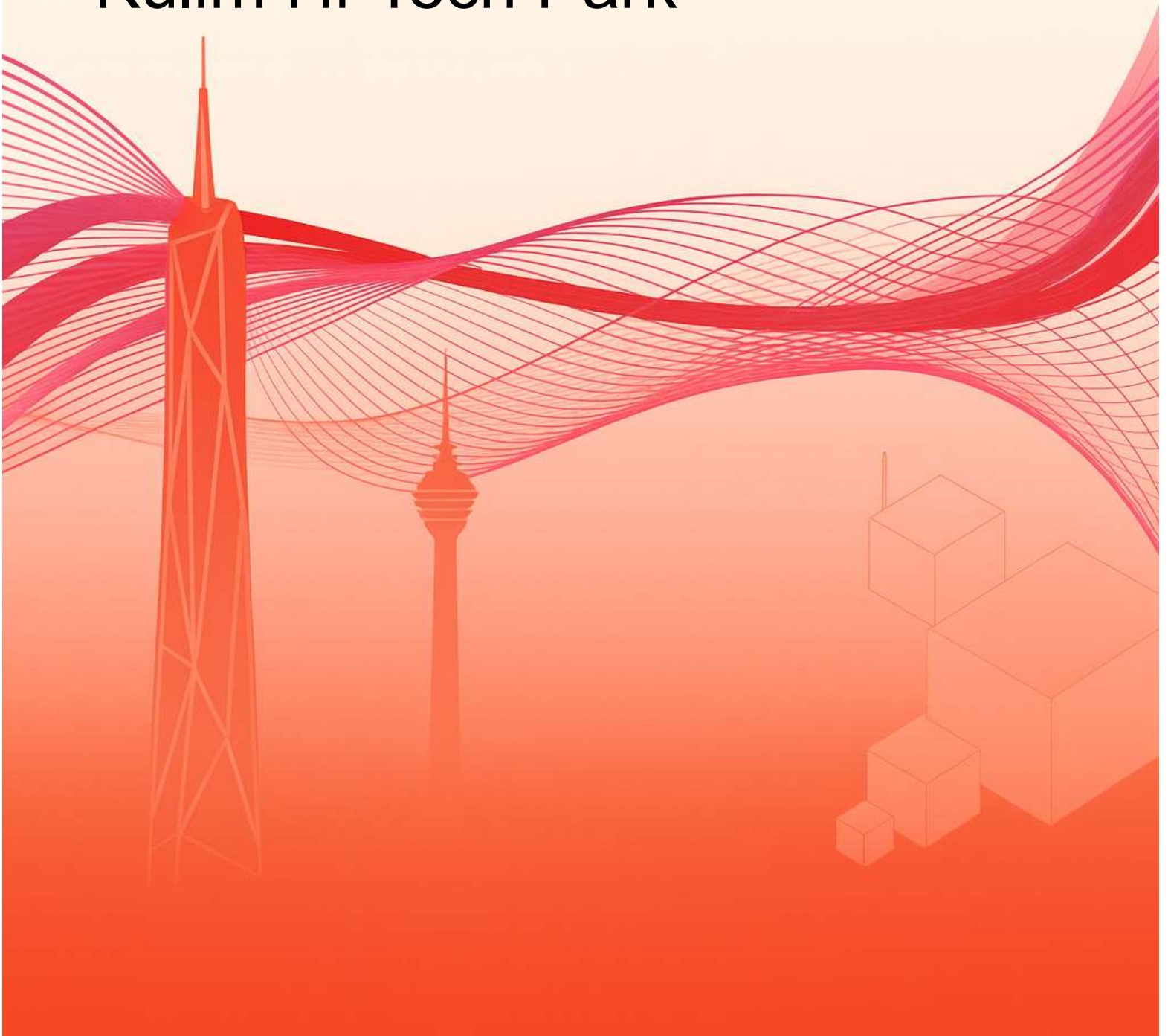
Suruhanjaya Tenaga
Energy Commission

Registration No.: GP/ST/No. 57/2025

Guidelines

for the Connection of Solar Photovoltaic Installation for Self-Consumption in Kulim Hi-Tech Park



GUIDELINES FOR THE CONNECTION OF SOLAR PHOTOVOLTAIC INSTALLATION FOR SELF-CONSUMPTION IN KULIM HI-TECH PARK

[AUGUST 2025]

Registration Record

REGISTRATION NO.	REVISION DATE	REMARKS
GP/ST/No.57/2025		First Version

ELECTRICITY SUPPLY ACT 1990

[*Act 447*]

GUIDELINES FOR THE CONNECTION OF SOLAR PHOTOVOLTAIC INSTALLATION FOR SELF-CONSUMPTION IN KULIM HI-TECH PARK

GP/ST/ No.57/2025

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

Citation and commencement

1. (1) These guidelines may be cited as the **Guidelines for the Connection of Solar Photovoltaic Installation for Self-Consumption in Kulim Hi-Tech Park**.

(2) These Guidelines shall come into operation on the date of its registration.

Purpose

2. The purpose of these Guidelines are as follows:

(a) to prescribe the conditions for the installation of Solar PV System for self-consumption;

(b) to set out the requirements and obligations on the NUR Utility Company and any person who installs, owns, uses, works, or operates the solar PV installation; and

(c) to outline the SELCO application procedure.

Dated: 4 August 2025

SITI SAFINAH BINTI SALLEH
Chief Executive Officer
Energy Commission

TABLE OF CONTENTS

1.0 Application

1.1 These Guidelines shall apply to—

(a) Kulim Hi-Tech Park;

(b) any person who owns, uses, works, operates or permits to use, work or operate any solar PV installation for self-consumption;

(c) NUR; and

(d) any other person who carries out the design, installation, testing, commissioning and maintenance works of the solar PV installation.

1.2 No separate solar PV installation shall be installed at such premises for self-consumption.

2.0 Interpretation

In these Guidelines, unless the context otherwise requires, the definitions of the terms are as follows:

Act 447 means the Electricity Supply Act 1990 [*Act 447*];

Apparent Power means the product of voltage and alternating current measured in kVA or MVA;

Active Power means the product of voltage and the in-phase component of alternating current measured in units of watts and standard multiples thereof, i.e.:

1000 Watts = 1 kW;
1000 kW = 1 MW;
1000 MW = 1 GW; and
1000 GW = 1 TW;

Apparatus means all types of equipment in which electrical conductors are used, supported or of which they may form a part or High Voltage electrical circuits

	forming part of a system on which safety precautions may be applied to allow work and/or testing to be carried out;
Applicant	means a person applying to be a **SELCO Consumer** of NUR grid;
BESS	means battery energy storage system which is a device that stores energy;
Commission	has the meaning assigned to it under the Act;
Competent Person	has the meaning assigned to it under the Act;
Connection Point	means the interface point on a consumer's installation with the licensee's electricity supply network;
Consumer	means an owner or occupier of a premises who is supplied or requires to be supplied with electricity by the licensee;
Distribution Licensee	means a holder of a licence to distribute issued by the Commission under section 9 of Act 447;
Electrical Consultant	means the consulting firm which is registered under Board of Engineers Malaysia;
Electrical Contractor	has the meaning assigned to it under the Regulations;
Grid Owner	means the party to use, work or operate the Transmission System and Distribution System in

	Kulim Hi-Tech Park which is represented by NUR Distribution;
High Voltage	has the meaning assigned to it under the Regulations;
Indirect Connection	means the connection of a renewable energy installation to a supply line indirectly through the internal distribution board of the Consumer where the renewable energy installation is connected to an electrical point within the premises of the Consumer instead of the point of common connection;
installation	has the meaning assigned to it under the Act;
Licensee	has the meaning assigned to it under the Act;
Load	means the Active Power, Reactive Power or Apparent Power, drawn by the particular installation or equipment connected to the Transmission System or Distribution System;
Low Voltage	has the meaning assigned to it under the Regulations;
Maximum Demand	means twice the largest number of kilowatt-hours used during any consecutive thirty minutes in a month;
Medium Voltage	has the meaning assigned to it under the Regulations;
MW	means megawatt or 1,000 kW in a.c. rating;

Non-Stand-Alone System	means a system connected to the electricity utility grid;
NUR	means NUR Distribution Sdn Bhd (Company No: 407806-X), a company with the address at Lot 30, Jalan Hi-Tech 4 Kulim Hi-Tech Park 09000 Kulim, Kedah, Malaysia;
Plant	means fixed and movable items used in the generation and/or supply and/or transmission of electricity, other than Apparatus;
Point of Interconnection	means the point where the electrical installation of the SELCO Consumer is physically connected to the Supply System, where: *(a)* for supply at Low Voltage, the point is at the cutoff fuse; and *(b)* for supply at Medium Voltage, the point is at the incoming switchgear, at the Premises of the SELCO Consumer;
Premise	means any building together with its land, outbuildings and any structures within the same compound occupied or used by the Consumer;
PSS	means Power System Study, a technical analysis or system check carried out or caused to be carried by the Grid Owner or any other party endorsed by Grid Owner to assess the potential impact of the proposed solar PV installation under the SELCO programme on the planning and

	operation of the network of the Grid Owner to which the solar PV installation will be connected;
PV	means photovoltaic;
PV Meter	means the meter facility installed in the Consumer's Premise for measuring the energy generated by the PV Installation, including any associated battery energy storage system;
Reactive Power	means the product of voltage and current and the sine of the phase angle between them measured in units of volt-amperes reactive and standard multiples thereof, i.e.: 1000 VAr = 1 kVAr; 1000 kVAr = 1 MVAr;
Regulations	means the Electricity Regulations 1994 [*P.U.(A) 38/1994*];
SELCO	means self-consumption;
Solar PV System	means Solar Photovoltaic System, which refers to a system converting sunlight directly to electricity which comprise of PV cells, PV modules, solar inverter, the associated switching, protection and control devices, cables, and other related equipment and devices;
Supply System	means the Distribution System or Transmission System used, worked or operated by the Grid Owner within Kulim Hi-Tech Park;
System	has the meaning assigned to it under the Act;

Transmission System	means NUR's Transmission System which comprises all the 132kV elements but excludes Generation Circuits, transformer connections to lower voltage Systems and External Interconnections between the Transmission System and External Systems;
user	means any person connected to and using the Transmission System or Distribution System.

3.0 Solar PV Installation

3.1 The solar PV installation shall be installed in the premises where the owner or occupier resides or conducts its business activity and shall be strictly for self-consumption of the owner or occupier within the premises only.

3.2 The energy produced from the solar PV installation shall not be supplied to any other person or premises outside the premises of the owner or occupier.

3.3 The installation of solar PV panels shall be within the same premises.

3.4 Eligibility Criteria

3.4.1 The Applicant shall be an existing Consumer of NUR Distribution Sdn. Bhd. and has been in operation for a minimum of six (6) months.

3.4.2 Any consumer who is in the development and planning stage which are yet to be in operation is not eligible to apply.

3.5 Capacity Limit

3.5.1 For a Non-Stand-Alone System, the capacity limit for solar PV System installation shall be lower than eighty-five percent (85%) from the existing maximum demand of the Consumer.

3.5.2 The Maximum Demand of the NUR Consumer is based on the average of the recorded Maximum Demand for the past six months.

3.5.3 Notwithstanding paragraph 3.5.1, the maximum capacity for SELCO solar PV rooftop in Kulim Hi-tech Park shall adhere to the limitation of NUR network based on the PSS approval by NUR.

3.6 Types of installation allowed

The solar PV installation shall be of PV panels mounted on the rooftop of the buildings within the same Premises.

3.7 SELCO Solar PV Registration

The Consumer of the Solar PV System is required to register the installation with NUR by the registered Electrical Contractor or Electrical Consultant by submitting the following documents:

(a) the Letter of Award for the following:
  (i) from developer to main contractor;
  (ii) from main contractor to solar service provider;
  (iii) from solar service provider to PSS consultant;

(b) the latest 6 months of NUR electrical bills;

(c) a SELCO application letter;

(d) a SELCO application form;

(e) a copy of the Certificate of Registration of the Electrical Contractor ~~i~~issued by the Commission and the Sustainable Energy Development Authority (SEDA);

(f) a copy of the registration certificate of the Electrical Consultant by the Board of Engineers Malaysia (BEM);

(g) all relevant drawings and layouts for solar PV design; and

(h) all PV Apparatus manual and factory test type test results.

3.8 Registration of the Installation with the Commission by the Registered Electrical Contractor

3.8.1 Upon completion of the installation work, the Installation shall be tested and certified with a Completion Certificate and a Test Certificate by a Competent Person as prescribed in the Regulations.

3.8.2 The Consumer of the Solar PV System is required to register the installation with the Commission and the registration shall be done by the registered Electrical Contractor by submitting the following documents:

(a) a SELCO Solar PV System registration form;

(b) a certified copy of the drawings, plans and specifications including any subsequent approved amendments and modifications by a Competent Person;

(c) a PSS report endorsed by the Licensee subsequent to the PSS presentation under paragraph 6.0 of these Guidelines; and

(d) a Completion Certificate and Test Certificate for the Installation as prescribed in the Regulations.

3.9 Battery Energy Storage System (BESS) Requirements

3.9.1 The installation of a BESS alongside the Solar PV system is required and the provision of BESS for SELCO application in Kulim Hi-Tech Park is mandatory for all solar PV system, and only if the SELCO application has technical violation based on PSS Stage findings.

3.9.2 The consumer shall refer to the technical and any other documents published by the NUR on the relevant technical and commercial requirements, specifications, standards, etc. for the design, installation, testing, commissioning and operation of the grid-connected Solar PV System.

4.0 Point of Interconnection

4.1 The types of Indirect Connection for Solar PV power generation system are as follows:

(a) Type A – for LV Consumer; and

(b) Type B – for MV Consumer.

4.2 Feeding Method

4.2.1 Indirect Feed - Connection point at Consumer

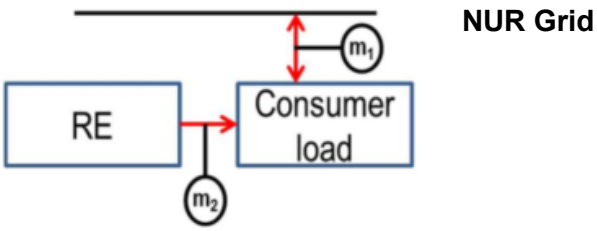


Figure 1: Connection to NUR grid

The connection point is within the Consumer's network without direct connection to the NUR grid's system. This method is adopted for Self-Consumption scheme. Power consumption and export are measured by m1, while power generation is measured by m2. For self-consumption, meter m1 is a Consumer premise meter. Meter m2 is a dedicated PV meter to record the generation from the indirect PV generation system and all costs relating to the PV meter shall be borne by the Consumer.

4.3 Type A: LV Consumer Connections

4.3.1 Type A is applicable to NUR grid's Consumer with connection to the LV network.

4.3.2 The PV connection point shall be done at the distribution board or the main switch board of the Consumer.

4.3.3 The use of a single-phase inverter shall not cause unbalance conditions to NUR grid's system. If such a condition is violated, requirement of a three-phase inverter is automatically enforced.

4.3.4 The Annual reading for M2 shall be furnished to NUR.

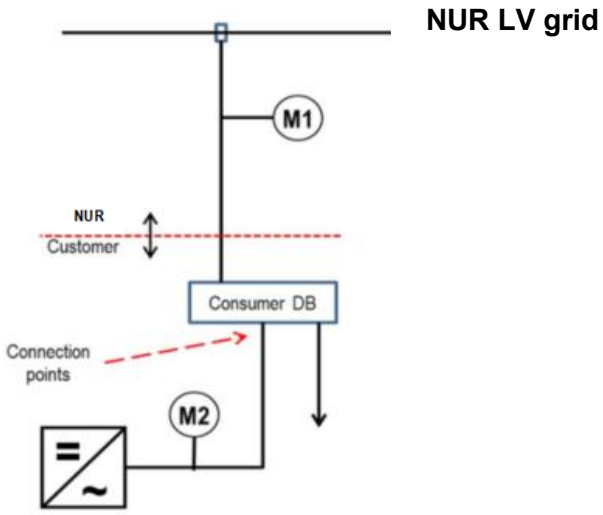


Figure 2: Type A connection

4.4 Type B: MV Consumer Connections

4.4.1 Type B connection is applicable for NUR grid's Consumer with connection to MV network.

4.4.2 The PV connection point shall be done at the main switch board of the Consumer.

4.4.3 The use of a single-phase inverter shall not cause unbalance conditions to NUR grid's system. If such a condition is violated, requirement of a three-phase inverter is automatically enforced.

4.4.4 The annual readings for M2 and M3 shall be furnished to NUR.

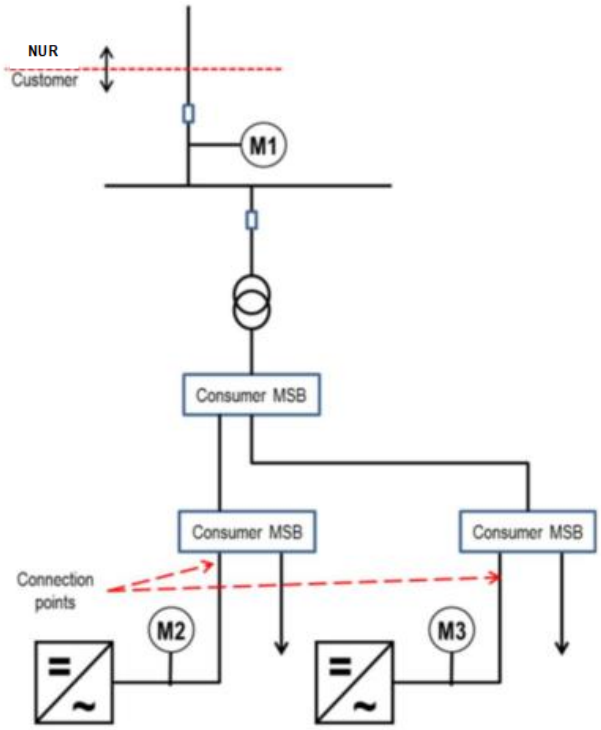


Figure 3: Type B connection

5.0 PSS Requirements for SELCO Solar PV System Installation

5.1 The Consumer shall ensure that the NUR grid is not gravely affected by the PV System installation and shall be responsible for implementing necessary mitigation measures and its associated costs as required in the studies outcome.

5.2 A PSS is required for all applications with Solar PV Installation with peak capacity of 425 kWac and above in order to check the acceptability of the installation to be connected to the Supply System, and the cost to conduct the PSS shall be the responsibility of the Applicant.

5.3 The completion of the PSS study is the pre-requisites for the approval of application to the SELCO Solar PV and shall be conducted prior to the approval of the application.

5.4 In the event the result of the study demonstrates the need for any modification to the Supply System for the connection of the solar PV Installation, it is the

responsibility of the Applicant to bear all costs of such modification works by Grid Owner.

5.5 As the connection is done internally, the Consumer shall appoint a qualified Electrical Contractor to design the Solar PV System interconnection.

5.6 All drawings, plans, and specifications shall be approved by a suitably qualified Professional Engineer. No substantial amendment and modification shall be made to the plan and specification unless such amendment and modification has been approved by the said Professional Engineer.

5.7 The PSS studies shall be conducted by NUR or caused to be conducted by NUR or any party endorsed by NUR.

5.8 NUR Distribution shall issue an invoice for PSS application processing fee to the Applicant and the payment of such invoice shall be made with NUR Distribution and a copy of the payment receipt shall be sent to NUR Distribution by the Applicant.

5.9 NUR Distribution will kick off the PSS study after the copy of payment receipt is received.

5.10 The PSS report shall be presented to NUR for endorsement with the following technical requirements which shall include, but not limited to:

(a) general description and assessment of the electrical supply system connected to the Applicant's Premises such as type of substation, capacity, voltage and current rating and fault withstand capability of the transformers and switchgear, current carrying capacity and short circuit current rating of the cables supplying electricity to the Premises and connection of Solar PV System;

(b) analysis on load flow;

(c) analysis on short circuit at the Point of Interconnection before and after connection of the solar PV installation (fault level will be provided by NUR);

(d) analysis on different scenarios as below:

(i) with solar PV system under maximum and minimum load;

(ii) without solar PV system under maximum and minimum load;

(e) proposal on the controlling and operating philosophy for electrical system;

(f) proposal on the zero export mechanism;

(g) proposal on the reverse power relay system; and

(h) any other issues which may have impact on the Supply System such as reactive power, power quality and other matters affecting the security, reliability and quality of supply.

5.11 List of Required Documents for PSS Approval.

The appointed Electrical Consultant of the Consumer of the Solar PV System shall submit the following documents to NUR for PSS approval:

(a) a certified copy of the drawings, plans and specifications including any subsequent approved amendments and modifications by the suitably qualified Professional Engineer;

(b) a certified copy of the 4 days Load profiling from Friday to Monday by the suitably qualified Professional Engineer;

(c) a copy of the proposed solar PV capacity calculation based on six month or twelve months maximum demand, if available;

(d) a certified copy of existing Consumer and proposed solar PV equipment specification and datasheet for solar PV inverter, transformer, cable, busbar, circuit breaker and generator;

(e) a certified copy of the proposed solar PV inverter dynamic model and user guidelines;

(f) a certified copy of the proposed solar PV inverter Factory Acceptance Test Report and type test report;

(g) a PSS report prepared by NUR subsequent to the PSS presentation under Section 6.0 of these Guidelines; and

(h) a certified copy of the Power Quality Measurement Report at NUR Point Of Interconnection substation by the suitably qualified competent person.

5.12 All applications shall be submitted through online submission or email to NUR and shall be processed in the order in which they are received.

5.13 NUR will review the submitted documents and will provide feedback or notification to the Applicant in case of incomplete application submission.

5.14 The result of the PSS is valid for one year from the date of approval of the study.

5.15 The general mitigation plan for technical violation shall be referred to the technical and any other documents published by the NUR on the relevant technical and commercial requirements, specifications, standards, etc. for the design, installation, testing, commissioning and operation of the grid-connected Solar PV System.

6.0 Testing & Commissioning

6.1 Upon completion of the installation works of the solar PV installation, the Electrical Contractor who carried out the installation works shall ensure that the installation to be tested and commissioned by the Competent Person in accordance with the Act and the Regulations.

6.2 The Supervision and Completion Certificate and the Test Certificate (Form G and Form H as prescribed in the First Schedule of the Regulations) for the installation shall be duly signed by the Competent Person undertaking the works in accordance with the Regulations. A copy of the certificates shall be kept by the Consumer for record and reference purposes.

6.3 There are 2 types of testing required, namely –

(a) the inverter compliance test, where–

(i) the Consumer is responsible to ensure that the inverter units are in compliance to the requirements of these Guidelines; and

(ii) the certified results of tests must be submitted for verification; and

(b) the interconnection compliance test, where–

(i) prior to commissioning, the interconnection must be tested to ensure that the performance is up to the required standard, installations are according to the approved scheme, settings are done as approved, etc.;

(ii) any Indirect Connection of Solar PV power generation system plant should not have detrimental impact to the operation of NUR grid; and

(iii) tests to prove the following items shall be carried out in the commissioning process as follows:

A. Anti-islanding on loss of mains;

B. Interlocking scheme, if any;

C. Equipment functional tests; and

D. Power Quality measurement.

6.4 In order to conduct the tests referred to in paragraph 6.2, the test equipment used shall have a valid calibration certificate.

6.5 Commissioning of LV Connection

For connections that are situated on a long feeder, special attention to the voltage level during peak and low load is to be made. Such a condition could result in excessive voltage rise during low load period.

7.0 Licensing Requirements

For solar PV system installation above 24 kW for single phase and 72 kW for three-phase, any person who uses, works or operates the installation shall require a licence as stipulated under the Guidelines on Licence Application under the Electricity Supply Act 1990 issued by the Commission.

8.0 Alteration and Disconnection of Solar PV Installation

8.1 The owner of the solar PV Installation shall inform the Commission in writing at least one month in advance prior to any alteration to the solar PV installation, provided that any such alteration shall be in accordance with the provisions of these Guidelines.

8.2 The letter shall be submitted to NUR at least three months prior to the planned date of the alteration or disconnection and shall specify the reasons for such alteration or disconnection of their solar PV installation.

9.0 Environmental Attributes

The value of any credits or financial benefit which are available or may become available for reductions of greenhouse gas emission earned from the generation of Solar PV Energy by the Solar PV Installation shall be solely for the benefit of the SELCO Consumer.

10.0 Costs

For the purpose of these Guidelines, any installation commissioned after the registration date of these Guidelines is subject to charges, fees, or any other payment that will be imposed by the Government to reflect the true cost of supply, to ensure fairness to all Consumers, and to maintain the security and reliability of the electricity supply system.

11.0 Appendix

Application Forms

Attachment 1

Registration Form Submission To EC

PART 1: INFORMATION

- Please submit this form together with a copy of Supervision and Completion Certificate (Form G) and Test Certificate (Form H) of the solar PV installation to the Energy Commission within one month of commissioning of the solar PV installation
- For grid-connected system, please send a copy of this form to NUR prior to the installation of the solar PV system
- The installation shall comply with "Guidelines for The Connection of Solar Photovoltaic Installation for Self-Consumption in Kulim Hi-Tech Park".

For office use only:

Reference No: _____

Date Received: _____

Time Received: _____

Receiving Officer: _____

PART 2: CONSUMER INFORMATION

Name of Consumer: _____ IC/ROC Number: _____

Electricity Bill Account Number: _____(*not applicable for off grid system*)

Electricity Utility Company: _____ (e.g. TNB, SESB, NUR) (*not applicable for off grid system*)

Email address: _____ Phone Number: _____

Mailing Address: _____

_____

I hereby authorize the Electrical Contractor as described in PART 4 to act on my behalf to manage my Self Consumption (SelCo) registration

Signature: Date:

PART 3: CONTACT PERSON (IF RELEVANT)

Name: _____ IC Number: _____

Relationship: _____

Email address: _____ Phone Number: _____

Mailing Address: _____

_____

PART 4: ELECTRICAL/ELECTRICAL SERVICES CONTRACTOR/COMPETENT PERSON DETAILS

i. ELECTRICAL CONTRACTOR

(a) Name of Electrical Contractor : _____

(b) Company ROC No : _____

(c) Registration No. with Energy : _____

Commission : _____

(d) Phone number of company : _____

(e) E-mail address : _____

(f) Mailing Address

ii. COMPETENT PERSON(S) IN-CHARGED OF INSTALLATION, TESTING & COMMISSIONING WORKS

(a) Name of Competent Person(s): : _____

(b) IC No : _____

(c) Competent Person(s) Certificate No : _____

(d) Phone number of company : _____

(e) E-mail address : _____

(f) Mailing Address : _____

iii. ELECTRICAL SERVICES CONTRACTOR (IF RELEVANT):

(a) Name of Electrical Services Contractor : _____

(b) Company ROC No : _____

(c) Registration No. with Energy Commission : _____

(d) Name of Competent Person(s) : _____

(e) IC No : _____

(f) Competent Person(s) Certificate No : _____

(g) Phone Number of company : _____

(h) E-mail address : _____

(i) Mailing Address

PART 5: SOLAR PV SERVICE PROVIDER DETAILS (IF ANY)

Company Name: _____ Company ROC No:_____

Phone Number: _____ E-mail address: _____

Mailing Address: _____

PART 6: CONSUMER INFORMATION

Installation Address: _____

_____

Supply Voltage ☐ Low Voltage (230V/400V) ☐ Medium Voltage (11kV/33kV) 400V/11kV/33kV/132kV/275kV)

☐ High Voltage (132kV/275kV)

Solar PV Installation connection to: _____

Solar PV Installation Type ☐ Roof (Domestic) ☐ Roof (Factory)

☐ Roof (Commercial) ☐ Roof (Warehouse)

☐ Others: _____(Please provide details)

PART 7: TECHNICAL INFORMATION

a) Existing maximum demand of electrical Installation _____ kW

b) Existing average monthly energy consumption_____kWh

- for consumer less than six (6) months record (*if applicable):

☐ 1 month ☐ 4 months

☐ 2 months ☐ 5 months

☐ 3 months ☐ 6 months

c) Capacity of solar PV installation _____in $kW_{p,}$ _____in kW_{ac}

d) Estimated energy production per month _____kWh

e) Scheduled date of commissioning of solar system: _____(dd/mm/yyyy)

f) Installation of Battery Energy Storage System:

☐ Yes ☐o

- Battery capacity: _____ kW/kWh
- Battery Manufacturer: _____
- Battery Standard used: _____

g) Daytime Peak Demand before installing the solar PV installation _____ kW (if available)

h) Daytime Lowest Demand before installing the solar PV installation _____ kW (if available)

PART 8: PHOTOVOLTAIC (PV) INSTALLATION INFORMATION

a) PV Module (i) Manufacturer/Model : _____

(ii) Type: Monocrystalline ☐ Polycrystalline ☐ Thin Film ☐

PERC ☐ Dual Facial ☐ Others: _____

(iii) Module Capacity : _____ (kWp)

(iv) Module Efficiency : _____ (%)

(v) Total Capacity of Modules : _____ (kWp)

: _____ (kWh/kWp)

(vi) Reference Yield : _____ (kg)

(vii) Module Weight

b) Inverter

(i) Manufacturer/Model : _____

(ii) Number of Inverters : _____

(iii) Inverter Capacity (each) : _____

(iv) Total Inverter Capacity : _____

(i) Type: Single Phase ☐ Three Phase ☐

(ii) Inverter Input/Output voltage: _____

(iii) Inverter Input/Output current: _____

(iv) Rated Power Factor: _____ Adjustable Range: _____ lagging to _____ leading

(v) Inverter Efficiency _____

PART 9: DECLARATION OF ELECTRICAL CONTRACTOR UNDERTAKING THE SOLAR PV INSTALLATION WORK

By signing this form, I declare that:

- I am representing the applicant of the premise and the information furnished above is true to my knowledge.
- I hereby acknowledge that all information given is 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 installation design comply to the relevant International/Malaysian standards and Guidelines for Solar Photovoltaic Installation for Self-Consumption.
- I also verify that the site condition is fit for installations of the solar PV system.

Signature : _____

Name : _____

IC No : _____

Designation : _____

Name of Electrical Contractor : _____

Date

Suruhanjaya Tenaga
Energy Commission
No. 12, Jalan Tun Hussein
Precinct 2
62100 Putrajaya
Tel : +603 8870 8500
Web : www.st.gov.my