

## Future Innovations Light The Way For Solar Power

*Law360, New York (January 03, 2014, 11:06 AM ET)* -- The utility-scale solar power market has seen dramatic changes in the past several years: the decline of subsidies and tax incentives, the rise of new investors and providers of solar power and the increasing improvements in technology that continue to increase efficiency of solar power output at increasingly competitive prices.

As solar power gains widespread acceptance in the grid — partially due to subsidies and incentives, but also due to an increased confidence in the reliability of solar power based on performance data — providers face increasing challenges in traditional markets and new regions. Although most solar projects still originate from power purchase agreements that set a guaranteed rate for the power, utility-scale solar no longer survives on significant government and regulatory subsidies.

In 2013, Standard & Poor's rated — although not highly — the first bond offering based on solar electricity payments for a leading installer of solar systems in the United States, SolarCity. Utility-scale solar power has become increasingly competitive with traditional energy sources, and has attracted an explosion of renewable energy investment in the U.S. and internationally.

Constant improvements in solar panel technologies forecast an optimistic outlook for utility-scale solar power as a price-competitive option in addition to its carbon-saving advantages. Chinese manufactured solar panels have significantly affected world pricing, provoking debate about the sustainability of price decreases in comparison to technology advances and continued solar construction. However, other cost measures of solar power also continue to fall: "hard" costs required for panel installation, such as racks and inverters, but also "soft" costs of financing, design, engineering and installation.

Markets for utility-scale solar power continue to emerge, especially in the Middle East and South America. In the western United States, utility-scale solar power plants already contribute significantly to the grid, and in the eastern United States, utility-scale solar power is growing due to both demand for and initiatives aimed at expanding renewable energy output. Worldwide, the solar power sector has seen tremendous growth with no indication of slowdown. In fact, the International Energy Agency estimates an increase in solar power's share of global electricity to rise tenfold by 2020.

In addition to these developing markets, solar power has significant potential in areas without an established grid. Extremely rural and isolated areas may be an untapped market for solar power's potential. In Africa, for example, solar power on a micro-level is exploding — solar lamps and even panels installed to provide energy to rural villages are becoming common. On a larger scale, over the long term, solar power may be a viable solution to delivering energy in areas lacking the traditional infrastructure to support a grid.

As solar increases in volume and influence in worldwide energy output, a large number of new solar providers and contractors have entered the market, leading to increased competition, but also exposing uncertainties in a sector still in the process of maturing. For example, U.S. states are beginning to address the lack of regulation of solar power with the implementation of new — and often solar-specific — licensing laws. Traditional utilities and direct providers of solar power dispute existing laws and regulations allowing distribution of solar power to consumers.

Even with rapid growth and expansion of the solar power sector, one significant constraint on the future of solar power is the “battery issue.” Solar panels do not produce energy at night: so how can solar power be stored for use at a later date, or preserved efficiently for use on demand?

Solar providers are funding significant research into the answer to this critical question. By some estimates, the market for solar-generated energy storage may be \$19 billion by 2017. An efficient storage solution would capture excess generation created by solar panels during the day, providing a free, dispatchable power solution 24 hours a day, thus avoiding interruptions from lack of sunlight. As researchers make progress into this solution, governments have begun to support and invest in potential grid-storage options.

For example, Britain connected a large-scale battery (2 MW) to the grid in August, and Duke Energy in Texas recently began using a 36MW battery for storage of electricity produced by wind turbines (also a renewable energy source with the same storage challenges of solar power). The German government announced incentives for systems pairing batteries with solar panels, and Japan also announced its investment in energy storage systems paired with solar panels. Such systems and long-term storage solutions will increase the reliability of solar power generation, allowing solar power to move into a more mainstream energy source (with additional benefits of sustainability and affordability). Much of the ultimate growth potential for utility-scale solar as a stand-alone power generation source depends upon the viability of a storage solution.

The past several years have seen significant and promising growth in the utility-scale solar sector, both in the United States and worldwide. The utility-scale solar power market is rapidly expanding and continues to adjust to constant technology increases and new demand for solar power. Technology, and demand, will almost certainly lead to additional adjustments in the evolving solar power industry, with the key to long-term expansion resting in the development and success of a large-scale energy storage solution. Once this is developed, the solar power industry may fundamentally alter the way we view power production and energy in future generations.

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[11] Id.