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What homeowners should look at before buying a solar PV system

The Edge, Malaysia



Page 1 of 2

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Malaysian homeowners are increasingly investing in solar photovoltaic (PV) systems. Fuelled by the growing popularity of smart homes and the steady uptake of electric vehicles (EVs), rooftop solar is being positioned as the centrepiece of integrated, low-carbon households, promising lower electricity bills and greater self-sufficiency.

Under the National Energy Transition Roadmap (NETR), Malaysia is targeting a renewable energy capacity of 70% by 2050, with rooftop solar playing a major role. The government's push is also evident in a continuous rollout of solar schemes: the Feed-in Tariff (FiT) introduced in 2011, the Net Energy Metering (NEM) programme in 2016 and Solar ATAP (Accelerated Transition Action Programme), which was introduced in January this year as a replacement for NEM.

However, for homeowners, several practical considerations tend to emerge only after installation, by which point the commitment to a 25- to 30-year asset on the roof has already been made. *City & Country* speaks to industry experts on what homeowners should focus on first when buying a solar PV system.

What is different under Solar ATAP

The previous NEM scheme worked as an energy credit system. Every excess kWh sent to the grid offset imported electricity on a 1:1 basis, which made return-on-investment (ROI) calculations relatively straightforward and often included a side income on top of electricity bill savings.

Now, Solar ATAP operates differently in three key ways.

First, the financial benefit now comes primarily from using one's own daytime generation, rather than from selling excess electricity back to the grid. Excess energy can be carried forward but at a system marginal price (SMP), meaning, credits will be dynamic and market-based.

Second, the removal of the fixed quota across different user categories that characterised NEM means more Malaysians can now apply for Solar ATAP without the "first come, first served" pressure of the previous scheme.

Third, the allowance for larger systems enables homeowners to install set-ups that can cover up to 100% of their household electricity demand, designed to maximise self-consumption during daytime hours.

This means the biggest savings are from using free electricity immediately during the day to avoid paying Tenaga Nasional Bhd (TNB) tariff rates. This encourages heavy electricity usage in the daytime rather than at night. To use "gained" daytime energy at night, battery storage systems (BESS) are necessary.

If users generate more than they use, the excess flows back to the grid, for which they will receive credits. Accumulated credits will offset monthly electricity bills. For users whose consumption exceeds their generation, they will need to pay TNB the net difference.

Ultimately, Solar ATAP encourages self-consumption and appropriately sized systems.



"Solar energy is now positioned not as a side income opportunity, but as part of a broader household energy management strategy and a long-term sustainability investment."

— Ellina, DP Architects

"Solar energy is now positioned not as a side income opportunity, but as part of a broader household energy management strategy and a long-term sustainability investment," says DP Architects director and Malaysian Institute of Architects (PAM) honorary treasurer Ellina Rahman.

One practical effect of the redesign is that homeowners no longer need to invest in oversized battery storage to capture excess daytime generation for export, says GSPARX Sdn Bhd managing director San-subari Che Mud. This helps lower the upfront cost of going solar and increase its accessibility, he adds.

In short, ROI assumptions based on the old NEM economics no longer apply. Homeowners evaluating solar quotations in 2026 should understand whether their household's actual daytime consumption pattern aligns with the new economics.

The 'false economy' narrative

What trips up many homeowners after in-



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— Teoh, PAB Architecture

stallation is not the technology, but their own behaviour. A common "solar rebound effect" occurs when households end up consuming more electricity due to an increased comfort with consumption. As a result, their electricity bills climb.

PAB Architecture Sdn Bhd director and PAM honorary secretary David Teoh installed a 9kWp PV system on his roof three years ago as he was eager to jump on the bandwagon. His electricity bill dropped significantly at first, but it began to climb back up after several months.

"I always offer a word of caution against the 'false economy' of having solar panels. Because the energy felt 'free', I inadvertently started consuming more," he says.

The corrective measure for Teoh was a self-audit of major household appliances. He replaced a 1.5HP non-inverter air conditioner rated at 3,720kWh per year with an inverter model consuming only 961kWh per year and upgraded to a more energy-efficient refrigerator. His household

subsequently recorded several months of net energy generation.

A later EV purchase pushed consumption back up, but the overall household bill remains well below what it would have cost by using petrol. "The most realistic savings — and the best return on investment — come when you conserve energy first and match your mindful consumption with what your roof can actually generate," says Teoh.

According to Ellina, those who are likely to benefit the most from daylight consumption are households with work-from-home arrangements, EV charging needs, larger families or heavy air conditioning use. They tend to achieve "very compelling savings under Solar ATAP" because they are consuming while the roof is generating electricity.

On the other hand, homeowners with lower daytime consumption may face longer payback periods.

Roof, design and safety considerations

The physical realities of installation matter as much as the financial calculations.

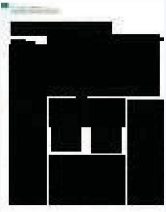
Teoh says that for optimal generation, a roof should ideally face north or south while following the sun's path so as not to suffer the heat intensity of the east-west orientation. A slight pitch is also preferable, so the rain can wash away any debris, he adds.

"Flat concrete roofs are the most ideal and safest condition for installation, although pitched roofs can also accommodate solar panels effectively," says Ellina.

Landed properties — bungalows, as well as semi-detached and terraced houses — are generally well-suited for solar PV systems. Stratified apartments are typically not, as building exteriors are usually common property.

The same legal complication applies to strata-titled townhouses, says Teoh. "For strata-titled properties, the roof is legally classified as 'common property'. You cannot simply install solar panels without the consent of the other owners or management corporation."

Older homes carry an additional consid-



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Page 2 of 2

eration: the roof structure must be assessed by a professional to confirm it can safely bear the dead weight of a solar PV system for at least 25 years, particularly when timber trusses are involved.

Safety considerations have prompted formal guidance that most homeowners have not seen. Ellina notes that Bomba Malaysia's rooftop solar guidelines require a one-metre passageway on the rooftop for firefighter access, sufficient distance between panels and any ventilation point to allow for smoke discharge, and an adequate gap between panels and the party wall separating linked houses to prevent fire spread between properties.

Beyond fire risk, roof leaks are the most common installation problem. Sealants applied around mounting penetrations on pitched tiled roofs deteriorate over time, which can lead to mould growth, water seepage and, in serious cases, deterioration of the roof structure itself.

Physical damage is a quieter but real risk. Teoh had to replace several of his solar panels after they were damaged by falling debris from neighbouring construction. "A physically damaged panel isn't just an efficiency issue as cracked glass allows moisture to enter, which can lead to electrical arcing — a very real fire hazard," he says.

Safety risks also extend beyond installation. End-of-life solar panels and their components — including battery storage units common in hybrid set-ups — require proper disposal and recycling. Dismantling work itself carries safety risks, particularly falls from height, with general awareness of building maintenance still low in Malaysia, says Ellina.

Warranties, exclusions and maintenance

Teoh advises buyers to look beyond standard certifications when selecting a service provider, and at how the solar panels will be physically attached to the roof, what mounting system the vendor is proposing and whether the installer will accept responsibility in the event of a leak. Companies with their own installation and operations and maintenance (O&M) teams are recommended.

"Look for a company with a strong in-house installation team and dedicated O&M team. A 25-year warranty is effectively meaningless if the vendor's business model suggests it won't be around in five years," he says.



Key areas to be further enhanced are clearer national guidelines on solar panel recycling, standardised decommissioning practices and incentives to encourage investment in local recycling."

— Sansubari, GSPARX

Warranties themselves come in two distinct forms: a product warranty typically covers manufacturing defects for 10 to 15 years, while a performance warranty guarantees a specified percentage of power output over the panels' 25-year lifespan.

"What homeowners often miss are the exclusions," says Teoh. "Standard warranties do not cover 'Acts of God' such as lightning strikes, severe storms or winds carrying debris that cause damage to the roof and panels. They also don't cover pest damage, like monkeys or rats chewing through your cables.

"If you are adopting rooftop solar, you should contact your insurer to add your new PV system to your homeowner's insurance policy to protect against these everyday realities."

Maintenance is non-negotiable, he adds. Dust, pollution and bird droppings can reduce output by 10% to 15%, requiring periodic cleaning with water and a soft brush. Inverters typically require replacement at the 10- to 15-year mark, well before the panels themselves degrade — a recurring cost that rarely appears prominently in the original quotation. "While solar is generally 'fit and forget', it does require some maintenance," says Teoh.

He explains that annual inspections and

system maintenance are typically carried out by the vendors, and due diligence makes a difference. "As the owner, you can track panel performance through [a designated] app. This will give you information on how efficient the system is. Any year-on-year drop in performance can be detected, so you can take remedial action by contacting your vendor."

Disposal, recycling and end of life

Disposal of the solar PV system enters the picture when the panels reach their "end of life" phase, when they need to be decommissioned and recycled.

Homeowners are advised to engage certified contractors who can handle the removal and recycling of components at a dedicated recycling facility. It should be noted that not every solar provider offers dismantling and recycling services.

With operational lifecycles of 25 to 30 years and nationwide domestic adoption having begun in 2006, Malaysia is approaching what can be considered its first major decommissioning cycle. "We are looking at the first cycle of main bulk panel disposal in 2030 to 2035," says Ellina.

In this country, solar panels are classified as e-waste under the Department of Environment's Environmental Quality (Scheduled Waste) Regulations 2005. However, the legislation does not yet include specific guidelines on solar panel handling, storage or recycling — a gap that the broader circular economy framework for renewable energy will need to address.

Panel components — glass, silicon, metal — are individually recyclable, but solar panels are engineered as durable composites built to withstand 25 years of weather and heat, which makes separating those materials for recycling more complex, says Ellina.

"Malaysia needs to be ready in terms of specific methods for processing e-waste, recycling and appropriate disposal sites, given the rising consumer uptake of EVs, energy storage systems and industrial-grade e-waste components, in addition to solar panels," she adds.

For GSPARX's Sansubari, the framing of an imminent "decommissioning wave" may be premature. He points out that many of the earliest FIT-era installations from 2011 onwards remain technically healthy beyond the contractual period.

In such cases, the practical pathway is often repurposing — continuing to use the panels for self-consumption, paired with battery storage to capture excess daytime energy for evening peak use. Existing assets may also find roles in emerging energy-as-a-service or community energy models, he adds.

Repurposing second-life panels comes with its own considerations. Such panels may already contain micro-cracks, or develop invisible ones if not handled or transported properly, which can reduce output and create localised hotspots — a fire risk on timber roof trusses, says Teoh.

"Second-life panels carry no warranties and cannot be legally tied to the grid under current utility schemes. They may be more suitable for small, off-grid garden sheds and are probably safer used that way. It is always better to consult an electrical engineer familiar with solar panels if you want more accurate advice," he adds.

For homeowners signing a 25-year contract in 2026, the takeaway is that rooftop solar's sustainability does not end at generation. Lithium-ion batteries, specifically lithium iron phosphate (LFP) variants commonly used in residential energy storage, also require careful end-of-life handling.

While Solar ATAP's self-consumption economics still encourages homeowners to pair their systems with battery storage energy systems (BESS), the disposal question not only extends beyond solar panels, but also to the entire solar energy setup.

Sansubari sees the next phase of policy development as one that should be focused on strengthening the circular economy for solar assets. "Key areas to be further enhanced are clearer national guidelines on solar panel recycling, standardised decommissioning practices and incentives to encourage investment in local recycling," he says.

He also points to extended producer responsibility mechanisms where manufacturers and industry players share responsibility for end-of-life management, alongside greater use of recyclable materials, improved supply-chain traceability and research into second-life applications.

Until these frameworks are fully developed, the deployment of solar PV systems will continue to outpace the infrastructure needed to support them. ■