

Financing Utility-Scale Solar Projects in the United States

Shamshek Asad, Head of Research, Washington, DC | Nikolay Filchev, Analyst, Washington, DC | Rossa FitzGerald, Analyst, Washington, DC

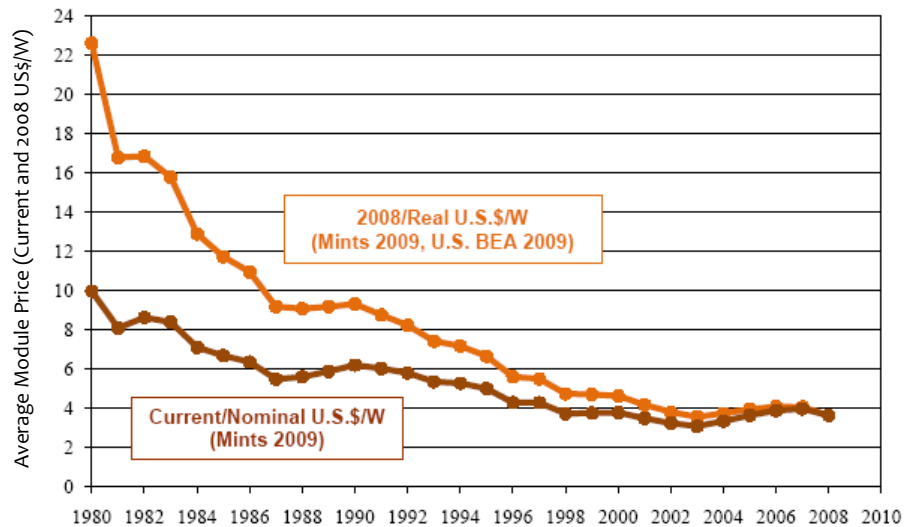
The cost of utility-scale solar projects is falling due to module production efficiency improvements and economies of scale. The presence of significant federal subsidies is also improving the economics of solar power. Utilities in various states are signing power purchasing agreements (PPAs) in order to comply with Renewable Portfolio Standards (RPS) and the solar project pipeline is growing rapidly. But investor appetite may prove limited amid a tight financing market and an uncertain outlook on federal subsidies, commodity prices and climate legislation.

This commentary examines recent trends in the costs, economics and financing of utility-scale solar projects and the opportunities for private equity and other investors.

DECLINING COSTS

The installed cost, which is the sum of module and non-module costs, of crystalline photovoltaic (PV) has declined by 2-4% per year on average over the past decade. In 2009 the installed cost fell under US\$4/watt, while installed costs for thin film were as low as US\$3/watt. Following a classic learning curve, PV module costs have fallen rapidly, reducing by half between 2005 and the third quarter of 2009, from US\$1.59/watt to US\$0.85/watt, as reported by market leader First Solar. Based on an analysis conducted by the National Renewable Energy Laboratory (NREL), figure 1 shows the decline in PV module costs over the past three decades. A key factor for the cost reduction has been the increased global supply of silicon, the major component of solar PV cells. Meanwhile, declines in the investment costs of Concentrated Solar Power (CSP) are expected to be driven by increasing project scale and cost reductions in plant equipment components.

Figure 1: Historical Averages - Global PV Module Prices



Source: 2008 Solar Technologies Market Report, NREL, January 2010

DISCLAIMER

The information contained in this Commentary is of a general nature and is not intended to be used for investment advice. This Commentary has been prepared by Taylor-DeJongh from sources we believe to be reliable and accurate at the time of writing.

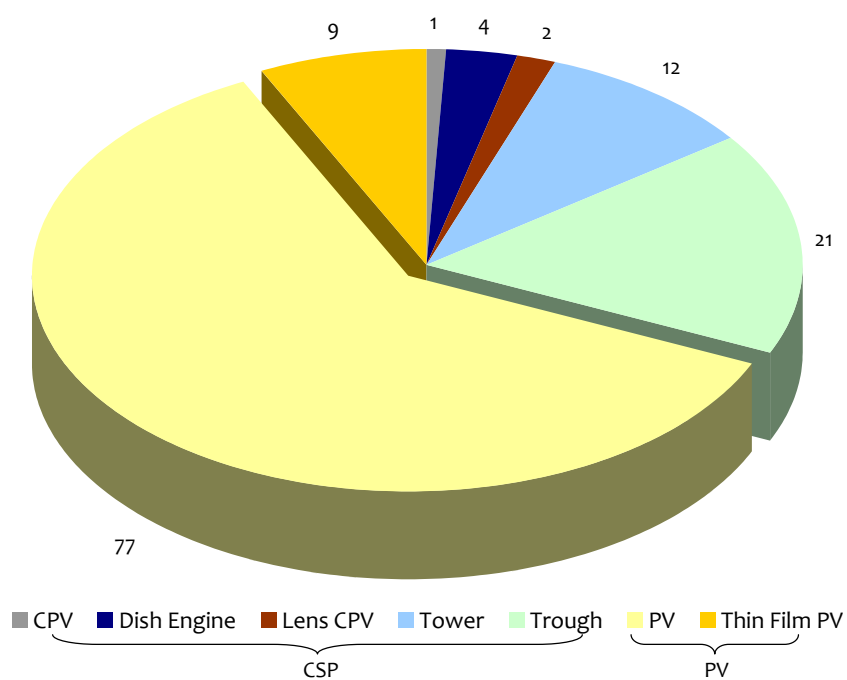
© 2010 Taylor-DeJongh

In tandem with declining installed costs, federal, state and local incentives have made solar projects more attractive to investors. The most prominent incentives include the federal Investment Tax Credit (ITC), the Treasury Cash Grant, the five-year accelerated depreciation (MACRS), and the Department of Energy’s ‘Temporary’ and ‘Innovative Technology’ Loan Guarantee programs. The ‘Innovative Technology’ Loan Guarantee program allows qualifying projects to apply for loans from the Federal Financing Bank (FFB). Combined, these incentives can and should continue to defray the large upfront capital costs of utility-scale solar projects.

UTILITY DEMAND

US utilities have realized that they cannot meet state-level RPS through commercial and residential-scale solar projects alone. At least 18 states have adopted RPS with solar carve-outs or distributed generation requirements, which push utilities to carefully consider solar power generation opportunities. The combination of falling levelized costs for solar energy and increased utility demand has resulted in an expanding pipeline of utility-scale projects under development in the US and more signed PPAs between utilities and developers, notably in the Southwest and the Northeast. As of May 2010, 11.9 GW of PV and 10.1 GW of CSP are under construction or development, with 86 PV and 40 CSP projects, respectively. Shorter project completion times, lower total financing needs (PV installations being typically of smaller size than CSP plants) and declining solar module costs have generated more interest in PV than in CSP, reflected in the larger number of utility-scale PV projects under construction and development, as illustrated in figure 2.

Figure 2: Number of Utility-Scale Solar Projects Under Construction or Development as of May 2010

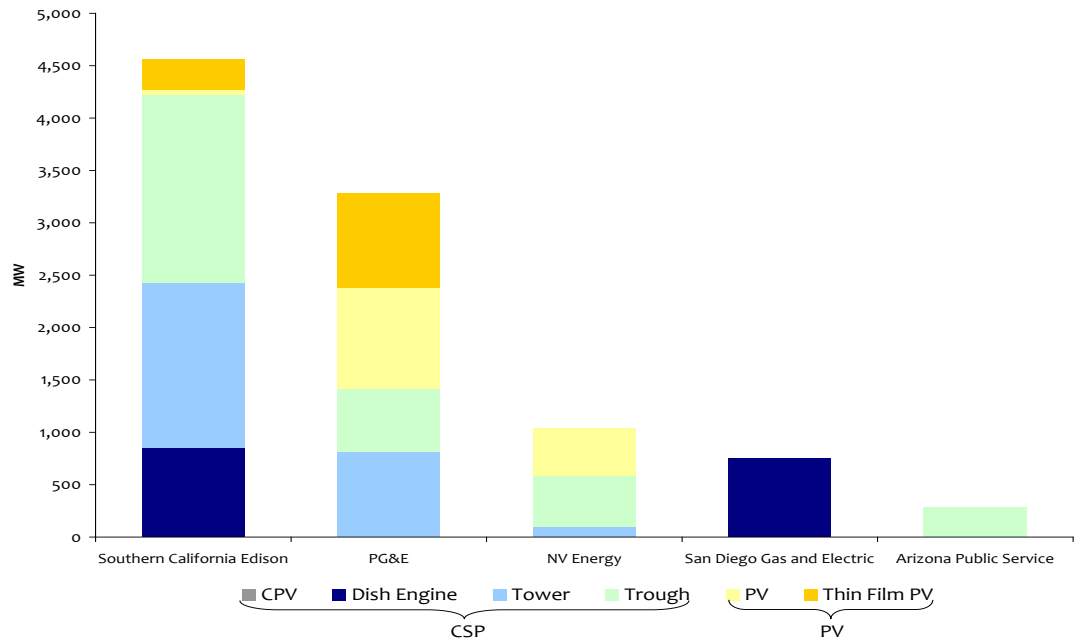


Source: Solar Energy Industries Association

While the number of PV plants under construction or development is more than double that of CSP projects, the average size of CSP plants is much larger, at 252 MW compared to 137 MW for solar PV (which also includes one 5 GW project in California). Utility companies in California, Nevada and Arizona are among the largest purchasers of solar power, as depicted in figure 3. California has one of the highest RPS requirements in the United States.

“...combination of falling levelized costs for solar energy and increased utility demand has resulted in an expanding pipeline of utility-scale projects under development in the US and more signed PPAs between utilities and developers.”

Figure 3: Top 5 Utility Purchasers by Technology Type (Projects Under Construction or Development)



Source: Solar Energy Industries Association

COMPARATIVE ECONOMICS

While decreasing installed costs have made PV and CSP assets more feasible, it is government incentives that have made these projects truly attractive to developers and investors. Our analysis shows that when utility-scale solar PV projects receive no subsidies, they are unable to compete with conventional combined-cycle gas turbine (CCGT) plants on a LCOE basis – at least under the current legislative environment in the United States. Our findings are consistent with those of Deutsche Bank, Credit Suisse, Lazard and Standard & Poor’s. If natural gas prices were higher or RPS make renewable energy credits (RECs) more valuable, or if federal legislation requires gas peaking plants to buy carbon credits, solar PV energy could be a cheaper peaking alternative to natural gas - albeit with federal subsidies in place.

The Energy Information Administration’s (EIA) Reference Case Outlook, with no carbon legislation, anticipates that US coal prices will essentially remain flat through 2030. Although natural gas prices are expected to increase by as much as 45% by 2030, even with gas at US\$7/MMBtu, the LCOE for a combined cycle gas plant is significantly less than that for a typical utility-scale PV plant that benefits from the ITC and MACRS. That investors will continue to pursue gas and coal-fired independent power producers (IPPs) is reflected in the EIA’s 2010 Reference Case Outlook, which forecasts that as much as 78% of US energy requirements will be met by fossil fuels in 2035.

FINANCING GAP

With debt and equity markets still tight, the large pipeline of solar projects may struggle to find interested investors. On the equity side, some analysts have pointed to private equity to fill the void left by tax equity investors, many of whom withdrew from financing solar projects, as their tax liabilities diminished during the financial crisis. While private equity firms have been financing solar developers, who have large cash requirements at the project development

There are 86 solar PV projects under construction or development compared to 40 CSP projects.

“... when utility-scale solar PV projects receive no subsidies, they are unable to compete with conventional combined-cycle gas turbine (CCGT) plants on a LCOE basis.”

“... private equity firms have been financing solar developers, who have large cash requirements at the project development stage.”

stage, they have not shown much interest in investing in individual projects, given the associated construction, technology and subsidy risks in the United States. The preference of PE firms has been to invest in developers using tested and proven solar module technologies.

An emerging financing option for utility-scale solar in the United States, in the absence of willing tax equity investors, is experienced global independent power producers (IPPs). They have in-depth knowledge of the solar market and are reportedly interested in building a pipeline of mid- to large-scale solar projects. While these strategic investors have relatively high rate of return requirements, they come with valuable technical experience and deep pockets. US developers can resort to these strategic investors for financing of projects with large capital requirements. Recent examples of such investors looking to benefit from the RPS requirements in the United States include Sojitz Corporation, Iberdrola Renewables, Enel North America and Acciona Solar Power.

Innovative suppliers with new and improved modules and strong balance sheets are increasingly moving into the solar project development market, with the intent to commercialize their nascent technologies. Suppliers pursuing this path include Suntech, BP Solar and First Solar.

On the debt side, US banks remain supremely cautious. The all-in cost of term financing remains elevated at approximately 8-9%. Under the DOE's 'Innovative Technology' Loan Guarantee Program, qualifying projects may apply to the Federal Financing Bank for loans, but so far only one solar project – BrightSource's 392 MW Ivanpah Solar Electric Generating System – has secured a conditional commitment from the DOE. Moreover, the future of federal subsidies is highly uncertain: the Treasury Cash Grant is set to expire at the end of 2010; the ITC is due to fall to 10% at the end of 2016; and the DOE's Temporary Loan Guarantee Program requires that beneficiary projects commence construction by September 30, 2011.

CONCLUSION

Despite the healthy utility-scale solar project pipeline, primarily driven by state RPS requirements with carve-outs for solar power, and the improving economics of solar energy, the outlook for utility-scale solar expansion in the United States remains cautious. The ability to finance the solar pipeline remains tight. Post-financial crisis, few tax equity investors have returned to finance utility-scale solar projects. While strategic investors and private equity companies are providing capital to bridge the gap, the long-term uncertainty about federal subsidies and the availability of cheaper renewable sources, such as wind, will serve as barriers to the exploitation of utility-scale solar's true potential.

Factors that would make the financing of utility-scale solar projects more attractive in the United States include:

- Further declines in PV module and CSP construction costs, which would reduce capital investment.
- The expansion of cost-based feed-in tariffs, which remove revenue risk for investors.
- The introduction of climate legislation, which would make fossil-fired electricity generation more expensive, as project operators will have to internalize the cost of carbon emissions. This in turn will make utility-scale solar a relatively more attractive investment, making it easier to finance utility-scale solar projects.