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Malaysia's rooftop estate offers valuable solar potential

2020 marked a record-breaking year for renewable energy. Solar photovoltaics (PV) will be at the forefront of this continued opportunity in 2021-22, with renewable energy expected to account for 90% of new capacity expansion globally.

This period of accelerating growth is framed by a projected US\$6 trillion power sector investment between now and 2025, higher than the expected investment in oil and gas. This is largely driven by expansion in renewable energy.

Solar PV is now a mature and disruptive renewable energy technology, leading capacity additions around the globe. Annual installation of solar PV is expected to reach more than 160GW in 2022, almost 50% higher than in 2019. Rooftop solar is a critical element of this opportunity, unlocking the substantial generation capacity of building stock in Malaysia and across Southeast Asia.

Shining a light on solar rooftop potential

Rooftop solar installations provide an opportunity to generate significant volumes of zero-carbon renewable energy from otherwise unutilised urban and commercial environments. The economic potential of this technology has seen significant improvements over recent decades, making rooftop solar an increasingly cost-effective distributed energy solution.

These innovative technologies are championed for a range of benefits for the end customers and suppliers alike — tackling the carbon intensity of generation, improving supply reliability, reducing power costs and delivering grid independence, to name but a few.

Yet, while the attractiveness continues to grow, the business case for rooftop solar still faces some notable technical and commercial hurdles. This is ultimately a complex and often challenging market to navigate.

While the theoretical potential of rooftop solar is vast — contributing a substantial share of 290GW of sub-1MW PV installations forecasted to be deployed in Asia-Pacific in the next five years — physical limitations and local instal-



BY MARKO LACKOVIC AND JAIME RUIZ-CABRERO

lation challenges may significantly curtail the full scope of such ambitions.

These hurdles mean that finding the right approach to boost rooftop solar potential in Southeast Asia will require a nuanced and localised strategy. An understanding of local market conditions, product competitiveness, and market awareness are critical to such business cases.

On the most fundamental level, rooftops need to be of a certain size and design to be suitable for solar installation. The more substantial a rooftop is, the greater the possibility for appropriate installation with a positive financial return.

The financial case for rooftop solar is enhanced by the potential to sell excess power generated back into the grid, providing a valuable return on investment. Yet, the prices offered for this excess electricity are generally lower than grid electricity tariffs in markets across the region.

Installing battery technology can provide a buffer that shifts these considerations somewhat, but at the cost of higher total cost of ownership. Malaysia recently announced plans to adopt up to 500MW of battery storage technology in the Peninsular Malaysia Generation Development Plan 2020 to support grid-scale renewable energy, perhaps foreshadowing growing adoption in rooftop solar applications also.

Local regulation and support schemes can also influence the potential to accelerate local product competitiveness. Positive regulatory support, for example, is a contributing factor in why the renewable energy arm of national utility Tenaga Nasional Bhd recently partnered with Singapore's Sunseap Group to invest in rooftop solar installations in Vietnam's rapidly expanding power market.



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Reluctance around introduction of favourable regulation stimulating rooftop installations is seen across Southeast Asia. Higher buy-back tariffs for excess electricity would certainly stimulate higher penetration of solar rooftops. However, a careful balance is required.

Solar rooftops and distributed power generation — while bringing numerous upsides — more broadly introduce a complex environment for grid operators due to two-way power flows. Grid owners still need to maintain grid quality despite potentially suffering reduced revenue generation resulting from distributed generation.

A strong partner ecosystem to leverage is another key enabler, ensuring that collaborator companies have the experience and capacity to effectively deploy solar rooftop potential. This not only facilitates a successful rollout, but can help overcome key technical challenges.

Making this technology financially viable also often comes down to the size of an operator's portfolio. Those players with a substantial portfolio of installations are far more likely to deliver economic success than smaller players attempting to deliver returns on a limited number of installations.

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Malaysia's rooftop potential

Malaysia has already made some encouraging steps into the rooftop solar space. Net metering allocations have enabled rooftop solar users to benefit from self-generated electricity while selling excess energy back into the grid. An additional 500MW of net metering capacity was opened for applications by the Sustainable Energy Development Authority (SEDA) in February.

Iterations in the programme since net metering 1.0 started have gradually increased the price-competitiveness of this self-generation solution, boosting payments for excess energy and making for a far more attractive ecosystem. The continued falls in the cost of solar rooftop generation is likely to further support the cost-competitiveness of this approach.

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Malaysia's educational institutions offer a particularly lucrative opportunity, with the combined capacity potential of schools and universities accounting for almost 90% of the total 4.4GW rooftop potential. There is a real opportunity to aggregate public rooftops and tender out this combined space to developers who can accelerate rooftop solar installation.

The path to success

Navigating this complex environment will require a carefully considered approach for operators. That's particularly true in the case of incumbent

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New players already actively entering this market

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utilities, who should act now if they want to take advantage of this transition.

New players are already actively entering this market, while incumbents are still searching for the right business models to build on their commercial and technical strengths. Utility Tenaga has already made some important moves in this space, establishing subsidiary TNB Renewables Sdn Bhd, and making shrewd investments in high-growth global markets such as Vietnam.

First-movers are likely to act strategically to corner market share, and control the ecosystem across their value chains and collaborator networks. This will not only offer an advantage in a localised approach, but allow them to leverage the economies of scale that are key to a successful portfolio.

Investors and financial backers, essential for such capital-intensive activity, might want to consider a portfolio approach comprising multiple rooftop solar projects to de-risk early financial exposure. Focus on end-to-end business

developers could offer a more rewarding pathway, with higher capital requirements but greater control.

What is clear is that implementation remains complex, but successfully navigating that landscape will deliver remarkable opportunities for power industry operators and consumers alike. **E**

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