to be redone.

All test results shall be certified by the Independent Engineer and submitted to TNB.

### **D3.7 Power Quality (PQ) Measurements**

#### *Pre/Post Initial Operation Date (IOD)*

Power quality measurements are to be done at the point of connection to ascertain the existing power quality before commissioning and after the connection of the plant. The recording period shall be 7 days before commissioning to capture the base voltage regulation profile without connection to the plant and 7 days after commissioning with the plant connected.

Measurement shall capture the following parameters and not limited to:

- a) Total harmonic distortion (THD) voltage
- b) Unbalanced voltage
- c) Flicker voltage

#### *Permanent Power Quality Measurements*

SPP shall install a permanent power quality recorder at the circuit breaker and to submit the PQ report as and when requested by TNB.

### **D4.0 OPERATION AND MAINTENANCE OF THE SPP INTERCONNECTION FACILITY, THE SPP INTERCONNECTOR AND THE SPP WORKS**

#### **D4.1 Operation of the SPP Interconnection Facility, the SPP Interconnector of the SPP Works**

Operation of the Interconnection Facility circuit breaker shall be subjected to the agreed procedures as specified in the Interconnection Operation Manual (IOM).

#### D4.2 Maintenance of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works

SPP and TNB shall have compatible programs for the maintenance of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. Maintenance on the protection equipment shall be coordinated between the Parties.

TNB reserves the right to inspect, at any time, the protective equipment including relays and circuit breakers at the SPP Interconnection Facility and the Connection Point.

Communication between the Parties during operation hours shall normally be done via fixed telephone lines available at the Parties' ends. However, normal mobile telephone may be used when the Parties are certain about the safe switching operation to be carried out prior to switching.

#### D4.3 Outages

In the event of any outage (planned or unplanned), any restoration work shall be carried out by the Parties in accordance with the procedures as stated in the IOM

For all tripping involving the SPP Interconnection Facility, an investigation to determine the cause of the tripping shall be carried out and coordinated between TNB and SPP. The findings of the investigation shall be shared between and limited to the Parties only.

#### D5.0 OWNERSHIP

The ownership boundary of the SPP is up to and including the cable termination at the Connection Point at the TNB Interconnection Facility.

The responsibility for control, operation and maintenance of the interconnection facility is as shown in the table below:

| <i>Item</i>                 | <i>Ownership</i> | <i>Control</i> | <i>Operation</i> | <i>Maintenance</i> |
|-----------------------------|------------------|----------------|------------------|--------------------|
| <b>TNB substation</b>       |                  |                |                  |                    |
| <i>Primary</i>              | <i>TNB</i>       | <i>TNB</i>     | <i>TNB</i>       | <i>TNB</i>         |
| <i>Secondary</i>            |                  |                |                  |                    |
| ▪ <i>OCEF + RPR</i>         | <i>TNB</i>       | <i>TNB</i>     | <i>TNB</i>       | <i>TNB</i>         |
| ▪ <i>CD + communication</i> | <i>SPP</i>       | <i>SPP</i>     | <i>SPP</i>       | <i>SPP</i>         |
| ▪ <i>Interlocking</i>       | <i>SPP</i>       | <i>SPP</i>     | <i>SPP</i>       | <i>SPP</i>         |
| <b>SPP substation</b>       |                  |                |                  |                    |
| <i>Primary</i>              | <i>SPP</i>       | <i>SPP</i>     | <i>SPP</i>       | <i>SPP</i>         |



|                          |            |            |            |            |
|--------------------------|------------|------------|------------|------------|
| <i>Secondary</i>         |            |            |            |            |
| ▪ <i>OCEF + RPR + CD</i> | <i>SPP</i> | <i>SPP</i> | <i>SPP</i> | <i>SPP</i> |
| ▪ <i>PQR</i>             | <i>SPP</i> | <i>SPP</i> | <i>SPP</i> | <i>SPP</i> |

OCEF – Overcurrent Earth Fault, CD – Current Differential, RPR – Reverse Power Relay, PQR – Power Quality Recorder

SPP shall own and be responsible for the costs of operation and maintenance of all installations located within their boundary.

**D5.1 Transfer of SPP Works**

Upon completion of the SPP Works at the TNB Interconnection Facility, SPP shall transfer the SPP Works and take all actions necessary to transfer to TNB all rights, title and interests to the SPP Works so that TNB shall become the owner thereof.

The protection system at the Connection Point of the TNB Interconnection Facility shall be provided by SPP and handed over to TNB. The protection system includes the protection devices, communication cables and associated accessories.

All equipment which is to be transferred to TNB shall comply with TNB specifications.

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FOR RFP PURPOSES ONLY

**APPENDIX E**

**METEOROLOGICAL MEASURING FACILITIES**

FOR RFP PURPOSES ONLY

**E1.0 DEFINITIONS**

E1.1 All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except as otherwise defined herein.

**E2.0 METEOROLOGICAL MEASURING FACILITIES**

E2.1 SPP shall install the Meteorological Measuring Facilities which shall comprise of:

- a) One full weather meteorological station with independent and back-up power source; and
- b) One set of pyranometer for every 10MW of Contracted Capacity.

E2.2 The Meteorological Measuring Facilities shall maintain historical data and readings throughout the Term. The minimum data resolution shall be every 15 minutes. SPP shall submit such meteorological data as may be requested by TNB from time to time.

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FOR RFP PURPOSES ONLY

APPENDIX F

OPERATION AND MAINTENANCE

FOR RFP PURPOSES ONLY

**F1.0 GENERAL**

All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except where as otherwise defined herein.

**F2.0 OPERATION AND MAINTENANCE OF THE FACILITY****F2.1 General**

- F2.1.1 SPP shall operate and maintain the Facility in accordance with (i) the requirements of this Agreement, (ii) the operating and maintenance standards recommended by the EPC Contractor in the relevant manuals provided to it, (iii) the Design Limits and (iv) Prudent Utility Practices.
- F2.1.2 The operation of the interconnection facilities and/or synchronizing circuit breaker shall operate as described in the IOM.
- F2.1.3 SPP shall operate the Facility in parallel with the Distribution Network during the Term.
- F2.1.4 All solar photovoltaic energy delivered by SPP to TNB from the Facility shall have, at the Connection Point, the electrical characteristics set forth in Appendix B.
- F2.1.5 Throughout the Term, SPP shall maintain (i) a maintenance log setting forth, inter alia, all maintenance and inspection works performed on the Facility, (ii) an operations log in accordance with Clause 8.10 (*Operation Log*) of this Agreement and (iii) any other records customarily maintained by solar power producers and operators of solar photovoltaic generating facilities.

**F2.2 Planned Outages**

- F2.2.1 SPP shall use its best endeavours to coordinate planned outages with TNB.
- F2.2.2 The maintenance of interconnection facilities shall be mutually coordinated between SPP and TNB, and scheduled to minimize the number of outages required.
- F2.2.3 SPP has full responsibility for the maintenance of the Facility as described in the Appendix D.
- F2.2.4 Complete maintenance records shall be maintained by SPP and SPP shall make available such records for TNB's review during normal business hours upon receipt of 24 hours' written notice from TNB.

**F2.3 Revalidation Report**

F2.3.1 SPP shall on the tenth (10<sup>th</sup>) and fifteenth (15<sup>th</sup>) anniversary of the Commercial Operation Date submit to TNB an Independent Engineer's certificate certifying that the Facility continues to have the capacity and capability to meet the Contracted Capacity and conform to the electrical characteristics and meet the operational standards as set out in Appendix B, together with the test results showing that effect.

**F2.4 Access to the Facility and Site**

F2.4.1 Without prejudice to any of TNB's other rights of access to the Facility set out in this Agreement, SPP authorises and empowers TNB and its authorised employees, representatives and/or agents to have access to the Facility and the Site, upon reasonable prior notice (given the circumstances then prevailing) and subject to SPP's safety rules and regulations, (i) for the purpose of reading and maintaining the TNB Metering Equipment, or (ii) for the purpose of examining, repairing or removing any or TNB's property, including the TNB Metering Equipment.

F2.4.2 In the event that TNB reasonably believes that the Facility, SPP Interconnection Facility and/or the SPP Interconnector does not have sufficient safety and protection systems in place in accordance with this Agreement and Prudent Utility Practices such that the continued operation of the Facility would pose an imminent danger to any part of the Distribution Network, TNB may undertake an inspection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector either (i) immediately, in the event of an imminent danger (including the simultaneous disconnection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector from the Distribution Network) or (ii) upon having served forty-eight (48) hours' prior written notice to SPP, with reasons therefor, in all other circumstances (but without the simultaneous disconnection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector from the Distribution Network).

F2.4.3 Each Party shall bear its own costs and expense that may be incurred in connection with such inspection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector by TNB. TNB shall not be liable to SPP for any damage caused to the Facility, SPP Interconnection Facility and/or the SPP Interconnector by in the event of an immediate disconnection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector.

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**APPENDIX G**

**CALCULATION OF TEST ENERGY PAYMENT, ENERGY PAYMENT, NON-ACCEPTANCE  
PAYMENT AND NON-DELIVERY PAYMENT**

FOR RFP PURPOSES ONLY

**G1.0 Definitions**

All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except as otherwise defined herein.

**G1.1 Calculations Of Test Energy Payment, Energy Payment, Non-Acceptance Payment and Non-Delivery Payment**

The Test Energy Payments, Energy Payments, Non-Acceptance Payments and Non-Delivery Payments under this Agreement shall be calculated in accordance with this Appendix G. This Appendix G shall be read in conjunction with and subject to the provisions of Clause 4 (*Sale and Purchase Obligation*), Clause 5 (*Billing and Payment*) and Clause 8 (*Commercial Operations*) of this Agreement.

**G1.2 Test Energy Payment**

Commencing from the Initial Operation Date until the Commercial Operation Date, the Test Energy Payment for each Billing Period shall be calculated as follows:

|  |                             |
|--|-----------------------------|
| <b>TEST ENERGY PAYMENT<br/>(FOR TEST ENERGY DELIVERED)</b> | $TEP = NEO_{TE} \times TER$ |
|--|-----------------------------|

Where:

TEP = the Test Energy Payment (in RM) for such Test Energy delivered in such Billing Period;

NEO<sub>TE</sub> = the Net Electrical Output (in kWh) delivered from the Facility pursuant to any Test Energy delivered in such Billing Period; and

TER = the Test Energy Rate (in RM/kWh).

**G1.3 Energy Payment**

Without duplication of any payment made pursuant to G1.2, commencing from the Commercial Operation Date, the Energy Payment for each Billing Period shall be calculated as follows:

|                       |   |
|-----------------------|---|
| <b>ENERGY PAYMENT</b> | $EP = (NEO_{T1i} \times ER) + (NEO_{T2i} \times EER)$ |
|-----------------------|---|

where:

EP = the Energy Payment (in RM) in such Billing Period;

NEO<sub>i</sub> = the Net Energy Output (in kWh) delivered in such Billing Period;



- NEO<sub>T1i</sub> = the Net Energy Output (in kWh) delivered for such Billing Period not exceeding MAAQ of such Contract Year calculated based on the following conditions:
- NEO<sub>T1i</sub> = NEO<sub>i</sub>, when ANEO<sub>m</sub> + ENEO ≤ MAAQ; or
  - NEO<sub>T1i</sub> = MAAQ – ANEO<sub>m-1</sub> – ENEO, when ANEO<sub>m</sub> + ENEO > MAAQ and ANEO<sub>m-1</sub> + ENEO ≤ MAAQ; or
  - NEO<sub>T1i</sub> = 0, when ANEO<sub>m-1</sub> + ENEO > MAAQ;
- NEO<sub>T2i</sub> = the Net Energy Output (in kWh) delivered for such Billing Period exceeding MAAQ of such Contract Year calculated based on the following conditions:
- NEO<sub>T2i</sub> = 0, when ANEO<sub>m</sub> + ENEO ≤ MAAQ; or
  - NEO<sub>T2i</sub> = ANEO<sub>m</sub> – MAAQ – ENEO, when ANEO<sub>m</sub> + ENEO > MAAQ and ANEO<sub>m-1</sub> + ENEO ≤ MAAQ; or
  - NEO<sub>T2i</sub> = NEO<sub>i</sub>, when ANEO<sub>m-1</sub> + ENEO > MAAQ;
- MAAQ = *[the annual quantity for the first twelve (12) months from COD as submitted by SPP as part of its bid submission to the Suruhanjaya Tenaga and as confirmed by the Suruhanjaya Tenaga to be the basis for the award of the Project to SPP] x n ÷ N;*
- ANEO<sub>m</sub> = the aggregate of NEO<sub>i</sub> for each Billing Period (in kWh) in such Contract Year including such Billing Period;
- ANEO<sub>m-1</sub> = the aggregate of NEO<sub>i</sub> for each Billing Period (in kWh) in such Contract Year excluding such Billing Period;
- ENEQ = the aggregate equivalent Net Energy Output (in kWh) in such Contract Year when TNB has failed or refused to accept Net Energy Output at the Connection Point calculated as follows:
- $$\frac{0.7 \times \text{EAA}}{n_{np}} \times h_{np}$$
- i = an index representing each of the preceding Billing Period *i* in such Contract Year;
- n = the actual number of days in the prevailing Contract Year;
- N =
- 365, for all years; or
  - 366, for a leap year.
- EAA = as defined in G1.4;

$n_{np}$  = as defined in G1.4; and

$h_{np}$  = as defined in G1.4.

#### G1.4 NON-ACCEPTANCE PAYMENT

The Non-Acceptance Payment shall be calculated as follows:

|                               |   |
|-------------------------------|---|
| <b>NON-ACCEPTANCE PAYMENT</b> | $NAP = \frac{0.7 \times EAA}{n_{np}} \times ER \times 1000 \times h_{np}$ |
|-------------------------------|---|

where:

NAP = the Non-Acceptance Payment in RM payable by TNB to SPP

EAA = the estimated annual availability (in MWh), being

- (a) the Declared Annual Quantity for the first, second and third Contract Years in the Term; or
- (b) the average annual quantity of metered Net Energy Output in the three (3) Contract Years immediately preceding that Contract Year

$n_{np}$  = the actual number of hours in that Contract Year

$h_{np}$  = the actual number of whole hours TNB fails or refuses to accept Net Energy Output delivered at the Connection Point

#### G1.5 NON-DELIVERY PAYMENT

The Non-Delivery Payment shall be calculated as follows:

|                             |   |
|-----------------------------|---|
| <b>NON-DELIVERY PAYMENT</b> | $NDP = ER \times [(0.7 \times DAA) - TNEO] \times 1000$ |
|-----------------------------|---|

where:

NDP = the Non-Delivery Payment in RM payable by SPP to TNB

DAA = the Declared Annual Availability in MWh of such Contract Year

TNEO = the total Net Energy Output (in MWh) delivered in that Contract Year

**Attachment A to Appendix G  
Minimum Annual Quantity**

| <b>Contract Year</b> | <b>Minimum Annual Quantity<br/>(MWh)</b> |
|----------------------|--|
| 1                    |  |
| 2                    |  |
| 3                    |  |
| 4                    |  |
| 5                    |  |
| 6                    |  |
| 7                    |  |
| 8                    |  |
| 9                    |  |
| 10                   |  |
| 11                   |  |
| 12                   |  |
| 13                   |  |
| 14                   |  |
| 15                   |  |
| 16                   |  |
| 17                   |  |
| 18                   |  |
| 19                   |  |
| 20                   |  |
| 21                   |  |
| 22                   |  |

[Note: If the COD is not on the SCOD, this Attachment A shall be updated by mutual agreement between the Parties and confirmed by the Suruhanjaya Tenaga, pro-rated based on the number of actual days in that Contract Year.]

APPENDIX H

DESCRIPTION OF SITE

FOR RFP PURPOSES ONLY

APPENDIX I

FINANCIAL MODEL

FOR RFP PURPOSES ONLY

**APPENDIX J**

**CONSEQUENCES OF TERMINATION**

FOR RFP PURPOSES ONLY

**J1.0 Definitions**

All capitalised terms shall have the same meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except as otherwise defined herein.

When used herein, the defined terms set forth below shall have the following meanings:

**“Adjusted Transfer Amount”** means the Transfer Amount as adjusted pursuant to Section J.2.6(b) of this Appendix J;

**“Affiliate”** means, in relation to any person at a particular time:

- (i) any person who directly or indirectly Controls, or who owns beneficially more than 50% of the issued share capital (or equivalent securities) of, that person; or
- (ii) any Subsidiary of that person; or
- (iii) any other person who is Controlled by any person described in (i) above;

**“Auditor”** means a firm of auditors to be selected in accordance with the provisions of Section J.3 of this Appendix J;

**“Calculation Date”** means the date of termination of this Agreement as specified in the Purchase Notice;

**“Corporate Tax”** means, for any Financial Year, the aggregate income tax payable by SPP on its income for that Financial Year, whether in Malaysia or elsewhere, excluding any provision for deferred taxation as determined in accordance with Section 6 of the Income Tax Act 1967;

**“Financial Year”** means the accounting period used by SPP in respect of the operations of SPP as agreed by its Board of Directors and as presented to its annual general meeting, irrespective of whether that accounting period is a calendar year or not;

**“Interest on Sponsors Gross Equity Contribution”** means the aggregate amount determined by applying the Default Rate to each amount comprising the Sponsors Gross Equity Contribution for the period from the date of injection of such amount of the Sponsors Gross Equity Contribution to the Calculation Date;

**“Outstanding Indebtedness”** means the lesser of:-

- (i) the aggregate amount at the Calculation Date of all amounts owing to the Financing Parties (other than any amounts owing to the shareholders of SPP and their respective Affiliates) as incurred under the Initial Financing Documents and as amortised in accordance thereunder and reflected in the Financial Model; and

- (ii) the aggregate amount at the Calculation Date of all amounts owing to the Financing Parties (other than any amounts owing to the shareholders of SPP and their respective Affiliates) as incurred under the Financing Documents;

including any reasonable costs and fees related to accelerated repayment and other financing termination costs, but excluding any costs and fees relating to the Sponsors Gross Equity Contribution, as certified by the Auditor at the Calculation Date;

**“Purchase Notice”** means a notice given by TNB pursuant to Clause 15.4(a) or a notice given by SPP pursuant to Clause 15.4(b) of this Agreement;

**“Retained Sum”** means an amount certified by the Auditor as being the aggregate of the cash balances at bank and in hand and liquid securities held by SPP and to be retained by SPP after the Calculation Date;

**“Sponsors Gross Equity Contribution”** means an amount certified by the Auditor as at the Calculation Date as being the lesser of:-

- (i) the aggregate of all registered and paid-up share capital issued by SPP and any share premia received by SPP, the subscription price received by SPP for all loan stocks, bonds and redeemable preference shares issued by SPP to its shareholders and their respective Affiliates, all loans (whether secured, unsecured or subordinated) received by SPP from its shareholders and their respective Affiliates and all other forms of capital contributed on or before the Calculation Date by the shareholders of SPP and their respective Affiliates for financing the Project, as committed by SPP, its shareholders and their respective Affiliates at the Financial Closing Date in accordance with the Initial Financing Documents; and
- (ii) the aggregate of all registered and paid-up share capital issued by SPP and any share premia received by SPP, the subscription price received by SPP for all loan stocks, bonds and redeemable preference shares issued by SPP to its shareholders and their respective Affiliates, all loans (whether secured, unsecured or subordinated) received by SPP from its shareholders and their respective Affiliates and all other forms of capital contributed on or before the Calculation Date by the shareholders of SPP and their respective Affiliates for financing the Project, as outstanding as at the Calculation Date;

Where the shareholders of SPP and/or their respective Affiliates have provided interim financing to SPP for the construction costs of the Project prior to the Commercial Operation Date, such amount shall not be construed as part of the Sponsors Gross Equity Contribution provided such interim financing shall not exceed the amount assumed for third party debt financing as reflected in the Financial Model and the Sponsors Gross Equity Contribution for the Project shall not be less than 20% of the Total Project Costs.

**“Sponsors Equity Repayment”** means an amount certified by the Auditor as being equal to the aggregate of:-



- (i) the sum of all dividend, distribution, interest, profit, fee, premium, charges and other payments in respect of the Sponsors Gross Equity Contribution, actually paid by or on behalf of SPP; and
- (ii) the sum of all re-payment, pre-payment, redemption, re-purchase, return, and other payments in respect of the Sponsors Gross Equity Contribution, actually paid by or on behalf of SPP;

**“Subsidiary”** means, with respect to any person, at any particular time, any person which is directly or indirectly Controlled, or more than 50% of whose issued share capital (or equivalent securities) is then beneficially owned, by that person;

**“Taxes”** means any form of taxation, duty, levy, impost, charge or other similar contribution created or imposed by any state, federal or local government in Malaysia, including any related penalty, interest, fine or surcharge that become payable by SPP as a result of the purchase of the Project by TNB, but excluding any Corporate Tax;

**“Total Project Costs”** means the aggregate amount of the expenditure incurred and paid by SPP in connection with the Project up to the date which is one (1) year after the Commercial Operation Date and includes all development costs, procurement costs (but excluding such procurement costs relating to the operation and maintenance of the Facility actually incurred and paid by SPP after the Commercial Operation Date), construction costs and financing costs (excluding the financing costs actually incurred and paid by SPP after the Commercial Operation Date);

**“Transfer Amount”** means the relevant amount payable by TNB for the transfer by LSD Developer to TNB of the Project, the Site (including the Access Rights) and all the rights and interests related thereto, pursuant to and calculated in accordance with this Appendix J, prior to the adjustment pursuant to Section J.2.6; and

**“Transfer Costs”** means an amount equal to all reasonable costs and expenses of SPP which are incurred or suffered as a result of the purchase of the Project by TNB, including any termination payments or novation fees on contracts in connection with the Project whose terms are reasonable and customary for private power projects such as the Project or were specifically approved by TNB, and all Taxes, any reasonable breakage costs and fees, any registration fees and other reasonable and necessary termination costs that become payable by SPP as a result of the purchase of the Project by TNB, but excluding the Outstanding Indebtedness.

## **J2.0 Purchase Price of Project**

### **J2.1 Purchase after termination for a SPP Event of Default**

- (a) If TNB terminates this Agreement pursuant to Clause 15.3 (*Right to Terminate; Additional Rights*) of this Agreement and it has given a Purchase Notice pursuant to Clause 15.4(a) of this Agreement, TNB shall pay an amount equal to:
  - (i) the Outstanding Indebtedness if the Sponsors Gross Equity Contribution as at the date which is one year after the Commercial Operation Date amounts to 20% or more of the Total Project Costs and ninety-five per cent (95%) of

the Outstanding Indebtedness if the Sponsors Gross Equity Contribution as at the date which is one year after the Commercial Operation Date amounts to less than 20% of the Total Project Costs; **plus**

- (ii) the "A" Purchase Price as set out in Attachment A of this Appendix J; **plus**
- (iii) the Transfer Costs; **less**
- (iv) the Retained Sum.

- (b) Upon payment in full by TNB of the amount set out in J.2.1(a), all SPP's rights, title and interest in the Project and the Site (including the Access Rights) shall simultaneously be transferred by SPP to TNB (or its nominees) free from any encumbrance whatsoever.

## **J2.2 Purchase after termination for a TNB Event of Default**

- (a) If SPP terminates this Agreement pursuant to Clause 15.3 (*Right to Terminate; Additional Rights*) of this Agreement and TNB is required to purchase the Project pursuant to Clause 15.4(b) of this Agreement, TNB shall pay an amount equal to:

### Pre-Commercial Operation Date

- (i) the Outstanding Indebtedness; **plus**
- (ii) the Sponsors Gross Equity Contribution; **plus**
- (iii) the Interest on Sponsors Gross Equity Contribution; **plus**
- (iv) the Transfer Costs; **less**
- (v) the Retained Sum.

### Post-Commercial Operation Date

- (i) the Outstanding Indebtedness; **plus**
- (ii) the "B" Purchase Price as determined in accordance with Attachment A of this Appendix J; **plus**
- (iii) the Transfer Costs; **less**
- (iv) the Retained Sum.

- (b) Upon payment in full by TNB of the amount set out in J.2.2(a), all SPP's rights, title and interest in the Project and the Site (including the Access Rights) shall simultaneously be transferred by SPP to TNB (or its nominees) free from any encumbrance whatsoever.

## **J2.3 Transfer of Project**

- (a) When SPP transfers all rights, title and interests in the Project and the Site (including the Access Rights) to TNB (or its nominees) pursuant to section J.2.1 or J.2.2 of this Appendix J, the transfer shall (to the extent practicable) include all of SPP's right, title and interest in:-
- (i) all raw materials, consumables and spare parts;
  - (ii) all tangible personal property;
  - (iii) all buildings and fixtures;
  - (iv) computerised and non-computerised records, reports, data, files and information;
  - (v) all drawings, test results and operation and maintenance manuals;
  - (vi) all warranties of equipment, materials and work;
  - (vii) all contract rights and insurance policies;
  - (viii) all work in progress under contracts with vendors, suppliers, contractors and subcontractors;
  - (ix) all rights with respect to any insurance proceeds payable to or for the account of SPP, but unpaid at the date of termination of this Agreement, in respect of SPP's right, title and interest in the Project;
  - (x) all user rights, licences, sub-licences or other rights in respect of all patents, trade marks, registered designs, design rights, applications for any of the foregoing, copyrights, trade or business names, inventions, processes, know-how and other industrial property rights purported to be used or required by or in respect of the Facility; and
  - (xi) for the avoidance of doubt, the Facility, the Interconnection Facilities, all plant, equipment and machinery including all power generation and transmission plant, equipment and machinery.
- (b) SPP shall sign all assignments, agreements, licences, sub-licences and other documents in a form required by TNB and procure relevant third parties to sign such documents so as to transfer all rights, title and interest in the Project and the Site (including the Access Rights) to TNB (or its nominees) free of encumbrances and SPP shall take all reasonable steps and actions considered by TNB to be necessary or desirable to procure that these rights, title and interest in the Project and the Site (including the Access Rights) are transferred to TNB (or its nominees) free of encumbrances.

**J2.4 Redemption of Encumbrance over the Project**

- (a) Where the Outstanding Indebtedness is payable pursuant to J.2.1 or J.2.2, it shall be paid by TNB directly to the Financing Parties (other than the shareholders of SPP and their respective Affiliates) whose receipt shall be a good discharge for TNB and the Outstanding Indebtedness shall thereby be deemed to have been paid to SPP. Payment of the Outstanding Indebtedness shall, where required by TNB, be in exchange for a transfer or assignment to TNB (or its nominees) of all rights, title and interests in the Initial Financing Documents (other than those in respect of the Sponsors Gross Equity Contribution), documented and evidenced to the satisfaction of TNB.
- (b) Where required by TNB, SPP shall procure that the Financing Parties discharge all securities and other encumbrances given on or over the Project and the Site (including the Access Rights) in exchange for the payment of the Outstanding Indebtedness. For this purpose, SPP shall procure that the Financing Parties sign all re-assignments, discharge of charge, agreements, and other documents in a form required by TNB so as to transfer all rights, title and interest in the Project and the Site (including the Access Rights) to TNB (or its nominees) free of encumbrances and SPP shall procure that the Financing Parties shall take all steps and actions considered by TNB to be necessary or desirable to procure that all rights, title and interest in the Project and the Site (including the Access Rights) are transferred to TNB (or its nominees) free of encumbrances.

**J2.5 Transfers Amount**

- (a) Within thirty (30) days of the Purchase Notice, SPP shall provide to TNB and the Auditor for verification, a statement setting out the following information as at the Calculation Date:
- (i) the actual outstanding principal amount of the debt facilities provided by the Financing Parties pursuant to the Financing Documents;
  - (ii) the sum of all dividend, distribution, interest, profit, fee, premium, charges and other payments paid by SPP in respect of the Sponsors Gross Equity Contribution;
  - (iii) the sum of all repayment, redemption, re-purchase, return, and other payments made by SPP in respect of the Sponsors Gross Equity Contribution;
  - (iv) its calculation of the amount due to SPP pursuant to this Appendix J, together with detailed workings; and
  - (v) all supporting information (including those reasonably requested by TNB) to enable TNB to verify the amounts referred to in Section J.2.5(a)(i) to (a)(iv) above.
- (b) The Parties shall use reasonable endeavours to agree the Transfer Amount and the Adjusted Transfer Amount. In the event the Parties are unable to reach agreement on the Transfer Amount and the Adjusted Transfer Amount within thirty (30) days after the date of submission of the material referred to in Section J.2.5(a) above, the

determination of the Transfer Amount and the Adjusted Transfer Amount shall be resolved in accordance with Clause 18 (*Dispute Resolution*) of this Agreement.

### **J2.6 Adjustment**

- (a) The Parties shall agree a date for the transfer of the Project, the Site (including the Access Rights) and other rights and interests of SPP pursuant to this Appendix J, failing which the date of such transfer shall be thirty (30) days after the Adjusted Transfer Amount is agreed between the Parties or is resolved in accordance with Clause 18 (*Dispute Resolution*) of this Agreement.
- (b) The Transfer Amount shall be adjusted as follows:
  - (i) when TNB has paid any amount to SPP during the period between the Calculation Date and the Transfer Date, the Transfer Amount shall be reduced by such amount to avoid double counting; or
  - (ii) where TNB has not paid any amount to SPP during the period between the Calculation Date and the Transfer Date, there shall be added the amount representing the carrying costs of the Transfer Amount.

### **J3.0 The Auditor**

- (a) The Auditor shall be appointed by agreement between the Parties or failing agreement by the President for the time being of the Malaysian Institute of Accountants upon an application made by any Party. The Auditor's cost and expenses shall be borne as to 50% by SPP and 50% by TNB.
- (b) SPP shall procure that the Auditor has access to all the books and records of SPP for the purposes of enabling the Auditor to make the relevant certifications and decisions.
- (c) The Parties shall use their respective best endeavours to ensure that the Auditor certifies the amount of the Outstanding Indebtedness, the "B" Purchase Price, the Sponsors Gross Equity Contribution, the Interest on Sponsors Gross Equity Contribution, the Retained Sum or the Transfer Costs as required for the purposes of Section J.2. The Auditor shall act as an expert and not as an arbitrator to the intent that the Auditor's certification or decision in the absence of manifest error shall be final and binding upon the Parties.

**Attachment A to Appendix J**

**Determination of Purchase Prices**

**JA.1 Purchase according to Section J2.1**

The “A” Purchase Price shall be equal to ten Ringgit (RM 10).

**JA.2 Purchase according to Section J2.2**

To determine the “B” Purchase Price, the following equation shall be used:

“B” Purchase Price = QR + SEC – SER, provided that if it results in a negative number, the “B” Purchase Price shall be zero.

Where:

SEC = the sum of all Sponsors Gross Equity Contribution paid to SPP prior to the Calculation Date.

SER = the sum of all Sponsors Equity Repayment paid on or prior to the Calculation Date.

QR = the quarterly return on the SEC, calculated in accordance with the following formula:

$$QR = \sum_{n=1}^N \left\{ \left[ (SEC_n - SER_n) \times (1 + X\%)^{(N-n)/4} \right] - (SEC_n - SER_n) \right\}$$

Where:

SEC<sub>n</sub> = (i) the sum of all Sponsors Gross Equity Contribution paid to SPP within calendar quarter *n*, or

(ii) zero (0), if the cumulative sum of all Sponsors Gross Equity Contribution paid to SPP in each of the full calendar quarters prior to (and including) calendar quarter *n* is greater than SEC.

SER<sub>n</sub> = the sum of all Sponsors Equity Repayment paid within calendar quarter *n*.

*n* = an index, from 1 through to N, representing each of the full calendar quarters occurring since the Effective Date.

N = the aggregate number of full calendar quarters occurring between the Effective Date and the Calculation Date (both dates inclusive).

X = the lower of:

- (a) nine per cent (9%), and
- (b) Project returns as in the Financial Model.

For this purpose, a calendar quarter means a period of three (3) months ending on 31 March, 30 June, 30 September and 31 December.

FOR RFP PURPOSES ONLY

APPENDIX K

LETTER OF AWARD

FOR RFP PURPOSES ONLY



EXHIBIT 1

FORM OF BANK GUARANTEE

FOR RFP PURPOSES ONLY

## FORM OF BANK GUARANTEE

TO: **TENAGA NASIONAL BERHAD (Company No. 200866-W)**  
**Ibu Pejabat TNB**  
**No. 129, Jalan Bangsar**  
**59200 Kuala Lumpur**  
**Wilayah Persekutuan**

## WHEREAS:

- (A) By a power purchase agreement dated [•] (**Power Purchase Agreement**) entered into between **TENAGA NASIONAL BERHAD (Company No. 200866-W) (TNB)** and [•] (**Company No. [•] (SPP)**), SPP has agreed to design, construct, own, operate and maintain a solar photovoltaic energy generating facility with a capacity of [•]MWac to be located in [•] to generate and deliver solar photovoltaic energy to TNB upon the terms and conditions contained in the Power Purchase Agreement.
- (B) Under Clause 6.5 (*Establishment of Security*) of the Power Purchase Agreement, SPP is obliged to provide a bank guarantee to TNB as security for the due performance by SPP of its obligations under the Power Purchase Agreement.

In consideration of TNB accepting our obligations herein contained in discharge of SPP's obligation to provide such bank guarantee, we, **[full name and address of bank]** hereby irrevocably and unconditionally agree to pay to you an amount up to Ringgit Malaysia [•] (RM) only (**Guaranteed Amount**) and accordingly covenant with you and agree as follows:

1. Upon receipt of a written demand made by you upon us from time to time or at any time and without being entitled or obliged to make any enquiry either of you or of SPP, and without the need for you to take legal action against or to obtain the consent of SPP, and notwithstanding any objection by SPP and without any further proof or conditions and without any right of set-off or counterclaim, we shall forthwith pay to you the amount or amounts specified in such demand or demands, not exceeding in aggregate the **Guaranteed Amount**; it being confirmed that you may make as many separate demands hereunder as you think fit. Such payment or payments shall be made by transfer to an account in your name at such bank in such place as you shall direct. You shall not be obliged to exercise any other right or remedy you may have before making a demand under this Bank Guarantee.
2. Your demand shall be conclusive evidence of our liability to pay you and of the amount of the sum or sums which we are liable to pay to you. Our obligation to make payment under this Bank Guarantee shall be a primary, independent and absolute obligation and we shall not be entitled to delay or withhold payment for any reason. Our obligations hereunder shall not be affected by any act, omission, matter or thing which but for this provision might operate to release or otherwise exonerate us from our obligations hereunder in whole or in part, including without limitation and whether or not known to us or you:
  - (a) any time or waiver granted to SPP or any other person;

- (b) the taking, variation, compromise, renewal or release of or refusal or neglect to perfect or enforce any rights, remedies or securities against SPP or any other person;
  - (c) any legal limitation, disability or incapacity relating to SPP or any other person;
  - (d) any dispute between you and SPP or any allegation that SPP has claims against you or any objection or representation made to us by SPP;
  - (e) any variation of or amendment to the Power Purchase Agreement or any other document or security so that references to the Power Purchase Agreement in this Bank Guarantee shall include each such variation and amendment to the Power Purchase Agreement;
  - (f) any unenforceability, invalidity or frustration of any obligations of SPP or any other person under the Power Purchase Agreement or any other document or security; and
  - (g) any other fact, circumstance, provision of statute or rule of law which might, were our liability to be secondary rather than primary, entitle us to be released in whole or in part from our undertaking.
3. This Bank Guarantee shall continue to remain valid and full force and effect until [•], being the date after the expiration of one hundred and ninety (190) days from the Scheduled Commercial Operation Date. If you give us a written and signed notice on or before the date of expiration of this Bank Guarantee or any subsequent extension thereof pursuant to the stipulation to extend the Bank Guarantee, we shall: (i) automatically extend the Bank Guarantee for the period requested from the original date of expiration of this Bank Guarantee or from the expiration date of the extension(s) which may have been subsequently made as indicated in the request for extension, or (ii) pay you the undrawn amount of this Bank Guarantee.
4. Any payment made hereunder shall be made free and clear of, and without deduction or set-off for or on account of any liability whatsoever including, without limitation, any present or future taxes, duties, charges, fees, deductions or withholdings of any nature whatsoever and by whomsoever imposed.
5. The benefit of this Bank Guarantee and all rights and powers hereunder may be assigned by you.
6. Capitalised expressions used in this Bank Guarantee, which are not otherwise defined herein, shall have the meanings attributed to them in the Power Purchase Agreement.
7. This Bank Guarantee shall be governed by and construed in accordance with the laws of Malaysia and we hereby agree to submit to the exclusive jurisdiction of the Courts of Malaysia over any claim arising out of this Bank Guarantee.

**IN WITNESS WHEREOF** this Bank Guarantee has been executed on the [•] day of [•]

The Common Seal of )  
[Bank] was hereunto )  
affixed in the presence of: )

OR

Signed, Sealed and Delivered by )  
for and on behalf of )  
[Bank] in the presence of: )

FOR RFP PURPOSES ONLY

## **APPENDIX G:**

PPA for Distribution Connected LSS (Sabah and Labuan)

**[DRAFT POWER PURCHASE AGREEMENT FOR LARGE SCALE SOLAR PHOTOVOLTAIC INSTALLATIONS OF 1MW – 15MW CONNECTING TO THE MEDIUM VOLTAGE DISTRIBUTION NETWORK.]**

**POWER PURCHASE AGREEMENT**

**THIS POWER PURCHASE AGREEMENT** is made on the [●] day of [●] 20[●];

**BETWEEN:**

- (1) **SABAH ELECTRICITY SDN BHD (SESB)**, a company duly incorporated under the Laws of Malaysia (Company Registration No. 462872-W) and having its registered office at Wisma SESB, Jalan Tunku Abdul Rahman, 88673 Kota Kinabalu, Sabah;

**AND**

- (2) [●] (**SPP**), a private limited liability company incorporated under the Companies Act, 1965 (Company Registration No. [●]) and having its registered office at [●];

(each, a **Party** and, collectively, the **Parties**).

**WHEREAS:**

- (A) SPP has been granted a letter of award (Ref No. [●]) dated [●] by Suruhanjaya Tenaga to design, construct, testing, commission, own, operate and maintain a solar photovoltaic energy generating facility with a capacity of [**not less than 1MWac but not more than 15MWac**] MWac to be located in [●] for connection to SESB's medium voltage Distribution Network at [**insert node**].
- (B) SPP wishes to sell to SESB and SESB wishes to purchase from SPP, the Net Electrical Output generated by the Facility and delivered to SESB in accordance with the terms and conditions set out in this Agreement.

**IT IS HEREBY AGREED:**

**1. DEFINITIONS**

**1.1 Defined Terms**

In this Agreement, the following terms shall have the meanings set out against them below:

**Abandons**

means (i) during the period beginning on the Effective Date and ending on the Commercial Operation Date, the failure by SPP to perform any material part of the construction works on the Project and the Independent Engineer is unable to confirm in writing within fifteen (15) days of being requested to do so by SESB that there is a reasonable prospect of SPP achieving the Commercial

Operation Date before **[to insert a specified date which is 180 days from the Scheduled Commercial Operation Date]**; and (ii) during the period beginning on the Commercial Operation Date and ending on the expiration of the Term, the failure by SPP to operate the Facility for a continuous period of more than six (6) months unless:

- (a) SESB is in breach of a material obligation under this Agreement; or
- (b) the Facility was during such period the subject of repair, rehabilitation or repowering; or
- (c) SPP is excused from doing so pursuant to the provisions of Clause 15 (*Force Majeure*) or as a result of the occurrence of an event of the type contemplated in Clauses 4.4(a) and 4.4(c) (*Exceptions to SESB's Obligation to Accept Net Electrical Output*);

and **Abandon** and **Abandoned** shall be construed accordingly;

**Access Rights**

means all rights necessary to construct, install, commission, energise, test, operate, maintain, upgrade, replace and remove any part of the Project and the SESB Metering Equipment including all rights of way, easements and continuing access rights;

**Agreed Program**

shall have the meaning given to it in Clause 8.12 (b)(*Initial Operation date*);

**Agreement**

means this Power Purchase Agreement and the appendices and exhibits attached to it;

**Assume Site Conditions**

means the following assumed conditions for the relevant tests in Appendix C in respect of the Facility:

|                              |                              |
|------------------------------|------------------------------|
| Ambient Air Temperature      | 34°C                         |
| Atmospheric Pressure         | 1013 mbar                    |
| Average Relative Humidity    | 85%                          |
| Power Factor at the Facility | 0.85 lagging to 0.90 leading |
| Solar Irradiance             | (SPP to provide)             |

**Billing Period**

means (i) the period beginning on the Initial Operation Date and ending on the last day of the month in which that date occurs, (ii) each one month period thereafter during the Term, and (iii) the period beginning on the first day of the month in which the Term expires and ending on the day the Term expires;

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| <b>Billing Statement</b>                | shall have the meaning given to it in Clause 5.1 ( <i>Billing Statements</i> );   |
| <b>Business Day</b>                     | means any day excluding Saturday, Sunday or public holidays on which commercial banks are open for business in Sabah.   |
| <b>Capital Improvement Threshold</b>    | shall have the meaning given to it in Clause 20.1 ( <i>Change-in-Law Adjustment</i> );  |
| <b>Change-in-Law</b>                    | means, in each case after the date of this Agreement, the enactment, introduction, adoption or making of any new Law, any change in, variation, repeal or modification of any existing Law, the commencement of any Law which has not yet come into effect, or any change in the interpretation or application of any Law;  |
| <b>Commencement Date</b>                | means the date notified by SPP to SESB on which the notice to proceed under the EPCC Contract is issued;  |
| <b>Commercial Operation Date or COD</b> | means the date on which all the conditions precedent as set forth in Clause 3.3 ( <i>Conditions Precedent to Commercial Operations</i> ) of this Agreement shall have been satisfied or waived in writing by SESB ;   |
| <b>Contract Year</b>                    | means, the period which begins on the Commercial Operation Date and ends on December 31 of the year in which the Commercial Operation Date occurs, each subsequent period during the Term which begins on January 1 and ends on December 31 of the same year and the period of twelve (12) months or less which begins on January 1 and ends on the last day of the Term;   |
| <b>Contracted Capacity</b>              | means [●] MWac or as revised in accordance with Clause 9.7 ( <i>Revised Contracted Capacity</i> );  |
| <b>Control</b>                          | means the power (whether directly or indirectly and whether by the ownership of share capital, the possession of voting power, contract or otherwise) to appoint and/or remove all or such of the members of the board of directors or other governing body of a person as are able to cast a majority of the votes capable of being cast by the members of that board or otherwise to control or have the power to control the policies and affairs of that person; and for the purposes of this definition, a person (the "relevant person") "Controls" a person if (i) it can exercise the requisite power by acting in concert with one or more other persons pursuant to an agreement or understanding (whether formal or informal) and (ii) the relevant person owns 20% or more of the securities of the person who is Controlled having ordinary voting power for the election of the members of the board of directors |



or other governing body of that person, or if that person has no such board of directors or other governing body, 20% or more of the ownership interests in that person; and “Controls”, “Controlling” and “Controlled” shall be construed accordingly;

**Corporate Authorisation** means any authorisation, resolution, approval or consent required under the constituent documents or other internal procedures of a Party;

**Critical Milestones** means those events specifically described in Clause 3.5 (*Critical Milestones*), the occurrence of which are necessary for SESB to have assurance that the Commercial Operation Date will occur by the Scheduled Commercial Operation Date;

**Declared Daily Quantity** means on any given day of a Contract Year, the forecasted daily quantity (in MW) of the Facility’s output for every 15 minutes interval to be generated and delivered to the Distribution Network at the Interconnection Point from the Facility, as may be declared from time to time by SPP for such day pursuant to Clause 9.2;

**Declared Annual Quantity** means the annual quantity (in MWh) of solar photovoltaic energy to be generated and delivered to the Distribution Network at the Interconnection Point from the Facility for each Contract Year which shall not exceed the Maximum Annual Allowable Quantity;

**Default Rate** means a rate equal to one per cent (1%) above the base lending rate then in effect at the principal office of Malayan Banking Berhad or its successor-in-title;

**Design Limits** means the design limits of the Facility as set out or incorporated by reference in Appendix B;

**Despatch** means the issuance of a Despatch Instruction and Despatches and Despatched shall be construed accordingly;

**Despatch Instruction** means an oral or written instruction or electronic signal communicated to SPP by the Grid System Operator or the Control Centre directing the Facility to commence, increase, decrease, maintain or cease the generation and delivery of solar photovoltaic energy into the Distribution Network, in accordance with the provisions of this Agreement (applicable for 5MW and above);

**Distribution Code** means the Malaysian Distribution Code as may be applicable or Sabah and Labuan Distribution Code, as amended from time to time in accordance with applicable Law;

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| <b><i>Distribution Network</i></b>        | means that part of the Grid System of electric lines or cables, substations and associated equipment and buildings for transporting electricity at nominal voltage of 33 kV or below;  |
| <b><i>Effective Date</i></b>              | means the date on which all conditions precedent listed in Clause 3.1 ( <i>Conditions Precedent to the Effectiveness of this Agreement</i> ) have been satisfied or waived;  |
| <b><i>EIA Approval</i></b>                | means all the requisite approvals required from the Department of Environment under the Environmental Quality Act 1974 in respect of the Project pursuant to the submission of an Environmental Impact Assessment Report by SPP in relation thereto;   |
| <b><i>Electrical Service Engineer</i></b> | means a person who holds a certificate of competency as an electrical services engineer issued under the Electricity Regulations 1994;   |
| <b><i>Emergency Condition</i></b>         | means a condition or situation that is (i) described or regarded as such in the Distribution Code or (ii) in the judgement of the Grid System Operator, based on Prudent Utility Practices, either (a) presents an imminent physical threat of danger to life or property, or (b) threatens the safety, integrity, stability or security of the Grid System, or (c) could reasonably be expected to cause a significant disruption on the Distribution Network, or (d) could reasonably be expected to adversely affect the provision of safe, adequate and reliable electricity supply to end users, including other utilities with which the Distribution Network is interconnected; |
| <b><i>Energy Payment</i></b>              | means a payment determined in accordance with Appendix G to be made by SESB to SPP for Net Electrical Output generated and delivered from the Facility at the Interconnection Point;   |
| <b><i>Energy Rate</i></b>                 | means RM[●] per kWh or such other rate as may be adjusted in accordance with the terms of this Agreement;  |
| <b><i>EPCC Contract</i></b>               | means all contracts to be entered into between SPP and the EPCC Contractor in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works;   |
| <b><i>EPCC Contractor</i></b>             | means any firm or firms retained by SPP and approved by Suruhanjaya Tenaga to provide services (other than consultancy or project management services) in connection with the design, engineering, procurement,  |

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|   | construction, installation, testing and commissioning of the Facility and the SPP Interconnection Facility, the SPP Interconnector and the SPP Works;  |
| <b>Event of Default</b>                       | means the occurrence of any of the events described in Clauses 16.1 ( <i>SPP Event of Default</i> ) or 16.2 ( <i>SESB Event of Default</i> ), as the case may be;  |
| <b>Excess Energy or ER</b>                    | means such Net Electrical Output generated and delivered by SPP and accepted by SESB in excess of the Maximum Allowable Quantity in any Contract Year;   |
| <b>Excess Energy Rate or EER</b>              | means RM0.01 per kWh;  |
| <b>Facility</b>                               | means the solar photovoltaic energy generating facility located at the Site with a capacity of [●] MWac and ancillary equipment and facilities as more specifically described in Appendix A and includes any Modification thereto which has been approved in writing by SESB ;   |
| <b>Financial Closing Date</b>                 | means the date on which the Financing Documents relating to the financing for the total construction costs of the Project have been entered into by SPP and the Financing Parties, and all of the conditions precedent for the initial drawdown under such Financing Documents have been satisfied by SPP or waived by the Financing Parties thereunder;   |
| <b>Financial Model</b>                        | means the financial model setting out the basis on which the financing of the Project and the costs of and revenue from the Project have been calculated by SESB together with Suruhanjaya Tenaga from the data provided by SPP (including the assumptions used, the cell logic network for the financial model software and accompanying documentation necessary to operate the financial model) recorded on a CD-Rom or other electronic medium storage, to be amended from time to time in accordance with the terms of this Agreement; |
| <b>Financial Model Input Adjustment Event</b> | has the meaning given to it in Clause 6.3 ( <i>Revision of the Financial Model</i> );  |
| <b>Financial Year</b>                         | means the accounting period used by SPP in respect of the operations of SPP as agreed by its Board of Directors and as presented to its annual general meeting irrespective of whether that accounting period is a calendar year or not;   |
| <b>Financing Documents</b>                    | means the loan agreements (including agreements for any subordinated debt), notes, bonds, indenture, guarantees,   |

security agreements, hedging agreements and any other documents relating to the financing or refinancing and security arrangements for the Project which have been or are to be entered into by SPP, excluding any agreements relating to Sponsors' Gross Equity Contribution;

- Financing Parties** means the Persons, in accordance with the Financing Documents, providing financing, hedging or other form of banking or bond facilities (including any refinancing in respect thereof) for the Project and includes any agent(s) or trustee under such banking or bond facilities;
- Force Majeure Event** shall have the meaning given to it in Clause 15.1 (*Force Majeure Event Defined*);
- Government Authorisation** means any authorisation, consent, concession, decree, permit, waiver, privilege, exemption and approval from, or filing with, or notice to, any Government Entity;
- Government Entity** means any national, state or local government of Malaysia and any ministry, department, instrumentality, agency, authority, commission or any such other entity of any national, state or local government of Malaysia;
- Grid System** means the bulk power network controlled or used by the Grid System Operator for the purpose of transmitting and distributing electricity to end users;
- Grid System Operator or GSO** shall have the meaning given to it in the Distribution Code;
- Independent Engineer** means an established reputable consulting engineering firm or professional engineers, registered with the Board of Engineers Malaysia and who shall not be the Owner's Engineer, retained by SPP and approved by the Suruhanjaya Tenaga, the Financing Parties and SESB as the independent engineer in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the Site, the SPP Interconnection Facility, the SPP Interconnector, the SPP Works and associated facilities, as more specifically described in Appendix K;
- Independent Expert** means an established reputable firm or company of professional accountants or investment bank, as may be appointed by the Suruhanjaya Tenaga as an independent expert pursuant to Clause 6.10 (*The Suruhanjaya Tenaga's right to appoint Independent Expert*);

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| <b>Initial Contract Year</b>                     | means the Contract Year in which the Commercial Operation Date occurs;   |
| <b>Initial Financing Documents</b>               | means the loan agreements (including agreements for any subordinated debt), notes, bonds, indenture, guarantees, security agreements, hedging agreements and any other documents relating to the financing and security arrangements for the Project which are entered into between the Financing Parties and SPP, excluding any agreements relating to Sponsors' Gross Equity Contribution; |
| <b>Initial Financial Model</b>                   | means the Financial Model as confirmed by Suruhanjaya Tenaga to be the basis for the award of the Project to SPP and in which the Energy Rate has been derived, a hard copy of which is set out in Appendix N;   |
| <b>Initial Operation Date</b>                    | means the date on which Net Electrical Output is first generated and delivered from the Facility to the Distribution Network;  |
| <b>Input Data</b>                                | means the data and information specified in Appendix N;  |
| <b>Interconnection Point</b>                     | means the demarcation line for ownership and maintenance as more specifically described and shown in shown in Appendix E;  |
| <b>kV</b>  | means kilovolt;  |
| <b>kVArh</b>                                     | means kilovolt-ampere-reactive-hour;   |
| <b>kW</b>  | means kilowatt;  |
| <b>kWh</b>                                       | means kilowatt-hour;   |
| <b>Law</b>                                       | means any law, legislation, statute, rule, order, treaty, regulation, directive, guideline, request or requirement, announcement or published practice or any interpretation thereof which is enacted, issued, promulgated or made by any Government Entity or by any court or tribunal, including any Government Authorisation;   |
| <b>Letter of Award</b>                           | means the letter of award (Ref No. [●]) dated [●] issued by Suruhanjaya Tenaga to SPP for the award of the Project, a copy of which is set out in Appendix O;  |
| <b>Maximum Annual Allowable Quantity or MAAQ</b> | means such quantity (in MWh or kWh) calculated by the Contracted Capacity multiply by the number of hours in the Contract Year and reduced by a capacity factor of [●];  |

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| <b><i>Meteorological Measuring Facilities</i></b> | means all of the facilities as described in Appendix F that are necessary in accordance with Prudent Utility Practices to enable SPP and SESB to monitor and record the meteorological conditions at the Site;  |
| <b><i>Modification</i></b>                        | means an addition or modification to, or change in, or replacement or renewal of plant, equipment, machinery or facilities used by SPP for purposes of, or incidental to, the generation and delivery of solar photovoltaic energy to the Distribution Network (other than in the ordinary course of operation of any part thereof) and which is in accordance with Prudent Utility Practices and approved in writing by SESB;                    |
| <b><i>MW</i></b>                                  | means megawatt;   |
| <b><i>MWac</i></b>                                | means megawatt in alternate current;  |
| <b><i>MWh</i></b>                                 | means megawatt hour;  |
| <b><i>Net Electrical Output</i></b>               | means the solar photovoltaic energy generated and delivered to the Distribution Network at the Interconnection Point from the Facility by SPP as measured in kWh by the SESB Metering Equipment or as otherwise determined in accordance with the provisions of Clause 11.5 ( <i>Adjustments for Inaccurate Meters</i> ) during such period;  |
| <b><i>Non-Acceptance Payment</i></b>              | means the amount payable by SESB to SPP pursuant to Clause 9.4 ( <i>Consequence of SESB's Failure to Accept Net Electrical Output</i> ) for failing to accept energy delivered from the Facility by SPP other than as permitted under Clauses 4.4 ( <i>Exceptions to SESB's Obligations to Accept Net Electrical Output</i> ) and 15 ( <i>Force Majeure</i> ) due to reasons not attributable to SPP as calculated in accordance with Appendix G; |
| <b><i>Non-Delivery Payment</i></b>                | means the amount payable by SPP to SESB pursuant to Clause 9.5 ( <i>Consequences of SPP Failure to Deliver Net Electrical Output</i> ) for failing to deliver at least 70% of the Declared Annual Quantity other than as permitted under Clauses 4.6 ( <i>Suspension of Sale Obligation</i> ) and 15 ( <i>Force Majeure</i> ) due to reasons not attributable to SESB as calculated in accordance with Appendix G;                                |
| <b><i>O&amp;M Agreement</i></b>                   | means the agreement to be made between SPP and the O&M Contractor to operate and maintain the Facility;   |
| <b><i>O&amp;M Contractor</i></b>                  | means an appropriately qualified operation and maintenance contractor retained by SPP to provide services in connection with the operation and  |

maintenance of the Facility;

- Owner's Engineer** means an established reputable consulting engineering firm or professional engineers, registered with the Board of Engineers Malaysia, retained by SPP as SPP's engineer in connection with the design, engineering, procurement, construction, installation, testing and commissioning of the Facility, the Site, the SPP Interconnection Facility, the SPP Interconnector, the SPP works and associated facilities;
- Person** means any individual, corporation, partnership, joint venture, trust, unincorporated organisation or Government Entity;
- Project** means, collectively, the financing, design, engineering, procurement, construction, installation, testing, commissioning, ownership, operation and maintenance of the Facility, the Site, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector, the SPP Works and associated facilities irrespective of whether construction has been completed or the Commercial Operation Date has been achieved, as more specifically described in Appendix A, and any Modification thereto;
- Project Documents** means, collectively, this Agreement, the EPCC Contract, the O&M Agreement, the Site Agreement and such other agreements as SESB and SPP shall from time to time mutually designate as a "Project Document";
- Prudent Utility Practices** means the practices, methods and standards generally followed by the electricity supply industry in Malaysia, during the applicable period, with respect to the design, construction, testing, operation and maintenance of electricity generating and transmission equipment of the type used by the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, which practices, methods and standards generally conform to applicable Laws, the operation and maintenance standards recommended by the relevant equipment suppliers and manufacturers, the internationally accepted standards relating to solar photovoltaic generating facilities and the Distribution Code;
- Review** has the meaning assigned to the term in Clause 6.5(a)(*Rights of Review*);
- Review Documents** means all the documents, data, records and materials required to support and verify the Input Data or the actual costs incurred by SPP in relation to the Project;

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| <b><i>Ringgit Malaysia or RM</i></b>               | means the lawful currency of Malaysia;  |
| <b><i>Scheduled Commercial Operation Date</i></b>  | means [●] or in each case (if applicable) such other date determined in accordance with Clauses 8.15 ( <i>Consequences of Delay by SESB</i> ) or 15.3(b) ( <i>Effect of force Majeure Event</i> );  |
| <b><i>Site</i></b>                                 | means the parcel of land upon which the Project is to be constructed and located, as more specifically described in Appendix H;   |
| <b><i>Site Agreement</i></b>                       | means the agreement or document in which SPP is granted the right to occupy and use the Site for the Project including right of ownership, lease, tenant, licence and such other rights for occupation throughout the Term;   |
| <b><i>Sponsors' Equity Repayment</i></b>           | shall have the meaning given to it in Appendix J;   |
| <b><i>Sponsors' Gross Equity Contributions</i></b> | shall have the meaning given to it in Appendix J;   |
| <b><i>SPP Interconnection Facility</i></b>         | means all of the facilities to be designed, constructed, owned, operated and maintained by SPP as further described in Appendix E to enable SPP to deliver solar photovoltaic energy from the Facility and to maintain the stability of the Distribution Network;   |
| <b><i>SPP Interconnector</i></b>                   | means the distribution line(s) or underground cables and associated facilities to be designed, constructed, owned, operated and maintained by SPP as further describe in Appendix E that interconnect the SPP Interconnection Facility and the SESB Interconnection Facility;   |
| <b><i>SPP Licence</i></b>                          | means the licence required to be obtained by SPP pursuant to Section 9 of the Electricity Supply Act 1990 to enable SPP to own and operate the Facility and deliver and sell solar photovoltaic energy to SESB;   |
| <b><i>SPP Works</i></b>                            | means the design, engineering, procurement, supply, manufacturing, construction, installation, erection, testing, commissioning, labour, services, facilities, equipment, supplies and materials to be furnished, supplied or performed by SPP at the SESB Interconnection Facility as further described in Appendix E; |
| <b><i>Suruhanjaya Tenaga</i></b>                   | means Suruhanjaya Tenaga established under the Energy Commission Act 2001 and any successor thereof;  |



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| <b>Taxes</b>                              | means any tax, charge, impost, tariff, duty or fee of any kind which is charged, imposed or levied by any Government Entity, including any value added tax, customs duties, sales tax, stamp duty, withholding tax, excise tax, property tax or registration or licence fee;   |
| <b>Term</b>                               | means the period of this Agreement as specified in Clause 2.1 ( <i>Term</i> ) and any extension as may be determined in accordance with Clause 15.3(c) ( <i>Effect of Force Majeure</i> ) and 20.1(c) ( <i>Change-in-Law Adjustment</i> );   |
| <b>Test Energy</b>                        | means the Net electrical Output generated in connection with the commissioning of the Facility prior to the Commercial Operation Date;   |
| <b>SESB Interconnection Facility</b>      | means the existing SESB's substation and SESB's control centre (including the SPP Works);  |
| <b>SESB Licence</b>                       | means the licence granted to SESB under the Electricity Supply Act 1990 to enable SESB to own and operate electricity generating facilities and supply electrical energy to other Persons; and   |
| <b>SESB Metering Equipment</b>            | means the main and check metering equipment and devices (including telemetering equipment and software) as further described in Appendix D owned by SESB for the measurement of Net Electrical Output and electrical energy delivered from the Distribution Network at the applicable Interconnection Point to the Facility. |
| <b>Updated Input Financial Model</b>      | means the Initial Financial Model, as updated pursuant to Clause 6 ( <i>Energy Rate Review and Adjustments</i> ), and includes such updated Financial Model and the Updated Technology Financial Model;  |
| <b>Updated Technology Financial Model</b> | means the Initial Financial Model or the current version of the Updated Input Financial Model, which has been updated so that it is compatible with technology currently in use at the time of the update, in accordance with Clause 6.8 ( <i>Updating of Technology relating to the Financial Model</i> );                  |

## 1.2 Construction of Certain Terms and Phrases

Unless the context of this Agreement otherwise requires:

- (a) words of any gender include the other gender;
- (b) words using the singular or plural number also include the plural or singular number, respectively;

- (c) the terms “hereof”, “herein”, “hereunder”, “hereby”, “hereto” and similar words refer to this entire Agreement and not any particular Clause, Exhibit, Appendix or any other subdivision of this Agreement;
- (d) a reference to a “Clause”, “Exhibit”, or “Appendix” are to a clause, exhibit or appendix to this Agreement;
- (e) the words “include” or “including” shall be deemed to be followed by “without limitation” or “but not limited to” whether or not they are followed by such phrases or words of like import;
- (f) references to any statute or statutory provision shall be construed as a reference to the same as it may have been, or may from time to time be, amended, modified or re-enacted;
- (g) all references to the generation and/or delivery of solar photovoltaic energy shall include the provision of the following services ancillary to such generation and delivery in accordance with the Distribution Code, the Design Limits and Prudent Utility Practices:
  - (i) reactive power; and
  - (ii) voltage regulation;
- (h) references to “this Agreement” or any other agreement or document shall be construed as a reference to such agreement or document as amended, modified or supplemented and in effect from time to time and shall include a reference to any document which amends, modifies or supplements it, or is entered into, made or given pursuant to or in accordance with its terms;
- (i) whenever this Agreement refers to a number of days, such number shall refer to calendar days unless Business Days are specified. All accounting terms used in this Agreement and not expressly defined shall have the meanings given to them under generally accepted accounting principles of Malaysia applied on a consistent basis;
- (j) this Agreement shall not be construed adversely to a Party solely because that Party was responsible for preparing it; and
- (k) in the event of a conflict between the provisions of the main body of this Agreement and any provision in the Appendices, the provisions of the main body of this Agreement shall prevail.

## 2. TERM

### 2.1 Term

This Agreement shall take effect on the Effective Date and continue in effect for a term (the **Term**) which expires on the day before the twenty-first (21st) anniversary of the Commercial Operation Date (including such day), unless otherwise extended in accordance with Clauses 15.3(c) (*Effect of Force Majeure Event*) and 20.1(c) (*Change-in-Law Adjustment*) or earlier terminated in accordance with the provisions of this Agreement.

### 2.2 Expiry or Earlier Termination

Upon the expiry of the Term or earlier termination of this Agreement, SESB shall have the right to disconnect the SESB Interconnection Facility (including the SPP Works) from the Facility, the SPP Interconnection Facility and the SPP Interconnector.

## 3. CONDITIONS PRECEDENT AND CRITICAL MILESTONES

### 3.1 Conditions Precedent to the Effectiveness of this Agreement

This Agreement shall be effective upon satisfaction of the following conditions:

- (a) all Corporate Authorisations which are required to have been obtained by the Parties in connection with the execution and delivery of this Agreement have been obtained and are in full force and effect and a statement in writing to that effect has been delivered to the other Party;
- (b) this Agreement has been executed and delivered by each of the Parties;
- (c) SPP has submitted to SESB a copy of the Letter of Award and a certified copy of the Site Agreement;
- (d) SPP has submitted to Suruhanjaya Tenaga a certified copy of each of this Agreement and the Site Agreement; and
- (e) SPP has submitted to SESB a copy of the power system study report conducted on the Project based on generic model (the **Stage 1 Power System Study Report**) as approved by SESB.

If any of the conditions above has not been satisfied in full before the date being three (3) months from the date of this Agreement, either Party may terminate this Agreement by delivering to the other Party a notice in writing. In the event of termination under this Clause 3.1 (*Conditions Precedent to the Effectiveness of this Agreement*), this Agreement shall cease to have any further force or effect and neither Party shall have any obligation or liability (save in respect of any antecedent breach) to the other Party whether at law, hereunder or otherwise.

### 3.2 Conditions Precedent to the Initial Operations

The Initial Operation Date and the right of SPP to commence generation and deliver Test Energy and the obligation of SESB to accept Test Energy shall not occur until the following conditions have been satisfied:

- (a) SPP has submitted to SESB, with a copy to Suruhanjaya Tenaga, a certified copy of each of the Project Documents (other than this Agreement and the Site Agreement) accompanied by a confirmation that the Project Documents (other than this Agreement) are in full force and effect, all conditions to their effectiveness are satisfied or waived thereunder and no default of any material provisions thereunder has occurred or is continuing;
- (b) SPP has submitted to SESB, with a copy to Suruhanjaya Tenaga, a certified copy of each of the Initial Financing Documents accompanied by a confirmation that the Initial Financing Documents are in full force and effect, all conditions to their effectiveness are satisfied or waived thereunder and no default of any material provisions thereunder has occurred or is continuing;
- (c) SPP has submitted to SESB a certified copy of the SPP Licence;
- (d) SPP has submitted to SESB, with a copy to Suruhanjaya Tenaga, a certificate from the Independent Engineer that the Facility, SPP Interconnection Facility, the SPP Interconnector and the SPP Works have been designed, manufactured, supplied, constructed, installed, tested and commissioned in accordance with this Agreement;
- (e) SPP has submitted to SESB (i) a certified copy of the SPP Licence and (ii) a copy of the final power system study report conducted on the Project based on comprehensive models provided by the manufacturer of the solar photovoltaic energy panels and other components which will be used in the Facility (the **Stage 2 Power System Study Report**) as approved by SESB in writing;
- (f) SPP has submitted to SESB, with a copy to Suruhanjaya Tenaga, the full set of documentation for Initial Operation Date and the proposed commissioning, start-up and testing programs and relay settings are agreed by SESB in accordance with Clause 8.12 (*Initial Operation Date*);
- (g) the performance security as set out in Clause 7.5 (*Establishment of Security*) has been delivered to SESB and is in full force and effect;
- (h) SPP has submitted to SESB, with a copy to Suruhanjaya Tenaga, (i) a certified copy of the EIA Approval (if the Department of Environment requires the submission of an Environmental Impact Assessment Report by SPP); or (ii) a written confirmation from the Department of Environment that EIA Approval is not required; and

- (i) no default by SPP of any material provision of this Agreement, the conditions to the Letter of Award or SPP Licence has occurred or is continuing.

### 3.3 Conditions Precedent to Commercial Operations

The Commercial Operation Date and the right of SPP to supply and deliver Net Electrical Output and the obligation of SESB to accept Net Electrical Output and make Energy Payments shall not occur until the following conditions have been satisfied:

- (a) SPP has submitted to SESB a copy of the "Commissioning Test Certificate" or similar document to the like effect issued by Suruhanjaya Tenaga as contemplated by the SPP Licence in respect of the Facility being operational;
- (b) SPP has submitted to SESB, with a copy to Suruhanjaya Tenaga, the final design of the Facility and a certificate from the Independent Engineer stating that the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works have been tested and commissioned in accordance with this Agreement as set out in Clause 9.1 (*Commercial Operation Date*) and the EPCC Contract and that the Facility has the capacity and capability to meet the Contracted Capacity and the test results showing that effect;
- (c) no default by SPP of any material provision of this Agreement, the conditions to the Letter of Award, the SPP Licence, the Project Documents or the Financing Documents has occurred or is continuing;
- (d) the representations and warranties by SPP in this Agreement are true and correct in all material respects as if made on the Commercial Operation Date; and
- (e) all documentation, data, information and certified test results set out in Appendix B have been submitted by SPP to SESB, with a copy to Suruhanjaya Tenaga, and verified by SESB as being in conformance with the requirement of Appendix B within the time frames set out therein.

### 3.4 Timeframe to meet Certain Conditions to the Commencement of Generation of Electricity

SPP shall:

- (a) not later than the Financial Closing Date for the Initial Financing Documents, submit to SESB, with a copy to the Suruhanjaya Tenaga, one (1) certified copy of each of the Initial Financing Documents;
- (b) not later than the Financial Closing Date for the Initial Financing Documents, submit to SESB, with a copy to the Suruhanjaya Tenaga, one

- (1) certified copy of each of the Project Documents (other than this Agreement and the Site Agreement);
- (c) not less than [fifteen (15) months] prior to the Initial Operation Date, submit to SESB the conceptual design report with a certificate from the Independent Engineer for the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with Clause 8.3 (*Conceptual Design*);
- (d) not less than [twelve (12) months] prior to the Initial Operation Date, submit to SESB, the shop drawings for components of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with Clause 8.4 (*Shop Drawings*); and
- (e) not less than [sixty (60) days] before the Initial Operation Date, submit to SESB, the full set of documentation for the Initial Operation Date as set out in Clause 8.12(*Initial Operation Date*); and
- (f) not later than the Initial Operation Date, submit to SESB a copy of the SPP Licence.

### 3.5 Critical Milestones

The Parties shall co-operate to procure that the following critical milestones are met:

- (a) the conceptual design for the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall be submitted to SESB on or before **[insert a date which is no later than / [15] months prior to Initial Operation Date]**;
- (b) the Financial Closing Date shall occur on or before **[to insert a date which is at latest 10 months prior to Initial Operation Date or such longer period as required for on Site installations of the Facility]**; and
- (c) the Initial Operation Date shall occur on or before **[to insert a date which is no earlier than 30 days prior to the Scheduled Commercial Operation Date]**.

The failure to meet any of the milestones set out above shall not in itself amount to an Event of Default by SPP.

#### 4. SALE AND PURCHASE OBLIGATIONS

##### 4.1 Sale and Purchase of Net Electrical Output and Excess Energy

- (a) Starting on the Commercial Operation Date and continuing throughout the Term, SPP shall deliver and sell to SESB and SESB shall accept and purchase the Net Electrical Output which is generated by the Facility up to the Maximum Annual Allowable Quantity.
- (b) The price for calculation of Energy Payments in respect of Net electrical Output generated and delivered by SPP and accepted by SESB, up to the Maximum Annual Allowable Quantity, shall be at the Energy Rate.
- (c) Any Net Electrical Output generated by the Facility in excess of the Maximum Annual Allowable Quantity may be, but without any obligation, accepted by SESB (*Excess Energy*).
- (d) The price for calculation of Energy Payments in respect of Excess Energy generated and delivered by SPP and accepted by SESB shall be at the Excess Energy Rate.
- (e) SESB shall make Energy Payments for such Net Electrical Output and Excess Energy at the times stipulated in Clause 5 (*Billing and Payment*) and in amounts calculated in accordance with Appendix G.

##### 4.2 Output Exceeding Contracted Capacity

- (a) The Parties recognise the Letter of Award expressly provides that the Contracted Capacity is fixed and SPP is not permitted to install or resize the Facility above the Contracted Capacity. In the event any instantaneous output (in MW) from the Facility exceeds the Contracted Capacity in any half (1/2) hourly period, SESB shall not be obligated to accept the output, or if accepted, not required to pay for the Net Electrical Output delivered by the Facility over that half (1/2) hourly period.
- (b) SPP shall install protection schemes to reasonably prevent any instantaneous output (in MW) from the Facility exceeding the Contracted Capacity. SPP shall keep SESB indemnified for all losses, costs, expenses or damages from any damage to or destruction of property or personal injury (including death) resulting from delivery of such excess capacity.

##### 4.3 Title and Risk of Loss

Title to and the risk of loss of any solar photovoltaic energy generated from the Facility and transmitted to SESB in accordance with this Agreement shall pass to SESB at the Interconnection Point.

#### 4.4 Exceptions to SESB's Obligation to Accept Net Electrical Output

Notwithstanding any other provisions of this Agreement, SESB shall not be obliged to accept Net Electrical Output if either of the events or circumstances described below occur:

- (a) an Emergency Condition occurs within the Distribution Network as a result of which the Distribution Network is unable to accept Net Electrical Output. SESB shall give SPP advance notice of such occurrence(s) to the extent practicable in the circumstances then prevailing and shall give SPP a full explanation of such occurrence(s) promptly after it occurs;
- (b) the Facility delivers to SESB Net Electrical Output which does not conform to the electrical characteristics described in Appendix B. SESB shall notify SPP of this condition. SESB shall not be obliged to accept solar photovoltaic energy from the Facility until the condition is corrected or until SPP demonstrates to the reasonable satisfaction of SESB that SPP is operating in accordance with the operating standards set out in Appendix B;
- (c) SESB interrupts the acceptance of solar photovoltaic energy from the Facility to conduct necessary maintenance of the SESB Metering Equipment or the Distribution Network. In such instances, SESB shall give SPP as much advance notice as possible, but in no event less than seventy two (72) hours' prior notice of any such planned maintenance;
- (d) the Facility delivers to SESB Net Electrical Output which is not solely driven by solar photovoltaic technology, for example output from energy storage devices, hybrid generating devices with other fuel sources or concentrated solar thermal technology;
- (e) any constraint or interruption in the Distribution Network;
- (f) the Facility has delivered to SESB Net Electrical Output in a Contract Year exceeding the Maximum Annual Allowable Quantity of such Contract Year; or
- (g) the instantaneous output (in MW) delivered by the Facility exceeds the Contracted Capacity.

#### 4.5 SPP's Obligations to Comply with Despatch Instruction

- (a) During an Emergency Condition, SPP shall comply with the following requirements:
  - (i) SPP shall comply with the Despatch Instruction to generate and deliver electrical energy from the Facility; and
  - (ii) the Grid System Operator shall have the right to disconnect the Distribution Network and/or the SESB Interconnection Facility from



the Facility, the SPP Interconnection Facility and/or the SPP Interconnector.

- (b) SPP shall at all times ensure that the Facility is capable of receiving and complying with each Despatch Instruction, failing which the Grid System Operator shall have the right to disconnect the Distribution Network and/or the SESB Interconnection Facility from the Facility, the SPP Interconnection Facility and/or the SPP Interconnector.

#### 4.6 Suspension of SPP Sale Obligation

- (a) Notwithstanding any provisions to the contrary in this Agreement and in addition to Clause 15 (*Force Majeure*), SPP shall not be obliged to sell and deliver Net Electrical Output pursuant to this Clause 4 (*Sale and Purchase Obligation*) for so long as SPP cannot, consistent with Prudent Utility Practices, generate and deliver Net Electrical Output because of an Emergency Condition.
- (b) SPP shall give SESB advance notice of the occurrence of any such Emergency Condition to the extent practicable under the circumstances or as soon thereafter as practicable.

#### 4.7 Prudent Utility Practices

All actions required or taken under this Agreement by either Party shall be consistent with the Design Limits and Prudent Utility Practices.

### 5. BILLING AND PAYMENT

#### 5.1 Billing Statements

- (a) On the first day of each Billing Period, SPP shall download half (1/2) hourly meter reading for the immediately preceding Billing Period using the telemetering device connected to the main metering equipment comprising the SESB Metering Equipment. SPP shall prepare and deliver to SESB within thirty (30) days of downloading such half (1/2) hourly meter reading, a hardcopy and a softcopy of a statement in a format mutually agreed by the Parties (a **Billing Statement**) setting out details of the meter reading and SPP's calculation of the Energy Payment due to SPP in respect of the Facility for the immediately preceding Billing Period. SPP shall, together with the Billing Statement, deliver such documents as may be required by SESB in such format as SESB shall direct.
- (b) If SPP is unable to download such half (1/2) hourly meter reading from the main metering equipment comprising the SESB Metering Equipment, then SPP shall in writing request from SESB such downloaded half (1/2) hourly meter reading from the main metering equipment comprising the SESB Metering Equipment. If, within five (5) days from the receipt of the written request from SPP, SESB is unable to provide SPP such downloaded

half (1/2) hourly meter reading from the main metering equipment comprising the SESB Metering Equipment, SPP shall manually read the main metering equipment comprising the SESB Metering Equipment jointly with SESB. SPP shall give SESB five (5) days' written notice prior to the reading of such main metering equipment comprising the SESB Metering Equipment.

- (c) If the main metering equipment comprising the SESB Metering Equipment cannot be manually read by SPP within five (5) days of any day on which SPP and SESB are due to read the SESB Metering Equipment, SPP shall download such meter reading from the back-up metering equipment comprising the SESB Metering Equipment. If SPP is unable to download such half (1/2) hourly meter reading from the back-up metering equipment comprising the SESB Metering Equipment, then SPP shall in writing request from SESB such downloaded half (1/2) hourly meter reading from the back-up metering equipment comprising the SESB Metering Equipment. If, within five (5) days from the receipt of the written request from SPP, SESB is unable to provide SPP such downloaded half (1/2) hourly meter reading from the back-up metering equipment comprising the SESB Metering Equipment, then SPP shall manually read the back-up metering equipment comprising the SESB Metering Equipment jointly with SESB for the purposes of SPP preparing a Billing Statement. SPP shall give SESB five (5) days' written notice prior to the reading of such back-up metering equipment comprising the SESB Metering Equipment.
- (d) If, for any reason, such half (1/2) hourly meter reading cannot be obtained from the SESB Metering Equipment in the manner set out in this Clause 5.1 (*Billing Statements*), then the provisions of Clause 11.5 (*Adjustments for Inaccurate Meters*) shall apply for the purpose of SPP preparing a Billing Statement in respect of the Facility for the immediately preceding Billing Period subject that all relevant losses and auxiliary consumptions (if any) as may be mutually agreed by the Parties shall be taken into account.

## 5.2 Payment

- (a) SESB shall, within thirty (30) days of receipt of the Billing Statement, pay to SPP the Energy Payment and/or Non-Acceptance Payment (if any) invoiced in such Billing Statement:
- (i) less any amount due to SESB from SPP (including but not limited to the Non-Delivery Payment); and
  - (ii) less any amount in the Billing Statement disputed by SESB in good faith and which is to be settled in accordance with Clause 5.3 (*Payment Disputes*).
- (b) Any amounts, other than those specified in Clause 5.2(a) (*Payment*), due to either Party under this Agreement shall be paid or objected to within thirty (30) days following receipt by the other Party of an itemised statement from the Party to whom such amounts are due setting out, in reasonable

detail, the basis for such payment.

- (c) If any undisputed amount is not paid when due, there shall be due and payable to the other Party interest thereon, calculated on a simple basis at the Default Rate, from the date such amount became due (including such date) until the date such amount is paid in full (excluding such date).
- (d) SESB shall have the option, in any statement it provides to SPP pursuant to this Clause 5.2 (*Payment*), to require payment from SPP of any amount due to SESB or to require SPP to treat such amount due to SESB as a credit against any amount that SESB may then be owing to SPP under the terms of this Agreement.

### 5.3 Payment Disputes

- (a) If either Party disputes the accuracy of a statement provided pursuant to this Clause 5 (*Billing and Payment*), the Parties shall use their best efforts to resolve the dispute in accordance with Clause 19.1 (*Senior Officers*). Any adjustment which the Parties may subsequently agree to make shall be made by a credit or additional charge on the next statement delivered. If the Parties are unable to resolve the dispute in this manner, any amount disputed may be withheld pending final resolution of the dispute in accordance with the procedures described in Clause 19.2 (*Arbitration*).
- (b) Notwithstanding any provisions to the contrary in this Agreement, if SESB disputes in good faith the calculation of any Energy Payment and/or Non-Acceptance Payment (if any), the procedure set out in this Clause 5.3 (*Payment Disputes*) shall apply to such a dispute and SESB may withhold payment of the disputed amount.
- (c) Upon resolution of a disputed amount, the amount shall be due and payable to the appropriate Party, with interest thereon, calculated on a simple basis at the Default Rate, from the date on which such amount became due hereunder if no dispute had arisen (including such date) until such amount is paid in full (excluding such date).
- (d) The existence of a dispute as to any statement provided under this Clause 5.3 (*Payment Disputes*) shall not relieve either Party from complying with any other provision of this Agreement.

### 5.4 No Set-Off

Except as otherwise provided in this Agreement, all payments by either Party to the other Party under this Agreement shall be made free of any restriction or condition and without deduction on account of any amount claimed from the other Party which is disputed in good faith by that Party.

## 5.5 Currency and Timing of Payment

Notwithstanding anything in this Agreement to the contrary, (i) all payments to be made by either Party under this Agreement shall be made in Ringgit Malaysia; and (ii) any payment that becomes due and payable on a day that is not a Business Day shall be deemed due and payable on the next succeeding Business Day.

## 5.6 Records

SPP shall keep properly stored and maintained such records as are required by this Agreement to be maintained and all documents and materials relating to or substantiating any charges to be paid by or to SPP under this Agreement at its offices at the Site or as required by Law at its registered office, for a minimum of seven (7) years or for such additional time as may be required by Law. Upon reasonable prior notice to SPP, SESB shall have the right to inspect, examine, audit and copy such records, documents and materials.

## 6. ENERGY RATE REVIEW AND ADJUSTMENTS

*(The whole of Clause 6 shall be applicable for direct award project only)*

### 6.1 Initial Financial Model

The Initial Financial Model has been agreed to between the Parties. SPP acknowledges that the Initial Financial Model (and thereafter any existing Updated Input Financial Model) shall be operated by SESB and the Suruhanjaya Tenaga for the purpose of adjusting the Energy Rate pursuant to this Agreement.

### 6.2 Prices and Rate

- (a) At the date of execution of this Agreement, the Energy Rate is calculated from the Initial Financial Model and is as set out in Appendix G. The Energy Rate has been derived from the conservative estimates of SPP available immediately prior to the execution of this Agreement in relation to the inputs into the Initial Financial Model.
- (b) SPP acknowledges that it has been awarded with the Project on the basis that it will take all efforts to minimise all expenditure relating to the Project. For the avoidance of doubt, SPP warrants that:
  - (i) SPP has taken all reasonable efforts to minimise all expenditure relating to the Project and all costs, fees, charges and other relevant items relating thereto have been incurred in a manner consistent with Prudent Utility Practices;
  - (ii) SPP has, prior to the floating of the competitive tender for the selection of the EPCC Contractor, obtained the written approval of the Suruhanjaya Tenaga in respect of the EPCC Contractor tender documents;

- (iii) the selection of the EPCC Contractor shall be subject to the prior approval of the Suruhanjaya Tenaga; and
- (iv) the EPCC Contractor will be selected on a competitive tender basis, whereby:
  - (aa) the EPCC Contractor shall demonstrate to the satisfaction of the Suruhanjaya Tenaga and SESB by providing them with a report that the technology to be used for the Facility has been proven reliable and the EPCC Contractor has experience of at least two (2) successful completion of solar photovoltaic energy generating facility with the same capacity as that of the Facility;
  - (bb) the EPCC Contractor shall demonstrate to the satisfaction of the Suruhanjaya Tenaga and SESB by providing them with a report that the model of the solar photovoltaic energy generating facility proposed to be used for the Facility shall be based on well-established and proven track records in which a minimum of five (5) solar photovoltaic energy generating facilities similar to that proposed for the Facility shall have been installed elsewhere and each of such solar photovoltaic energy generating facilities shall have been operating commercially for at least 24,000 equivalent operating hours; and
  - (cc) SPP shall demonstrate to the reasonable satisfaction of the Suruhanjaya Tenaga and SESB by providing them with a report containing reasons for selecting the EPCC Contractor and supported by at least three (3) competitive quotes from different, unaffiliated organisations, of which at least two (2) should be from and through organisations which are not Affiliates of SPP. SPP shall additionally confirm in writing to the Suruhanjaya Tenaga and SESB that competitive quotes have been obtained.

### 6.3 Revision of the Financial Model

SESB and the Suruhanjaya Tenaga shall be entitled to amend the Initial Financial Model, or the then prevailing Updated Input Financial Model, pursuant to agreement on or determination of inputs pursuant to Clause 6.6 (*Inputs to the Financial Model*), to determine and reduce the Energy Rate on the occurrence of each the following events:

- (a) the Commercial Operation Date;
- (b) the event described in Clause 6.7(b);
- (c) one (1) year after the Commercial Operation Date,

(each event referred to as “**Financial Model Input Adjustment Event**”).

#### **6.4 Provision of Information by SPP**

No later than thirty (30) days after the occurrence of any Financial Model Input Adjustment Event (save for the event described in Clause 6.3(b)(*Revision of the Financial Model*)), SPP shall furnish to SESB and the Suruhanjaya Tenaga the Input Data.

#### **6.5 Rights of Review**

- (a) SPP shall provide, and shall procure that its Affiliates shall provide SESB, the Suruhanjaya Tenaga and their authorised representatives or agents, upon prior reasonable notice, unrestricted access to the Review Documents, including the internal records of SPP and its Affiliates, for the purpose of reviewing and verifying the completeness and accuracy of the Input Data provided by SPP pursuant to Clause 6.4 (*Provision of Information by SPP*), including all costs, fees, charges and other relevant items, and to take copies of all such Review Documents and records (“**Review**”). SPP shall also procure that: (i) its brokers and agents; and (ii) the Contractors, directly provide SESB, the Suruhanjaya Tenaga and their authorised representatives or agents all such Review Documents as may be reasonably requested by SESB, the Suruhanjaya Tenaga and/or their authorised representatives or agents, for the purpose of the Review.
- (b) SPP shall preserve, and shall procure that its Affiliates shall preserve in accordance with Malaysian approved accounting standards the Review Documents in appropriate detail to accurately provide and substantiate the information to be given under Clause 6.4 (*Provision of Information by SPP*). In relation to the Review Documents prepared during the period of construction of the Project, the information shall be retained for the Term.

#### **6.6 Inputs to the Financial Model**

Unless SESB agrees with the inputs to the Initial Financial Model or the then existing Updated Input Financial Model, as the case may be, provided by SPP as part of the Input Data, following the completion of a Review pursuant to Clause 6.5 (*Rights of Review*), the Parties shall meet to agree (within thirty (30) days after the completion of the relevant Review) the proposed revised inputs into the Initial Financial Model or the then existing Updated Input Financial Model, as the case may be. If the Parties are unable to agree upon the appropriate revised inputs within ninety (90) days after the completion of relevant Review by SESB, either Party may refer the dispute of the inputs for revision to the Initial Financial Model or the then existing Updated Input Financial Model, as the case may be, to the Suruhanjaya Tenaga who shall make a determination after first consulting the Parties.

**6.7 Adjustment of Energy Rate**

- (a) Following the Review and in case SESB accept the inputs to the Initial Financial Model or the then existing Updated Input Financial Model, as the case may be, or if applicable, upon the determination by the Suruhanjaya Tenaga of, the inputs into the Initial Financial Model or the then existing Updated Input Financial Model, as the case may be, pursuant to Clause 6.6 (*Inputs to the Financial Model*), SESB and the Suruhanjaya Tenaga shall, taking into consideration the principles specified in Appendix N, amend the Initial Financial Model or the then existing Updated Input Financial Model, as the case may be, using such inputs and applying the principles set out in Appendix N, to determine the reduced Energy Rate. Upon determination of the Energy Rate by the Updated Input Financial Model:
- (i) the Energy Rate shall be adjusted downwards to reflect such determination with effect from the month following the determination; and
  - (ii) Appendix G shall be deemed to be amended to reflect the reduced Energy Rate for the remainder of the Term unless revised further in accordance with this Agreement.
- (b) In the event of a failure by SPP to deliver Input Data in accordance with Clause 6.4 (*Provision of Information by SPP*), or to comply with its obligations and/or warranties under Clause 6.2(b) (*Prices and Rate*) or Clause 6.5 (*Rights of Review*), the Initial Financial Model or the then existing Updated Input Financial Model, as the case may be, shall be revised so that the Energy Rate shall be seventy five per cent (75%) of the then prevailing Energy Rate, and Appendix G shall be deemed to be amended to reflect the amended Energy Rate for the remainder of the Term, unless revised in accordance with this Agreement.
- (c) If each costs of the construction or financing of the Project or both is reduced below the amounts appearing in the Initial Financial Model or the then existing Updated Input Financial Model, as the case may be, the Energy Rate (following the revision of the Financial Model or the then existing Updated Input Financial Model, as the case may be,) shall, pursuant to Clause 6.7(a) (*Adjustment of Energy Rate*), be adjusted, downwards to reflect seventy per cent (70%) of the costs reductions.
- (d) Where SPP receives any incentive in respect of Taxes (including but not limited to any relief, reduction or abatement in the payment of any such Taxes) and/or any tax allowance (including but not limited to any investment tax allowance) provided by any Government Entity at any time from the date of this Agreement up to one (1) year after the Scheduled Commercial Operation Date of the Facility, SESB shall be entitled to reflect the whole of the incentive or benefit and/or tax allowance provided by any Government Entity, when revising the Energy Rate.

## 6.8 Updating of Technology relating to the Financial Model

Either Party may, from time to time, substitute the software or equipment on which the Financial Model is held where there has been or is likely to be a change in technology as a consequence of which it would be no longer practical to run the Financial Model using the then current technology on which it is held. To differentiate such an amended Financial Model from the then current Updated Input Financial Model or Financial Model, it shall be referred to as the current "**Updated Technology Financial Model**". Prior to carrying out any such migration such Party shall notify the other Party of its proposals and the reasons therefore and if the other Party shall object to the same the issue shall be referred to the Suruhanjaya Tenaga who shall make a determination after first consulting the Parties.

## 6.9 Custody of Financial Model

- (a) No later than seven (7) days after the execution of this Agreement, SESB shall deliver two (2) copies of the Initial Financial Model to the Suruhanjaya Tenaga (both on disc and in hard copy) who shall hold them for the benefit of the Parties. The Parties shall bear equally the Suruhanjaya Tenaga's reasonable fees and costs incurred in holding the Initial Financial Model.
- (b) Either Party shall have the right to inspect and audit the Financial Model at all reasonable times in the presence of the other Party and shall give reasonable notice to the other Party for undertaking such inspection or audit.

## 6.10 The Suruhanjaya Tenaga's rights to appoint Independent Expert

The Suruhanjaya Tenaga may appoint an Independent Expert to assist the Suruhanjaya Tenaga on matters relating to Clause 6. The Independent Expert as may be appointed by the Suruhanjaya Tenaga shall possess skills in the financial and economic analysis of power purchase and supply under long term power purchase agreements and shall not, directly or indirectly, be associated with either Party as officer, employee, consultant, contractor or otherwise. The reasonable fees and costs of the Independent Expert shall be shared by the Parties in equal proportion.

## 7. DELAY COMPENSATION

### 7.1 Failure to Achieve the Scheduled Commercial Operation Date

If, due to the default of SPP or its contractors or agents under this Agreement, the Commercial Operation Date does not occur on or before the Scheduled Commercial Operation Date, SPP shall compensate SESB an amount equal to Ringgit Malaysia [**Quantum of compensation is a function of the Contracted Capacity and RM1,000, i.e. the Contracted Capacity (in MW) x RM1,000.00**] per day for each day following the Scheduled Commercial Operation Date until the earlier of (i) the Commercial Operation Date; (ii) the date on which this Agreement is terminated by SESB in accordance with the provisions of this Agreement; and (iii) one hundred and



eighty (180) days after the Scheduled Commercial Operation Date.

## 7.2 Abandonment of the Project

If SPP Abandons the Project after the Effective Date, SPP shall forthwith compensate SESB an amount equal to Ringgit Malaysia ***[Quantum of compensation is a function of the Contracted Capacity, RM1,000 and 180 days, i.e. the Contracted Capacity (in MW) x RM1,000.00 x 180 days]***.

## 7.3 No Penalty

The Parties agree that the precise level of actual damages that would be suffered by SESB arising out of or in relation to the delay or Abandonment described in this Clause 7 (*Delay Compensation*) would be difficult to ascertain with certainty. The Parties further agree that any sum payable under this Clause 7 (*Delay Compensation*) is not a penalty, and is genuine, fair and reasonable. Such amount represents a genuine, good faith and reasonable estimate of fair compensation for the losses to SESB that may reasonably be anticipated to suffer from such failure, and shall, without duplication, but subject to Clause 16.4 (*Consequences of Termination*), be the sole and exclusive remedy and measure of damages with respect to any failure by SPP to meet such obligations.

## 7.4 Maximum Amount of Compensation

The aggregate of compensation payable by SPP under this Clause 7 (*Delay Compensation*) shall not exceed Ringgit Malaysia ***[Quantum of compensation is a function of the Contracted Capacity, RM1,000 and 180 days, i.e. the Contracted Capacity (in MW) x RM1,000.00 x 180 days]***.

## 7.5 Establishment of Security

SPP shall secure payment of the compensation specified in this Clause 7 (*Delay Compensation*) by providing to SESB, not later than the earlier of (i) seven (7) days from the Financial Closing Date and (ii) two hundred and ten (210) days after the Effective Date, an irrevocable bank guarantee issued by a commercial bank reasonably acceptable to SESB in the form set out in Exhibit 1 for an amount equal to Ringgit Malaysia ***[Quantum of compensation is a function of the Contracted Capacity, RM1,000 and 180 days, i.e. the Contracted Capacity (in MW) x RM1,000.00 x 180 days]*** which bank guarantee shall permit drawings by SESB thereunder to satisfy the performance obligations of SPP under this Clause 7 (*Delay Compensation*). The bank guarantee shall remain valid until the expiration of one hundred and eighty (180) days after the Scheduled Commercial Operation Date. If SPP fails to furnish a bank guarantee to SESB within the time frame and valid for the duration set out in this Clause 7.5 (*Establishment of Security*) or such other date as may be otherwise agreed to by the Parties then SESB may terminate this Agreement by giving notice to SPP whereupon this Agreement shall cease to have any further force and effect and neither Party shall have any claim against the other under it save for any claim arising from any antecedent breach.

## 7.6 No Termination

Save where SPP has Abandoned the Project, SESB shall not be entitled to terminate this Agreement during any period in respect of which SPP is obliged to pay, is paying or has paid compensation due pursuant to this Clause 7 (*Delay Compensation*).

## 8. DESIGN, CONSTRUCTION, TESTING AND COMMISSIONING

### 8.1 General

- (a) SPP shall design, engineer, procure, construct, install, energise, test and commission the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with Prudent Utility Practices, the specifications and characteristics set forth in Appendices A, B, D, E and F, and the terms and conditions of this Agreement.
- (b) SPP shall within sixty (60) days from the Effective Date submit to SESB the proposed work programme and schedule relating to the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works and coordinate with SESB the submissions, testing and approval requirements as required in accordance with this Clause 8 (*Design, Construction, Testing and Commissioning*) and Prudent Utility Practices.
- (c) SPP shall, at its cost and expense, acquire all necessary Access Rights to the parcels of land on which the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility and the SPP Interconnector shall be constructed and located.

### 8.2 Notice of Commencement Date

SPP shall provide SESB with at least fifteen (15) days' prior notice of the proposed Commencement Date, and written confirmation that the Commencement Date has occurred within five (5) days after it occurs.

### 8.3 Conceptual Design

- (a) SPP shall at all times refer and consult with the designated representative(s) of SESB in respect of the design of the SPP Works. SESB shall notify SPP of its designated representative(s) no later than ninety (90) days from the date of execution of this Agreement.
- (b) SPP shall not less than [fifteen (15) months] prior to the Initial Operation Date, submit to SESB the conceptual design report for the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works consisting of the single line diagram, protection schemes, relay types and settings, and such other information in

such form as SESB shall direct in accordance with Prudent Utility Practices, together with the Independent Engineer's certificate stating that:

- (i) the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works when constructed in accordance with such design drawings will conform to the description set forth in Appendices A, D, E and F in all material respects and have the capacity to meet the operational characteristics set out in Appendix B;
  - (ii) it is technically feasible for the Commercial Operation Date to occur on or before the Scheduled Commercial Operation Date; and
  - (iii) the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works should have a useful life no shorter than the Term.
- (c) SESB may at its own cost review the conceptual design report of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works and recommend modifications, revisions and improvements, if needed or desirable in accordance with Prudent Utility Practices. SESB shall revert to SPP with its recommendations (if any) within sixty (60) days of receiving such conceptual design report.
- (d) Where any recommendations made by SESB are in respect of the Meteorological Measuring Facilities, the SPP Interconnection Facility, SPP Interconnector, the SPP Works or for the safe operation of the Facility with the Distribution Network in accordance with Prudent Utility Practices, SPP shall comply with the aforesaid recommendations and make the necessary changes to the conceptual design.
- (e) SPP shall comply with the recommendations made by SESB in respect of the conceptual design report of the SPP Works. No later than fourteen (14) Business Days prior to the Commencement Date, SPP shall submit to SESB the revised conceptual design report of the SPP Works (in such format as SESB shall direct) for SESB's approval.
- (f) SPP may comply with the recommendations made by SESB in respect of the conceptual design report of the Facility, the SPP Interconnection Facility and the SPP Interconnector. However, if the aforesaid recommendations relate to the safe operation of the Facility, the SPP Interconnection Facility and the SPP Interconnector with the Grid System, SPP shall comply with the aforesaid recommendations. No later than fourteen (14) Business Days prior to the Commencement Date, SPP shall submit to SESB such revised conceptual design report of the Facility, the SPP Interconnection Facility and the SPP Interconnector for SESB's acceptance.

#### 8.4 Shop Drawings

- (a) SPP shall not less than [twelve (12) months] prior to the Initial Operation Date submit to SESB the shop drawings for components of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works together with all protection data, related primary data, capability curves and relay terminal drawings and such other information in such form as SESB shall direct in accordance with Prudent Utility Practices, together with the Independent Engineer's certificate.
- (b) SESB may at its own cost review the shop drawings for components of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works and recommend modifications, revisions and improvements, if needed or desirable in accordance with Prudent Utility Practices. SESB shall revert to SPP with its recommendations (if any) within sixty (60) days of receiving such shop drawings and component data and information.
- (c) SESB shall be entitled to require factory acceptance test for components of the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with Prudent Utility Practices prior to their delivery to Site.
- (d) SPP shall provide SESB with no less than fourteen (14) days prior notice before the commencement of each factory acceptance test. SESB shall be entitled to witness the conduct of such tests and SPP shall within twenty-four (24) hours after the completion of each test submit to SESB the preliminary test results in respect of each test conducted. The test results shall be certified by the Electrical Service Engineer appointed by SPP.

#### 8.5 Conduct of Stage 1 Power System Study Report and Stage 2 Power System Study Report

- (a) SPP shall at all times refer and consult with the designated representative(s) of SESB in respect of the conduct of the Stage 1 Power System Study Report and the Stage 2 Power System Study Report. SESB shall notify SPP of its designated representative(s) no later than one hundred and twenty (120) days from the date of execution of this Agreement.
- (b) Fourteen (14) days prior to the execution of this Agreement, SPP shall have submitted to SESB the Stage 1 Power System Study Report conducted in accordance with Appendix B of this Agreement. Not less than sixty (60) days prior to the Commencement Date, SPP shall submit to SESB the Stage 2

Power System Study Report conducted in accordance with Appendix P of this Agreement.

- (c) SESB may, at its own cost, recommend modifications, revisions and improvements, if needed or desirable, to the Stage 1 Power System Study Report and the Stage 2 Power System Study Report in accordance with Prudent Utility Practices. SESB shall revert to SPP with its recommendations (if any) within forty five (45) days of being furnished the Stage 1 Power System Study Report and the Stage 2 Power System Study Report pursuant to Clause 8.5(b) (*Conduct of Stage 1 Power System Study Report and Stage 2 Power System Study Report*).
- (d) SPP shall comply with the recommendations made by SESB in respect of the Stage 1 Power System Study Report and the Stage 2 Power System Study Report. No later than thirty (30) days prior to the Effective Date, SPP shall re-submit to SESB the Stage 1 Power System Study Report after taking into the recommendations (if any) made by SESB for its written approval. No later than the Commencement Date, SPP shall re-submit to SESB the Stage 2 Power System Study Report after taking into the recommendations (if any) made by SESB for its written approval.
- (e) SPP shall implement any changes or modifications to the design of the Facility, the SPP Interconnection Facility and/or the SPP Interconnector in respect of the resubmitted Stage 1 Power System Study Report and Stage 2 Power System Study Report which have been approved by SESB pursuant to Clause 8.5(d) (*Conduct of Stage 1 Power System Study Report and Stage 2 Power System Study Report*).

**8.6 Facility's 33kV Transformer(s), SPP Interconnection Facility, the SPP Interconnector and the SPP Works Protection Scheme, Relay Type and Settings**

- (a) Not less than ninety (90) days before the Commencement Date, SPP shall provide SESB and the Grid System Operator with the protection schemes and relay type in relation to the Facility's 33kV transformer(s), the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.
- (b) Within sixty (60) days of receiving such material, SESB shall give SPP written notification of whether such protection schemes and relay type are acceptable to SESB.
- (c) If such protection schemes or relay type are not acceptable, SESB shall provide detailed information (within the same sixty (60) days' period) as to why such protection schemes or relay type are not acceptable and SPP shall comply with any reasonable request made by SESB consistent with Prudent Utility Practices in relation to such protection schemes and relay type and also in accordance to SESB protection guidelines
- (d) Not less than three hundred and sixty (360) days prior to the Initial Operation Date, SPP shall provide SESB all protection data, related primary

data, capability curves, relay terminal drawings and relay settings in relation to the Facility's 33kV transformer(s), the SPP Interconnection Facility and the SPP Interconnector. SESB may at its own cost, review such material (including but not limited to relay settings) and based on such review recommend modifications, revisions and improvements, if needed or desirable, in accordance with Prudent Utility Practices. SESB shall revert to SPP with its recommendations (if any) within one hundred and twenty (120) days of being furnished such material.

- (e) Not less than three hundred and sixty (360) days prior to the Initial Operation Date, SPP shall provide SESB all protection data, related primary data, capability curves and relay terminal drawings in relation to the SPP Works. SPP shall request from SESB the relay settings in relation to the SPP Works. SESB shall, upon such SPP's request, give SPP written notification of the relay settings in relation to the SPP Works and SPP shall implement such relay settings.
- (f) Upon SPP having completed a specification compliance audit (the **SCA**), a site acceptance test (the **SAT**) and a pre-commissioning inspection and testing audit procedure (the **PIAT**) on the SPP Works specified in Clause 8.8 (*Inspection of the SPP Works*) and Clause 8.9 but no later than fourteen (14) Business Days prior to the conduct of the reliability and safety verification (the **RSV**) pursuant to Clause 8.9(e), SPP shall submit to SESB the relay settings as installed at the Facility's 33kV transformer(s), the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. SPP shall submit the printout of final relay settings of the Facility's 33kV transformer(s), the SPP Interconnection Facility, the SPP Interconnector and the SPP Works with endorsement by the Electrical Service Engineer for SESB's acceptance.

## 8.7 Construction Period

- (a) SPP shall throughout the construction period keep SESB informed of the work programme and schedule relating to the Facility, the Meteorological Measuring Facilities, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works and update SESB from time to time the progress and changes to the work programme and schedule.
- (b) SPP shall provide SESB with copies of monthly reports provided by the EPCC Contractor to SPP and any periodic reports provided to the Financing Parties describing the progress of construction of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.
- (c) SPP shall obtain the prior written consent of SESB for any proposed Modification to:
  - (i) the design or construction of the Facility if such Modification could reasonably be expected to have a material adverse effect on SESB's rights under this Agreement or on the Distribution Network; or

- (ii) the design or construction of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works that has been submitted to SESB pursuant to Clause 8.3 (*Conceptual Design*) or Clause 8.4 (*Shop Drawings*).
- (d) SESB shall revert to SPP within sixty (60) days of receiving any Modification request from SPP.
- (e) SESB may, at its own cost and upon reasonable prior notice to SPP, visit the Site to view the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. SESB shall at all times be subject to SPP's safety rules and regulations.

### Completion of SPP Works Construction

#### 8.8 Inspection of the SPP Works

- (a) SPP shall inform SESB the completion of the construction of the SPP Works. Upon reasonable prior notice given by SESB to SPP, SESB may inspect the SPP Works together with SPP to verify that the design and construction of the SPP Works conform to Appendix E and the conceptual design relating thereto that has been reviewed by SESB pursuant to Clause 8.3 (*Conceptual Design*) and Prudent Utility Practices. SPP shall conduct the SCA on the SPP Works in accordance with SESB SCA Guidelines. SPP shall invite SESB to witness the SCA and SESB may send its representatives for joint inspection. SESB may, during such joint inspection, examine and audit such records, documents and materials relating to the design, construction and testing of the SPP Works and SPP shall give SESB such access and assistance as SESB may reasonably require for the purposes of such joint inspection. Each Party shall bear its own costs of such joint inspection.
- (b) Within seven (7) days after such joint inspection, SESB shall submit its comments and recommendations to SPP in respect of such joint inspection.
- (c) SPP shall, at its own cost and expense, comply with any recommendation of SESB with respect to the design and construction of the SPP Works with the provisions of Appendix E and the conceptual design report relating thereto that has been reviewed by SESB pursuant to Clause 8.3 (*Conceptual Design*) and in accordance with the SESB Technical Specifications. SPP shall at its own cost and expense comply with any recommendation of SESB with respect to the design and construction of the SPP Interconnection Facility and the SPP Interconnector if such recommendation reasonably relates to ensuring compliance of the SPP Interconnection Facility and the SPP Interconnector with the provisions of Appendix E and the conceptual design report relating thereto that has been reviewed by SESB pursuant to Clause 8.3 (*Conceptual Design*) and Prudent Utility Practices.
- (d) SPP shall at its own cost and expense undertake all necessary works to

comply with any such recommendation of SESB with respect to the design and construction of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.

- (e) SPP shall provide SESB with seven (7) days' prior notice of its completion of such works whereupon SESB may re-inspect the SPP Interconnection Facility, the SPP Interconnector and the SPP Works to verify that the changes made by SPP comply with such recommendations.

**8.9 Testing of the SPP Works Upon Completion of Inspection and Interfacing Verification in respect of the SPP Works, the SPP Interconnection Facility and the SPP Interconnector**

- (a) Upon mutual agreement by the Parties that the SPP Works conform to Appendix E, the conceptual design report and the detailed design reviewed by SESB pursuant to Clause 8.3 (*Conceptual Design*) and Clause 8.6 respectively and the SESB Technical Specifications, SPP shall submit to SESB the testing schedule, the type and sequence of tests (including but not limited to the SAT), the testing procedures and the format for the test results of the SPP Works in accordance with the SESB SAT Guidelines, no later than thirty (30) days prior to the conduct of such tests including SAT.
- (b) SPP shall provide SESB with thirty (30) days' prior written notice of the proposed conduct of such tests (including but not limited to the SAT) on the SPP Works. SESB shall be entitled to witness the conduct of such tests. The test results in respect of the SAT on the SPP Works shall be certified by the Electrical Service Engineer appointed by SPP.
- (c) SPP shall conduct the PIAT on the SPP Works in accordance to SESB PIAT Guidelines. SPP shall provide SESB with fourteen (14) days' prior written notice of the proposed conduct of the PIAT on the SPP Works. SPP shall invite SESB to witness the PIAT on the SPP Works and SESB may send its representatives for witness of such PIAT on the SPP Works.
- (d) Upon SPP having completed the SCA, SAT and PIAT on the SPP Works specified in Clause 8.8 (*Inspection of the SPP Works*) and Clause 8.9 but prior to the conduct of the RSV on the SPP Works, SPP shall invite SESB for a joint conduct of the interfacing verification in respect of the SPP Works, the SPP Interconnection Facility and SPP Interconnector. SESB may, during such joint conduct, examine and audit such records, documents and materials relating to the design, construction and testing of the SPP Works, the SPP Interconnection Facility and SPP Interconnector and SPP shall give SESB such access and assistance as SESB may reasonably require for the purposes of such joint conduct. Each Party shall bear its own costs of such joint conduct.
- (e) SPP shall conduct RSV on the SPP Works in accordance to SESB RSV Guidelines. SPP shall provide SESB with fourteen (14) Business Days' prior written notice of the proposed conduct of the RSV on the SPP Works and SPP shall furnish SESB with the reports for SCA, SAT and PIAT conducted on the



SPP Works specified in Clause 8.8 (*Inspection of the SPP Works*) and Clause 8.9.

- (f) In the event the SPP Works fail to meet SESB's requirements for SCA, SAT and/or PIAT pursuant to the conduct of the RSV, the RSV shall be repeated at a convenient time mutually agreed between SESB and SPP.
- (g) If the RSV conducted pursuant to Clause 8.9(f) still fails, SPP shall make all necessary rectifications of the SPP Works. SPP shall obtain SESB's prior written consent if such rectifications of the SPP Works could reasonably be expected to have a material adverse effect on SESB's rights under this Agreement or on the Distribution Network.
- (h) Each Party shall bear its own respective cost and expense for conducting the SAT, the PIAT and the RSV under this Clause 8.9.
- (i) SPP shall submit to SESB a copy of the as-built drawings for the SPP Interconnection Facility, the SPP Interconnector and the SPP Works not later than ninety (90) days from the Initial Operation Date.
- (j) SPP shall also furnish SESB with the Independent Engineer's certificate stating that the SPP Interconnection Facility, the SPP Interconnector and the SPP Works have been designed, manufactured, supplied, constructed, installed and tested in accordance to the requirements of this Agreement (including but not limited to the recommendations made by SESB pursuant to Clause 8.3(d), Clause 8.3(e) and Clause 8.5(e)) and Prudent Utility Practices and are ready to be energized.

**8.10 Commissioning of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

- (a) The commissioning of the SPP Works may commence subject to:
  - (i) the successful completion of the conduct of the RSV on the SPP Works pursuant to Clause 8.9(e);
  - (ii) SPP shall have submitted to SESB, a certificate from the Independent Engineer that the SPP Works have been designed, manufactured, supplied, constructed, installed and tested in accordance with the requirements of this Agreement pursuant to Clause 8.9(j);
  - (iii) SPP shall have submitted to SESB the final relay settings of the SPP Works for SESB's acceptance pursuant to Clause 8.6(f); and
  - (iv) SPP shall have submitted advance notification of commissioning and test programs to SESB and the Grid System Operator. SPP shall have obtained written confirmation from the Grid System Operator that the energization and commissioning of the SPP Works may commence.

- (b) The commissioning of the SPP Interconnection Facility and SPP Interconnector may commence subject to:
- (i) the successful commissioning of the SPP Works pursuant to Clause 8.10(a);
  - (ii) SPP shall have submitted to SESB, a certificate from the Independent Engineer that the SPP Interconnection Facility and the SPP Interconnector have been designed, manufactured, supplied, constructed, installed and tested in accordance with the requirements of this Agreement;
  - (iii) SPP shall have submitted to SESB, the final relay settings of the Facility's 33kV transformer(s), the SPP Interconnection Facility and the SPP Interconnector to SESB that have been accepted by SESB pursuant to Clause 8.6(f); and
  - (iv) SPP shall have submitted advance notification of commissioning and test programs to SESB and the Grid System Operator. SPP shall have obtained written confirmation from the Grid System Operator that the energization and commissioning of the SPP Interconnection Facility and the SPP Interconnector may commence.
- (c) The procedures for the shutdown and commissioning of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works including backfeed from the Distribution Network shall comply with the procedures as may be given by SESB and/or the Grid System Operator in writing to SPP.

#### **8.11 Relay Settings of the Facility**

- (a) The design of the Facility's protection system including the relay setting of the Facility, as further described in Appendix B of this Agreement, shall not be dependent on the protection system of the SPP Interconnector, SPP Interconnection Facility and/or the SPP Works.
- (b) All the relay settings in relation to the Facility referred to in Clause 8.11(a) (*Relay Settings of the Facility*) have been installed by SPP, tested and certified by Electrical Service Engineer

#### **8.12 Initial Operation Date**

- (a) Upon completion of the construction, installation and testing of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, SPP shall submit to SESB a notice of the proposed Initial Operation Date together with a full set of documentation for the Initial Operation Date which shall consist of:

- (i) a copy of the as built drawings for SPP Interconnection Facility, the SPP Interconnector and the SPP Works together with the Independent Engineer's certificate stating the design and construction of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works conform to Appendix E and the conceptual design relating thereto as approved by SESB;
  - (ii) a copy of the Interconnection Operation Manual (IOM) as agreed by SESB;
  - (iii) the factory acceptance test results and pre-commissioning test results for the components of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works as specified by SESB including any anti-islanding, electrical protection scheme, protection coordination study, cable tests, communication facilities, metering facilities tests, and calibrations for testing equipment;
  - (iv) the commissioning, start-up and testing programs for the Facility which shall consist of the commissioning and testing programs, testing schedule, test procedures, test loads and test loads patterns for all tests required to comply with the Distribution Code and the provisions of this Agreement and EPCC Contract;
  - (v) the relay settings as proposed by the manufacturer of the Facility's solar photovoltaic generators and transformers together with the calculations and relevant data thereto; and
  - (vi) such other documentation as SESB shall direct in accordance with Prudent Utility Practices.
- (b) If any proposed commissioning, start-up and testing programs and relay settings are not acceptable to SESB, SESB shall within thirty (30) days provide SPP detailed information as to why the proposed commissioning, start-up and testing programs and relay settings are not acceptable to SESB and SPP shall comply with any such revisions as may be required by SESB in accordance with Prudent Utility Practices. SPP shall re-submit such revisions for SESB's approval before commencement of the proposed commissioning, start-up and testing programs (the **Agreed Program**).
- (c) SPP shall provide SESB with no less than fourteen (14) days prior notice before the commencement of each test. SESB shall be entitled to witness the conduct of such tests and SPP shall within twenty-four (24) hours after the completion of each test submit to SESB the preliminary test results in respect of each test conducted. The test results shall be certified by the Electrical Service Engineer appointed by SPP.
- (d) Notwithstanding any provision in this Agreement, no generation of solar photovoltaic energy from the Facility in an interconnected mode with the Distribution Network may take place and the Initial Operation Date may not occur until (i) all the interconnection protective devices in relation to the

Facility have been installed by SPP and been inspected and approved by SESB, (ii) all the relay types and relay settings in relation to the Facility been installed by SPP and been approved by SESB, and (iii) the Grid System Operator has confirmed in writing, within a reasonable period, that the operation of the Facility with the Distribution Network may commence.

- (e) No Energy Payment shall be applicable for any Test Energy generated during the testing and commissioning of the Facility.

### **8.13 No Endorsement**

Unless expressly stated in this Agreement, any review, verification, acceptance, endorsement or approval by SESB or the Grid System Operator of any material, documents, designs, drawings, schedules, design data, control and protection settings, test procedures, test results, test reports or other information submitted by SPP concerning the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, or any presence of SESB to witness any test performed on the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall not be deemed to constitute an endorsement of the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works nor a warranty or other assurance by SESB of the safety, durability or reliability of the Facility or the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.

### **8.14 Compliance**

Notwithstanding any provision in this Agreement, SPP shall comply with all instructions, recommendations, procedures and directions which may be given by SESB at any time during the design, construction, testing and commissioning of the Facility where such instructions, recommendations, procedures and directions are in accordance with Prudent Utility Practices, the Distribution Code or for the safe operation of the Facility with the Distribution Network.

### **8.15 Consequences of Delay by SESB**

If, otherwise than due to any default or omission on the part of SPP under this Agreement and subject to the SPP Interconnection Facility, the SPP Interconnector and the SPP Works having been completed by SPP and the Facility is otherwise completed and ready for commercial operation barring the testing and commissioning required, the Commercial Operation Date is delayed, then the Scheduled Commercial Operation Date shall be extended by one day for each day the Commercial Operation Date is delayed.

### **8.16 Advance Commercial Operation Date**

If SPP notifies SESB that the Commercial Operation Date can be achieved earlier than the Scheduled Commercial Operation Date, SESB may agree to an earlier

Commercial Operation Date from which Energy Payments shall be payable in accordance with this Agreement.

## 9. COMMERCIAL OPERATIONS

### 9.1 Commercial Operation Date

- (a) SPP shall provide SESB with at least thirty (30) days' prior notice of the proposed Commercial Operation Date. SPP shall provide SESB with written confirmation that the Commercial Operation Date has occurred within twenty-four (24) hours after it occurs. The said confirmation shall be provided together with the Independent Engineer's certificate stating that the Facility has been tested and commissioned in accordance with the Agreed Program and the Facility has the capacity and capability to meet the Contracted Capacity with the test results showing that effect.
- (b) Not later than sixty (60) days after the occurrence of the Commercial Operation Date, SPP shall submit to SESB a hardcopy and a softcopy of the performance test report and the project completion report relating to the Facility as prepared by the EPCC Contractor.
- (c) Not later than one hundred and ninety (90) days after the occurrence of the Commercial Operation Date, SPP shall submit to SESB a hardcopy and a softcopy of the project completion report relating to the Project as prepared by the EPCC Contractor.

### 9.2 Declarations of Annual and Monthly Quantity (*applicable for installation below 5MW*)

- (a) Together with the notice of the proposed Commercial Operation Date, SPP shall furnish SESB with the Declared Annual Quantity for the Contract Year in which the Commercial Operation Date occurs (the *Initial Contract Year*). In addition to furnishing the Declared Annual Quantity for the Initial Contract Year, if the Commercial Operation Date occurs in any of the months of October, November and December, SPP shall also simultaneously furnish SESB with the Declared Annual Quantity for the Contract Year immediately following the Initial Contract Year.
- (b) For each subsequent Contract Year, SPP shall submit the Declared Annual Quantity for each Contract Year to SESB not less than sixty (60) days prior to January 1 of that Contract Year together with the schedule of any planned outages expected for that Contract Year.
- (c) No later than twenty-fifth (25th) day of each month or such other time as SESB shall otherwise require, throughout the Term, SPP shall update and re-declare to SESB the updated quantity of solar photovoltaic energy expected for the next calendar month and each subsequent month until the end of that Contract Year together with any changes to the schedule of any planned outages.

- (d) SPP shall update and re-declare to SESB any expected changes to the quantity of solar photovoltaic energy in the event of any unplanned outages or Emergency Condition as soon as practicable. SPP shall provide SESB with at least seven (7) days' prior notice for any proposed change to any planned outages.
- (e) SPP shall submit the declarations in this Clause 9.2 (*Declarations of Annual and Monthly Quantity*) in such manner and with such additional details and information as may be prescribed from time to time by SESB and/or the Grid System Operator in accordance with Prudent Utility Practices.

**Declaration of the Declared Daily Quantity (applicable for installation 5MW and above)**

- (a) No later than twenty-fifth (25th) day of each month or such other time as SESB shall otherwise notify, throughout the Term, SPP shall declare to SESB the Declared Daily Quantity for the following three (3) rolling months' period (the **3 Month Ahead Declared Daily Quantity**) in such manner or form as may be prescribed from time to time by SESB.
- (b) At 12.30 pm every Wednesday or such other time as SESB shall otherwise notify, throughout the Term, SPP shall declare to SESB the Declared Daily Quantity for a period of nine (9) days beginning from the coming Saturday to the next Sunday (the **Week Ahead Declared Daily Quantity**) in such manner or form as may be prescribed from time to time by SESB.
- (c) At 10.00 am every day or such other time as SESB shall otherwise notify, throughout the Term, SPP shall declare to SESB the Declared Daily Quantity for the following day (the **Day Ahead Declared Daily Quantity**) in such manner or form as may be prescribed from time to time by SESB.
- (d) SPP may redeclare the Declared Daily Quantity at any time to take account of any deration or change in the Declared Daily Quantity.

**9.3 Operation and Maintenance of the Facility**

SPP shall at all times operate and maintain the Facility in accordance with Prudent Utility Practice, the Distribution Code and the terms and conditions of this Agreement specifically the provisions of Appendix H.

**9.4 Consequence of SESB's failure to Accept Net Electrical Output**

If, otherwise than due to (i) an interruption due to a Force Majeure Event affecting SESB; or (ii) the events or circumstances described in Clause 4.4 (*Exceptions to SESB's Obligation to Accept Net Electrical Output*), SESB fails to accept the Net Electrical Output as may be generated and delivered by SPP, then

SESB shall pay SPP the Non- Acceptance Payment calculated in accordance with Appendix G.

#### **9.5 Consequences of SPP Failure to Deliver Net Electrical Output**

If, otherwise than due to (i) an Emergency Condition; (ii) an interruption due to a Force Majeure Event affecting SPP; or (iii) any default or omission on the part of SESB, the total Net Electrical Output delivered by the Facility in a Contract Year is less than seventy per cent (70%) of the Declared Annual Quantity of such Contract Year, then SPP shall pay SESB the Non-Delivery Payment calculated in accordance with Appendix G.

#### **9.6 Consequences of SPP Failure to Meet Operating Standards**

- (a) If SPP fails to comply with or operate in conformity with any of the operating standards or characteristics set out in Appendix B, SPP shall forthwith compensate SESB an amount equal to Ringgit Malaysia Twenty Thousand (RM XXX) for each failure.
- (b) If SPP continues to fail to rectify any failure to comply with any of the operating standards or characteristics set out in Appendix B within thirty (30) days from the notification date, each failure to rectify within the said period shall be treated as a separate failure and SPP shall forthwith compensate SESB an amount equal to Ringgit Malaysia Twenty Thousand (RM XXX) for each failure to rectify.

#### **9.7 Revised Contracted Capacity**

- (a) Prior to the Commercial Operation Date, SPP shall cause performance tests to be conducted on the Facility (including but not limited to the determination of the capacity and capability of the Facility) in accordance to the Appendix C. No later than the Commercial Operation Date, SPP shall submit to SESB, with a copy to the Suruhanjaya Tenaga, a certificate from the Independent Engineer confirming that the Facility has the capacity and capability to meet the Contracted Capacity of the Facility and the test results which show that SPP can meet the Contracted Capacity of the Facility as certified by the Independent Engineer. In the event the capacity of the Facility as certified by the Independent Engineer
  - i. is more than the Contracted Capacity, then the Contracted Capacity shall be used for the purpose of the calculation of the payments as described in Appendix G, for the remainder of the Term, unless revised in accordance with this Agreement.
  - ii. is less than the Contracted Capacity, then the Contracted Capacity shall

be revised downwards to reflect the actual capacity of the Facility as certified by the Independent Engineer and such Revised Contractual Capacity shall be used for the purpose of the calculation of the payments as described in Appendix G, for the remainder of the Term, unless revised in accordance with this Agreement.

- (b) SPP shall on the fifth (5<sup>th</sup>), tenth (10<sup>th</sup>) and fifteenth (15<sup>th</sup>) anniversary of the Commercial Operation Date (the **Performance Test Date**) shall cause performance tests to be conducted on the Facility (including but not limited to the determination of the capacity and capability of the Facility) in accordance to the Appendix C. No later than thirty (30) days after the Performance Tests Date, SPP shall submit to SESB, with a copy to the Suruhanjaya Tenaga, a certificate from the Independent Engineer confirming the capacity and capability of the Facility and the test results which show that SPP can meet the capacity and capability of the Facility as certified by the Independent Engineer. If the capacity of the Facility as certified by the Independent Engineer is less than the Contracted Capacity, then the Contracted Capacity shall be revised downwards to reflect the actual capacity of the Facility (the **Revised Contractual Capacity**) and such Revised Contractual Capacity shall be used for the purpose of the calculation of the payments as described in Appendix G, for the remainder of the Term, unless revised in accordance with this Agreement.

## 9.8 Back-up Electricity Supply

Any back-feed of electricity from the Distribution Network to the Facility, at any time prior to or from the Commercial Operation Date SPP shall submit the necessary application to SESB and enter into consumer agreement with SESB which shall be at a commercial tariff on a sen/kWh basis to be determined and measured by SESB metering equipment and charged at SESB's then prevailing tariff.

## 9.9 Inadvertent Net Active Power Flow

SPP shall install the necessary equipment at the Facility to prevent any inadvertent net active power flows at the Interconnection Point from the Facility to the Distribution Network and vice versa. SESB and the GSO shall have the right to disconnect the SPP Interconnection Facility, the SPP Interconnector and the SPP Works during any incidence of inadvertent net active power flow.

## 9.10 Pollution Control

SPP shall construct and operate the Facility in accordance with all provisions of any of the Laws and Government Authorisations relating to pollution control and environmental standards.



**9.11 Operations Log**

SPP shall keep an accurate daily operations log which shall include all information relating to the Declared Annual Quantity, the generation profiles of the Facility and any significant events relating to the operation and maintenance of the Facility. SESB shall be entitled to review SPP's log at any time upon giving reasonable notice.

**9.12 Permitted Set Offs**

SESB shall be entitled to set off any outstanding amount due to it under this Clause 9 (*Commercial Operations*) against any sums due and payable to SPP under the terms of this Agreement.

**9.13 No Penalty**

The Parties agree that the precise level of actual damages that would be suffered by SESB arising out of or in relation to the event described in Clauses 9.5 (*Consequences of SPP Failure to Deliver Net Electrical Output*) and 9.6 (*Consequences of SPP Failure to Meet Operating Standards*) would be difficult to ascertain with certainty. The Parties further agree that any sum payable under Clauses 9.5 (*Consequences of SPP Failure to Deliver Net Electrical Output*) and 9.6 (*Consequences of SPP Failure to Meet Operating Standards*) are not penalties, and is genuine, fair and reasonable. Such amount represents a genuine, good faith and reasonable estimate of fair compensation for the losses to SESB that may reasonably be anticipated from such failure.

**10. SPP INTERCONNECTION FACILITY, SPP INTERCONNECTOR AND SPP WORKS****10.1 SPP Interconnection Facility, SPP Interconnector and SPP Works**

- (a) SPP shall design, construct, install, test, energise and commission the SPP Interconnection Facility, the SPP Interconnector and the SPP Works at its expense in accordance with Prudent Utility Practices and the specifications set out in Appendix E.
- (b) SPP shall complete the construction, installation and testing of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works not later than ninety (90) days before the Initial Operation Date.
- (c) Upon completion of the construction, installation and testing but prior to the energising and commissioning of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works, SPP shall submit a certificate from the Independent Engineer confirming that (i) the SPP Interconnection

Facility, the SPP Interconnector and the SPP Works have been designed, constructed and installed in accordance with the specifications set out in Appendix E (ii) the completion of all tests and requirements in accordance with Clause 8.9 have been carried out, and (iii) the SPP Interconnection Facility, the SPP Interconnector and the SPP Works can be safely operated in parallel with the Distribution Network. Upon receipt of such certificate from the Independent Engineer and verifying the test procedures and results on the basis of which such certificate was given, SESB shall synchronise the SPP Interconnection Facility and the SPP Interconnector with the Distribution Network.

- (d) SPP shall transfer to SESB and take all actions necessary to effect the transfer of all rights, title and interest to the completed SPP Works, free from encumbrances, on or before the Initial Operation Date so that SESB shall become the owner thereof. All costs relating to, incidental or consequent upon such transfer shall be borne by SPP. Upon such transfer, all property and title in such completed and transferred SPP Works shall pass to SESB. Subject to Clause 10.3 (*Warranties and Indemnities*), SESB shall thereafter be responsible for the operation and maintenance of the same.

## **10.2 Land, Easements and Rights of Way**

- (a) SPP shall, at its cost and expense, acquire all ownership rights, title and interest including all Access Rights relating to the parcels of land on which the SPP Interconnection Facility and the SPP Interconnector shall be constructed and located pursuant to Clause 10.1 (*SPP Interconnection Facility, SPP Interconnector and SPP Works*).
- (b) SESB shall co-operate with SPP to ensure that the SPP Interconnection Facility, the SPP Interconnector and the SPP Works are constructed and installed in the manner and by the date set out in Clause 10.1(b) (*SPP Interconnection Facility, SPP Interconnector and SPP Works*).
- (c) SPP shall reimburse SESB for its reasonable expenses incurred in providing such co-operation as may be requested by SPP.

## **10.3 Warranties and Indemnities**

- (a) SPP expressly warrants to SESB as follows:
- (i) that the SPP Works shall be designed, constructed and installed in accordance with Prudent Utility Practices and the requirements and specifications set out in Appendix E and free from defects in materials and workmanship; and
- (ii) that all equipment and items installed in the SPP Works shall be installed, and all work shall be performed, in accordance with Prudent Utility Practices, the requirements set out in Appendix E and other requirements of the equipment manufacturers or suppliers.

- (b) The warranties given in Clause 10.3(a)(*Warranties and Indemnities*) above shall continue for a period of twenty-four (24) months from the date of transfer of the SPP Works to SESB pursuant to Clause 10.1(d) (*SPP Interconnection Facility, SPP Interconnector and SPP Works*). If any part of the SPP Works is replaced or repaired during such twenty-four (24) month period or any extension of it, then equivalent warranties on the parts so replaced or repaired shall continue for a period of twenty-four (24) months from the date of the completion of such replacement or repair, provided always that no warranty shall extend beyond a period of forty-eight (48) months from the date of transfer of the SPP Works to SESB pursuant to Clause 10.1(d) (*SPP Interconnection Facility, SPP Interconnector and SPP Works*).
- (c) SPP further represents and warrants that the SPP Works shall be free from latent engineering or design defects and in the event any latent engineering or design defect results in a failure or degradation of durability or performance of the SPP Works, SPP shall without charge to SESB take such remedial action as may be necessary to rectify the defect. The warranties given in this Clause 10.3(c) (*Warranties and Indemnities*) shall continue for a period of sixty (60) months from the date of transfer of the SPP Works pursuant to Clause 10.1(d) (*SPP Interconnection Facility, SPP Interconnector and SPP Works*).
- (d) SPP undertakes that it will take such action as SESB may reasonably require to enforce any warranties given to SPP by the EPCC Contractor in respect of the SPP Works.
- (e) If due to any defect in (a) the SPP Interconnection Facility and/or the SPP Interconnector or (b) the SPP Works (which amounts to a breach by SPP of any of the warranties set out in this Clause 10.3 (*Warranties and Indemnities*)) and as a result the Distribution Network is unable to accept Net Electrical Output from the Facility, SPP shall not be entitled to any Energy Payment and/or Non-Acceptance Payment during such period notwithstanding that the Facility is otherwise capable of generating solar photovoltaic energy.
- (f) Upon the expiration of the warranties period as set out in Clause 10.3(b) (*Warranties and Indemnities*) and all remedial action (if any) as may be necessary to rectify the defect in any part of the SPP Works having been completed to the satisfaction of SESB, SESB shall, at its sole discretion, issue a final certificate of taking over of operations.

#### 10.4 Protective Devices

Each Party shall be responsible for protecting its own facilities from possible damage caused by electrical disturbances or other problems arising from the operation or non-operation of the other Party's facilities.

**11. METERING****11.1 Metering Devices**

- (a) SPP shall, at its own cost and expense, install or procure the installation of the SESB Metering Equipment as set out in Appendix D.
- (b) Subject to Clause 11.4 (*Inspection of Metering Equipment*), the SESB Metering Equipment shall be used to measure the transfer of electric energy across the Interconnection Point from SPP to SESB or from SESB to SPP, as the case may be.
- (c) The specifications for the SESB Metering Equipment shall be as set out in Appendix D. The SESB Metering Equipment shall be sealed and the seal shall not be broken for any reason whatsoever except when the SESB Metering Equipment is to be inspected and tested or adjusted in accordance with Clause 11.3 (*Warranties and Indemnities*) or Clause 11.4(*Inspection of Metering Equipment*).
- (d) SPP shall not permit any of its employees, agents, contractors or subcontractors of any tier to tamper with the SESB Metering Equipment without SESB's prior written consent.
- (e) At all times, SPP agrees to keep the location associated with the SESB Metering Equipment clean, clear and accessible to SESB and its authorised agents.

**11.2 Pre-Operational Testing of SESB Metering Equipment**

- (a) The pre-operational testing of the SESB Metering Equipment shall be carried out in accordance with the provisions of Appendix D.
- (b) Upon the installation of the SESB Metering Equipment, SPP shall, not later than thirty (30) days after the conduct of the site tests and without any outstanding works subsisting, transfer to SESB and take all actions necessary to effect the transfer of all rights, title and interest of the SESB Metering Equipment and provide to SESB at all times the Access Rights to the SESB Metering Equipment.

**11.3 Warranties and Indemnities**

- (a) SPP expressly warrants to SESB that:
  - (i) the SESB Metering Equipment shall be designed, tested and installed in accordance with Prudent Utility Practices and the requirements and specifications set out in Appendix D and free from defects in materials and workmanship;
  - (ii) that all equipment and items relating to the SESB Metering

Equipment shall be installed, and all work shall be performed, in accordance with Prudent Utility Practices, the requirements set out in Appendix D and other requirements of the equipment manufacturers or suppliers.

- (b) The warranties given in Clause 11.3 (*Warranties and Indemnities*) shall continue for a period of twenty-four (24) months from the date of transfer of the SESB Metering Equipment. If any part of the SESB Metering Equipment is replaced or repaired during such twenty-four (24) month period or any extension of it, then equivalent warranties on the parts so replaced or repaired shall continue for a period of twenty-four (24) months from the date of the completion of such replacement or repair, provided always that no warranty shall extend beyond a period of thirty-six (36) months from the date of transfer of the SESB Metering Equipment to SESB.
- (c) SPP further represents and warrants that the SESB Metering Equipment shall be free from latent engineering or design defects and in the event any latent engineering or design defect results in a failure or degradation of durability or performance of the SESB Metering Equipment, SPP shall without charge to SESB take such remedial action as may be necessary to rectify the defect. The warranties given in this Clause 11.3 (*Warranties and Indemnities*) shall continue for a period of sixty (60) months from the date of transfer of the SESB Metering Equipment.

#### **11.4 Inspection of Metering Equipment**

- (a) SESB shall inspect and test the SESB Metering Equipment at SPP's cost and expense on a regular schedule determined by SESB in accordance with Prudent Utility Practices and Appendix D. SESB shall provide SPP with reasonable advance written notice of any inspection and tests to be conducted. SESB shall permit a representative of SPP to witness and verify all inspections and tests.
- (b) Upon two (2) weeks' prior written notice from SPP, SESB shall perform additional inspections or tests of any of the SESB Metering Equipment. SPP and SESB shall agree on a mutually convenient time for such inspections or tests and SESB shall permit a qualified representative of SPP to witness and verify such inspections and tests. The results of any such test on the SESB Metering Equipment shall be deemed final and conclusive. The actual expense of any such additional inspection or testing shall be borne by SPP unless, upon such inspection or testing, such Metering Equipment is found to register inaccurately by more than +/- 1%, in which event the expense of such additional inspection or testing shall be borne by SESB.
- (c) If, as a result of the inspection and tests conducted pursuant to Clause 11.4(a) or Clause 11.4(b) above, any of the SESB Metering Equipment is found to be defective or inaccurate, reasonable steps shall be taken by SESB to adjust, repair, replace and/or re-calibrate such Metering Equipment unless the provisions of Clause 11.3 (*Warranties and Indemnities*) apply.

**11.5 Adjustments for Inaccurate Meters**

If the SESB Metering Equipment fails to register, or if the measurement made by the SESB Metering Equipment is found upon testing to be inaccurate by more than +/- 1%, an adjustment shall be made correcting all measurements by the inaccurate or defective metering device for billing purposes for both the amount of the inaccuracy and the period of the inaccuracy in the following manner:

- (a) if the Parties cannot agree on the amount of the adjustment necessary to correct the measurements made by the SESB Metering Equipment, the Parties shall agree the amount of the necessary adjustment on the basis of deliveries of solar photovoltaic energy from the Facility to the Distribution Network during periods of similar operating conditions when the SESB Metering Equipment was registering accurately;
- (b) If the Parties cannot determine or agree on the actual period during which the inaccurate measurements were made, the period during which the measurements are to be adjusted shall be one half of the period from the last previous test of the relevant part of the SESB Metering Equipment to the test that found such part of the SESB Metering Equipment to be defective or inaccurate; and
- (c) If the adjustment period so determined covers a period of deliveries for which payments have already been made by SESB, SESB shall use the corrected measurements as determined in accordance with this Clause 11.5 (*Adjustment for Inaccurate Meters*) to re-calculate the amount due for the period of the inaccuracy and shall subtract the previous payments by SESB for such period from such re-calculated amount. If the difference is a positive number, that difference shall be paid by SESB to SPP and if the difference is a negative number, that difference shall be paid by SPP to SESB. Payment of such difference by the owing Party shall be made within fifteen (15) Business Days of receipt by the other Party of a statement to that effect. In the event there are payments due from SPP to SESB, SESB shall have the right to set off such sums from payments due to SPP from SESB.

**12. REPRESENTATIONS AND WARRANTIES; ADDITIONAL COVENANTS OF SPP AND SESB****12.1 Representations and Warranties of SPP**

SPP represents and warrants to SESB that as at the date of this Agreement:

- (a) SPP is a private limited liability company duly organised and validly existing under the laws of Malaysia and SPP has all requisite power and authority to conduct its business, to own its properties and to execute, deliver and perform its obligations under this Agreement.
- (b) The execution, delivery and performance by SPP of this Agreement has been duly authorised by all necessary action, including applicable Corporate

Authorisations, and does not and will not (i) require any consent or approval of SPP's Board of Directors or shareholders, other than those that have been obtained, or (ii) result in a breach of, or constitute a default under, any provisions of SPP's constitution or incorporation documents, any indenture, contract or agreement to which it is a party or by which it or its assets may be bound, or violate any Law, order, writ, judgment, injunction, decree, determination or award presently in effect having applicability to SPP.

- (c) This Agreement constitutes a legal, valid and binding obligation of SPP.
- (d) There is no pending action or proceeding affecting SPP before any court, Government Entity or arbitrator that is likely to affect materially and adversely the financial condition or operations of SPP and the ability of SPP to perform its obligations hereunder, or that purports to affect the legality, validity or enforceability of this Agreement.

## **12.2 Representations and Warranties of SESB**

SESB represents and warrants to SPP that as at the date of this Agreement:

- (a) SESB is a public limited liability company duly organised and validly existing under the laws of Malaysia and SESB has all requisite power and authority to conduct its business, to own its properties and to execute, deliver, and perform its obligations under, this Agreement.
- (b) The execution, delivery and performance by SESB of this Agreement has been duly authorised by all necessary action, including Applicable Corporate Authorisations, and does not and will not (i) require any consent or approval of SESB's Board of Directors other than those that have been obtained, or (ii) result in a breach of, or constitute a default under any provisions of SESB's constitution or enabling documents, any indenture, contract or agreement to which it is a party or by which it or its assets may be bound, or violate any Law, order, writ, judgment, injunction, decree, determination or award presently in effect having applicability to SESB.
- (c) This Agreement constitutes a legal, valid and binding obligation of SESB.
- (d) There is no pending action or proceeding affecting SESB before any court, Government Entity or arbitrator that is likely to affect materially and adversely the financial condition or operations of SESB and the ability of SESB to perform its obligations hereunder, or that purports to affect the legality, validity or enforceability of this Agreement.

## **12.3 Permits: Compliance with Laws**

- (a) Each Party shall, at its own expense, acquire and maintain in effect, from any and all Government Entities with jurisdiction over such Party and/or the Facility, all Government Authorisations.

- (b) SPP shall, as required by applicable Laws in force as at the Effective Date, complete or have completed all inspections and environmental impact studies, in each case necessary (i) for the operation and maintenance of the Facility, and (ii) for SPP to perform its obligations under this Agreement.
- (c) SPP shall, at all times, comply with the terms and conditions of the SPP Licence and all Laws applicable to it and/or to the Facility, including but not limited to all environmental laws in effect at any time during the Term. SPP shall not be regarded as being in breach of its obligations hereunder with respect to any relevant Change in Law if SESB has failed to perform its obligations under Clause 20 (*Change-in-Law*) in respect thereof.
- (d) SESB shall, at all times, comply with the terms and conditions of the SESB Licence and all Laws applicable to it.

#### **12.4 Continuity of Existence**

Each Party shall preserve and keep in full force and effect its corporate existence and all Government Authorisations necessary for the proper conduct of its business.

#### **12.5 Books and Records**

Each Party shall keep proper books of records and account, in which full and correct entries shall be made of all dealings or transactions of or in relation to such Party's business and affairs in accordance with generally accepted accounting principles consistently applied.

#### **12.6 Certificates**

Each Party shall be entitled to deliver or cause to be delivered from time to time to the other Party certifications of its officers, accountants, engineers or agents as such Party may reasonably request in connection with the performance of the other Party's obligations under this Agreement.

#### **12.7 Qualified Personnel**

SPP shall, during the Term and as required by Law, only employ appropriately trained, qualified and registered (if applicable) personnel for the purposes of operating and maintaining the Facility, SPP Interconnection Facility and SPP Interconnector and co-ordinating operations with the Distribution Network .

#### **12.8 Operate, Maintain or Tamper with the other Party's Equipment**

Each Party shall not permit any of its employees, agents, contractors or subcontractors of any tier to operate, maintain or tamper with the other Party's equipment on their respective sides of the Interconnection Point without the prior written consent of the other Party which shall not be unreasonably withheld, except in situations when such actions are taken to prevent immediate injury, death or property damage, and each Party shall use its best efforts to provide the other Party



with advance notice of the need for such actions.

#### **12.9 Designs, Drawings and Specifications**

SPP shall promptly submit to SESB copies of the designs, drawings and specifications relating to the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.

#### **12.10 Other Businesses**

SPP shall not undertake, participate or otherwise be involved whether directly or indirectly in any business or opportunity other than the construction and operation and maintenance of the Facility and the sale of solar photovoltaic energy generated by the Facility to SESB under this Agreement.

#### **12.11 Delivery of the Initial Financial Model**

On or before the execution of this Agreement, SPP shall deliver one (1) soft copy (on CD-Rom or other electronic storage medium) of the Initial Financial Model to SESB and update the Initial Financial Model for any changes to reflect the Initial Financing Documents on or before the Financial Closing Date provided always no change to the Energy Rate shall be permitted.

#### **12.12 Refinancing of the Project**

- (a) SPP may, during the Term and with the prior written approval of SESB and the Suruhanjaya Tenaga, arrange for the Project to be refinanced for the purposes of reducing the cost of financing of the Project.
- (b) It is expressly agreed by the Parties that SPP shall pay SESB an amount equal to seventy per cent (70%) of any savings in the cost of financing of the Project arising in each calendar year from the refinancing of the Project, after taking into account any actual costs and expenses reasonably and properly incurred by SPP pursuant to the refinancing of the Project, in twelve (12) equal monthly instalments, with the first instalment payable on the first day of the month immediately following such month in which the Financial Closing Date in connection with the refinancing of the Project occurs, failing which SESB shall be entitled to set off any outstanding amount due to it hereunder against any sums due and payable to SPP under the terms of this Agreement. The Parties further agree that SESB and/or its duly appointed auditors shall have the right, at any time upon reasonable prior notice, to inspect, examine, audit and copy such records, documents and materials.
- (c) In the event of any refinancing of the Project, SPP shall submit to SESB one (1) certified copy of the Financing Documents relating to such refinancing within seven (7) days after the Financial Closing Date in connection with the refinancing of the Project occurs.

**12.13 Incentive and benefit provided by any Government Entity**

- (a) The Parties acknowledge that the Energy Rate has been determined by the Parties based on the assumption that SPP or the O&M Contractor will not be receiving any incentive or benefit in respect of Taxes (including but not limited to any relief, reduction or abatement in the payment of any such Taxes) and/or any tax allowance (including but not limited to any investment tax allowance) from any Government Entity at any time after the Financial Model Input Adjustment Event specified in Clause 6.3(c) (*Revision of the Financial Model*) in connection with, or in relation to, or otherwise incidental to the operation, maintenance or ownership of the Project or any part thereof by the relevant Persons as specified above (as the case may be).
- (b) (i) It is expressly agreed and acknowledged by the Parties that any such Persons receives any such incentive or benefit and/or tax allowance from any Government Entity at any time after the Financial Model Input Adjustment Event specified in Clause 6.3(c) (*Revision of the Financial Model*), SPP shall within seven (7) days thereof furnish SESB with a written statement setting out in sufficiently reasonable detail such incentive or benefit and/or tax allowance provided by any Government Entity. For the avoidance of doubt, the Parties agree that such incentive or benefit and/or tax allowance provided by any Government Entity shall be for the benefit of SESB.
- (ii) SPP shall provide, and shall procure that the O&M Contractor shall provide SESB, the Suruhanjaya Tenaga and their authorised representatives unrestricted access to all the documents, data, records and materials required to support and verify the accuracy of the statement furnished by SPP or the actual incentive or benefit and/or tax allowance from any Government Entity as provided in Clause 12.13(a), including the internal records of SPP, and to the records of the O&M Contractor, including all costs, fees, charges and other relevant items, and to take copies of all such documents and records. SPP shall preserve, and shall procure that the O&M Contractor shall preserve in accordance with Malaysian approved accounting standards the documents in appropriate detail to accurately provide and substantiate the information to be given under Clause 12.13(a).
- (c) Unless otherwise expressly agreed by SESB, SPP shall pay to SESB an amount equal to the whole of the incentive or benefit and/or tax allowance provided by any Government Entity as provided in Clause 12.13(a) on the first day of the month immediately following such month in which such incentive or benefit and/or tax allowance from any Government Entity arises, failing which SESB shall be entitled to set off any outstanding amount due to it hereunder against any sums due and payable to SPP under the terms of this Agreement.

#### 12.14 Amendments to the Project Documents

- (a) Once a Project Document has been entered into by the parties thereto, no change, variation, modification or amendment to the terms of that Project Document which could reasonably be expected to have a material adverse effect on SESB's rights under this Agreement shall be permitted without the express written consent of SESB (such consent not to be unreasonably withheld or delayed).
- (b) If, subject to Clause 12.14(a), SPP enters into any agreement, contract and/or document to change, vary, modify or amend the terms of the Project Document, SPP shall submit to SESB one (1) certified copy of such agreement, contract and/or document within seven (7) days after their being entered into by the parties thereto.

#### 12.15 Green Technology Benefits

It is expressly agreed and acknowledged by the Parties that the value of any credits or financial benefits which are available or may become available for reductions of "green house gas" emissions (the **Green Technology Benefits**) earned from the generation of solar photovoltaic energy by the Facility shall be solely for the benefit of SESB and passed through entirely to SESB. SPP hereby undertakes with SESB that it will take such action as SESB may require in order to qualify for the Green Technology Benefits and to establish a mechanism for the passing through of such Green Technology Benefits to SESB.

### 13. TAXES AND FINES

#### 13.1 Taxes and Fees

SPP shall pay all present and future taxes (whether national, state or local) imposed in connection with the ownership, operation and maintenance of the Facility, and, except as otherwise specified below, shall pay all other duties, impositions, assignments, levies, fees, costs and expenses (reasonably incurred) of any kind (whether or not to a Government Entity) necessary to assure the performance of its obligations under this Agreement.

#### 13.2 Fines

- (a) Save as provided in Clause 13.2(c) below, any fines, penalties or other costs incurred by SPP or its agents, employees or subcontractors for non-compliance by SPP, its agents, employees, or subcontractors with the requirements of any Laws or Government Authorisations shall not be reimbursed by SESB but shall be the sole responsibility of SPP.
- (b) If such fines, penalties or other costs are assessed against SESB by any Government Entity or court of competent jurisdiction due to the non-compliance by SPP with any Law or Government Authorisation SPP shall

indemnify and hold harmless SESB against any and all losses, liabilities, damages and claims suffered or incurred because of the failure of SPP to comply therewith. SPP shall also reimburse SESB for any and all legal or other expenses (including lawyers' fees) reasonably incurred by SESB in connection with such losses, liabilities, damages and claims.

- (c) If such fines, penalties or other costs are assessed against SPP by any Government Entity or court of competent jurisdiction due to the non-compliance by SESB with any Law or Government Authorisation SESB shall indemnify and hold harmless SPP against any and all losses, liabilities, damages and claims suffered or incurred because of the failure of SESB to comply therewith. SESB shall also reimburse SPP for any and all legal or other expenses (including lawyers' fees) reasonably incurred by SPP in connection with such losses, liabilities, damages and claims.

## **14. INSURANCE**

### **14.1 Insurance Required for the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

SPP undertakes to SESB that it shall maintain or procure to be maintained in effect the following insurance policies and coverage with respect to the Facility and where applicable, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works:

- (a) all insurances required by Law;
- (b) such insurance as is appropriate and customary for a prudent photovoltaic energy independent power producer; and
- (c) without prejudice to sub-Clause (b) above, all insurances as required under the Financing Documents.

### **14.2 Availability of Coverage**

If any of the insurances referred to in Clause 14.1 are not available on reasonable commercial terms, SPP shall provide to SESB detailed information as to the maximum amount of available coverage that it is able to purchase and shall be required to obtain SESB's consent (which consent shall not be unreasonably withheld or delayed) as to the adequacy of such coverage under the circumstances prevailing at the time.

### **14.3 Scope of Insurance**

SPP shall where applicable cause the insurers providing the coverage described in Clause 14.1 to amend or endorse each such policy:

- (a) to include SESB, its directors, officers and employees as additional insureds;

- (b) to provide that such insurance is primary with respect to the interest of SESB, its directors, officers and employees, and that any other insurance maintained by SESB is in excess and not contributory to the insurance provided under Clause 14.1;
- (c) to include a waiver of all rights of subrogation against SESB, its directors, officers and employees;
- (d) to contain a severability of interest provision; and
- (e) to provide for at least sixty (60) days' written notice to SESB prior to the cancellation, termination, non-renewal or material change of any such insurance coverage.

#### **14.4 Premium and Reports**

- (a) SPP shall ensure that SESB, its directors, officers or employees shall not in any way be liable for the payment of any premiums required to be made to maintain the insurance policies set out in Clause 14.1.
- (b) SPP shall, if requested by SESB, use its best endeavours to procure for SESB's use any reports prepared by its insurers (whether in respect of compliance or claims) in respect of any insurance policies maintained in respect of the Facility or SPP.

#### **14.5 Evidence of Insurance**

SPP shall cause such insurers or the agents thereof to provide SESB with certificates of insurance evidencing the policies described in Clause 14.1. Failure to provide such certificates shall not relieve SPP of its obligation to maintain the insurance coverage described in this Agreement, nor shall failure to obtain or maintain such insurance or recover any amount from such insurance relieve, or in any way reduce, any obligation or liability imposed on SPP elsewhere in this Agreement. SPP shall forthwith upon receipt thereof provide to SESB certificates of insurance coverage or insurance policies for the construction period and operation period as required by this Clause 14 (*Insurance*). These certificates shall be made available to SESB within thirty (30) days of inception or renewal.

#### **14.6 Application of Proceeds**

SPP shall apply the proceeds of any such insurance policies received following a claim by SPP for loss or damage to the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with the requirements of the Financing Documents (so long as they are in effect) and otherwise to repair and/or reinstate the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. The time taken for the disbursement of the proceeds from any such insurance shall not in any way affect or delay the rectification, reinstatement and/or indemnification of any such loss or damage.

**15. FORCE MAJEURE****15.1 Force Majeure Event Defined**

For the purposes of this Agreement, a Force Majeure Event shall mean an event, condition, or circumstance or its effect which:

- (a) is beyond the reasonable control of and occurs without fault or negligence on the part of the Party claiming it as a Force Majeure Event; and
- (b) causes a delay or disruption in the performance of any obligation under this Agreement despite all reasonable efforts of the Party claiming it as a Force Majeure Event to prevent it or mitigate its effects.

Subject to satisfying the foregoing criteria, Force Majeure Events include without limitation, the following:

- (i) strikes or lockouts and/or other work stoppages or industrial action (other than those solely affecting the Party claiming the same as a Force Majeure Event);
- (ii) acts of public enemies or terrorists or acts of war, whether or not war is declared, acts of force by a foreign nation or embargo;
- (iii) public disorders, insurrection, rebellion, sabotage, riots or violent demonstrations;
- (iv) explosions, fire, earthquakes, landslides, subsidence, sabotage, and/or other natural calamities and acts of God;
- (v) unusually severe weather conditions;
- (vi) expropriation or compulsory acquisition by any Government Entity;
- (vii) failure to obtain or renew any Government Authorisations; and
- (viii) any Force Majeure Event affecting the performance of any Person that is a party to the EPCC Contract or other contract between SPP and such Person relating to the construction, operation or maintenance of the Facility.

**15.2 Notice of Force Majeure and Consequences**

If a Force Majeure Event occurs, the Party affected by it shall:

- (a) as soon as reasonably practicable, give the other Party written notice of the Force Majeure Event, including full information about it and the actions and time estimated to be necessary to resume performance of the affected Party's obligations under this Agreement.

- (b) afford the other Party reasonable access to its facilities for obtaining further information about the event.
- (c) use, at its own cost, all reasonable efforts to remedy its inability to perform and to resume full performance of its obligations under this Agreement as soon as practicable (provided that such Party shall not be required by this Clause 15.2 (c) to settle any strikes on terms that are adverse to such Party and not commercially reasonable);
- (d) keep the other Party reasonably apprised of such efforts; and
- (e) provide written notice when it resumes the performance of its obligations under this Agreement.

### 15.3 Effect of Force Majeure Event

- (a) Subject to the limitations set out in this Agreement, if either Party is rendered unable by reason of a Force Majeure Event to perform, wholly or in part, any obligation set out in this Agreement, then upon that Party giving notice as specified in Clause 15.2 (*Notice of Force Majeure and Consequences*) and full particulars of the Force Majeure Event, those obligations of that Party shall be suspended or excused to the extent their performance is affected by the Force Majeure Event.
- (b) The Scheduled Commercial Operation Date shall be extended by one (1) day for each day the Commercial Operation Date is delayed by a Force Majeure Event.
- (c) The Term shall be extended by one (1) day for each day (i) the Facility is unavailable after its Commercial Operation Date due to any Force Majeure Event affecting the Facility and (ii) SPP is not entitled under its insurance to receive insurance proceeds which replace any Energy Payments not received by SPP for such period.

### 15.4 Limitations

- (a) The Party claiming relief under Clause 15.3 (*Effect of Force Majeure Event*) shall suspend or be excused from performance of its obligations under this Agreement to the minimum extent practicable in the circumstances.
- (b) Any relief of a Party's obligations under this Agreement given by Clause 15.3 (*Effect of Force Majeure Event*) shall be subject to any limitations explicitly set out in this Agreement.
- (c) The Parties shall only be able to claim the benefit of Clause 15.3 (*Effect of Force Majeure Event*) to excuse their obligations under this Agreement for any Force Majeure Event that occurs, or is in effect, after the Effective Date.

- (d) Obligations of the Parties that are required to be completely performed before the occurrence of a Force Majeure Event shall not be excused as a result of it occurring.
- (e) Neither Party shall be relieved of any obligations under this Agreement solely because of increased costs or other adverse economic consequences that may be incurred through the performance of such obligations of the Parties.
- (f) Notwithstanding anything in this Clause 15 (*Force majeure*), a Force Majeure Event in relation to either Party shall not include:
  - (i) normal wear and tear or random flaws in materials and equipment or breakdowns in equipment; or
  - (iii) any full or partial curtailment in the electric output of the Facility that is caused, or arises from, the acts or omissions of any third party including any vendor, materials supplier, customer, or supplier of SPP, except (to the extent) such acts or omissions are themselves caused by any event, circumstance or combination of events or circumstances which does constitute a Force Majeure Event.

#### 15.5 Right to Terminate

- (a) If a Force Majeure Event prevents either Party from substantially performing any material obligation under this Agreement for a period which exceeds one hundred and eighty (180) days either Party may terminate this Agreement by giving thirty (30) days' written notice of termination, unless the provisions of sub-Clause (b) below apply.
- (b) If a Force Majeure Event which prevents either Party from substantially performing any material obligation under this Agreement cannot be remedied within one hundred and eighty (180) days with the use of reasonable diligence, then that period shall be extended for a further period of one hundred and eighty (180) days.
- (c) If the Party affected is unable to remedy the Force Majeure Event by the end of the further period of one hundred and eighty (180) days, the Parties shall consult as to what steps shall be taken with a view to mitigating or remedying the consequences of the relevant Force Majeure Event, having regard to all the circumstances. Such circumstances shall include consideration of how far the Party affected is able to demonstrate to the reasonable satisfaction of the other Party that:
  - (i) it is diligently applying reasonable efforts to execute a plan to overcome the effects of the Force Majeure Event and resume performance of its obligations under this Agreement; and
  - (ii) the Force Majeure Event can be overcome within a reasonable time



after the expiration of the further period of one hundred and eighty (180) days.

- (d) Following consultation or consultations, the Parties shall determine whether and on what terms the further period of one hundred and eighty (180) days should be extended or whether and on what terms this Agreement should be terminated.
- (e) If the Parties agree to extend the second period then the provisions of sub-Clauses (c) through (f) shall apply mutatis mutandis at the end of such extension.
- (f) If the Parties are unable to agree to extend the further period of one hundred and eighty (180) days, either Party may terminate this Agreement by giving thirty (30) days' written notice of termination. In the event of termination of this Agreement under this Clause 15.5, this Agreement shall cease to have any further force or effect and neither Party shall have any obligation or liability (save in respect of any antecedent breach) to the other Party whether at law, hereunder or otherwise.

#### **15.6 Survival of Provisions**

The provisions of this Clause 15 (*Force Majeure*) shall survive the termination or expiry of this Agreement.

### **16. DEFAULT AND TERMINATION**

#### **16.1 SPP Events of Default**

Each of the following events shall constitute an Event of Default by SPP, unless excused under another provision of this Agreement:

- (a) SPP fails to make a payment of any amount of substantial nature which is due and payable under this Agreement within sixty (60) days after receipt of notice of non-payment from SESB;
- (b) SPP fails to comply with or operate in conformity with any obligation of this Agreement (other than a payment obligation) and such failure, if capable of remedy, continues uncured for a period of ninety (90) days, after receipt of notice of such failure from SESB;
- (c)
  - (i) SPP is dissolved or liquidated, other than for the purpose of a voluntary dissolution or liquidation as part of a reorganisation or reincorporation;
  - (ii) SPP applies for or consents to a receiver, manager, custodian, trustee or liquidator being appointed over or taking possession of all or a substantial part of its assets;

- (iii) SPP admits in writing its inability to pay its debts as they fall due;
  - (iv) SPP makes a general assignment or an arrangement or composition with or for the benefit of its creditors;
  - (v) SPP commences a voluntary case or files a petition seeking to take advantage of any law relating to bankruptcy, insolvency, reorganisation of its debts, winding-up or composition or re-adjustment of its debts;
  - (vi) SPP fails to dispute in a timely manner, or acquiesces in writing to, any petition filed against it in an involuntary case under any bankruptcy or similar law;
  - (vii) SPP takes any action for the purpose of effecting any of the events described in paragraphs (c) (i) through (v) above;
- (d) the Facility delivers to SESB Net Electrical Output which is not solely driven by solar photovoltaic technology or the Facility and/or the Project comprises energy storage devices;
  - (e) the Commercial Operation Date fails to occur within one hundred and eighty (180) days from the Scheduled Commercial Operation Date;
  - (f) SPP Abandons the Project after the Effective Date and fails to resume activities within a period of time agreeable to SESB;
  - (g) the Site Agreement is terminated;
  - (h) the SPP Licence is suspended or revoked or terminated or expired due to SPP's default, and SPP has not caused the SPP Licence to be reinstated or renewed either (i) within the shorter of three hundred and sixty-five (365) days and the legally permissible period for such reinstatement or renewal or (ii) after having exhausted all available administrative or legal appeals and applications for such reinstatement or renewal; or
- (i) any of the following events occur prior to the fifth (5<sup>th</sup>) anniversary of the Commercial Operation Date, without the prior written approval of the Federal Government of Malaysia:
    - (i) SPP sells, conveys, transfers or otherwise disposes of the Project or any material part or any interest in it to any other Person or enters into an agreement to do so; or
    - (ii) any Shareholder sells, transfers or otherwise disposes of any share of SPP or [●] (including for this purpose the assignment of the beneficial interest therein the creation of any charge or other security interest over, such share or the renunciation or assignment of any right to receive or to subscribe for such share) or any interest

in such share or enters into an agreement to do so; or

(iii) there is a change in Control of SPP;

and for the purposes of this paragraph (i):-

(iv) "interest in a share" shall have the meaning assigned to such phrase in Section 6A of the Companies Act 1965;

(v) "[●]" means [●] (Company Registration No. [●]); and

(v) "Shareholder" means a Person who, legally or beneficially, owns or Controls any share of SPP or [●] or any interest in such share.

## 16.2 SESB Events of Default

Each of the following events shall constitute an Event of Default by SESB, unless excused under another provision of this Agreement:

- (a) SESB fails to make a payment of any amount of substantial nature which is due and payable under this Agreement within sixty (60) days after receipt of notice of non-payment from SPP;
- (b) SESB fails to comply with or operate in conformity with any obligation of this Agreement (other than a payment obligation) and such failure, if capable of remedy, continues uncured for a period of ninety (90) days, after receipt of notice of such failure from SPP; or
- (c) (i) SESB is dissolved or liquidated, other than voluntary dissolution or liquidation as part of a reorganisation or reincorporation;
- (ii) SESB applies for or consents to a receiver, manager, custodian, trustee or liquidator being appointed over or taking possession of all or a substantial part of its assets;
- (iii) SESB admits in writing its inability to pay its debts as they fall due;
- (iv) SESB makes a general assignment or an arrangement or composition with or for the benefit of its creditors;
- (v) SESB commences a voluntary case or files a petition seeking to take advantage of any law relating to bankruptcy, insolvency, reorganisation of its debts, winding-up or composition or re-adjustment of its debts;
- (vi) SESB fails to dispute in a timely manner, or acquiesces in writing to, any petition filed against it in an involuntary case under any bankruptcy or similar law;

- (vii) SESB takes any action for the purpose of effecting any of the events described in paragraphs (c) (i) through (v) above.

### 16.3 Right To Terminate; Additional Rights

- (a) If an Event of Default occurs (other than an Event of Default falling within Clauses 16.1(b) (*SPP Events of Default*) and Clause 16.2(b) (*SESB Events of Default*) that cannot be cured with the exercise of reasonable diligence within the period of ninety (90) days therein), the non-defaulting Party may terminate this Agreement by giving fourteen (14) days' written notice to the other Party.
- (b) If an Event of Default which falls within Clauses 16.1(b) (*SPP Events of Default*) or 16.2(b) (*SESB Event of Default*) cannot be cured with the exercise of reasonable diligence within the period of ninety (90) days specified therein, then that period shall be extended for a further period of one hundred and eighty (180) days. If the Event of Default continues uncured at the end of such further period, then the non-defaulting Party may terminate this Agreement immediately by written notice to the defaulting Party.
- (c) This right of termination shall be in addition to all other rights and remedies available to the non-defaulting Party, at law or in equity or otherwise, for the breach of this Agreement by the other Party. Such rights and remedies may include compensation for monetary damages, injunctive relief and specific performance.
- (d) Nothing in this Clause 16 herein shall give any Party the right to terminate this Agreement for a breach of any obligation under this Agreement save and except the Event of Default as stated in Clauses 16.1(*SPP Events of Default*) and 16.2 (*SESB Events of Default*) above and where there is a claim of breach of this Agreement, the non-defaulting Party shall have other rights and remedies at law or in equity against the defaulting Party including monetary compensation, injunctive relief and specific performance.

### 16.4 Consequences of Termination

- (a) If SESB terminates this Agreement as a result of an Event of Default by SPP, SESB shall have the option but not the obligation, exercisable by prior notice in writing within sixty (60) days of the termination of this Agreement, to purchase the Project in the manner and for the purchase price determined in accordance with the provisions of Appendix J. In the event that the option is exercised, SPP shall sell the Project to SESB.
- (b) If SPP terminates this Agreement as a result of an Event of Default by SESB, SPP shall have the option but not the obligation, exercisable by prior notice in writing within sixty (60) days of the termination of this Agreement, to sell the Project to SESB, in the manner and for the purchase price determined in accordance with the provisions of Appendix J. In the event that the option is exercised, SESB shall, subject to all rights, title and interest in the Site

(including the access rights) are capable of being transferred to SESB (or its nominees) free of encumbrances, purchase the Project from SPP.

- (c) SPP shall ensure that the Financing Parties specifically acknowledge and are bound by SESB's rights set out in Clauses 16.4(a) and 16.4(b).
- (d) the provisions of this Clause 16.4 and Appendix J shall survive termination of this Agreement.

## **17 THE SURUHANJAYA TENAGA'S RIGHTS**

SPP acknowledges Suruhanjaya Tenaga has a statutory right to step in and operate the Facility and if Suruhanjaya Tenaga exercises such statutory rights at any time, SESB shall, so long as consistent with the terms of the Financing Documents or the rights of the Financing Parties thereunder, be entitled to make Energy Payments and/or Non-Acceptance Payments to Suruhanjaya Tenaga or at Suruhanjaya Tenaga's direction and such payments shall for the purposes of this Agreement be deemed a payment made to SPP in full discharge of SESB's obligation to SPP hereunder.

## **18. INDEMNIFICATION AND LIABILITY**

### **18.1 Indemnification**

- (a) Neither Party shall be liable to the other for any claims, judgments, liabilities, losses, costs, expenses or damages of any kind or character (including loss of use of property), which are the consequence of damage to or destruction of property or personal injury (including death) resulting from the performance of this Agreement, unless:
  - (i) otherwise specifically provided in this Agreement, or
  - (ii) the damage or injury arises out of or is caused by the breach of this Agreement by a Party or by the negligence or misconduct of a Party's own officers, directors, employees, agents, contractors or subcontractors.
- (b) The exclusion stipulated in the preceding paragraph shall include the design, construction, maintenance or operation of property, facilities or equipment owned or used by the other Party, or the use or misuse of or contact with the solar photovoltaic energy delivered hereunder.
- (c) Each Party shall indemnify and hold the other Party, and its officers, directors, agents, employees, contractors, and subcontractors, harmless from and against any and all claims, judgments, losses, liabilities, costs, expenses (including reasonable lawyers' fees) and damages of any nature whatsoever for personal injury, death or property damage to third parties, caused by any act or omission of the indemnifying Party or the indemnifying Party's own officers, directors, affiliates, agents, employees, contractor or

subcontractors that arises out of or are in any manner connected with the performance of this Agreement, except:

- (i) workers compensation claims by any officers, directors, agents, employees, contractors and subcontractors of the Party seeking indemnification hereunder; and
  - (ii) to the extent such injury, death or damage is attributable to the negligence or misconduct of, or breach of this Agreement by, the Party seeking indemnification hereunder.
- (d) If either Party receives a claim from a third party (not being a Party) in respect of which it is entitled to the benefit of an indemnity under this Clause 18.1 (*Indemnification*) it shall notify the other Party within fifteen (15) days of receipt of the claim and shall not settle or pay the claim without the prior approval of the other Party (which approval shall not be unreasonably withheld or delayed).
- (e) If the Party giving an indemnity wishes to contest or dispute a claim, it may conduct the proceedings in the name of the indemnified Party, if it provides the indemnified Party security against any costs involved to the reasonable satisfaction of that Party.
- (f) SPP shall defend, indemnify and hold SESB, and its officers, directors, agents, employees, contractors and subcontractors, harmless from and against any and all claims, judgments, liabilities, losses, costs, expenses (including reasonable lawyers' fees) and damages under every applicable environmental law or regulation arising out of the condition of the Site, SPP's construction, ownership or operation of the Facility, the SPP Interconnection Facility and the SPP Interconnector or the construction of the SPP Works, including the discharge, dispersal, release, storage, treatment, generation, disposal or escape of pollutants or other toxic or hazardous substances from the Facility, the SPP Interconnection Facility and the SPP Interconnector, the contamination of the soil, air, surface water or ground water at or around the Site or any pollution abatement, replacement, removal, or other decontamination or monitoring obligations with respect thereto, except to the extent such damages are attributable to the negligence or misconduct of, or breach of this Agreement by SESB, its officers, directors, agents, employees, contractors or subcontractors.
- (g) Notwithstanding any provision in this Agreement to the contrary, in no event shall SESB or the Grid System Operator be liable for damage or destruction of property, facilities or equipment operated by SPP as a result of any review, verification, acceptance, endorsement or approval of any material, documents, studies, designs, drawings, schedules, design data, control and protection settings, test procedures, test results, test reports or other information submitted by SPP concerning the Facility, the SPP Interconnection Facility, the SPP Interconnector and the SPP Works under this Agreement, or any presence of SESB or the Grid System Operator to

witness any test performed on the Facility, the SPP Interconnection Facility and the SPP Interconnector during the Term.

## 18.2 Consequential Damages

Neither Party shall be liable to the other Party for any indirect, incidental, consequential or punitive damages as a result of the performance or non-performance of the obligations imposed pursuant to this Agreement, including failure to deliver or purchase solar photovoltaic energy hereunder, irrespective of the causes of such damages, including fault or negligence. The Parties hereby agree that the compensation provided for in this Agreement shall not constitute such indirect, incidental, consequential or punitive damages.

## 18.3 Survival

The obligations under this Clause 18 (*Indemnification and Liability*) arising in connection with any event or circumstances occurring before the termination or expiration of this Agreement shall survive such termination or expiration.

## 19. DISPUTE RESOLUTION

### 19.1 Senior Officers

- (a) SPP and SESB shall each designate in writing to the other Party a representative who shall be authorised to resolve a Dispute (as defined in this paragraph) in an equitable manner and unless otherwise expressly provided in this Agreement, to exercise the authority of the Party which appointed him to make decisions by mutual agreement. For the purposes of this Clause 19 (*Dispute Resolution*), a **Dispute** shall mean any dispute, controversy, claim or difference of whatever nature and howsoever arising under, out of or in connection with this Agreement, including the breach, termination or validity thereof.
- (b) If the designated representatives are unable to resolve any Dispute arising under this Agreement, the Dispute shall be referred by the representatives, respectively, to a senior officer designated by SPP and to a senior officer designated by SESB for resolution.
- (c) The Parties agree to attempt to resolve all Disputes arising hereunder promptly, equitably and in a good faith manner. The Parties further agree to provide each other with reasonable access during normal business hours to any and all non-privileged records, information and data pertaining to any such Dispute.
- (d) If any decision on a Dispute is mutually agreed by the designated representatives of the Parties pursuant to Clauses 19.1(a) or 19.1(b) (*Senior Officers*), such decision shall be final and conclusive as to such Dispute.

## 19.2 Arbitration

- (a) If any Dispute cannot be resolved between the Parties pursuant to Clause 19.1 (*Senior Officers*) above within three (3) months (or such further periods as the Parties may agree) after it arises or, if either Party fails to designate a representative or to participate in any attempt to resolve any Dispute pursuant to Clause 19.1 (*Senior Officers*), then such Dispute shall be settled exclusively and finally by arbitration. Either Party may serve formal notice that a Dispute exists (the **Dispute Notice**) upon the other. The Dispute Notice shall specify the nature of the Dispute, the points in issue and the Party's intention to refer the Dispute to arbitration. If the Parties fail to resolve the Dispute within a further period of fifteen (15) days from the date upon which the Dispute Notice was served, either Party may request that the Dispute be referred to arbitration by written notice referring to this Clause 19.2 (*Arbitration*) to that effect to the other Party (the **Arbitration Notice**). For the avoidance of doubt, any Dispute that cannot be resolved between the Parties, including any matter relating to the interpretation of this Agreement, shall be submitted to arbitration irrespective of the magnitude of the Dispute, the amount in Dispute or whether such Dispute would otherwise be considered justifiable for rule or resolution by any court or arbitral tribunal. This Agreement and the rights and obligations of the Parties shall remain in full force and effect and the performance of this Agreement shall continue pending the award in such arbitration proceeding, which award shall determine the Dispute between the Parties, including whether and when termination of this Agreement shall become effective.
- (b) Each arbitration shall be conducted in accordance with the Rules for Arbitration of the Regional Centre for Arbitration at Kuala Lumpur (the **Centre**), except as such rules conflict with the provisions of this Clause 19.2 (*Arbitration*) in which event the provisions of this Clause 19.2 (*Arbitration*) shall prevail.
- (c) The Parties shall mutually agree on the single arbitrator within thirty (30) days of the receipt of the Referral Notice. Only persons with experience in commercial agreements and in particular the implementation and interpretation of power purchase agreements shall be appointed as the arbitrator. No arbitrator shall be a present or former employee or agent of or consultant or counsel to either Party or any affiliate of either Party unless both Parties consent in writing to such appointment. If the Parties cannot agree on the single arbitrator, the arbitrator shall be appointed in accordance with the Rules for Arbitration at the Centre.
- (d) The language to be used shall be the English language.
- (e) Any decision or award of each arbitral tribunal appointed pursuant to this Clause 19.2 (*Arbitration*) shall be final and binding upon the Parties. The Parties waive to the extent permitted by law any rights to appeal or any review of such award by any court or tribunal of competent jurisdiction. The Parties agree that any arbitration award made may be enforced by the



Parties against assets of the relevant Party wherever they are located or may be found, and a judgment upon any arbitration award may be entered into by any court having jurisdiction thereof.

- (f) At any oral hearing of evidence in connection with any arbitration, each Party or its legal counsel shall have the right to examine its witnesses and to cross-examine the witnesses of the opposing Party. No evidence of any witness shall be presented in written form unless the opposing Party shall have an opportunity to cross-examine such witness, except as the Parties may otherwise agree in writing or except under extraordinary circumstances where the interests of justice require a different procedure.
- (g) For the avoidance of doubt, all disputes arising under or in connection with this Agreement shall be resolved in accordance with Clause 19 (*Dispute Resolution*) and nothing contained in this Agreement shall be construed as permitting either Party to commence proceedings in any court in any jurisdiction.

## **20. CHANGE-IN-LAW**

### **20.1 Change-in-Law Adjustment**

- (a) If there is a Change-in-Law which requires SPP to make any material capital improvement or other material modification to the Facility the cost of which is in excess of the Capital Improvement Threshold in any calendar year, which material capital improvement or other material modification is required for the purpose of enabling SPP to fulfil its obligations under this Agreement in compliance with such Change-in-Law, SPP shall as soon as practicable consult with SESB regarding the extent of the modification required, the implementation of the modifications, the period of unavailability (if any) and the required expenditure.
- (b) The Parties shall in, good faith, minimise the required expenditure consistent with Prudent Utility Practices, the Distribution Code and SPP's obligations under this Agreement and agree upon any extension of the Term or any adjustment to the Energy Rate to reflect such cost in excess of the Capital Improvement Threshold for submission to Suruhanjaya Tenaga for approval. SPP and SESB shall use their respective best efforts to limit the remedy to an extension of Term only and only in the event it is not commercially feasible to do so, resort to an adjustment to the Energy Rate. If the Parties cannot reach agreement, the matter shall be determined in accordance with Clause 19 (*Dispute Resolution*).
- (c) After receipt by SPP and SESB of the written approval from Suruhanjaya Tenaga of:
  - (i) the costs of the material capital improvement or material modification to the Facility;

- (ii) such extension of the Term or adjustment to the Energy Rate; and
- (iii) the inclusion of any adjustments to the Energy Rate as part of SESB's tariff rates to its customers in a manner consistent with such adjustments;

the Term or the Energy Rate, as the case may be, shall be adjusted in the manner as approved by Suruhanjaya Tenaga.

- (e) For purpose of this Clause 20 (*Change-in-Law*), the Capital Improvement Threshold shall be Ringgit Malaysia Two Hundred and Fifty Thousand (RM250,000.00).
- (f) For purposes of this Clause 20 (*Change-in-Law*), a change in the Distribution Code shall be treated as if a Change-in-Law.
- (g) SPP's inability to perform its obligations during the period required by SPP to effect the changes or modification to the Facility necessitated by any Change-in-Law shall not be a breach of this Agreement to the extent such inability is a direct consequence of the Change-in-Law.

## 21. MISCELLANEOUS

### 21.1 Transfers and Assignment

- (a) Except as required by the Financing Parties under the Financing Documents or as permitted under this Agreement under Clause 21.1 (*Transfers and Assignment*) or Clause 21.2 (*Successors and Assigns*), SPP shall not sell, convey, transfer or otherwise dispose of the Project or any material part or any interest in it to any other Person without the prior written consent of SESB and Suruhanjaya Tenaga. For purposes of this Clause 21.1 (*Transfers and Assignment*), any transfer of the controlling interest in SPP to any Person who is not a direct or indirect shareholder of SPP on the Effective Date shall be deemed to be a transfer subject to the terms of this Clause 21.1 (*Transfers and Assignment*).
- (b) If the Financing Documents so require, SESB shall:
  - (i) provide its consent to assignments and acknowledgement of rights of the Financing Parties (including cure rights and the rights of the Financing Parties under the Financing Documents to be substituted for SPP upon the occurrence of any default provided that the Financing Parties shall notify SESB in writing before exercising such rights) as shall be necessary or reasonably appropriate in order to obtain financing for the Project in a timely manner provided that such rights shall be subject to the terms of this Agreement and not

inconsistent with SESB's rights hereunder;

- (ii) make payments to SPP directly into a collateral security account established under the Financing Documents (subject to any claims or rights SESB may have against SPP under this Agreement);
  - (iii) in the event of a default and provided that a prior written notice has been given to SESB, accept as a substitute for SPP under this Agreement, the agent for the Financing Parties, any designee or transferee of such agent or any purchaser of SPP or the Project upon a foreclosure sale conducted on behalf of the Financing Parties of SPP's interest in the Project or of the issued share capital of SPP; and
  - (iv) subject to a prior written notice already been given to SESB, afford the Financing Parties an opportunity to remedy any Event of Default by SPP within the relevant cure period hereunder before terminating this Agreement.
- (c) SPP acknowledges:
- (i) any assignment or transfer to a secured party pursuant to the Financing Documents shall not relieve SPP of its obligations to SESB under this Agreement;
  - (ii) no such assignee or transferee shall be liable for the performance of SPP's obligations under this Agreement; and
  - (iii) any exercise by any such assignee or transferee shall be subject to the terms of this Agreement.

## 21.2 Successors and Assigns

This Agreement shall be binding upon and shall inure to the benefit of the Parties and their respective successors and permitted assigns.

## 21.3 Notices

Except as otherwise specified in this Agreement, any notice, demand for information or documents required or authorised by this Agreement to be given to a Party shall be given in writing and shall be sufficiently given if delivered by registered mail, courier or hand delivered against written receipt, or if transmitted and clearly received by facsimile transmission addressed as set out below, or if sent to such Party by registered mail, courier or hand delivery to such other address as such Party may designate for itself by notice given in accordance with this Clause 21.3 (*Notices*). Any such notice shall be effective only if given by such Party (and not on its behalf by an agent) and upon actual delivery or receipt thereof.

All notices given by facsimile shall be confirmed in writing, delivered or sent as aforesaid, but the failure to so confirm shall not vitiate the original notice.

The address for the delivery of notices and bills to each Party and the respective telephone and facsimile numbers are as follows:

(a) For SPP:

[●]

Attention: [●]

Telephone: [●]

Facsimile: [●]

(b) For SESB:

Pejabat Setiausaha Syarikat  
Sabah Electricity Sdn Bhd  
Tingkat 1, Wisma SESB,  
Jalan Tunku Abdul Rahman,  
88673 Kota Kinabalu  
Sabah

Attention: Setiausaha Syarikat

Telephone: 088-282 210

Facsimile: 088-223 320

With a copy to : General Manager (Single Buyer)  
Sabah Electricity Sdn Bhd  
Tingkat 10, Wisma SESB  
Jalan Tunku Abdul Rahman  
88673 Kota Kinabalu  
Sabah

Telephone: 088-282 355

Facsimile: 088-282 421

#### 21.4 Choice of Law

This Agreement shall be governed by, and construed in accordance with, the laws of Malaysia. Subject to the provisions of Clause 19.2 (*Arbitration*), the Parties hereby submit to the exclusive jurisdiction of courts located in Kuala Lumpur, Wilayah Persekutuan.

#### 21.5 Entire Agreement

This Agreement constitutes the entire understanding between the Parties and supersedes any and all previous understandings between the Parties with respect to the subject matter hereof.

**21.6 Further Assurances**

If either Party determines in its reasonable discretion that any further instruments or other things are necessary or desirable to carry out the terms of this Agreement, the other Party shall, at the expense of the requesting Party, execute and deliver all such instruments and assurances and do all things reasonably necessary or desirable to carry out the terms of this Agreement.

**21.7 Waiver**

No waiver by either Party of the performance of any obligation under this Agreement or with respect to any default or any other matter arising in connection with this Agreement shall be deemed a waiver with respect to any subsequent performance, default or matter.

**21.8 Modification or Amendment**

No modification, amendment or waiver of any provisions of this Agreement shall be valid unless it is in writing and signed by both Parties.

**21.9 Severability**

If any term or provision of this Agreement or the application thereof to any Person or circumstances shall to any extent be declared invalid or unenforceable by any Malaysian authority or court of competent jurisdiction, the remainder of this Agreement or the application of such term or provision to Persons or circumstances other than those as to which it is declared invalid or unenforceable shall not be affected thereby, and each other term and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law.

**21.10 Counterparts**

This Agreement may be executed in counterparts all of which shall constitute one agreement binding on both Parties and shall have the same force and effect as an original instrument, notwithstanding that both Parties may not be signatories to the same original or the same counterpart.

**21.11 Confidential Information**

- (a) This Agreement and any information provided by either Party to the other Party pursuant to this Agreement and labelled "CONFIDENTIAL" shall be utilised by the receiving Party solely in connection with the purposes of this Agreement and shall not be disclosed by the receiving Party to any third party, except with the providing Party's consent, and upon request of the providing Party shall be returned thereto.
- (b) Notwithstanding subparagraph (a) above, the Parties acknowledge and agree that such information may be disclosed on a "need to know" basis to the Financing Parties, potential financiers of the Project,

suppliers and potential suppliers of major equipment to the Facility and other third parties as may be necessary for SESB and SPP to perform their obligations under this Agreement. To the extent that such disclosures are necessary, the Parties also agree that they shall endeavour in disclosing such information to seek to preserve the confidentiality of such disclosures.

- (c) Nothing in this Clause 21.11 (*Confidential Information*) shall prevent either Party from providing any confidential information received from the other Party to any court or government authority as may be required by such court or government authority, provided that, if feasible, the disclosing Party shall have given prior notice to the other Party of such required disclosure and, if so requested by such other Party, shall have used all reasonable efforts to oppose the requested disclosure, as appropriate under the circumstances, or to otherwise make such disclosures pursuant to a protective order or other similar arrangement for confidentiality.
- (d) The provisions in this Clause 21.11 (*Confidential Information*) shall continue for a period of three (3) years following early termination or expiration of this Agreement.

#### **21.12 Independent Contractors**

The Parties are independent contractors. Nothing contained in this Agreement shall be deemed to create an association, joint venture, partnership or principal/agent relationship between the Parties or to impose any partnership obligation or liability on either Party. Neither Party shall have any right, power or authority to enter into any agreement or commitment, act on behalf of, or otherwise bind the other Party in any way.

#### **21.13 Third Parties**

This Agreement is intended solely for the benefit of the Parties. Save as otherwise expressly stated, nothing in this Agreement shall be construed to create any duty or liability to or standard of care owing to any other Person.

#### **21.14 Headings**

The headings contained in this Agreement are solely for the convenience of the Parties and should not be used or relied upon in any manner in the construction or interpretation of this Agreement.

#### **21.15 Language**

- (a) The official text of this Agreement shall be in the English language.
- (b) Except as otherwise specifically provided to the contrary, all documents, notices, waivers and all other communications, written or otherwise, between the Parties in connection with this Agreement shall be in the English language.

**21.16 Time of the Essence**

Time, wherever mentioned in this Agreement shall be of the essence.

**21.17 Stamp Duties**

This Agreement shall be duly stamped and all stamp duties in relation thereto shall be borne by SPP.

**21.18 Goods and Services Tax**

- (a) All amounts stated in this Agreement are exclusive of goods and services tax (**GST**) unless clearly stated otherwise.
- (b) The Parties acknowledge and agree that if GST is imposed on any supplies made by any Party under this Agreement such Party shall have the right to increase the consideration payable on the supply by an amount equal to the GST imposed calculated as follows:

**GST Amount = A X R**

Where:

A is the consideration payable for the supply; and

R is the applicable rate of GST prevailing at the time of supply (expressed as a percentage).

- (c) The other Party shall pay the GST Amount at the same time and in the same manner as the consideration for the supply provided.
- (d) The amount of GST payable shall be identified in a tax invoice drawn up in accordance with the requirements of the Goods and Services Tax Act 2014.
- (e) The Parties acknowledge and agree that notwithstanding any imposition of any GST on either Party, the Energy Rate shall not be subject to any adjustment whatsoever.

[END OF CLAUSES]

**IN WITNESS WHEREOF**, the Parties to this Agreement have hereunto affixed their hands and seals the day and year first above written.

**THE COMMON SEAL OF** )  
**SABAH ELECTRICITY SDN BHD** was hereunto )  
affixed in the presence of: )  
)  
)  
)  
)  
)  
)  
)

.....  
Director/ Company Secretary

.....  
Director

**THE COMMON SEAL OF** )  
**[●]** was hereunto affixed in the presence of: )  
)  
)  
)  
)  
)  
)  
)

.....  
Director/ Company Secretary

.....  
Director

FOR RFP PURPOSES ONLY



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DATED [●] DAY OF [●] 20[●]

BETWEEN

SABAH ELECTRICITY SDN BHD  
(COMPANY REGISTRATION NO: 462872-W)

AND

[●]  
(COMPANY REGISTRATION NO: [●])

---

POWER PURCHASE AGREEMENT

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APPENDIX A

PROJECT DESCRIPTION AND DESIGN CONDITIONS

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**A1.0 GENERAL**

A1.1 All capitalised terms shall have the meanings given to them in Clause 1.1 (Defined Terms) of this Agreement except where as otherwise defined herein.

**A2.0 GENERAL DESCRIPTION**

[SPP to insert the general description of the Project which includes but limited to:

1. A summary of its significant components, such as photovoltaic panels, DC collection system, current inverters, meteorological measuring facilities, solar irradiance instrumentation and any other related electrical equipment.
2. A drawing showing the general arrangement of the Facility i.e the Facility's topology.]

**A2.1 Facility Design Parameters**

The following design parameters are to be considered for the design of the Facility:

**A2.1.1 Site Ambient Conditions**

| Description   | Unit                 | Value (SPP to fill in) |
|---|----------------------|------------------------|
| Site altitude (above MSL)   | m                    |                        |
| Site mean temperature range   | °C                   |                        |
| Site mean relative humidity range   | %                    |                        |
| Site ambient pressure   | mbar                 |                        |
| Annual average rainfall   | mm                   |                        |
| Seismic acceleration  | G                    |                        |
| Average isoceraunic level (number of thunder days per year)<br>Mean<br>Maximum<br>Minimum | days/year            |                        |
| Basic average wind speed  | m/s                  |                        |
| Solar irradiance  | watts/m <sup>2</sup> |                        |
| Cloud cover   | okta                 |                        |

| Descri                          | Unit | Value (SPP to fill in) |
|---------------------------------|------|------------------------|
| Building lifespan design factor | Year |                        |

### **A2.1.2 Environmental Requirements**

SPP shall be responsible for investigating the need for and obtaining all necessary consents, permits, licenses and approvals for executing the design, supply, construction and commissioning of the Facility and equally in meeting with all relevant legal and environmental requirements or guidelines specified in the Environmental Quality Act 1974.

## **A3.0 MAIN EQUIPMENT DESCRIPTIONS**

### **A3.1 Photovoltaic Modules and Array**

#### **A3.1.1 General Description**

#### **A3.1.2 Manufacturer and Model Name**

#### **A3.1.3 Photovoltaic Module Type**

#### **A3.1.4 Efficiency**

#### **A3.1.5 Total PV Modules Count**

#### **A3.1.6 Array Design and Configuration**

#### **A3.1.7 Annual Output and Capacity Degradation (in %)**

#### **A3.1.8 Warranty**

#### **A3.1.9 Performance Guarantee by EPCC Contractor**

[SPP to describe the type of performance guarantee provided by the EPCC Contractor and the duration of such guarantee.]

#### **A3.1.10 Technical Specifications**

Refer to Attachment 1 [SPP to provide the specification sheet of the product to be attached to this Appendix A.]

### **A3.2 Balance of System**

#### **A3.2.1 Meteorological Measuring Facilities (“MMF”)**

##### **A3.2.1.1 General Description**

##### **A3.2.1.2 Pyranometer**

- A3.2.1.3 Pyrheliometer**
- A3.2.1.4 Temperature Sensor**
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- A3.2.1.8 Rain Gauge**
- A3.2.1.9 Dust Monitor**
- A3.2.1.10 Data Logging and Telemetry System**
- A3.2.1.11 Technical Specifications**

Refer to Attachment 2 [SPP to provide the specification sheet of each MMF items to be attached to this Appendix A.]

#### **A3.2.2 Photovoltaic Mounting System**

#### **A3.2.3 Solar Tracking System**

- A3.2.3.1 General Description**
- A3.2.3.2 Manufacturer and Model Name**
- A3.2.3.3 Technical Specifications**

Refer to Attachment 3 [SPP to provide the specification sheet of the product to be attached to this Appendix A.]

#### **A3.2.4 Power Optimiser**

- A3.2.4.1 General Description**
- A3.2.4.2 Manufacturer and Model Name**
- A3.2.4.3 Technical Specifications**

Refer to Attachment 4 [SPP to provide the specification sheet of the product to be attached to this Appendix A.]

#### **A3.2.5 Cables**

- A3.2.5.1 General Description**
- A3.2.5.2 Manufacturer and Model Name**
- A3.2.5.3 Technical Specifications**

Refer to Attachment 5 [SPP to provide the specification sheet of the product to be attached to this Appendix A.]

### **A3.2.6 DC Isolator**

#### **A3.2.6.1 General Description**

#### **A3.2.6.2 Manufacturer and Model Name**

#### **A3.2.6.3 Technical Specifications**

Refer to Attachment 6 [SPP to provide specification sheet of the product to be attached to this Appendix A.]

### **A3.2.7 Inverter**

#### **A3.2.7.1 General Description**

#### **A3.2.7.2 Manufacturer and Model Name**

#### **A3.2.7.3 Type**

#### **A3.2.7.4 Topology**

#### **A3.2.7.5 Efficiency**

#### **A3.2.7.6 Maximum Power Point Tracking (“MPPT”) System**

#### **A3.2.7.7 Description of Logic and Algorithm of the MPPT System**

#### **A3.2.7.8 Warranty**

#### **A3.2.7.9 Technical Specifications**

Refer to Attachment 7 [SPP to provide the specification sheet of the product to be attached to this Appendix A.]

### **A3.2.8 Fusebox**

#### **A3.2.8.1 General Description**

#### **A3.2.8.2 Manufacturer and Model Name**

#### **A3.2.8.3 Technical Specifications**

Refer to Attachment 8 [SPP to provide the specification sheet of the product to be attached to this Appendix A.]

### **A3.2.9 AC Isolator**

#### **A3.2.9.1 General Description**

#### **A3.2.9.2 Manufacturer and Model Name**

**A3.2.9.3 Technical Specifications**

Refer to Attachment 9 [SPP to provide the specification sheet of the product to be attached to this Appendix A.]

**A3.2.10 Transformers**

**A3.2.10.1 Low Voltage (LV) Transformer**

**A3.2.10.2 High Voltage (HV) Transformer**

**A3.2.11 Control and Protection System**

**A3.2.11.1 Control System**

**A3.2.11.2 Electrical Distribution System**

**A3.2.11.3 Interlock and Protection System**

**A3.2.11.4 Lightning and Surge Protection**

**A3.2.12 Performance Monitoring and Communication System**

**A3.2.12.1 Real Time Energy Output Monitoring System**

**A3.2.12.2 Data Acquisition System**

**A3.2.12.3 Data Communication Link to Control Centre**

**A3.2.12.4 Troubleshooting and Diagnostic System**

**A3.2.13 Control Rooms and Common Equipment Room**

**A3.2.13.1 Central Control Room**

**A3.2.13.2 Common Equipment Room**

**A3.2.13.3 Local Control Room**

**A3.2.14 SPP Interconnection Facility and SPP Interconnector**

Refer to Appendix E for details.

**A3.2.15 Metering**

Refer to Appendix D for details.

**A3.3 Current Transformer**

**A3.4 Voltage Transformer**

**A4.0 OVERALL FACILITY CONTROL AND MONITORING PHILOSOPHY**

**A4.1 Plant Operation Philosophy**

**A4.2 Local Control and Monitoring Philosophy**

**A4.3 Remote Control and Monitoring Philosophy**

**A4.4 Supervisory Control and Monitoring Philosophy**

**A5.0 OPERATIONAL PHILOSOPHY**

**A5.1 General Description**

**A5.2 Emergency Shutdown System**

**A6.0 TECHNICAL LIMITS OF FACILITY**

**Refer to Appendix B for details.**

**A7.0 PROJECT CODES AND STANDARDS**

A7.1 Compliance with all relevant Malaysian laws, regulations, codes and standards are mandatory for the Project.

A7.2 The following codes and standards or their equivalent will also be utilized in the design and construction of the Facility:

[SPP to insert the relevant Project codes and standards.]

A7.3 Unless a higher or stricter standard or requirement is expressly provided in this Agreement and/or Appendices, the Malaysian standards and regulations shall prevail in the event of a conflict between the Malaysian standards and regulations and any recognised international codes and standards, including those codes and standards set out in A7.2 above, utilised by SPP in the design and construction of the Facility.

APPENDIX B

FACILITY TECHNICAL REQUIREMENTS  
AND OPERATING CHARACTERISTICS

FOR RFP PURPOSES ONLY

**B1.0 GENERAL**

All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except where as otherwise defined herein.

Parallel operation of the Facility on the Distribution Network requires both SESB and SPP to meet certain minimum requirements for performance, operation and safety. This Appendix B describes the minimum technical and operational requirements which SPP shall comply with under the terms of this Agreement. SPP shall work closely with SESB from an early state of the Project to ensure that these requirements are met and that the design features of the Facility is compatible with the Distribution Network requirements.

In connection with the design, construction, operation and maintenance of the Facility, all SPP installations shall adhere to all applicable national and local codes, rules and Laws. In the absence of any such standards, Prudent Utility Practices or OEM standards shall, subject to the prior written consent of SESB, be applied by SPP.

SPP shall conform to all applicable provisions stated in the Distribution Code and SESB Technical Guidebook on Grid-interconnection of Photovoltaic Power Generation System to LV and MV Networks ("PV Interconnection Guidebook"). SPP shall not be allowed to be connected to the Distribution Network until such compliance is met.

**B2.0 DESIGN REQUIREMENTS****B2.1 Grid Voltage Variation**

The Distribution Network voltage fluctuates in response to the feeder length and the load level. The limits to be complied with for the planning of the interconnection shall be  $\pm 5\%$ .

**B2.2 Facility Voltage Fluctuation**

The maximum voltage fluctuation range allowed due to varying solar radiation is 6%. This requirement differs from that for voltage flicker.

**B2.3 Grid Frequency Variation**

SPP shall maintain plant frequency to operate in synchronism with the Distribution Network. Nominal system frequency is 50 Hz with normal range of  $\pm 1\%$  which is between 49.5Hz and 50.5Hz. The Facility is required to withstand short time operation within the range 47Hz and 52 Hz.



**B2.4 Current Harmonics**

Total Harmonic Distortion Current Distortion (THD) shall be <5 % at inverter rated output. The point of measurement is at the combiner box of the inverters.

Each individual harmonic shall be limited to the percentages listed in the table below (Current distortion limits reference to IEC 61727-2003 Table 1). Even harmonics in these ranges shall be less than 25 % of the lower odd harmonic limits listed.

| Odd harmonics | Distortion limit (%) |
|---------------|----------------------|
| 3 – 9         | < 4.0                |
| 11 – 15       | < 2.0                |
| 17 – 21       | < 1.5                |
| 23 – 33       | < 0.6                |

| Even harmonics | Distortion limit (%) |
|----------------|----------------------|
| 2 – 8          | < 1.0                |
| 10 – 32        | < 0.5                |

**B2.5 Voltage Fluctuation and Harmonics / Power Quality**

The acceptable permissible values for voltage fluctuation and harmonics are detailed in the table below. The point of measurement is at the Connection Point, normally at the SESB Interconnection Facility.

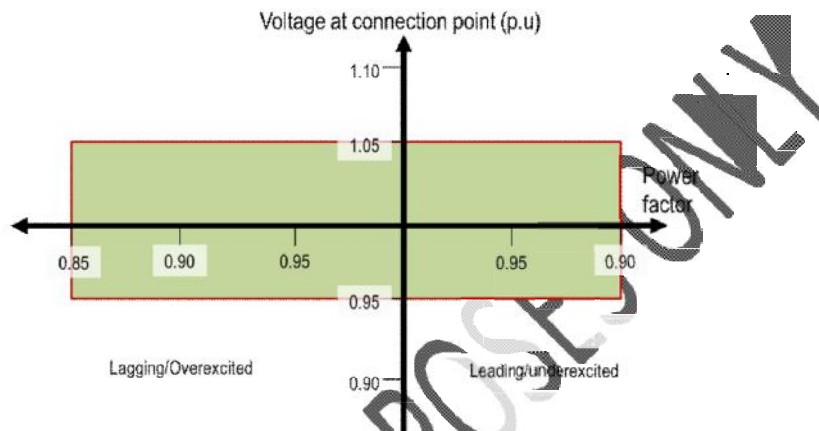
| Type Of Disturbance | Indices   | Acceptable permissible values at Connection Point | Reference Document                  |
|---------------------|---|---|-------------------------------------|
| Voltage Flicker     | Absolute Short Term Flicker Severity ( $P_{st}$ ) | 1.0 (at 132kV and below)                          | UK'S Engineering Recommendation P28 |
|                     | Absolute Long Term Flicker Severity ( $P_R$ )     | 0.8 (at 132kV and below)                          |                                     |
| Harmonic Distortion | Total Harmonic Distortion Voltage (THDV) %        | 4 % at 11kV                                       | Engineering Recommendation ER G5/4  |
|                     |   | 3% at 33kV  |                                     |
| Voltage Unbalance   | Negative Phase Sequence Voltage %                 | 2% for 1 minute                                   | UK's Engineering Recommendation P29 |

**B2.6 DC Injection**

The Facility shall not inject DC current more than 1% of the rated inverter output current under any operating condition.

**B2.7 Power Factor**

The allowed power factor of Facility range is 0.85 lagging to 0.9 leading as shown in the figure below.

**B2.8 Transient Over-voltages**

Typical Basic Impulse Insulation Levels (BIL) of the Distribution Network is as given in the table below. The Facility and its apparatus shall be compatible with the insulation levels of the Distribution Network.

| System Voltage (kV) | BIL (kV) |
|---------------------|----------|
| 11                  | 75       |
| 33                  | 170      |

**B2.9 System Fault Level**

The table below shows the rated equipment to be used to withstand the maximum sub-transient three phase symmetrical short circuit fault levels. Under MDC, SESB is limited to plan for not exceeding 90% of the equipment rated design.

| Nominal Voltage [kV] | Rated Voltage [kV] | Fault Current [kA] |
|----------------------|--------------------|--------------------|
| 33                   | 36                 | 25                 |
| 11                   | 12                 | 20/25              |

### B2.10 Synchronisation

Synchronisation devices shall be provided and maintained by SPP. During operation, synchronisation is at the Facility side by matching with the Distribution Network parameters as mentioned below:

- Interlocking logics are satisfied
- Frequency difference  $< 0.2$  Hz
- Voltage magnitude difference  $< 10\%$
- Voltage angle difference  $< 10$  degrees

Inverter shall be capable of synchronising with the grid automatically within the specified reconnection time.

### B2.11 Centralised inverter

Facility with a total output exceeding 10MW shall use central inverters instead of string inverters.

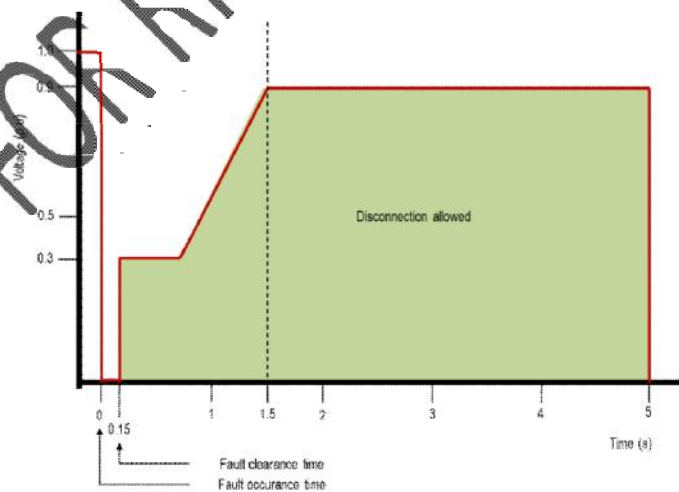
### B2.12 Standard compliance

The Facility and its interconnection shall comply with the following standards MS 1837, IEC 61727, IEEE 1547.

## B3.0 NETWORK SUPPORT

### B3.1 Fault Ride Through

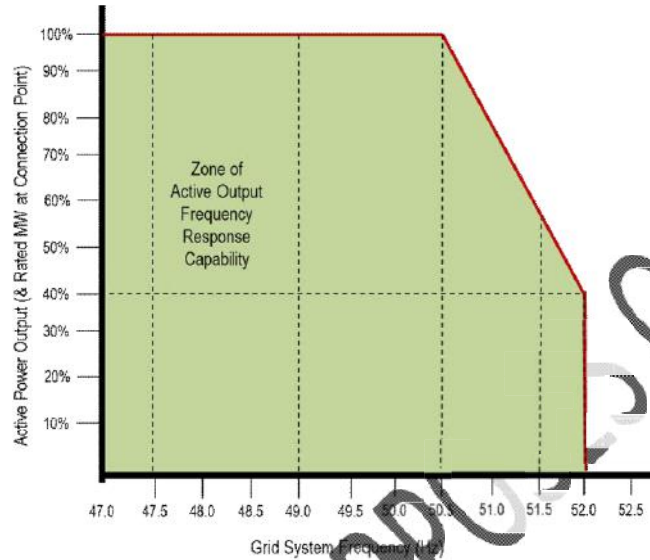
During disturbance, the Distribution Network will experience temporary low voltage/sag. The Facility is expected to continuously operate during distribution system voltage fluctuation as shown in the figure below.



### B3.2 Frequency MW Response

The Facility is expected to be uninterrupted within the frequency range of 47Hz to 50.5Hz.

During frequency disturbance, when the frequency increases more than 50.5Hz, the Facility shall reduce its power output as shown in the figure below:



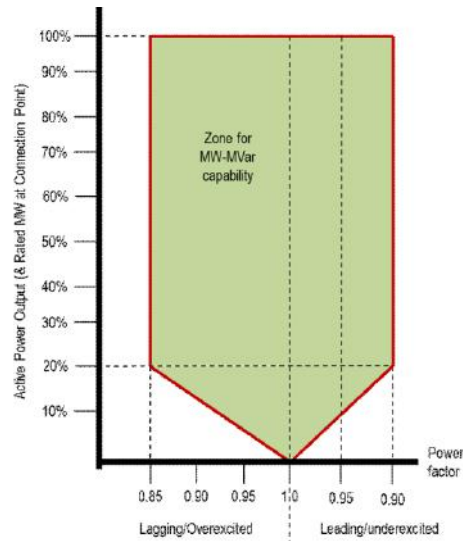
### B3.3 Voltage Support (AVQC)

The Facility shall have the capability to manage its power generation as follows:

- The Facility shall be able to reduce its power output or disconnect from the distribution system during system contingencies.
- The Facility shall reduce its generation output to avoid voltage rise above the limit.
- SPP shall monitor and ensure that the power generation of the plant does not exceed the Contracted Capacity.
- The inverter shall have the capability to perform active/reactive power control for voltage regulation.

### B3.4 Reactive Power

The Facility shall be able to deliver reactive power requirement at the Connection Point as shown in the figure below. Full range of reactive power 0.85 lagging to 0.9 leading shall be achieved at 20% output.



### B3.5 Droop Curve

The Facility shall be fitted with a droop controller or equivalent control device to provide frequency response under normal operational conditions.

### B4.0 PROTECTION REQUIREMENTS

The Facility protection scheme is under SPP's responsibility. The Facility shall have sufficient protection systems to prevent or limit damage to its generation and auxiliary equipment. The protection systems shall provide for adequate contingencies both within and external to the Facility.

SPP shall ensure the Facility's protective apparatus are properly maintain and in working order at all times during which the Facility is connected to or is in parallel operation with the Distribution Network. Any changes to the approved settings of the protection systems shall be referred to SESB for its prior approval.

Sufficient redundancy shall be included in the protection system so that failure of any single component in the protection system or communication channel that form part of the protection system, will not prevent isolation of faults from the system within the required time. In the event of failure of the main protection scheme, a back-up protection scheme shall operate.

All protection schemes must be consistent and compatible with SESB's configuration and existing protection schemes.

#### B4.1 Feeder Protection at Connection Point

The protection interfacing requirements are as follows:

- a) Unit Protection (Current Differential)
- b) Overcurrent and Earth Fault (OCEF) / Non Directional OCEF
- c) Interlocking scheme
- d) Reverse Power Relay

Where applicable, the following protection schemes may be required:

- a) Arc protection
- b) Busbar protection
- c) Automatic transfer scheme

#### **B4.2 Feeder Requirements at SPP Interconnection Facility**

The SPP feeder shall be equipped with the following equipment:

- a) Current Differential Relay matching with the protection interfacing requirements at SESB Interconnection Facility
- b) Power Quality (PQ) recorder

The PQ recorder shall measure THDI, voltage fluctuation and flicker. Data storage capacity for the PQ recorder is to last at least for 1 month. The sampling rate shall be at least 128 samples per cycle.

#### **B4.3 Fault Clearing Time**

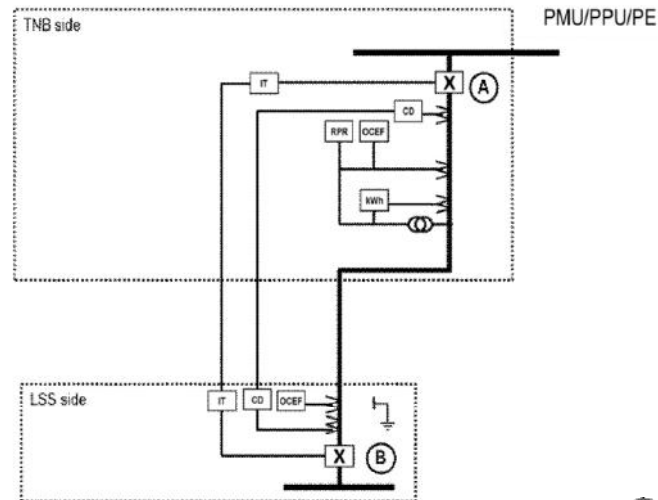
The fault clearing times for 11kV and 33kV network is as depicted in the table below or such other requirements as may be prescribed by the Distribution Code or SESB in accordance with Prudent Utility Practices.

| Type of fault                   | 11kV, 33kV |
|---------------------------------|------------|
| Substation & transformer faults | 150ms      |
| Overhead line & cable faults    | 600ms      |

#### **B4.4 Interlocking of the Interconnection Feeder**

The interlocking facilities shall operate in the following manner, referring to the figure below.

- A open – B to open
- B close position – A cannot close
- A open position – B cannot close
- Earth Switch B ON – A cannot close



#### B4.5 Protection equipment

The protection relay and PQR equipment to be used is subject to the approval of SESB.

#### B4.6 Protection coordination study

SPP shall carry out the internal protection coordination to mitigate internal and external fault.

- a) For any internal fault, the Facility shall not cause problems to the utility system and its customers. The failure of the Facility equipment includes:
- Failure of protection equipment
  - Failure of control equipment
  - Loss of control power
  - Interconnection power and fibre optics cables

- b) For any Distribution Network fault outside the Facility, the Facility shall be protected from any damaging effect.

The Facility shall be disconnected from the Distribution Network during any of the above conditions and any reverse power flow exceeding the prescribed relay settings.

#### **B4.7 Anti-Islanding**

During loss of mains, the inverter shall cease to operate in islanded mode. The anti-islanding protection is required to mitigate the following events:

- a) Safety  
b) Power quality  
c) Inverter technical limit

##### *Anti islanding detection*

Inverters shall have the following anti-islanding capabilities:

- Under Voltage
- Over Voltage
- Under Frequency
- Over Frequency
- 1 additional active/passive anti-islanding detection

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*Isolation time*

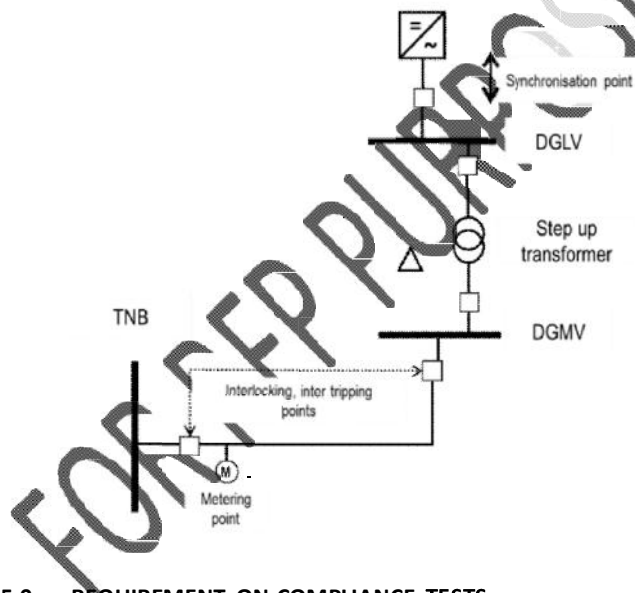
Upon detection of the loss of mains, the Facility shall be isolated within the time as shown in B2.9.

**B4.8 Reconnection time**

The reconnection time of the Facility to the Distribution Network shall be more than 5 minutes after SESB connection has been stabilised.

**B4.9 Earthing scheme**

- a) The Facility earthing scheme shall not cause maloperation to the SESB's protection scheme.
- b) The zero sequence components between the Distribution Network and the Facility shall be isolated. The Facility step up transformer(s) shall have delta ( $\Delta$ ) configuration at SESB's Interconnection Facility side as illustrated in the figure below to ensure the Facility does not contribute zero sequence current to Distribution Network during fault.

**B5.0 REQUIREMENT ON COMPLIANCE TESTS****B5.1 Requirement for SPP to carry out compliance tests**

SPP shall organise to conduct tests specified in B4 to prove compliance on the technical requirements stated in this Appendix B.

The tests shall be certified by the Independent Engineer and witnessed by SESB's representatives. All costs related to the tests shall be borne by SPP.

SPP shall ensure that all tests stated under this section can be repeated fully by independent third party testers during the commercial operation of the Facility.

**B5.2 Verification tests for COD**

The verification for COD shall be conducted after the Initial Operation Date and the minimum duration shall be not less than 7 days. The verification tests shall be performed by the Independent Engineer. The verification test parameters and verification methods include the following:

|   | <b>Requirement</b>                   | <b>Procedure</b>  | <b>Expected Result</b>           |
|---|--------------------------------------|-------------------|----------------------------------|
| Grid Frequency Variation                                  | B2.3                                 | Factory test      | Pass                             |
| Reactive Power  | B3.4                                 | Factory test      | Pass                             |
| Grid Voltage Variation                                    | B2.1                                 | Factory test      | Pass                             |
| Grid System Fault Level                                   | B2.9                                 | Site verification | Compliance to Power System Study |
| Protection System   | B4.1<br>B4.2<br>B4.3<br>B4.4<br>B4.6 | Factory test      | Compliance to Coordination Study |
| Voltage Support (AVQC)                                    | B3.3                                 | Factory test      | Pass                             |
| Equivalent Control Device to Speed Governor (Droop Curve) | B3.5<br>B2.3                         | Factory test      | Pass                             |
| Frequency MV Response                                     | B3.2                                 | Factory test      | Pass                             |
| Power Quality   | B2.5                                 | Site test         | Pass                             |
| Fault Ride Through (LVRT)                                 | B3.1                                 | Factory test      | Pass                             |
| Inverter Functional Verifications                         | B4.7<br>B4.8<br>B2.4<br>B2.5         | Site test         | Pass                             |

| <b>Test method</b> |   |
|--------------------|---|
| Factory test       | Valid test certificate/results from the factory                 |
| Site test          | Electrical and functional tests of the interconnection facility |
| Site verification  | Confirmation against approved drawings or specification         |

**B5.3 Procedures of Tests**

SPP shall submit the proposed site test procedures for SESB's consent no later than sixty days (60) days prior to the Initial Operation Date. The test procedures shall be as prescribed by SESB from time to time in accordance with Prudent Utility Practices.

**B5.4 Confirmation for COD**

SPP shall submit the tests results and certified test reports consisting of (i) a Verification Report and (ii) a Power Quality Report in accordance with the requirements of this Agreement and in such format as SESB may specify.

SPP shall submit the factory acceptance test reports on the major plant and equipment (i.e. solar photovoltaic panels, power transformers, circuit breakers, inverters, power servers etc.) as early as possible after completion of such FAT tests; but no later than sixty (60) days prior to the Initial Operation Date.

*[The remainder of this page has been intentionally left blank.]*

FOR RFP PURPOSES ONLY

**APPENDIX C**

**CAPACITY TESTING PROCEDURES**

**FOR DETERMINING THE CONTRACTED CAPACITY AND THE REVISED CONTRACTED  
CAPACITY**

FOR RFP PURPOSES ONLY

**C1.0 DEFINITIONS**

- (a) All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.
- (b) When used herein, the defined terms set forth below shall have the following meanings:

**“Assumed Site Conditions”** means the following assumed conditions for the relevant tests in this Appendix C in respect of the Facility:

|                              |                              |
|------------------------------|------------------------------|
| Ambient Air Temperature      | 34°C                         |
| Atmospheric Pressure         | 1013 mbar                    |
| Relative Humidity            | 85%                          |
| Power Factor at the Facility | 0.85 lagging to 0.90 leading |
| Solar Irradiance             | [To be Provided by SPP]      |

- (c) The guidelines and procedures set out in this Appendix C may be revised upon the mutual agreement in writing of the Parties.

**C2.0 GUIDELINES****C2.1 Types of Tests**

- (a) SPP shall establish the Contracted Capacity prior to the Commercial Operation Date in accordance with the requirements of this Agreement and this Appendix C. For this purpose all references to Revised Contracted Capacity in this Appendix C shall be read as Contractual Capacity.
- (b) SPP shall establish the Revised Contracted Capacity on every 5<sup>th</sup>, 10<sup>th</sup>, 15<sup>th</sup> and 20<sup>th</sup> Contract Year in accordance with the requirements of this Agreement and this Appendix C.

**C2.2 Independent Tester**

- (a) In undertaking the test to establish the Revised Contracted Capacity or the generating capacity of the Facility, SPP shall nominate an independent party who shall be responsible for undertaking any such test. The acceptability of the independent party concerned shall be subject to the agreement of SESB. The selected independent party shall also be retained to undertake any retest referred to in C3.5.
- (b) All results of any test or retest notified to SESB under this Appendix C shall be certified, as to its accuracy, veracity and compliance with the terms of this Appendix C, by the independent tester.

**C2.3 Notification of Test Date**

In respect of the test to establish the Revised Contracted Capacity, SPP shall schedule and give SESB sixty (60) days prior written notification of its intention to undertake such tests. The exact date for the conduct of such test shall be finally determined by the GSO whereupon SPP shall forthwith notify SESB in writing of such date.

**C2.4 Test Results in respect of Revised Contracted Capacity**

- (a) The Revised Contracted Capacity shall be the quantity, in megawatts, of electric power which can be generated and delivered by the Facility, without restriction, on a continuous rating basis as measured by the Metering Equipment.
- (b) The average of the calculations performed for each one (1) hourly tranch of the test period (as provided for in C3.2) shall be used to determine the value of the Revised Contracted Capacity.
- (c) The results of any test or retest under this Appendix C shall be referenced to Assumed Site Conditions. The actual power factor during any test or retest shall be within the range of 0.85 lagging to 0.95 leading and the frequency shall be within the range of 49.5 Hz to 50.5 Hz.
- (d) SPP shall furnish SESB all the correction curves for the power generating equipment in the Facility prior to the Initial Operation Date. Any adjustment of the results of a test or retest under this Appendix C to Assumed Site Conditions shall be made using these correction curves.

**C2.5 Restrictions during Testing**

- (a) During the performance of the test to establish the Revised Contracted Capacity or any retest pursuant thereto, the Facility shall be operated (i) within its Design Limits and in accordance with Prudent Utility Practices, (ii) with all normal auxiliaries in service and (iii) in compliance with all applicable Laws (including all emissions requirements and environmental Laws), and (iv) in accordance with the operating standards recommended by the major equipment manufacturer's as applying to routine operation of the Facility.
- (b) SPP shall not install or use any performance enhancing equipment during the conduct of any test or retest under this Appendix C. SPP shall, however, be permitted to perform other normal cleaning operational procedures prior to the commencement of any test.

**C3.0 TESTING PROCEDURES FOR REVISED CONTRACTED CAPACITY****C3.1 Test Codes and Reports**

- a) The procedure for any test or retest shall be as set out in this Appendix C and where no specific procedure is set out in this Appendix C in relation to any aspect of such test or retest, the relevant procedure set out in the latest revision of ASTM 2848 – 11e1 "Standard Test Method for Reporting Photovoltaic Non-Concentrator

Performance” shall be applicable to the extent it is not inconsistent with any express procedure set out in this Appendix C.

- b) The uncertainty in any measurement for tests conducted under this Appendix C shall not exceed 0.5% or other lower limit set out in the relevant performance test code.
- c) Prior to the commencement of any of the tests or retests under this Appendix C, SPP and SESB shall agree on the technical content and format of a verification report recording the results of such tests or retests.

### **C3.2 Test Period**

[To be Provided]

### **C3.3 Test Measurements**

[To be Provided]

### **C3.4 Notification of Test Results**

- (a) Upon completion of any testing under this Appendix C, SPP shall, within five (5) Business Days, notify SESB in writing of the test results. In such notification, SPP shall also indicate its acceptance or rejection of such test results and in the event that the test results are accepted, to further indicate its declaration of the value of the Revised Contracted Capacity.
- (b) After receipt of the notification from SPP in accordance with C3.4(a) above, SESB shall, within five (5) Business Days after the receipt of such notification, similarly notify SPP in writing of its acceptance of the test results and any declaration which may have been made by SPP in respect of the value of the Revised Contracted Capacity or of its rejection of such test results and any declaration made pursuant thereto. If SPP does not notify SESB of the test results pursuant to C3.4(a) above, SESB may, at its absolute discretion, accept or reject the test results and those test results if accepted shall be used as the basis for establishing the Revised Contracted Capacity
- (c) The test results shall be deemed to be accepted by SESB in the event of its failure to notify SPP in accordance with C3.4 (b). In such event, the test results shall be used as the basis for establishing the Revised Contracted Capacity
- (d) In the event that SPP and SESB accept the test results and the declaration made in accordance with C3.4 (a) and C3.4 (b) above, or such test results are deemed to be accepted in accordance with the procedure set out in C3.4 (b) and C3.4(c) above, such test results shall be used as the basis for establishing the Revised Contracted Capacity. The new Revised Contracted Capacity (in MW) shall be rounded to a whole number in that a figure of five (5) or more in the first (1<sup>st</sup>) decimal place shall result in the rounding upwards to the next higher whole number and a figure of less than five (5) in the first (1<sup>st</sup>) decimal place shall result in the rounding downwards to the next lower whole number.

### **C3.5 Retests**

- (a) Where the test results are rejected by either Party in accordance with the procedures set out in C3.4(a) and C3.4(b) above, such Party shall be entitled to only one retest of the Revised Contracted Capacity.
- (b) Any retest as provided for in C3.5(a) above, shall be carried out as soon as reasonably practicable and in any event, shall be no later than fourteen (14) days from the date the test results are rejected by either Party. Such retest shall be in accordance with the testing procedures set out in this Appendix C and upon serving written notice by SPP to SESB.
- (c) If SPP requested the retest, the results of such retest shall be deemed to be accepted by SPP and SPP shall, within two (2) Business Days upon completion of such retest, notify SESB in writing of the test results. In such notification, SPP shall also indicate its declaration of the value of the Revised Contracted Capacity.
- (d) If SESB requested the retest and SPP has not exceeded its limit of one (1) retest as provided for in C3.5(a) above, SPP shall, within two (2) Business Days upon completion of such retest, notify SESB in writing of the test results and shall also indicate its acceptance or rejection of such test results. In the event that the test results are accepted, SPP shall further indicate its declaration of the value of the Revised Contracted Capacity.
- (e) After receipt of the notification from SPP in accordance with C3.5(c) or C3.5(d) above, as the case may be, SESB shall, within five (5) Business Days after the receipt of such notification, similarly notify SPP in writing of its acceptance of the test results and any declaration which may have been made by SPP in respect of the value of the Revised Contracted Capacity, or, if SESB has not exceeded its limit of one (1) retest as provided for in C3.5(a) above, of its rejection of such test results and any declaration made thereto.
- (f) The results of any retest shall be deemed to be accepted by SPP or SESB in the event of their failure to notify the other in accordance with C3.5 (c), C3.5 (d) and C3.5 (e) above. In such event, such results shall be used as the basis for establishing the Tested Annual Available Capacity or the generating capacity of the Facility pursuant to a Revalidation test or as the case may be.

### **C3.6 Supervision and Access**

- (a) SPP shall permit SESB or its authorized representative to monitor any test or retest under this Appendix C.
- (b) SESB or its authorized representative shall have full access to the Facility and/or the Site during any test or retest under this Appendix C and shall also be permitted to review all data in relation thereto.

### **C3.7 Costs and expenses**

- (a) SPP and SESB shall bear their own costs and expenses incurred in monitoring the tests or retest under this Appendix C and also in reviewing the results thereof.



- (b) Subject to C3.7(a) above and excluding all costs and expenses associated with the operations of the Facility during the tests or retests under this Appendix, all other costs and expenses which may be incurred in respect of conducting such tests or retests shall be borne by the Parties as follows:
- (i) The testing in respect of the Revised Contracted Capacity : SPP;
  - (ii) Any retest : the Party which requests such retest.
- (c) Notwithstanding anything contained in C3.7(b), any Party that unjustifiably interrupts a test or retest under this Appendix C shall bear the costs incurred by the other Party in conducting, monitoring or supervising of such test or retest.

FOR RFP PURPOSES ONLY

APPENDIX D

ENERGY ACCOUNTING AND SESBSESB METERING  
EQUIPMENT

FOR RFP PURPOSES ONLY

## **D1.0 DEFINITIONS**

D1.1 All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except as otherwise defined herein.

## **D2.0 ENERGY ACCOUNTING**

### **D2.1 Metering Location & Arrangement**

D2.1.1 The Net Energy Output (kWh) delivered to SESB shall be measured by the SESB Metering Equipment. The SESB Metering Equipment shall be located within the SESB Interconnection Facility. The point of metering shall be connected adjacent to the Interconnection Point (specifically at the XXXkV side of the generator step-up transformers) and the SESB Metering Equipment shall be located at the new XXX Substation metering room.

### **D2.2 SESB Metering Equipment**

D2.2.1 The SESB Metering Equipment as described in D2.4.2 and D3.0 and other related equipment shall be supplied and installed by SPP in accordance with Prudent Utility Practices and this Appendix D.

D2.2.2 The SPP may install own, operate and maintain a separate check metering system at the metering room. The SPP Metering Equipment, if installed, shall comprise the equipment set out in D3.1, D3.2, D3.3 and D3.4 and shall be supplied and installed by SPP in accordance with Prudent Utility Practices and this Appendix D.

### **D2.3 Pre-operational Testing**

D2.3.1 Prior to the installation of the kWh and kVAh meters comprising the SESB Metering Equipment, SPP shall deliver such meters for accuracy calibration tests (the **Tests**) to either a SESB test laboratory for such purpose or an independent test laboratory accredited with ISO/IEC 17025:2005 endorsed in writing by SESB.

D2.3.2 If the Tests are conducted in a SESB test laboratory, SPP shall witness the Tests and verify the Test results.

D2.3.3 If the Tests are conducted in an accredited independent test laboratory as described in D2.3.1, SPP and SESB shall witness and verify the Test results. Copies of the Test results shall be submitted to SESB as soon as practicable but in any event not later than fourteen (14) days after such Tests being conducted.

D2.3.4 All costs associated with the Tests, including any costs incurred by SESB in witnessing the Tests and verifying the Test results, shall be borne by SPP.

D2.3.5 The Tests shall be carried out in compliance with IEC/BS Standards. After satisfactory accuracy calibration tests, such meters shall be sealed by SESB and installed by SPP at the appropriate location on the Site. SPP shall give SESB fourteen (14) days prior written notice of the installation of such tested meters at the Site and SESB may witness such installation. Upon the installation of such meters, site tests shall be undertaken by SESB at SPP's expense, prior to the commissioning of the SESB Metering Equipment.

D2.3.6 The testing of any current transformers, potential transformers or metering equipment during installation and energisation of such SESB metering equipment shall be undertaken by SPP at its own costs and expense. The costs and expense incurred in respect of any witnessing of such tests as aforesaid by SESB shall be fully borne by SPP.

#### **D2.4 Meter Readings**

D2.4.1 In order to verify the quantity of electrical energy delivered by SPP to SESB in each Billing Period, a half (1/2) hourly meter reading shall be obtained in accordance with the provisions of Clause 5.1 of this Agreement.

D2.4.2 A telephone line and optical fibre telecommunication channels shall be provided by SPP for remote telemetering purpose. No later than thirty (30) days prior to the Initial Operation Date, SPP shall provide GPRS/GSM communication medium for remote meter reading ("RMR") purposes with compatible modems and SIM Card. SPP to ensure the adequacy of signal strength in the metering room for effective GPRS/GSM communication of RMR.

D2.4.3 SPP shall seek SESB's comments on the telecommunication service provider, communication medium and minimum signal strength to be used for RMR.

D2.4.4 SESB shall at all times give SPP all access to the SESB metering room for witnessing of meter testing, verification of test results and meter readings at regular schedules agreed by both parties. The metering room shall only be accessed by SPP with the presence of SESB representatives.

#### **D2.5 Metering Room**

D2.5.1 The energy meter shall be installed on a metering kiosk which shall be housed in a metering room at a mutually agreed location in the SESB Interconnection Facility. The specification of the metering kiosk and metering room shall be in accordance with SESB Electricity Supply Application Handbook.

D2.5.2 No later than ninety (90) days prior to the Commencement Date, SPP shall submit the proposed layout diagram for the metering kiosk and the metering room for SESB's endorsement.

D2.5.3 The metering room shall operate on a "2-key System" whereby SESB and SPP shall each keep a set of key(s) to the metering room. For the avoidance of doubt, the metering room shall only be accessed when both the representatives of SPP and TNB are present.

D2.5.4 SPP may, at its own cost and expense, install such equipment relating to downloading of meter data at SESB Interconnection Facility. SESB shall provide, upon prior reasonable notice, access to SPP for the installation and maintenance of such equipment which relates to the downloading of meter data.

## **D2.6 Meter Inspection and Testing**

D2.6.1 The SESB Metering Equipment installed by SPP shall be tested by SESB at SPP's costs and expense on a regular schedule determined by SESB in accordance with Prudent Utility Practices. The costs and expense for any additional inspections and tests shall be borne by SPP or SESB in accordance with Clauses 8.8 and 8.9 of this Agreement. The test results of the SESB Metering Equipment, upon being obtained pursuant to Clauses 8.8 or 8.9 of this Agreement, shall be deemed to be final and conclusive.

## **D3.0 SESB Metering Equipment**

D3.0.1 The SESB Metering Equipment shall consist of one main and one back-up system, which shall have the same configuration. The SESB Metering Equipment comprising of the main and back-up metering equipment shall each have separate sets of current transformer (CT) and inductive voltage transformer (VT). The SESB Metering Equipment and the associated custody transfer information system for purchases of electrical energy as specified in this Appendix D shall be supplied and installed by SPP.

D3.0.2 The CT and VT shall be installed at the Connection Point circuit breaker. SPP shall ensure that both the CT and VT are calibrated in accordance with SESB's specification and procedure.

D3.0.3 For each circuit rated XXX kilovolt ("kV") and above, three-phase, four-wire metering devices shall be used. The SESB Metering Equipment shall consist of one main and one back-up system, which shall have the same configuration. The main and back-up metering equipment comprising the SESB Metering Equipment shall each have a separate set of current transformer ("CT") and voltage transformer ("VT"). Use of the CT and VT with multicores and windings is recommended. The metering data shall be transmitted to the new Landis & Gyr PC based workstation via communication links for energy billing and accounting purposes provided by IPP at Wisma SESB or Penampang LDC. The final location will be decided by SESB.

D3.1 Current transformers and voltage transformers shall be furnished and installed by SPP at the agreed location which shall be as close as possible to the Interconnection Point and shall be used exclusively for metering purposes only. The main voltage transformer shall be of the inductive type (IVT). Equipment data will be as indicated below.

### **D3.1.1 Current Transformer**

|                |  |
|----------------|--|
| Accuracy Class | 0.2  |
| Ratio          | [SPP shall provide to be approved by SESB prior to Initial Operation Date]/1A  |
| Rated Burden   | 30 VA  |
| Quantity       | One (1) for each phase with single secondary, one secondary for the main and the other for the back-up system, for each circuit. |
| Standard       | BS 7626, IEC 60044-1, IEC 61869-2  |

**D3.2 Voltage Transformer**

|                |  |
|----------------|--|
| Accuracy Class | 0.5  |
| Ratio          | [SPP shall provide to be approved by SESB prior to Initial Operation Date]                               |
| Rated Burden   | 100VA  |
| Voltage Factor | 1.9 for 8 hours  |
| Quantity       | One (1) for each phase and one each for the main and the other for the back-up system, for each circuit. |
| Standard       | BS 3941, IEC186, IEC 61869-3   |

D3.4 The metering devices and software required to operate the SESB Metering Equipment is listed below.

(1) **Energy Meters**

| <b><u>Energy Meters</u></b> |  |
|-----------------------------|--|
| Accuracy Class for kWh      | 0.2s   |
| Accuracy Class for kVAh     | 0.5s   |
| Quantity                    | two for each circuit, one each for the main and back-up system for every circuit |
| Standard                    | MS 62052-11<br>MS 62053-22<br>MS 62053-23  |

(2) **Mandatory Features for Energy Meters**

- a) Two communication facilities (RS232 port and RS485 port), are required to transfer metering data from site to RMR data centre via communication medium mentioned in D2.4.2.
- b) The energy meters shall be provided with meter configuration and reading software.
- c) For the purpose of SESB remote meter reading system, the energy meter shall be Itron Enterprise Edition (IEE) compliant.
- d) The energy meters including software shall be provided with thirty six (36) months' manufacturer's warranty.

(3) **Portable Test Equipment**

This equipment is to be purchased by SPP and transferred to SESB and shall be used as a metering standard for onsite meter accuracy test purposes.

| <b><u>Portable Test Equipment</u></b> |     |
|---------------------------------------|-----|
| Quantity                              | One |

(4) **Telemetering Units****Telemetering Units**

|                 |   |
|-----------------|---|
| Quantity        | Two units, one for the main and one for check. The telemetering units should be able to tele-meter all inputs |
| Preferred Brand | Landis & Gyr  |

**Programmable Features**

- (a) CT and PT ratio normalisation
- (b) Time of use energy calculation
- (c) Time of use maximum demand calculation
- (d) Summation of all inputs or any chosen subtotals
- (e) kVArh calculation
- (f) Power factor calculation
- (g) Import / export calculation

(5) **Programming Software for Meters and Telemetering Units****Meters and Telemeteing Units**

|           |   |
|-----------|---|
| Quantity: | one unit with manufacturer service warranty |
|-----------|---|

#### Features

- (a) Programming of meter ratio and output pulse
- (b) Programming of parameters of telemetering unit
- (c) Extracting / loading parameter data from / to meter and telemetering unit
- (d) Software programme manuals shall be supplied together with the unit

#### (6) Telemetering Software

|                       |  |
|-----------------------|--|
| Telemetering Software |  |
| Quantity:             | Two units with manufacturer's warranty |

#### Programmable Features

- (a) Acquisition of metering values from telemetering unit (load profile)
- (b) Storage of acquired values
- (c) Call-up of reset values from telemetering unit
- (d) Energy accounting / reporting to provide data on energy generation of interchange
- (e) Logging of abnormal operational conditions
- (f) Software programme manuals shall be supplied together with the metering devices

#### D3.5

The CT and VT secondary leads shall be multi-core armoured cable for each main and back-up in any one circuit. Minimum wire size for these leads shall be 7/0.85 mm and in accordance with BS 6346 for 600/1000 volt-grade cable. A separate and enclosed cable conduit/ trunking shall be installed to route the wires to the metering kiosk. The metering kiosk shall be located in a mutually agreed



location in the metering room as described in D2.5. The final layout diagram for the metering kiosk shall be provided by SPP for approval by SESB after written confirmation by SPP to SESB of the type of metering devices to be provided by SPP.

A marshalling cubicle shall be provided for the CT and VT connections complete with terminal blocks and fuses. The cubicle shall be sealed by SESB.

D3.6 All of the cables, cable routing, marshalling cubicle, metering kiosk and related metering accessories, such as fuses and terminal blocks shall be provided by SPP.

D3.7 SPP shall, prior to expiry of the warranty period as set out in Clause 11.3 of this Agreement, be responsible for the safekeeping and proper storage of spare CT and IVT (3-units each). Upon the expiry of the warranty period as set out in Clause 11.3 of this Agreement and SPP having passed the end of warranty (EOW) tests conducted by SESB on such spare CT and IVT (3-units each), SPP shall handover and deliver such spare CT and IVT (3-units each) to SESB at such site designated by SESB.

D3.8 The final metering set-up shall be demonstrated to be working especially on the RMR facility and agreed upon by SESB prior to actual installation thereof to ensure that it is in accordance with the requirements of the RMR Data Centre.

### **D3.9 Custody of Metering Equipment**

D3.9.1 SESB shall control and have custody of the Metering Equipment comprising main and check meters that shall be required for determining parameters for use in calculating SESB's payments to SPP, or SPP's payment to SESB.

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APPENDIX E

DESIGN OF THE SPP INTERCONNECTION FACILITY, THE SPP INTERCONNECTOR  
AND THE SPP WORKS

FOR RFP PURPOSES ONLY

**E1.0 GENERAL**

All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except where as otherwise defined herein.

**E2.0 DESIGN OF THE SPP INTERCONNECTION FACILITY, THE SPP INTERCONNECTOR AND THE SPP WORKS****E2.1 Design of the SPP Interconnection Facility, SPP Interconnector and SPP Works**

The proposed design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall comprise all the major features as described in the Power System Study Report), including details of the following:

- Net export capacity or rated  $MW_{ac}$
- Connection Point
- Voltage level at the Connection Point
- Length, size and type of cable to be connected from the SPP Interconnection Facility to the Connection Point
- Circuit breaker requirements
- Direct current system (DC)
- Supervisory Control and Data Acquisition System (SCADA)
- Communication system equipment

**E2.2 Coordination and Planning**

The engineering design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall conform to the requirements of SESB's standards and practices and the provisions of this Agreement.

The detailed engineering design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall be submitted by the consultant appointed by SPP to SESB for approval. Where the design submitted is unacceptable to SESB, SESB will notify the consultant of the non-acceptance together with the reasons therefor. The consultant shall thereafter re-submit the amended design to SESB.

SPP shall procure, construct and install the SPP Interconnection Facility, the SPP Interconnector and the SPP Works in accordance with the approved engineering design.

At least two (2) coordination meetings between SESB and SPP in respect of the construction and installation of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall be held at the following times:

- (i) Prior to commencement of construction and installation of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works; and
- (ii) Prior to testing and commissioning of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works.

**E2.3 Design Criteria for the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

The following factors (amongst others) shall be taken into consideration during design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works for effective and reliable operation under all reasonably expected systems and conditions:

- Personnel and public safety
- Voltage
- Power factor
- Transfer limits
- Equipment ratings
- Technical losses
- Short circuit conditions
- Power quality
- System protection and other control requirements
- Synchronizing facilities
- Anti-Islanding
- System earthing

SESB shall have the right to review the design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works to ensure reliability and safety of the connection of the SPP Interconnection Facility to the SESB Interconnection Facility.

The operating range at the Connection Point shall comply with the requirements of the Distribution Code.

The SPP Interconnection Facility shall be equipped with interlocking facilities to prevent undesired operation that could present safety hazard.

**E2.4 Equipment and Items to be installed at the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

The equipment provided by SPP for the construction and installation of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works may undergo quality inspection.

**E2.5 Supervisory Control and Data Acquisition System (SCADA)**

SPP plant may be equipped with SCADA facilities to provide monitoring for its own use at the Facility. The provision of SCADA is mandatory at the Connection Point in accordance with SESB standard practices and guidelines.

**E2.6 COMMUNICATION AND SCADA FACILITIES**

In order to ensure coordinated control and monitoring of the facilities and interconnection facilities, communication channels between the GSO and Single Buyer for energy accounting shall be established in accordance with the requirement set down below.

**E2.6.1 Communication Requirements**

Voice and data communication channels are required between the Penampang Main State LDC and Wisma SESB (Kota Kinabalu) Backup State LDC and the New xxxkV Switching Station to enhance secure and efficient operation control of plant equipment. New optical fibre next generation OLTE multiplexer communication equipment are required to be installed at New xxxkV Switching Station for interfacing with the state optical fibre communication system. All communication system equipment offered shall comply with the latest SESB technical specifications and requirements.

The offered OLTE multiplexer equipment must be fully compatible with the existing Network Management System (SAFN NMS) installed in Main Telecommunication Control Centre at Wisma SESB (Kota Kinabalu). The SAFN NMS is currently used to provide centralized real-time control, monitoring and data acquisition and system configuration work at the state optical fibre Wide Area Network (WAN) equipment.

Additional and new communication equipment is also required to be installed at PMU XX for data and telecontrol services. All costs involved for the interfacing work and upgrading work shall be borne by the Seller. The Seller shall also provide power budget calculations based on safety margin of 6dB power complying with specification requirements.

**D2.6.2 Main Optical fibre SDH Communication System**

Refer to proposed optical fibre communication network drawings:-

- **XXX** - Proposed Communication Equipments Layout
- **XXX** - Proposed Optical Fibre Network Connectivity Layout

The Communication Facility for the Interconnection Facility between the Facility Power Station and New xxkV Switching Substation with PMU/PPU XXX for dedicated voice (PABX), data, telecontrol, metering and teleprotection services to be handed over to SESB for Operation and Maintenance are:-

**a) Complete New xxkV Switching substation**

- One (1) set of new next generation Optical Line Terminal Equipment (OLTE) digital access multiplexer communication equipment with network protection.
  - 8Mbit/s optical line interface unit facing the Facility Power Station
  - 8Mbit/s optical line interface unit facing PMU XXX.
  - Next generation digital primary access multiplexer with

- i) 1+1 redundant power supply unit
  - ii) 1+1 redundant control unit
  - iii) Service unit
  - iv) 2Mbit/s interface unit with 120/75 ohm coaxial termination (Minimum of 4 ports)
  - v) V.24/V.28 asynchronous data channel unit (Minimum of 5 ports)
  - vi) Foreign Exchange Subscriber (FXS) unit (Minimum of 10 ports)
  - vii) Local Area Network (LAN) Ethernet interface
- One (1) lot of equipment panels and accessories of the followings:-
    - 19"/ETSI Sub-racks of the communication equipments
    - 600 x 700 x 42HU Floor Mounted Cabinet for 19" Access Multiplexer Subrack and MDF
    - 600 x 700 x 42HU Floor Mounted Cabinet for 19" ODF
  - One (1) lot of Main Distribution Frame (MDF) and accessories of the followings:-
    - LSA KRONE module terminal blocks for channel termination c/w holder, etc.
  - One (1) lot of Optical Distribution Frame (ODF) and accessories of the followings:-
    - Splicing tray FC/PC single mode adaptor (12 pieces) and splice protection sleeves and accessories set
    - FC/PC simplex single mode patchcord, 10m AND 20M
    - 12 cores pig-tail, single mode fibre, 0.5m
  - One (1) lot of 48VDC type 1 battery and charger equipment c/w isolator and accessories.
  - Other associated works as follows:-
    - Wiring, fuses, labels and cable glands for the communication equipments.
    - Interfacing to other systems within the station building such as protection relay, RTU telecontrol system V.24 interfacing, network system Ethernet interfacing, substation dedicated voice telephone system, etc., inclusive of cable ladder, cable trunk, cable tray and etc., where necessary to complete.
    - Installation, testing and commissioning.
    - Others to complete.



- One (1) lot of optical fibre cable system work for connectivity with PMU XXX and Facility Power Station which covers, but not limited to, the following:-
  - Supply and delivery of optical fiber cable, joint boxes and accessories.
  - Laying work of optical fiber cable from 3 ways joint box to New xxkV Switching Station.
  - Laying work of optical fiber cable from New xxkV Switching Station to the Facility Power Station.
  - Splicing/termination works at the new 3 ways joint box and at the ODF panel inside the building.
  - Any related works to complete the works.
  
- b) PMU XX**
  - One (1) lot of new next generation Optical Line Terminal Equipment (OLTE) digital access multiplexer communication equipment with network protection.
    - 8Mbit/s optical line interface unit facing New xxkV Switching Substation.
    - Next generation digital primary access multiplexer with
      - i) 1+1 redundant power supply unit
      - ii) 1+1 redundant control unit
      - iii) Service unit
      - iv) 2Mbit/s interface unit with 120/75 ohm coaxial termination (Minimum of 4 ports)
  - One (1) lot of equipment panels and accessories of the followings:-
    - 19"/ETSI Sub-racks of the communication equipments.
    - 600 x 700 x 42HU Floor Mounted Cabinet for 19" OLTE Sub-rack.
  - One (1) lot of Main Distribution Frame (MDF) and accessories of the followings:-
    - LSA KRONE module terminal blocks for channel termination c/w holder, etc.
  - One (1) lot of Optical Distribution Frame (ODF) and accessories of the followings:-
    - Splicing tray FC/PC single mode adaptor (12 pieces) and splice protection sleeves and accessories set.
    - FC/PC simplex single mode patch cord, 10m and 20m.

- 12 cores pig-tail, single mode fibre, 0.5m.
- Other associated works as follows:-
  - Wiring, fuses, labels and cable glands for the communication equipments.
  - Interfacing to other systems within the station building such as protection relay, etc. inclusive of cable ladder, cable trunk, cable tray and etc..., where necessary to complete.
  - Installation, testing and commissioning.
  - Others to complete
- One (1) lot of optical fibre cable system work for connectivity with New xxkV Switching Station and PPU XX which covers, but not limited to, the following:-
  - Splicing/termination works at the ODF panel inside the building.
  - Any related works to complete the works.
- c) **PPU XXX**
  - One (1) lot of equipment panels and accessories of the followings:-
    - 600 x 700 x 42HU Floor Mounted Cabinet for 19" ODF.
  - One (1) lot of Optical Distribution Frame (ODF) and accessories of the followings:-
    - Splicing tray FC/PC single mode adaptor (12 pieces) and splice protection sleeves and accessories set.
    - FC/PC Simplex single mode patch cord, 10m and 20m.
    - 12 cores pg-tail, single mode fibre, 0.5m.
  - Other associated works as follows:-
    - Wiring, fuses, labels and cable glands for the communication equipments.
    - Interfacing to other systems within the station building such as protection relay, etc. inclusive of cable ladder, cable trunk, cable tray and etc..., where necessary to complete.
    - Installation, testing and commissioning.
    - Others to complete.

- One (1) lot of optical fibre cable system work for connectivity with New xxkV Switching Station and PMU XXX which covers, but not limited to, the following:-
  - Splicing/termination works at the ODF panel inside the building.
  - Any related works to complete the works.

### **E2.6.3 Telecommunication Network Management System (STNMS)**

The existing Network Monitoring system (NMS) at Wisma SESB (Kota Kinabalu) Telecommunication Control Centre (TCCs) shall be configured for the additional new optical fibre communication system at PMU XXX and also for the new optical fibre communication system at the Facility Power Station and New xxkV Switching Substation.

Configuration work of OLTE access multiplexer equipment such as follows shall be performed to enable the NMS monitor and control the new nodes.

- Configuring the new node/equipment and network database.
- Assigning and identifiers to the node.
- Configuring the termination points of port/channel.
- Configuring the timing source and synchronization.
- Configuring the Data Communication Channels (DCC).
- Configuring the cross connections.
- Configuring alarms.
- Any others configuration and setting related to ensure the network could be monitored in real-time.

The configurations and settings shall have backup in case of the current configuration and settings are missing or the hardware and software are faulty.

### **E2.6.4 Backup Communication System**

The backup data communication is TM leased line which is from the Facility to Penampang State LDC for the RTU and from the New xxkV Switching Station to Wisma SESB (Kota Kinabalu) for the metering equipment while the backup voice channel is TM hot line.

**E2.6.5 Communication Link for Transmission of Energy Data**

SESB optical fibre communication system from Wisma SESB (Kota Kinabalu) Backup State LDC will be the main line for data communication between the energy accounting and metering equipment and the Energy Billing System (EBS) workstation at Wisma SESB (Kota Kinabalu). Necessary extension work to the workstation is required for rapid data availability, for billing and statistical analysis, setting parameters, etc. See drawing reference: XXX for details.

The workstation shall consist of server and Client computer c/w monitor, Ethernet switch and software for the billing purposes.

**D2.6.6 Extension Work for SCADA/EMS System and SCADA/DMS System at Penampang State LDC and Wisma SESB (Kota Kinabalu)**

The extension works required are:-

- Database and single Line Diagrams checking.
- Point to point tests with Substation Automation System (SAS) at PMU XXX and Remote Terminal Unit (RTU) at the new xxkV Switching Substation and the Facility Power Station.
- Others to complete.

With the completion of the SCADA/EMS and SCADA/DMS systems point to point test with Penampang Main State LDC and Wisma SESB (Kota Kinabalu) Back up State LDC system, system operators will be able to remotely monitor, acquire data and control the xxkV feeder at XXX substation and new xxkV Switching Substation in real-times.

**E3.0 TESTING AND COMMISSIONING FOR IOD****E3.1 General**

The SPP Interconnection Facility, the SPP Interconnector and the SPP Works shall be subject to testing and commissioning in accordance with Prudence Utility Practices.

All testing and commissioning shall be performed by a competent testing service provider appointed by SPP. All test equipment to be utilised for such purposes shall have a valid calibration certificate.

All testing and commissioning results shall be certified by the Independent Engineer and to be submitted to SESB.

### **E3.2 IOD Checklist**

SPP shall submit to SESB the full set of documentation for the Initial Operation Date pursuant to Clause 7.6 (*Initial Operation Date*) and the IOD Checklist as may be prescribed by SESB from time to time at least sixty (60) days prior to the proposed Initial Operation Date.

### **E3.2 Interconnection Operation Manual**

The Interconnection Operation Manual (IOM) forming part of the documentation for the Initial Operation Date outline the duties and responsibilities of both parties at the Connection Point. The IOM is also to set out the necessary procedures to be followed to ensure safety to the operating personnel and to avoid any damage to the equipment at the Connection Point. SPP shall prepare the IOM for the interconnection for approval of SESB before the Initial Operation Date.

The IOM shall address each of the following interconnection:

- SPP Interconnection Facility and SPP Interconnector
- Communication
- Switching procedures
- Fault reporting
- Outage program
- System emergency / collapse
- Sequence of operation
- Boundaries and ownership

### **E3.4 Initial Operation Date**

Submission of all the documents required for the Initial Operation Date pursuant to Clause 3.2(c) (*Conditions Precedent to the Initial Operating Date*) of this Agreement shall be made to SESB (with a copy to Suruhanjaya Tenaga) not less than sixty (60) days prior to the Initial Operating Date.

### **E3.4 Testing for the Interconnection Facilities**

Testing shall be carried out during the shutdown stage which involves the connection of the Facility to Distribution Network. Such test includes and not limited to the following:

- Electrical protection scheme
- Protection coordination study
- Cable and/or overhead test result
- SCADA
  
- VCB and DC system

- Communication System Equipment

All tests shall be carried out by a qualified tester and with a valid calibration certificate

### **E3.5 Commissioning Tests for IOD**

There are 2 levels of testing required:

- a) Inverter compliance tests
- b) Interconnection compliance tests

The scope of testing during IOD shall cover:

- a) The Facility shall cease to energise during loss of mains. Anti-islanding test must comply with the following time:
  - Disconnection time:  $\leq 2s$  and
  - Reconnection time:  $> 5min$
- b) Functional tests of all equipment
- c) Any resetting of factory-set parameters at site requires testing to be redone.

All test results shall be certified by the Independent Engineer and submitted to SESB.

### **E3.6 Power Quality (PQ) Measurements**

#### *Pre/Post Initial Operation Date (IOD)*

Power quality measurements are to be done at the point of connection to ascertain the existing power quality before commissioning and after the connection of the plant. The recording period shall be 7 days before commissioning to capture the base voltage regulation profile without connection to the plant and 7 days after commissioning with the plant connected.

Measurement shall capture the following parameters and not limited to:

- a) Total harmonic distortion (THD) voltage
- b) Unbalanced voltage
- c) Flicker voltage

#### *Permanent Power Quality Measurements*

SPP shall install a permanent power quality recorder at the circuit breaker and to submit the PQ report as and when requested by SESB.

### **E4.0 OPERATION AND MAINTENANCE OF THE SPP INTERCONNECTION FACILITY, THE SPP INTERCONNECTOR AND THE SPP WORKS**

#### **E4.1 Operation of the SPP Interconnection Facility, the SPP Interconnector of the SPP Works**

Operation of the Interconnection Facility circuit breaker shall be subjected to the agreed procedures as specified in the Interconnection Operation Manual (IOM).

**E4.2 Maintenance of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works**

SPP and SESB shall have compatible programs for the maintenance of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works. Maintenance on the protection equipment shall be coordinated between the Parties.

SESB reserves the right to inspect, at any time, the protective equipment including relays and circuit breakers at the SPP Interconnection Facility and the Connection Point.

Communication between the Parties during operation hours shall normally be done via fixed telephone lines available at the Parties' ends. However, normal mobile telephone may be used when the Parties are certain about the safe switching operation to be carried out prior to switching.

**E4.4 Outages**

In the event of any outage (planned or unplanned), any restoration work shall be carried out by the Parties in accordance with the procedures as stated in the IOM

For all tripping involving the SPP Interconnection Facility, an investigation to determine the cause of the tripping shall be carried out and coordinated between SESB and SPP. The findings of the investigation shall be shared between and limited to the Parties only.

**E5.0 OWNERSHIP**

The ownership boundary of the SPP is up to and including the cable termination at the Connection Point at the SESB Interconnection Facility.

The responsibility for control, operation and maintenance of the interconnection facility is as shown in the table below:

| <i>Item</i>                 | <i>Ownership</i> | <i>Control</i> | <i>Operation</i> | <i>Maintenance</i> |
|-----------------------------|------------------|----------------|------------------|--------------------|
| <b>SESB substation</b>      |                  |                |                  |                    |
| <i>Primary</i>              | <i>DL</i>        | <i>DL</i>      | <i>DL</i>        | <i>DL</i>          |
| <i>Secondary</i>            |                  |                |                  |                    |
| • <i>OCEF + RPR</i>         | <i>DL</i>        | <i>DL</i>      | <i>DL</i>        | <i>DL</i>          |
| • <i>CD + communication</i> | <i>SPP</i>       | <i>SPP</i>     | <i>SPP</i>       | <i>SPP</i>         |
| • <i>Interlocking</i>       | <i>SPP</i>       | <i>SPP</i>     | <i>SPP</i>       | <i>SPP</i>         |
| <b>SPP substation</b>       |                  |                |                  |                    |
| <i>Primary</i>              | <i>SPP</i>       | <i>SPP</i>     | <i>SPP</i>       | <i>SPP</i>         |

|                          |            |            |            |            |
|--------------------------|------------|------------|------------|------------|
| <i>Secondary</i>         |            |            |            |            |
| • <i>OCEF + RPR + CD</i> | <i>SPP</i> | <i>SPP</i> | <i>SPP</i> | <i>SPP</i> |
| • <i>PQR</i>             | <i>SPP</i> | <i>SPP</i> | <i>SPP</i> | <i>SPP</i> |

OCEF – Overcurrent Earth Fault, CD – Current Differential, RPR – Reverse Power Relay, PQR – Power Quality Recorder

SPP shall own and be responsible for the costs of operation and maintenance of all installations located within their boundary.

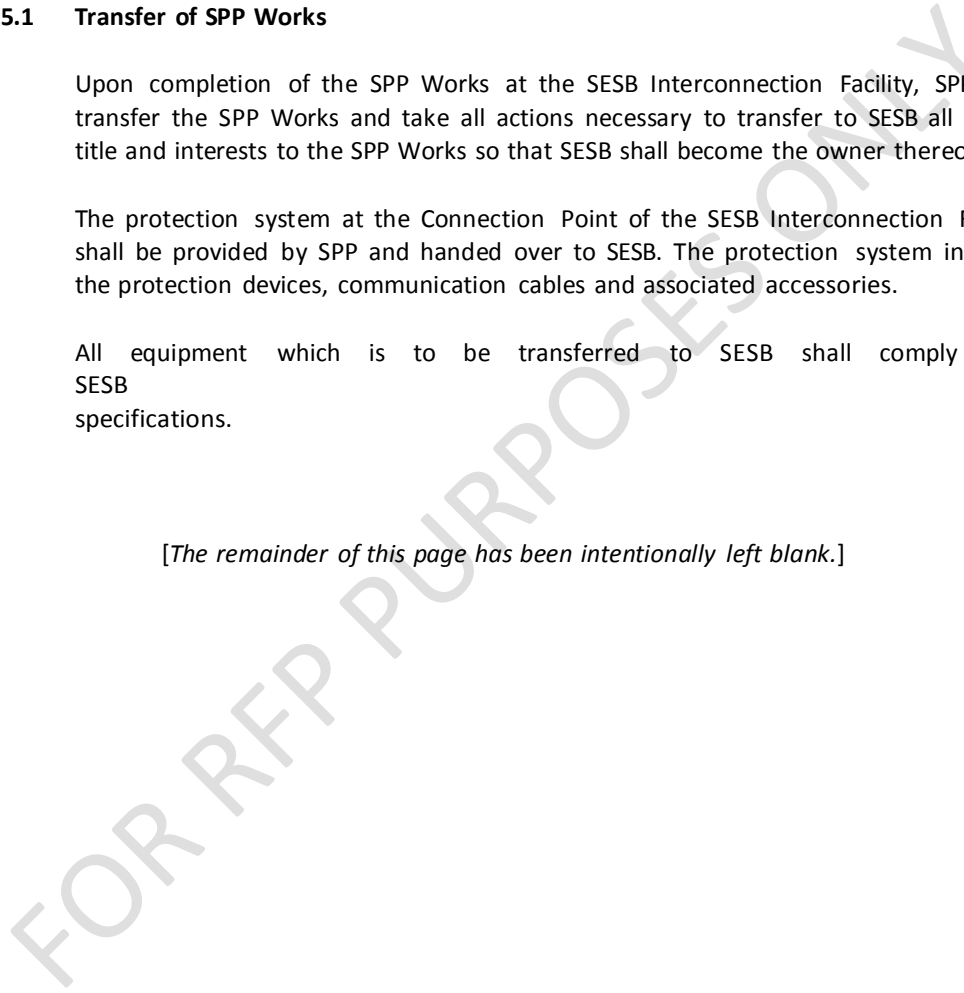
**E5.1 Transfer of SPP Works**

Upon completion of the SPP Works at the SESB Interconnection Facility, SPP shall transfer the SPP Works and take all actions necessary to transfer to SESB all rights, title and interests to the SPP Works so that SESB shall become the owner thereof.

The protection system at the Connection Point of the SESB Interconnection Facility shall be provided by SPP and handed over to SESB. The protection system includes the protection devices, communication cables and associated accessories.

All equipment which is to be transferred to SESB shall comply with SESB specifications.

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APPENDIX F

METEOROLOGICAL MEASURING FACILITIES

FOR RFP PURPOSES ONLY

**F1.0 DEFINITIONS**

F1.1 All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except as otherwise defined herein.

**F2.0 METEOROLOGICAL MEASURING FACILITIES**

F2.1 SPP shall install the Meteorological Measuring Facilities which shall comprise of:

- a) One full weather meteorological station with independent and back-up power source; and
- b) One set of pyranometer for every 1MW of Contracted Capacity.

F2.2 The Meteorological Measuring Facilities shall maintain historical data and readings throughout the Term. The minimum data resolution shall be every 15 minutes. SPP shall submit such meteorological data as may be requested by SESB from time to time.

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FOR RFP PURPOSES ONLY

APPENDIX G

CALCULATION OF ENERGY PAYMENT, NON-ACCEPTANCE PAYMENT  
AND NON-DELIVERY PAYMENT

FOR RFP PURPOSES ONLY

**G1.0 Definitions**

All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except as otherwise defined herein.

**G1.1 Calculations Of Energy Payment, Non-Acceptance Payment and Non-Delivery Payment**

The Energy Payments, Non-Acceptance Payments and Non-Delivery Payments under this Agreement shall be calculated in accordance with this Appendix G. This Appendix G shall be read in conjunction with and subject to the provisions of Clause 4 (*Sale and Purchase Obligation*), Clause 5 (*Billing and Payment*) and Clause 9 (*Commercial Operations*) of this Agreement.

**G1.2 Energy Payment**

The Energy Payment for each Billing Period shall be calculated as follows:

$$\text{ENERGY PAYMENT} \quad EP = (NEO_{T1i} \times ER) \times (NEO_{T2i} \times EER)$$

where:

- EP = the Energy Payment (in RM) in such Billing Period;
- ER = the Net Electrical Output generated and delivered by SPP and accepted by SESB in excess of the Maximum Allowable Quantity in any Contract Year
- EER = RM0.01 per kWh
- NEO<sub>i</sub> = the Net Energy Output (in kWh) delivered in such Billing Period;
- NEO<sub>T1i</sub> = the Net Energy Output (in kWh) delivered in such Billing Period not exceeding MAAQ of such Contract Year
- NEO<sub>T2i</sub> = the Net Energy Output (in kWh) delivered for such Billing Period exceeding MAAQ of such Contract Year

**G1.3 NON-ACCEPTANCE PAYMENT**

The Non-Acceptance Payment shall be calculated as follows:

|                               |   |
|-------------------------------|---|
| <b>NON-ACCEPTANCE PAYMENT</b> | $NAP = \frac{0.7 \times EAA}{n_{np}} \times ER \times 1000 \times h_{np}$ |
|-------------------------------|---|

where:

- NAP = the Non-Acceptance Payment in RM payable by SESB to SPP
- EAA = the estimated annual availability (in MWh), being
- (a) the Declared Annual Quantity for the first, second and third Contract Years in the Term; or
  - (b) the average annual quantity of metered Net Energy Output in the three (3) Contract Years immediately preceding that Contract Year
- ER = the Net Electrical Output generated and delivered by SPP and accepted by SESB in excess of the Maximum Allowable Quantity in any Contract Year
- $n_{np}$  = the actual number of hours in that Contract Year
- $h_{np}$  = the actual number of whole hours SESB fails or refuses to accept Net Electrical Output delivered at the Connection Point

**G1.5 NON-DELIVERY PAYMENT**

The Non-Delivery Payment shall be calculated as follows:

|                             |   |
|-----------------------------|---|
| <b>NON-DELIVERY PAYMENT</b> | $NDP = ER \times [(0.7 \times DAQ) - TNEO] \times 1000$ |
|-----------------------------|---|

where:

- ER = the Net Electrical Output generated and delivered by SPP and accepted by SESB in excess of the Maximum Allowable Quantity in any Contract Year
- NDP = the Non-Delivery Payment in RM payable by SPP to SESB
- DAQ = the Declared Annual Quantity in MWh of such Contract Year
- TNEO = the total Net Energy Output (in MWh) delivered in that Contract Year

**ATTACHMENT 1; DAQ & MAAQ TABLE**

| <b>Contract Year</b> | <b>Declared Annual Quantity (DAQ)</b> | <b>Maximum Annual Allowable Quantity (MAAQ)</b> |
|----------------------|---------------------------------------|---|
| <b>1</b>             |                                       |   |
| <b>2</b>             |                                       |   |
| <b>3</b>             |                                       |   |
| <b>4</b>             |                                       |   |
| <b>5</b>             |                                       |   |
| <b>6-10</b>          |                                       |   |
| <b>11-15</b>         |                                       |   |
| <b>16-20</b>         |                                       |   |
| <b>21</b>            |                                       |   |

**Note: The DAQ and MAAQ beyond 5<sup>th</sup> contract year shall be established based on the revised contracted capacity to be ascertained on the 5<sup>th</sup>, 10<sup>th</sup>, 15<sup>th</sup> and 20<sup>th</sup> Contract Year**

FOR RFP PURPOSES ONLY

APPENDIX H

OPERATION AND MAINTENANCE

FOR RFP PURPOSES ONLY

**H1.0 GENERAL**

All capitalised terms shall have the meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except where as otherwise defined herein.

**H2.0 OPERATION AND MAINTENANCE OF THE FACILITY****H2.1 General**

H2.1.1 SPP shall operate and maintain the Facility in accordance with (i) the requirements of this Agreement, (ii) the operating and maintenance standards recommended by the EPC Contractor in the relevant manuals provided to it, (iii) the Design Limits and (iv) Prudent Utility Practices.

H2.1.2 The operation of the interconnection facilities and/or synchronizing circuit breaker shall operate as described in the IOM.

H2.1.3 SPP shall operate the Facility in parallel with the Distribution Network during the Term.

H2.1.4 All solar photovoltaic energy delivered by SPP to SESB from the Facility shall have, at the Connection Point, the electrical characteristics set forth in Appendix B.

H2.1.5 Throughout the Term, SPP shall maintain (i) a maintenance log setting forth, inter alia, all maintenance and inspection works performed on the Facility, (ii) an operations log in accordance with Clause 8.10 (*Operation Log*) of this Agreement and (iii) any other records customarily maintained by solar power producers and operators of solar photovoltaic generating facilities.

**H2.2 Planned Outages**

H2.2.1 SPP shall use its best endeavours to coordinate planned outages with SESB.

H2.2.4 The maintenance of interconnection facilities shall be mutually coordinated between SPP and SESB, and scheduled to minimize the number of outages required.

H2.2.5 SPP has full responsibility for the maintenance of the Facility as described in the Appendix E.

H2.2.6 Complete maintenance records shall be maintained by SPP and SPP shall make available such records for SESB's review during normal business hours upon receipt of 24 hours' written notice from SESB.



**H2.3 Revalidation Report**

H2.3.1 SPP shall on the tenth (10<sup>th</sup>) and fifteenth (15<sup>th</sup>) anniversary of the Commercial Operation Date submit to SESB an Independent Engineer's certificate certifying that the Facility continues to have the capacity and capability to meet the Contracted Capacity and conform to the electrical characteristics and meet the operational standards as set out in Appendix B, together with the test results showing that effect.

**H2.4 Access to the Facility and Site**

H2.4.1 Without prejudice to any of SESB's other rights of access to the Facility set out in this Agreement, SPP authorises and empowers SESB and its authorised employees, representatives and/or agents to have access to the Facility and the Site, upon reasonable prior notice (given the circumstances then prevailing) and subject to SPP's safety rules and regulations, (i) for the purpose of reading and maintaining the SESB Metering Equipment, or (ii) for the purpose of examining, repairing or removing any or SESB's property, including the SESB Metering Equipment.

H2.4.2 In the event that SESB reasonably believes that the Facility, SPP Interconnection Facility and/or the SPP Interconnector does not have sufficient safety and protection systems in place in accordance with this Agreement and Prudent Utility Practices such that the continued operation of the Facility would pose an imminent danger to any part of the Distribution Network, SESB may undertake an inspection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector either (i) immediately, in the event of an imminent danger (including the simultaneous disconnection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector from the Distribution Network) or (ii) upon having served forty-eight (48) hours' prior written notice to SPP, with reasons therefor, in all other circumstances (but without the simultaneous disconnection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector from the Distribution Network).

H2.4.3 Each Party shall bear its own costs and expense that may be incurred in connection with such inspection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector by SESB. SESB shall not be liable to SPP for any damage caused to the Facility, SPP Interconnection Facility and/or the SPP Interconnector by in the event of an immediate disconnection of the Facility, SPP Interconnection Facility and/or the SPP Interconnector.

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**APPENDIX I**

**DESCRIPTION OF SITE**

FOR RFP PURPOSES ONLY

**11.0 General**

All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.

**12.0 Description of Site**

[To be Provided by SPP]

**13.0 Site Meteorological Conditions**

The following data are indicative of the Site:

|                             |   |
|-----------------------------|---|
| Atmospheric Pressure        | : |
| Ambient air temperature     | : |
| Relative Humidity range     | : |
| Yearly Average Humidity     | : |
| Temperature range           | : |
| Yearly average temperature  | : |
| Rainfall                    | : |
| Basic Wind speed            | : |
| Seismic acceleration        | : |
| Isoceraunic level           | : |
| Ground Level (GL) $\pm$ 0.0 | : |
| Solar Radiance              | : |

**14.0 Marine Conditions**

## 4.1 River Water

The quality of river water at the Site is as shown below:-

|                                 |                           |  |
|---------------------------------|---------------------------|--|
| pH                              |                           |  |
| Conductivity                    | $\mu$ S/cm                |  |
| Total Solid                     | ppm.                      |  |
| Total-Alkalinity                | ppm. as CaCO <sub>3</sub> |  |
| Chloride                        | ppm. as Cl                |  |
| Total Hardness                  | ppm. as CaCO <sub>3</sub> |  |
| Calcium                         | ppm. as Ca                |  |
| Magnesium                       | ppm. as Mg                |  |
| Sulphate                        | ppm. as SO <sub>4</sub>   |  |
| Total Iron Ion                  | ppm. as Fe                |  |
| River Water Temperature         | °C                        |  |
| Specific Gravity of River Water |                           |  |

|                              |  |  |
|------------------------------|--|--|
| Specific Heat of River Water |  |  |
|------------------------------|--|--|

## 4.2 River Tide Level

|   | Height (m) |
|---|------------|
| Highest Astronomical Tide (HAT)         |            |
| Mean High Water Springs (MHWS)          |            |
| Mean High Water Neaps (MHWN)            |            |
| Mean River Level (MSL)                  |            |
| Malaysian Land Survey Datum (MLSD = EL) |            |
| Mean Low Water Neaps (MLWN)             |            |
| Mean Low Water Springs (MLWS)           |            |
| Lowest Astronomical Tide (LAT)          |            |

FOR RFP PURPOSES ONLY

**APPENDIX J**

**CONSEQUENCES OF TERMINATION**

FOR RFP PURPOSES ONLY

## J1.0 Definitions

All capitalised terms shall have the same meanings given to them in Clause 1.1 (*Defined Terms*) of this Agreement except as otherwise defined herein.

When used herein, the defined terms set forth below shall have the following meanings:

**“Adjusted Transfer Amount”** means the Transfer Amount as adjusted pursuant to Section J.2.6(b) of this Appendix J;

**“Affiliate”** means, in relation to any person at a particular time:

- (i) any person who directly or indirectly Controls, or who owns beneficially more than 50% of the issued share capital (or equivalent securities) of, that person; or
- (ii) any Subsidiary of that person; or
- (iii) any other person who is Controlled by any person described in (i) above;

**“Auditor”** means a firm of auditors to be selected in accordance with the provisions of Section J.3 of this Appendix J;

**“Calculation Date”** means the date of termination of this Agreement as specified in the Purchase Notice;

**“Corporate Tax”** means, for any Financial Year, the aggregate income tax payable by SPP on its income for that Financial Year, whether in Malaysia or elsewhere, excluding any provision for deferred taxation as determined in accordance with Section 6 of the Income Tax Act 1967;

**“Financial Year”** means the accounting period used by SPP in respect of the operations of SPP as agreed by its Board of Directors and as presented to its annual general meeting, irrespective of whether that accounting period is a calendar year or not;

**“Interest on Sponsors Gross Equity Contribution”** means the aggregate amount determined by applying the Default Rate to each amount comprising the Sponsors Gross Equity Contribution for the period from the date of injection of such amount of the Sponsors Gross Equity Contribution to the Calculation Date;

**“Outstanding Indebtedness”** means the lesser of:-

- (i) the aggregate amount at the Calculation Date of all amounts owing to the Financing Parties (other than any amounts owing to the shareholders of SPP and their respective Affiliates) as incurred under the Initial Financing Documents and as amortised in accordance thereunder and reflected in the Initial Financial Model; and

- (ii) the aggregate amount at the Calculation Date of all amounts owing to the Financing Parties (other than any amounts owing to the shareholders of SPP and their respective Affiliates) as incurred under the Financing Documents;

including any reasonable costs and fees related to accelerated repayment and other financing termination costs, but excluding any costs and fees relating to the Sponsors Gross Equity Contribution;

**“Purchase Notice”** means a notice given by SESB pursuant to Clause 15.4(a) or a notice given by SPP pursuant to Clause 15.4(b) of this Agreement;

**“Retained Sum”** means an amount certified by the Auditor as being the aggregate of the cash balances at bank and in hand and liquid securities held by SPP and to be retained by SPP after the Calculation Date;

**“Sponsors Gross Equity Contribution”** means an amount certified by the Auditor as at the Calculation Date as being the lesser of:-

- (i) the aggregate of all registered and paid-up share capital issued by SPP and any share premia received by SPP, the subscription price received by SPP for all loan stocks, bonds and redeemable preference shares issued by SPP to its shareholders and their respective Affiliates, all loans (whether secured, unsecured or subordinated) received by SPP from its shareholders and their respective Affiliates and all other forms of capital contributed on or before the Calculation Date by the shareholders of SPP and their respective Affiliates for financing the Project, as committed by SPP, its shareholders and their respective Affiliates at the Financial Closing Date in accordance with the Initial Financing Documents; and
- (ii) the aggregate of all registered and paid-up share capital issued by SPP and any share premia received by SPP, the subscription price received by SPP for all loan stocks, bonds and redeemable preference shares issued by SPP to its shareholders and their respective Affiliates, all loans (whether secured, unsecured or subordinated) received by SPP from its shareholders and their respective Affiliates and all other forms of capital contributed on or before the Calculation Date by the shareholders of SPP and their respective Affiliates for financing the Project, as outstanding as at the Calculation Date;

**“Sponsors Equity Repayment”** means an amount certified by the Auditor as being equal to the aggregate of:-

- (i) the sum of all dividend, distribution, interest, profit, fee, premium, charges and other payments in respect of the Sponsors Gross Equity Contribution, actually paid by or on behalf of SPP; and
- (ii) the sum of all re-payment, pre-payment, redemption, re-purchase, return, and other payments in respect of the Sponsors Gross Equity Contribution, actually paid by or on behalf of SPP;

“**Subsidiary**” means, with respect to any person, at any particular time, any person which is directly or indirectly Controlled, or more than 50% of whose issued share capital (or equivalent securities) is then beneficially owned, by that person;

“**Taxes**” means any form of taxation, duty, levy, impost, charge or other similar contribution created or imposed by any state, federal or local government in Malaysia, including any related penalty, interest, fine or surcharge that become payable by SPP as a result of the purchase of the Project by SESB, but excluding any Corporate Tax;

“**Transfer Amount**” means the relevant amount payable by SESB for the transfer by LSD Developer to SESB of the Project, the Site (including the Access Rights) and all the rights and interests related thereto, pursuant to and calculated in accordance with this Appendix J, prior to the adjustment pursuant to Section J.2.6; and

“**Transfer Costs**” means an amount equal to all reasonable costs and expenses of SPP which are incurred or suffered as a result of the purchase of the Project by SESB, including any termination payments or novation fees on contracts in connection with the Project whose terms are reasonable and customary for private power projects such as the Project or were specifically approved by SESB, and all Taxes, any reasonable breakage costs and fees, any registration fees and other reasonable and necessary termination costs that become payable by SPP as a result of the purchase of the Project by SESB, but excluding the Outstanding Indebtedness.

## **J2.0 Purchase Price of Project**

### **J2.1 Purchase after termination for a SPP Event of Default**

- (a) If SESB terminates this Agreement pursuant to Clause 15.3 (*Right to Terminate; Additional Rights*) of this Agreement and it has given a Purchase Notice pursuant to Clause 15.4(a) of this Agreement, SESB shall pay an amount equal to:
- (i) 95% of the Outstanding Indebtedness; **plus**
  - (ii) the “A” Purchase Price as set out in Attachment A of this Appendix J; **plus**
  - (iii) the Transfer Costs; **less**
  - (iv) the Retained Sum.
- (b) Upon payment in full by SESB of the amount set out in J.2.1(a), all SPP’s rights, title and interest in the Project and the Site (including the Access Rights) shall simultaneously be transferred by SPP to SESB (or its nominees) free from any encumbrance whatsoever.



**J2.2 Purchase after termination for a SESB Event of Default**

- (a) If SPP terminates this Agreement pursuant to Clause 15.3 (*Right to Terminate; Additional Rights*) of this Agreement and SESB is required to purchase the Project pursuant to Clause 15.4(b) of this Agreement, SESB shall pay an amount equal to:

Pre-Commercial Operation Date

- (i) the Outstanding Indebtedness; **plus**
- (ii) the Sponsors Gross Equity Contribution; **plus**
- (iii) the Interest on Sponsors Gross Equity Contribution; **plus**
- (iv) the Transfer Costs; **less**
- (v) the Retained Sum.

Post-Commercial Operation Date

- (i) the Outstanding Indebtedness; **plus**
- (ii) the "B" Purchase Price as determined in accordance with Attachment A of this Appendix J; **plus**
- (iii) the Transfer Costs; **less**
- (iv) the Retained Sum.

- (b) Upon payment in full by SESB of the amount set out in J.2.2(a), all SPP's rights, title and interest in the Project and the Site (including the Access Rights) shall simultaneously be transferred by SPP to SESB (or its nominees) free from any encumbrance whatsoever.

**J2.3 Transfer of Project**

- (a) When SPP transfers all rights, title and interests in the Project and the Site (including the Access Rights) to SESB (or its nominees) pursuant to section J.2.1 or J.2.2 of this Appendix J, the transfer shall (to the extent practicable) include all of SPP's right, title and interest in:-

- (i) all raw materials, consumables and spare parts;
- (ii) all tangible personal property;
- (iii) all buildings and fixtures;
- (iv) computerised and non-computerised records, reports, data, files and information;
- (v) all drawings, test results and operation and maintenance manuals;

- (vi) all warranties of equipment, materials and work;
  - (vii) all contract rights and insurance policies;
  - (viii) all work in progress under contracts with vendors, suppliers, contractors and subcontractors;
  - (ix) all rights with respect to any insurance proceeds payable to or for the account of SPP, but unpaid at the date of termination of this Agreement, in respect of SPP's right, title and interest in the Project;
  - (x) all user rights, licences, sub-licences or other rights in respect of all patents, trade marks, registered designs, design rights, applications for any of the foregoing, copyrights, trade or business names, inventions, processes, know-how and other industrial property rights purported to be used or required by or in respect of the Facility; and
  - (xi) for the avoidance of doubt, the Facility, the Interconnection Facilities, all plant, equipment and machinery including all power generation and transmission plant, equipment and machinery.
- (c) SPP shall sign all assignments, agreements, licences, sub-licences and other documents in a form required by SESB and procure relevant third parties to sign such documents so as to transfer all rights, title and interest in the Project and the Site (including the Access Rights) to SESB (or its nominees) free of encumbrances and SPP shall take all reasonable steps and actions considered by SESB to be necessary or desirable to procure that these rights, title and interest in the Project and the Site (including the Access Rights) are transferred to SESB (or its nominees) free of encumbrances.

#### **J2.4 Redemption of Encumbrance over the Project**

- (a) Where the Outstanding Indebtedness is payable pursuant to J.2.1 or J.2.2, it shall be paid by SESB directly to the Financing Parties (other than the shareholders of SPP and their respective Affiliates) whose receipt shall be a good discharge for SESB and the Outstanding Indebtedness shall thereby be deemed to have been paid to SPP. Payment of the Outstanding Indebtedness shall, where required by SESB, be in exchange for a transfer or assignment to SESB (or its nominees) of all rights, title and interests in the Initial Financing Documents (other than those in respect of the Sponsors Gross Equity Contribution), documented and evidenced to the satisfaction of SESB.
- (b) Where required by SESB, SPP shall procure that the Financing Parties discharge all securities and other encumbrances given on or over the Project and the Site (including the Access Rights) in exchange for the payment of the Outstanding Indebtedness. For this purpose, SPP shall procure that the Financing Parties sign all re-assignments, discharge of charge, agreements, and other documents in a form required by SESB so as to transfer all rights, title and interest in the Project and the Site (including the Access Rights) to SESB (or its nominees) free of encumbrances and SPP shall procure that the Financing Parties shall take all steps and actions

considered by SESB to be necessary or desirable to procure that all rights, title and interest in the Project and the Site (including the Access Rights) are transferred to SESB (or its nominees) free of encumbrances.

### **J2.5 Transfers Amount**

- (a) Not later than the Calculation Date, SPP shall provide to SESB and the Auditor for verification, a statement setting out the following information as at the Calculation Date:
- (i) the actual outstanding principal amount of the debt facilities provided by the Financing Parties pursuant to the Financing Documents;
  - (ii) the sum of all dividend, distribution, interest, profit, fee, premium, charges and other payments paid by SPP in respect of the Sponsors Gross Equity Contribution;
  - (iii) the sum of all repayment, redemption, re-purchase, return, and other payments made by SPP in respect of the Sponsors Gross Equity Contribution;
  - (iv) its calculation of the amount due to SPP pursuant to this Appendix J, together with detailed workings; and
  - (v) all supporting information (including those reasonably requested by SESB) to enable SESB to verify the amounts referred to in Section J.2.5(a)(i) to (a)(iv) above.
- (b) The Parties shall use reasonable endeavours to agree the Transfer Amount and the Adjusted Transfer Amount. In the event the Parties are unable to reach agreement on the Transfer Amount and the Adjusted Transfer Amount within thirty (30) days after the date of submission of the material referred to in Section J.2.5(a) above, the determination of the Transfer Amount and the Adjusted Transfer Amount shall be resolved in accordance with Clause 18 (*Dispute Resolution*) of this Agreement.

### **J2.6 Adjustment**

- (a) The Parties shall agree a date for the transfer of the Project, the Site (including the Access Rights) and other rights and interests of SPP pursuant to this Appendix J, failing which the date of such transfer shall be thirty (30) days after the Adjusted Transfer Amount is agreed between the Parties or is resolved in accordance with Clause 18 (*Dispute Resolution*) of this Agreement.
- (b) The Transfer Amount shall be adjusted as follows:
- (i) when SESB has paid any amount to SPP during the period between the Calculation Date and the Transfer Date, the Transfer Amount shall be reduced by such amount to avoid double counting; or
  - (ii) where SESB has not paid any amount to SPP during the period between the Calculation Date and the Transfer Date, there shall be added the amount representing the carrying costs of the Transfer Amount.

**J3.0 The Auditor**

- (a) The Auditor shall be appointed by agreement between the Parties or failing agreement by the President for the time being of the Malaysian Institute of Accountants upon an application made by any Party. The Auditor's cost and expenses shall be borne as to 50% by SPP and 50% by SESB.
- (b) SPP shall procure that the Auditor has access to all the books and records of SPP for the purposes of enabling the Auditor to make the relevant certifications and decisions.
- (c) The Parties shall use their respective best endeavours to ensure that the Auditor certifies the amount of the Outstanding Indebtedness, the "B" Purchase Price, the Sponsors Gross Equity Contribution, the Interest on Sponsors Gross Equity Contribution, the Retained Sum or the Transfer Costs as required for the purposes of Section J.2. The Auditor shall act as an expert and not as an arbitrator to the intent that the Auditor's certification or decision in the absence of manifest error shall be final and binding upon the Parties.

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**Attachment A to Appendix J**

**Determination of Purchase Prices**

**JA.1 Purchase according to Section J2.1**

The "A" Purchase Price shall be equal to ten Ringgit (RM 10).

**JA.2 Purchase according to Section J2.2**

To determine the "B" Purchase Price, the following equation shall be used:

"B" Purchase Price = QR + SEC – SER, provided that if it results in a negative number, the "B" Purchase Price shall be zero.

Where:

SEC = the sum of all Sponsors Gross Equity Contribution paid to SPP prior to the Calculation Date.

SER = the sum of all Sponsors Equity Repayment paid on or prior to the Calculation Date.

QR = the quarterly return on the SEC, calculated in accordance with the following formula:

$$QR = \sqrt[N]{\left[ \left( \sum_{n=1}^N (SEC_n - SER_n) \right) \xi (1 + X\%)^{(N-n)/4} \right]} - \left( \sum_{n=1}^N (SEC_n - SER_n) \right)$$

Where:

SEC<sub>n</sub> = (i) the sum of all Sponsors Gross Equity Contribution paid to SPP within calendar quarter *n*, or  
 (ii) zero (0), if the cumulative sum of all Sponsors Gross Equity Contribution paid to SPP in each of the full calendar quarters prior to (and including) calendar quarter *n* is greater than SEC.

SER<sub>n</sub> = the sum of all Sponsors Equity Repayment paid within calendar quarter *n*.

*n* = an index, from 1 through to N, representing each of the full calendar quarters occurring since the Effective Date.

N = the aggregate number of full calendar quarters occurring between the Effective Date and the Calculation Date (both dates inclusive).

- X = the lower of:
- (a) nine per cent (9%), and
  - (b) Project returns as in the Initial Financial Model.

For this purpose, a calendar quarter means a period of three (3) months ending on 31 March, 30 June, 30 September and 31 December.

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APPENDIX K

INDEPENDENT ENGINEER

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**K1. DEFINITIONS**

All capitalised terms shall have the meanings given to them in Clause 1.1 of this Agreement except as otherwise defined herein.

**ROLE AND FUNCTION**

K1.1 The IPP shall engage a reputed Independent Engineer who has relevant technical experiences in carrying out the following services:

- i) Review and confirm stage 1 and stage 2 power system studies (PSS) reports to SESB.
- ii) Review and confirmation of conditions precedent as detailed in the PPA requirements.
- iii) Inspect Facility and Interconnection Facilities during construction, testing and commissioning.
- iv) Provide ad hoc assistance on technical matter during design, engineering, construction, testing and commissioning.
- v) Attend technical meetings as and when required.
- vi) Issue clearance certificates.
- vii) Submit six (6) sets of review and confirmation reports to SESB for each stage of services as shown below.

**Stage 1 – Commencement Date**

Prior to Commencement Date the Independent Engineer shall review the Stage 1 power system study (pss) report, conceptual design reports and accompanying drawings provided by the IPP to ensure that:

- (a) The stage 1 PSS using generic models conducted by the IPP confirm the verification of the impact of the Facility and Interconnection Facilities on the existing Distribution System/Network.
- (b) The design conforms to the description of the Facility, Interconnection Facilities, specific scopes and responsibilities and technical and design standards, requirements and operating characteristics set forth in this Agreement in all material respects.
- (c) The design will meet the requirements for supplying reactive power and providing voltage regulation and frequency control at the Facility within the specified power factor range and frequency and capability of the solar PV plant.
- (d) The design meets the technical guidelines and performance standards for parallel operation as set forth in the description and requirements of the Interconnection Facilities set forth in the Agreement.



The Independent Engineer shall submit confirmation of the above review according to the PPA requirements in writing.

#### Stage 2 – Initial Operation Date

Prior to Initial Operation Date, the Independent Engineer shall review and certify the following to confirm that the Facility and the Interconnection Facilities have been designed, engineered, constructed and tested to accordance with the relevant Grid Code and Distribution Code, Prudent Utility Practices, specific scopes and responsibilities, technical standards and requirements and operating characteristics, the terms of this Agreements and the design documents and drawings submitted to SESB after detailed engineering work. The reviewed documents shall be issued in stages based on schedules of the Project as listed below:

- (a) The stage 2 PSS using manufacture's comprehensive models conducted by the IPP confirms the Facility has the capability and capacity to the minimum requirements for performance, operation and safety of the relevant Grid Code and Distribution Code, technical standards, design and technical requirements/specifications and operating characteristics set forth in this Agreement.
- (b) The reports on equipment manufacturing quality control and assurance, type tests and routine tests for the Facility and the Interconnection Facilities including communication system equipment.
- (c) Protection coordination (relay settings and grading) study report.
- (d) The construction and installation report including SAFCA and site testing, pre-commissioning and commissioning procedures and records and permit to works.
- (e) Verification tests reports
- (f) Solar PV plant performance/capacity test reports.
- (g) Testing procedures for determining Contracted Capacity and Revised Contracted Capacity.
- (h) Interconnection Operation Manual (IOM)
- (i) Commissioning , start-up and testing programs
- (j) Six (6) sets of Interconnection Facility including communication facility as-built O&M manuals and drawings respectively in hard copies properly prepared and documented before hand over to SESB.
- (k) Two (2) sets of Interconnection Facility including communication facility As-Built O&M manuals and drawings respectively in soft copies in DVD-ROM format properly prepared and documented before hand over to SESB.

- (1) The Independent Engineer shall submit confirmation of above review and issue clearance certificates that the Facility and Interconnection Facilities are safe and ready for initial energization and commissioning.

### Stage 3 – Commercial Operation Date

The Independent Engineer shall submit confirmation of the above review reports in a timely manner to SESB prior to issuing completion certificates for Commercial Operation Date of the Facility and the Interconnection Facilities.

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APPENDIX L

TECHNICAL PARTICULARS

FOR RFP PURPOSES ONLY

[TO BE PROVIDED BY SPP AND SESB]

FOR RFP PURPOSES ONLY

APPENDIX M

DRAWINGS

FOR RFP PURPOSES ONLY

[TO BE PROVIDED BY SPP AND SESB]

FOR RFP PURPOSES ONLY

**APPENDIX N**

**ENERGY RATE REVIEW AND  
ADJUSTMENTS AND INITIAL  
FINANCIAL MODEL**

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**N1. Input Data**

N1.1 The Input Data to be supplied by SPP to the Suruhanjaya Tenaga and SESB pursuant to Clause 7 shall include:

- (a) details of the costings for construction of the Project on an open book basis by SPP under the EPCC Contract together with a report containing reasons for selecting the EPCC Contractor and supported by at least three (3) competitive quotes from different, unaffiliated organisations, of which at least two (2) should be from and through organisations which are not Affiliates of SPP. SPP shall additionally ensure that it obtains and provides to the Suruhanjaya Tenaga and SESB a report confirming that competitive quotes have been obtained;
- (b) the amount and details of any incentive of whatsoever nature provided by any Government Entity;
- (c) any other information that may be reasonably requested by SESB and the Suruhanjaya Tenaga and relevant to the revision of the Financial Model;
- (d) the values to be input into the relevant cells of the Financial Model; and
- (e) all data in support of and to verify the information and material specified above.

**I2. Principles to be applied at the time of revision of Financial Model**

I2.1 SESB and the Suruhanjaya Tenaga shall be entitled to revise the Initial Financial Model and any Updated Input Financial Model on the occurrence of any Financial Model Input Adjustment Event.

I2.2 While revising the Initial Financial Model and any Updated Input Financial Model, any savings in Project cost under the EPCC Contract and any incentive of whatsoever nature provided by any Government Entity (other than investment tax allowance from the relevant Government Entity, subsidies on its financing and incentive granted in relation to the Site), shall be taken into account for determining the Energy Rate while anchoring the project return assumed in the Initial Financial Model or specified in any Updated Input Financial Model, as the case may be, which shall not exceed nine per cent (9%). For the avoidance of doubt, the adjusted Energy Rate shall at no time during the Term be higher than the Energy Rate.

I2.3 While revising the Initial Financial Model and any Updated Input Financial Model, the inputs to be used for such revision shall be exclusive of goods and services tax, unless otherwise clearly stated that they are intended to be goods and services tax inclusive.



Initial Financial Model

**[TO BE PROVIDED BY SPP]**

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APPENDIX O

LETTER OF AWARD

FOR RFP PURPOSES ONLY

APPENDIX P

POWER SYSTEM STUDY  
(PSS)

FOR RFP PURPOSES ONLY

# 1. Power System Study (PSS)

## 1.1 Objectives of PSS

- a) To identify connection scheme options (and configurations) for the LSS plant to be connected to the Distribution Network.
- b) To investigate the impact of the LSS power generation to the Distribution Network
- c) To assess LSS compliance with the technical requirements in Malaysian Distribution Code (MDC) as may be applicable and the Sabah and Labuan Distribution Code (SLDC).

## 1.2 Scope of PSS

DL will perform the PSS using any one of the simulation softwares – PSS ADEPT, PSS Sincal, PSSE by Siemens, DigSilent by Powerfactory

Scope of PSS includes:

- Adequacy – penetration limit
- Powerflow analysis
- Short circuit analysis
- Redundancy study
- Operational constraints & limitations
- Interconnection method & scope of work

In evaluating the LSS connection, the operational flexibility of the network is not to be compromised.

## 1.3 PSS Information Requirements

LSS developers are required to furnish the following technical information as in Table 1 together with the proposal.

**Table 1: PSS Information Requirements**

|   | Requirements |
|---|--------------|
| <b>Design</b>                           |              |
| Single Line Diagram (SLD) <sup>1</sup>  | ✓            |
| Plant layout drawings                   | ✓            |
| Installed capacity <sup>2</sup>         | ✓            |
| Maximum output <sup>3</sup>             | ✓            |
| Maximum Annual Allowable Quantity [MWh] | ✓            |
| Expected COD                            | ✓            |
| <b>Equipment</b>                        |              |
| Inverter datasheet                      | ✓            |
| PV panel/module datasheet               | ✓            |
| Site & location layout                  | ✓            |
| Proximity to nodal point                | ✓            |
| Declarations compliance to standards    | ✓            |

<sup>1</sup> SLD shall be endorsed by the Professional Engineer and qualified GCPV system designer

<sup>2</sup> Total rating of PV plant in MW

<sup>3</sup> Maximum plant export capacity in MW

- All applications will be processed in the order in which they are received. Incomplete applications will not be accepted and will be returned to the person submitting the application.
- DL will issue invoice for application processing fee. The payment of invoice can be made at any DL payment outlet and a copy of payment receipt must be sent to the DL.
- Application processes and the relevant forms and fees are subject to change without prior notice.

#### 1.4 Submission of PSS Application

All applications for connection of LSS plant to the Distribution Network shall be submitted to the respective DL offices:

|      |   |
|------|---|
| SESB | Sustainable Energy Department,<br>Level 4, Wisma SESB,<br>Jalan Tunku Abdul Rahman,<br>88673 Kota Kinabalu, Sabah<br>Telephone : 08-8282699 |
|------|---|

#### 1.5 PSS Validity

The PSS report is valid only for 1 cycle of bidding process. No extension of PSS report is allowed.

#### 1.6 Guideline and Criteria to be used for PSS

The PSS results are to comply with relevant requirements in the MDC as may be applicable and SLDC.

Any violation to the codes and standards pertaining to the LSS connection are to be highlighted and mitigation action(s) shall be recommended accordingly in the report.

**EXHIBIT 1  
FORM OF BANK GUARANTEE**

FOR RFP PURPOSES ONLY

## FORM OF BANK GUARANTEE

TO: **SABAH ELECTRICITY SDN BHD (Company No. 462872-W)**  
Jalan Tunku Abd Rahman  
88673 Kota Kinabalu  
Sabah

## WHEREAS:

- (A) By a power purchase agreement dated [•] (**Power Purchase Agreement**) entered into between **SABAH ELECTRICITY SDN BHD (Company No. 462872-W) (SESB)** and [•] (**Company No. [•]) (SPP)**, SPP has agreed to design, construct, own, operate and maintain a solar photovoltaic energy generating facility with a capacity of [•]MWac to be located in [•] to generate and deliver solar photovoltaic energy to SESB upon the terms and conditions contained in the Power Purchase Agreement.
- (B) Under Clause 6.5 (*Establishment of Security*) of the Power Purchase Agreement, SPP is obliged to provide a bank guarantee to SESB as security for the due performance by SPP of its obligations under the Power Purchase Agreement.

In consideration of SESB accepting our obligations herein contained in discharge of SPP's obligation to provide such bank guarantee, we, [full name and address of bank] hereby irrevocably and unconditionally agree to pay to you an amount up to Ringgit Malaysia [•] (RM) only (**Guaranteed Amount**) and accordingly covenant with you and agree as follows:

1. Upon receipt of a written demand made by you upon us from time to time or at any time and without being entitled or obliged to make any enquiry either of you or of SPP, and without the need for you to take legal action against or to obtain the consent of SPP, and notwithstanding any objection by SPP and without any further proof or conditions and without any right of set-off or counterclaim, we shall forthwith pay to you the amount or amounts specified in such demand or demands, not exceeding in aggregate the Guaranteed Amount; it being confirmed that you may make as many separate demands hereunder as you think fit. Such payment or payments shall be made by transfer to an account in your name at such bank in such place as you shall direct. You shall not be obliged to exercise any other right or remedy you may have before making a demand under this Bank Guarantee.
2. Your demand shall be conclusive evidence of our liability to pay you and of the amount of the sum or sums which we are liable to pay to you. Our obligation to make payment under this Bank Guarantee shall be a primary, independent and absolute obligation and we shall not be entitled to delay or withhold payment for any reason. Our obligations hereunder shall not be affected by any act, omission, matter or thing which but for this provision might operate to release or otherwise exonerate us from our obligations hereunder in whole or in part, including without limitation and whether or not known to us or you:
  - (a) any time or waiver granted to SPP or any other person;

- (b) the taking, variation, compromise, renewal or release of or refusal or neglect to perfect or enforce any rights, remedies or securities against SPP or any other person;
  - (c) any legal limitation, disability or incapacity relating to SPP or any other person;
  - (d) any dispute between you and SPP or any allegation that SPP has claims against you or any objection or representation made to us by SPP;
  - (e) any variation of or amendment to the Power Purchase Agreement or any other document or security so that references to the Power Purchase Agreement in this Bank Guarantee shall include each such variation and amendment to the Power Purchase Agreement;
  - (f) any unenforceability, invalidity or frustration of any obligations of SPP or any other person under the Power Purchase Agreement or any other document or security; and
  - (g) any other fact, circumstance, provision of statute or rule of law which might, were our liability to be secondary rather than primary, entitle us to be released in whole or in part from our undertaking.
3. This Bank Guarantee shall continue to remain valid and full force and effect until [•], being the date after the expiration of one hundred and ninety (190) days from the Scheduled Commercial Operation Date. If you give us a written and signed notice on or before the date of expiration of this Bank Guarantee or any subsequent extension thereof pursuant to the stipulation to extend the Bank Guarantee, we shall: (i) automatically extend the Bank Guarantee for the period requested from the original date of expiration of this Bank Guarantee or from the expiration date of the extension(s) which may have been subsequently made as indicated in the request for extension, or (ii) pay you the undrawn amount of this Bank Guarantee.
4. Any payment made hereunder shall be made free and clear of, and without deduction or set-off for or on account of any liability whatsoever including, without limitation, any present or future taxes, duties, charges, fees, deductions or withholdings of any nature whatsoever and by whomsoever imposed.
5. The benefit of this Bank Guarantee and all rights and powers hereunder may be assigned by you.
6. Capitalised expressions used in this Bank Guarantee, which are not otherwise defined herein, shall have the meanings attributed to them in the Power Purchase Agreement.
7. This Bank Guarantee shall be governed by and construed in accordance with the laws of Malaysia and we hereby agree to submit to the exclusive jurisdiction of the Courts of Malaysia over any claim arising out of this Bank Guarantee.

**IN WITNESS WHEREOF** this Bank Guarantee has been executed on the [•] day of [•]



The Common Seal of )  
[Bank] was hereunto )  
affixed in the presence of: )

OR

Signed, Sealed and Delivered by )  
for and on behalf of )  
[Bank] in the presence of: )

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**EXHIBIT 2**

**FORM OF DAILY OPERATION**

FOR RFP PURPOSES ONLY

| <p><b>[COMPANY NAME]</b><br/><b>[POWER PLANT NAME]</b></p> |        |        |                  |      |  |                                 |          |         |
|--|--------|--------|------------------|------|--|---------------------------------|----------|---------|
| To: 1. SESB  |        |        |                  | Fax: |  |                                 |          |         |
| <b>DAILY STATION OPERATIONS SUMMARY</b>                    |        |        |                  |      |  |                                 |          |         |
| Date:  |        |        | Day:             |      |  |                                 |          |         |
| TIME   | UNIT 1 | UNIT 2 | UNIT 3           |      |  |                                 | Total MW | Remarks |
| Status   |        |        |                  |      |  |                                 |          |         |
| 0100   |        |        |                  |      |  |                                 |          |         |
| 0200   |        |        |                  |      |  |                                 |          |         |
| 0300   |        |        |                  |      |  |                                 |          |         |
| 0400   |        |        |                  |      |  |                                 |          |         |
| 0500   |        |        |                  |      |  |                                 |          |         |
| 0600   |        |        |                  |      |  |                                 |          |         |
| 0700   |        |        |                  |      |  |                                 |          |         |
| 0800   |        |        |                  |      |  |                                 |          |         |
| 0900   |        |        |                  |      |  |                                 |          |         |
| 1000   |        |        |                  |      |  |                                 |          |         |
| 1100   |        |        |                  |      |  |                                 |          |         |
| 1200   |        |        |                  |      |  |                                 |          |         |
| 1300   |        |        |                  |      |  |                                 |          |         |
| 1400   |        |        |                  |      |  |                                 |          |         |
| 1500   |        |        |                  |      |  |                                 |          |         |
| 1600   |        |        |                  |      |  |                                 |          |         |
| 1700   |        |        |                  |      |  |                                 |          |         |
| 1800   |        |        |                  |      |  |                                 |          |         |
| 1900   |        |        |                  |      |  |                                 |          |         |
| 2000   |        |        |                  |      |  |                                 |          |         |
| 2100   |        |        |                  |      |  |                                 |          |         |
| 2200   |        |        |                  |      |  |                                 |          |         |
| 2300   |        |        |                  |      |  |                                 |          |         |
| 2400   |        |        |                  |      |  |                                 |          |         |
| Total MW   |        |        |                  |      |  |                                 |          |         |
| Remarks  |        |        |                  |      |  |                                 |          |         |
| NR: Shutdown on NLDC request                               |        |        | TR: Unit Tripped |      |  | SR: Shutdown on Station request |          |         |
| NA: Not Available  |        |        | SB: Standby      |      |  |                                 |          |         |
| Declared by:   |        |        |                  |      |  |                                 |          |         |
|  |        |        |                  |      |  | Date/Time:                      |          |         |
| Shift Manager<br>[SOLAR POWER PLANT NAME]                  |        |        |                  |      |  |                                 |          |         |

**EXHIBIT 3**

**TESTING GUIDELINES PRIOR TO COMMERCIAL OPERATION IN SESB GRID  
SYSTEM**

FOR RFP PURPOSES ONLY

|            |  |          |
|------------|--|----------|
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|            |   |          |
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## 1.0 INTRODUCTION

This document contains requirements for Solar Power Plant Tests. The Solar Power Plant test Tests are to be conducted prior to or during commissioning of new Solar Power Plant installations. All tests have to be completed prior to commercial operation of the Solar Power Plants in the SESB Grid System.

Since Solar Power Plant vary in sizes and types over a wide range, it is not practical to write the test requirements in details for each specific Solar Power Plant. As such, this document contains the minimum requirements to be followed by the Solar Power Plant Facility in implementing the Solar Power Plant Tests. These test requirements are neither to be used as an all-inclusive step-by-step testing manual nor as replacement for manufacturer supplied Solar Power Plant test procedures. The requirements shall not restrict the Solar Power Plant Facility from proposing Solar Power Plant test procedures with improved or higher standard of requirements. However, where the minimum requirements are unable to be implemented, the Solar Power Plant Facility to justify the reasons to SESB (as the GSO) and propose alternative recommendations for GSO approval.

Any entity that is contracted to supply, install, and commission and/or operate an electricity generating facility will be referred to as 'Solar Power Plant Facility' and would be required to comply with all the provisions pertaining to Solar Power Plant Tests in this document.

Solar Power Plants that have been in service prior to adoption of these test requirements shall be subject to the minimum requirements of the tests in this document, to complete the GSO data base (i.e. SESB data base) and prove the security of the system.

### 1.1 References

#### (a) Power Purchase Agreement (PPA)

Agreement between SESB (as the GSO) and the Solar Power Plant Facility on the commercial aspects relating to the purchase of the power station output and technical conditions relating to its connection to and performance on the Grid System.

#### (b) SESB Transmission Standards and Code Of Practice

The Solar Power Plant Facility shall comply with provisions of the latest revision of the following SESB Transmission Standards to fulfil Solar Power Plant Test requirements.

- (i) Transmission System Reliability Standards Version 2.0 – 1<sup>st</sup> Edition (2006)
- (ii) Transmission System Power Quality Standards Version 2.0 -1<sup>st</sup> Edition (2006)
- (iii) Transmission Protection & Control Code of Practice – 2<sup>nd</sup> Edition (2003)

#### (c) The Distribution Code

The Solar Power Plant Facility shall comply with the provisions of the latest revision (that is, the version available on the date of test) of the Grid Code for Solar Power Plant requirements not specifically addressed in the Power Purchase Agreement or in contractual agreements with SESB (as the GSO).

(d) LSS Guidelines for Distribution Connected

The Solar Power Plant Facility shall comply with the provisions of the latest revision (that is, the version available on the date of test) of the LSS Guideline published by Energy Commission for Solar Power Plant requirements not specifically addressed in the Power Purchase Agreement, the Distribution Code or in contractual agreements with SESB (as the GSO).

## **2.0 NEW SOLAR POWER PLANT INSTALLATIONS**

### **2.1 Test Procedure (Site-Specific)**

The Solar Power Plant Facility shall submit the following items to SESB for approval prior to test with sufficient lead-time as determined by SESB:

- Site-specific Solar Power Plant test procedures
- Documentation for correction factors and correction curves, if any,
- Calculation methods to be applied to the test results
- Documentation and valid calibration certificates for test equipment, instruments and recorders

The Solar Power Plant Facility shall provide all test equipment, instruments and recorders as identified for each test in Section 3.0, which shall have valid calibration certificates traceable to national or international standards.

### **2.2 Submission of Test Results**

- (a) Test reports for Solar Power Plant Tests shall be submitted for SESB review after each test. Additionally, all test results data tables shall also be submitted in softcopy (MS-Excel file format is preferred).
- (b) SESB will comment on the acceptability of the Solar Power Plant Test results.
- (c) One set (hardcopy) of Official Test Reports and one set (softcopy) compiled on CD in PDF file format shall be submitted to the SESB for review prior to the Commercial Operation Date. Submission of the Official Test Reports to SESB for review is a pre-requisite for the Solar Power Plant Facility to be accepted for Scheduling and Dispatch by the GSO.

### **2.3 Failure of Test Results**

If the results of the Solar Power Plant Tests partly or entirely fail to meet the minimum pass criteria or indicate non-compliance with the test requirements, SESB (as the GSO) shall have the right to reject the test results in part or in total.

### **2.4 Re-Test**

If the reason for failure to meet the requirements of the Solar Power Plant Tests can be readily identified, the Solar Power Plant Facility may at its expense modify the plant equipment to be capable of meeting the requirements and re-test the plant. The GSO shall schedule the re-test.

**2.5 SESB Solar Power Plant Test Committee**

**2.6 Work Flow Prior to Solar Power Plant Test**

**2.7 Work Flow after Solar Power Plant Test**

**2.8 Coordination Meeting**

Coordination meeting between SESB and Solar Power Plant Facility will be held from time to time as required to review and discuss the test procedure, schedule and the test result upon request from either party.

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**3.0 SOLAR POWER PLANT TESTS**

**3.1 Response to Grid Frequency Variation**

3.1.1 Requirements

3.1.2 Objective

3.1.3 Procedure

3.1.4 Pass Criteria

**3.2 Grid Fault Level**

3.2.1 Requirements

3.2.2 Objective

3.2.3 Procedure

3.2.4 Pass Criteria

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**3.3 Grid Fault Detection and Clearing Time Limits**

3.3.1 Requirements

3.3.2 Objective

3.3.3 Procedure

3.3.4 Pass Criteria

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**3.4 Inverter Site Test**

3.4.1 Power Factor Test

3.4.1.1 Requirements

3.4.1.2 Objective

3.4.1.3 Procedure

3.4.1.4 Pass Criteria

3.4.2 Harmonics Test

3.4.2.1 Requirements

3.4.2.2 Objective

3.4.2.3 Procedure

3.4.2.4 Pass Criteria

3.4.3 Voltage Fluctuation Test

3.4.3.1 Requirements

3.4.3.2 Objective

3.4.3.3 Procedure

3.4.3.4 Pass Criteria

3.4.4 Flicker Test

3.4.4.1 Requirements

3.4.4.2 Objective

3.4.4.3 Procedure

3.4.4.4 Pass Criteria

3.4.5 DC Current Injection Test

3.4.5.1 Requirements

3.4.5.2 Objective

3.4.5.3 Procedure

3.4.5.4 Pass Criteria

3.4.6 Anti-islanding Test

3.4.6.1 Requirements

3.4.6.2 Objective

3.4.6.3 Procedure

3.4.6.4 Pass Criteria

3.4.7 Steady State Voltage Measurement at Medium Voltage

3.4.7.1 Requirements

3.4.7.2 Objective

3.4.7.3 Procedure

3.4.7.4 Pass Criteria



**3.5 High Speed and Delayed Auto Reclosing**

3.5.1 Requirements

3.5.2 Objective

3.5.3 Procedure

3.5.4 Pass Criteria

**3.6 Black Start**

3.6.1 Requirements

3.6.2 Objective

3.6.3 Procedure

3.6.4 Pass Criteria

**3.7 Speed Governor Response, Primary MW Response, Secondary MW Response and High Frequency MW Response**

3.7.1 Requirements

3.7.2 Objective

3.7.3 Procedure

3.7.4 Test Patterns

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3.7.5.1 Typical parameters for Solar Power Plant

3.7.5.2 Typical Parameters for Solar Power Plant

3.7.6 MW Output Measurement

3.7.7 Pass Criteria

**3.8 Protection System**

3.8.1 Requirements

3.8.2 Objective

3.8.3 Procedure

3.8.4 Pass Criteria

**3.9 Quality of Service**

3.9.1 Requirements

3.9.2 Objective

3.9.3 Procedure

3.9.4 Measurement and Analysis

3.9.5 Test Method

3.9.5.1 Background harmonics at 33 kV

3.9.5.2 Full Speed No Load Test

3.9.5.3 On Load Test

3.9.6 Data to be measured

3.9.6.1 Background Measurement

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3.9.6.3 On Load (Measurement at both Solar Power Plant Transformer MV side and Solar Power Plant Voltage)

Analysis of data for THD and Voltage Unbalance

3.9.7 Analysis of data for THD and Voltage Unbalance

3.9.8 Pass Criteria

### **3.10 House Load Operation**

3.10.1 Requirements

3.10.2 Objective

3.10.2.1 House Load Operation

3.10.2.2 Dead-Bus Closing

3.9.2.3 Synchronizing to Live-Bus

3.9.3 Procedure

3.10.2.3 House Load Operation Test

3.10.2.4 Dead-Bus Closing (line energizing test)

3.10.2.5 Synchronizing to Live-Bus

3.10.3 Pass Criteria

### **3.11 Under Frequency Relay**

3.11.1 Requirements

3.11.2 Objective

3.11.3 Procedure

3.11.4 Pass Criteria

**3.12 Loss of a Power Supply**

3.12.1 Requirements

3.12.2 Objective

3.12.3 Procedure

**3.13 Standby Fuel Stock**

3.13.1 Requirements

3.13.2 Objective

3.13.3 Procedure

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**3.13.4 Pass Criteria**

The Solar Power Plant Facility is deemed to have passed the test if the above requirements are met.

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### **3.14 On-Line Fuel Changeover**

3.14.1 Requirements

3.14.2 Objective

3.14.3 Procedure

3.14.4 Pass Criteria

### **3.15 Power System Stabilizer (PSS) Tuning**

3.15.1 Requirements

3.15.2 Objective

3.15.3 Procedure

3.15.3.1 Verifying the functionality of all aspects of the PSS equipment

3.15.3.2 Parameter Checking

3.15.3.3 System Impedance Measurement

3.15.3.4 AVR Frequency Response Test

3.15.3.4.1 Close Loop AVR Frequency Response Test

3.15.3.4.2 Open Loop AVR Frequency Response Test

3.15.3.5 Exciter Frequency Response Test

3.15.3.5.1 Uncompensated Frequency Response Test (with PSS OFF)

3.15.3.5.2 PSS Frequency Response Test (Lead Lag Parameters)

3.15.3.5.3 Gain Margin Test

3.15.3.5.4 Compensated Frequency Response Test (with PSS ON)

3.15.3.5.5 Step Response Test

3.15.3.5.6 Line Switching Test

3.15.3.5.7 Step Response Test (for excitation model validation)

3.15.4 Pass Criteria

### **3.16 Machine Model Parameter Verification**

3.16.1 Requirements

3.16.2 Objective

3.16.3 Procedure

3.16.4 Pass Criteria

3.16.4.1 Pass Criteria for Solar Power Plant parameters

3.16.4.2 Pass Criteria for Excitation Model Verification

3.16.4.3 General Pass Criteria

### **3.17 Revised Contractual Capacity Test**

3.17.1 Requirements

3.17.2 Objective

3.17.3 Test Results

3.17.4 Restrictions during Testing

3.17.5 Test Codes and Reports

3.17.6 Test Measurements

3.17.7 Procedure

3.17.8 Formula for Unit Net Output Correction

3.17.9 Pass Criteria

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**3.18 Minimum Up Time, Minimum Down Time and Maximum Down Time**

3.18.1 Requirements

3.18.2 Objective

3.18.3 Procedure

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**3.19 Response to Grid Voltage Variation**

3.19.1 Requirements

3.19.2 Objective

3.19.3 Procedure

3.19.4 Typical Detailed Procedure for Grid Voltage Response Testing

3.19.5 Pass Criteria

**3.20 Reactive Power Capability**

3.20.1 Requirements

3.20.2 Objective

3.20.3 Procedure

3.20.4 Pass Criteria

**3.21 Regulation and Load Following Capability**

3.21.1 Requirements

3.21.2 Objective

3.21.3 Procedure

3.21.4 Pass Criteria

**3.22 Unit Start**

3.22.1 Requirements

3.22.2 Objective

3.22.3 Procedure

3.22.4 Pass Criteria

**3.23 Dispatch Ramp Rate**

3.23.1 Requirements

3.23.2 Objective

3.23.3 Procedure

3.23.3.1 Test Conditions

3.23.3.2 Ramp Rate Test Calculations

3.23.3.3 Ramp Rate Test records

3.23.4 Pass Criteria

**3.24 Minimum Loading**

3.24.1 Requirements

3.24.2 Objective

3.24.3 Procedure

3.24.4 Pass Criteria

**3.25 Dispatch Heat Rate**

3.25.1 Requirements

3.25.2 Objective

3.25.3 Procedure

3.25.4 Pass Criteria

**3.26 Reliability Run (RR)**

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#### 4.0 GLOSSARY OF TERMS

##### Access

The contracted right to use an electrical system to transfer electrical energy.

##### Adequacy

See Reliability.

##### Adjacent System or Adjacent Control Area

Any system or Control Area either directly interconnected with or electrically close to (so as to be significantly affected by the existence of) another system or Control Area.

##### Ancillary Service

A service, other than the production of electricity, which is used to operate a stable and secure power system including reactive power, operating reserve, frequency control, and blackstart capability.

##### Area Control Error

The instantaneous difference between actual and scheduled interchange, taking into account the effects of frequency bias.

##### Automatic Generation Control (AGC)

Equipment that automatically adjusts a Control Area's generation to maintain its interchange Schedule Plus its share of frequency regulation.

The following AGC modes are typically available:

Tie Line Bias Control - Automatic generation control with both frequency and interchange terms of Area Control Error considered.

Constant Frequency (Flat Frequency) Control - Automatic generation control with the interchange term of Area Control Error ignored. This Automatic Generation Control mode attempts to maintain the desired frequency without regard to interchange.

Constant Net Interchange (Flat Tie Line) Control - Automatic generation control with the frequency term of Area Control Error ignored. This Automatic Generation Control mode attempts to maintain interchange at the desired level without regard to frequency.

##### Automatic Voltage Regulator

Automatic maintenance of a generation unit's terminal voltage at a desired setpoint.

##### Auxiliaries

Any item of Plant and/or Apparatus not directly a part of the boiler plant or Generating Unit, but required for the boiler plant's or Generating Unit's functional operation. 'Auxiliary' shall be defined accordingly.

##### Availability

A measure of time a generating unit, transmission line, or other facility is capable of providing service, whether or not it actually is in service. Typically, this measure is expressed as a percent available for the period under consideration.

**Backup Power**

Power provided by contract to a customer when that customer's normal source of power is not available.

**Baseload**

The minimum amount of electric power delivered or required over a given period at a constant rate.

**Blackstart**

The procedure necessary for a recovery from a total shutdown or partial shutdown.

**Blackstart Capability**

The ability of a generating unit or Power Station equipped for Black Start capability, that is the capability to Start – Up at least one of its Generating Units from total Shutdown and to energise a part of the Grid System and to be synchronised to the Grid System upon instruction from the GSO, within a set time period agreed with the GSO, without any external electrical power supply and start delivering power without assistance from the electric system.

**Black Start Station**

Power Stations which are registered by the Single Buyer and the GSO, pursuant to the relevant Agreement, as having a Black Start Capability.

**Bulk Electric System**

A term commonly applied to the portion of an electric utility system that encompasses the electrical generation resources and bulk transmission system.

**Capacity**

The rated continuous load-carrying ability, expressed in megawatts (MW) or megavolt- amperes (MVA) of generation, transmission, or other electrical equipment.

**Baseload Capacity**

Capacity used to serve an essentially constant level of customer demand. Baseload generating units typically operate whenever they are available, and they generally have a capacity factor that is above 60%.

**Peaking Capacity**

Capacity used to serve peak demand. Peaking generating units operate a limited number of hours per year, and their capacity factor is normally less than 20%.

**Net Capacity**

The maximum capacity (or effective rating), modified for ambient limitations, that a generating unit, power plant, or electric system can sustain over a specified period, less the capacity used to supply the demand of station service or auxiliary needs.

**Intermediate Capacity**

Capacity intended to operate fewer hours per year than baseload capacity but more than peaking capacity. Typically, such generating units have a capacity factor of 20% to 60%.

**Capacity Factor**

The ratio of the total energy generated by a generating unit for a specified period to the maximum possible energy it could have generated if operated at the maximum capacity rating for the same specified period, expressed as a percent.

**Cascading**

The uncontrolled successive loss of system elements triggered by an incident at any location. Cascading results in widespread service interruption, which cannot be restrained from sequentially spreading beyond an area predetermined by appropriate studies.

**Cogeneration**

Production of electricity from steam, heat, or other forms of energy produced as a by-product of another process.

**Combined Cycle**

An electric generating technology in which electricity and process steam is produced from otherwise lost waste heat exiting from one or more combustion turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam Solar Power Plant for use by a steam turbine in the production of electricity. This process increases the efficiency of the electric generating unit.

**Commercial Operation Date**

The date at which all testing of a Power Station or a Generating Unit or a Grid System Development or a User Development is completed and the plant is certified by the relevant party (e.g., Single Buyer, the GSO, SESB Transmission or a User) for commercial use with the Grid System.

**Commonly Owned Unit**

A generating unit whose capacity is owned or leased and divided among two or more entities. Synonym: Jointly Owned Unit.

**Commissioning**

Activities involved in undertaking the Commissioning Test or implementing the Commissioning Instructions pursuant to the terms of the Connection Agreement or as the context requires the testing of any item of users equipment prior to connection or re-connection in order to determine that it meets all requirements and standards for connection to the Transmission System. It also includes activities that determine the new values of parameters that apply to it following a material alteration or modification and in addition those activities involved in undertaking the Commissioning Tests or implementing the Commissioning Instructions as the context requires.

**Commissioning Instructions**

A step-by-step test procedure for a Commissioning Test.

**Commissioning Test**

A test or a series of tests for establishing, by measurement, the characteristics of Plant or Apparatus or Equipment are in accordance with the specified Equipment standards and its fitness for connection to and continuous operation on the Grid System without any adverse effects. Commissioning tests are conducted on equipment that is connecting to the Transmission System for the first time or after modification.

**Compliance Test**

A test or a series of tests for establishing the compliance of a Plant or Apparatus or system with the relevant clauses of the Grid Code and any additional clauses in the relevant Agreement.

**Contingency**

The unexpected failure or outage of a system component, such as a Solar Power Plant, transmission line, circuit breaker, switch, or other electrical element. A contingency also may include multiple components, which are related by situations leading to simultaneous component outages.

**Control Area**

An electric system or systems, bounded by interconnection metering and telemetry, capable of controlling generation to maintain its interchange schedule with other Control Areas and contributing to frequency regulation of the Interconnection.

**Curtaibility**

The right of a transmission provider to interrupt all or part of a transmission service due to constraints that reduce the capability of the transmission network to provide that transmission service. Transmission service is to be curtailed only in cases where system reliability is threatened or emergency conditions exist.

**Curtailement**

A reduction in the scheduled capacity or energy delivery.

**Demand**

The rate at which electric energy is delivered to or by a system or part of a system, generally expressed in kilowatts or megawatts, at a given instant or averaged over any designated interval of time. Demand should not be confused with Load.

Types of Demand include:

**Instantaneous Demand**

The rate of energy delivered at a given instant.



**Average Demand**

The electric energy delivered over any interval of time as determined by dividing the total energy by the units of time in the interval.

**Integrated Demand**

The average of the instantaneous demands over the demand interval.

**Demand Interval**

The time period during which electric energy is measured, usually in 15-, 30-, or 60-minute increments.

**Peak Demand**

The highest electric requirement occurring in a given period (e.g., an hour, a day, month, season, or year). For an electric system, it is equal to the sum of the metered net outputs of all Solar Power Plants within a system and the metered line flows into the system, less the metered line flows out of the system.

**Coincident Demand**

The sum of two or more demands that occur in the same demand interval. Non-coincident Demand The sum of two or more demands that occur in different demand intervals.

**Contract Demand**

The amount of capacity that a supplier agrees to make available for delivery to a particular entity and which the entity agrees to purchase.

**Firm Demand**

That portion of the Contract Demand that a power supplier is obligated to provide except when system reliability is threatened or during emergency conditions.

**Billing Demand**

The demand upon which customer billing is based as specified in a rate schedule or contract. It may be based on the contract year, a contract minimum, or a previous maximum and, therefore, does not necessarily coincide with the actual measured demand of the billing period.

**Demand-Side Management**

The term for all activities or programs undertaken by an electric system or its customers to influence the amount or timing of electricity use. Indirect Demand-Side Management Programs such as conservation, improvements in efficiency of electrical energy use, rate incentives, rebates, and other similar activities to influence electricity use.

**Direct Control Load Management**

The customer demand that can be interrupted by direct control of the system operator controlling the electric supply to individual appliances or equipment on customer premises. This type of control, when used by utilities, usually involves residential customers. Direct Control Load Management as defined here does not include Interruptible Demand.

**Interruptible Demand**

The magnitude of customer demand that, in accordance with contractual arrangements, can be interrupted by direct control of the system operator or by action of the customer at the direct request of the system operator. In some

instances, the demand reduction may be initiated by the direct action of the system operator (remote tripping) with or without notice to the customer in accordance with contractual provisions. Interruptible Demand as defined here does not include Direct Control Load Management.

**Derating (Solar Power Plant)**

A reduction in a generating unit's Net Dependable Capacity.

**Forced Derating**

An unplanned component failure (immediate, delayed, postponed) or other condition that requires the output of the unit be reduced immediately or before the next weekend.

**Maintenance Derating**

The removal of a component for scheduled repairs that can be deferred beyond the end of the next weekend, but requires a reduction of capacity before the next planned outage.

**Planned Derating**

The removal of a component for repairs that is scheduled well in advance and has a predetermined duration.

**Scheduled Derating**

A combination of maintenance and planned deratings.

**Dispatchable Generation**

Generation available physically or contractually to respond to changes in system demand or to respond to transmission security constraints. See Must- Run Generation.

**Disturbance**

An unplanned event that produces an abnormal system condition.

**Dynamic Rating**

The process that allows a system element rating to vary with the changing environmental conditions in which the element is located.

**Economic Dispatch**

The allocation of demand to individual generating units on line to effect the most economical production of electricity.

**Electrical Energy**

The generation or use of electric power by a device over a period of time, expressed in kilowatthours (kWh), megawatthours (MWh), or gigawatthours (GWh).

**Firm Energy Electrical**

Energy backed by capacity, interruptible only on conditions as agreed upon by contract, system reliability constraints, or emergency conditions and where the supporting reserve is supplied by the seller.

**Non-firm Energy**

Electrical Energy that may be interrupted by either the provider or the receiver of the energy by giving advance notice to the other party to the transaction. This advance notice period is equal to or greater than the minimum period agreed to in the

contract. Non-firm Energy may also be interrupted to maintain system reliability of third-party Transmission Providers. Non-firm Energy must be backed up by reserves.

**Emergency Energy**

Electrical Energy purchased by a member system whenever an event on that system causes insufficient Operating Capability to cover its own demand requirement.

**Economy Energy**

Electrical Energy produced and supplied from a more economical source in one system and substituted for that being produced or capable of being produced by a less economical source in another system.

**Off-Peak Energy**

Electrical Energy supplied during a period of relatively low system demands as specified by the supplier.

**On-Peak Energy**

Electrical Energy supplied during a period of relatively high system demands as specified by the supplier.

**Electric System Losses**

Total electric energy losses in the electric system. The losses consist of transmission, transformation, and distribution losses between supply sources and delivery points. Electric energy is lost primarily due to heating of transmission and distribution elements.

**Electric Utility**

A corporation, person, agency, authority, or other legal entity or instrumentality that owns or operates facilities for the generation, transmission, distribution, or sale of electric energy primarily for use by the public and is defined as a utility under the statutes and rules by which it is regulated. Types of Electric Utilities include investor-owned, cooperatively owned, and government-owned (federal agency, crown corporation, state, provincials, municipals, and public power districts).

**Element**

Any electric device with terminals that may be connected to other electric devices, such as a Solar Power Plant, transformer, circuit, circuit breaker, or bus section. See Rating, System Element Rating.

Limiting Element

The element that is either operating at its appropriate rating or would be following the limiting contingency and, as a result, establishes a system limit.

Emergency

Any abnormal system condition that requires automatic or immediate manual action to prevent or limit loss of transmission facilities or generation supply that could adversely affect the reliability of the electric system.

Energy Emergency

A condition when a system or power pool does not have adequate energy resources (including water for hydro units) to provide its customers' expected energy requirement. See Capacity Emergency.

Energy Exchange

Transaction whereby the receiver accepts delivery of energy for a supplier's account and returns energy later at times, rates, and in amounts as mutually agreed. See Storage, Banking.

Energy Imbalance Service

See Ancillary Service.

Expected Unserved Energy

The expected amount of energy curtailment per year due to demand exceeding available capacity. It is usually expressed in megawatthours (MWh).

Fault

An event occurring on an electric system such as a short circuit, a broken wire, or an intermittent connection.

Forecast

Predicted demand for electric power. A forecast may be short term (e.g., 15 minutes) for system operation purposes, long-term (e.g., five to 20 years) for generation planning purposes, or for any range in between. A forecast may include peak demand, energy, reactive power, or demand profile. A forecast may be made for total system demand, transmission loading, substation/feeder loading, individual customer demand, or appliance demand.

Forecast Uncertainty

Probable deviations from the expected values of factors considered in a forecast.

Frequency

The number of alternating current cycles in a second, at which the generating system is operating, expressed in Hz.

Frequency Bias

A value, usually given in megawatts per 0.1 Hertz (MW/0.1 Hz), associated with a Control Area that relates the difference between scheduled and actual frequency to the amount of generation required to correct the difference.

Frequency Deviation

A departure from scheduled frequency.

Frequency Error

The difference between actual system frequency and the scheduled system frequency.

#### Frequency Regulation

The ability of a Control Area to assist the interconnected system in maintaining scheduled frequency. This assistance can include both turbine governor response and automatic generation control.

#### Frequency Response (Equipment)

The ability of a system or elements of the system to react or respond to a change in system frequency.

#### Frequency Response (System)

The sum of the change in demand, plus the change in generation, divided by the change in frequency, expressed in megawatts per 0.1 Hertz (MW/0.1 Hz).

#### Scheduled Frequency

60.0 Hertz, except during a time correction.

#### Frequency Response

##### Primary Response

The automatic response to Frequency changes released increasingly with time over the period 0 to 10 seconds from the time of Frequency change and fully available by the latter, and which is sustainable for at least a further twenty (20) seconds by Generating Units, dispatched by the GSO to provide such a response.

##### Secondary Response

The automatic response to Frequency which is fully available by thirty (30) seconds from the time of Frequency change to take over from the Primary Response, and which is sustainable for at least thirty (30) minutes from Generating Units, dispatched by the GSO to provide such a response.

##### High Frequency Response

An automatic reduction in Active Power output of a Generating Unit in response to an increase in System Frequency above the Target Frequency (or such other level of Frequency as may have been agreed in a relevant Agreement). This reduction in Active Power output must be in accordance with the provisions of the relevant Agreement which will provide that it will be released increasingly with time over the period 0 to 10 seconds from the time of the Frequency increase on the basis set out in the relevant Agreement and fully achieved within ten (10) seconds of the time of the start of the Frequency increase and it must be sustained at no lesser reduction thereafter. The interpretation of the High Frequency Response to a +0.5 Hz frequency change is shown diagrammatically in the Malaysian Grid Code – Connection Code Appendix 3 (CC.A.3). This response requirement also arises from the need to protect the shaft system of a Generating Unit from consequential mechanical damage from an uncontrolled rise in speed associated with the high Frequency.

##### Generation (Electricity)

The process of producing electrical energy from other forms of energy; also, the amount of electric energy produced, usually expressed in kilowatthours (kWh) or megawatthours (MWh).

**Generation, Gross**

The electrical output at the terminals of the Solar Power Plant, usually expressed in megawatts (MW). Generation, Net Gross generation minus station service or unit service power requirements, usually expressed in megawatts (MW).

**Solar Power Plant Facility**

Any entity that supplies, installs, commissions and/or operates an electricity generating plant. This term includes, but is not limited to, Solar Power Plant Suppliers and Contractors who have been contracted for the design, supply, erection, installation, testing and commissioning Solar Power Plants to be connected to the Grid System, Solar Power Producers (SPP), co-Solar Power Plants and small power producers and all other non-utility electricity producers, such as exempt wholesale Solar Power Plants who sell electricity.

**Governor Control System**

A system which will result in Active Power output of a Generation Unit changing, in response to a change in System Frequency, in a direction which assists in the recovery to Target Frequency.

**Governor Droop**

The percentage drop in the Frequency that would cause the Generation Unit under free governor action to change its output from zero to its full Availability.

**Grid Code**

See Malaysian Grid Code.

**Grid System Operator (GSO)**

A part of SESB Transmission Division which is responsible for, inter alia, the development planning, operation planning, operation and control of the Grid System in compliance with the provisions of the Grid Code.

**Imbalance**

A condition where the generation and interchange schedules do not match demand.

**Inadvertent Energy Balancing**

A Control Area's accounting of its inadvertent interchange, which is the accumulated difference between actual and scheduled interchange.

**Inadvertent Interchange or Inadvertent**

The difference between a Control Area's net actual interchange and net scheduled interchange.

**Incremental Energy Cost**

The additional cost that would be incurred by producing or purchasing the next available unit of electrical energy above the current base cost.

**Incremental Heat Rate**

The amount of additional heat that must be added to a thermal generating unit at a given loading to produce an additional unit of output. It is usually expressed in British thermal units per kilowatt hour (Btu/kWh) of output.

**Solar Power Producers (SPP)**

Any entity that owns or operates an electricity generating facility that is not included in an electric utility's rate base. This term includes, but is not limited to, coSolar Power Plants and small power producers and all other nonutility electricity producers, such as exempt wholesale Solar Power Plants who sell electricity.

**Initial Operation Date**

The date of first synchronization of a Solar Power Plant to the Grid System, as stated in the relevant Agreement between the Single Buyer (GSO) and a Solar Power Plant Facility.

**Interchange**

Electric power or energy that flows from one entity to another.

**Actual Interchange**

Metered electric power that flows from one entity to another.

**Interchange Scheduling**

The actions taken by scheduling entities to arrange transfer of electric power. The schedule consists of an agreement on the amount, start and end times, ramp rate, and degree of firmness.

**Scheduled Interchange**

Electric power scheduled to flow between entities, usually the net of all sales, purchases, and wheeling transactions between those areas at a given time.

**Interconnected System**

A system consisting of two or more individual electric systems that normally operate in synchronism and have connecting tie lines.

**Interconnection**

The facilities that connect two systems or Control Areas. Additionally, an interconnection refers to the facilities that connect a nonutility Solar Power Plant to a Control Area or system.

Interface

The specific set of transmission elements between two areas or between two areas comprising one or more electrical systems.

Island

A portion of a power system or several power systems that is electrically separated from the interconnection due to the disconnection of transmission system elements.

Joint Unit Control

Automatic generation control of a generating unit by two or more entities.

Lambda

A term commonly given to the incremental cost that solves the economic dispatch calculation. It represents the cost of the next kilowatt hour that could be produced from dispatchable units on the system.

Load

An end-use device or customer that receives power from the electric system. Load should not be confused with Demand, which is the measure of power that a load receives or requires. See Demand.

Load Cycle

The normal pattern of demand over a specified time period associated with a device or circuit.

Load Duration Curve

A non-chronological, graphical summary of demand levels with corresponding time durations using a curve, which plots demand magnitude (power) on one axis and percent of time that the magnitude occurs on the other axis.

Load Factor

A measure of the degree of uniformity of demand over a period of time, usually one year, equivalent to the ratio of average demand to peak demand expressed as a percentage. It is calculated by dividing the total energy provided by a system during the period by the product of the peak demand during the period and the number of hours in the period.

Load Following

An electric system's process of regulating its generation to follow the changes in its customers' demand.

Load Shedding

The process of deliberately removing (either manually or automatically) preselected customer demand from a power system in response to an abnormal condition to maintain the integrity of the system and minimize overall customer outages.



**Load Shifting**

Demand-side management programs designed to encourage consumers to move their use of electricity from on-peak times to off-peak times.

**Loop Flows**

See Parallel Path Flows.

**Loss of Load Expectation (LOLE)**

The expected number of days in the year when the daily peak demand exceeds the available generating capacity. It is obtained by calculating the probability of daily peak demand exceeding the available capacity for each day and adding these probabilities for all the days in the year. The index is referred to as Hourly Loss-of-Load-Expectation if hourly demands are used in the calculations instead of daily peak demands. LOLE also is commonly referred to as Loss-of-Load-Probability. See Expected Unserved Energy.

**Malaysian Grid Code (MGC)** The Malaysian Grid Code (2006) Version 2.0 (Edition 1.0) is an essential document to provide procedures, requirements, responsibilities and obligations of the GSO and all Users of the Grid System to ensure its efficient development and secure operation without unduly discriminating any User or category of Users. It is for this reason that compliance to the Grid Code is obligatory and not optional under the license term applicable to each User. The GSO in discharging his duties through the provisions of the Grid Code ensures independence, non-discrimination and transparency of all his activities.

**Planning Code (PC)**

Part IV of the Malaysian Grid Code (2006)

**Connection Code (CC)**

Part V of the Malaysian Grid Code (2006)

**Operation Code (OC)**

Part VI of the Malaysian Grid Code (2006)

**Scheduling and Dispatch Code (SDC)**

Part VII of the Malaysian Grid Code (2006)

**Data Registration Code (DRC)**

Part VIII of the Malaysian Grid Code (2006)

**Metering Code (MC)**

Part IX of the Malaysian Grid Code (2006)

**Margin**

The difference between net capacity resources and net internal demand. Margin is usually expressed in megawatts (MW).

**Adequate Regulating Margin**

The minimum on-line capacity that can be increased or decreased to allow the electric system to respond to all reasonable instantaneous demand changes to be in compliance with the Control Performance Criteria.

**Available Margin**

The difference between Available Resources and Net Internal Demand, expressed as a percent of Available Resources. This is the capacity available to cover random factors such as forced outages of generating equipment, demand forecast errors, weather extremes, and capacity service schedule slippages.

**Capacity Margin**

The difference between net capacity resources and net internal demand expressed as a percent of net capacity resources.

**Marketer**

An entity that has the authority to take title to electrical power generated by itself or another entity and remarket that power at market-based rates.

**Metered Value**

A measured electrical quantity that may be observed through telemetering, supervisory control and data acquisition (SCADA), or other means.

**Metering**

The methods of applying devices that measure and register the amount and direction of electrical quantities with respect to time.

**Must-Run Generation**

Generation designated to operate at a specific level and not available for dispatch. See Dispatchable Generation.

**Net Capacity Resource**

The total owned capacity, plus capacity available from SOLAR power producers, plus the net of total capacity purchases and sales, less the sum of inoperable capacity, and less planned outages.

**Net Dependable Capacity**

The maximum capacity a unit can sustain over a specified period modified for seasonal limitations and reduced by the capacity required for station service or auxiliaries.

**Net Energy for Load**

The electrical energy requirements of an electric system, defined as system net generation, plus energy received from others, less energy delivered to others through interchange. It includes system losses but excludes energy required for storage at energy storage facilities.

**Net Internal Demand**

The metered net outputs of all Solar Power Plants within a system, plus the metered line flows into the system, less the metered line flows out of the system, less Direct Control Load Management and, less Interruptible Demand.

**Net Schedule**

The algebraic sum of all scheduled transactions across a given transmission path or between Control Areas for a given period or instant in time.

**Off Peak**

Those hours or other periods defined by contract or other agreements or guides as periods of lower electrical demand.

**On Peak**

Those hours or other periods defined by contract or other agreements or guides as periods of higher electrical demand.

**Operating Criteria**

The fundamental principles of reliable interconnected systems operation.

**Operating Guides**

Operating practices that a Control Area or systems functioning as part of a Control Area may wish to consider. The application of Guides is optional and may vary among Control Areas to accommodate local conditions and individual system requirements.

**Operating Instructions**

Training documents, appendices, and other documents that explain the Criteria, Requirements, Standards, and Guides.

**Operating Policies**

The doctrine developed for interconnected systems operation. This doctrine consists of Criteria, Standards, Requirements, Guides, and instructions and apply to all Control Areas.

**Operating Procedures**

A set of policies, practices, or system adjustments that may be automatically or manually implemented by the system operator within a specified time frame to maintain the operational integrity of the interconnected electric systems.

Automatic Operating Systems Special protection systems, remedial action schemes, or other operating systems installed on the electric systems that require no intervention on the part of system operators.

**Normal (Pre-contingency) Operating Procedures**

Operating procedures that are normally invoked by the system operator to alleviate potential facility overloads or other potential system problems in anticipation of a contingency.

Post-contingency Operating Procedures

Operating procedures that may be invoked by the system operator to mitigate or alleviate system problems after a contingency has occurred.

Operating Requirements

Obligations of a Control Area and systems functioning as part of a Control Area.

Operating Reserve: Spinning Reserve Service

See Ancillary Service.

Operating Reserve: Supplemental Reserve Service

See Ancillary Service.

Operating Standards

The obligations of a Control Area and systems functioning as part of a Control Area that is measurable. A Standard may specify monitoring and surveys for compliance.

Operating Transmission Limit

The maximum value of the most critical system operating parameter(s) which meets: (a) pre-contingency criteria as determined by equipment loading capability and acceptable voltage conditions, (b) transient performance criteria or, (c) post-contingency loading and voltage criteria.

Outage

Forced Outage

The removal from service availability of a generating unit, transmission line, or other facility for emergency reasons or a condition in which the equipment is unavailable due to unanticipated failure.

Forced Outage Rate

The hours a generating unit, transmission line, or other facility is removed from service, divided by the sum of the hours it is removed from service, plus the total number of hours the facility was connected to the electricity system expressed as a percent.

Maintenance Outage

The removal of equipment from service availability to perform work on specific components that can be deferred beyond the end of the next weekend, but requires the equipment be removed from service before the next planned outage. Typically, a Maintenance Outage may occur anytime during the year, have a flexible start date, and may or may not have a predetermined duration.

Planned Outage

Removing the equipment from service availability for inspection and/or general overhaul of one or more major equipment groups. This outage usually is scheduled well in advance.

**Overlap Regulation Service**

A method of providing regulation service in which the Control Area providing the regulation service incorporates some or all of another Control Area's tie lines and schedules into its own Automatic Generation Control/Area Control Error equation.

**Parallel Path Flows**

The difference between the scheduled and actual power flow, assuming zero inadvertent interchange, on a given transmission path. Synonyms: Loop Flows, Unscheduled Power Flows, and Circulating Power Flows.

**Planning (System)**

The process by which the performance of the electric system is evaluated and future changes and additions to the bulk electric systems are determined.

**Planning Guides**

Good planning practices and considerations that Regions, subregions, power pools, or individual systems should follow. The application of Planning Guides may vary to match local conditions and individual system requirements.

**Planning Policies**

The framework for the reliability of interconnected bulk electric supply in terms of responsibilities for the development of and conformance to NERC Planning Principles and Guides and Regional planning criteria or guides, and NERC and Regional issue resolution processes. NERC Planning Procedures, Principles, and Guides emanate from the Planning Policies.

**Planning Principles**

The fundamental characteristics of reliable interconnected bulk electric systems and the tenets for planning them.

**Planning Procedures**

An explanation of how the Planning Policies are addressed and implemented by the NERC Engineering Committee, its subgroups, and the Regional Councils to achieve bulk electric system reliability.

**Point of Delivery**

A point on the electric system where a power supplier or wheeling entity delivers electricity to the receiver of that energy or to a wheeling entity. This point could include an interconnection with another system or a substation where the transmission provider's transmission and distribution systems are connected to another system.

**Point of Receipt**

A point on the electrical system where an entity receives electricity from a power supplier or wheeling entity. This point could include an interconnection with another system or Solar Power Plant bus bar.

## Power

### Apparent Power

The product of the volts and amperes. It comprises both real and reactive power, usually expressed in kilovoltamperes (kVA) or megavoltamperes (MVA).

### Reactive Power

The portion of electricity that establishes and sustains the electric and magnetic fields of alternating-current equipment. Reactive power must be supplied to most types of magnetic equipment, such as motors and transformers. It also must supply the reactive losses on transmission facilities. Reactive power is provided by Solar Power Plants, synchronous condensers, or electrostatic equipment such as capacitors and directly influences electric system voltage. It is usually expressed in kilovars (kvar) or megavars (Mvar).

### Real Power

The rate of producing, transferring, or using electrical energy, usually expressed in kilowatts (kW) or megawatts (MW).

### Power Factor

The ratio of Active Power to Apparent Power.

### Power Flow Program

A computerized algorithm that simulates the behavior of the electric system under a given set of conditions.

### Power Purchase Agreement (PPA)

Agreement between the Single Buyer and a Solar Power Plants or Network Operators relating to the financial and technical conditions relating to the purchase of the Power Station output and technical conditions relating to its connection to and performance on the Grid System.

### Power Pool

Two or more interconnected electric systems planned and operated to supply power for their combined demand requirements.

**Power System Stabilizer (PSS) Device** that injects a supplementary signal into the AVR (Automatic Voltage Regulator) in order to improve Power System damping.

### Prudent Utility Practices

Those standards, practices, methods and procedures conforming to safety and legal requirements which are attained by exercising that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from skilled and experienced operatives engaged in the same type of undertaking under the same or similar circumstances.

### Ramp Period

The time between ramp start and end times usually expressed in minutes.

### Ramp Rate (Schedule)

The rate, expressed in megawatts per minute, at which the interchange schedule is attained during the ramp period.

### Rating

The operational limits of an electric system, facility, or element under a set of specified conditions.

#### Continuous Rating

The rating as defined by the equipment owner that specifies the level of electrical loading, usually expressed in megawatts (MW) or other appropriate units that a system, facility, or element can support or withstand indefinitely without loss of equipment life.

#### Normal Rating

The rating as defined by the equipment owner that specifies the level of electrical loading, usually expressed in megawatts (MW) or other appropriate units that a system, facility, or element can support or withstand through the daily demand cycles without loss of equipment life.

#### Emergency Rating

The rating as defined by the equipment owner that specifies the level of electrical loading, usually expressed in megawatts (MW) or other appropriate units, that a system, facility, or element can support or withstand for a finite period. The rating assumes acceptable loss of equipment life or other physical or safety limitations for the equipment involved.

Reactive Supply and Voltage Control from Generating Sources Service  
See Ancillary Service.

#### Real-Time Operations

The instantaneous operations of a power system as opposed to those operations that are simulated.

Regulation and Frequency Response Service  
See Ancillary Service.

#### Reliability

The degree of performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. Reliability may be measured by the frequency, duration, and magnitude of adverse effects on the electric supply. Electric system reliability can be addressed by considering two basic and functional aspects of the electric system Adequacy and Security.

#### Adequacy

The ability of the electric system to supply the aggregate electrical demand and energy requirements of the customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.

#### Security

The ability of the electric system to withstand sudden disturbances such as electric short circuits or unanticipated loss of system elements.

#### Reliability Criteria

Principles used to design, plan, operate, and assess the actual or projected reliability of an electric system.

#### Rerating

A change in the capability of a Solar Power Plant due to a change in conditions such as age, upgrades, auxiliary equipment, cooling, etc.

#### Reserve

##### Operating Reserve

That capability above firm system demand required to provide for regulation, load forecasting error, equipment forced and scheduled outages, and local area protection. The additional output from Generating Plant or the reduction in Demand must be realisable in realtime operation to respond in order to contribute to containing and correcting any System Frequency fall to an acceptable level in the event of a loss of generation or a loss of import from an External Interconnection or mismatch between generation and Demand.

##### Spinning Reserve

Unloaded generation, which is synchronized and ready to serve additional demand. It consists of Regulating Reserve and Contingency Reserve.

##### Regulating Reserve

An amount of spinning reserve responsive to Automatic Generation Control, which is sufficient to provide normal regulating margin.

##### Contingency Reserve

An additional amount of operating reserve sufficient to reduce Area Control Error to zero in ten minutes following loss of generating capacity, which would result from the most severe single contingency. At least 50% of this operating reserve shall be Spinning Reserve, which will automatically respond to frequency deviation.

##### Non-spinning Reserve

That operating reserve not connected to the system but capable of serving demand within a specific time, or Interruptible Demand that can be removed from the system in a specified time. Interruptible Demand may be included in the Non-spinning Reserve provided that it can be removed from service within ten minutes.

##### Planning Reserve

The difference between a Control Area's expected annual peak capability and its expected annual peak demand expressed as a percentage of the annual peak demand.

#### Response Rate

##### Emergency Response Rate

The rate of load change that a generating unit can achieve under emergency conditions, such as loss of a unit, expressed in megawatts per minute (MW/Min).

##### Normal Response Rate

The rate of load change that a generating unit can achieve for normal loading purposes expressed in megawatts per minute (MW/Min).

#### Schedule

An agreed-upon transaction size (megawatts), start and end time, beginning and ending ramp times and rate, and type required for delivery and receipt of power and



energy between the contracting parties and the Control Area(s) involved in the transaction.

**Schedule Confirmation**

The process of verifying the accuracy of an interchange schedule(s) between all the entities to the transaction.

**Scheduled Losses**

The scheduled power transfer to a transmission provider for compensation of losses incurred on that provider's transmission system due to a transfer of power between purchasing and selling entities.

**Schedule Implementation**

The process of entering the details of a negotiated schedule into the control system(s) of a Control Area(s) involved in a transaction of power and energy.

**Schedule Period**

The length of time between the nominal starting and ending time of each schedule.

**Scheduling, System Control, and Dispatch Service**

See Ancillary Service.

**Security**

See Reliability.

**Single Buyer**

Part of SESB that is responsible for managing Power Purchase Agreements and Settlement process.

**Single Contingency**

The sudden, unexpected failure or outage of a system facility(s) or element(s) (generating unit, transmission line, transformer, etc.). Elements removed from service as part of the operation of a remedial action scheme are considered part of a single contingency.

**Special Protection System**

See Operating Procedures.

**Stability**

The ability of an electric system to maintain a state of equilibrium during normal and abnormal system conditions or disturbances.

**Small-Signal Stability**

The ability of the electric system to withstand small changes or disturbances without the loss of synchronism among the synchronous machines in the system.

**Transient Stability**

The ability of an electric system to maintain synchronism between its parts when subjected to a disturbance of specified severity and to regain a state of equilibrium following that disturbance.

**Stability Limit**

The maximum power flow possible through some particular point in the system while maintaining stability in the entire system or the part of the system to which the stability limit refers.

**Storage**

Energy transferred from one entity to another entity that has the ability to conserve the energy (i.e., stored as water in a reservoir, fuel oil in tank, etc.) with the intent that the energy will be returned at a time when such energy is more usable to the original supplying entity. See also Banking and Energy Exchange. Synonym: Energy Banking.

**Substation**

A facility for switching electrical elements, transforming voltage, regulating power, or metering.

**Supervisory Control**

A form of remote control comprising an arrangement for the selective control of remotely located facilities by an electrical means over one or more communications media.

**Supervisory Control and Data Acquisition (SCADA)**

A system of remote control and telemetry used to monitor and control the electric system.

**Surge**

A transient variation of current, voltage, or power flow in an electric circuit or across an electric system.

**Synchronize**

The process of connecting two previously separated alternating current apparatuses after matching frequency, voltage, phase angles, etc. (e.g., paralleling a Solar Power Plant to the electric system).

**System**

An interconnected combination of generation, transmission, and distribution components comprising an electric utility, an electric utility and SOLAR power producer(s) (SPP), or group of utilities and SPP(s).

**System Operator**

An individual at an electric system control center whose responsibility it is to monitor and control that electric system in real time.

**Telemetry**

The process by which measurable electrical quantities from substations and generating stations are instantaneously transmitted using telecommunication techniques.

**Thermal Rating**

The maximum amount of electrical current that a transmission line or electrical facility can conduct over a specified time period before it sustains permanent damage by overheating or before it violates public safety requirements.

**Tie Line**

A circuit connecting two or more Control Areas or systems of an electric system.

Tie Line Bias A mode of operation under automatic generation control in which the area control error is determined by the actual net interchange minus the biased scheduled net interchange.

#### Time Error

An accumulated time difference between Control Area system time and the time standard. Time error is caused by a deviation in Interconnection frequency from 60.0 Hertz.

#### Time Error Correction

An offset to the Interconnection's scheduled frequency to correct for the time error accumulated on electric clocks.

#### Total Transfer Capability (TTC)

The amount of electric power that can be transferred over the interconnected transmission network in a reliable manner based on all of the following conditions:

- (1) For the existing or planned system configuration and with normal (pre-contingency) operating procedures in effect, all facility loadings are within normal ratings and all voltages are within normal limits.
- (2) The electric systems are capable of absorbing the dynamic power swings, and remaining stable, following a disturbance that results in the loss of any single electric system element, such as a transmission line, transformer, or generating unit.
- (3) After the dynamic power swings subside following a disturbance that results in the loss of any single electric system element as described in 2 above, and after the operation of any automatic operating systems, but before any post-contingency operator-initiated system adjustments are implemented, all transmission facility loadings are within emergency ratings and all voltages are within emergency limits.
- (4) With reference to condition 1 above, in the case where pre-contingency facility loadings reach normal thermal ratings at a transfer level below that at which any first contingency transfer limits are reached, the transfer capability is defined as that transfer level at which such normal ratings are reached.
- (5) In some cases, individual system, power pool, subregional, or Regional planning criteria or guides may require consideration of specified multiple contingencies, such as the outage of transmission circuits using common towers or rights-of-way, in the determination of transfer capability limits. If the resulting transfer limits for these multiple contingencies are more restrictive than the single contingency considerations described above, the more restrictive reliability criteria or guides must be observed. See Available Transfer Capability.

#### Transfer Capability

The measure of the ability of interconnected electric systems to move or transfer power in a reliable manner from one area to another over all transmission lines (or paths) between those areas under specified system conditions. The units of transfer capability are in terms of electric power, generally expressed in megawatts (MW). In this context, "area" may be an individual electric system, power pool, Control Area, subregion, or NERC Region, or a portion of any of these. Transfer capability is directional in nature. That is, the transfer capability from "Area A" to "Area B" is not generally equal to the transfer capability from "Area B" to "Area A".

**Transmission**

An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to other electric systems.

**Bulk Transmission**

A functional or voltage classification relating to the higher voltage portion of the transmission system.

**Sub-transmission**

A functional or voltage classification relating to the lower voltage portion of the transmission system. Transmission Constraints Limitations on a transmission line or element that may be reached during normal or contingency system operations.

**Transmission Customer**

Any eligible customer (or its designated agent) that can or does execute a transmission service agreement or can or does receive transmission service.

**Transmission Provider**

Any public utility that owns, operates, or controls facilities used for the transmission of electric energy in interstate commerce.

**Unit Commitment**

The process of determining which Solar Power Plants should be operated each day to meet the daily demand of the system.

**Voltage Collapse**

An event that occurs when an electric system does not have adequate reactive support to maintain voltage stability.

Voltage Collapse may result in outage of system elements and may include interruption in service to customers.

**Voltage Control**

The control of transmission voltage through adjustments in Solar Power Plant reactive output and transformer taps, and by switching capacitors and inductors on the transmission and distribution systems.

**Voltage Limits**

**Normal Voltage Limits**

The operating voltage range on the interconnected systems that is acceptable on a sustained basis.

**Emergency Voltage Limits**

The operating voltage range on the interconnected systems that is acceptable for the time sufficient for system adjustments to be made following a facility outage or system disturbance.

**Voltage Reduction**

A means to reduce the demand by lowering the customer's voltage.

**Voltage Stability**

The condition of an electric system in which the sustained voltage level is controllable and within predetermined limits.

FOR RFP PURPOSES ONLY

**EXHIBIT 4**  
**REQUIREMENTS FOR OUTAGE AND COMMISSIONING WORKS FOR INTERCONNECTION  
FACILITIES**

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|           |  |           |
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**1. PURPOSE**

1. This document summarizes the requirements on the outage and commissioning work process.
2. All SPP involve on SESB distribution apparatus require for outage and commissioning work need to follow the process instituted in this document

**2. SCOPE OF DOCUMENT**

1. This document is applied to the following processes:
  - a. Outage on distribution installation
  - b. Commissioning of distribution apparatus
  - c. Permit to work on distribution medium voltage apparatus

**3. OUTAGE PROCESS - OUTAGE ON DISTRIBUTION APPARATUS**

**3.1 Outage Definition**

1. Outage is to take out of service and completely isolated a distribution apparatus so that work can be carried out on the aforementioned apparatus without disruption to the remaining grid system. Distribution apparatus are distribution lines, cables and substation apparatus such as transformers, circuit breakers, busbars and protection relays.
2. Outage is required for personnel to work safely with the equipment, the necessary earth switches would be applied where appropriate, for purpose of construction work, testing and etc..

**3.2 Parties involved**

1. Outage applications process can involve the following parties or its representative:
  - a. SPP
  - b. Chief Engineer Generation (Major Project) CEG MP
  - c. Chief Engineer (Operation Planning) CE OP
  - d. Chief Engineer (Distribution Maintenance) CE TM
  - e. Chief Engineer (Protection and Communication) CE P&K
  - f. Chief Engineer (System Operation) CE SO
  - g. Zone Area Managers ZAM



3.3 Approval CE OP

1. Any outage on distribution apparatus would require the prior approval from CE OP. Failure to comply with this requirement may warrant CE OP to refuse to issue relevant operation instruction, and switching instruction to LDC, and may eventually jeopardize the SPP work progress.

3.4 90 Days Notice

1. At least 90 days before the first commencement of the outage on the distribution apparatus, the following information must be forwarded to CE OP:
  - a. Provide the overall outage plan (either outage on live primary or secondary) and information on each one of the outages for the duration of the project.
    - Relevant layout drawing and single line drawing depicting area of work
    - Date, Time and period of isolation required
    - Description of work to be carried out
    - Method of Statement
  - b. Project team organization chart completed with members curriculum vitae and responsibility, especially on:
    - Project Manager/Leader
    - Site supervisor
    - Safety Officer
    - Service Engineer
    - Competent Engineer
  - c. Letter of appointment of Service Engineer and Competent Engineer
  - d. Certificates of Service Engineer and Competent Engineer issued by Energy Commission
  - e. Relevant contact details on the Project Team's telephone, fax and others for communication purpose if needs arise.
  - f. Following information pertaining to each of the outage:
    - Identification of risk during work
    - Measures to be taken prior to work to minimize risk
    - Contingency plans to prevent any untoward incident

2. Copies of the outage application or any revision/update thereof by SPP must be forwarded to the parties involved as mentioned in 3.2 (b) to (g) via CEG MP.
3. Every outage schedule forwarded to CE OP must encompass in the outage plan from beginning till the end. At this stage, the outage schedule is still considered as tentative, changes can still be made to schedule, if require. CE OP may call for discussion/meeting to evaluate and approve/reject/reschedule the outage schedule application, if necessary.
4. Monthly, SPP is required to forward its outage revision/update to CE OP not later than 5th day of each month.

### 3.5 30 Days Notice

1. At least 30 days before the first commencement of the work scheduled on the distribution apparatus, SPP must forward the information on its next three months work schedule to CE OP via One Stop Centre as per item 3.10. Work schedule for the first month is considered as confirmed. Work schedule must reach CE OP not later than 5th day of the month before any work is allowed to proceed.
2. The above work schedule must be forwarded every month until the works are completed.
3. CEG MP is required to ensure consents from the following parties have been obtained for the confirmed outage work schedule:
  - a. SESB ZAM, System Operation, Distribution Maintenance and Protection and Communication.
4. Seven (7) working days before the work scheduled, SPP needs to reconfirm the work schedule to CE OP. Reconfirmation must reached CE OP not later than 16:00Hr on Wednesday seven (7) working days before the work scheduled date.
5. During the above process, CE OP may call for discussion/meeting as deemed required, or fit.

### 3.6 CE OP Authority

1. CE OP reserves the right to reschedule the outage schedule based on prevailing conditions to preserve system reliability.

### 3.7 Late Notices

1. Any notices received less than the stipulated time frame stated above (i.e. 90 days and 30 days) could only be considered based on its merit together with the number of late notice days, such that its target outage date may be adjusted accordingly, as normal outage application will be given the priority.

### 3.8 General Guidelines

1. General guidelines on outage application:
  - a. Total outage of a substation or power station is not allowed

- b. Outage of double circuit lines on the same tower is not allowed unless alternative line route is available. If available, outage on double circuit lines can only be carried out at designated time (e.g. off peak period 2200-0600 hours or weekends Saturday 1400 till Sunday) of duration not more than 24 hours.
- c. Outage period on distribution apparatus of more than 2 days is not allowed.
- d. Outage on any substation with single busbar for more than 24 hours is not allowed. Outage of double busbars is not allowed.
- e. Outage of communication lines is not allowed unless there is an alternative route available.
- f. Outage of inter-connector to other utilities is not allowed.
- g. If an outage has been given to equipment, the next outage request for the same equipment will not be allowed for a period of at least three months.
- h. All outages must follow above process.

### 3.9 Procedure to Obtain Exception

- 1. To gain exception to the above procedure, CE OP would only give due consideration after receiving written consent given by General Manager (Distribution) on the exemption application.

### 3.10 One Stop Centre

- 1. Active communication and coordination are required from all parties to put the outage in place.
- 2. As such, CE OP stipulates that the task of carrying out the communication and coordination is to be under the responsibility of CEG MP.
- 3. As of now, CEG MP functions as the one stop centre for all outages needs related to SPP projects. The channel of communication between CEG MP and CE OP shall be conducted in the usual manner.

#### 4. COMMISSIONING PROCESS - COMMISSIONING OF DISTRIBUTION INSTALLATION

##### 4.1 Commissioning Definition

1. Commissioning is to put into service a new Distribution apparatus by connecting to the existing grid network.
2. In this context, CE OP assumes:
  - a. Distribution project and/or power station substation switchyard which is within the scope of the SPP, and which will be handed over to SESB

##### 4.2 Parties Involved

1. Outage applications involve the following parties or its representative:
  - a. SPP
  - b. Chief Engineer Generation (Major Project) CEG TP
  - c. Chief Engineer (Operation Planning) CE OP
  - d. Chief Engineer (Distribution Maintenance) CE TM
  - e. Chief Engineer (Protection and Communication) CE P&K
  - f. Chief Engineer (System Operation) CE SO
  - g. Zone Area Managers ZAM

##### 4.3 Approval CE

1. All proposals to commission any new distribution OP apparatus (including power station and power station substation) would require prior approval from CE OP. Failing to comply with this requirement may warrant CE OP to refuse to issue relevant operation instruction, and switching instruction to LDC, and may eventually jeopardize the SPP project work progress.
2. In particular for distribution apparatus and open switchyard power station substation, process to get CE OP approval includes all the prerequisites documented in "Distribution Facility Commissioning Management System" enforced by the SESB

##### 4.4 90 Days Notice

1. All applications and commissioning schedule need to be submitted to CE OP at least 90 days before the first commencement of the commissioning on the Distribution apparatus. For example, if the date of commissioning is December 2009, then application must reach OP not later than September 2009. Separately, a copy of the

application and schedule of information by SPP must also be forwarded to the parties involved as mentioned in 4.2.

2. Early submission will facilitate the application approval.
3. All commissioning application shall include the following complete information to CE OP (not less than 90 days before date of commissioning):
  - a. Apparatus to be commissioned
  - b. Single line drawing of power station substation (including the power station)
  - c. Date, time of start and end for each commissioning work
  - d. Detail description of testing work of each commissioning work
  - e. Identification of safety measures and risk monitoring during work
  - f. Measures to be taken prior to work to minimize risk
  - g. Contingency plans if any untoward incident occur
  - h. Name and curriculum vitae of engineer/officer holding authorization/competent completed with relevant contact details on their telephone, fax and others for communication purpose during commissioning if needs arise.
  - i. Draft Interconnection Operation Manual (IOM)
  - j. Method of Statement
4. Every commissioning schedule forwarded to CE OP must encompass the commissioning plan from beginning till completion. At this stage, the commissioning schedule is considered as tentative, changes can still be made to schedule, if require. CE OP may call for discussion/meeting to evaluate and approve/reject/reschedule the commissioning schedule if necessary.
5. Monthly, SPP is encouraged to forward its commissioning revision/update.

#### 4.5 30 Days Notice

1. At least 30 days before the first commencement of the commissioning work on the distribution apparatus, SPP must forward the information on its next three months commissioning work schedule to CE OP. Commissioning work schedule for the first month is considered as confirmed. Commissioning work schedule must reach CE OP not later than 5th day of the month before any work is allowed to proceed, and forwarded via CEG MP on its confirmed commissioning work schedule. For example, if the commissioning date is 28th November 2009, the commissioning work schedule must reach CE OP not later than 5th October 2009. If the commissioning work involved more than one month, the commissioning work schedule for each of the following months must be separately arranged. Any late confirmation of work PIAT Approval Notice schedule (later than 5th day of the month) will result in the CE OP to arrange the commissioning program in the following month.

2. Assigning of numbering and nomenclature to new distribution apparatus is carried out and validated by CE SO. Early submission of application to obtain numbering and nomenclature together with commissioning application will facilitate the arrangement of work by CE OP.
3. All confirmed commissioning schedule shall be forwarded (30 days notice) to CE OP with complete information on the following:
  - a. Apparatus to be commissioned
  - b. Single line drawing of power station substation (including power station) completed with numbering and nomenclature as given by CE SO.
  - c. Clearance Certificate is given by CE P&K, CE TM and CE SO stating that the apparatus, protection system, communication and telecontrol system are in order.
  - d. Certificate is given by ZAM stating that the metering system is in order.
  - e. Date, Time start and end for each commissioning work
  - f. Agreement from CEG MP, CE SO, CE OP, CE TM, ZAM on the commissioning schedule.
  - g. Switching program prepared by SPP Project and agreed by CE SO.
  - h. Identification of safety measures and risk monitoring during work.
  - i. Measures to be taken prior to work to minimize risk
  - j. Contingency plans if any untoward incident occurs
  - k. Name and curriculum vitae of engineer/officer holding authorization/competent completed with relevant contact details on their telephone, fax and others for communication purpose during commissioning if needs arise.
  - l. Technical Data (per Schedule 1 attached)

#### 4.6 PIAT Approval Notice

1. SPP is required to forward the approval notice (together with letter) pertaining to PIAT given by CEG MP (refer to Distribution Facility Commissioning Management System) not less than 5 days before the commissioning program was confirmed.

#### 4.7 Late Notices

1. Any notices received less than the stipulated time frame stated above (i.e. 90 days and 30 days) could only be considered based on its merit together with the number of late notice days, such that its target commissioning date may be adjusted accordingly, as normal commissioning application will be given the priority.

## 4.8 Incomplete Information

1. CE OP would not consider any application submitted with incomplete information and not according to the stipulated conditions mentioned above.

## 4.9 OP Authority

1. CE OP reserves the right to reschedule the commissioning schedule based on prevailing conditions to preserve system reliability.

## Schedule 1 DATA NEEDED BEFORE COMMISSIONING

## 1 SUBSTATION

- 1.1 Substation Name
- 1.2 Connectivity Diagram (Please attach)
- 1.3 Line / Cable Data
- 1.4 Distance
- 1.5 Conductor Size
- 1.6 Thermal Rating
- 1.7 Tower Type
- 1.8 CT Ratio
- 1.9 Circuit Type

## 2. TRANSFORMER / REACTOR / CAPACITOR DATA

## 2.1 \_\_\_\_\_ MVA \_\_\_\_/\_\_\_\_/\_\_\_\_ kV AUTO TRANSFORMER

- a. Name
- b. Voltage
- c. Capacity
- d. Vector Group
- e. Winding Impedance
  - i. HV/LV
  - ii. HV/TV
  - iii. LV/TV
- f. Tap Changer Range
  - i. Max Tap (pos/kV)
  - ii. Min Tap (pos/kV)
  - iii. Nom. Tap (pos/kV)
  - iv. % per step
- g. Current Rating (At tap )
  - i. HV
  - ii. LV
  - iii. TV
- h. Manufacturer
- i. Type of Cooling
- j. Year

## 2.2 \_\_\_\_\_ MVA \_\_\_\_/\_\_\_\_ kV POWER TRANSFORMER

- a. Name
- b. Voltage
- c. Capacity
- d. Vector Group
- e. Impedance
- f. Current Rating
- f. Tap Changer Range
- h. Manufacturer
- i. Type of Cooling
- j. Year

2.3 \_\_\_\_\_ MVA \_\_\_\_/\_\_\_\_ kV POWER TRANSFORMER

- a. Name
- b. Voltage
- c. Capacity
- d. Vector Group
- e. Impedance
- f. Current Rating
- g. Tap Changer Range
- h. Manufacturer
- i. Type of Cooling
- j. Year

2.4 \_\_\_\_\_ KVA \_\_\_\_/\_\_\_\_ kV EARTHING TRANSFORMER

- a. Name
- b. Voltage
- c. Capacity
- d. Vector Group
- e. Impedance
- f. Current Rating
- g. Tap Changer Range
- h. Manufacturer
- i. Type of Cooling
- j. Year

2.5 REACTOR / CAPACITOR

- a. Name
- b. Voltage
- c. Capacity
- d. Vector Group
- e. Impedance
- f. Current Rating
- g. Tap Changer Range
- h. Manufacturer
- i. Type of Cooling
- j. Year
- k. Connection Voltage



## 5. PERMIT TO WORK PROCESS - PERMIT TO WORK ON DISTRIBUTION MEDIUM VOLTAGE APPARATUS

### 5.1 Introduction

1. This section states the information needed to be forwarded to CE OP, on the work involves the primary and secondary of the distribution apparatus.

### 5.2 90 Days Notice

1. At least 90 days before the first commencement of the outage work on the distribution apparatus, SPP must forward the following information to CE OP via One Stop Centre as mentioned in item 3.10:
  - a. Provide the overall work schedule (either outage on live primary or secondary) and information on each of the work for the duration of the project. Tentative work schedule is sufficed for this purpose.
  - b. Project team organization chart completed with members curriculum vitae and responsibility, especially on:
    - Project Manager/Leader
    - Site supervisor
    - Safety Officer
    - Service Engineer
    - Competent Engineer
  - c. Letter of appointment of Service Engineer and Competent Engineer
  - d. Certificates of Service Engineer and Competent Engineer issued by Energy Commission
  - e. Relevant contact details on the Project Team's telephone, fax and others for communication purpose if needs arise.
  - f. Following information pertaining to each of the outage:
    - Identification of safety measures and risk monitoring during work.
    - Measures to be taken prior to work to minimize risk
    - Contingency plans if any untoward incident occur

### 5.3 30 Days Notice

1. At least 30 days before the first commencement of the work plan on the distribution apparatus, SPP must forward the information on its next three months work plan to

CE OP. Work plan for the first month is considered confirm. Work plan must reach CE OP not later than 5th day of month before any work is allowed to proceed.

2. Monthly, the above work schedule update/revision must be forwarded until all works are completed.
3. Seven (7) working days before the work planned, SPP needs to reconfirm the work plan to CE OP. Reconfirmation must reached CE OP not later than 16:00Hr on Wednesday seven (7) working days before the work scheduled date.

5.4 Particular Details Required For Working on Primary and Secondary Distribution Apparatus

1. Permit to work process (PTW): SPP must obtain PTW via One Stop Centre as per item 3.10 before working on the Distribution apparatus. Process to obtain PTW is as follows:
  - a. For work on primary equipment, a PTW will be issued by CE TM.
  - b. For work on secondary equipment, a PTW will be issued by CE P&K.
2. The work duration of a PTW on a dead (on outage) Distribution apparatus shall be the sanction of CE TM.
3. For work on live distribution apparatus (primary or secondary, without outage), a single PTW is valid for one day only, issued from beginning of the day and cancelled at the end of the day when the work is completed. Daily, the PTW shall be issued as follows:
  - a. Before starting the day work (say at 0800 hours), SPP must conduct a daily briefing on the extend of work to be undertaken, and representatives from CE TM / CE P&K must be present during the briefing session.

- b. The following information must be included in the briefing:
  - Identification of safety measures and risk monitoring during work
  - Measures to be taken prior to work to minimize risk
  - Contingency plans if any untoward incident occurs
- c. Records/notes of daily briefing must be faxed to LDC (duly signed and chopped by the Service Engineer or Competent Engineer)
- d. LDC will evaluate and make decision on whether to allow work to proceed or not and replied by means of fax.
- e. Based on LDC decision, CE TM and/or CE P&K will then proceed to issue PTW or not.
- f. CE TM / CE P&K requires to cancel the PTW at the end of the day (say at 1800 hours)
- g. A daily de-briefing must be conducted (toward end or after working hour) covering the work completed and the day ahead work plan. Records/notes of daily debriefing must be faxed to LDC.

## **6. GENERATION COMMISSIONING PROCESS - INFORMATION REQUIREMENT ON GENERATION SCHEDULE**

### **6.1 Providing Information on Generation Output Level during Commissioning Test**

1. Tentative generation commissioning schedule must be given to CE OP via One Stop Centre as mentioned in item 3.10 not less than 90 days before its commissioning. Start time, stop time and hourly output level MW must be given in tabulated and graphical format together with other relevant information and type of test to be carried out.
2. Confirmed generation commissioning schedule must be given to CE OP via One Stop Centre as mentioned in item 3.10 not less than 30 days before the commissioning. Start time, stop time and hourly output level MW must be given in tabulated and graphical format together with other relevant information and type of test to be carried out.
3. Reconfirmed generation commissioning schedule must be given to CE OP via One Stop Centre as mentioned in item 3.10 not less than Seven (7) working days before its commissioning. Start time, stop time and hourly output level MW must be given in tabulated and graphical format together with other relevant information and type of test to be carried out.
4. Daily test schedule stating start time, stop time and hourly output level MW must be given in tabulated and graphical format together with other relevant information and type of test to be carried out to CE OP via One Stop Centre as mentioned in item 3.10 a day before its scheduled commissioning day and not later than 1000 hours.

Any changes identified after 1000 hours can be forwarded once again not later than 0800 hours the following morning.

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EXHIBIT 5

SAFETY REQUIREMENT

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## **APPENDIX 5 - SAFETY REQUIREMENTS**

### **1.0 PRE-COD STAGE**

#### **1.1 Permit -To-Work System**

The SPP shall apply to SESB for Permit to Enter Site and Permit to Work (PTW) before commencement of any installation and testing works at existing SESB's substations and distribution /transmission line equipment.

The SPP shall submit the name(s) of the person(s) holding Certificate of Competency issued under the Electricity Supply Regulation 1994 of the Electricity Supply Act 1990 (Act 447), who shall be responsible for installation, testing and commissioning of the substation installation, stating the type of Certificate of Competency and Limitations, if any.

A certified copy of valid Certificate of Competency shall be submitted for verification by SESB.

Where the work involves extension to a "live" substation, line or working in the vicinity of any "live" equipment, PTW shall only be issued to the named competent person(s).

The competent person is required to be present on site during the duration of the above work.

The operation of or connections to any items of equipment once made live shall be subjected to the SESB safety rules and instructions which require PTWs to be issued by an Authorised Person to the Competent Person of the SPP before any work can be carried out.

Refer to details of PTW process of Exhibit 5 for implementation purpose.

#### **1.2 Safety Compliance Audit (SAFCA)**

The SPP shall comply with the requirements of the Occupational Safety and Health Act 1994 (Act 514) in the execution of the Interconnection Facilities works to be handed over to SESB for operation and maintenance. To ensure safety implementation at site construction work by the SPP, the SPP is required to comply with the SESB SAFCA guidelines. A copy of the safety guidelines can be obtained from SESB prior to the Commencement Date.

#### **1.3 Site Responsibility**

A schedule shall be agreed between the SPP and SESB concerning division of responsibilities at the site pertaining to, amongst other things, ownership, control, safety, operation and access. The Site Responsibility Schedule and an Operational Diagram will be agreed by the SPP and SESB.

These will indicate the operational boundaries and asset ownership boundaries, between the **SPP** and SESB at the Interconnection Point (including a proposed Point of Common Coupling). This shall include a geographic site plan and operational schematic

indicating ownership boundaries. A copy of this will be clearly displayed at each part of the site, once mutual agreement has been reached. Such agreement, not being unreasonably withheld by either party, shall be necessary before commissioning can commence on the site.

#### **1.4 Numbering and Nomenclature**

Consistent and unambiguous numbering and nomenclature of apparatus in the Distribution System and Grid System facilitates safe operation and control of the apparatus by the GSO.

All MV apparatus of the Distribution System and HV apparatus of the Grid System that are and will be under the control of the GSO shall have numbering and nomenclature in accordance with the system specified in the operating code no.9 of the prevailing Sabah and Labuan Grid Code or as determined by the GSO. The numbering and nomenclature of each item of MV and HV Apparatus shall be included in the single line diagram prepared for each site of SESB or SPP site. The numbering and names are also used in the labeling of equipment including, towers, apparatus, control panels and diagrams.

## **2.0 POST COD STAGE**

### **2.1 Safety Coordination**

Testing and Maintenance of the Interconnection Facilities and Facility equipment at the Interconnection Point shall be safely co-ordinated between SESB and SPP in accordance with the Safety Coordination procedures and Record for Interconnection Safety Precautions (RISP) Requesting and Implementing forms as described in the provisions of the operating code no. 8 of the prevailing Sabah and Labuan Grid Code.

SESB and SPP shall implement their own electrical safety rules based on the safety prudent utility practices and Electricity Supply Regulation 1994.

Nominated safety coordinators are responsible for the coordination of safety on MV and HV apparatus at the interconnection point. The names of the safety coordinators will be notified by the SPP and SESB. The SESB safety coordinator shall be authorised by the GSO on behalf of Energy Commission. In the case of the SPP, the safety coordinator shall be authorised by the Energy Commission. Only persons with such authorisation will carry out the provisions of the operating code no.8 of the prevailing Sabah and Labuan Grid Code. The safety coordinator of the SPP will be a company nominated Energy Commission competent person authorised by the SPP to carry out functions set out in the operating code no.8.



**No. 12, Jalan Tun Hussein  
Precinct 2**

**62100 Putrajaya**

**Tel : +603 8870 8500**

**Fax : +603 8888 8637**

**Web : [www.st.gov.my](http://www.st.gov.my)**