

SOLAR ENERGY OUTLOOK IN THE MIDDLE EAST

February 16th 2017, DR. SHAWN QU



Company Overview

- Founded in Ontario, Canada, 2001
- Listed on NASDAQ (CSIQ) in 2006
- Over 10,000 employees globally
- Subsidiaries in 8 countries / territories including UAE, Turkey, Egypt
- > 17 GW of solar modules shipped cumulatively
- > 3.5 GWp solar power plants developed, built and connected
- No. 1 Solar Company 2016 according To Photon & IHS

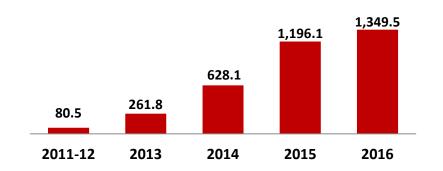
Highlights

- **2015** Revenue: **\$3.5** Billion
- **2015 Shipments: 4.7 GW**
- 2015 Net Income: \$172 Million
- 2016 Shipment Guidance: 5.07 5.17
 GW

Global Footprint and Brand

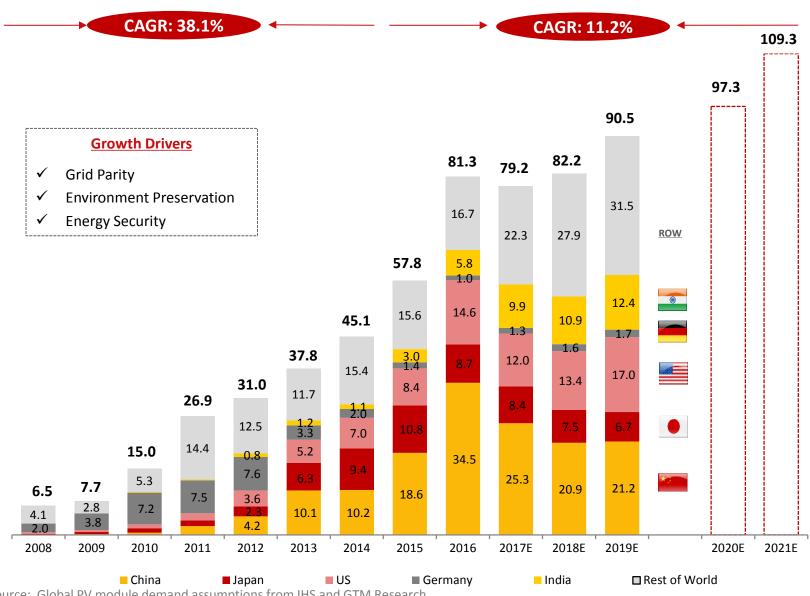


Solar Power Plants Built and Connected





2016 Global Annual PV Installation Exceeding 81GW



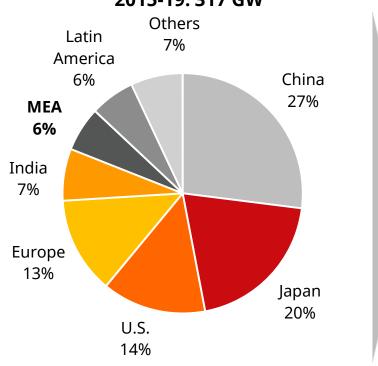
Source: Global PV module demand assumptions from IHS and GTM Research

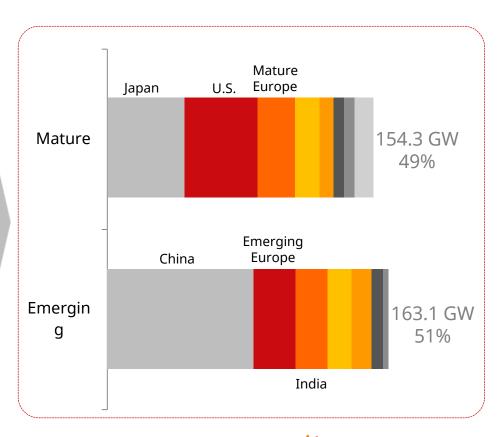
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Global Opportunities

- Mature markets: grid-parity and evolving storage solutions will drive growth of distributed generation and self consumption
- Emerging markets: utility-scale business and hybrid micro-grids will drive growth and create high margin opportunities for IPPs

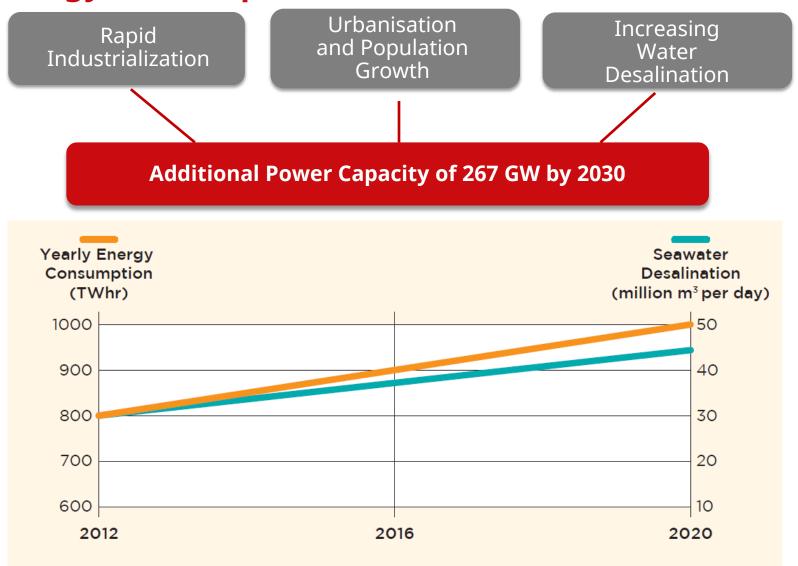
Global PV Demand in Regional Markets 2015-19: 317 GW







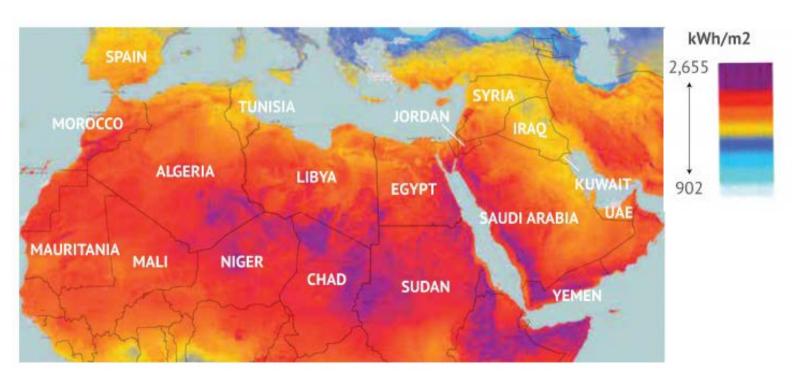
Energy Consumption Growth in the Middle East



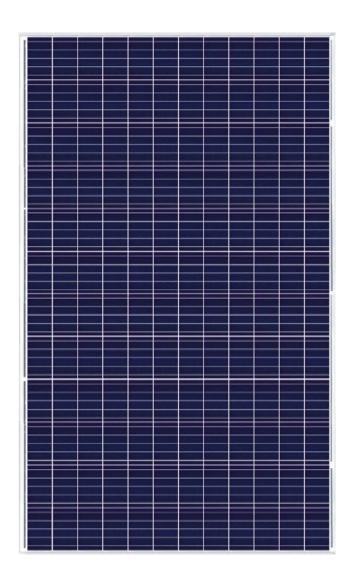


Why Solar?

- **Solar irradiation** in the Middle East is among the highest in the world with over 2,500 kWh/m²/year
- Competitive **financing** cost
- Benefit to the local economy in terms of job creation, especially with local manufacturing
- Solar **technology** is developing at a rapid pace, bringing down solar equipment costs and increasing efficiency



KoolPower Dymond: A desert-optimized solar technology





Supreme power output (335-345W) with the proprietary dicing and double parallel circuit design



Low light-induced-degradation (LID), particularly good for high-irradiation countries



Low hot-spot risk and lower operation temperature



Specially designed for tracker application with light-redirecting film and size optimization



Minimize the micro-crack risk with double-glass module architecture



High resistance to salt mist and other extreme weather condition



Higher warranty of up to 30 years and lower annual degradation values



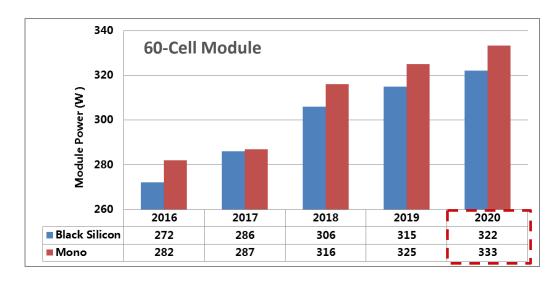
Minimize dust accumulation and easier cleaning

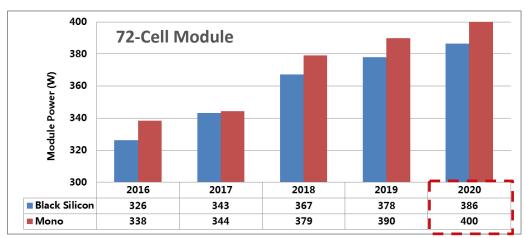
Solar Modules Increasingly Efficient and Powerful

--- more green power with the same footprint and infrastructure

Technological Innovations:

- CSI's Black Si nano-texturing technology paves the way for diamond-wire sawing in multicrystalline wafer production.
- Black Si with PERC will improve the multi-crystal cell efficiency above 21.4% in 2020.
- Mono PERC cell mass production efficiency to reach above 22.5% by 2020.
- Design and process innovations will enable 400W+ module before 2020, resulting in a significant reduction in LCOE.

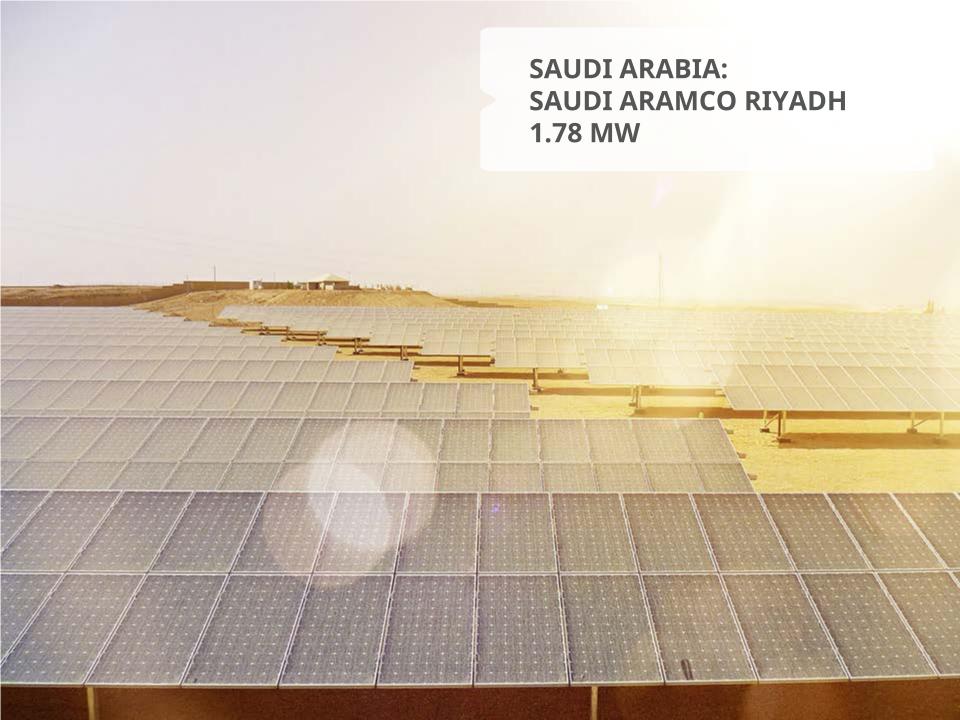




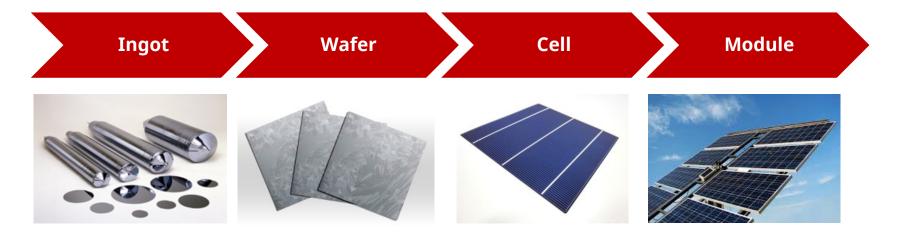








Manufacturing in the Middle East



- 1 GW vertically integrated solar factory with advanced technology and automation
- 3,000 manufacturing jobs will be created
- Supply chain localization to reduce cost

Necessary Government support:

- Clearly defined solar policies and incentives for local products
- More diversified industrial ecosystems

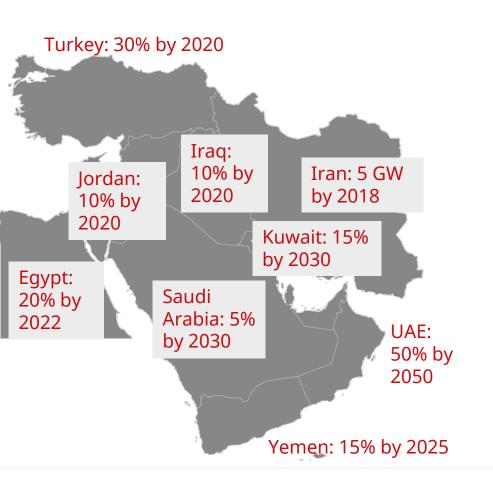
Canadian Solar Inc.







Renewable energy targets of the Middle East



In 2016, ~3.8% of all global solar installations occurred in the Middle East (2,8 GW of 76 GW worldwide)



Ongoing solar projects in the Middle East (MWac)

	Operational	Under execution*	Tendered in 2016	2020 solar target	Percentage of 2020 target reached
Egypt	70	1,800	250	3,125	2%
Jordan	30	320	120	1,000	3%
Morocco	160	350	245	2,000	8%
Kuwait	12	60	85	850	1.4%
Algeria	270	80	2,000	13,000	2%
UAE	128	200	1,150	11,500	1%
Saudi Arabia	23	62	170	2,125	1%
Total	693	2,872	4,020	33,600	2%

Source: Middle East Solar Industry Association 2016 * PPA singing, awarded, construction etc

The Case for Renewables

Job Creation

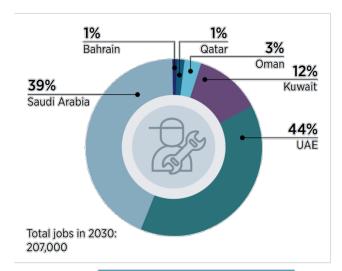
• 140,000 direct jobs every year, reaching around 207,000 in 2030

Fossil Fuel Savings

 Savings of 2.5 billion barrels of oil equivalent (2015-2030), equivalent to USD 55 billion to USD 87 billion, depending on oil and gas prices.

Environmental Benefits

- Carbon emissions can be reduced by a ~1 Gt by 2030, an 8% reduction in per capita carbon footprint.
- Water withdrawal in the power sector reduced by 16%, equivalent to 11 trillion litres of water per year.







Sh Canadian Solar

"In 50 years, when we might have the last barrel of oil, the question is: when it is shipped abroad, will we be sad? If we are investing today in the right sectors, I can tell you we will celebrate that moment."

Sheikh Mohammed bin Zayed Crown Prince Abu Dhabi (The National, 2015)