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Solar Construction Costs Continue Historic Decline, Providing Cushion Against Trade Disputes

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A recent report from the U.S. Energy Information Administration (EIA) confirmed significant cost curve progress for the U.S. solar industry, offering encouraging signs that developers will successfully weather international trade disputes and continue to drive historic deployment.

The EIA concluded that average costs for solar PV systems continued to decline on an annual basis from 2013 to 2017, noting a 37% drop in costs for solar PV generators during this period in a recent "Today in Energy" blog post.[1] This compares favorably during the period with a 13% drop in costs for wind generators and a 4.7% drop in costs for natural gas systems. Over that same time period, solar was the only technology of the three to experience decreases in average construction costs each year.

Why This Matters

Despite the headwinds of a well-publicized trade war that includes tariffs on many solar components, market growth in solar generation projects increased for the first quarter of 2019 to a historic high, as noted below, with significant utility-scale development and residential solar growth occurring. The Commercial & Industrial space had a more modest first quarter, down from 2018 figures. However, significant growth overall is still expected during the next five years (from 2019-2024), with recent decreases in construction costs providing some cushion against market shocks such as tariffs on international imported components.

While decreasing construction costs and continued growth in solar PV investment and deal activity are promising signs for the market in 2019, industry players should also monitor the recent trend of developers stockpiling panels to lock in the 30% federal tax credit[2] as this rush for panels may impact prices in the near future.[3] Also see here for a Foley webinar on September 19th addressing the start of construction guidelines.

Summary of Construction Cost Decreases by Technology

Average U.S. Constructions Costs per Generation Technology, 2017 (EIA)

Technology	Capacity Added	Average Cost per kW ($/kW)	Average Change in Costs from 2013
Solar PV	5.0 GW	$2343	-37%
Wind (onshore)	5.8 GW	$1647	-13%
Natural Gas	10.5 GW	$920	-4.7%

During the time period of these cost decreases, the installed capacity of new solar generation assets increased by 5.0 GW in 2017, while natural gas generation assets increased by 10.5 GW and wind by 5.8 GW. Solar generation projects accounted for 37% of total new electricity generation construction costs, or $12 billion for the year. The EIA attributed the drop in construction costs for solar PV systems to decreasing costs for crystalline silicon axis-based tracking panels, with such panels accounting for more than half of the solar PV capacity added at new plants overall in 2017.

Recent Growth

With a view to today's market, Figures from the latest Solar Energy Industries Association (SEIA) U.S. Solar Market Insight[4] (June 2019) forecast the number of U.S. solar market installations to double over the next five years, from two million at the end of the first quarter of 2019 to four million in 2023, as opposed to the slight decrease in investment in 2016 and 2017 as reported by EIA. The industry's installation of 2.7 GW (DC) for the quarter marks the best first quarter for the market and a 10% jump from a year ago. The majority of new capacity (1.6 GW) came from utility-scale solar installations. SEIA also anticipates total U.S. PV capacity to more than double over the next five years. A summary of SEIA's observations are below.

Market Data from U.S. Solar Market Insight - SEIA (June 2019)

Market	Q1 2019 Installations	Trend
Residential PV	603 MW (DC)	Up 6% from Q1 2018 Down 8% from Q4 2018
Non-residential PV	548 MW (DC)	Down 28% from Q4 2018 Down 18% from Q1 2018
Utility PV	1633 MW (DC)	Forecast for 2019 - 2024 is up by 5.1 GW (DC) Utility PV Pipeline is 27.7 GW (DC)

In addition to increased investment and installation, SEIA reported the continuing trend of falling costs of PV systems in 2019. Price reductions in components, design/engineering, supply chain, permitting, and labor prices have led to historic lows in PV system pricing across the solar market.

***Update**: After this article was originally posted, SEIA released an updated U.S. Solar Market Insight report[5] (September 2019) for the second quarter of 2019. The report highlights a continuation of trends noted above, including the rebound of residential solar, a continuing decline for non-residential non-utility scale PV, and significant growth in the pipeline for utility PV projects, now estimated at 37.9 GW (DC). The report estimates 17% growth in installed capacity through the full year 2019, and based on a strong second quarter, added an additional 6 GW to the five-year forecast. The report continues to project a doubling in total installed U.S. PV capacity over the next five years.*

Andrew Miller is a contributing author to this article.

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[1] U.S. Energy Information Administration, “Average U.S. Construction Costs for Solar Generation Continue to Decrease”. September 3, 2019, https://www.eia.gov/todayinenergy/detail.php?id=41153

[2] See Foley & Lardner LLP, “Beginning Construction Continuity Safe Harbor Extended for National Security Concerns”, Foley & Lardner LLP Renewable Energy Outlook, July 15, 2019, https://www.foley.com/en/insights/publications/2019/07/construction-safe-harbor-national-security

[3] Groom, Nicola, “Expiring U.S. solar subsidy spurs rush for panels”, Reuters, July 19, 2019, https://www.reuters.com/article/us-usa-solar-subsidy-focus/expiring-u-s-solar-subsidy-spurs-rush-for-panels-idUSKCN1UE0CO.

[4] Solar Energy Industries Association, “U.S. Solar Market Insight – Executive Summary”. June 2019, https://www.seia.org/research-resources/solar-market-insight-report-2019-q2

[5] Solar Energy Industries Association, “U.S. Solar Market Insight – Executive Summary”. September 2019, https://www.seia.org/research-resources/solar-market-insight-report-2019-q3

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