



کمنتین تناک

MINISTRY OF ENERGY  
BRUNEI DARUSSALAM

GUIDEBOOK

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# SOLAR PV ROOFTOP and Net-metering Programme

*"Save for your future"*

@ Ministry of Energy 2022

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Guidebook for Solar PV Rooftop and Net-metering Programme serves as a reference or guidance for the public who wish to explore the opportunities in producing their own Renewable Energy on their own. The Guidebook entails general information on how to start planning for your solar PV system, how to enroll in the Net-metering Programme, estimated cost of Solar PV system, etc. The Guidebook is a live document, and will be constantly updated and revised by the Ministry based on the latest information and requests from the Public (if any).

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# INTRO: SOLAR PV SYSTEM

## What is Solar Photovoltaic (PV) System?

A technology that produces electricity by converting energy from the sun, that can be used to power your home. Photovoltaics, and often shortened as PV, gets the name from the process of converting light (photons) to electricity (voltage), which is called the photovoltaic effect.

Photovoltaics also widely known as **solar panels**.

Today, electricity generated by this photovoltaic system has become cost competitive in many regions and these systems are being deployed at large scales to help power the grid.



*Figure 1 Solar panels installed at the rooftop of a building*

# How does Solar PV System work?

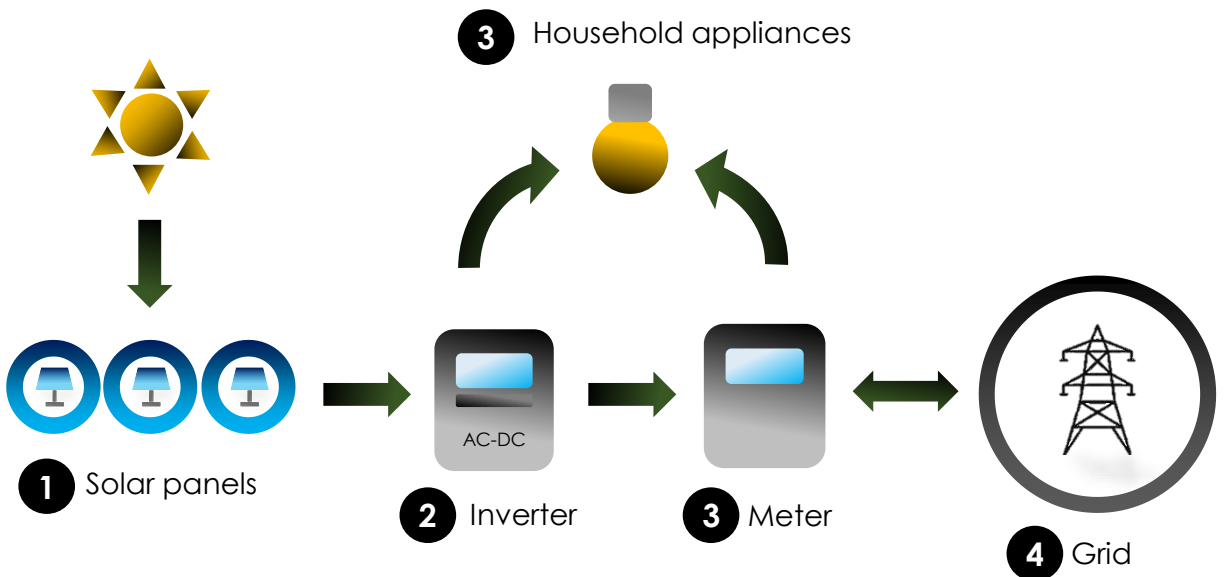


Figure 2 Typical diagram of how Solar PV system works

- 1 Solar panels convert energy from the sun to electricity.
- 2 An inverter converts the electricity produced by solar panels from direct current (DC) to alternating current (AC) for use in your home
- 3 The electricity converted power your household appliances.
- 4 The electricity can be used to power electronics locally, or can be sent to the grid to be used elsewhere.



## What is Solar PV Rooftop System?

A solar PV system that is mounted on the roof or integrated into the façade of the building. Solar system is installed at the rooftop of each building. The potential of the solar rooftop for an individual rooftop depends on the amount of solar panel that can be installed on their rooftop, but also depends on its size, shading, tilt, location, and construction.



Two most common solar rooftop photovoltaic system types in Brunei are mounted at the roofing of a building, or mounted at the garage or car pouch.



*Figure 3 Photo of solar panels mounted on roofing of a building*

# Groups of Solar PV Systems

Solar PV systems can be broadly classified in TWO major groups:

## ① GRID-TIED SYSTEM:

The system directly coupled to the grid and does not require battery storage. Electricity generated by the system is either can be sold or bought from the Utility. There are many benefits of having this system installed; less balance of system components are needed, eliminates energy storage requirement and simultaneously reduce cost of system, can utilize the existing electrical infrastructure and efficient use of available electricity (contributes to grid if there are excess electricity available).

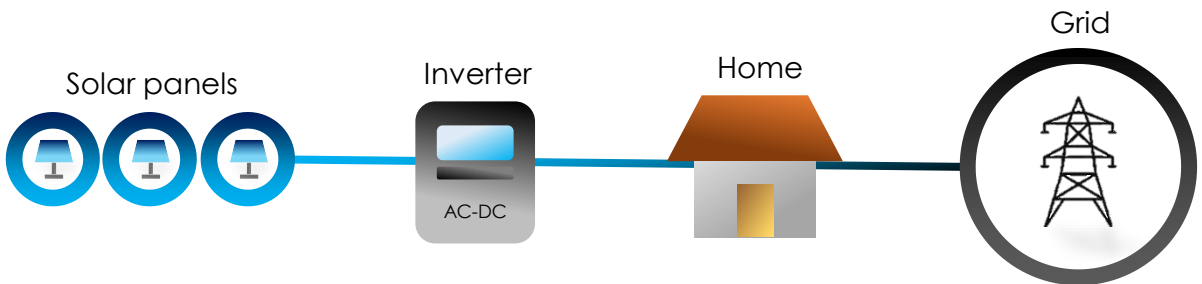


Figure 4 Grid-tied System

## ② OFF-GRID OR STANDALONE SYSTEM:

The system is independent from connected to the grid. The system can be complex, and can be as simple depending on the size of load it will served. Inverter can be eliminated or replaced by a DC to DC converter if only DC loads are to be fed by the solar panels. Its also possible to connect the solar panels directly to a DC load when storage methods are used.

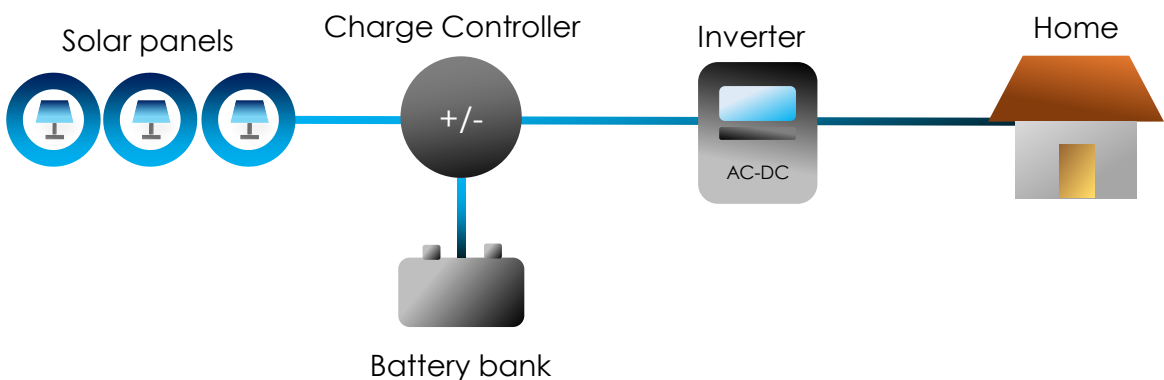


Figure 5 Off-grid or Standalone System

\*Hybrid system is also possible where battery storage system combined with grid connection for additional reliability and scheduling flexibility.



# HOW TO START PLANNING FOR YOUR SOLAR PV SYSTEM?

## What type of Solar PV system should I choose?

When you are not sure of which type of solar PV system should you go for, first is to know your purpose of installing one.

If you/your:

- Wish to reduce your monthly bills.
- Home or building's electrical system is connected to the grid.

You should go for a Grid-Tied Solar PV system as your home or building is already connected to the network. Any electricity generated from the solar PV system will reduce your monthly bills as you are reducing your reliance to the grid as your electricity supply.

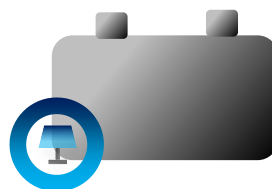
If you/your:

- Wish to be independent from the external power source.
- Home or building's electrical system is not connected to the grid.
- Wish to power some part of your home or building without having to use the electricity from the grid.

You should go for the off-grid or standalone Solar PV system. This system is suitable if you wish to power home or building that has no existing electricity infrastructure yet for example houses located at rural areas, agriculture, etc. Usually, there is a need to have battery storage system installed together with the solar PV system to increase reliability of electricity supply.



Grid-tied Solar  
PV System



Off-grid or Stand-  
alone Solar PV  
System

# How to size my solar PV system?

Before you decide the size or capacity of your solar PV system you would like to installed, it is best to size your system correctly. Under-sizing or oversizing your system will produced undesirable outcome as your may not be able to enjoy the benefits of having the solar PV system installed because of it.

## ① Check your consumption

First is to check your monthly consumption.

## ② Create different scenarios of size of system

The purpose of creating different scenarios of size of the solar PV system is to make comparison to your monthly consumption.

To calculate how much electricity can each kWp system generate:

$$\text{Kilowatt-hour (kWh) or unit generated} = \beta \text{ kWp system} \times 24 \text{ hours} \times 30 \text{ days} \times \text{capacity factor of panel}$$

$\beta$  kWp system = size of solar PV system

Capacity factor of panel = a measure of how much energy is produced by a plant compared with its maximum output

For example:

If your monthly consumption is 1000kWh or 1000 units, if you install a 1kWp system, 3kWp system, 5kWp system, 10kWp system, etc. which size will be able to cover my monthly consumption?




$$\begin{aligned} \text{Kilowatt-hour (kWh) or unit generated} &= \\ 1 \text{ kWp system} \times 24 \text{ hours} \times 30 \text{ days} \times 18\% &= \\ &= 129.6 \text{ kWh or unit} \end{aligned}$$

$\beta$  kWp system = 1kWp

Capacity factor of panel = 0.18 (or 18%)

1kWp system can generate 129.6kWh or 129.6 units. This means, 1kWp system can only cover about one-fifth of your monthly consumption.

Try calculating for different kWp system:

		kWh or unit generated
3kWp		388.8
5kWp		648.0
10kWp		1296.0

From the calculation, check which one equal to or close to you monthly consumption of 1000 kWh or 1000 units. Based on the above, solar PV system with 8kWp to 9kWp capacity can cover your 1000kWh or 1000 units monthly consumption.

### ③ Check cost of Solar PV system

Once you decided on your capacity or size of installation, you should check the cost of the overall system including the material procurement cost, installation cost and operating cost (if any).

### ③ Check your Payback Period

It is equally important to check your Payback Period before making investment for the system. Payback Period means the length of time you required for your investment to recover its initial outlay in terms of profits or savings.

How to calculate your Payback Period?

$$\text{Payback Period} = \frac{\text{Total Investment Cost}}{\text{Total savings per year}}$$

For example:

If you have monthly consumption of 1000 kWh or 1000 units, and you decided to install a 7kWp system. 7kWp system can generate about 907.2 kWh or 907.2 units.

First, find out how much your saving is. For 7kWp system, you can save about 907.2 kWh or 907.2 units.

Second, convert your savings to monetary value. If you are categorized under Residential Tariff, you will be calculating based on the prevailing tariff. For instance, to convert 907.2 kWh or 907.2 units to monetary value under Residential Tariff in Brunei is:

		For 907.2 kWh or 907.2 units	Bills (B\$)
First 600 units or 600 kWh	B\$0.01 per kWh or B\$0.01 per unit	600	B\$6.00
From 601 to 2000 kWh or units	B\$0.08 per kWh or B\$0.08 per unit	307.2	B\$24.58
First 2001 to 4000 kWh or units	B\$0.10 per kWh or B\$0.10 per unit	-	-
Beyond 4001 kWh	B\$0.12 per kWh or B\$0.12 per unit	-	-
		<b>Total</b>	<b>B\$30.58</b>

Your savings is about B\$30.58 per month.

To calculate your Payback Period:

$$\text{Payback Period} = \text{B\$3,000} / (\text{B\$30.58} \times 12 \text{ months})$$

$$= \text{approximately 8 years}$$

Total Investment Cost = estimated about B\$4,000.00

Total Payback Period is about 8 years.

# NET-METERING PROGRAMME

## What is Net-metering?

Net-Metering is mechanism that allows solar photovoltaic system owners to export their excess energy generated by their solar photovoltaic system back to the grid in exchange for credit..

## How does Net-metering work?

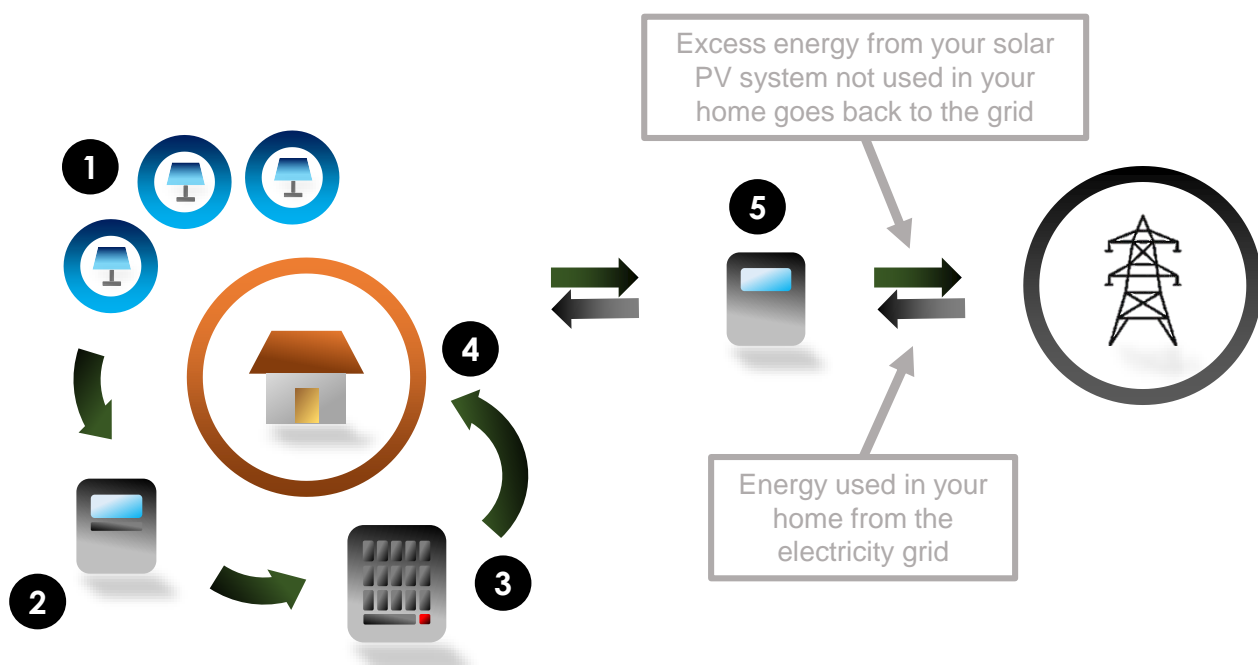


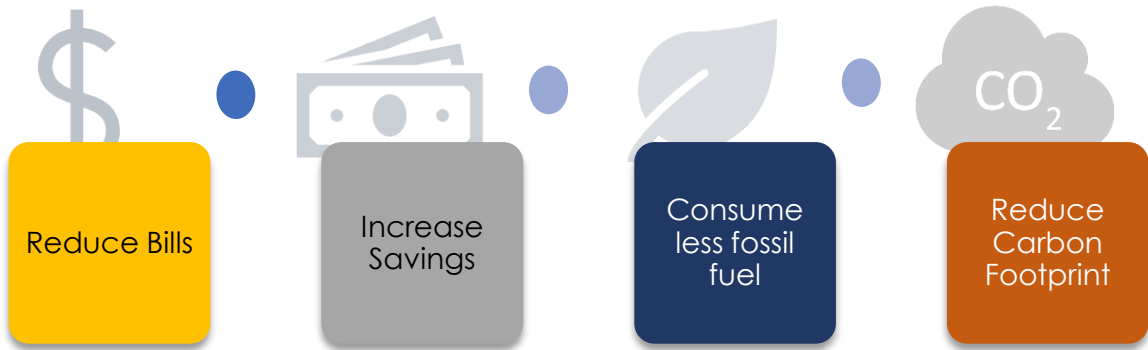
Figure 6 Diagram showing how Net-metering works

- 1 Solar panels convert energy from the sun to electricity.
- 2 An inverter converts the electricity produced by solar panels from direct current (DC) to alternating current (AC) for use in your home
- 3 The electricity converted goes to your distribution board
- 4 The electricity is used in your home
- 5 The Net-meter measures energy used from the grid and excess energy produced



# +Factor

## Why should I invest in Net-metering? What do I gain from it?



Net-metering enables you to take control of your energy needs by installing and generating your own electricity and therefore, reducing your future monthly electric bills and increase your savings. The battery-less storage system is an environmental-friendly solution that will help you reduce your carbon footprint and lessen the use of non-renewable energy.



Figure 7 Photo of solar panels mounted at rooftop of building

# How do I apply for Net-metering Programme?

Applicants who are interested in enrolling in the Net-Metering Program are to follow each stage:



Potential applicants who are interested to enroll in the programme should fill in a *Net-metering Pre-Application Form* and submit the form to the ministry, or email the completed form to [renewable.energy@me.gov.bn](mailto:renewable.energy@me.gov.bn).

Once the form has been submitted, applicants are required to find licensed and registered Solar Photovoltaic (PV) contractors. The list of Solar Photovoltaic (PV) contractors registered under Ministry of Energy can be found on the ministry's website.

Appointed Contractor should submit relevant documentations to the relevant agencies and the ministry for approvals prior installation.

Once the application has been approved, contractors may now proceed with the installation activities and applicants should now be enrolled in the programme.

# Pre-Application Form

NET-METERING PRE-APPLICATION FORM



## NET-METERING PRE-APPLICATION FORM

Applicant's Name

Applicant's Address

Installer Company's Name (If applicable)

Capacity to be installed

Category      Residential        
                         Government        
                         Commercial     

**Notes:**  
*Applicants with successful pre-application shall proceed to appoint their Registered Solar PV Contractor for Net-metering Application submission.*

# Test and Commissioning Form

## NET-METERING TEST AND COMMISSIONING (T&C) FORM

Consumer name:		Inspection date:	
Electricity bill account no.:		Inspection time start:	
Installation address:		Inspection time finish:	
<b>SOLAR PV INSTALLATION TECHNICAL INFORMATION</b>			
[Before installation] Voltage at Point of Connection	RED:  Volts	YELLOW:  Volts	BLUE:  Volts
[After installation] Voltage at Point of Connection	RED:  Volts	YELLOW:  Volts	BLUE:  Volts
Voltage at Meter (If accessible)	RED:  Volts	YELLOW:  Volts	BLUE:  Volts
Anti-islanding test	Disconnection time:	sec	
	Reconnection time:	min	
<b>VERIFICATION OF TEST AND COMMISSIONING (T&amp;C) OF SOLAR PV BY QUALIFIED PERSON</b>			
QP's name:		QP's signature:	
QP's NRIC:	Company's official chop:		
QP'S Registration No.:			
Date:			

## Estimated Cost of the System

Below shows the estimated cost of current Solar PV and Net-Metering System (as of 2021), the estimated Payback Period and Return on Investment (ROI):

	Price of Solar PV in package (may include or exclude price of Net-Meter)	**Payback Period	***Return on Investment (ROI)
3kWp*	B\$3,800 – B\$5,000	10 to 18 years	6% to 10% p.a.
5kWp	B\$5,800 – B\$7,000		
10kWp	B\$10,600 – B\$12,000		
20kWp	B\$17,700 – B\$20,000		

### Notes:

\*kWp means kilo-watt peak.

\*\*Payback Period means the length of time required for an investment to recover its initial outlay in terms of profits or savings.

\*\*\*Return on Investment means the ratio of a profit or loss made in a fiscal year expressed in terms of an investment.



# Estimated Cost Breakdown of the System

Below shows the estimated cost of breakdown of Solar PV system (as of 2021). The price estimated is based on the real quotation from registered Solar PV Contractors:

MATERIALS	Price
Solar panel	B\$130 – B\$200/ module
Inverter	B\$600 – B\$2000*
Net-Energy Meter (Single-phase, 3-phase, CT Meter)	B\$1100 – B\$2100*
45sqmm PV cable and MC4 (rated 30A/1000VDC) Connectors	B\$200 – B\$1000*
Mounting system (Rooftop) - clipped	B\$200 – B\$1000*
Low Voltage AC Cables	B\$200 – B\$1000*
63A AC Distribution Cabinet	B\$180 - B\$1000*
Lightning Protection	B\$180 – B\$300*
Monitoring System	B\$200*

\*Disclaimer: Prices stated are based on 1kWp system

SERVICES	Price
Installation of solar panels with mounting system	B\$450
Installation of Inverter	B\$150
Installation of Net-Energy Meter	B\$150
Structural assessment of rooftop of building for Net-metering Programme	B\$300**
Electrical Design of Solar PV system for Net-metering Programme	B\$300**
Testing and Commissioning of Solar PV System	B\$200**

\*\*Disclaimer: Prices stated are based on minimum capacity installation.

OTHERS	Price
Net-metering Application Fee	B\$5/kW

# Estimated Cost of Operation and Maintenance of the System

ESTIMATED OPERATION AND MAINTENANCE COST FOR SOLAR PV SYSTEMS	
Inverter Replacement (every 10 years)	B\$1000
Solar Panel Cleaning (optional)	B\$ 100
Net-Meter (Sim card)	\$8 per month / B\$1920 for 20 years

The solar panels often last beyond their expected lifespan of 20 years, they will only need replacement when:

- They break beyond repair.
- They are physically damaged by wind, debris, or other factors.
- The solar panels show inefficiency and declined energy production.
- Poor racking or bad weather caused damage.



Figure 8 Photo of Inverter and PV Combiner box

# SUCCESS STORIES OF NET-METERING

Ministry of Energy of Brunei Darussalam conducted a pilot project on Net-metering since 2020. 4 residential houses and 2 government buildings participated in the pilot project. Below shows the outcome of the pilot project of some of the houses and building.

## Government Building

One of government building enrolled under the Net-metering Programme is Temburong District Office, at Pekan Bangar, Temburong. A total of 100kWp solar PV system was installed in the year 2021, and the system was officiated by the Minister of Energy in July, 2021.



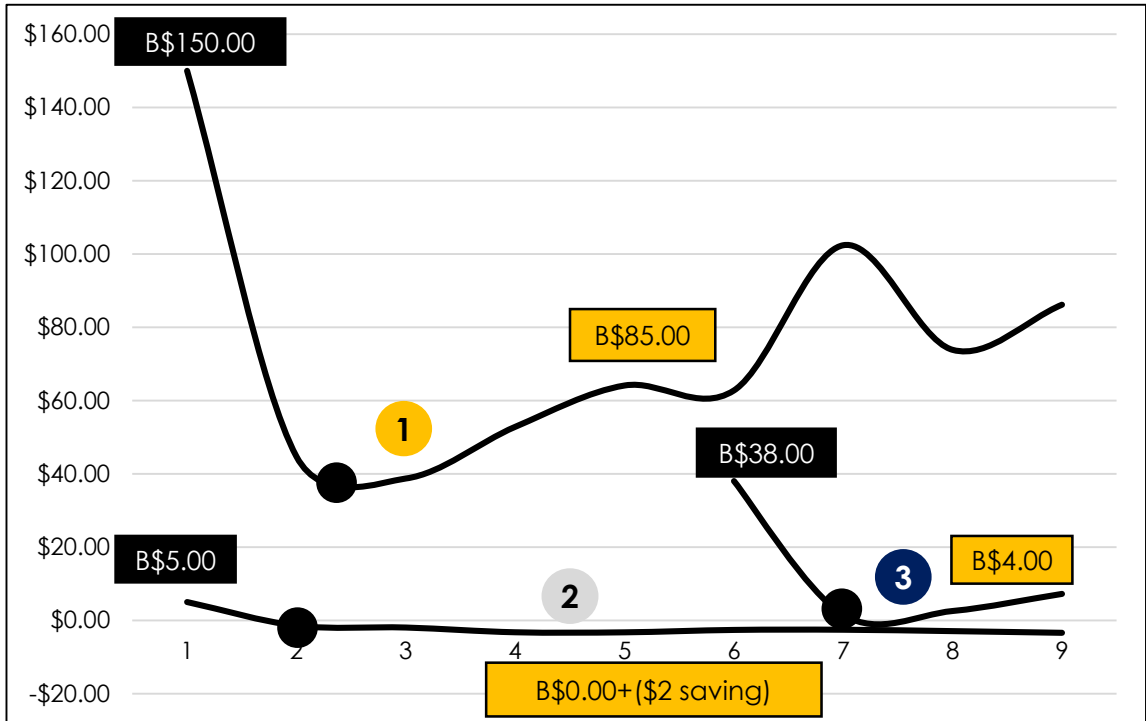
Figure 9 Photo of 100kW Solar PV System installed on the rooftop of Temburong District Office

After 3 months enrolled in the programme, the building had shown a significant result out of it. The building reduced about B\$1,000.00 per month from the installation of 100kWp system at the rooftop.

**FUN FACT:** 100kWp system at Temburong District Office is known as **the first and the largest solar rooftop** installed at Government building

# Residential Houses

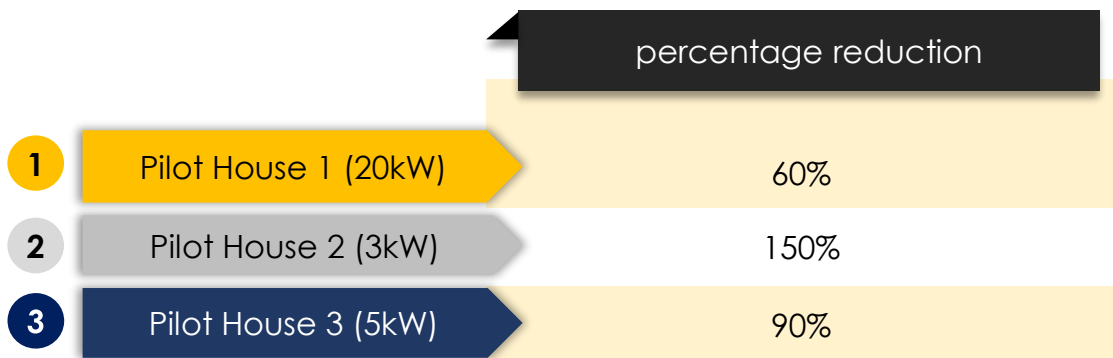
Three of the pilot houses have a significant reduction of monthly bills after enrolling to the Net-metering Programme. Below shows the graphical illustration of the three pilot houses before and after enrolling in the programme.



Legend:

- Net-meter installed
- before
- after


Figure 10 Graphical illustration of monthly billing of pilot houses before and after enrolled in Net-metering Programme.



# REGISTRATION OF SOLAR PV CONTRACTOR

Solar PV Supplier/Manufacturer/Installer participating for Net-metering Programme should be registered under the Ministry of Energy by submitting the form below:

*SUSTAINABLE ENERGY DIVISION (SED)*



**REGISTRATION FORM (SOLAR PV SUPPLIER / MANUFACTURER / INSTALLER)**

Please complete this form and send to [renewable.energy@me.gov.bn](mailto:renewable.energy@me.gov.bn)

Register as	
	<i>(Solar PV Supplier/Manufacturer/Installer)</i>
Company Owner's Name	
Company Name	
Company Registration Number	
Expiry Date	
Company Address	
Email	
Website	
Contact No.	

**Recent Projects**  
*(List recent solar installation projects done by Company, including year of installation, type of projects, etc.)*



# List of Registered Solar PV Contractor Under Ministry of Energy

Below are the list of company registered with Ministry of Energy as Solar PV Contractor (as of February 2022):

Registered as	Address	Contact No.	Email	Website	
HASANUR JAYA SDN. BHD	Supplier, Installer	No.17, Simpang 42, Kg Batu Besurat, Jalan Batu Besurat, Mukim Gadong, BE3519.	8240219 / 2450123	<a href="mailto:hasanurjayasdnbhd@gmail.com">hasanurjayasdnbhd@gmail.com</a>	N/A
MEGAWATT SOLAR SOLUTIONS	Supplier, Installer	Simpang 281-32, Lambak Kanan Industrial Area, Mukim Berakas, BB3510. Brunei Muara.	7186711 / 7188232	<a href="mailto:contact@mwsolar.com.bn">contact@mwsolar.com.bn</a> <a href="mailto:medic@yuhhuatc.com">medic@yuhhuatc.com</a>	<a href="http://www.mwsolar.com.bn">www.mwsolar.com.bn</a>
RAB FOREVER GOODWILL SDN. BHD.	Supplier, Installer	Kg. Tanjong Bunut, Spg.1411-43-57, No.19, Jln. Tutong, BF2920.	7246189 / 7121838	<a href="mailto:goodwill_28@yahoo.com">goodwill_28@yahoo.com</a> <a href="mailto:rab@brunei-rab.com">rab@brunei-rab.com</a>	<a href="http://www.brunei-rab.com">www.brunei-rab.com</a>
DSC ENGINEERING COMPANY SDN. BHD.	Supplier	Unit 7, 1st Floor, Block C, Latiffuddin Complex, Jln Tungku Link, Gadong, BE3719.	2424608 / 8725663	<a href="mailto:dscengineeringcompany@gmail.com">dscengineeringcompany@gmail.com</a>	N/A
SIVLI. SDN. BHD	Installer	Unit No.11, Ground Floor, Bangunan Na'asihah Noralam, Spg. 633, Jln Gadong, Kg. Beribi, Mukim Gadong, BSB, BE1118.	2431155	<a href="mailto:enquiry@sivli.com">enquiry@sivli.com</a> <a href="mailto:products@sivli.com">products@sivli.com</a>	<a href="http://www.sivli.com">www.sivli.com</a>
HASANUR JAYA SDN. BHD.	Supplier, Installer	No.17, Simpang 42, Kg Batu Besurat, Jalan Batu Besurat, Mukim Gadong, BE3519.	8240219 / 2450123	<a href="mailto:hasanurjayasdnbhd@gmail.com">hasanurjayasdnbhd@gmail.com</a>	N/A
MEGAWATT SOLAR SOLUTIONS	Supplier, Installer	Simpang 281-32, Lambak Kanan Industrial Area, Mukim Berakas, BB3510, Brunei Muara.	7186711 / 7188232	<a href="mailto:contact@mwsolar.com.bn">contact@mwsolar.com.bn</a> <a href="mailto:medic@yuhhuatc.com">medic@yuhhuatc.com</a>	<a href="http://www.mwsolar.com.bn">www.mwsolar.com.bn</a>

	Registered as	Address	Contact No.	Email	Website
TSK SDN. BHD.	Supplier, Installer	No.7, First Floor, Bangunan Hj. Mohd. Salleh, Spg. 103, Jalan Gadong, BE3719.	2451004 / 2453806	<a href="mailto:sales@tskelectric.com">sales@tskelectric.com</a>	<a href="http://www.tskelectric.com">www.tskelectric.com</a>
MORSJAYA ELECTRICAL CO SDN. BHD.	Supplier	No 5-8, Bangunan Hj Othman, Kg. Pengkalan Gadong, BE3719.	2448469 /70	<a href="mailto:chris.jong@morsjayelectric.com">chris.jong@morsjayelectric.com</a>	N/A
BMS ENGINEERING & PARTNERS SDN. BHD.	Supplier, Installer	Unit 2, Ground Floor, Bangunan Rebhan, Simpang 24, Jalan Gadong. BE2919.	2449628	<a href="mailto:bmshe@gmail.com">bmshe@gmail.com</a>	N/A
ALAM MAKMUR SDN. BHD.	Supplier, Installer	Block A, Unit 6, 2nd Floor, Berakas Centre, Jalan Utama Berakas, Simpang 66, Kg. Serusop, BB2313, Brunei Darussalam.	2331008 (Office) 7447702 (Mobile)	<a href="mailto:hilmihazwan.zakaria@gmail.com">hilmihazwan.zakaria@gmail.com</a> <a href="mailto:makmurhse@gmail.com">makmurhse@gmail.com</a>	N/A
JOFFREN OMAR COMPANY SDN. BHD.	Supplier, Installer	Lot 47-48, Sg. Bera Light Industrial Area, Seria KB1933, Brunei Darussalam.	3222183	<a href="mailto:sales@joffrenomar.com">sales@joffrenomar.com</a>	<a href="http://www.joffrenomar.bn">http://www.joffrenomar.bn</a>
LEE JONG ELECTRICAL CO SDN BHD	Supplier, Installer	No.23 Spg.99-10, Jalan Bengkurong Masin, Kg. Bengkurong, BF1920, Brunei Darussalam.	2652199	<a href="mailto:leejong@brunet.bn">leejong@brunet.bn</a>	<a href="http://www.leejong.com.my">http://www.leejong.com.my</a>
BIT COMPUTER SDN BHD	Supplier, Installer	A9, Urairah Complex, Kiulap, Bandar Seri Begawan.	+6732231923 / +6738167885	<a href="mailto:bitloo@yahoo.com">bitloo@yahoo.com</a>	BIT COMPUTER SDN BHD, BIT SOLAR BRUNEI (Facebook)
P&J COMPANY	Supplier	Unit 9 2nd Floor, Block B, Abdul Razak Complex, Jalan Gadong BE3519, Negara Brunei Darussalam	+6732455145 / +673243159	<a href="mailto:sales@bobbyelectrical.com">sales@bobbyelectrical.com</a> / <a href="mailto:office@bobbyelectrical.com">office@bobbyelectrical.com</a>	N/A
LE ENERGY SOLUTIONS SDN BHD	Supplier, Installer	Wisma LE Energy, Spg 71, Jalan Bengkurong Masin, Kg Bengkurong, Brunei	+6732652666	<a href="mailto:admin@le-energysolutions.com">admin@le-energysolutions.com</a>	<a href="http://admin@le-energysolutions.com">admin@le-energysolutions.com</a>

	Registered as	Address	Contact No.	Email	Website
LUXE DEVELOPMENT SDN BHD	Installer	Unit 1-2, 1st Floor, Bangunan Suas, Spg 41-1-12, Kg Kiarong, Brunei	+6738770899	<a href="mailto:seehung@luxedevelopment.com">seehung@luxedevelopment.com</a>	<a href="http://www.luxedevelopment.com">www.luxedevelopment.com</a>
SISTEM INTEGRASI SDN BHD	Supplier, Installer	No.465, Kg Beribi, Mile 4, Jalan Gadong, BE1118, BSB, Negara Brunei Darussalam	+6732428208 / +6738722168 / +6738713017	<a href="mailto:lhon@sigroup.com.bn">lhon@sigroup.com.bn</a> / <a href="mailto:admin@sigroup.com.bn">admin@sigroup.com.bn</a>	<a href="http://www.sigroup.com.bn">www.sigroup.com.bn</a>
REZQAN WASIAN SDN BHD	Installer	Unit 29, Simpang 88, 2nd Floor, Block D, Lim Eng Ming Building, Jalan Kiulap BE151, Negara Brunei Darussalam	+6738742822 / +6732232618	<a href="mailto:sales@rezqanwasian.com">sales@rezqanwasian.com</a>	<a href="http://www.rezqanwasian.com">http://www.rezqanwasian.com</a>
SERIKANDI OIL FIELD SERVICES SDN BHD	Installer	LOT 4 334 , No.16, Jalan Menteri, Kuala Belait KA1931, Negara Brunei Darussalam	+6733333486 / +6738776786 / +6738731495	<a href="mailto:shaikhaliid@serikandi.com">shaikhaliid@serikandi.com</a> / <a href="mailto:jamain.julaihi@serikandi.com">jamain.julaihi@serikandi.com</a>	<a href="http://www.serikandi.com">www.serikandi.com</a>
INSYS ENGINEERING SDN BHD	Supplier, Installer	Unit 37, Block C, 2nd Floor, Simpang 21, Jin Gadong Gadong Central Building, Jalan Gadong BE 4119 Negara Brunei Darussalam	+6738989813	<a href="mailto:insys.brunei@gmail.com">insys.brunei@gmail.com</a>	<a href="http://www.insysengineering.com">www.insysengineering.com</a>

# TERMS & DEFINITIONS

**Alternating Current (AC):** Flow of electric charge that can reverse periodically. The type of current used at your home and in the grid.

**Direct Current (DC):** Electric charge that flows in one direction.

**Export:** It is the excess electricity produced by Solar Rooftop System that gets exported to the grid.

**Grid:** Also known as Power Grid, is an interconnected electric power distribution system that delivers electricity from producers to consumers.

**Inverter:** It is an electric device that converts Direct Current (DC), which is the output of the solar panels into Alternating Current (AC), which is the type of current used by the grid, homes and buildings.

**Kilowatt:** Rate at which energy is being generated or consumed.

**Kilowatt-hour (kWh):** Measure of energy used over a period of time.

**Kilowatt-peak (kWp):** Rate at which solar panels generate energy at peak performance

**Net-Meter:** It is an energy meter that can run both forward and backward, measuring both energy imports and exports.

**Non-Renewable Energy:** Energy derived from natural sources that cannot be replenished, such as Fossil Fuel, Coal & etc.

**Solar Photovoltaic:** A solar system that directly converts sunlight into electricity.

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