Distributed rooftop solar installation in Jeddah, Saudi Arabia, part of Haala Energy's portfolio.

The Green Finance Gap in the Kingdom

by Faris Al Sulayman & Rowan Jandu

In 2018 Saudi Arabia took its first serious steps in what is set to be a new era of renewable energy development. The Renewable Energy Project Development Office (REPDO), part of the Saudi Ministry of Energy and Mineral Resources (MoEMR) awarded the 300MWp Sakaka Solar project—the first of its kind in the Kingdom—for a record low price. A similarly striking price was also achieved at the tender of a 400MWp wind project at Dumat Al Jandal.

At the utility scale, there are few structural obstacles standing in the way of the Kingdom's aims of reaching its ambitious target of 27.3 GWp of installed renewables capacity by 2023, equivalent to a third of overall projected generation capacity in the mid-2020s.[1] If a truly sustainable, localized renewables industry is to take off in Saudi Arabia, distributed generation (solar on the rooftops of homes and businesses) must do a lot of the heavy lifting. The ability of the state to build a healthy and vibrant private sector renewables ecosystem will be a litmus test for some of the broader economic reforms it is attempting to undertake. Clever and flexible green finance will determine whether a local distributed industry can get off the ground. More-

over, the state can be a catalyst in allowing the industry to leapfrog challenges faced elsewhere and make up for lost time.

> The ability of the state to build a healthy and vibrant private sector renewables ecosystem will be a litmus test for some of the broader economic reforms it is attempting to undertake.

Why distributed energy resources are valuable

With the rise of renewables, distributed energy resources (DER) are becoming an increasingly important segment of the global energy mix. According to Navigant Research's *Global DER Deployment Database* report, DER installations are estimated to increase at a double digit compound annual growth rate between 2019 and 2025, with solar installations representing half of the anticipated growth.[2] These generation assets produce energy at a smaller scale and closer to the point of use than conventional centralized plants. Although distributed generation is generally more expensive to install on a unit of capacity basis ($/kWp), the proximity to the point of consumption means that power does not have to be run long distance through expensive transmission and distribution networks, avoiding the associated losses and costs. As a result, distributed generation can be cost-competitive on a unit of energy consumed ($/kWh) basis, often referred to as the levelized cost of energy (LCOE). In addition, a more granular and dispersed energy generation network is more resilient, with outages in any one part having a lesser impact on the whole. Finally, DER can be quicker to deploy at scale because large centralized power projects depend on the effective sponsorship, planning and project management of governments, without which significant delays and setbacks are likely.

Creating a favorable environment for private-sector development of DER is therefore a relatively appealing and straightforward way for governments to accelerate progress towards their renewables targets and energy transition, complementing the public-sector development of centralized power plants. This is doubly true in Saudi Arabia as it attempts to undertake a series of economic reforms, typified by Vision 2030 and the National Transformation Program, that aim to shift the onus of growth from the bloated public sector to the private sector.

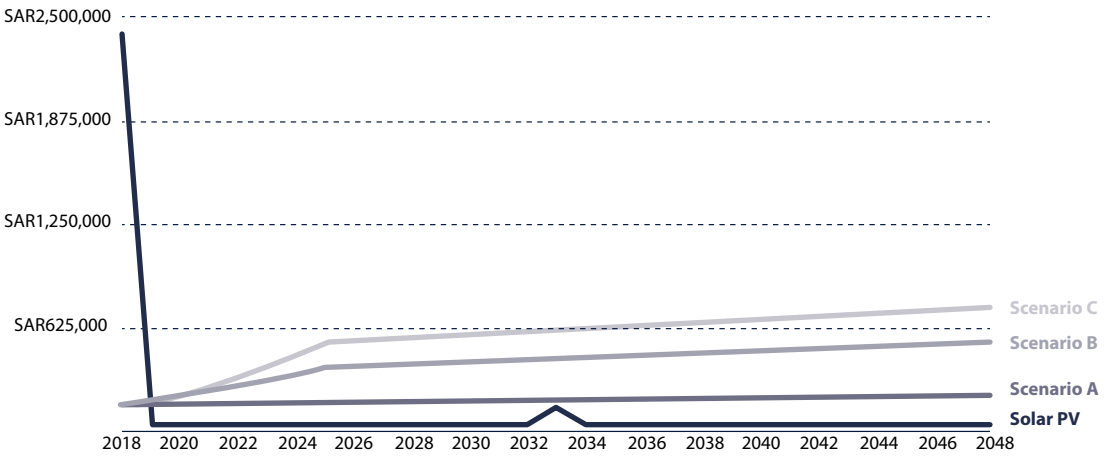
A further benefit of developing a healthy DER ecosystem would be increasing the local content of the renewable energy elements of the Saudi mega-projects announced over the past 24 months (REPDO, NEOM, Softbank etc). If a well-established local DER market existed, local companies would be more likely to be able to contribute to large projects, and foreign companies might also consider establishing a more permanent presence on the ground, producing inputs, creating jobs and driving economic growth. The number of solar firms, both local and foreign, based in the UAE, with its well-established local DER market, is a good example of this.

The development of DER projects is driven by the price of electricity from the grid, and the cost of the alternatives, both of which are determined by a combination of market forces and government manipulation through subsidies and regulation. In Saudi Arabia today, the LCOE for solar is lower than the cost of electricity from the grid for many large energy consumers, and the consensus is that this gap will only get larger as energy subsidies continue to be lifted over the coming years and the cost of solar components continues to decline. As an example, the tariff paid by large commercial consumers, like a shopping mall or warehouse, is 0.30 SAR/kWh, and the LCOE of rooftop solar could easily be below 0.20 SAR/kWh. This presents an opportunity for energy consumers to make long-term savings by developing DER today.

The green finance gap

Despite the fact that developing distributed solar photovoltaic (PV) systems is already economically viable for many energy consumers in the Kingdom, the size of the savings is subject to some uncertainty, being dependent on the rate of subsidy reform pursued by the state (see Figure 1). This means energy consumers are faced with investment decisions characterized by large potential savings over a 30-year period with relatively low risk of outright losses, but a high upfront capital commitment to an unfamiliar technology, with uncertain project payback periods of around 7-10 years. For many heavy energy users in the commercial and industrial sectors, this is not yet a convincing investment case. Diverting significant capital away from their core businesses is unappealing, even if internal rates of return (IRRs) are likely to be 10-15% or higher over the full project lifetime.

Figure 1: Cost of a typical commercial scale solar PV system under different tariff scenarios:



Source: SEC, DEWA, Haala Energy

Note on scenarios: A) tariffs increase by inflation only, averaging 2% per annum; B) tariffs increase to 46hl (Dubai's current price) by 2025, and then with inflation thereafter; and C) tariffs increase to 63hl by 2025, with inflation thereafter. The distance between the Solar PV line and each scenario line is indicative of the return on investment (ROI).

For another category of investors however, these metrics make for a very interesting proposition. The prospect of relatively low-risk, double-digit IRRs over long-time horizons of 25-30 years is very appealing to asset managers and large institutional investors, particularly those comfortable with the underlying technology (solar PV being reliable and well established) and the local macro-economic outlook.

This presents an opportunity already familiar to many working with DER worldwide, namely the possibility of bridging the finance gap by offering power purchase agreements (PPAs) or leases of distributed generation assets to energy off-takers, financed by larger institutional investors. Under such models off-takers stand to benefit from lower cost energy with little to no price risk over time and no upfront capital commitments, while specialist investors can lock-in above average rates of return over long time horizons. The investment risks can be relatively low, particularly with the right approach to evaluating off-taker credit risk and the aggregation of large numbers of projects spanning different locations and sectors.

Why the gap persists

At present in Saudi Arabia, the economic case for such solutions is strong and there are plenty of interested players on either side of the gap, both off-takers and investors. The finance gap stubbornly persists and remains a major bottleneck holding back renewable energy development. In general, the Saudi finance sector is relatively conservative, often waiting for the state to explicitly take the lead in opening up a new space for investment. In the case of green finance, unfamiliar project and technology risks and the challenges associated with the residual value of renewables assets, are cause for some hesitation.

The scale of DER project finance is also a major challenge. Although the underlying project structures and cash flows are similar in nature to more conventional non-recourse lending models, DER project debt requirements are typically less than $10 million, which does not justify the considerable legal and due diligence costs that are normal with ticket sizes in the hundreds of millions. Lending at this scale could benefit from a more wholesale approach with pre-defined eligibility criteria and the aggregation of numerous projects (ideally across different sectors) to reduce risk—principles that are already well established in the mortgage and car leasing markets.

In addition to these sector specific challenges, the general liquidity situation in Saudi has tightened considerably over the last two years as interest rates have risen in line with the US Federal Reserve, and outstanding domestic sovereign debt has risen to over SAR 500 billion ($150 billion) as of the end of 2018, with a plan to reach $181 billion in outstanding debt by the end of 2019. The combination of these factors means that limited-recourse debt is not generally available for DER project developers.

Bridging the gap

In lieu of a more rapid removal of energy subsidies which may be politically sensitive and further slowdown an already sluggish economy, the state can play a role in bridging this gap and stimulating DER project development by assuming some of the risk on behalf of the private sector. Once a history of local commercial operation is established, private sector finance should be more forthcoming. This could be done in a number of ways, both directly and indirectly.

As a relatively straightforward and low-cost option, the state could offer a loan guarantee program to local banks and establish a set of standards that can be used to assess the bankability of projects. The Ministry of Finance already has a similar program to support start-ups and small business called *Kafalah*, and the same framework can be expanded to include project finance. The US Department of Energy, through its Title XVII program,[3] and India's Renewable Energy Development Agency,[4] are two large programs that could be emulated.

In anticipation of the growth of a secondary market for solar assets, the state can also provide debt directly to businesses choosing to invest in their own solar projects. The Saudi Industrial Development Fund (SIDF) has a number of similar debt products for industrial clients and is set to roll out a more tailored product aimed specifically at energy efficiency improvements soon. Such a program could be expanded to include commercial entities, who in fact pay the highest electricity tariffs and therefore have the strongest investment case for solar. Similar tried and tested debt programs have been developed by the EBRD, various governments, as well as local and international clean energy funds. A step in between a loan guarantee program and direct lending would be an on-lending program through commercial banks, similar to the Green Initiative developed by the European Investment Bank.[5]

Ultimately, the state has a number of ways to bridge the finance gap and depending on its fiscal capabilities and appetite for exposure it can use one or more of these tools to provide a boost to the industry. More broadly, the emergence of smart and flexible finance options for the distributed solar market is typically the kind of development that trails the birth of the industry by a few years. Given the prolonged low energy cost environment in the Kingdom however, the state playing a role in bridging the finance gap would allow the industry to leapfrog some of these traditional hurdles, and in doing so, make up for lost time.

Rowan Jandu is a co-founder at Haala Energy, a commercial scale solar developer based in Saudi Arabia. Faris Al Sulayman is also a co-founder at Haala Energy and a Research Fellow at the King Faisal Center for Research and Islamic Studies in Riyadh.

---

[1] Note: the capacity factor of renewables is lower than that of conventional generation assets, meaning that this capacity figure would translate into less generated energy when compared with the latter (TWh/year).

[2] Global DER Deployment Database," *Navigant Research*, 2019. https://www.navigantresearch.com/reports/global-der-deployment-database

[3] TITLE XVII. (n.d.). Accessed December 1, 2018. https://www.energy.gov/lpo/title-xvii

[4] "Financing and Norms and Schemes," *IREDA*, 2017. http://www.ireda.in/writereaddata/Annexure%20I(1).pdf

[5] "Green Initiative," *European Investment Bank*, July 6, 2018. Accessed December 1, 2018. http://www.eib.org/en/projects/priorities/climate-and-environment/green-initiative.htm