

# Home rooftop solar energy system – a reality check

MALAYSIA has been actively promoting rooftop solar generation since 2005, with various legislation and incentive schemes.

It began with the launch of the Building Integrated Photovoltaic (BIPV) programme in 2005 to increase the uptake of solar photovoltaic (PV) technology. Subsequently, the National Surya 1000 programme was introduced in 2007 to encourage the installation of solar PV systems in residential and commercial properties.

This was followed by the Renewable Energy Act 2011 and the Sustainable Energy Development Authority Act 2011 that introduced the Feed in Tariff (FIT) scheme, to purchase electricity generated from renewable resources at a fixed rate and period. FIT was well-received, particularly by oil palm estates and smallholdings because the mechanism is mainly for biogas, biomass and geothermal mini-hydro.

To increase the number of rooftop solar energy producers, the Net Energy Metering (NEM) was introduced in 2016, and it has undergone two reiterations – NEM 2.0 and NEM 3.0 – to attract more commercial and residential consumers. Under NEM, a consumer installs a solar PV system on the rooftop primarily for self-consumption. Any excess energy generated is exported to the grid, and the value of the sale is offset by the value of electricity bought from the public utility, Tenaga Nasional Bhd (TNB).

In short, consumers only pay for the difference in amount between their monthly consumption and the solar energy sales, which will be reflected in their TNB electricity bill.

“NEM 3.0 that is currently in place is set to run until 2023,” says Ruzaida Daud, deputy director of renewable energy capacity procurement init at the Energy Commission or Suruhanjaya Tenaga (ST). “Consumers are encouraged to install solar PV systems to hedge against the rising cost of electricity,” she adds.

Even then, solar panels remain a fairly rare sight on residential rooftops because many homeowners feel it is not cost effective enough.

“I believe the price of solar PV systems is the main factor deterring Malaysian homeowners,” says Nirinder Singh, the former managing director of TNBX, a wholly owned subsidiary of TNB, which currently offers renewable energy solutions for homes and businesses. “In addition, our country’s tariffs are among the lowest in Southeast Asia, so it doesn’t create the urgency for homeowners to save on their electricity bills by installing solar PV systems.”

He also points out, “The bigger the size of the solar PV system, the more cost efficient. Currently, a solar PV system costs between RM4,000 and RM5,000 per kilowatt peak (kWp), and includes the solar panel, inverter, other Balance of System (BOS) equipment, workmanship and after sales warranty offered by the service provider.

“Since the price of the solar PV system is considered to be relatively high, the payback



period was fixed at 10 years under NEM 3.0.”

“Savings, however, are more visible for customers with higher electricity bills that require bigger systems,” he explains. “True savings are best enjoyed when the payback period ends between five and seven years within the first 10-year period. After that, the consumer has to start considering reinvestment costs for battery storage.”

It is estimated that when the monthly electricity bill exceeds RM400, installing a solar PV system may work out to be more cost-effective in the long run. But even that may not happen.

Nirinder points out that homes generally use less energy during the day but that is when the solar PV system generates optimally. Battery storage (usually an additional cost) is therefore required or else the energy produced is wasted and there are no real savings in electricity bills.

Ruzaida says that savings on electricity bills and returns on investment differ from system to system. It also depends on the electricity consumed, rooftop space, installation capacity

allowed, and capital expenditure incurred for installation.

She explains, “For example, a household with a monthly electricity bill of RM200, may save about RM123 on their bills based on a simple payback period of 10 years. But they have an upfront cost of RM14,000 for a 2.38 kWp installation. Houseowners in this category may not find any benefit in having a rooftop solar installation.”

Despite schemes such as FIT, NEM 2.0 and NEM 3.0, more can be done to boost rooftop solar PV installations in residential properties. Nirinder suggests allowing larger size solar PV systems, particularly for households contending with high electricity bills. This will enable them to actually recover a higher percentage of their investment costs. Currently, home solar PV systems are subject to size limitations.

“In addition, the one-to-one offset rate for excess energy exported to the grid could be extended to 20 years, instead of the current 10 years,” he adds. “The 10-year limit prevents homeowners from enjoying the sale of their solar energy; the current focus is on offsetting costs, not making a profit.”

“The declining cost of solar PV systems owing to technology upgrades and market competition, together with supportive government policies and incentives, are expected to drive future growth in our recovering economy,” he notes.

“Solar panel prices are not regulated by ST,” says Ruzaida. “Our role is to issue licences for installation and the size of the system – it must be safe and efficient.”

“Usually, solar panels last 25 to 30 years, and after this period their efficiency starts to decline significantly, with solar production output falling at 0.8% annually. This rate of decline is called solar panel degradation rate, and it varies according to the quality of manufacturing,” she added.

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