



TNB RENEWABLE ENERGY APPLICATION HANDBOOK REVISION 2020



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Contents

Disclaimer	i
Abbreviations	iv
Glossary of Terms	v
1. Introduction	1
1.1 Overview	1
1.2 Objective & Scope	1
2. Feed-in Tariff (FiT) Scheme	2
2.1 FiT Overview	2
2.2 Fit-in Tariff (FiT) Scheme Application Process	3
2.3 Contract/Agreement for FiT	4
2.4 RE Fund (KWTBB) & FiT Energy Payment	5
3. Net Energy Metering (NEM) Scheme	6
3.1 NEM Overview	6
3.2 NEM Scheme Application Process	7
3.3 Contract/Agreement for NEM	9
3.4 NEM Billing	10
4. Large Scale Solar (LSS) Scheme	11
4.1 LSS Overview	11
4.2 LSS Scheme Application Process	12
4.3 Contract/Agreement for LSS	14
4.4 LSS Scheme Energy Payment	15
5. New Enhanced Dispatch Arrangement (NEDA) Scheme	16
5.1 NEDA Overview	16
5.2 NEDA Registration Process	19
5.3 NEDA Agreement	20
5.4 NEDA Settlement	21
6. Self-Consumption (SELCO) Scheme	22
6.1 SELCO Overview	22
6.2 SELCO Application Process	22
6.3 Contract/Agreement for SELCO Scheme	23

7. Technical Feasibility Study	24
7.1 General Requirement	24
7.2 Connection Confirmation Check (CCC)	26
7.3 Power System Study (PSS)	26
7.4 Net Energy Metering Assessment Study (NEMAS)	27
7.5 Application Process for Technical Feasibility Study	28
8. RE Interconnection Scheme & Boundaries	30
8.1 Connection Scheme	30
8.2 Boundary of Ownership & Operation	35
9. Metering Requirement	36
9.1 General Requirement	36
9.2 Energy Accounting by Category of Metering Installation	37
9.3 Meter Reading	40
9.4 Meter Inspection and Testing	40
10. RE Operation	41
10.1 Interconnection Operation Manual	41
Reference	43
APPENDICES	44
APPENDIX 1: Summary of RE Scheme and Connected Capacity	44
APPENDIX 2: Sample of Feed-In Approval Certificate	46
APPENDIX 3: A summary of REPPA forms	47
APPENDIX 4: Sample of RE Application Form	48
APPENDIX 5: Sample of Meter Application Form	49
APPENDIX 6: Sample of NEM Meter Application Form	50
APPENDIX 7: Sample of NEM Meter Declaration Form	51
APPENDIX 8: Sample of NEM Inspection and Commissioning Form	52
APPENDIX 9: Settlement Formula	53
APPENDIX 10: Sample of Self-Consumption Solar PV System Registration Form	55
APPENDIX 11: Sample of Borang Maklumat Awal (BMA) Perjangkaan	58

Abbreviations

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

Abbreviations	Descriptions
BMA	Borang Maklumat Awal
CCC	Connection Confirmation Check
CT	Current Transformer
DL	Distribution Licensee
FiA	Feed-in Approval
FiAH	Feed-in Approval Holder
FiT	Feed-in Tariff
IOM	Interconnection Operational Manual
kV	kilovolt
kW	Kilowatt of power generation
kWh	Kilowatt-hour
kWp	Kilowatt Peak (for solar photovoltaic only)
LSS	Large Scale Solar
LV	Low Voltage (operation of equipment at a voltage less than 1000V or 1kV)
LVCT	Low Voltage Current Transformer
MAAQ	Maximum Annual Allowable Quantity
MV	Medium Voltage (operation of equipment at a voltage more than 1000V or 1kV but not exceeding 50kV)
MW	Megawatt of Power Generation
NEDA	New Enhanced Despatch Arrangement
NEM	Net Energy Metering
PPA	Power Purchase Agreement
PSS	Power System Study
RC	Registered Contractor
RE	Renewable Energy
RE Act 2011	Renewable Energy Act 2011 & its Rules
REPPA	Renewable Energy Power Purchase Agreement
RJO	Rechargeable Job Order
SEDA	Sustainable Energy Development Authority Malaysia
SELCO	Self-consumption
SLA	Service Level Agreement
Solar PV	Solar Photovoltaic
SP	Service Provider for solar photovoltaic installation
SPP	Solar Power Producer
ST	Suruhanjaya Tenaga
T&C	Testing & Commissioning
VOR	Variable Operating Rate
VCB	Vacuum Circuit Breaker
VT	Voltage Transformer

Glossary of Terms

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

Term	Definition
Anti-islanding	The condition that occurs when parts of the network including associated generating unit become detached electrically from the rest of the grid system;
Current Transformer (CT)	Current transformer (CT) is a type of transformer that is used to measure AC Current. It produces an alternating current (AC) in its secondary which is proportional to the AC current in its primary.
Distribution Licensee (DL)	The holder of a license to distribute issued by Commission under Section 9 of the Electricity Supply Act 1990;
Distribution Network	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;
Distribution System	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;
Demand or Load	Means demand of MW/kW and MVar/kVar of electricity (i.e. both Active Power and Reactive Power), unless otherwise stated;
Distribution Code (MDC)	The Malaysian Distribution Code is a document Distribution Code for Peninsular Malaysia, Sabah & F.T. Labuan containing a set of technical rules and Procedures that facilitate coordinated planning, coordinated design, coordinated development, and coordinated operation of the Distribution System;
Feed-in Approval Holder (FiAH)	A person who holds feed-in approval issued by Sustainable Energy Development Authority (SEDA) Malaysia

Term	Definition
Feed-in Tariff (FIT)	A Policy mechanism that obliges Distribution Licensees (DLs) to buy from Feed-in-Approval Holders (FIAHs) the electricity produced from grid-connected renewable energy developers over a fixed period at a particular rate, which is set by a governmental agency, Sustainable Energy Development Authority (SEDA) Malaysia.
Flicker	Power-line flicker is a visible change in brightness of a lamp due to rapid fluctuations in the voltage of the power supply. The voltage drop is generated over the source impedance of the grid by the changing load current of an equipment or facility. These fluctuations in time generate flicker.
Interconnection Facility (IF)	The components that interconnect the RE Plant and the distribution network. This includes the substation at the RE Plant, overhead lines or underground cables where the connection to the distribution network is made;
Inverter	A machine, device, or system that changes DC power to AC power;
Islanding	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;
Large Scale Solar (LSS)	Any solar photovoltaic plant with minimum size of 1MWac and maximum of 50MWac, connected to either the transmission system or distribution system in Peninsular Malaysia, Sabah or Labuan.
Low Voltage	A voltage normally exceeding extra low voltage but not exceeding 1,000 volts alternating current or 1,500 volts direct current between conductors, or 600 volts alternating current or 900 volts direct current between conductor and earth.
LV Direct Connection	means the connection of a renewable energy installation directly to a low voltage supply line has to be technically feasible according to prudent utility practices.
LV Indirect Connection	means the connection of a renewable energy installation to a low voltage supply line indirectly through the internal distribution board of the RE developer where the renewal energy installation is connected to an electrical point within the premises of the RE developer instead of the point of common connection.
Main Distribution Sub-station (PPU)	Main Distribution Sub-station (PPU) is normally applicable to 33 kV for interconnecting 33 kV networks with 11 kV networks. It provides capacity injection into 11 kV network through a standardized transformation of 33/11 kV.

Term	Definition
Main Switching Station (SSU)	Main Switching Station (SSU) at 33 kV and 11 kV are established to serve the following function: - <ul style="list-style-type: none"> I. To supply a dedicated bulk consumer (33 kV and 11 kV) II. To provide bulk capacity injection or transfer from a PMU/PPU to a load center for further localized distribution.
Medium Voltage	A voltage equal to or exceeding 1 kV but not exceeding 50 kV; A voltage normally exceeding 1kV but equal to or not exceeding 50,000 volts or 50 kV;
New Enhanced Dispatch Arrangement (NEDA)	The New Enhanced Dispatch Arrangement is the mechanism used by the Single Buyer for scheduling the dispatch of generation under the Single Buyer Market.
Net Energy Metering (NEM)	A mechanism where an eligible consumer installs a solar PV system primarily for his own use and the excess energy to be exported to the grid for which credit to be received that may be used to offset part of the electricity bill for energy provided by the distribution licensee to the electricity consumer during the applicable billing period.
NEM Assessment Study (NEMAS)	A pre-requisite study for NEM application and shall be performed prior to the approval of the NEM application. The study shall be conducted by DL to establish the technical and safety requirements and determine the feasibility of interconnection.
Plant	A Generation Facility that generates power from renewable resources with a capacity less than 30MW and ancillary equipment and facilities and includes any modification thereto;
Point of Common Coupling (PCC)	The point of common coupling where RE Plant is connected to the distribution system;
Power Purchase Agreement (PPA)	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;
Power System Study (PSS)	Studies to analyze and improve electrical system safety, reliability and efficiency. Power system studies are performed for new systems during the design phase, after modifications to the feeding power grid, and before modifications to existing electrical systems.
Prudent Utility Practice	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;

Term	Definition
Renewable Energy	Electricity that is generated or produced from renewable resources.
Suruhanjaya Tenaga (ST)	Commission or Energy Commission established under the Energy Commission Act 2001 (Act 610);
Total Harmonic Distortion (THD)	Harmonic distortion is the departure of a waveform from sinusoidal shape that is caused by the addition of one or more harmonics to the fundamental. Total Harmonic Distortion is the square root of the sum of the squares of all harmonics expressed as a percentage of the magnitude of the fundamental.
Transmission Main Intake (PMU)	Transmission Main Intake Substation (PMU) is the interconnection point of 132 kV or 275 kV to the distribution network.
Type Test	Test of one or more devices made to a certain design to demonstrate that the design meets certain specifications;
Power Factor	Power factor (PF) is calculated by dividing the Real Power, P, in the W unit by the Apparent Power, S, in the VA unit.
Voltage Transformer (VT)	Potential transformer or voltage transformer gets used in electrical power system for stepping down the system voltage to a safe value which can be fed to low ratings meters and relays.
Variable Operating Rate or VOR	A unit of measurement expressed in RM/kWh.

1. Introduction

1.1 Overview

Renewable Energy (RE) as set out in the first column of the Schedule of the RE Act 2011, refers to electricity generated from recurring and non-depleting indigenous resources or technology. Malaysian National RE Policy & Action Plan is approved by Cabinet on 2nd April 2010. The vision of National RE Policy & Action Plan aims to enhance utilization of indigenous renewable energy resources to contribute towards national electricity supply security and sustainable socio-economic development. [Ref. 1]

The National RE Policy & Action Plan is set to accomplish the following objectives:

- i. To increase RE contribution in the national power generation mix
- ii. To facilitate the growth of the RE industry
- iii. To ensure reasonable RE generation costs
- iv. To conserve the environment for future generation
- v. To enhance awareness on the role and importance of RE

5 strategic thrusts have been identified to achieve the 5 objectives:

- Thrust 1:** Introduce an appropriate regulatory framework
- Thrust 2:** Create conducive business environment for RE
- Thrust 3:** Intensify human capital development
- Thrust 4:** Enhance RE research and development
- Thrust 5:** Increase public and stakeholder awareness & RE policy advocacy

Thrust 1 forms the foundation for the remaining strategic thrusts. It involves the enactment of the Renewable Energy Act which mandates the implementation of the Feed-in Tariff (FiT) mechanism. Now, there are some RE programmes that is available in Malaysia other than FiT such as Net Energy Metering (NEM), Large Scale Solar (LSS), New Electricity Despatch Arrangement (NEDA) and Self-Consumption (SELCO).

1.2 Objective & Scope

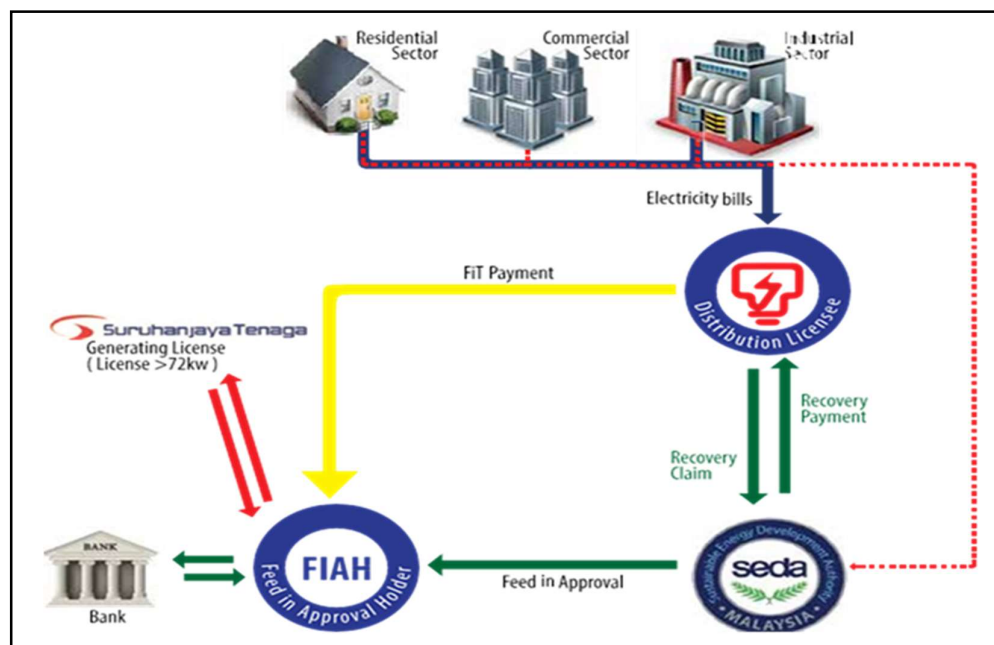
The Handbook provides information on processes, requirements and standards of practice. The objective of this guideline is to elaborate on standard practices and implementation processes which cover both commercial and technical aspects. RE plant described in this document refer to those connected to the distribution network at 33kV, 11kV and Low Voltage (LV) system covering schemes of FiT, NEM, LSS, NEDA and SELCO. Summary of RE scheme and connected capacity in **Appendix 1**.

2. Feed-in Tariff (FiT) Scheme

2.1 FiT Overview

Malaysia's Feed-in Tariff (FiT) system obliges Distribution Licensees (DLs) to buy from Feed-in Approval Holders (FIAHs) the electricity produced from renewable resources (renewable energy) and sets the FiT rate. The DLs will pay for renewable energy supplied to the electricity grid for a specific duration. By guaranteeing access to the grid and setting a favorable price per unit of renewable energy, the FiT mechanism would ensure that renewable energy becomes a viable and sound long-term investment for companies, industries and also for individuals. [Ref. 2]

Figure 2.1: Feed-in Tariff (FiT) Mechanism in Malaysia



Key Terminologies in Feed-In Tariff:

- Distribution Licensees: Companies holding the licence to distribute electricity (e.g. TNB, SESB, NUR).
- Feed-in Approval Holder: An individual or company who holds a feed-in approval certificate issued by Sustainable Energy Development Authority (SEDA) Malaysia. The holder is eligible to sell renewable energy at the FiT rate.
- FiT rate: Fixed premium rate payable for each unit of renewable energy sold to DL's. The FiT rate differs for different renewable resources and installed capacities. Bonus FiT rate applies when the criteria for bonus conditions are met.
- Indigenous: Renewable resources must be from within Malaysia and are not imported from other countries.
- Duration: Period of which the renewable electricity could be sold to DL's and paid with the FiT rate. The duration is based on the characteristics of the renewable resources and

technologies. The duration is 16 years for biomass, and 21 years for biogas resources, small hydropower and solar photovoltaic technologies. [Ref. 2]

2.2 Fit-in Tariff (FiT) Scheme Application Process

Application for feed-in approvals depends on the availability of the FiT quota for each RE technology and is subject to approval by SEDA Malaysia. Prospective applicants for feed-in approvals are strongly encouraged to familiarise themselves with the provisions and requirements of the Renewable Energy Act 2011, the subsidiary legislation made under the act, and the relevant Acceptance Test and Performance Assessment (AT&PA) Guidelines.

The eligible RE developers may apply for the FiT certificate from SEDA Malaysia after they have completed the technical feasibility study and obtained an approval letter from the DL. RE installation with generation capacity of less than and including 12 kW does not require any technical study.

Detailed application guidelines can be downloaded via SEDA Malaysia website which can be accessed through www.seda.gov.my. An application for a feed-in approval must be made by electronic transmission through the Feed-in Tariff Online portal (e-FiT) accessible at <https://efit.seda.gov.my>, or any other submission method; as may be determined by the Authority and notified on its website.

Successful applicants will be granted feed-in approval certificates by SEDA Malaysia which indicate the details of the renewable energy installation information and contractual requirements. A sample of the feed-in approval certificate is shown in **Appendix 2**. The holder of this feed-in approval certificate will be termed as Feed-in Approval Holder (FiAH). Next, FiAH shall download the standard REPPA document from SEDA Malaysia website to be filled up and submitted to the DL for signing process and stamping.

Figure 2.2: FiT Application scheme process [Ref.3]

STEP 1 Check the current FiT quota with SEDA	STEP 5 Sign your Renewable Energy Power Purchase Agreement with DL
STEP 2 Find your registered contractor/service provider (RC/SP)	STEP 6 Your (RC/SP) will do construction & installation solar PV system
STEP 3 Your (RC/SP) will apply for Technical Assessment with DL (if applicable)	STEP 7 Your (RC/SP) will proceed for interconnection works, testing & commissioning
STEP 4 If approved, your (RC/SP) will get the approval/quota from ST	

Detail technical assessment is described further in Chapter 7: Technical Feasibility Study.

2.3 Contract/Agreement for FiT

Table 2.1 shows the document requirement for agreement FiT scheme. [Ref. 4]

Table 2.1: Document requirement for agreement FiT scheme

Item	Feed-in Tariff (FiT)
Nomenclature	REPPA
Commercial Term	16 years for biomass, 21 years for biogas resources, small hydropower and solar photovoltaic technologies.
Template	There are nine (9) REPPA standard forms available and downloadable at SEDA Malaysia website. FiAH needs to choose the correct REPPA form according to the FiA certificate. A summary of REPPA forms is illustrated in Appendix 3 .
Agreement Preparation	FiAH shall download the relevant REPPA form from the SEDA website and fill up accordingly. The REPPA form is standard and any amendment or alteration of any words or sentences is prohibited except those portions that require FiAH to fill up, whichever applicable.
Compilation	Every single set of the REPPA document must be compiled in a management file.
Appendices	<ul style="list-style-type: none"> • Appendix A - Renewable Energy Installation <ul style="list-style-type: none"> – Description of renewable energy installation as per the description submitted to the Authority in the application for the feed-in approval • Appendix B - Interconnection Facilities <ul style="list-style-type: none"> – Description of interconnection facilities, including the description of the connection point. • Appendix C - Communication Facilities <ul style="list-style-type: none"> – Description of communication facilities • Appendix D - Consequences of Termination • Appendix E - Feed-in Approval Certificate and Conditions <ul style="list-style-type: none"> – Certified true copy of certificate of the feed-in approval issued by the Authority to the feed-in approval holder.
Timeline for Signing	60 days, except for solar PV installation with generation capacity of less and including 1MW shall be signed within 30 days after DL receives the completed REPPA documents.

Other Requirements:

- i. RE developer shall print three (3) copies of the agreement on A4 paper (100gm) or Conqueror (Laid Brilliant White – 80gm).
- ii. RE developer shall initial each page of the agreement (except the signing page) using black ink (ball point pen is not allowed).
- iii. RE developer shall submit agreement and all other documents listed below:
 - RE Application Form (**Appendix 4**) together with documents required under Section 2 of the form that consists of Form 9, Form 24, Form 44 and Form 49 whichever applicable must be certified as true copies by a Company Secretary or Commissioner of Oath.

- A copy of RE developer’s bank statement, and Mykad/Passport or Form 9 from Suruhanjaya Syarikat Malaysia (SSM) for company registration
 - Metering Application Form for meter procurement (**Appendix 5**).
- iv. DL shall authorize Signatories for the agreement.
 - v. All copies of the signed agreement shall be returned to RE developer for stamping.
 - vi. RE developer shall return or submit a copy of the original stamped agreement to the DL and the Implementing Agency within 7 days after the signing is done.
 - vii. RE developer shall keep one original copy of stamped agreement, and submit a copy each to the DL and the Implementing Agency.

2.4 RE Fund (KWTBB) & FiT Energy Payment

RE Fund

The Renewable Energy (RE) fund is a fund collected by the Government through consumer’s electricity consumption. The fund is used to promote growth of electricity generation from renewable energy resources. As stipulated in the RE Act 2011, the RE fund (KWTBB) is collected through a surcharge of consumers’ electricity consumption at the rate of 1.6%. The surcharge applies to all customers except for domestic customers with electricity consumption of 300kWh and below per month. DL’s function is as the collecting agent of the fund for the Government. The RE Fund (KWTBB) collected from the consumer’s electricity bill is channeled to the Government (SEDA), who manages and administers the FiT system. The DL will claim from SEDA for the recovery from the RE Fund, a sum equivalent to the difference between the amount of feed-in tariffs paid by the DL to FiAH and the displaced cost.

FiT Energy Payment

DL shall only initiate the billing and payment process upon the approval of commissioning date by the authority. The monthly meter reading is used to create payment advice in the DL billing system. The DL shall pay the applicable tariffs no later than thirty days after the issuance of a payment advice to each FiAH, or no later than thirty days after the receipt of invoice from FiAH.

The energy generated and delivered prior to the commissioning date shall be paid at a test energy rate as stipulated in the renewable energy power purchase agreement. During the contract term, the annual net energy output shall be paid at the applicable energy rate up to the declared annual quantity. Payment for the annual energy generation that exceeds the declared annual quantity is subject to the conditions set in each renewable energy power purchase agreement.

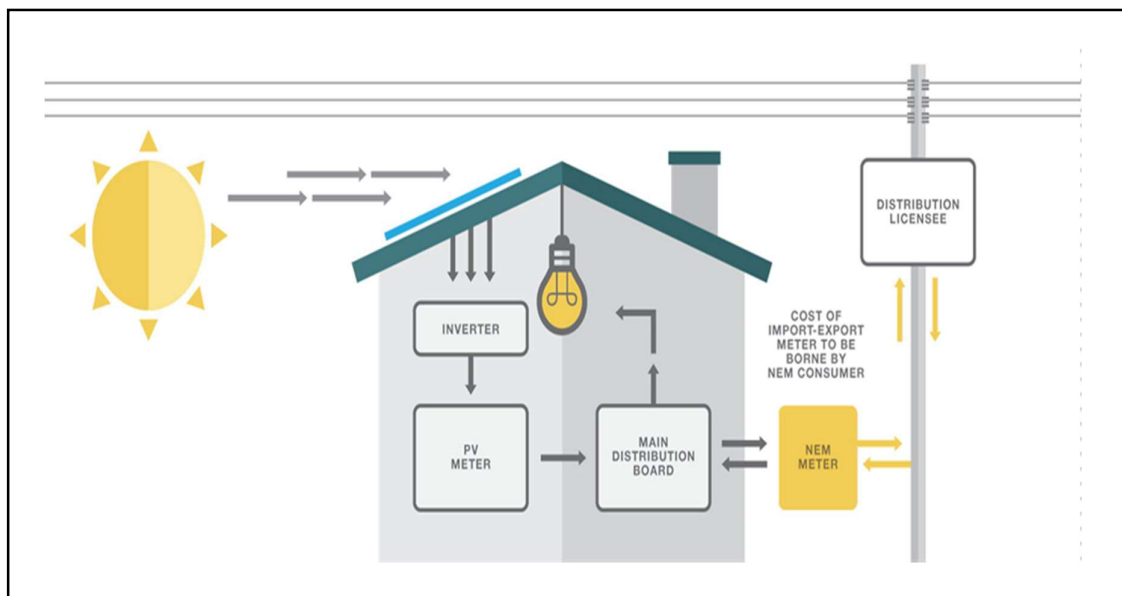
3. Net Energy Metering (NEM) Scheme

3.1 NEM Overview

The solar PV sector has been booming over the last decade and is forecasted to confirm this trend in the coming years. Net Energy Metering (NEM) scheme which allows consumers who generate electricity from solar energy for their own use, as well feeding electricity they do not use back into the grid, is expected to accelerate in the next few years, in line with the Government initiatives to increase the penetration of renewable energy in the energy mix.

NEM scheme is a billing mechanism that credits indirect solar PV system owners for the electricity they add to the grid. For example, if a residential consumer has a PV system on the rooftop, it may generate more electricity than the home uses during daylight hours. If the home is net-metered, the extra electricity produced will provide a credit against what electricity is consumed at night or other periods where the home's electricity use exceeds the solar energy system's output. Consumers are billed for their energy use taken from the Distribution Licensee supply, which will be offset with the energy exported from their solar PV generation.

Figure 3.1: Net Energy Metering (NEM) in Malaysia



Based on FiT experience, solar PV is a technology that requires minimal construction and with high take up rate compared to other RE technologies. One factor driving such growth is the declining cost of solar PV systems in recent years. As solar PV technology is more applicable to the NEM scheme, it is one of the technologies that allows the public at large to play an active role in mitigating climate change. They can generate clean energy, hence reducing the energy consumption and greenhouse gas emissions.

The NEM scheme is ideally suitable to complement the current FiT and Large Scale Solar schemes in achieving the 20% national RE target in electricity power mix by enabling more solar PV rooftop applications, and these efforts in turn help to reduce dependency on imported fossil fuels.

The energy generated by NEM consumers will be consumed first which implies that less energy will be imported from the utility. In many countries, the NEM scheme is effective to hedge against fluctuation or increase in electricity tariff in the future. This is especially relevant for consumers that fall under the high electricity tariff block. [Ref. 5]

Around the world, net metering policies vary significantly: if and how long banked credits can be retained, and how much the credits are worth. In Malaysia, the policy is continually being revised for each NEM scheme offered, which is limited by a prescribed quota within an offer period. An eligible consumer installs a solar PV system, from which the energy produced will be consumed first and any excess will be exported to TNB and compensated at the stipulated rate of the NEM scheme subscribed by the consumer. The credit to be received may be used to offset part of the electricity bill during the applicable billing period. The credit roll over period also varies according to the NEM scheme subscribed. This scheme is applicable to all domestic, commercial, industrial and agricultural sectors as long as they are the customers of DL. The PV systems can be installed at available rooftops or car porch within their own premises. For ground-mounted system, it may be allowed on case by case basis and the installation shall be within compound of applicant's premise and approved by the SEDA.

3.2 NEM Scheme Application Process

NEM is one of the options for Solar Producer to generate electricity from their own solar PV system, and self-consume the generated energy to reduce electricity bills. Any excess of solar energy generated will be exported to the grid to offset the electricity bills. A bi-directional meter will be installed for these types of connections, and applicants must ensure that adequate communication signal is available since meter reading will be done remotely. The eligible RE developers may apply for the NEM certificate from SEDA Malaysia via eNEM system, accessible through SEDA website.

Figure 3.2: Responsibilities of Consumer RPVSP and Distribution Licensee

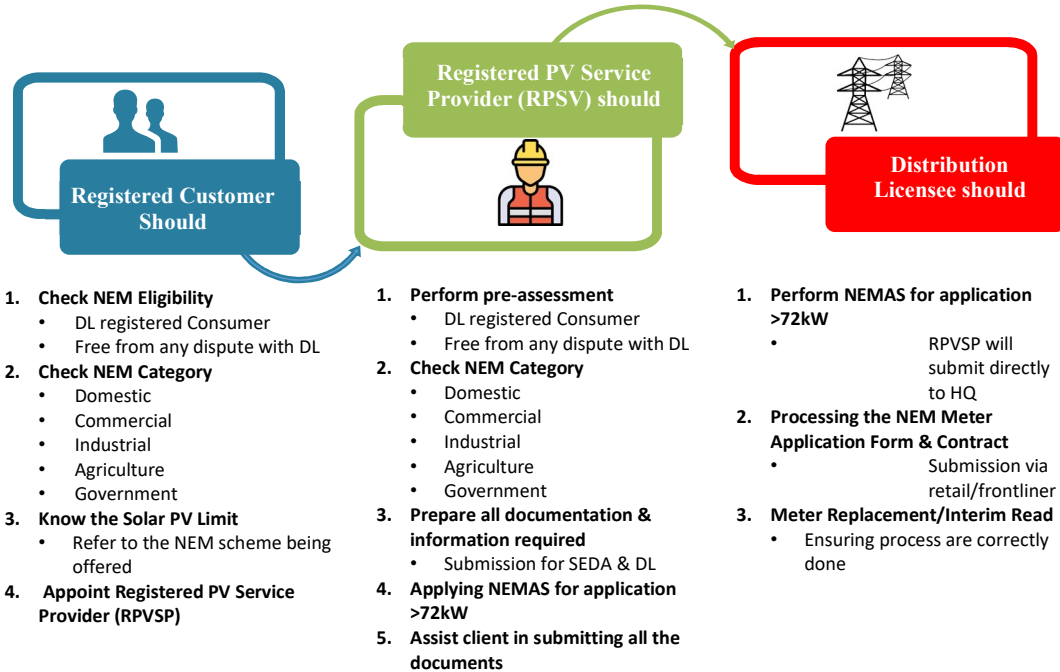
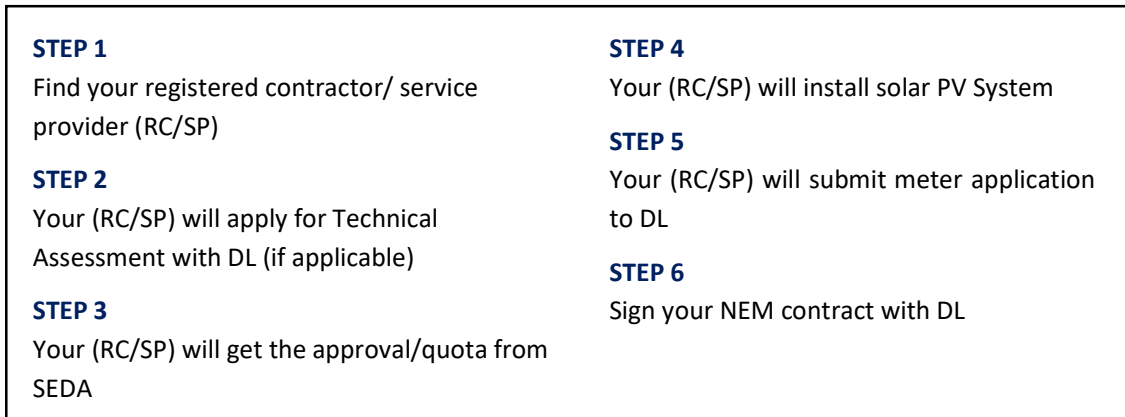
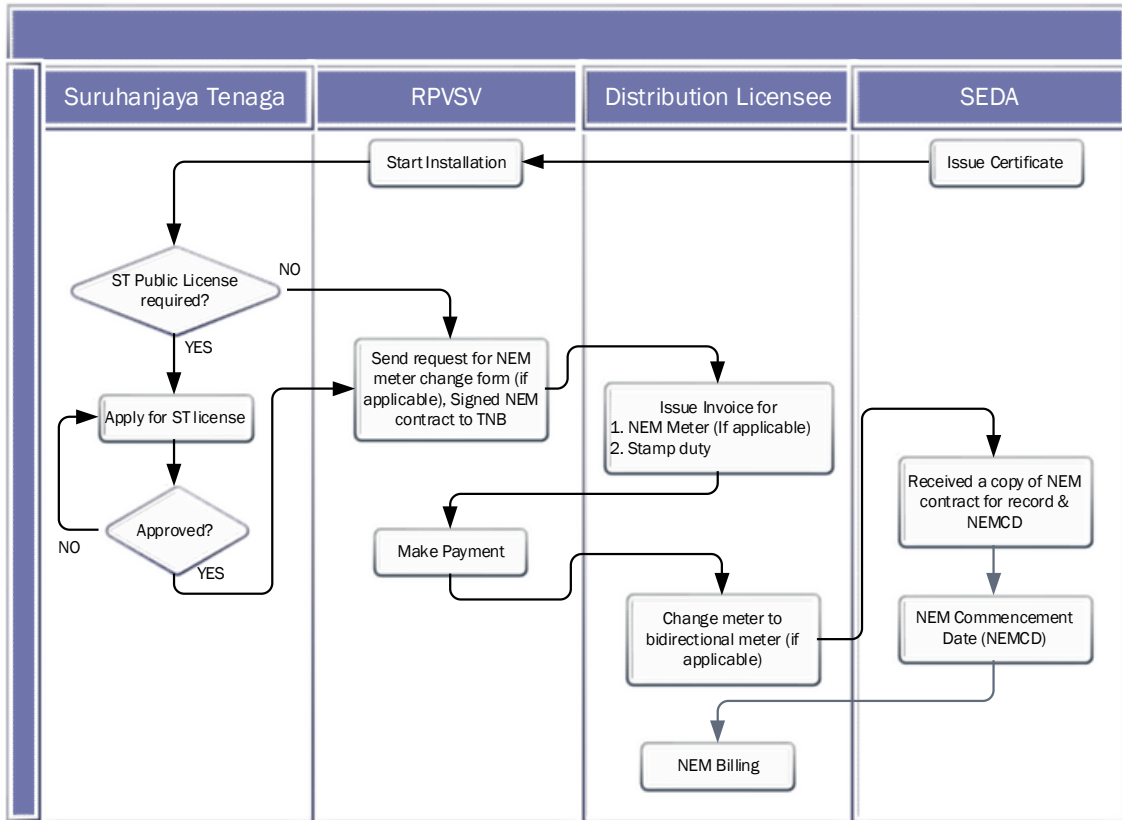


Figure 3.3: NEM Scheme application process [Ref. 3]



Detail technical assessment is described further in Chapter 7: Technical Feasibility Study. Successful applicants will be granted NEM approval certificates by SEDA Malaysia. **Figure 3.4** shows the subsequent process after NEM approval.

Figure 3.4: NEM Process Flow After NEM Approval



3.3 Contract/Agreement for NEM

NEM applicant must submit the application, only after all of the installation work for Solar PV fully completed. Please ensure that meter requirement is fulfilled (3 phase meter board, meter relocation) prior to submitting the application. Only fully-completed application will be processed. Incomplete application will be returned to applicant. DL reserves the right to reject incomplete submission.

Submission of the NEM Meter Application Form and NEM Contract must include the following forms and supporting documents. [Ref. 6]

NEM Meter Application Form (Appendix 6)

- i. NEM Certificate
- ii. Pictures of DL meter and interconnection from the grid;
- iii. Picture of proposed meter location (If there are changes of meter location for the existing meter)

NEM Contract

- i. NEM Declaration Form (DL Contract) (**Appendix 7**)
- ii. Form G & Form H
- iii. A copy of Generating License by Suruhanjaya Tenaga (subject to requirement according to Electricity Supply Act 1990)
- iv. NEM Contract
- v. DL Inspection & Commissioning Form (**Appendix 8**)

3.4 NEM Billing

Following the NEM Commissioning Date, the DL shall provide the following details with the electricity bill for each Billing Period:

- i. Quantum of electricity exported into the distribution system by the solar PV system;
- ii. Quantum of electricity supplied by the DL to the NEM Consumer;
- iii. Quantum of net electricity that has been billed for payment by the NEM Consumer;
- iv. Quantum of electricity credits available to the NEM Consumer which is carried over from the previous Billing Period;
- v. Quantum of electricity exported by the NEM Consumer into the distribution system in excess of the electricity supplied by the DL (quantum of electricity credits) which shall be carried forward to the next Billing Period.

The NEM scheme subscribed by the consumers will determine the credit amount to be net-off and the allowable roll over period for the excess credit to be carried forward, after which any remaining credit will be forfeited. There will be no cash transaction involved in NEM scheme.

4. Large Scale Solar (LSS) Scheme

4.1 LSS Overview

Large Scale Solar or known as LSS is a competitive bidding programme to drive down the Levelized Cost of Energy (LCOE) for the development of large scale solar photovoltaic plant (LSS) and Suruhanjaya Tenaga (ST) is the implementing agency for this scheme. [Ref. 7]

The key principles of LSS framework shall be as follows: [Ref. 8]

- 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 may carry certain merit points;
- iii) The plant capacity range for LSS power plant is as specified in the RFP;
- iv) The connection to the electricity network, whether to the transmission network or Distribution Network, shall be based on technical criteria and evaluation through a comprehensive system study;
- v) The PPA shall be based on take and pay, energy only under Build, Own and Operate (BOO) concession;
- vi) The LSS power plant may be a combination of several solar farms from different sites from one single Shortlisted Bidder and arising out of the same submission of RFP and connected to one Interconnection Point, whereby single PPA with one Energy Rate shall be applied;
- vii) The PPA duration is 21 years with fixed energy price throughout;
- viii) The offers by the Shortlisted Bidders shall be based on the optimum output, final yield and specific yield of the proposed LSS power plant in accordance with the design and technology used.
- ix) The LSS developer shall declare the plant's energy production for 21 years. In the PPA, the LSS developer is entitled to be paid the Energy Rate up to the LSS power plant's Maximum Annual Allowable Quantity (MAAQ). Any energy beyond MAAQ, if accepted by TNB or SESB, shall be paid at the Excess Energy Rate; and
- x) The Energy Rate shall include but not limited to the following:
 - Engineering Procurement and Construction (EPC)
 - Land cost
 - Project development cost
 - Financing cost
 - O&M cost
 - Interconnection cost

Figure 4.1: TNB Large Scale Solar (LSS) at Sepang



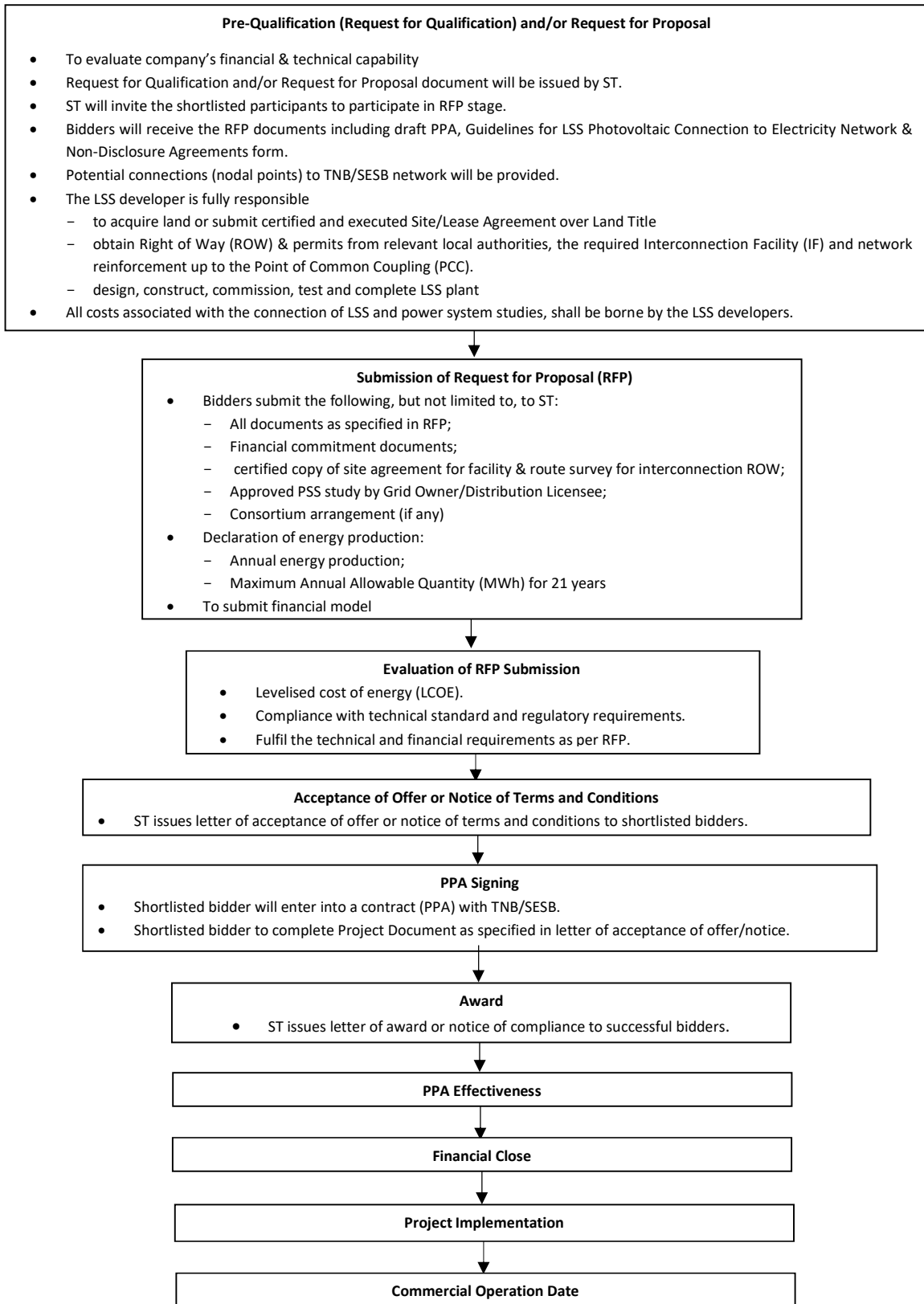
4.2 LSS Scheme Application Process

LSS is a scheme that lets Solar Power Producer (SPP) to generate own electricity via solar PV farm with installed capacity ranging from 1MW to <30MW (for distribution connected solar PV plants), and sell to the grid. This scheme is managed and administered by the ST and the selection for potential solar developers will be through competitive bidding. A technical study must be conducted before submission for the scheme to the ST. Interested applicants shall view the authority’s website, www.st.gov.my for announcement of request for proposal during the competitive bidding cycle.

Figure 4.2: LSS Application Process [Ref. 3]

<p>STEP 1 Check for the notice from Suruhanjaya Tenaga (ST) to purchase the Request for Proposal (RFP) document</p> <p>STEP 2 Find your registered contractor / service provider (RC/SP)</p> <p>STEP 3 Your (RC/SP) will apply for Technical Assessment with DL</p>	<p>STEP 4 If approved, submit your bid to ST</p> <p>STEP 5 If you are successful, sign your Solar Power Purchase Agreement with DL</p> <p>STEP 6 Develop the LSS plant & interconnection facilities</p> <p>STEP 7 Proceed with interconnection works & testing & commissioning</p>
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Figure 4.3: Process Flow Chart LSS [Ref. 8]



Detail technical assessment is described further in Chapter 7: Technical Feasibility Study.

4.3 Contract/Agreement for LSS

Table 4.1 shows the document requirement for agreement LSS scheme. [Ref. 8]

Table 4.2: Document requirement for agreement LSS scheme

Item	Large Scale Solar (LSS)
Nomenclature	PPA
Commercial Term	21 years
Template	PPA draft is available for reference in LSS Guideline by ST.
Agreement Preparation	Distribution licensee shall prepare the complete PPA main body.
Compilation	Every single set of the PPA document must be compiled in a hardcover with binder screws.
Appendices	<ul style="list-style-type: none"> • Appendix A – Project Description and Design Conditions • Appendix B – Technical Requirements • Appendix C – Energy Accounting and DL Metering Equipment • Appendix D – Design of the SPP Interconnection Facility, the SPP Interconnector and the SPP Works • Appendix E – Meteorological Measuring Facilities • Appendix F – Operation and Maintenance • Appendix G – Calculation of Test Energy Payment, Energy Payment, Non-Acceptance Payment and Non-Delivery Payment • Appendix H – Description of Site • Appendix I – Financial Model • Appendix J – Consequences of Termination • Appendix K – Letter of Award • Appendix L – Walk Away Events • Exhibit 1 – Form of Bank Guarantee
Timeline for Signing	60 days after DL receives the completed PPA documents.

Other Requirements:

- i. RE developer shall print three (3) copies of the agreement on A4 paper (100gm) or Conqueror (Laid Brilliant White – 80gm).
- ii. RE developer shall initial each page of the agreement (except the signing page) using black ink (ball point pen is not allowed).

- iii. RE developer shall submit agreement and all other documents listed below:
 - RE Application Form (**Appendix 4**) together with documents required under Section 2 of the form that consists of Form 9, Form 24, Form 44 and Form 49 whichever applicable must be certified as true copies by a Company Secretary or Commissioner of Oath.
 - A copy of RE developer's bank statement, and Mykad/Passport or Form 9 from Suruhanjaya Syarikat Malaysia (SSM) for company registration
 - Metering Application Form for meter procurement (**Appendix 5**).
- iv. DL shall authorize Signatories for the agreement.
- v. All copies of the signed agreement shall be returned to RE developer for stamping.
- vi. RE developer shall return or submit a copy of the original stamped agreement to the DL and the Implementing Agency within 7 days after the signing is done.
- vii. RE developer shall keep one original copy of stamped agreement, and submit a copy each to the DL and the Implementing Agency.

4.4 LSS Scheme Energy Payment

DL shall only initiate the billing and payment process upon the approval of commissioning date by the authority. The monthly meter reading is used to create payment advice in the DL billing system. The DL shall pay the applicable tariffs no later than thirty days after the issuance of a payment advice to each SPP, or no later than thirty days after the receipt of invoice from SPP.

The energy generated and delivered prior to the commissioning date shall be paid at a test energy rate as stipulated in the renewable energy power purchase agreement. During the contract term, the annual net energy output shall be paid at the applicable energy rate up to the declared annual quantity. Payment for the annual energy generation that exceeds the declared annual quantity is subject to the conditions set in each renewable energy power purchase agreement.

5. New Enhanced Dispatch Arrangement (NEDA) Scheme

5.1 NEDA Overview

New Enhanced Dispatch Arrangement (NEDA) was introduced in 2015 to enhance short run competition and cost efficiency of the Malaysia Electricity Supply Industry.

The main objectives of NEDA are to: [Ref. 9]

- enhance cost efficiency in generation through short-run competition;
- enable energy-efficient options, particularly the use of efficient technology, such as cogeneration to participate in the electricity market;
- provide opportunity for non-PPA/SLA generators to operate as Merchant Generators to supply and sell energy to the Single Buyer and to enhance their business options by maximizing the use of existing facilities in a cost-efficient manner for the benefit of the electricity supply industry and the consumer.

NEDA has been implemented in a few phases. In Phase 1, between 2015 and September 2016, only generators with a PPA or SLA were allowed to participate and the competition was limited to bidding of Variable Operating Rate (VOR). This arrangement did not allow bidding of the fuel cost component of operational cost.

NEDA Phase 2, introduced in September 2016, presents greater short term efficiency by allowing the non-PPA/SLA Generators, known as Merchant Generators to trade in the market alongside the PPA/SLA Generators as shown in Table 5.1. These Merchant Generators include Expired PPA/SLA Generators, Large Merchant Generators and Price Takers. The Price Takers are the small merchant generators such as co-generation, small RE generators and franchise utilities with capacity below 30 MW.

Table 5.1: NEDA Phase 2

Merchant Generator (Non-PPA)				
Category	1	2	3	4
	* PPA/SLA Generator	* Ex-PPA/SLA Generator utilizing power sector gas	* Large Merchant Generator	Price Taker
Bidding Mechanism	Bid Heat Rate and/or VOR	Bid Heat Rate and/or VOR	Bid Price – Quantity	Do not bid, just submit Planned Generation Schedule (PGS)
Settlement	Pay as Bid	Pay as Bid	Pay as Bid	Higher of Forecast System Marginal Price and Actual System Marginal Price

* Bidding Participants PPA – Power Purchase Agreement SLA – Service Level Agreement ST – Suruhanjaya Tenaga VOR – Variable Operating Rate

In May 2019, another new category was introduced, i.e. the Solar Power Producer (SPP). This category is only opened to the Large Scale Solar 3 (LSS3) generators and the upcoming Large Scale Solar 4 (LSS4). They can only participate in NEDA once they have fulfilled the obligation under the Solar PPA to provide the Maximum Annual Allowable Quantity (MAAQ).

In the latest phase, which was effective beginning December 2019, new amendments were incorporated in the Guidelines for NEDA based on the recommendations made by NEDA Viability Study, conducted in 2018 by GE India Industrial. The amendments are in terms of bidding period, bidding mechanism and settlement.

Table 5.2 below illustrates the updated categories of NEDA Participants, the bidding mechanisms and settlement methods for the different categories.

Table 5.2: Categories of the NEDA Participants [Ref. 10]

	Generator with PPA		Generator without PPA (Merchant Generator)		
Category	PPA/SLA Generator	<p>Solar Power Producer (SPP)</p> <ul style="list-style-type: none"> • Open to LSS3 • Can only participate in NEDA once the obligation under the SOLAR PPA to provide the Maximum Annual Allowable Quantity (MAAQ) is fulfilled 	Ex-PPA/SLA Generator (utilizing power sector gas)	<p>Large Merchant Generator</p> <ul style="list-style-type: none"> • Co-Gen Plant • Ex-PPA/SLA on Own Fuel • Franchise Utility • Part PPA/SLA • Renewable Plant • Any other generator approved by ST to participate in NEDA <p>with export capacity greater or equal to 30 MW</p>	<p>Price Taker</p> <ul style="list-style-type: none"> • Co-Gen Plant • Ex-PPA/SLA on Own Fuel • Franchise utility • Renewable Plant • Any other generator approved by ST to participate in NEDA <p>with export capacity 100kW-29.9 MW without PPA/SLA</p>
Bidding Mechanism	VOR	Bid Price	Price-Quantity	Price-Quantity	Do not bid, just submit Planned Generation Scheduled (PGS)
Settlement	Pay as Bid	<ul style="list-style-type: none"> • At the Bid Price if the Bid Price is not more than Energy Rate in the PPA and the System Marginal Price • At the Excess Energy Rate in the PPA if the Bid Price is more than the Energy Rate in the PPA or the System Marginal Price 	Actual System Marginal Price	Actual System Marginal Price	<p>Actual System Marginal Price</p> <p>*Note: Any Metered Output below the higher of 100kW or 1% of the Price Taker’s Installed Capacity, shall be disregarded for the purpose of Settlement</p>

5.2 NEDA Registration Process

Figure 5.1 and Figure 5.2 shows the registration and timeline process for NEDA scheme. The process depends on whether the participant is an existing facility or new facility and also whether the participant is transmission or distribution connected. In general, the registration process flow is as follows:

Figure 5.1: NEDA Registration Process [Ref. 3]

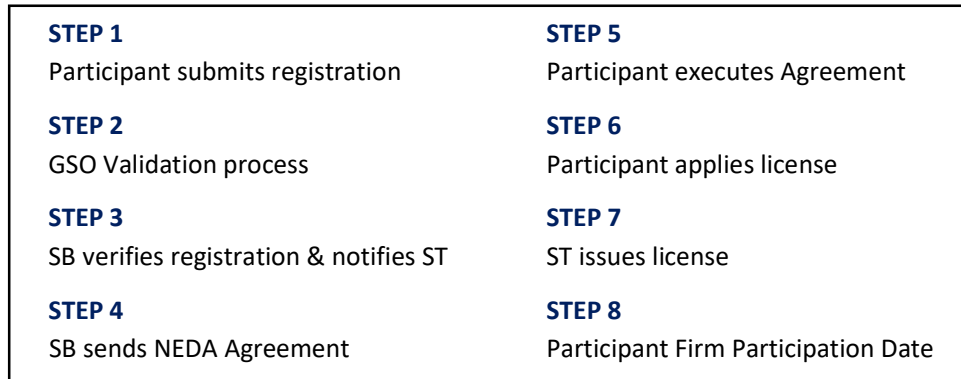
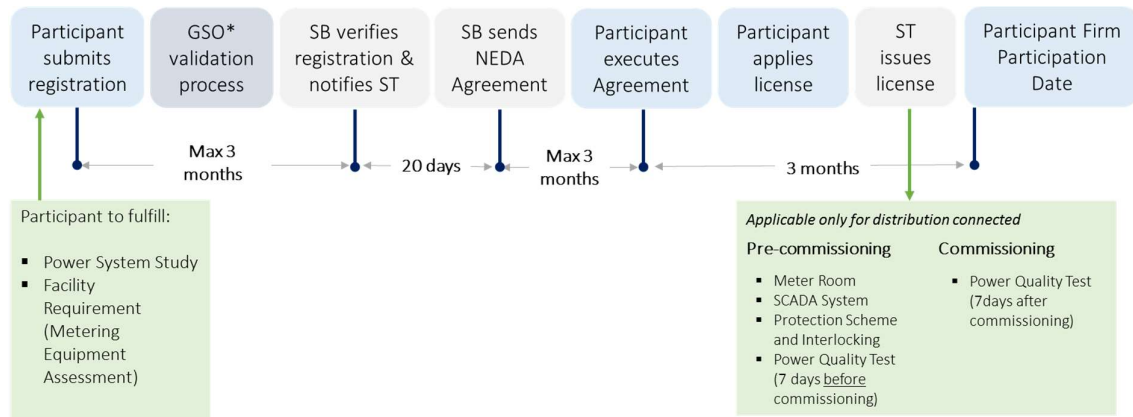


Figure 5.2: NEDA Registration Timeline Process [Ref. 10]



Detail technical assessment is described further in Chapter 7: Technical Feasibility Study.

5.3 NEDA Agreement

Table 5.2 shows relevant NEDA agreement(s) in order to participate in NEDA scheme.

Table 5.2 Relevant NEDA Agreement(s) [Ref. 11]

Relevant Agreement	NEDA Framework Agreement	NEDA Deed of Accession	PPA/SLA Supplemental Agreement
What it does?	<ul style="list-style-type: none"> Make NEDA Rules contractually enforceable between market participants 	<ul style="list-style-type: none"> Allow future parties to accede to NEDA Framework Agreement and become a NEDA party 	<ul style="list-style-type: none"> Amend PPAs and SLAs to ensure NEDA participation does not affect rights/obligations under PPA/SLA Allow PPA and SLA holders accede to NEDA Framework Agreement as original parties (to avoid signing two agreements) Allow PPA and SLA holders to decide a lower Heat Rate and/or VOR
Who will sign?	TNB and the first NEDA Participant (PPA/SLA or Merchant)	Merchant Generators, Solar Power Producer	PPA and SLA Generators
Who will be a party?	Multilateral all NEDA parties including TNB in its capacity as TNB Generation, Single Buyer and GSO.	The incoming party and TNB (on behalf of all existing NEDA Parties)	Bilateral, between each PPA/SLA holder and Single Buyer
How do future parties participate?	Via NEDA Deed of Accession	-	-

5.4 NEDA Settlement

SPP as NEDA Participants dispatching energy to the Single Buyer shall be paid, either: [Ref. 11]

- a) at the Bid Price if the Bid Price is not more than the Energy Rate in the PPA and the Actual System Marginal Price; or
- b) at the Excess Energy Rate in the PPA if the SPP does not submit any Bid, or the Bid Price is more than the Energy Rate in the PPA or the Actual System Marginal Price

SPP shall send an invoice to the Single Buyer for amounts owed to the SPP by the Single Buyer in respect of each relevant Billing Period within seven (7) Working Days after the end of the relevant Billing Period, which shall: [Ref. 11]

- a) be based on the pricing principles and formulae set out in **Appendix 9** and the Metered Output in each Half-Hour Period
- b) specify the Trading Data (in a format as shall be specified by the Single Buyer from time to time) for that NEDA Participant for each relevant Trading Day, (“Settlement Invoice”).

Single Buyer shall pay the amounts owed to the SPP in relation to the billing period within thirty (30) Days of receipt of the hard copy settlement invoice by the Single Buyer.

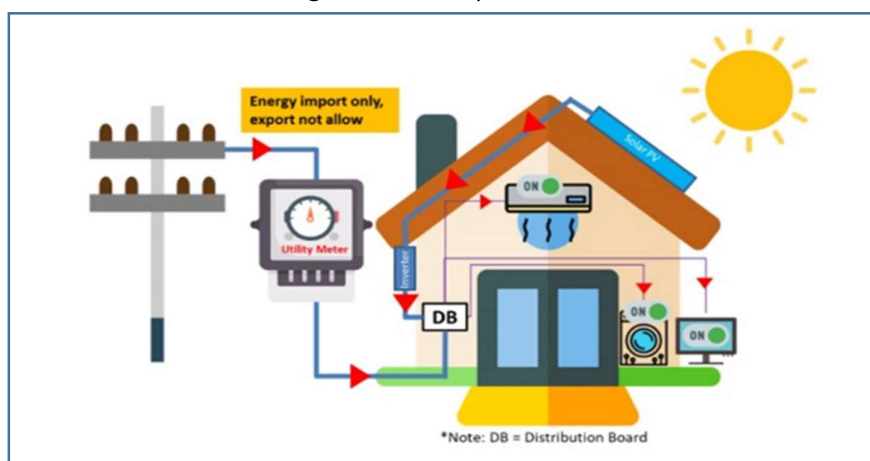
6. Self-Consumption (SELCO) Scheme

6.1 SELCO Overview

Self-consumption or known as SELCO applies when electricity is being generated for own usage and any excess is not allowed to be exported to the grid. The Government is encouraging individual, commercial and industrial consumers to install solar PV for their own consumption, looking to hedge against the rising cost of electricity. Installed capacity for Solar PV system installation: [Ref. 12]

- i. Stand-alone system: no capacity limit for solar PV system installation for self-consumption purposes.
- ii. non-stand-alone system: the capacity limit for solar PV system installation shall be lower than seventy-five per cent (75%) of the maximum demand of the consumer's existing installation.

Figure 6.1: Example of SELCO



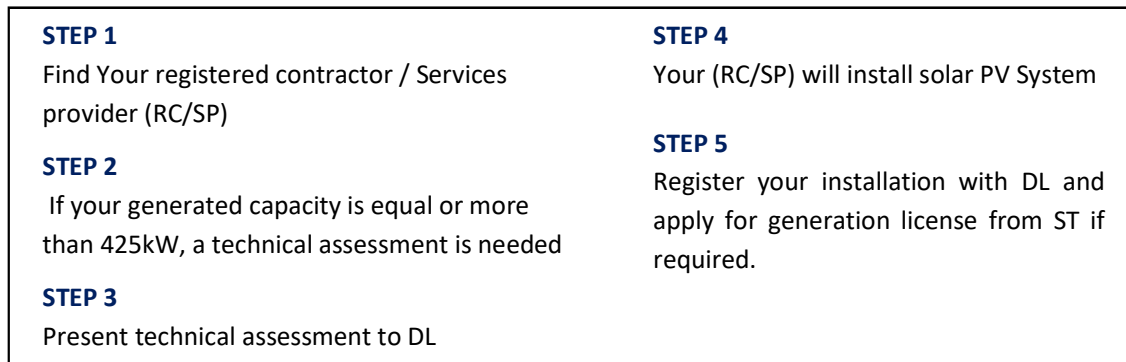
6.2 SELCO Application Process

Apart from Net Energy Metering, SELCO is another option to generate electricity from your own solar PV system to reduce electricity bills. SELCO lets solar producer consume all the electricity generated by solar system but will not allow any excess to flow into the utility network. Solar producers with installed capacity of the solar PV system of 425kW and above are required to present to DL the technical feasibility study of the proposed connection of the generating plant/source, for the DL to identify whatever effects it may have on the utility network.

SELCO solar producer is required to register the solar PV system installation with the DL by submitting the following documents: [Ref. 13]

- i. Self-Consumption Solar PV System Registration Form as **Appendix 10**;
- ii. A certified copy of the drawings, plans and specifications including any subsequent approved amendments and modifications by the suitably qualified competent person;
- iii. A PSS report endorsed by DL subsequent to the PSS presentation (if applicable);
- iv. Completion Certificate and Test Certificate for the installation shall be in Form G and Form H as prescribed in the First Schedule, Electrical Regulations 1994.

Figure 6.2: SELCO Process Flow [Ref. 3]



Detail technical assessment is described further in Chapter 7: Technical Feasibility Study.

6.3 Contract/Agreement for SELCO Scheme

There is no contract/agreement for SELCO scheme. However, applicant should register the installation with the DL by submitting the following documents: [Ref. 13]

- i. Self-Consumption Solar PV System Registration Form as **Appendix 10**;
- ii. A certified copy of the drawings, plans and specifications including any subsequent approved amendments and modifications by the suitably qualified competent person;
- iii. A PSS report endorsed by DL subsequent to the PSS presentation (if applicable);
- iv. Completion Certificate and Test Certificate for the installation shall be in Form G and Form H as prescribed in the First Schedule, Electrical Regulations 1994.

For solar PV system installation above 24kW for single phase and 72kW for three phase, any person who uses, works or operates the installation shall require a license as stipulated under the “Guidelines on Licensing Under Section 9 of the Act”.

7. Technical Feasibility Study

7.1 General Requirement

Prior to the RE application, the eligible RE developer are required to perform technical feasibility study. This study is imposed to any eligible developers who plan to construct and commission renewable energy installation. The study is categorized according to the generation capacity of the RE installation as depicted in **Table 7.1**.

Table 7.1: Scope of Technical Feasibility Study [Ref. 14]

RE Scheme	Generation capacity	Type of Technical Feasibility Study	Duration of Study	Fee per Technical Feasibility Study	Study Conducted By
Feed-in Tariff (FiT)	≤12 kW	No technical study required	Not applicable	Not applicable	Not applicable
	>12 kW up to ≤180 kW	Connection Confirmation Check (CCC)	30 days	RM 1,000	DL
	>180 kW up to ≤ 425 kW	Connection Confirmation Check (CCC)	30 days	RM 5,000	DL
	≤1 MW Medium voltage	Power System Study (PSS)	30 days	RM 20,000	DL
	>1 MW up to ≤10 MW	Power System Study (PSS)	40 days	RM 40,000	DL
	>10 MW up to <30 MW	Power System Study (PSS)	50 days	RM 60,000	DL
	>425 kW up to ≤1 MW (housing development or individual applications)	Power System Study (PSS)	60 days	RM 500 per installation	DL
Large Scale Solar (LSS)	≥1 MW up to <30 MW	Power System Study (PSS)	(a) 30 days For ≤ 1 MW	(a) RM 20,000.00	DL
New Enhanced Dispatch Arrangement (NEDA)	≥100 kW up to <30 MW		(b) 40 days For >1 MW upto ≤10 MW (c) 50 days For >10 MW up to <30 MW	(b) RM 40,000.00 (c) RM 60,000.00	
Net Energy Metering (NEM)	≤72 kW	No technical study required	Not applicable	Not applicable	Not applicable
	>72 kW up to ≤180 kW	Net Energy Metering Assessment (NEMAS)	30 days	RM 1,000.00	DL / Qualified Electrical consultant
	>180 kW up to ≤425 kW	Net Energy Metering Assessment (NEMAS)	30 days	RM 5,000.00	DL / Qualified Electrical consultant
	>425 kW up to ≤1 MW	Net Energy Metering Assessment (NEMAS)	30 days	RM 8,000.00	DL / Qualified Electrical consultant

RE Scheme	Generation capacity	Type of Technical Feasibility Study	Duration of Study	Fee per Technical Feasibility Study	Study Conducted By
Net Energy Metering (NEM)	>1 MW up to ≤2 MW	Net Energy Metering Assessment (NEMAS)	30 days	RM 15,000.00	DL / Qualified Electrical consultant
	>2 MW up to ≤5 MW	Net Energy Metering Assessment (NEMAS)	30 days	RM 20,000.00	DL / Qualified Electrical consultant
	>5 MW up to ≤10 MW	Net Energy Metering Assessment (NEMAS)	30 days	RM 30,000.00	DL / Qualified Electrical consultant
	>10 MW up to <30 MW	Net Energy Metering Assessment (NEMAS)	30 days	RM 40,000.00	DL / Qualified Electrical consultant
Self-Consumption (SELCO)	≤425 KW	No technical study required	Not applicable	Not applicable	Not applicable
	>425 kW up to <30 MW	Power System Study (PSS)	Refer to appointed consultant	Refer to appointed consultant	Qualified Electrical consultant

Note:

1. An additional period of **10 days** shall be granted to the DL if an insulation coordination study is deemed necessary and carried out by the DL as part of the power system study.
2. An additional cost of:
 - a. **Twenty thousand ringgit (RM20,000.00)** shall be paid to the DL if an insulation coordination study is deemed necessary and carried out by the DL as part of the power system study; and
 - b. **Ten thousand ringgit (RM10,000.00)** shall be paid to the DL for PV installation where a dynamic study to determine voltage fluctuations is necessary and solar radiation data is provided by the RE developer.
3. Fees may be subjected to applicable government tax

The approved RE technologies depending on program available are solar PV, biogas, biomass and mini hydro. The eligible RE developers are advised to conduct preliminary survey to identify the nearest existing TNB electrical network for the interconnection.

For ease of connection reference, list of major substations feasible for RE connection namely *Nodal Points* are identified by DL. The *Nodal Points* were identified based on the following considerations: [Ref. 15]

- a) Fault level less than 90% of equipment short circuit rating and;
- b) Adequate local Load

Thus, for RE application above 425kW, any connection that is not in the *Nodal Point* list due to fault level above 90 % of equipment short circuit rating, the RE developer shall minimize its fault current contribution as per Distribution Code Clause 5.4.9.6. Among the technologies that can be used to minimize fault current are fault current limiter, current limiting reactor, or any other similar equipment / technologies that have capability to minimize or limit the fault current. The RE Plant connection will be implemented provided that the above conditions are carried out by the developer. [Ref. 15]

The requirement of fault current minimization as stipulated in Distribution Code clause 5.4.9.6 above is exempted for all RE application of 425kW and below.

At this stage the eligible producer has not yet committed to the physical construction of the renewable energy installation. The findings of the technical feasibility study will assist the eligible producer to decide on the feasibility of the project in terms of cost and assist the DL to prepare the technical requirements needed for interconnection.

7.2 Connection Confirmation Check (CCC)

Connection Confirmation Check (CCC) is an assessment to determine the connection point of RE installation to a low voltage Distribution Network. The generation capacity that required this study is above 12kW to 425kW for FiT scheme as **Table 7.1**. It is assessed in terms of the nearest connection point to the RE installation and to confirm whether the proposed connection is technically possible, and, if so, whether any necessary modification to the DL's existing electricity distribution network is required to facilitate the acceptance of renewable energy generated by the renewable energy installation. [Ref. 14]

Any cost incurred for the connection of the RE installation to the Distribution Network shall be borne by the eligible RE developer. Hence, it is crucial for the eligible RE developer to conduct their own preliminary survey to determine the nearest proposed connection point for their RE installation.

7.3 Power System Study (PSS)

Power System Study (PSS) is a detailed study to determine the optimal interconnection point to medium voltage network. The study is required as to establish technical and safety requirements that may be necessary for the interconnection and operation of the renewable energy installation to ensure that it will not affect the stability and safety of the existing network or customer. PSS is also a prerequisite in cases whereby the substation has an existing connection of low voltage RE installation up to 425kW. [Ref. 14]

The PSS involves a site visit in order to confirm the RE Plant, to study the network configuration if any, and to identify the interconnection point and any other requirements involved. The PSS consultant shall prepare the simulation and findings, to be presented to the RE developer and the DL appointed person.

DL will perform the PSS using simulation software such as PSS ADEPT, PSS Sincal, PSSE by Siemens, Dig Silent by Power factory, or other similar software.

Scope of PSS includes:

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

Table 7.2 below shows the minimum equipment rating to be used to withstand the maximum sub-transient three phase symmetrical short circuit fault levels.

Table 7.2: Short Circuit Withstand Rating for Power Equipment

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

Other connection consideration includes the availability of space for the new switchgear extension within the existing substation, including the associated control panel and the metering room. [Ref. 14]

PSS is valid for 1 year commencing from the date of the DL's approval. In evaluating the RE Facility connection, the operational flexibility of the network is not to be compromised.

7.4 Net Energy Metering Assessment Study (NEMAS)

NEM Assessment Study (NEMAS) is a mandatory study for NEM scheme installation above 72 kW, and is generally based on the rated kW of the proposed installation. The study will determine the technical impact to the DL's electricity Distribution Network and establish technical and safety requirements that may be necessary for the installation. The study is a pre-requisite for NEM application approval and will thus be performed prior to the approval of the NEM application. At this stage the NEM applicant has not yet committed to the physical construction. The findings of the study will assist the DL to decide on the feasibility of the project. It will also assist the DL to prepare the technical requirements or necessary modification to DL network needed for interconnection to facilitate the acceptance of energy generated by the installation. [Ref. 14]

The NEM Consumer shall engage with DL/qualified consultants to conduct NEMAS for installation above 72kW. Upon request by the NEM Consumer, Distribution Network data will be provided by DL subject to signing off Non-Disclosure Agreement (NDA) between the party that will perform the NEMAS and DL, if required by DL. The assessment conducted will be based on the Consumer's Load profile which shall include, but are not limited to: [Ref. 6]

- i) general description of the electrical supply system and connection of solar PV system;
- ii) simple network study from Consumer side to the Point of Common Coupling (PCC);
- iii) analysis on voltage and Power Factor impact to DL network; and
- iv) any other analysis required by the DL for the purpose of safety and security of the distribution network and other electricity consumer.

All NEMAS conducted by the qualified consultants must be presented to DL prior to the approval of the NEM application. Any modification costs involved described in paragraph above shall be borne by the NEM Consumer. Each study will be valid for 1 year commencing from the date of the DL's approval of the study.

The technical study report is required prior to NEM application to Implementing Agency. All study shall be conducted by DL/qualified consultants to establish the technical and safety requirements and determine the feasibility of connection. Should there be a necessity for additional technical study after report has been published, additional fee will be imposed to the NEM Consumer.

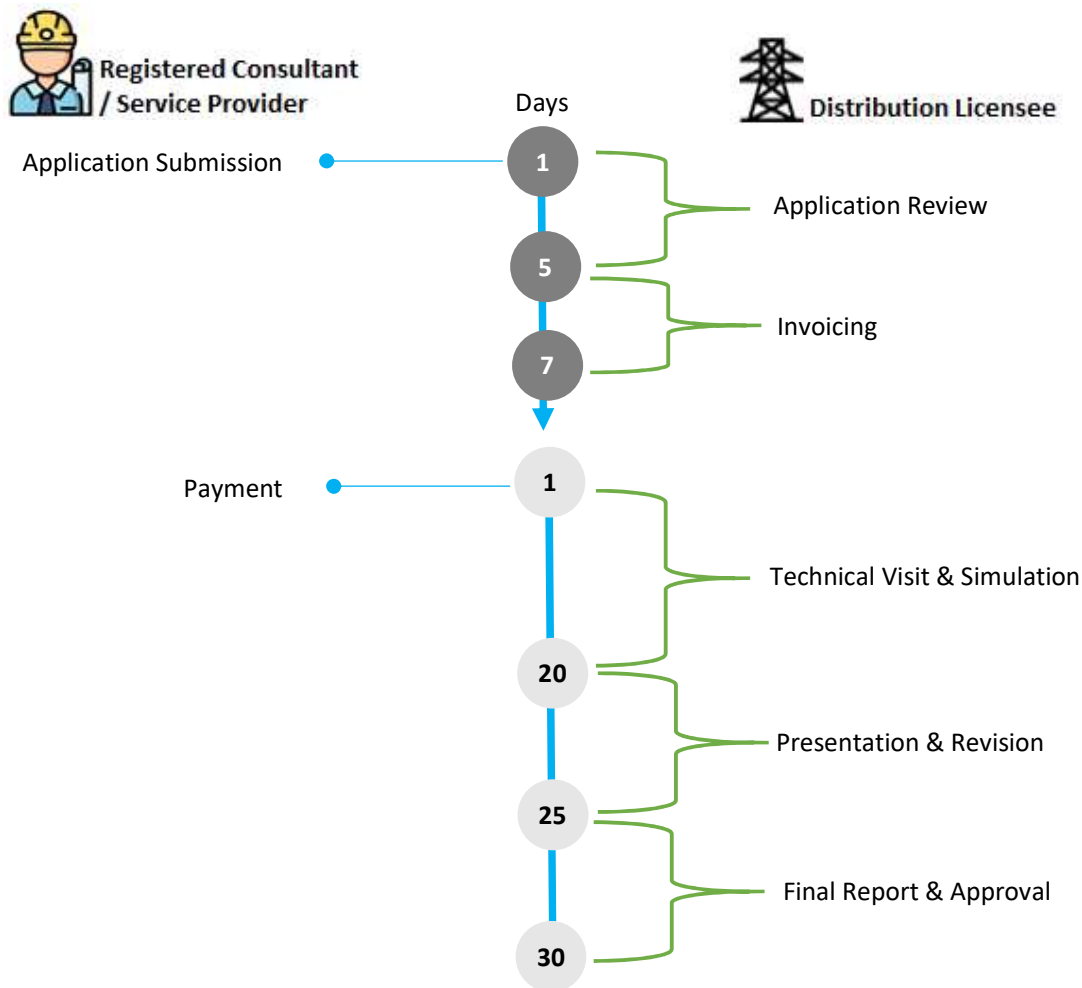
For capacity below 72kW, where there will be no analysis by the DL, the Consumer shall ensure that the exported power shall be less than the existing capacity of the DL and Consumer’s equipment. Appropriate functionality within the inverter or use of external device to be provided to mitigate such a condition.

7.5 Application Process for Technical Feasibility Study

Eligible RE developers shall appoint a registered consultant / service provider to complete and submit the technical feasibility study application, on their behalf. All forms and drawings shall be endorsed by a Professional Engineer with Practicing Certificate where applicable.

The technical feasibility study process and approximate timeline is illustrated in **Figure 7.1**. The approval letter shall be rendered by the DL to the eligible RE developer to apply for the RE scheme from the respective implementing agency, along with the technical feasibility study report.

Figure 3.1.: Technical Feasibility Study process [Ref. 14]



Note:

This is an approximate timeline only, and varies according to technical feasibility study type and RE generation capacity.

Table 7.3 below lists the documents required by the DL to conduct the technical feasibility study. The list is not comprehensive, and serves only as a guide. It may differ according to respective DL and subject to change without prior notice. Please refer to the DL for verification.

Table 7.3: Required Documents for Technical Feasibility Study Application

Documents Required	CCC / PSS for Non- Solar	CCC / PSS for Solar	NEMAS
Signed Application Form	✓	✓	✓
Site plans key map with nearest DL substation	✓	✓	
Single Line Diagram for RE Plant	✓	✓	✓
Single Line Diagram for interconnection with DL	✓	✓	
Datasheet for PV module		✓	✓
Datasheet for Inverter		✓	✓
Generator Datasheet	✓		
Generator reactive capability chart	✓		
4 days Load Profiling Form (Friday to Monday for capacity >72kW)			✓
12 months Recorded Maximum Demand			✓
Photo of existing DL meter and service line / substation			✓
Electricity Bill (for existing building)	✓	✓	✓

Note: All forms and drawings shall be endorsed by a Professional Engineer with Practicing Certificate where applicable.

8. RE Interconnection Scheme & Boundaries

8.1 Connection Scheme

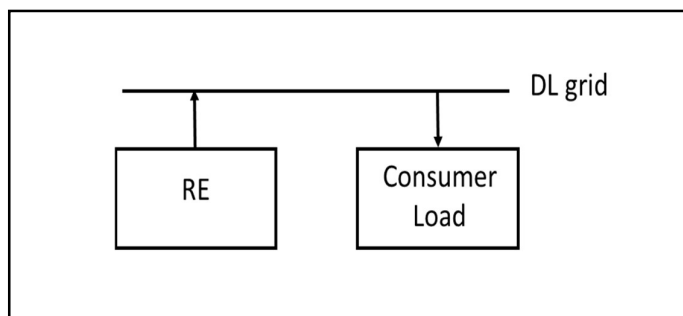
The connection scheme clauses take into the following considerations:

- a) Safety
- b) Connection with least alteration to existing network
- c) Cost

The feed-in method can be sub categorised as:

- a) Direct Feed – Connection point at DL

Figure 8.1: Connection to DL grid (direct)



- b) Indirect Feed – Connection point at consumer load

Figure 8.2 Connection to DL grid (indirect)

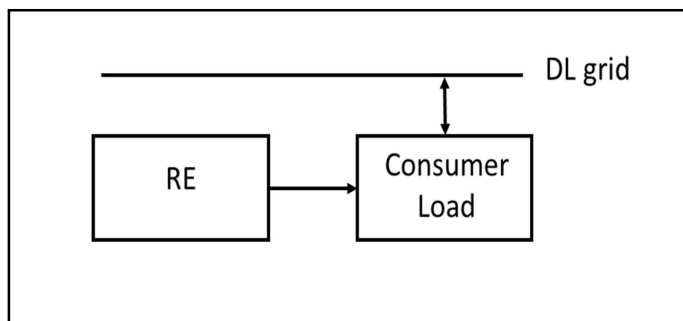


Table 8.1 presents various types of RE connection schemes at the LV and MV points.

Table 8.1 RE connection scheme. [Ref. 14]

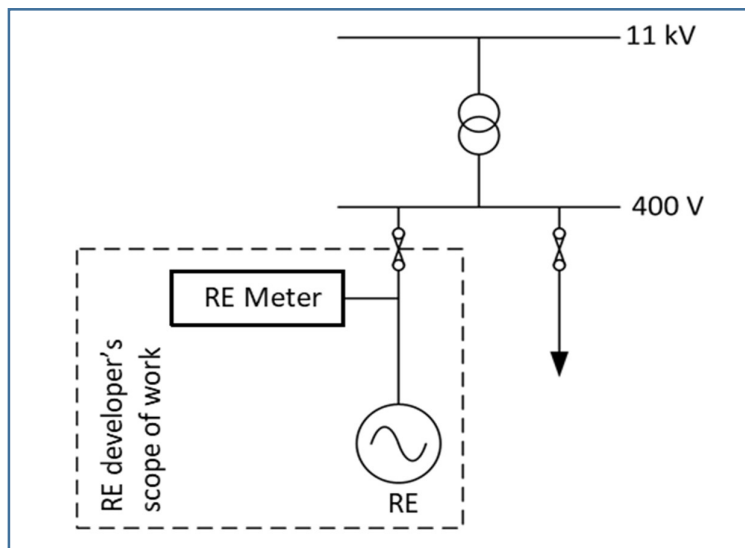
RE Source	Connection Scheme	Available Interconnection		
		LV	MV	MV (Multiple-feed)
Solar PV	FiT (Direct)	√	√	√
	NEM (Indirect)	√	√	N/A
	LSS (Direct)	N/A	√	√
Biomass/Biogas/ Hydro	FiT (Direct)	√	√	√
Wind Turbine	FiT (Direct)	√	√	√

The RE's LV output connection can be via direct and indirect connection as shown in **Figure 8.3** and **Figure 8.4**, respectively: [Ref. 14]

a) Direct connection

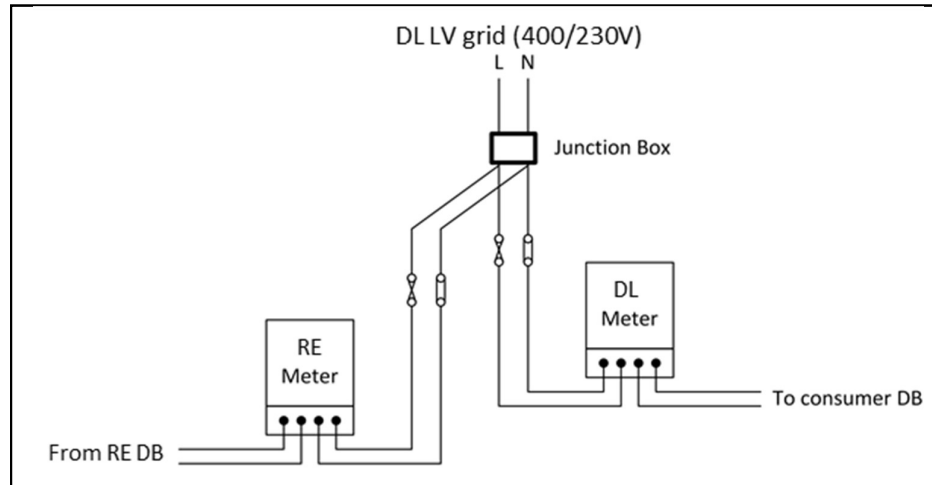
(i) RE output is connected directly to DL grid (LVDB/FP).

Figure 8.3 (i) RE connections for three-phase LV (direct connection).



(ii) RE output is connected directly to DL grid (LV grid).

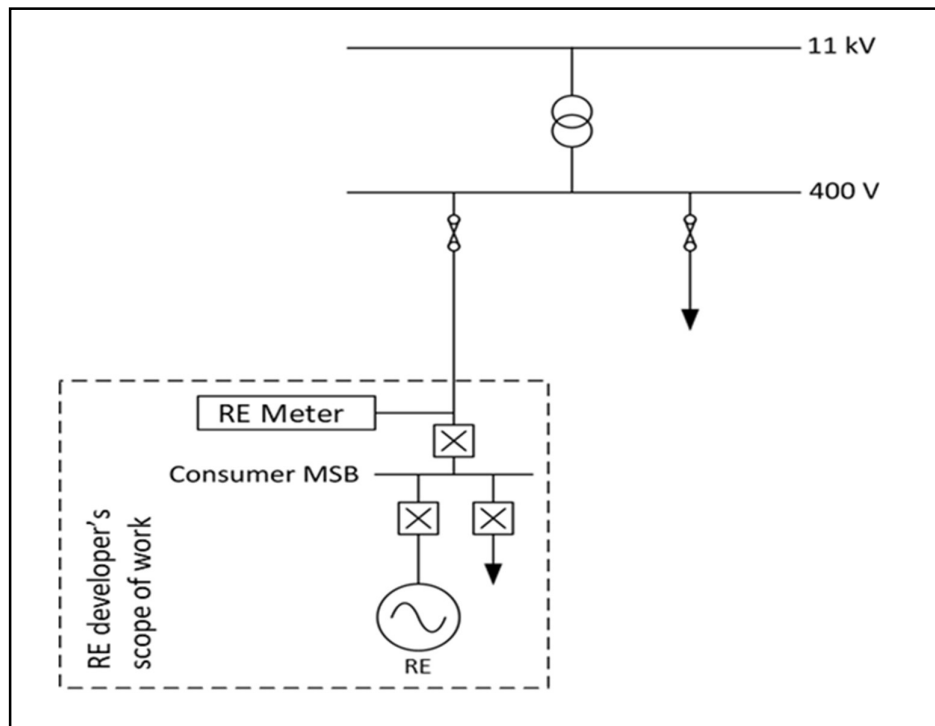
Figure 8.3 (ii) Re connections for single-phase and three-phase LV (direct connection).



b) Indirect connection

Indirect connection is allowed for a special case & requires additional verification & supplementary agreement with DL.

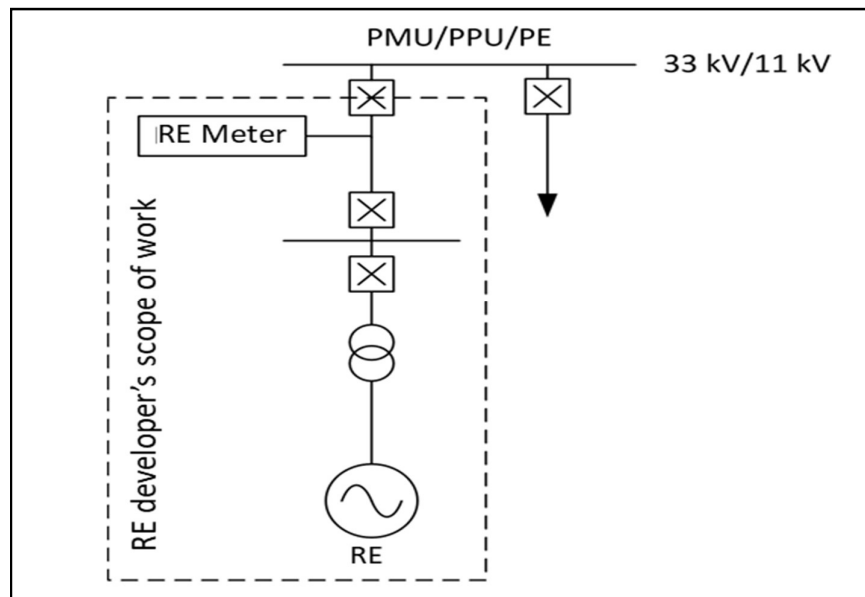
Figure 8.4 RE connections for single-phase and three-phase LV (indirect connection)



Direct and indirect MV connections at the PMU/PPU/PE are shown in **Figure 8.5** and **Figure 8.6**, respectively: [Ref. 14]

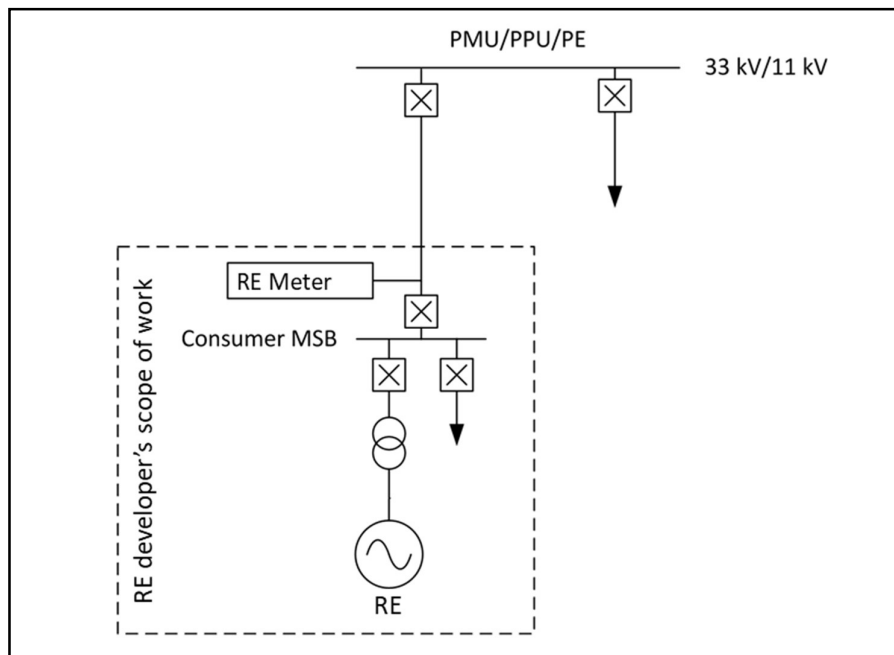
a) Direct connection

Figure 8.6 RE connections for MV output at PMU/PPU/PE (direct connection)



b) Indirect Connection

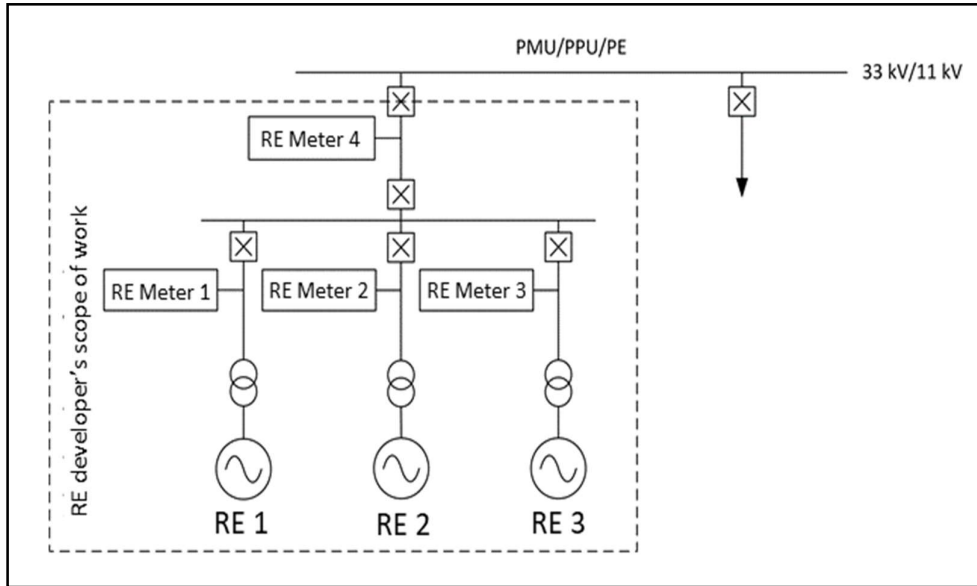
Figure 8.7 RE connections for MV output at PMU/PPU/PE (indirect connection)



In cases where multiple sources of generations are produced and owned within a common site, multiple-feed configuration is allowed to optimise the number of interconnection feeders at PMU/PPU/PE, as shown in **Figure 8.7** and **Figure 8.8**.

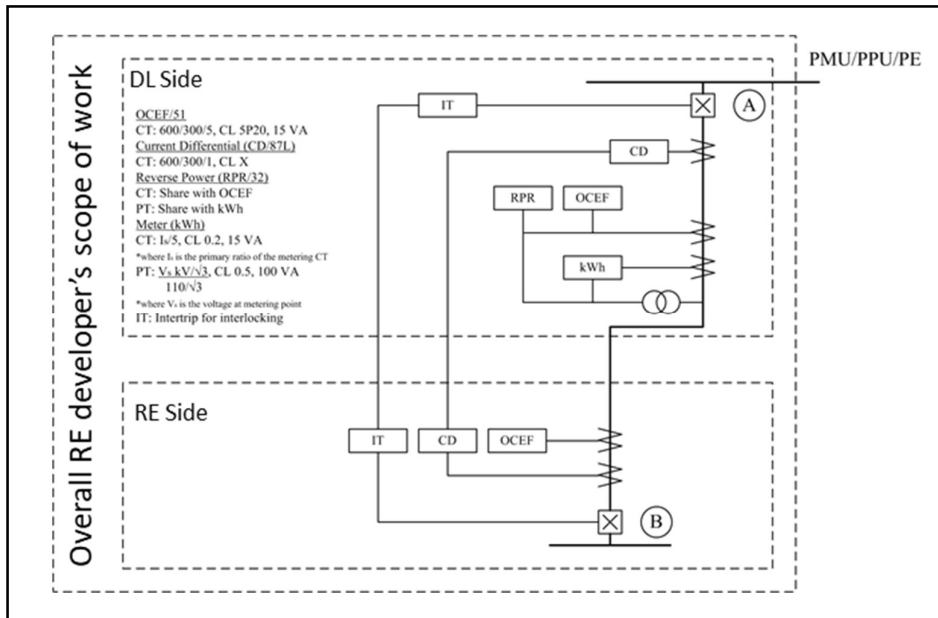
c) Direct Connection – Multiple Feed

Figure 8.7 RE connections for MV output at PMU/PPU/PE (direct multiple-feed connection)



Interconnection Feeder (IF) is the link between RE developer side and DL, as shown in **Figure 8.8**.

Figure 8.8 Interconnections diagram between DL and RE



8.2 Boundary of Ownership & Operation

The boundary of ownership & operation generally is located at the connection point to the existing network. This is the point which energy is injected into DL's Distribution System. In most cases, it is where the energy meter is located. [Ref. 14]

The interconnection cable belongs to RE developer until the cable termination at the PMU/PPU/PE. RE developer is to provide the necessary system expansion required within the scope as stipulated in the T&O Requirements and handover to DL. [Ref. 14]

9. Metering Requirement

9.1 General Requirement

1. All energy meters and metering equipment used for measuring import and export of electricity shall comply with the latest DL's specifications and electricity supply application guidelines. [Ref. 16]
2. Unless otherwise stated, the developer shall borne the associated costs but not limited to the following lists:
 - i. Energy Meter
 - ii. Metering & Network Equipment
 - iii. Metering & Network Accessories
 - iv. Installation
 - v. Testing & Commissioning
3. This metering guideline is applicable for RE Schemes such as:
 - i. Feed in Tariff (FIT)
 - ii. Net Energy Meter (NEM)
 - iii. Large Solar Scale (LSS)
 - iv. New Enhanced Dispatch Arrangement (NEDA)
 - v. Self-Consumption (SELCO)
4. The details metering technical requirement as described in subchapter 9.2 shall follow the category of metering installation according to maximum demand. The category of metering installation is in **Table 9.1**. However, the final category of metering installation may differ subject to technical feasibility study. [Ref. 16]

Table 9.1: Category of Metering Installation for RE Scheme According to Maximum Demand

Category of Meter Installation	Maximum Demand (MD)	RE Scheme				
		FIT	NEM	LSS	NEDA	SELCO
Low Voltage Whole Current Meter	≤60 kW	√	√	N/A	N/A	N/A
Low Voltage Current Transformer Meter	>60 kW up to <1 MW	√	√	N/A	√	N/A
Medium Voltage Meter	≥1 MW up to <30 MW	√	√	√	√	N/A

*N/A: Not Applicable

Table 9.2: Additional requirement for each RE scheme are as follow (if applicable)

RE Scheme	Additional Requirement
NEM	Existing meter shall be replaced if the meter is not capable of supporting bi-directional energy measurement and network communication.
NEDA	Based on the declared export capacity, DL may request NEDA participants to install separate metering system.

9.2 Energy Accounting by Category of Metering Installation

9.2.1 Low Voltage (Whole Current Meter)

9.2.1.1 Metering Location & Arrangement [Ref. 16]

- a) The metering arrangement shall comply with the latest DL specifications and electricity supply application guidelines.
- b) The location of the meter shall be accessible to DL personnel and facing the main entrance.
- c) The RE Developer is required to appoint a competent electrical contractor for the wiring and installation of new low voltage energy meter board.
- d) The RE Developer shall bear all costs associated with the connection of generation system including costs of meter installation, replacement, supply upgrading, and system connection/modification (if applicable).
- e) After the satisfactory site testing, DL shall seal the energy meter and metering equipment in accordance with DL's requirements.

9.2.1.2 Energy Meter & Network Equipment [Ref. 16]

The meter and network equipment shall be installed by DL during testing and commissioning (T&C) session.

9.2.1.3 Metering Accessories [Ref. 16]

All metering accessories such as fuse and neutral link shall be provided by the DL.

9.2.2 Low Voltage (Low Voltage Current Transformer Meter)

9.2.2.1 Metering Location & Arrangement [Ref. 16]

- a) The metering arrangement shall comply with the latest DL specifications and electricity supply application guidelines.
- b) Metering kiosk will be provided and installed by DL. However, in situation where the metering kiosk is not provided by DL, metering kiosk shall be supplied and installed by the customer/developer and shall be used exclusively for metering purposes only.

- c) Metering kiosk shall be installed nearest to the source of the DL supply (i.e. DL Substation, feeder pillar and etc). The metering kiosk position must be easily accessible at all times to DL personnel for maintenance.
- d) The RE developer shall bear all costs associated with the connection of generation system including costs of meter and metering kiosk installation, replacement, supply upgrading, and system connection/modification (if applicable).
- e) After the satisfactory site testing, DL shall seal the energy meter and metering equipment in accordance with DL's requirements.

9.2.2.2 Energy Meter & Network Equipment [Ref. 16]

The meter and network equipment shall be installed by DL during testing and commissioning (T&C) session.

9.2.2.3 Metering Current Transformer (CT) [Ref. 16]

The CT shall be installed by DL during testing and commissioning (T&C) session.

9.2.2.4 Metering accessories [Ref. 16]

All metering accessories such as fuse and neutral link shall be provided by the DL.

9.2.3 Medium Voltage Meter

9.2.3.1 Metering Location & Arrangement [Ref. 16]

- a) The energy meters shall be installed on a metering kiosk which shall be located in a metering room at the DL's substation.
- b) The specification of the metering kiosk and metering room shall be in accordance with the latest DL's electricity supply application guidelines.
- c) RE developer shall submit the proposed layout diagram for the metering kiosk and metering room for DL's endorsement
- d) The metering kiosk shall be sealed by the DL and the metering room shall be locked at all times by the DL.

9.2.3.2 Pre Operational Testing [Ref. 16]

- a) Prior to the installation of energy meters by DL, RE developer shall deliver metering current transformer for accuracy calibration tests to either DL testing laboratory for such purpose or an independent test laboratory accredited with ISO/IEC 17025 endorsed by DL
- b) If the tests are conducted in a DL testing laboratory, RE Developer shall, at its own cost and expense, witness the tests and verify the test result.
- c) If the tests are conducted in an independent accredited laboratory, DL shall verify the Test result. Copies of the test results shall be submitted to DL as soon as practicable but in any event not later than fourteen (14) days after such tests being conducted.

- d) All costs associated with the tests, including any costs incurred by DL in verifying the test results, shall be borne by customer/ developer.
- e) The Test shall be carried in compliance with relevant IEC/BS standards. After satisfactory accuracy calibration tests, RE developer shall, at its own cost and expense, procure energy meters from DL. RE developer shall give DL fourteen (14) days' prior written notice of the energy meters installation at the designated location in the DL substation. Upon the installation of such meters, site test shall be undertaken by DL at customer/ developer expense prior to the commissioning of the DL metering equipment.
- f) The testing of any current transformer, voltage transformer or metering equipment during installation and commissioning of such metering equipment shall be undertaken by RE developer at its own cost and expense. The cost and expense incurred in respect of any witnessing of such tests as aforesaid by DL shall be fully borne by customer/ developer.
- g) After the satisfactory site testing, DL shall seal the metering equipment in accordance with DL's requirements.

9.2.3.3 Energy Meter [Ref. 16]

The meter shall be installed by DL during testing and commissioning (T&C) session.

9.2.3.4 Metering Voltage Transformer (VT) & Current Transformer (CT) [Ref. 16]

- a) Metering VT and CT shall be supplied and installed by customer/ developer and shall be used exclusively for metering purposes only.
- b) The requirements for metering voltage transformer (VT) and current transformer (CT) shall comply with latest DL's electricity supply application guideline. Customer/ developer shall, at its own cost and expense, procure and install the metering CT and PT in accordance with DL's specifications.
- c) The details of the metering VT and CT shall be confirmed by DL during detailed design stage.

9.2.3.5 Metering Accessories [Ref. 16]

- a) The CT and VT secondary leads shall be multi-core (copper) armored cable and in accordance with the latest DL electricity supply application guideline.
- b) A cable tray shall be installed to route the armored cable to the metering kiosk. The metering kiosk shall be located in the metering room.
- c) The internal wiring inside the metering kiosk termination shall be provided by the customer/developer. The final layout diagram for the metering kiosk shall be provided by the customer/developer for the approval by the DL.
- d) All of the cables, cable routing, metering kiosk and related metering accessories such as fuses and terminal block shall be provided by the customer/developer.

9.3 Meter Reading

The DL employs remote meter reading between energy meter and the DL's data centre. Location of meter shall have adequate reception of the communication signal to enable data transmission.

For the wireless communication mode, the consumer/developer shall provide signal booster equipment in case of poor communication signal strength.

In the event of failed remote meter reading (RMR), DL shall take meter readings manually for respective accounts on that particular month.

9.4 Meter Inspection and Testing

RE developer is obliged to ensure that the RE installation and the energy meter are in good condition. Any tampering to the energy meter is prohibited and unlawful. RE developer is advised to monitor and record the export reading of the revenue meter on regular basis.

The energy meters shall be tested by the DL on a schedule determined by the DL in accordance with prudent utility practices.

The costs and expense for any additional inspections and tests shall be borne by the RE developer.

In the event of meter faulty or inaccuracy, RE developer shall lodge complaint to DL for further action. Additional, an official report shall be made to respective regulator (Suruhanjaya Tenaga, SEDA, etc) for inspection and verification.

- i. If the meter faulty or inaccuracy is due to natural cause (manufacturing, aging etc), DL shall replace the meter at no cost.
- ii. However, if the meter faulty or inaccuracy is due to mishandling or external factors then DL shall replace the meter at the expense of RE developer.

10. RE Operation

10.1 Interconnection Operation Manual

This Interconnection Operation Manual (“IOM”) is a condition precedent as stipulated in power purchase agreement for RE between DL and RE developer with MV Connection except for NEM and SELCO. Both the RE developer and DL shall outline in detail their respective duties and responsibilities for the maintenance and operation of the equipment in accordance with the agreed interconnection boundary and subject to the terms and conditions as specified in the IOM.

This chapter summarises the contents of the IOM. [Ref. 14]

1. The purpose of this IOM is to outline the duties and responsibilities of RE developer and DL. The IOM also sets out the necessary procedures to be followed to ensure safety to the operating personnel and to avoid equipment damage at the point of interconnection.
2. This IOM contains the entire document and understanding of the Parties with respect to the subject matter identified as recitals, introduction, interconnection facilities, communication, switching procedures, fault reporting, outage program, system emergency / collapse, definitions and appendices.
3. This IOM shall be revised and when necessary according to any changes of operating personnel or other relevant operating conditions affecting the Parties. Any changes to the IOM must be agreed by the Parties.
4. Notwithstanding anything in this IOM, DL shall ensure that requirements under the existing DL Supply Rules, Technical Instruction, Engineering Instructions, System Operation Manual, DL Safety Rules or the compliance of the Act and Prudent Utility Practice are satisfied. In the event of any inconsistency or ambiguity between IOM and the requirements listed above, the requirements listed above shall prevail over IOM.
5. Notwithstanding anything in this IOM, RE developer shall ensure that requirements under the existing RE developer’s Safety Rule Book and / or the recommended Operating and Maintenance Instructions provided by the equipment manufacturer or compliance of the Act and Prudent Utility Practice are satisfied. In the event of any inconsistency or ambiguity between IOM and the requirements listed above, the requirements listed above shall prevail over IOM.
6. Neither party shall be liable to the other for any claims, judgments, liabilities, losses, cost, expenses or damages of any kind of character (including loss of property) which are the consequence of damage to or destruction of property or personal injury (including death) resulting from the performance of this IOM unless the damage, destruction or injury arises out of or caused by the negligence, default, misconduct of a Party’s own employees, officers, agents, contractors or subcontractors.

7. The Parties shall indemnify and hold the other party, its officers, directors, employees, contractors and subcontractors, agents, harmless from and against any and all claims, losses, liabilities, cost, expenses and damages of any nature whatsoever for personal injury, death or property damage except to the extent such injury, death or damage attributable to the negligence, willful act or default of the party seeking indemnification herein mentioned.
8. Each Party shall designate in writing to the other Party a representative, who shall be authorized to resolve any dispute, controversy or claims arising out of or in relation to this IOM. The Parties hereby agree to attempt to resolve all disputes, controversy, claims, breach, termination or validity thereof arising under this IOM promptly, equitably and in a good faith manner.
9. All operations and technical matters shall be communicated, discussed and resolved solely between DL and RE developer. The services may be charge via Rechargeable Job Order (RJO) by DL when necessary.

This IOM shall be binding and complied with by the Parties.

Reference

The following list of references from various sources has been adopted in completing this guidebook:

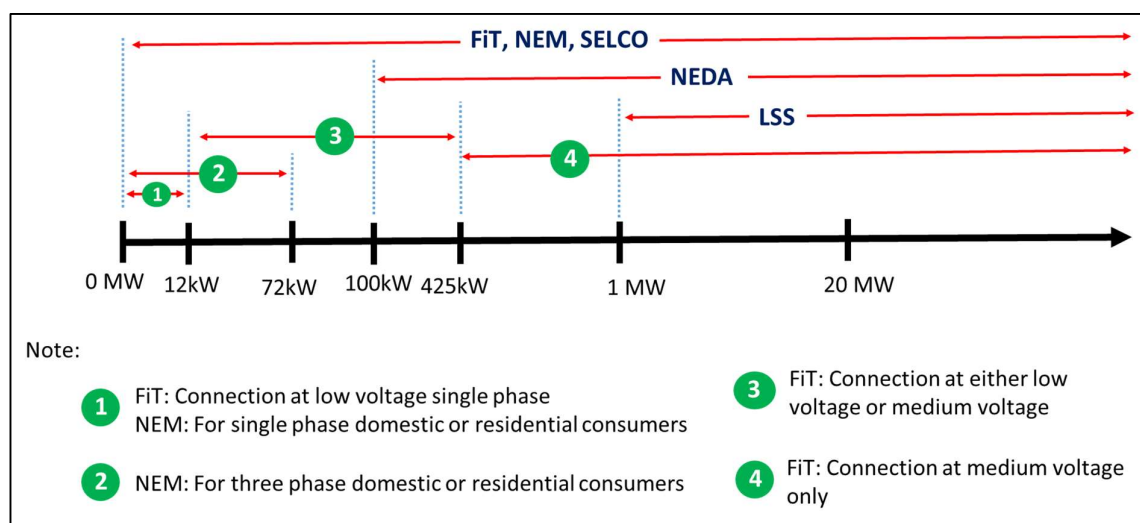
- [1] TNB Renewable Energy Handbook Edition 2015
- [2] <http://www.seda.gov.my/reportal/fit/> Accessed on: Apr. 14, 2020
- [3] <https://www.mytnb.com.my/renewable-energy/benefits-of-generating-your-own-re> Accessed on: Apr. 14, 2020
- [4] Guidelines and Determinations of the Sustainable Energy Development Authority Malaysia Edition 5th February 2016
- [5] <http://www.seda.gov.my/reportal/nem/> Accessed on: Apr. 14, 2020
- [6] Guidelines for Solar Photovoltaic Installation on Net Energy Metering Scheme Edition 3rd July 2019
- [7] <http://www.seda.gov.my/reportal/large-scale-solar/> Accessed on: Apr. 14, 2020
- [8] Guidelines On Large Scale Solar Photovoltaic Plant for Connection to Electricity Networks [Electricity Supply Act (Amendment) 2015 (Act A1501)]
- [9] <https://www.singlebuyer.com.my/nedaintro.php> Accessed on: Apr. 14, 2020
- [10] <https://www.singlebuyer.com.my/nedaregistration.php> Accessed on: Apr. 14, 2020
- [11] Guidelines for New Enhanced Dispatch Arrangement Edition 5th December 2019
- [12] <http://www.seda.gov.my/reportal/self-consumption/> Accessed on: Apr. 14, 2020
- [13] Guidelines On the Connection of Solar Photovoltaic Installation for Self-Consumption
- [14] TNB Technical Guidelines for Interconnection of Distributed Generator to Distribution System Edition 2018
- [15] Distribution Code for Peninsular Malaysia, Sabah & F.T. Labuan (Amendments) 2017
- [16] TNB Electricity Supply Application Handbook

APPENDICES

APPENDIX 1: Summary of RE Scheme and Connected Capacity

No	RE Scheme	Description	Capacity
1.	Feed in-Tariff (Fit)	A Policy mechanism that obliges Distribution Licensees (DLs) to buy from Feed-in-Approval Holders (FIAHs) the electricity produced from grid-connected renewable energy developers over a fixed period at a particular rate, which is set by a governmental agency, Sustainable Energy Development Authority (SEDA) Malaysia.	<ul style="list-style-type: none"> (i) Up to 12kW: Connection at low voltage single phase (ii) > 12kW and ≤ 425kW: Connection at either low voltage or medium voltage (iii) > 425kW onwards: Connection at medium voltage only
2.	Net Energy Metering (NEM)	A mechanism where an eligible consumer installs a solar PV system primarily for his own use and the excess energy to be exported to the grid for which credit to be received that may be used to offset part of the electricity bill for energy provided by the distribution licensee to the electricity consumer during the applicable billing period.	<ul style="list-style-type: none"> i) Domestic or residential Consumers, Max capacity not more than 12kW for single phase and 72kW for 3 phase systems ii) Commercial, industrial and agricultural Consumers, the maximum capacity <ul style="list-style-type: none"> a) Medium and high voltage Consumers, the maximum capacity limit is 75% of Maximum Demand based on; <ul style="list-style-type: none"> (i) Average of the recorded Maximum Demand of the past 1 year; or (ii) The declared Maximum Demand for Consumers with less than 1 year's record; b) For low voltage Consumers, the maximum capacity limit is 60% of fuse rating (for direct meter) or 60% of current transformer (CT) rating.
3.	Large Scale Solar (LSS)	Solar Photovoltaic Plant with capacity as approved by the Commission connected to either the Transmission Network or Distribution Network in Peninsular Malaysia, Sabah or Labuan;	<ul style="list-style-type: none"> (i) ≥ 1MW to 30MW: Connected to Distribution network (33kV and below) (ii) > 30MW onwards: Connected to Transmission Network

No	RE Scheme	Description	Capacity
4.	New Enhanced Dispatch Arrangement (NEDA)	The New Enhanced Dispatch Arrangement is the mechanism used by the Single Buyer for scheduling the dispatch of generation under the Single Buyer Market.	≥ 100kW
5.	Self-Consumption (SELCO)	Electricity generated is entirely for own use and in the event of excess of generation, the energy is not allowed to be exported to the grid	<p>i) For a stand-alone system, there is no capacity limit for Solar PV System installation for self-consumption purposes.</p> <p>(ii) For a non-stand-alone system, the capacity limit for Solar PV System installation shall be lower than seventy-five per cent (75%) of the maximum demand of the consumer's existing installation.</p>



APPENDIX 2: Sample of Feed-In Approval Certificate

A SAMPLE OF FEED-IN APPROVAL CERTIFICATE



Feed-In Approval

GRANTED PURSUANT TO SECTION 7 OF THE RENEWABLE ENERGY ACT 2011



(FIAH Application No. :

Date Approved :

)

Name of Feed-in Approval Holder (FIAH) :

MyKad No. / Passport No. :

/ Registration No.

/ Service Tax Registration No.

/ e-PBT No.

Land Title's UPI Code :

Location of Renewable
Energy Installation :

Renewable Resources :

Installed Capacity (MW) :

Net Export Capacity (MW) :

Scheduled Feed-in Tariff
Commencement Date :

Effective Period
(Years Commencing from
The Feed-in Tariff Commencement Date) :

Feed-in Tariff Rate (RM/kWh) :

BONUS :

(
Chief Executive Officer
Sustainable Energy Development Authority Malaysia

FIA Certificate No.

Dated :

THIS FEED-IN APPROVAL IS SUBJECT TO THE CONDITIONS SET OUT HEREINAFTER.

APPENDIX 3: A summary of REPPA forms

Renewable Resource	Forms	Export/Installed (solar PV only) Capacity
Biogas	Form BG1	Renewable energy power purchase agreement for a renewable energy installation having a net export capacity of up to and including 10 MW and utilising biogas as its renewable resource
	Form BG2	Renewable energy power purchase agreement for a renewable energy installation having a net export capacity of above 10 MW and up to and including 30 MW and utilising biogas as its renewable resource
Biomass	Form BM1	Renewable energy power purchase agreement for a renewable energy installation having a net export capacity of up to and including 10 MW and utilising biomass as its renewable resource
	Form BM2	Renewable energy power purchase agreement for a renewable energy installation having a net export capacity of above 10 MW and up to and including 30 MW and utilising biomass as its renewable resource
Small Hydropower	Form HP1	Renewable energy power purchase agreement for a renewable energy installation having a net export capacity of up to and including 10 MW and utilising hydropower as its renewable resource
	Form HP2	Renewable energy power purchase agreement for a renewable energy installation having a net export capacity of above 10 MW and up to and including 30 MW and utilising hydropower as its renewable resource
Solar PV	Form PV1	Renewable energy power purchase agreement for a renewable energy installation having a rated kWp of up to and including 1,000 kWp and utilising solar photovoltaic technology as its renewable resource
	Supplementary Agreement PV1	For GST purposes
	Form PV2	Renewable energy power purchase agreement for a renewable energy installation having a rated kWp of above 1,000 kWp and up to and including 12,000 kWp and utilising solar photovoltaic technology as its renewable resource
	Form PV3	Renewable energy power purchase agreement for a renewable energy installation having a rated kWp of above 12,000 kWp and up to and including 30,000 kWp and utilising solar photovoltaic technology as its renewable resource


APPENDIX 4: Sample of RE Application Form

PERMOHONAN BARU (RENEWABLE ENERGY)		Terikh NC Diwujudkan
UNTUK KEGUNAAN PEJABAT		
KOD STESEN : _____	Contract Acc (export) : _____	SN : _____
No Premise : _____	Contract Acc (import) : _____	SN 2 : _____
Inst. No export : _____	Inst. No import : _____	BPBM : _____
BAHAGIAN 1 (UNTUK DI ISI OLEH PEMOHON)		
MAKLUMAT PEMOHON		
NO. PROJEK PSS / FIAH : _____		
JENIS TEKNOLOGI : _____	<input type="checkbox"/> Biomass <input type="checkbox"/> Biogas <input type="checkbox"/> Hidro <input type="checkbox"/> Solar <input type="checkbox"/> Indirect	
KAPASITI (kW) : _____	<input type="checkbox"/> Direct	
PARAS VOLTAN PENYAMBUNGAN (I/P) : _____	<input type="checkbox"/> 240V <input type="checkbox"/> 415V <input type="checkbox"/> 11KV <input type="checkbox"/> 33KV	
CADANGAN TARIKH MULA TUGAS : _____		
NAMA KONTRAKTOR/SERVICE PROVIDER : _____		
NO. TELEFON : _____		
NAMA PEMAJU TBB : _____		
NO. KAD PENGENALAN / NO. SYARIKAT : _____		
NO. TELEFON (PEJABAT) : _____	NO. FAKS : _____	
NO. TELEFON (BIMBIT) : _____	E-MAIL : _____	
NAMA UNTUK DIHUBUNGI : _____		
NO. TELEFON (PEJABAT) : _____		
NO. TELEFON (BIMBIT) : _____	E-MAIL : _____	
WARGA NEGARA : _____	<input type="checkbox"/> Malaysia <input type="checkbox"/> Lain-lain	
NAMA WARIS TERDEKAT : _____		
NO. KAD PENGENALAN : _____		
NO. TELEFON (PEJABAT/RUMAH/BIMBIT) : _____	PERTALIAN : _____	
ALAMAT PREMIS (Plant)		
i. Status Premis : _____	<input type="checkbox"/> Pemilik <input type="checkbox"/> Sewa <input type="checkbox"/> Ibu/bapa/saudara <input type="checkbox"/> Lain-lain	
ii. No. Premis : _____	<input type="checkbox"/> Lot/PT _____ <input type="checkbox"/> No. _____ <input type="checkbox"/> Aras (Level) _____ <input type="checkbox"/> Lain-lain _____	
iii. Nama Premis : _____		
iv. Nama Jalan : _____		
v. Area / Daerah : _____		
vi. Poskod : _____		
vii. Negeri : _____		
ALAMAT SURAT MENYURAT		
i. No. Premis : _____	<input type="checkbox"/> Lot/PT _____ <input type="checkbox"/> No. _____ <input type="checkbox"/> Aras (Level) _____ <input type="checkbox"/> Lain-lain _____	
ii. Nama Premis : _____		
iii. Nama Jalan : _____		
iv. Area / Daerah : _____		
v. Poskod : _____		
vi. Negeri : _____		
NAMA AHLI LEMBAGA PENGARAH (Syarikat)		
<input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____		
SENARAI SEMAK: -Permohonan Peseorangan/Syarikat/Komuniti (DIWAJIBKAN)		
Peseorangan (Individual) <input type="checkbox"/> Sijil Penuh SEDA (4 m/surat) <input type="checkbox"/> Salinan Kad Pengenalan <input type="checkbox"/> Salinan Bil Elektrik terkini <input type="checkbox"/> Salinan Borang Q <input type="checkbox"/> Salinan Acc.Penyata Bank/Simpanan <input type="checkbox"/> Surat Pengesahan (Undertaking letter)SEDA untuk sijil yang terdapat kesalahan	Syarikat (Company) <input type="checkbox"/> Sijil Penuh SEDA (FIT) <input type="checkbox"/> Letter of Award (LSS) <input type="checkbox"/> Salinan Acc.Penyata Bank/Simpanan <input type="checkbox"/> Salinan Bil Elektrik terkini/ premis berhampiran <input type="checkbox"/> Salinan Borang Q <input type="checkbox"/> Form 24, 44 & 49 (CTC) <input type="checkbox"/> Salinan Laporan PSS atau CCC <input type="checkbox"/> PSS - Power System Study <input type="checkbox"/> CCC - Confirmation Connection Check	Komuniti:- Sekolah/Tempat Beribadat/Rumah Kebajikan <input type="checkbox"/> Sijil Penuh SEDA (4 m/surat) <input type="checkbox"/> Surat Pengesahan Bank Acc & Bank ID <input type="checkbox"/> Salinan Bill Elektrik terkini <input type="checkbox"/> Salinan Borang Q <input type="checkbox"/> Surat Pengesahan Jab Agama Islam <input type="checkbox"/> Surat Pendaftaran utk Kuil / Tokong <input type="checkbox"/> Surat Pengesahan Kementerian Pendidikan <input type="checkbox"/> Surat Pengesahan Jab Kebajikan Masyarakat <input type="checkbox"/> Salinan Minit Mesyuarat AGM

APPENDIX 5: Sample of Meter Application Form

PERMOHONAN METER	No. Akaun Bil Elektrik Pengguna:																																																	
BAHAGIAN 1																																																		
NAMA INDIVIDU / SYARIKAT / SERVICE PROVIDER : _____ NO. KAD PENGENALAN / NO. SYARIKAT : _____ ALAMAT INDIVIDU / SYARIKAT / SERVICE PROVIDER : _____ _____ _____ NO. FAKS : _____ NO. TEL PEJABAT / BIMBIT : _____																																																		
BAHAGIAN 2																																																		
PARAS VOLTAN PENYAMBUNGAN (I/P) : <input type="checkbox"/> 240V <input type="checkbox"/> 415V <input type="checkbox"/> 11kV <input type="checkbox"/> 33kV KAPASITI (kWh) : _____ <input type="checkbox"/> Direct <input type="checkbox"/> Indirect CADANGAN TARIKH MULA TUGAS : _____																																																		
BAHAGIAN 3																																																		
NAMA FIAH / SPP : _____ NO. APPLICATION : <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center; width: 150px; height: 15px;"><tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table> NO. FIAH : <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center; width: 150px; height: 15px;"><tr><td>A</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table> NO. PSS : <table border="1" style="display: inline-table; border-collapse: collapse; text-align: center; width: 80px; height: 15px;"><tr><td>P</td><td>S</td><td>S</td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr></table>																						A																				P	S	S						
A																																																		
P	S	S																																																
BAHAGIAN 3 (DOKUMEN YANG PERLU DIMAJUKAN OLEH PEMOHON)																																																		
SENARAI SEMAK <input type="checkbox"/> Salinan Sijil FIAH (m/s 1 sahaja) atau LOA <input type="checkbox"/> Borang Makluman Awal (BMA) - untuk kapasiti > 60kWp dan ke atas <input type="checkbox"/> Borang Permohonan Perkhidmatan AR (Customer Request)																																																		
Saya / Kami dengan ini memberi pengakuan bahawa makluman yang diberikan adalah benar. * _____ * Perlu ditandatangani oleh Pemohon / Nama / Syarikat / Jawatan / Alamat * Sila majukan borang permohonan ini kepada Puan Hasmahani Abdul Khair	KEGUNAAN PEJABAT <input type="checkbox"/> Dokumen Lengkap <input type="checkbox"/> Nota _____ _____ _____																																																	

APPENDIX 6: Sample of NEM Meter Application Form

 BORANG PERMOHONAN METER (NEM)	Tarikh Terima:			
BAHAGIAN 1 : MAKLUMAT KONTRAKTOR ELEKTRIK / SERVICE PROVIDER				
KONTRAKTOR ELEKTRIK / SERVICE PROVIDER : _____ NO. KAD PENGENALAN / NO. SYARIKAT : _____ ALAMAT KONTRAKTOR ELEKTRIK / SERVICE PROVIDER : _____ _____ NO. FAKS : _____ EMAIL : _____ NO. TEL PEJABAT / BIMBIT : _____				
BAHAGIAN 2 : MAKLUMAT TEKNIKAL				
KAPASITI (kW) : _____ CADANGAN TARIKH MULA TUGAS : _____				
BAHAGIAN 3 : MAKLUMAT PEMOHON NEM				
NAMA PEMOHON : _____ NO. KAD PENGENALAN PEMOHON : _____ E-MAIL PEMOHON : _____ NO. SIJIL NEM : <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> NO. AKAUN BIL : ELEKTRIK : <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 15px; border: 1px solid black;" type="text"/>				
BAHAGIAN 4 : DOKUMEN YANG PERLU DIMAJUKAN OLEH PEMOHON				
SENARAI SEMAK : <ul style="list-style-type: none"> <input type="checkbox"/> Salinan Sijil NEM <input type="checkbox"/> Gambar pemasangan meter sediada beserta talian serbis <input type="checkbox"/> Gambar cadangan lokasi meter sekiranya terdapat perubahan pada lokasi meter sediaada 				
Saya / Kami dengan ini memberi pengakuan bahawa maklumat yang diberikan adalah benar. * _____ * Perlu dicop dan ditandatangani oleh Pemohon/ Kontraktor Elektrik/Service Provider * Hanya borang yang lengkap diisi bersama dengan dokumen sokongan sahaja akan diterima dan diproses * Sila majukan borang permohonan ini kepada TNB Subzon	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="padding: 5px;">KEGUNAAN PEJABAT</th> </tr> <tr> <td style="padding: 5px;"> <input type="checkbox"/> Dokumen Lengkap <input type="checkbox"/> Ya <input type="checkbox"/> Tidak </td> </tr> <tr> <td style="padding: 5px;"> Nama Pegawai Penerima _____ </td> </tr> </table>	KEGUNAAN PEJABAT	<input type="checkbox"/> Dokumen Lengkap <input type="checkbox"/> Ya <input type="checkbox"/> Tidak	Nama Pegawai Penerima _____
KEGUNAAN PEJABAT				
<input type="checkbox"/> Dokumen Lengkap <input type="checkbox"/> Ya <input type="checkbox"/> Tidak				
Nama Pegawai Penerima _____				

APPENDIX 7: Sample of NEM Meter Declaration Form



NEM DECLARATION FORM REV 2019

NET ENERGY METERING (NEM) APPLICATION FORM

PART 1: CONSUMER INFORMATION									
Name of Consumer	: _____								
TNB Account Number	: _____								
Installation Address	: _____ _____ _____								
Contact Number	: H/P _____ Home _____								
Email	: _____								
NEM Application Number	: _____								
PART 2: NEM SOLAR PV SYSTEM INFORMATION									
Total Generation Capacity	: _____ kW								
Commissioning Date of NEM Solar PV System	: _____ (dd/mm/yyyy)								
NEM Solar PV System Comply with the Following Standards	<table border="0"> <tr> <td>IEEE 1547</td> <td><input type="checkbox"/></td> </tr> <tr> <td>IEC 61727</td> <td><input type="checkbox"/></td> </tr> <tr> <td>MS 1837</td> <td><input type="checkbox"/></td> </tr> <tr> <td>NEM Technical Guideline</td> <td><input type="checkbox"/></td> </tr> </table>	IEEE 1547	<input type="checkbox"/>	IEC 61727	<input type="checkbox"/>	MS 1837	<input type="checkbox"/>	NEM Technical Guideline	<input type="checkbox"/>
IEEE 1547	<input type="checkbox"/>								
IEC 61727	<input type="checkbox"/>								
MS 1837	<input type="checkbox"/>								
NEM Technical Guideline	<input type="checkbox"/>								
Inverter Manufacturer	: _____								
Inverter rating	: _____ kW								
Number of Phases	: <input type="checkbox"/> Single Phase <input type="checkbox"/> Three Phase								
PART 3: COMPETENT PERSON/SERVICE PROVIDER DECLARATION									
I declare that:									
<ul style="list-style-type: none"> • I am representing the owner of the premise and the information furnished above is true to my knowledge and belief. • I confirm that the solar PV system design comply to the standards (IEEE 1547, IEC 61727, MS 1837) and the inverter (s) used are as per approved lists. • I also verify that the site condition is fit for installation of the solar PV system as per applicable regulations. • I hereby acknowledge that all information given are true and the relevant Authority shall have the right to take any action if the above information are false. • I attached the Testing and Commissioning (T&C) form as evidence that all required T&C has been done. • I enclose a valid G & H forms to which the NEM solar PV installation is attached or wired for the electricity supply. 									
_____	Name:								
Competent Person/Professional Engineer/ Service Provider Signature	Designation:								
	IC No:								

APPENDIX 8: Sample of NEM Inspection and Commissioning Form

BORANG PEMERIKSAAN DAN MULATUGAS (T&C) NET ENERGY METERING (NEM) (OPC & LPC)

NAMA PELANGGAN:		TARIKH PEMERIKSAAN:	
NO AKAUN:		JAM MULA:	
ALAMAT PREMIS:		JAM TAMAT:	
MAKLUMAT TEKNIKAL PERPASANGAN SOLAR PV			
Voltan pada titik sambungan (sebelum perpasangan) <i>Voltage at Point of Connection (before installation)</i>	RED: Volts	YELLOW: Volts	BLUE: Volts
Voltan pada titik sambungan (selepas perpasangan) <i>Voltage at Point of Connection (after installation)</i>	RED: Volts	YELLOW: Volts	BLUE: Volts
Voltan pada Meter TNB (sekiranya boleh diakses) <i>Voltage at TNB meter (if accessible)</i>	RED: Volts	YELLOW: Volts	BLUE: Volts
Anti-islanding Test	Disconnection Time: _____		sec
	Reconnection Time: _____		min
PENGESAHAN PENGUJIAN DAN MULATUGAS SISTEM SOLAR PV OLEH ORANG KOMPETEN			
Tandatangan:		Cop Syarikat:	
Nama:			
No I/C:			
Tarikh:			

APPENDIX 9: Settlement Formula

Calculation of Energy Payment for Solar Power Producers

Calculation Guidelines

For the purpose of determining the Energy Payment for the Billing Period (i.e. EP), the principles outlined above are applied as follows:

Energy Payment for each day in a Billing Period

- (a) NEDA Participant shall provide Single Buyer with a schedule, set out in a format similar to the following table, for the Generation Facility for each day of a Billing Period.

Index <i>i</i>	Period	Established Capacity and equivalent established energy		Metered Output and equivalent Export Capacity		Paid Meter Output (Capped at the Established Capacity) (kWh)	Energy Rate (RM/kWh)	Actual System Marginal Price, (SMP _{<i>i</i>}) (RM/kWh)	Bid Price (RM/kWh)	Applicable Price, (E _{<i>i</i>}) (RM/kWh)	Energy Payment (EP) (RM)
		MW	kWh	kWh	MW						
1	0:00 – 0:30										
2	0:30 – 1:00										
3	1:00 – 1:30										
4	1:30 – 2:00										
	↓										
48	23:30 – 24:00										

- (b) For the Generation Facility, the Energy Payment for each Trading Day of a Billing Period is determined as follows:

$$EP \text{ (daily)} = \sum_{i=1}^{48} (E_i \times MO_i)$$

where

- MO_{*i*} = the Metered Output (in kWh) from the Generation Facility during the Half-Hour Period, capped at the Established Capacity;
- E_{*i*} = the Excess Energy Rate under the relevant PPA; or the price offered by such Solar Power Producer in its Bid if such Bid satisfies the conditions
- SMP = the Actual System Marginal Price in such Billing Period;
- SMP_{*i*} = the applicable SMP for the Half-Hour Period *i* (in RM/kWh);
- i* = an index referring to each Half-Hour Period of each Trading Day of the Billing Period;

Calculation of Energy Payment for Price Takers

Calculation Guidelines

For the purpose of determining the Energy Payment for the Billing Period (i.e. EP), the principles outlined above are applied as follows:

Energy Payment for each day in a Billing Period

- (a) NEDA Participant shall provide Single Buyer with a schedule, set out in a format similar to the following table, for the Generation Facility for each day of a Billing Period.

Index <i>i</i>	Period	Export Capacity (Registered) and equivalent export energy		Metered Output and equivalent Export Capacity		Non-Paid Meter Output (capped at below the higher of 100kW or 1% of the Price Taker's Installed Capacity) (kWh)	Paid Meter Output (Capped at the Export Capacity) (kWh)	Actual System Marginal Price (SMP _{<i>i</i>}) (RM/kWh)	Energy Payment (EP) (RM)
		MW	kWh	kWh	MW				
1	0:00 – 0:30								
2	0:30 – 1:00								
3	1:00 – 1:30								
4	1:30 – 2:00								
	↓								
48	23:30 – 24:00								

- (b) For the Generation Facility, the Energy Payment for each Trading Day of a Billing Period is determined as follows:

$$EP \text{ (daily)} = \sum_{i=1}^{48} (SMP_i \times MO_i)$$

where

- MO_{*i*} = the Metered Output (in kWh) from the Generation Facility during the Half-Hour Period *i*;
 SMP_{*i*} = the applicable Actual System Marginal Price for the Half-Hour Period *i* (in RM/kWh);
i = an index referring to each Half-Hour Period of each Trading Day of the Billing Period;

APPENDIX 10: Sample of Self-Consumption Solar PV System Registration Form




SELF-CONSUMPTION SOLAR PV SYSTEM REGISTRATION FORM

PART 1: INFORMATION	
<ul style="list-style-type: none"> Please submit the registration form to the Distribution Licensee before commissioning the solar PV system installation. Consumer shall comply with "Guideline on the Connection of Solar Photovoltaic Installation for Self-Consumption". Consumer need to conduct PSS for solar PV system with capacity $\geq 425\text{kW}$. Applicant need to apply for a generating license from Energy Commission for a single phase system with capacity $\geq 24\text{kW}$ or single phase system with capacity $\geq 72\text{kW}$. 	<p>For office use only:</p> <p>Reference No: _____</p> <p>Serial No: _____</p> <p>Date Received: _____</p> <p>Time Received: _____</p> <p>Receiving Officer: _____</p>
PART 2: CONSUMER INFORMATION	
<p>Applicant Name: _____</p> <p>Electricity Bill account number: _____ IC/ROC Number: _____</p> <p>Distribution Licensee Company: _____ (e.g. TNB, SESB, etc.)</p> <p>Email Address: _____ Phone Number: _____</p> <p>Mailing Address: _____</p> <p>_____</p> <p>I hereby authorize the Competent Person as described in PART 4 to act on my behalf to manage my Self Consumption (SelCo) registration</p> <p>Signature: _____ Date: _____</p>	
PART 3: ALTERNATIVE CONTACT PERSON	
<p>Name: _____</p> <p>Relationship: _____ IC Number: _____</p> <p>Email Address: _____ Phone Number: _____</p> <p>Mailing Address: _____</p> <p>_____</p>	
PART 4: COMPETENT PERSON (ELECTRICAL CONTRACTOR) DETAILS	
<p>Name: _____ IC/ Certification No. : _____</p> <p>Company Name: _____ Company ROC No. : _____</p> <p>Phone Number: _____ E-mail address: _____</p> <p>Mailing Address: _____</p> <p>_____</p>	

PART 5: SERVICE PROVIDER DETAILS (IF ANY)	
Name: _____	IC/ Certification No. : _____
Company Name: _____	Company ROC No. : _____
Phone Number: _____	E-mail address: _____
Mailing Address: _____	
PART 6: CONSUMER INFORMATION	
Installation Address: _____	
Installation Site Ownership:	<input type="checkbox"/> Fully Owned <input type="checkbox"/> Owned (charged to bank) <input type="checkbox"/> Leased
If not fully owned, please provide the owner's name: _____	
Is the applicant an existing FIAH / NEM?	: <input type="checkbox"/> Yes If yes, please provide the existing solar capacity installed(kW) _____ <input type="checkbox"/> No
Voltage at point of common coupling: @Utility meter	<input type="checkbox"/> Low Voltage (230V/400V) <input type="checkbox"/> Medium Voltage (11kV/33kV)
Reasons for installing solar PV system	<input type="checkbox"/> Reduce electricity bill <input type="checkbox"/> Peak Shaving <input type="checkbox"/> Reduce Green House effect <input type="checkbox"/> Other reasons: _____ <input type="checkbox"/> Farm <input type="checkbox"/> Roof (Domestic) <input type="checkbox"/> Roof (Commercial) <input type="checkbox"/> Garage <input type="checkbox"/> Others: _____
PART 7: TECHNICAL INFORMATION	
a) Maximum demand of existing installation _____ kW	
b) Installed Solar PV Capacity _____ in kW _p c) _____ in kW _{ac}	
d) Expected generation per month _____ kWh	
e) Date of Commissioning of solar system: _____ (dd/mm/yyyy)	
f) Installation of Battery Energy Storage System: <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, Battery capacity _____ kW Battery Manufacturer: _____	
g) Daytime Peak Demand (11am to 3pm) _____ kW (Friday to Monday)	
h) Daytime Lowest Demand _____ kW	
<i>Note: For stand alone system, no capacity limit for solar PV system installation. For non stand alone system, solar PV system installed capacity shall not be more than 75% of maximum demand.</i>	

PART 8: PHOTOVOLTAIC (PV) INSTALLATION INFORMATION	
a) PV Module	: i) Type: Monocrystalline <input type="checkbox"/> Polycrystalline <input type="checkbox"/> Thin Film <input type="checkbox"/> Others: _____ : ii) Manufacturer _____ : iii) Module capacity _____
b) PV Inverter	i) Number of inverter installed _____ ii) Inverter capacity _____ iii) Type: Single Phase <input type="checkbox"/> Three Phase <input type="checkbox"/> iv) Manufacturer _____ v) Power Factor: <input type="checkbox"/> _____ lagging <input type="checkbox"/> _____ leading <input type="checkbox"/> unity
PART 7: DECLARATION	
By signing this form, I declare that:	
<ul style="list-style-type: none">• I am representing the applicant of the premise and the information furnished above is true to my knowledge and belief.• I hereby acknowledge that all information given are true and the relevant Authority shall have the right to take any action if the above information is false.• I confirm that the solar PV system design comply to the standards (IEEE 1547, IEC 61727, MS 1837, Guidelines on the Connection of Solar Photovoltaic Installation for Self-Consumption).• I also verify that the site condition is fit for installation of the solar PV system as per applicable regulations.• I further agree to comply with the specifications, terms and conditions stipulated in the applicable guidelines and related regulations, as amended from time to time.	
Signature :	Competent Person stamp:
Name: _____	
Date: _____	

APPENDIX 11: Sample of Borang Maklumat Awal (BMA) Perjangkaan

	Jenis Dokumen: Aras III REKOD KUALITI	Tajuk Prosidur: BORANG MAKLUMAT AWAL PERJANGKAAN BESAR	Nombor Dokumen: MTER-750-76-QR-05
	NAIB PRESIDEN BAHAGIAN PEMBAHAGIAN UNIT METERING		Mukasurat: 1 of 1 Edisi: 1 Tarikh:

Stesen		Tarikh	
Kod Cas Kerja		No. Akaun (Jika ada)	

Maklumat Sistem Perjangkaan (Tandakan √):

Pemasangan Alatubah Arus & Voltan Di Perkakas Suis TNB		Bekalan Elektrik Daripada TNB Kepada Pengguna	
Pemasangan Alatubah Arus & Voltan Di Perkakas Suis Pengguna		Bekalan Elektrik Daripada Penjana Kepada TNB	

Pengguna / Penjana

Nama			
Alamat Tapak Bangunan			
Jenis Perusahaan		Tarif (i.e. C1, RE, NEM, NEDA)	

	Jurutera Perunding	Kontraktor Elektrik
Nama		
Alamat		
No. Telefon		
No. Faksimili		
Alamat E - Mel		

Butir - butir Bekalan Yang Dicadangkan

Kehendak Maksima / Kapasiti Eksport (kW)		Nisbah Alatubah Arus	
Bilangan Pembekal		Tarikh Mulatugas	
Voltan Sesalur Masuk TNB / Paras Voltan Sambungan Ke Grid TNB		Bacaan Kekuatan Signal GPRS Celcom (dBm)	
Lain - lain Maklumat			

Makluman - makluman berikut hendaklah dikepilkan:

- Gambarajah skematik (*single line schematic diagram*) menunjukkan sesalur TNB, perkakas suis & busbar utama pengguna, alatubah - alatubah arus dan voltan perjangkaan dan seumpamanya (termasuk sistem bekalan sedia ada sekiranya berkaitan)
- Pelan *layout* menunjukkan ukuran - ukuran jarak, perkakas - perkakas elektrik, panel meter, parit kabel dan seumpamanya

Disediakan Oleh: _____ Diperakukan Oleh: _____

(Pengguna / Penjana / Penyelia *Supply Planning*) (Jurutera *Supply Planning*)