

# Solar in the MENA region

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PES brings you an overview of solar in the MENA region in 2016 and a forecast for 2017.

2016 was a record breaking year for solar in the Middle East. With record low tariffs on Dubai Electricity and Water Authority's (DEWA) 800 MW Phase III project and Abu Dhabi Water and Electricity Authority's (ADWEA) Sweihan project, we could call it a successful year for large scale solar on the Arabian Peninsula. Record low tariffs below 3 US\$ cents per kWh attracted worldwide press attention.

These low prices have changed the perception of policymakers and industry

leaders. It even led to a downward revision of the Feed-in tariff in Egypt and revives the debate of the usefulness of Feed-in tariffs versus competitive bidding in the MENA region. On an unsubsidized basis, solar PV without storage is now one of the cheapest sources of electricity available – it costs less than unsubsidized nuclear, LNG and diesel used for off-grid power. Based on IRENA's projections, solar PV LCOEs are expected to continue to decrease going forward, but whether it will continue to drop as rapidly is subject to debate.

Rooftop solar kicked off in the UAE with approximately 6 MW up and running by the end of 2016. It is expected the rooftop market in the UAE could reach 70 MW in 2017. This would mean more than tenfold

growth in a 1-year period.

MESIA expects to see the following trends in 2017:

1. Start of construction of mega-PV plants: after the award of DEWA's Phase III project and the bid for ADWEA's Sweihan project, 2017 will be characterized by the start of the implementation of these two landmark projects in the Middle East.
2. Decreased cost for solar equipment: MESIA expects solar equipment prices to further decrease: (a) solar panels prices are expected to drop further in 2017, (b) 1,500 volt inverters become market standard, widely adopted, and thus cheaper, and (c) further consolidation on the balance of plant will drive costs further



down through economies of scale.

3. Increased cost of debt for new projects: infrastructure and more particularly renewable projects, including solar PV and CSP benefitted largely from the low cost of funding environment resulting from quantitative easing initiatives. With quantitative easing being scaled back and interest rates on the rise, renewable energy tariffs will be affected more than conventional tariffs in the absence of a fuel component.
4. Very low LCOE offers across Middle East and North Africa: we will continue to see solar Independent Power Projects (IPP) bids and Engineering, Procurement and Construction (EPC) contracts with very low LCOEs in 2017. The reality of such

aggressive pricing strategies is to be put to the test in terms of who will reach the lowest tariffs in Saudi Arabia, Jordan, Oman, and Kuwait.

5. Low oil and gas prices: consistently low to medium oil and gas prices will not slow down solar growth in the GCC; it is rather the opposite. Due to dramatically reduced income from oil sales, Saudi Arabia announced a hike in gasoline, diesel, and natural gas and electricity prices for consumers, which will improve solar power's competitiveness.
6. Energy independency: with solar PV LCOEs still below current market prices for oil and LNG and at par with natural gas based power generation, net energy importing countries, like Jordan, Morocco,

and Pakistan will keep driving growth for large-scale solar power plants.

7. Pick-up in battery storage solutions: solar PV without storage is at grid parity; so far solar PV's main utility is to act as a fuel-saver. Solar PV without storage does not allow saving on capacity payments payable to conventional power plants. The importance of reliable base load power from solar resources is highlighted by the increased importance of storage on a number of projects: CSP or hybrid (CSP + PV) solutions across the region. In 2017, we also expect to see further adoption of storage solutions (e.g. batteries, pumped hydro, etc.) across the Middle East. Storage and demand response solutions provide additional



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flexibility to the transmission system and allow peak load curbing.

8. Growth in commercial & industrial rooftop solar: lower prices for solar and increasing electricity rates will further lead to the adoption of distributed solar in 2017, mainly rooftop. One important driver for this market will be financial institutions becoming more comfortable to provide long term financing for industrial and commercial rooftops. We see the market further picking up in Jordan, Kuwait, Palestine, Pakistan, and the UAE.

9. Small-scale distributed generation initiatives: regulation, like net metering, or deployment targets, as defined in Dubai's new Solar Shams program, which makes solar mandatory for all rooftops in 2030, will push distributed solar power generation. Jordan has been advancing small scale distributed PV in 2016. We have seen RFPs from universities, libraries, etc.

2017 will lead to a further roll-out of solar energy in the MENA region. The UAE will continue leading the industry, with the implementation of 2 mega solar PV projects awarded and 1 CSP project up for tender in the first half of 2017 in Dubai. We will see more large scale projects popping up across the entire Middle East, e.g. Jordan, Kuwait, and Saudi Arabia. Large scale solar is pretty much on-track.

Indeed, during the World Future Energy Summit in Abu Dhabi in January 2017, Saudi Arabia announced its ambitious plan to have 9.5 GW of renewables commissioned by 2023. The first 300 MW solar is to be expected before the end of 2017. Jordan will tender another 200 MW solar PV, and Kuwait will soon launch the request for prequalification for a large scale solar park at Shagayah.

As far as rooftop solar is concerned, there is still some work to be done on the regulatory side in most markets. Most notably, for rooftop solar to take a substantial market share we will need to see government regulators do their part and adopt policies that promote solar energy, e.g. through net metering schemes. Regional financiers and bankers need to be further educated on innovative and sustainable ways of financing rooftop solar. The first steps have been taken, but still more work remains to be done.

Rooftop solar is proving to be an important contributor to this energy demand with consumers large and small receiving more and more, both the financial and environmental benefits.

Information disclosed by DEWA in Dubai, UAE, showed that in December 2016 over 90 MWp of projects were filled under NOC stage while 4.8MWp was connected to the grid. So 2017 will be a boom year with the rooftop market probably reaching

50MWp installed.

Cost of electricity generation from renewables has always been the key factor, especially in the competition between rooftop solar vs. subsidized conventional gas based energy sources. In Abu Dhabi for instance, with a partial removal of subsidy, the local utility tariff has changed from 15 fills/ Kwh to 31 fills/Kwh.

Although 2016 is possibly the best scenario for solar, when you have the solar panel prices coming in at record levels, the challenge still is getting the customers confidence in having a rooftop solar plant. As more and more solar projects are deployed and commissioned in the region, this perspective on solar rooftops will change and the demand will increase.

DEWA's net metering policy has been quite a landmark; this has now made industrial and commercial scale solar rooftop projects feasible for building owners and investors and payback of around 5years are becoming the norm.

We can't fail but to notice increasing trends in the implementation of roof top solar energy schemes in the Middle East.

Recently, a number of very large rooftop solar plants were announced in Dubai which include:

- A 1.5 MW system deployed to Jebel Ali Power Station

- The Dubai solar schools programme, targeting around 50 MW over three years of systems installed in schools across the Emirate
- DP World phase 1, installing the region's largest distributed system over 51 rooftops and 4 car parks with approx. 40MWp
- AL Nabooda Automobiles solar lease for the development of 6.7 MW of solar power to their new DIC facility
- Aramex new 3 MW system as an EPC purchase on their logistics facility

Additionally, rooftop solar projects create a plethora of new business opportunities, including:

- Component manufacturers, panels, invertors, combiners, measuring and monitoring systems, EPC contractors, electrical and mechanical contractors
- Both local and international solar developers and financiers looking for good investment returns.
- Solar System integration business with now over 50 companies registered as contractors and consultants.

The growth in the rooftop market is driven by a couple of factors:

- a The continued push for sustainable solutions of which PV can be considered

the poster boy

- b Economies of scale ramping up very fast creating amazing price drops
- c Innovation and efficiencies which will prepare ourselves for the next wave of system rollouts.

The main motor is, of course and especially in this region, the continued drop in PV silicon prices. This is what clients want to hear and what grabs the decision makers' attention. We even expect further drops in quarters 3 and 4 of 2017, on the back end of the Chinese PV plant developments and as more volume flows into our region.

The increased activity in the R&D segment as the industry reaches maturity can be seen in innovation on monitoring, inverters and PV cell technology. While the 'plain vanilla' poly-crystalline PV panels keep on seeing a slow and steady increase in efficiencies, there are also headlines regularly of new technologies hitting the industry press announcing the next breakthrough.

No article on Rooftop solar in Dubai is complete without touching on the issue of maintenance.

The key element on O&M in our region is the need for regular panel cleaning so they can deliver the power they are designed for. As solar plants are not energy dense, a vast expanse of space is needed to build them;

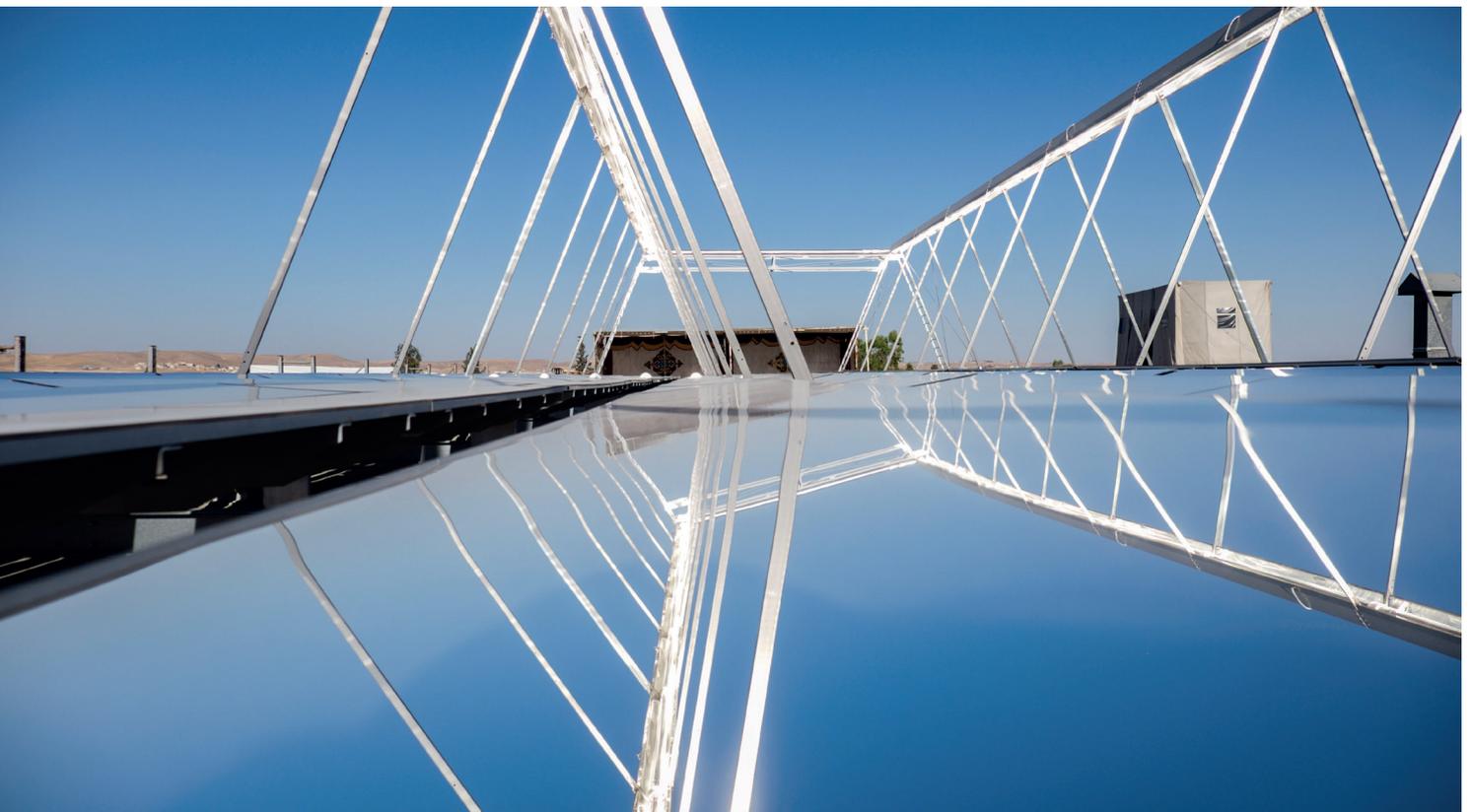
the surface cleaning of the panels can take quite some time and with it bring its own particularities. Access to the site, access to water, HSE issues, working at height and in the heat are all considerations that need to be made before planning out your PV system.

The losses an owner faces on a PV system in the UAE is actually higher, approx. 50% more, than the system losses faced by a solar system owner, in say, Germany. However the inflow of energy into a UAE based system is also double than the energy that hits the surface in Germany, on the condition that the panels are clean of course.

Now these facts should not deter owners from building solar, as a proper approach in facility management, can easily secure the big benefits that solar can bring. Innovation is also moving very fast in this segment and it will not be long before solar powered robotic cleaning will become the norm for solar in the Middle East. For now many solutions are being developed and experimented with but have not reached large scale adoption yet.

At the moment we still see manual cleaning as the run of the mill solution, which is being offered due to low labour costs, but as the industry grows and large rooftops get populated it cannot be imagined that manual cleaning, with all the associated risks will be the way forward.

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