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New York 2.0 SOLAR ROADMAP

A plan for energy reliability, security, environmental responsibility and economic development in New York State

Solar Initiative of New York™
new energy new york

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Many countries have taken advantage of the steep and rapid decline in the price of solar photovoltaic (PV) systems to markedly increase the adoption of PV. From 2008 to 2011, Germany installed approximately 20,000 MW; Italy, 10,000 MW; France, 2,500 MW; California, 1,210 MW; and New Jersey, 530 MW of PV. During the same period, New York installed a total of 100 MW of PV. Total global installations will continue to rise in the coming years, as many countries and regions that consider PV an important tool to meet renewable energy goals take advantage of falling prices.[i]

With the aim of preparing a framework to increase the adoption of solar PV in New York, the College of Nanoscale Science and Engineering (CNSE) at the University at Albany, together with 30 industry partners, prepared *New York's Solar Roadmap,* the first of its kind, in 2007. The roadmap set a target of 2000 MW of grid-connected solar installations to be achieved by 2017, and put forward four recommendations to achieve this target:

1. Updating the interconnection rules to encourage the installation of both large-scale and small-scale systems
2. Creating solar power economic development regions
3. Instituting technology clusters of excellence
4. Establishing demand pull incentives

Since the publication of *New York's Solar Roadmap*[ii] in 2007, considerable progress has been made on the first three fronts. There have been positive changes in the interconnection rules, the system size limits for net metering were increased to 25 kW for residential solar and 2 MW for commercial solar, and permitting has been streamlined in many counties. As solar hardware costs have fallen, soft costs associated with permitting, interconnection and financing have become a significant fraction of the total cost of an installed system. The Northeast Roundtable sessions organized at CNSE have provided valuable insight from installers on reducing these soft costs. Regional efforts to stimulate deployment of PV and promote economic development are underway in New York City, Long Island, the Capital Region, Hudson Valley and Western New York. New training and certification programs for installers, code officials, builders, architects and engineers for PV deployment are creating a qualified workforce to support the PV industry. A PV technology cluster of excellence has been set up with federal government support. The U.S. Photovoltaic Manufacturing Consortium (PVMC), a joint initiative between the College of Nanoscale Science and Engineering and SEMATECH, and headquartered at CNSE's Albany NanoTech Complex, was established as a national flagship program to maintain competitiveness for manufacturing scale-up of next-generation thin film solar PV modules and systems. In addition, NYSERDA has created clean energy incubators in Albany, Syracuse, Stony Brook, Buffalo, Rochester and New York City to catalyze the commercialization of cutting-edge innovations.

Clearly, the efforts over the last five years in New York have begun to bear fruit. The NY-Sun Initiative announced by Governor Andrew Cuomo will further accelerate the deployment of photovoltaics in the state. Initiatives to complement these ongoing efforts can put New York back in a leadership position in the solar industry, in both manufacturing and deployment. The development of a regional market in New York can provide the impetus to boost ongoing manufacturing initiatives like the PVMC. While current incentives have jump-started solar installations in the state, markets that have expanded more rapidly have benefitted from more robust and longer-term incentive programs. In Germany, Italy, France and, more recently, China, a feed-in tariff system has led to a rapid increase in solar installations. In New Jersey, a support system based on tradable Solar Renewable Energy Credits (SRECs) was instrumental in driving rapid deployment. While these incentive systems are effective, checks and caps are necessary to ensure that incentive programs remain at sustainable levels. New York is well-positioned to learn from these other programs and build upon them, identifying strengths and weaknesses of various policy approaches and charting a sound path forward.

New York's Solar Roadmap set a target of 2,000 MW to be achieved by 2017. While focused incentive programs can achieve this target, the ongoing developments in the PV industry and in New York suggest that a revised target of 1,500 MW by 2017 and 3,000 MW by 2021 would be appropriate (Figure 1).

Based on preliminary analysis, the estimated cost of achieving these targets utilizing two separate sets of incentives would require between $110M to $180M annually in the early years, increasing to approximately $250M in the later years. The incentives considered were an upfront payment for small systems under the current NYSERDA program, a bid-based incentive program for larger systems for IOUs, and a performance-based standard offer program for grid-connected systems in the New York Power Authority (NYPA) and the Long Island Power Authority (LIPA) territories.[iii] The lifetime cost of the program varies depending on the assumed distribution between small- and large-scale installations. The cumulative cost is estimated from $2.86B to $3.47B over the time period of 2013–2040.[iv] Over that same time period, it is expected that New Yorkers will spend (in 2010 dollars) approximately $648B on electricity. Roughly 40% of the cost would be covered by the IOUs, with the remainder split 40% by LIPA and 20% by NYPA. Given the annual electricity expenditures in these three jurisdictions, the direct impact on electricity rates, not taking into account countervailing benefits, can be estimated. The rate impacts for each year are shown in Figure 2. The impact on electricity rates is marginal, especially when compared to the large swings in energy prices that can occur using the existing fuel mix.

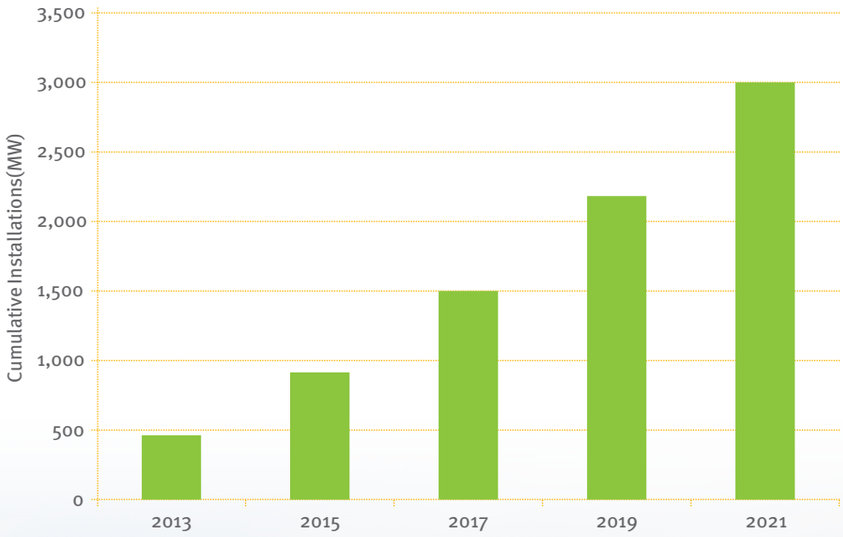

Figure 1: Total Projected Statewide Installations

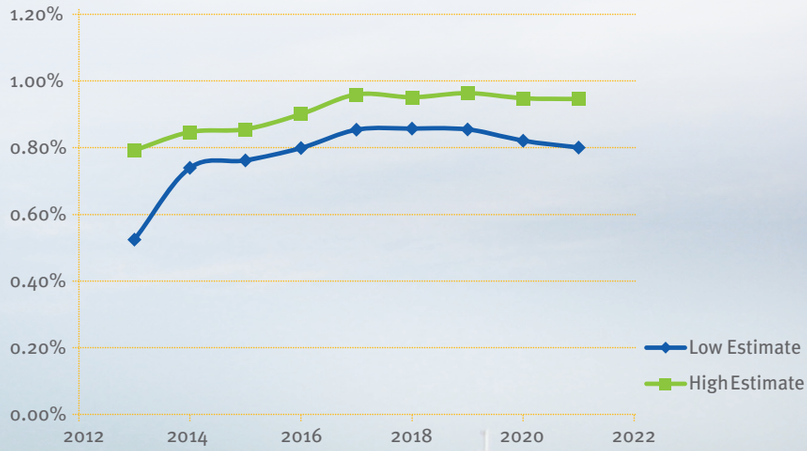

Figure 2: Cost of Program as a % of Annual Statewide Electricity Sales

BENEFITS OF THE PROGRAM

The *SunShot Vision Study,* published by the National Renewable Energy Laboratory (NREL), calculates that manufacturing and distribution of solar PV creates approximately 25 jobs for each megawatt.[v] The clean energy incubators established in universities across New York, combined with the establishment of the PVMC at CNSE, have laid the groundwork for a PV innovation and manufacturing ecosystem to take root and flourish in New York. These supply-side measures, if complemented with demand-side incentives, can transform New York into a leader in the PV industry. In the past, the development of a local PV market through government incentives was central to the growth of local manufacturing companies. For example, the government incentives for PV in Japan catapulted Japanese PV companies to the position of global market leaders in the 1990s. Similar incentives led to the establishment of many PV companies and a robust manufacturing supply chain in Germany in the 2000s. In the last few years, the growth of low-cost Chinese PV companies has sidelined Japanese, U.S. and European companies, even in their own local markets. An investigation by the U.S. Department of Commerce has concluded that Chinese companies have engaged in unfair competition. The subsequent imposition of import tariffs ranging from 31% to 250% on Chinese PV panels in the US have once again leveled the playing field for U.S. companies to compete effectively with Chinese companies. The current favorable environment in the PV industry offers an opportunity for New York State to invest in a demand-side incentive program that can catalyze the PV manufacturing efforts in the state. Investments made by New York State at CNSE have made both the college and New York the epicenter of the global semiconductor industry. The investments by the state were leveraged to attract additional private sector funding amounting to over ten times the investment by the state, resulting in a total investment of over $14B.

A robust demand-side PV incentive program, such as the 3,000 MW by 2021 target discussed here, can expand the market for PV in New York and attract additional private sector funding to the state's manufacturing centers, thereby creating a significant number of additional high-paying manufacturing jobs. In addition, the deployment of PV will result in the creation of a number of jobs in initial installation, as well as in ongoing operation and maintenance of the system. The recent NYSERDA report, *New York Solar Study,* predicts that from 5,000 MW of PV, 2,300 new jobs will be created in installation for the period 2013–2025, and 240 jobs will open in operations/maintenance for the period 2013–2049.[vi] Using those same assumptions, the proposed target of 3,000 MW will create approximately 13,716 jobs or an average of 1,524 new jobs created and/or supported in any given year from 2013–2021.

The installation of 3,000 MW of solar will bring a multitude of benefits to residents and businesses of New York. The electricity generating industry is the biggest contributor to greenhouse gas emissions. In addition to CO_2, fossil fuel plants result in NO_x, SO_2 and mercury emissions. The installation of PV will displace many existing coal and natural gas-based generators and reduce the emissions in the state. The NYSERDA study reports that installation of 5,000 MW by 2025 will reduce CO_2 emissions by 47 million tons from 2012–2049, with the reductions valued between $450M and $3.2B. To compare, 3,000 MW will reduce CO_2 emissions by around 28.2 million tons over the same period, an emissions abatement value of between $272M and $1.2B.

Finally, to meet the growing energy demands through fossil fuel-based generation, additional investment in distribution networks would be needed. Solar PV installed on residential and commercial rooftops will avoid or defer the need for these investments in the distribution network. Further, PV systems generate most of their output during the day, when electricity prices are high; thus, the deployment of PV will have a suppressing effect on wholesale electricity prices.[vii] In addition, the variability in fossil fuel prices adds an extra cost to electricity generation, and deployment of PV will help mitigate the cost and uncertainty that comes from this variability.

REFERENCES

[i] Aanesen, K., Hick, S., Pinner. D., (2012). *Solar Power : Darkest Before Dawn*, McKenzie and Company.

[ii] College of Nanoscale Science and Engineering, (2007). *New York's Solar Roadmap.* Albany, New York.

[iii] The cost estimates were derived in consultation with Fred Zalcman of SunEdison, and the Pace Energy & Climate Center at the Pace University School of Law.

[iv] In the high estimate case, the total installations were 75% in small systems and 25% in large systems for IOUs, and 25% in net-metered systems and 75% grid-connected systems for NYPA. In the low estimate case, percentage installations were reversed. In both cases, LIPA installations were 25% in net-metered and 75% in grid-connected.

[v] National Renewable Energy Labs, (2012). *Sunshot Vision Study.* Golden, Colorado.

[vi] New York State Energy Research and Development Authority, (2012). *New York Solar Study.* Albany, New York.

[vii] The NYSERDA New York Solar Study concluded that the wholesale price suppression effect from 5,000 MW of PV on the grid in 2025 would result in $3.3B in savings from reduced electricity prices.