ENERGY COMMISSION OF SABAH

GP(E)/ECoS/009/2024

Guidelines

on Grid-Connected Solar Photovoltaic System for Self-Consumption in Sabah (SELCO - PV SABAH)

[Electricity Supply Enactment 2024]

Registration Record

Reg. No	Issuance / Amendments	Effective Date
GP(E)/ECoS/009/2024	First Issuance	1 February 2024

ELECTRICITY SUPPLY ENACTMENT 2024

GUIDELINES ON THE CONNECTION OF SOLAR PHOTOVOLTAIC INSTALLATION FOR SELF-CONSUMPTION IN SABAH (SELCO – PV SABAH)

GP(E)/ECoS/009/2024

IN exercise of the power conferred by Section 101 of the Electricity Supply Enactment 2024, the Commission issues the following guidelines:

Citation and Commencement

1. These Guidelines may be cited as the **Guidelines on the Connection of Solar Photovoltaic Installation for Self-Consumption in Sabah**.

2. These Guidelines shall come into operation on the date of registration of these Guidelines.

Interpretation

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

Term	Definition
Enactment	means the Electricity Supply Enactment 2024
Commission	means the Energy Commission of Sabah established under the Energy Commission of Sabah Enactment 2023 and Energy Commission of Sabah Enactment (Amendment) 2024.
Competent Person	means a person who holds a certificate of competency issued by the Commission to perform work in accordance with the restrictions, if any, stated in the certificate.

Term	Definition
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.
Licensee	means the electricity utility with public licence issued by the Commission under Section 8 of the Enactment to supply electricity to consumers
Electrical Contractor with Class PV (Grid Connected) (ECCPV(GC))	means a person who holds a Certificate of Registration as an Electrical Contractor class A, B or C with Class PV (Grid Connected) issued under Regulation 78 of the Electricity Regulations 2024.
Electrical Work	means any work performed or carried out on an electrical installation and includes the installing, constructing, erecting or repairing, the altering of the structure, the replacing of any of its parts, the adding of any part to it or the carrying out of any work for the purposes of its maintenance, but does not include work in relation to: (a) the manufacturing of an electrical installation or the assembling in the course of, or in connection with, its manufacture for the purpose of producing a new article; or (b) the oiling, greasing, cleaning or painting of an electrical installation.
Electricity Distribution Network	means a system or part of a system at nominal voltage of 33 kilovolts or below of electric lines or cables, substations and associated equipment and buildings for distributing electricity regardless of whether a generating plant is connected to such system as in Section 2 of the Enactment
Electricity Transmission Network	means a system or part of a system at nominal voltage of 34 kilovolts and above of main supply lines or cables, substations and associated equipment and building used for conveying electricity — (a) from a generating station to a substation; (b) from one generating station to another; (c) from one substation to another; (d) to or from any interconnection point; or (e) to the final consumer; as in Section 2 of the Enactment

Term	Definition
Grid Connected Solar PV (GCSPV)	means a photovoltaic system that is connected to the utility grid directly or indirectly.
Grid Connected PV System Designer	means a person who holds a Certificate of Competency as a Grid-Connected Photovoltaic System Designer issued under Regulation 50
Indirect Connection	means the connection of an installation to a supply line indirectly through the internal distribution board of the consumer where the installation is connected to an electrical point within the premises of the consumer instead of the connection point.
Installation	means the whole of any plant or equipment under one ownership or, where a management is prescribed, the person in charge of the management, designed for the supply or use, or both, as the case may be, of electricity; including generating unit, if any, with all necessary plant, buildings and land in connection therewith, pipeline, supply line, electricity supply infrastructure, domestic and non-domestic electrical installation and consuming apparatus, if any;
Power Systems Study (PSS)	Study to determine the technical impact of the solar PV Installation to the Licensee's Distribution or Transmission System and establish the technical and safety requirements that may be necessary for the Installation.
Premise	Means a building together with its land outbuilding and any structures within the same compound occupied or used by the consumer
Private Installation	means an installation operated by a licensee[1] or owner solely for the supply of electricity to, and use thereof on the licensee's or owner's own property or premises, or, in the case of a consumer, taking electricity from a public installation for use only on the licensee's[1] or owner's property or premises. *[1](for the purpose of clarity, licensee here means the owner of the solar PV system granted the licence under Section 8.0 of the Enactment)*
Public Installation	means an installation operated by a licensee for the supply of electricity to any person other than the licensee.

Term	Definition
Solar Photovoltaic (PV) system	means sunlight converted directly to electricity through a system which includes solar PV cells, modules, inverter, the associated protection and control devices, alternating current and direct current cable and other related devices up to the incoming terminal of the PV meter.
Solar Photovoltaic generation for self- consumption	means electricity generated from solar PV system that is grid connected and it is entirely for own use and in the event of excess of generation, the energy is not allowed to be exported to the grid
Supply Line	means a conductor or conductors or other means of conveying, transmitting or distributing electricity, together with any casing, coating, covering, tube, pipe, insulator or post enclosing, surrounding or supporting the same or any part thereof, or any building or equipment connected there with for the purpose of transforming, conveying, transmitting or distributing electricity;

4. Any installation or extension to an existing installation likely to cause undue interference shall comply with Regulation 31 of the Electricity Regulations 2024 which stipulates that:

Regulation 31: “Power of Commission to make adjustment or alteration to installation”.
When an installation is found likely to cause undue interference with the supply of electricity to other consumers or other installations, the Commission may require the consumer, occupier or management of the installation to make adjustments or alterations to the installation or the operation of the electrical system to such an extent, as he considers necessary, to rectify the situation.”

5. Any person who installs electrical equipment or apparatus shall comply with the Section 54 of the Enactment which stipulates that:

Section 54 (1): “A competent person or a person under the control of a competent person who undertakes to carry out electrical work shall ensure that such electrical work complies with any regulations made under this Enactment, the electrical infrastructure safety code or non-domestic electrical installation safety code, as the case maybe, or in the absence of such regulations or codes, with standards and prudent industry practices as may be determined by the Commission.

(2): The person undertaking electrical work under subsection (1) shall ensure that such work shall not cause electricity related injury to any person or damage to any property.”

Purpose of these Guidelines

6. These Guidelines describe the application procedures, the specification and requirements of Grid Connected Solar Photovoltaic (GCSPV) system installation for self- consumption that shall be complied by any person who uses, works, operates or installs such installation.

7. The procedures and requirements are as in **ANNEX 1**.

Application of these Guidelines

8. These Guidelines shall apply to:

   i. any person who uses, works or operates any solar PV generating facility for self-consumption and indirect connection to the licensee distribution or transmission network in Sabah; and

   ii. the relevant Licensee whose network is to be connected with the self-consumption solar PV generating facility.

Notice by the Commission

9. The Commission may issue written notices from time to time in relation to these Guidelines.

Amendment and Variation

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

Dated: 01 February 2024

DATUK IR. ABDUL NASSER BIN ABDUL WAHID
Chief Executive Officer
Energy Commission of Sabah

ANNEX 1 - Connection of Solar Photovoltaic Installation for Self-Consumption

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Attachment 1 - Self-Consumption Solar PV System (SELCO – PV SABAH) Application Form

Attachment 2 - Self-Consumption Solar PV System for Sabah (SELCO – PV SABAH) Flow Chart

1.0 Eligibility Criteria

Any consumer who has installed grid-connected solar PV installation under the previous solar PV programme is not eligible to participate in this programme.

2.0 General requirements

2.1 Self-Consumption (SELCO - PV SABAH) is a Solar PV programme to encourage consumers to generate renewable energy through solar PV panels, and consume the renewable energy locally to power their homes, businesses or facilities. In SELCO - PV SABAH systems, the generated electricity is consumed on-site without exporting any excess energy to the grid.

2.2 The implementation of SELCO – PV SABAH systems can contribute to sustainability efforts, reduce dependence on traditional energy sources, and empower individuals or communities to actively participate in the generation and management of their electricity needs.

2.3 The consumer or Electrical Contractor with Class PV (Grid Connected) (ECCPV (GC)) involved in the installation and commissioning of the solar PV system for self-consumption can make use of these guidelines for:

a) understanding the solar PV system requirements;
b) reference to installed capacity, type of installation, plan, design and commissioning of the installation;
c) reference to application procedures with the Commission; and
d) reference to licensing requirements.

3.0 Obligations of the Consumer

3.1 As an individual or commercial premise consumer who decides to install the solar PV system for self-consumption, it is advisable to conduct some due diligence on the following items:

a) understand the electricity consumption of your premises or businesses and choose the right size system for your needs. The six- monthly consumption profile will determine the viability of solar PV system and will help you decide on the appropriate size of the system;
b) understand the electricity tariffs since the decision for investing in a solar PV system will depend on what electricity tariffs been imposed by the Licensee and how these may change once the solar PV system is installed;
c) to engage an ECCPV(GC) registered with the Commission and ensure the contractor has the relevant experience in designing, installing and commissioning the system; and
d) survey and make comparison on the products to be purchased and workmanship guarantees since there is a diverse range of products on the market.
e) In the event that the building or premise is not owned by the consumer of the solar PV system installation, it is advisable to establish an agreement with the landlord, building owner or joint management body (JMB) as part of the lease or rental term. This agreement shall determine the responsibilities of both consumer and landlord, building owner or JMB in installing and maintaining a solar PV system.

4.0 Finding a solar PV Registered Electrical Contractor Class PV (Grid Connected) (ECCPV (GC))

4.1 Finding the right person or company to manage the design and installation of the solar PV system is important. Although there is no physical difference between PV panels installed on residential and commercial properties, installation and inverter requirements can be quite different. So, it is important to ensure that your contractor has the relevant experience for the system size.

4.2 Solar PV systems come with some responsibilities for the consumer including learning the basic safety operation and maintenance of the system by checking the overall cabling and cleaning of PV modules on yearly basis. A comprehensive, on site solar and load analysis and two-way interview can help ensure a thoughtfully designed and well-planned installation.

4.3 The registered ECCPV (GC) will design the PV system, taking into account the electricity consumption to be offset and the specific characteristics of the premises by:

a) Conducting load analysis to establish the electrical loads during an average day;
b) determining the type of panels;
c) determining the size of solar PV system;
d) deciding the type of inverter;
e) establishing the location of solar panels considering angles and orientation for maximum sunlight exposure; and
f) advising on the local planning authority and building permits requirements.

5.0 Application to participate in SELCO – PV SABAH Programme

5.1 The consumer who wishes to install a solar PV system under the self-consumption programme is required to apply to the Commission by submitting the following documents:

a) Self-Consumption Solar PV System Application Form (Attachment 1).
b) drawings, plans and specifications including any subsequent approved amendments and modifications certified by the suitably qualified competent person; and
c) if applicable, PSS report endorsed by Licensee as described under 6.4, still within the validity period on the date of application.

5.2 All forms and documents are required to be submitted and approved by the Commission before carrying out any installation at the premise. Applications can be submitted via email to *selcopv@ecos.gov.my*.

5.3 The Commission will review the application, and if in order, issue *Permit to Install SELCO – PV SABAH* within 14 working days.

5.4 Upon completion, all installations with capacity of more than 24kW for single-phase system and more than 72kW for three-phase system are required to apply for a private licence as stated in 8.0.

5.5 A flow chart is included in Attachment 2 to provide a visual guide to the processes described in this guideline.

6.0 Technical Requirements for Solar PV System Installation

6.1 Installed Capacity

The maximum capacity limit for solar PV system, measured at the output of the inverter shall not exceed eighty-five per cent (85%) of the consumer's existing maximum demand.

6.2 Type of Installation

The solar PV installation shall be of PV panels mounted on the rooftop of the building within the same premise. However, solar PV other than mounted on rooftop within the same area owned or leased by the consumer may be considered depending on the merit of each case.

6.3 Plan and Design

As the connection is done internally, the consumer shall appoint an ECCPV (GC) registered with the Commission to design the solar PV system and its interconnection.

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

6.4 Power System Study (PSS)

The study is a pre-requisite for approval of the SELCO - PV SABAH Programme application for grid-connected systems. The study shall be performed, presented to and endorsed by the Licensee.

For all installations exceeding 24kW, the Consumer shall engage the Licensee or a suitably qualified consultant to carry out PSS. If a consultant is engaged by the Consumer to conduct the PSS, a Non-Disclosure Agreement (NDA) may be required by the Licensee before the system data is provided to the Consultant. The PSS shall include assessments as required by the Licensee, the complexity of which will vary depending on the capacity applied. For capacity above 425kW, the typical assessments include but are not limited to:

a) System description of the electrical supply system and connection of the solar PV Installation,
b) System study (load flow, short-circuit, voltage analysis),
c) Analysis on scenarios (1) with solar PV system under maximum load and minimum load, (2) without solar PV system under maximum load and minimum load;
d) Protection coordination,
e) Compliance to the codes and standards,
f) Mitigation strategies if required,
g) Controlling and operating philosophy for electrical system

The PSS shall be valid for six (6) months commencing from the date of the Licensee’s endorsement of the study.

The recommended fees for conducting PSS are as follows:

Installation Capacity(kW)	Study Required	Completion Period (Days)	Cost (RM)
≤ 24	No	-	-
> 24 - 180	Yes	14	1,000
> 180 - 425	Yes	21	5,000
> 425	Yes	30	10,000

6.5 Connection Requirements

The costs of any works required for the connection of the solar PV Installation to the Licensee's network shall be borne by the SELCO – PV SABAH Consumer.

Consumer and registered ECCPV(GC) shall comply to the following requirements:

a) prevention of export of energy from consumer's solar PV system to Licensee's network through appropriate functionality within the inverter, such as zero-rated energy export to grid, generation controller that does not to exceed the load demand, and use of external device or energy storage to mitigate the export of excess energy from consumer's solar PV system to the Licensee's network;

b) ensure that the size and specifications of the wiring connecting the PV arrays to the Main Switch Board (MSB) or Distribution Board (DB) are appropriate to guarantee reliable flow of energy to the consumer's system;

c) ensure that the Licensee has access to both the consumption meter (Licensee's meter) and solar PV meter at any time required by the Licensee;

d) comply to Clause 6.8 of the Sabah Distribution Code, which states that installations with capacity of 1MW and above shall be equipped with SCADA with RTU cubicle, associated cards and SCADA-ready switchgears.

e) if relevant, comply to the requirements stated in Sabah and Labuan Grid Code.

f) clearly display the following label at the Main-Switch Board (MSB) and/or Distribution Board (DB) cautioning the operator about potential energized parts originating from the solar PV system;

g) officially notify the Commission and Licensee in writing whenever the consumer intends to terminate his/her account or transfer ownership of the installation to another party.

h) certified copy of the drawings, plans and specifications including any subsequent approved amendments and modifications, shall be kept by the consumer for reference.

6.6 Testing and Commissioning (T&C)

Upon completion of the installation work, the installation shall be tested and commissioned by a suitably qualified competent person based on the procedure for the T&C of GCSPV Systems (based on type of inverter and capacity).

The consumer is required to provide advance notice and extend an invitation to the Licensee to attend and witness the T&C. The Licensee has the discretion to choose whether to exercise the right to witness the process or opt not to be present during T&C. The T&C works shall be performed by a suitably qualified competent person and shall comply with:

a) the requirements under Electricity Supply Enactment 2024 and the Electricity Supply Regulations 2024;

b) the plan and specification as mentioned in paragraph 6.3 and including

any subsequent approved amendments and modifications; and

c) such other requirements imposed by any other written law relating to the construction and installation of the generating facility.

Once the T&C has been completed, the competent person shall issue a Completion Certificate and Test Certificate for the installation (in Form G and Form H as prescribed in the First Schedule, Electricity Supply Regulations 2024) and submit a copy of the forms and certificates to the Commission and Licensee.

7.0 Compliance with government policies and laws of Sabah and Malaysia

Parties are subject to these guidelines and shall at all times comply with the applicable laws of Sabah and Malaysia, in particular the Enactment and Regulations.

8.0 Licensing requirements

For solar PV system installations with capacity of more than 24kW for single-phase system and more than 72kW for three-phase system, a licence for a private installation is required as stipulated under the **Guidelines on Licensing Under Section 8 of the Enactment**.

Licence applications can be made online through the online services at the Commission's website (*https://www.ecos.gov.my*).

9.0 Provision of Information to the Commission

Under Section 108 of the Enactment, the consumer of the solar PV system is obligated, upon request, to provide to the Commission with the necessary documents, accounts, estimates, returns, reports and other information in the manner and at the times specified by the Commission.

10.0 Suspension of Operation

Section 97 of the Enactment states that in the event the Commission identifies any defect in an installation or part that poses a danger, the Commission can issue a written notice to the licensee or owner that requires the defect to be rectified or removed within a specified period. The installation or part must not be operated or used after this period unless the defect is addressed according to the standards or prudent utility practices determined by the Commission.

11.0 Suspension and Revocation of Licence

The Commission may suspend or revoke a licence upon service of written notice to the consumer as stipulated under Section 13 of the Enactment.

[END OF DOCUMENT]

Attachment 1 - Self-Consumption Solar PV System (SELCO – PV SABAH) Application Form

PART 1: INFORMATION

- Consumer shall submit this application form to the Commission before carrying out any solar PV system installation. (A copy of this application form shall be made available during Testing & Commissioning)
- Consumer shall comply with "Guidelines on Grid-Connection Solar Photovoltaic System for Self-Consumption in Sabah (SELCO – PV SABAH)".
- Consumer is required to conduct PSS for solar PV system with capacity above 24kW.
- Consumer is required to apply for a generating licence from Energy Commission of Sabah for a single-phase system with capacity > 24kW or three-phase system with capacity > 72kW.

For ECoS use only:

Reference No: _____

Serial No: _____

Date Received: _____

Time Received: _____

Receiving Officer: _____

PART 2: CONSUMER INFORMATION

Applicant Name: _____ IC/ROC Number: _____

Electricity Bill account number: _____ Tariff Category: _____

Licensee Company: _____(e.g. SESB, KKIP Power, etc.)

Email address: _____ Phone Number: _____

Mailing Address: _____

_____

_____

PART 3: ALTERNATIVE CONTACT PERSON

Name: _____ IC Number: _____

Relationship: _____

Email address: _____ Phone Number: _____

Mailing Address: _____

_____

_____

PART 4: COMPETENT PERSON DETAILS

a) Grid Connected PV System Designer

Name: _____

IC No: _____ Certification No.: _____

Phone Number: _____ E-mail address: _____

Mailing Address: _____

_____

_____

b) Wireman (with three phase restriction)

Name: _____

IC No: _____ Certification No.: _____

Phone Number: _____ E-mail address: _____

Mailing Address: _____

_____

_____

PART 5: ECCPV (GC) DETAILS

Company Name: _____ Company ROC No: _____

Phone Number: _____ E-mail address: _____

Mailing Address: _____

_____

_____

PART 6: TECHNICAL INFORMATION

Installation Address: _____

_____

Installation Site Ownership: ☐ Fully Owned ☐ Owned (charged to bank) ☐ Leased

If not fully owned, please provide the owner's name:_____

Is the applicant an existing FIAH: ☐ Yes ☐ No If Yes, please provide the existing capacity solar installed capacity (kW) :_____

Voltage at common coupling @ Utility Meter: ☐ Low Voltage (230V/400V) ☐ Medium Voltage (11kV/33kV) ☐ High Voltage (66kV/132kV and above)

Reasons for installing solar PV system: ☐ Reduce electricity bill ☐ Peak Shaving ☐ Reduce Green House effect ☐ Other reasons:_____

Installation ☐ Roof (Domestic) ☐ Roof (Commercial) ☐ Carpark Others: _____

a) Maximum demand of existing installation _____kW

b) Proposed 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: ☐ Yes ☐ No If yes, Battery capacity _____ kW

Battery Manufacturer:_____

g) Daytime Peak Demand (11am to 3pm)_____kW (Friday to Monday)

h) Daytime Lowest Demand _____kW

PART 7: PHOTOVOLTAIC (PV) INSTALLATION INFORMATION

a) PV Module : i) Type: Monocrystalline ☐ Polycrystalline ☐ Thin Film ☐
Others: _____

: ii) Manufacturer _____

: iii) Module capacity _____

b) PV Inverter i) Number of inverters _____

ii) Inverter capacity _____

iii) Type: Single Phase ☐ Three Phase ☐

iv) Manufacturer _____

v) Power Factor: ☐ _____lagging ☐ _____leading ☐ unity

PART 9: DECLARATION

I hereby authorize the Competent Person as described in PART IV of the enactment to apply and register my Self Consumption (SELCO – PV SABAH) installation on my behalf:

Signature: _____

Name : _____

Date : _____

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 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 in Sabah) and the inverter(s) used are as per approved lists.
- I verify that the site condition is fit for installation of the solar PV system as per applicable regulations.
- I agree to comply with the specifications, terms and conditions stipulated in the applicable guidelines and related regulations, as amended from time to time.

Competent Person stamp:

Signature :_____

Name: _____

Date: _____

List of Documents to be Submitted During Application

1. A clear copy of the consumer's MYKAD OR latest Certificate of Registration from the Companies Commission of Malaysia.

2. The detailed engineering design of the solar PV system installation, including all relevant calculations to justify the installed capacity and its efficiencies (must be endorsed by the Grid Connected PV System Designer).

3. The Single Line Diagram (SLD) (endorsed by the Wireman with Three Phase Restriction for capacity below 72kW, or Professional Engineer (Electrical) for capacity 72kW and above).

4. A copy of certificate of Electrical Contractor with Class Photovoltaic Grid Connected or ECCPV (GC)

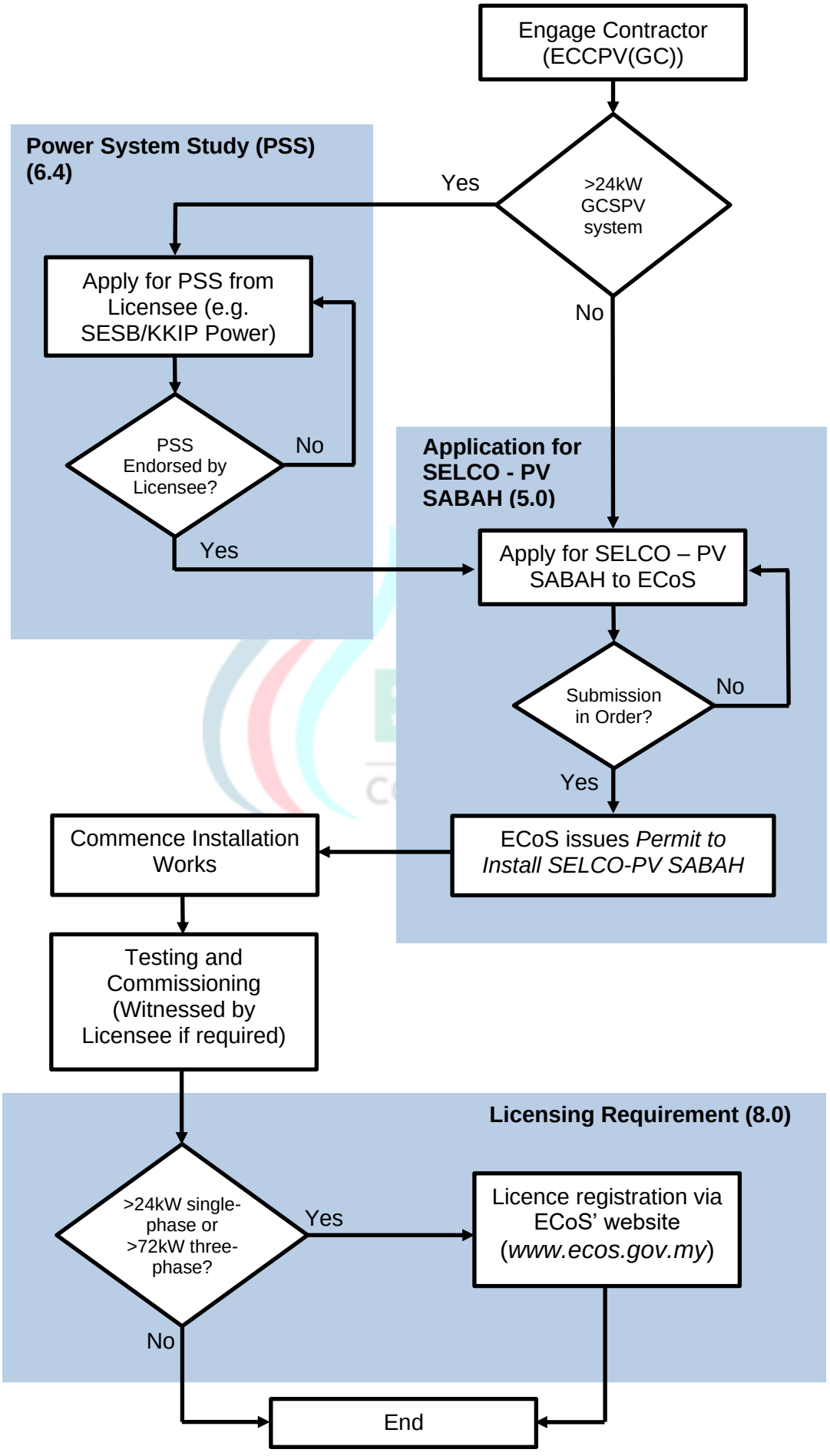
5. A certificate of registration of each Qualified Person with the Board of Engineers Malaysia as a Professional Engineer (Electrical) (for capacity 72kW and above)

6. Power system study (PSS) report endorsed by licensee (e.g. SESB) for capacity above 24kW.

7. Documents proving the Applicant's ownership of the premise, or other conditional or unconditional rights (e.g. Option-to-Rent/Lease or leasing agreement).

8. Latest 6 months of electricity bills

Attachment 2 - Self-Consumption Solar PV System for Sabah (SELCO – PV SABAH) Flow Chart



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