

Turning to the sun



Credit: Scatec Solar

Middle East | Simple economics are starting to overcome a reluctance to consider renewable energy in a region dominated for decades by powerful fossil fuel interests. Catherine Early reports

“When I first came to this region in 2007, solar wasn’t talked about by the media and everyday people. Twelve years later, it is being talked about everywhere,” reflects Gurmeet Kaur, board member of the Middle East Solar Industry Association (MESIA).

Targets for renewable energy and solar PV have proliferated across the region in recent years. Saudi Arabia is aiming to have 9.5GW of clean energy by 2023, Egypt wants 40% of its total electricity to be sourced from renewable energy by 2035, while Jordan has a goal of 10% of clean energy by 2020 and Morocco has ambitions for 5GW solar by 2030.

The United Arab Emirates (UAE) is targeting 50% of electricity from clean energy by 2050. Bahrain, Kuwait, Tunisia and Oman also have renewable energy targets.

Countries including UAE and Saudi Arabia followed the lead of trailblazers Jordan and Egypt, using competitive tenders similar to those they had used in the power and water sectors, which were already familiar to developers.

The turning point in seeing solar as an affordable source of power came in 2012, when Dubai’s first tender for independent

power producers (IPPs) for 200MW of the Mohammed bin Rashid Al Maktoum solar park achieved the lowest price globally for solar PV, at US\$0.06/KWh, Kaur says.

“The really low pricing spiked interest in neighbouring countries. Solar is now cheaper than fossil fuels, which is what has driven the market in this part of the world,” she says.

This has led to a change in attitudes in the region, which has for decades been dominated by cheap oil and gas. “In many oil-based economies that use oil domestically as well as for export, there’s an increasingly strong value proposition for solar, as oil prices become more and more volatile. There’s a lot of talk around economic diversification for countries dependent on petrodollars,” says Benjamin Attia, senior analyst from the solar team at energy research and consultancy Wood Mackenzie.

The Middle East does not have the same constraints facing other solar markets, such as congested grid or land issues, or low sunshine, he notes. “I think the economic case far outweighs any sort of political constraints, which are fairly minimal at this point too,” he says.

Though starting from a low base, growth is accelerating fast, with the

Megaprojects such as the recently completed Benban solar park in Egypt have helped put solar firmly on the map in the MENA region

region’s strong solar resource boosted by ever-lower prices achieved at government tenders. The International Energy Agency’s (IEA) latest renewable energy market update, published in October, revised up many of its predictions for MENA countries, mostly due to strong performance in solar markets over the past year.

“While the actual generation costs for each technology is country-specific, solar PV is increasingly seen as a cost-effective way of meeting fast-growing domestic power demand,” says IEA renewable energy analyst Yasmina Abdelilah.

For example, the IEA forecast that renewable energy capacity in the United Arab Emirates (UAE) will increase by more than 6.3GW – a tenfold rise – almost entirely from solar PV and concentrated solar power (CSP). This is a significant rise from its forecast a year earlier, the IEA said, mostly due to new plans announced in 2018 by the emirates of Dubai, Abu Dhabi, Umm Al Quwain and Ras Al Khaimah for a competitive tender for 3.7GW of utility-scale PV.

Similarly in Morocco, the IEA’s forecasts have risen to reflect the increasing economic attractiveness of solar PV and CSP, a more optimistic forecast for distributed PV, and a faster auction pace, with a tender for 230MW of combined solar PV

and CSP projects announced in July, which the agency had not foreseen in its previous forecast.

The IEA also highlights the high growth potential of solar PV in Saudi Arabia, which has experienced “unprecedentedly swift progress” since targets for 2023 were increased three-fold, and new plans to tender 2.2GW were announced in January 2019.

The country’s first tender saw 300MW contracted by Saudi developer ACWA Power, which achieved one of the lowest-ever solar tariffs of US\$0.0234/kWh. The energy from the US\$300 million is being bought by the Saudi Power Procurement Company (SPPC). The project was connected to the grid in November, and should be fully online soon, according to Attia.

“The first round set a precedent. There’s obviously things that need to change, but the targets are aggressive and very realistic. There’s been a lot of interest in the second round, with a large number of companies are pre-qualified to bid,” he says.

Visible from space

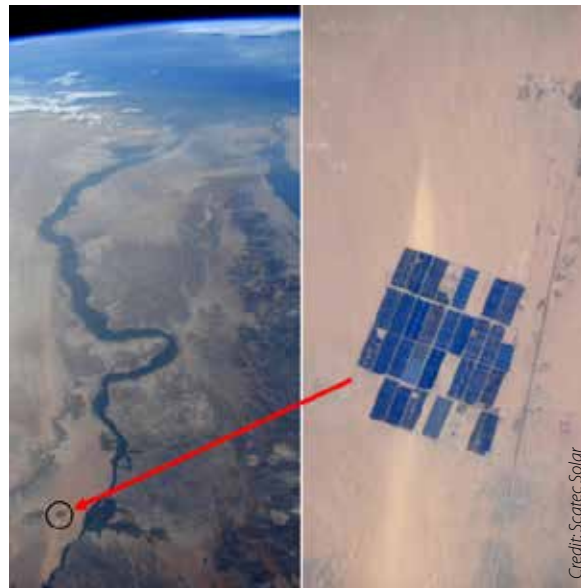
Over in Egypt, another MENA megaproject is now near completion. The 1.8GW Benban solar park is so big that its 7.2 million photovoltaic panels are visible from space. Egypt’s first utility-scale solar PV project uses a multi-developer model, which has involved the government assigning plots to some 30 developers that expressed interest in the project, including Alcazar Energy, IB Vogt and Scatec Solar.

It attracted more than US\$1.8 billion in public financing from at least 19 development finance institutions led by the European Bank for Reconstruction and Development.

The developer behind the largest section of the Benban project was Norwegian Scatec Solar. Morten Langsholdt, senior vice president of business development, led construction of the project. The government’s 25-year feed-in-tariff was a strong incentive for developers to move into Egypt, where there was no track record for solar PV, he says.

The project was a good example of the public and private sectors working together to overcome challenges, such as acquiring the permits needed not only to construct the plant, but also to sell the electricity to a public utility, he adds.

The Egyptian authorities set up the New and Renewable Energy Authority to act as a one-stop shop to set up new procedures for the plant. “Everyone was quite pleased



Egypt’s Benban solar plant is so large it is visible from space

with the approach of the Egyptian authorities and their ability to make agencies and ministries across the public sector work together to find solutions so that these projects can be realised. It sounds boring, but it’s very important when you’re investing US\$450million,” Langsholdt says.

The plant was also notable for being the largest to date to use bifacial panels, which increase energy generation by around 15-25%. The technology is fairly new to the industry, but had never been seen before in MENA, meaning that it was perceived as slightly risky by some financiers. Following extensive discussions with investors, reasonable estimates of the extra energy generation were drawn up, Langsholdt reports.

“Now we have set a precedent for large-scale application of this technology, and everyone will receive informed estimates on the basis of our data,” he says.

Not to be outdone, UAE also has very large projects underway. The Mohammed Bin Rashid Al Maktoum solar park in Dubai, led by utility the Dubai Electricity and Water Authority (DEWA), is now entering its fifth phase. The US\$13.6 billion project is the largest single-site solar energy project in the world, with a planned total production capacity of 5GW by 2030.

It was announced in 2012, with the first 13MW phase coming online in 2013. Subsequent phases became gradually bigger, and the third phase of the project is now being built out, with 200MW of the total 800MW already complete.

Prices secured by developers on the project have continued to smash records, with US\$0.056/kWh for the second phase, and \$US0.029/kWh for the third phase.

The 950MW fourth phase comprises a parabolic basin technology and CSP as well as PV, and is being developed by an international consortium for US\$0.073/kWh for the CSP element, and \$US0.024/kWh for the PV section.

The 900MW fifth phase will use PV panels only. DEWA announced the tender in February, and reported that it attracted 60 requests for qualification from developers. In November, DEWA confirmed that Saudi developer ACWA power had won the 25-year power purchase agreement at a price of US\$0.01695/kWh – a global record for a solar PV IPP project.

Attia says it is not surprising to see such low bids on a large-scale tender in a stable, attractive policy and regulatory environment, where there was also a strong procurement track record, transparent tendering, access to cheap finance, land allocation and easy interconnection and synchronisation within the solar park. “The ingredients are all there for very low prices,” he says.

Abu Dhabi meanwhile has this year seen completion of 1.18GW Noor solar PV plant at Sweihan, jointly developed by Japan’s Marubeni Corp and utility the Emirates Water and Electricity Company (EWEC), with panels by JinkoSolar. The project was contracted at US\$0.024 cents per kilowatt hour.

EWEC now has plans for a 2GW project at Al Dhafra, which will take the emirate’s total solar capacity to 3.2GW. In July, the utility reportedly shortlisted 24 out of 48 international and local developers expressing an interest bidding for contracts.

The plant is expected to be operational during the first quarter of 2022, meaning that the tender results should be announced before the end of Q1 2020, Attia says. “Similar to DEWA’s recent results, and the Sweihan tariffs, I’d expect financial bids will be globally competitive at Al Dhafra as well,” he adds.

Prices still falling

Successive tenders such as these have seen price records continue to be broken in the region, but commentators believe that the floor has not yet been reached. “Everyone has said that the prices can’t keep dropping, but I’m not sure we’re at the point where they can’t go lower yet,” says Kaur.

Once use of storage alongside solar PV becomes common, costs will sink even lower, making solar truly a replacement for fossil fuel plants in the region, she says. The

Commercial and industrial rooftop sector takes off

Many experts in the MENA region are touting the huge potential for distributed solar generation from commercial and industrial premises. An initiative in Dubai has demonstrated the opportunities in this sector, if appropriate policies are put in place.

The Shams Dubai project has been led by the Dubai Electricity and Water Authority (DEWA) since 2015, in an effort to encourage its customers to install solar PV panels on the rooftops of their offices, factories and commercial premises. Participants can both generate electricity from solar power, and export the excess to the power grid. The value of the exported electricity is then deducted from the company's future utility bills.

Some 1,354 buildings in the city, totalling 125MW of power, have now been connected via the scheme. DEWA has installed several distributed solar projects at its own premises, including the 1.5MW plant at Jebel Ali Power station.

The initiative's first business customer was the city's Al Maktoum International Airport, with a capacity of 30kW, followed by other private sector participants including the Emirates Engine Maintenance Centre in Warsan, where a 1MW installation on a carport was installed. Some 19 government organisations have also installed PV panels.

DEWA has also backed up the policy with a calculator to help property owners estimate the potential income from solar panels on their rooftops and certified consultants and contractors to plan and carry out installations. It runs its own equipment eligibility scheme and training programmes to improve confidence in the technology, and skills in the sector.

One PV company participating in the scheme is Yellow Door Energy, which has installed more than 100MW on commercial and industrial rooftops in Dubai. It develops and leases the PV panels and other equipment, acting as long-term investor and owner of assets. The company's chief executive, Jeremy Crane, says that customers range from food and beverage, retail, and light and heavy manufacturing.

"We believe that there's a potential in Dubai for 400-500MW in the next 10 years, probably at a rate of around 50-60MW per year. Projections from the government are higher – more than 100MW a year," Crane says.

Crane does not put this down to any particular problem with the scheme, just that the assumptions on the rates of uptake were too optimistic, and that businesses take a while to adopt new ideas for long-term investments.

Crane believes that most of the demand for rooftop solar will come from large international corporates, such as Unilever and Nestle, who have carbon reduction commitments and as such, are motivated to use renewable energy.

Although other countries in the MENA region have considered similar models to the Shams Dubai initiative, adoption is extremely slow due to the very low cost of power for commercial and industrial customers, he says.

Others agree that government subsidies for energy are hampering the growth of distributed solar in the region. The International Energy Agency's (IEA) report on renewables in October states that if retail prices for commercial and industrial players in UAE became cost-reflective, distributed PV would double its rate of expansion.

However, in Egypt, power subsidies for this sector are being discontinued, the report noted. Together with the introduction of net metering and falling system costs, self-generation has become increasingly economically attractive to businesses, and doubled the capacity of distributed solar PV, it said.



Distributed solar in the MENA region has had some success, such as in Dubai, but been constrained by the low cost of power for C&I customers

burgeoning use of bifacial modules will also make a difference. Previously, tendering documents prohibited the technology as there was no knowledge or history on performance, she explains. "I think in the future, we'll see a relaxation of tendering rules to enable more cost-effective and efficient products to be used," she says.

Attia believes that some countries could be approaching an artificial price floor for solar PV projects. But he agrees that tender requirements in the region could be tweaked to include other criteria. "We may start to see projects required to include storage, or other types of evolution where criteria besides just large generation with a low tariff are valued," he says, citing examples such as generation at different time blocks during the day, seasonal tariffs, or specific power production requirements for non-utility offtakers such as gasfields or desalination plants.

Experts in the region see that growth could yet be restrained due to a variety of factors. Balancing the grid access could become an issue, though not just yet, Attia believes. "There is a lot of talk around regional power trading, and connecting to Africa and Europe. But the market is not at the point right now where there is so much demand that we'll run into issues around balancing the grid due to high penetration of renewable energy," he says.

Abdelilah believes that the pace of growth could be accelerated if countries published schedules setting out a timeline for auctions on the way to meeting their renewable energy goals, most of which target 2025 or 2030. "That would give more visibility to banks and investors – if they know a country is tendering a certain amount each year, it's easier for them to give financing for both large-scale and small-scale PV. It sends a lot of signals to all stakeholders in the region that would bring costs down," she says.

Overall however, the outlook is very positive, she says. "We've updated the forecast for the second year in a row because things are progressing faster than we had previously thought. Governments are not shying away at all from renewable energy, more the opposite.

"Oman has jumped on the bandwagon this year and opened a tender. It used to just be Morocco – now everyone is heading towards a cost-competitive source of energy, and that is solar PV," she says. ■

For more on the Middle East's adoption of bifacial solar technology, turn to p.50