



# Tracking SunShot Initiative Progress: Utility-Scale Prices Falling Faster Than Residential Solar

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## In Brief

- The prices of utility-scale solar photovoltaic (PV) systems in the United States have fallen more sharply than residential solar system prices from 2010 to 2015
- Declining module costs have had a greater impact on utility-scale system prices given their larger share of total project costs
- Utility-scale systems can offer electric utilities economic and operational advantages over residential systems

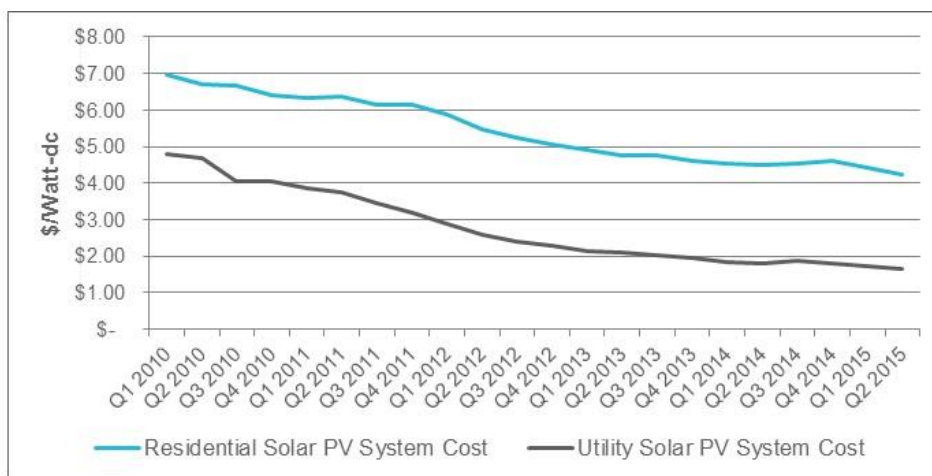
## Rapid Price Declines for Solar PV Systems

With the 2020 target date for the U.S. Department of Energy's SunShot Initiative just over the horizon, ScottMadden reviewed progress in solar PV price reductions to date. The objective of the SunShot Initiative is to reduce the price of solar technologies by approximately 75% between 2010 and 2020. Specific targets, in part, include:

- Residential system prices reduced to \$1.50/Watt-dc by 2020
- Utility-scale system prices reduced to \$1.00/Watt-dc by 2020

A review of capacity weighted average system prices since 2010 reveals the U.S. market has seen a significant decrease in system prices. Moreover, falling prices have been agnostic to the solar market segments. Figure 1 shows residential and utility-scale systems have all seen year-over-year reductions since 2010.

**Figure 1: Capacity Weighted Average PV System Price in Dollars, Q1 2010 to Q2 2015**

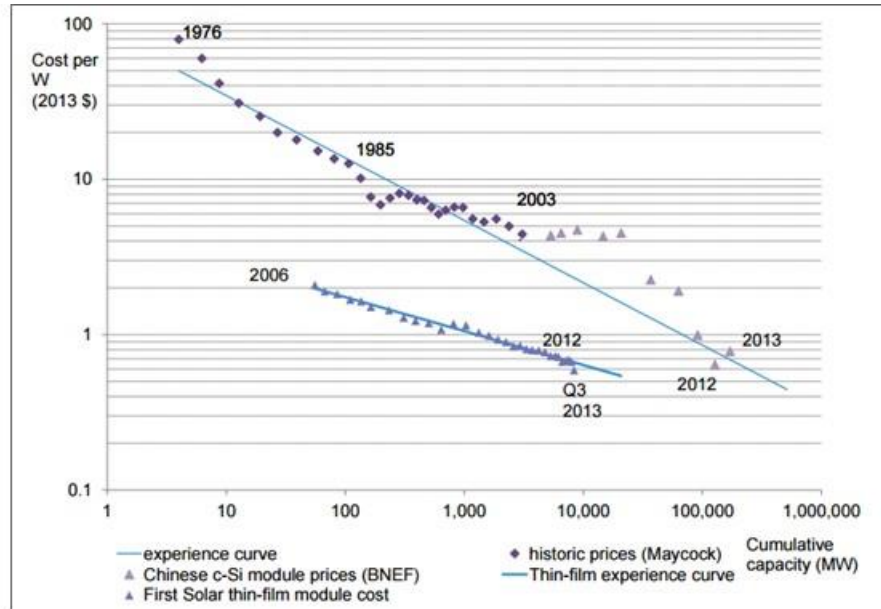


Sources: GTM Research and Solar Electric Industries Association, ScottMadden analysis

System pricing reductions are largely attributable to a decrease in solar module prices. Figure 2 shows the decline in module pricing, which was driven by lower commodity prices and new efficiencies in the

cost to manufacture and purchase solar modules. In particular, the introduction of low-cost polysilicon materials and ultrathin wafers led to enhanced cost efficiencies, and in turn, reductions in the total system price.

**Figure 2: Price of Solar Modules and Experience Curve**

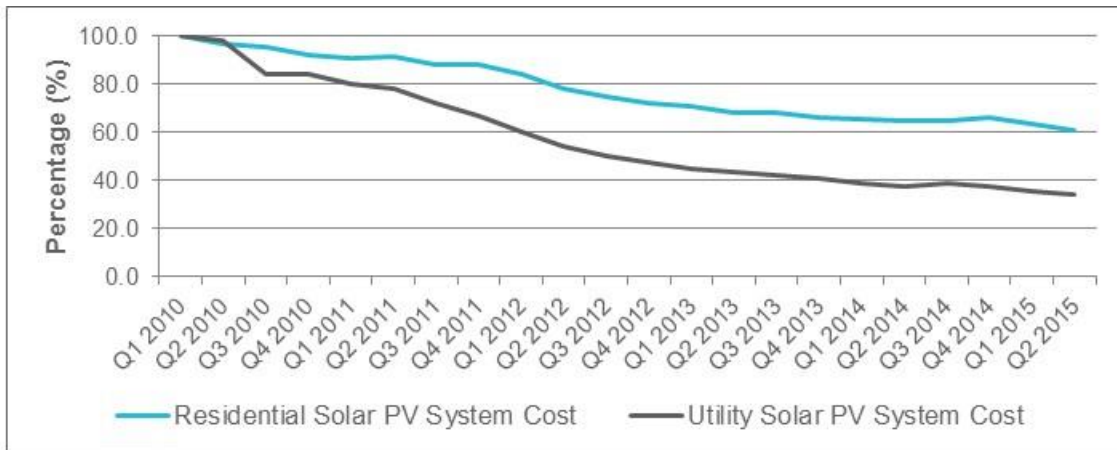


Source: Bloomberg New Energy Finance

### Utility-Scales Prices Drop Faster Than Residential Prices

More interestingly, price reduction for solar PV systems has been achieved faster in the utility-scale segment compared to the residential segment, as displayed in Figure 3. While both market segments have achieved significant price reductions since 2010, current utility-scale system pricing is equal to 34% of 2010 values. By comparison, current residential system pricing is only 61% of 2010 values.

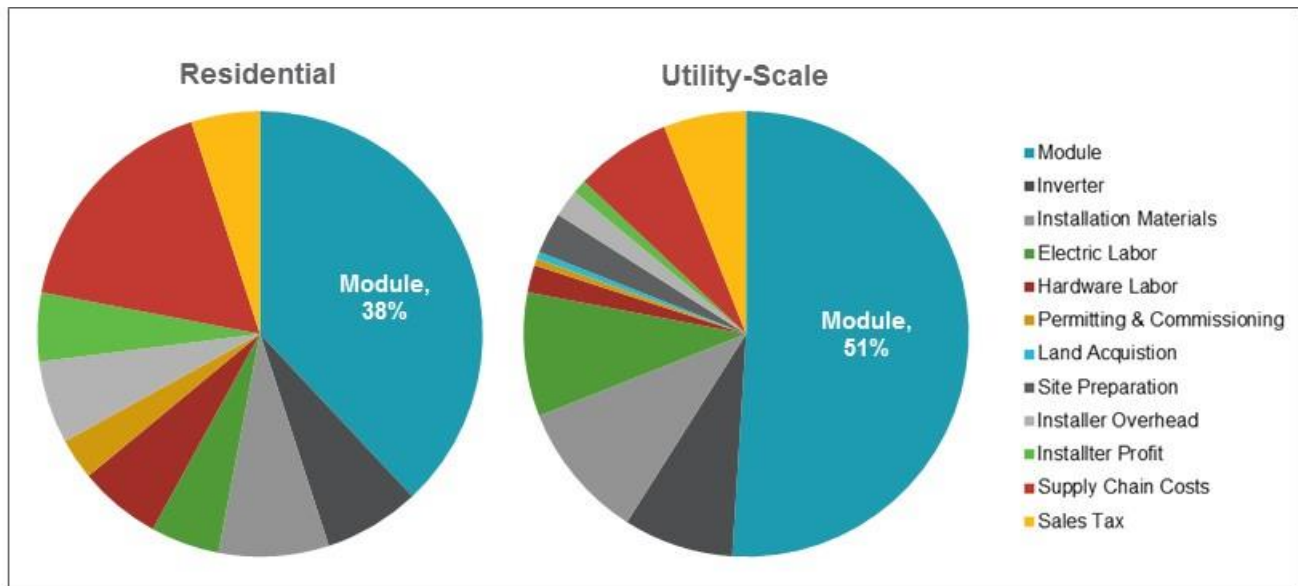
**Figure 3: Capacity Weighted Average PV System Price as Percentage, Q1 2010 to Q2 2015**



Sources: GTM Research and Solar Electric Industries Association, ScottMadden analysis

The reason for the difference is the importance of module pricing in the overall system cost and, secondarily, improvements in standardized construction of utility-scale projects. Utility-scale systems benefit from economies of scale in non-module costs (e.g., design, permitting, interconnection, etc.) and can spread these costs across greater capacity. As a result, module costs accounted for 51% of utility-scale system price—compared to 38% of residential system price—in the second half of 2010 (see Figure 4). Therefore, declining module costs have had a greater impact on utility-scale project prices while residential prices are limited by the greater significance of non-module costs. Utility-scale projects have also benefited from advancements in electrical and structural balance-of-system components and installations; and direct labor savings from re-engineered installation processes. The impact of these changes in the residential market is smaller because of the custom and unique nature of each residential solar system.

**Figure 4: Cost of Solar PV Components, Q3–Q4 2010**



## Implications

Utility-scale solar is better positioned than residential solar to reach the 2020 targets set by the SunShot Initiative (see Figure 5). The \$1.00/Watt target for utility-scale systems requires a 39% reduction from current prices, compared to the 66% reduction since 2010. Conversely, the cost of residential systems has only declined 39% since 2010. The market segments requires an additional 64% reduction from current prices to reach the \$1.50/Watt target.

Consequently, utility-scale solar systems currently offer electric utilities economic and operational advantages compared to residential systems. First, the economics of utility-scale solar are improving faster than the economics of residential solar. In addition to prices, utility-scale systems are more analogous to traditional central generation. An electric utility can design a solar system for optimal performance and strategically site the system on the transmission or distribution system.

As for residential solar, electric utilities are well positioned to play a valuable role in lowering non-hardware costs over the long term. Key strengths include the potential to leverage customer relationships to lower acquisition costs and low cost of capital to reduce financing expenses. Electric utilities can also streamline and standardize construction and interconnection processes as well as provide system monitoring during operations and maintenance. Business models and partnerships drawing upon these utility strengths could accelerate residential solar cost declines and move the market segment closer to the SunShot target.

**Figure 5: Capacity Weighted Average PV System Price and SunShot Initiative Targets**



## ABOUT SCOTTMADDEN'S CLEAN TECH & SUSTAINABILITY PRACTICE

Leveraging our energy expertise, the ScottMadden Clean Tech & Sustainability practice helps our clients effectively navigate through the quickly changing energy landscape. We specialize in assisting our clients with sustainable energy strategies and making smart portfolio choices. We work with our clients to understand and effectively utilize cleaner, renewable sources of energy, such as nuclear, wind, solar, biomass, and biofuels. Our experienced team of energy practitioners understands the roles of energy efficiency, demand response, and storage as part of an integrated strategy. We also assist clients with sustainability, bringing an understanding of energy-unique concerns.

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