New York State Energy Planning Board

NEW YORK SOLAR STUDY

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NYSERDA

February 27, 2012

Power New York Act of 2011

- Identify administrative and policy options that could be used to achieve goals of 2,500 Megawatts (MW) of PV installations operating by 2020 and 5,000 MW operating by 2025 (the “Goals”)
- Estimate the per MW cost of achieving increased generation from PV devices and the costs of achieving the Goals using the options identified in the analysis
- Analyze the net economic and job creation benefits of achieving the Goals using each of the options identified in the analysis
- Conduct an analysis of the environmental benefits of achieving the Goals using the options identified in the analysis

Analytical Team and Technical Reviewers

Analytical Team:

- Sustainable Energy Advantage
- La Capra Associates
- Economic Development Research Group
- Meister Consultants Group
- ICF International

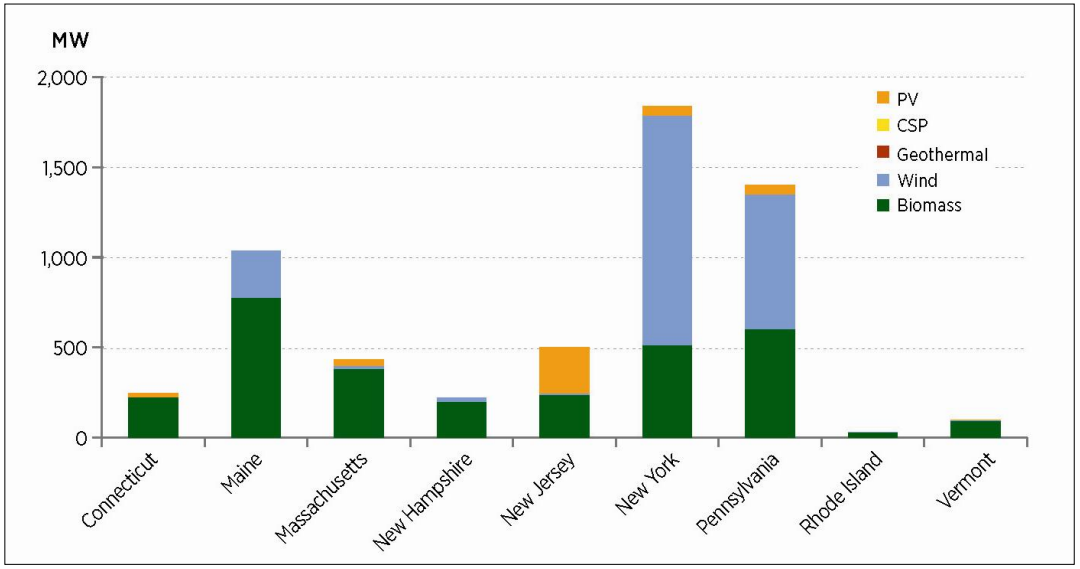
Technical Reviewers:

- Gerald Stokes PhD (Brookhaven National Laboratory)
- Prof. Richard Perez (ASRC, University at Albany)
- Tom Hoff (Clean Power Research)
- Barry Friedman, supported by 8 analysts (National Renewable Energy Laboratory's Strategic Energy Analysis Center)

In Consultation with the NYS Department of Public Service

NYS Renewable Energy Policy Context

ES-4. Renewables 2010 Installed Capacity (*excluding hydropower*) in the Northeast



Source: NREL 2010 Renewable Energy Data Book

- New York's policies are designed to develop a diverse portfolio of renewable energy resources
- PV currently makes up less than 0.1% of New York's electric generation portfolio – 5,000 MW of PV in 2025 would bring that figure to 3%

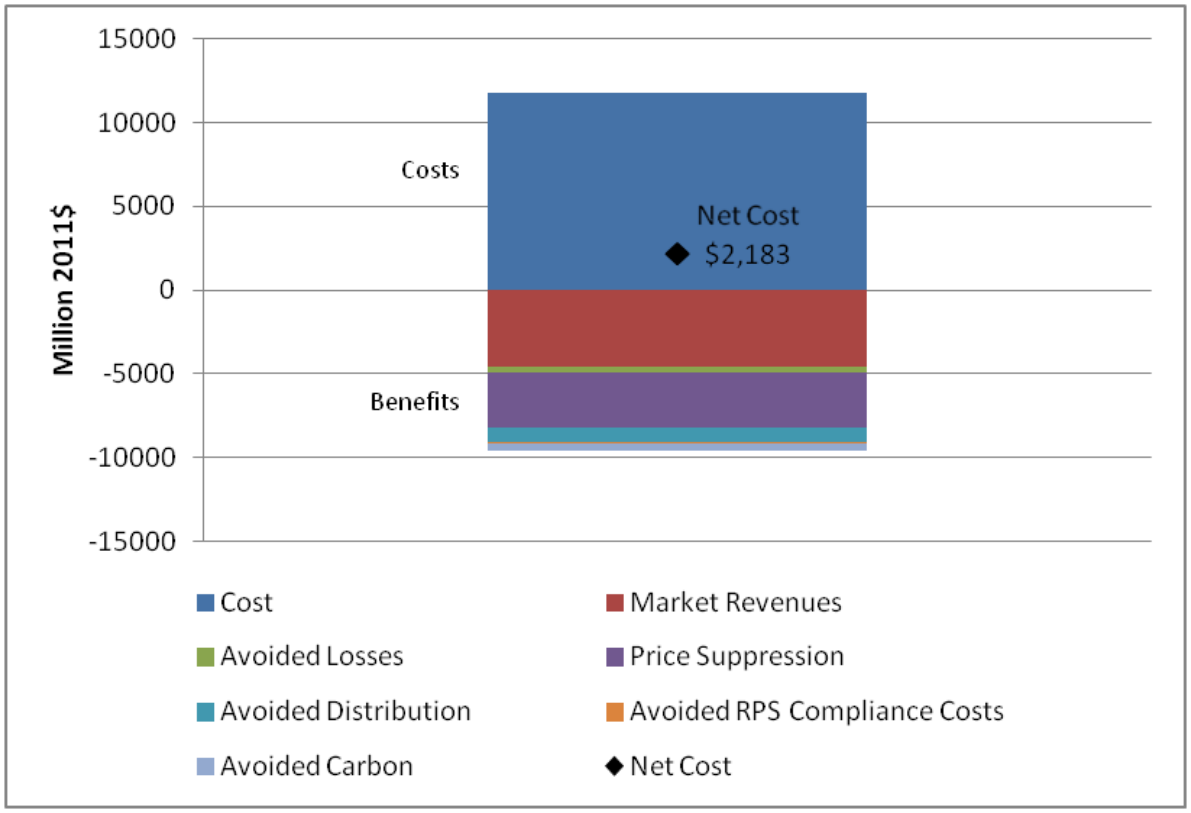
- New York's renewable energy capacity, including hydropower, is comparable to that of the other eight states in the Northeast combined
- Ranked 5th in U.S. for renewable energy capacity providing electricity to the state
- Only state east of the Mississippi named in the top 5
- Only Northeast state placing in the top 10

Cost Scenarios

	Basis	PV Installed Cost Projection (2025) Million $/MW		Federal Tax Credit Assumption
		Small-Scale	Large-Scale	
Low Cost Scenario	DOE SunShot Goal	$2.0	$1.4	Extension of the credit through 2025
Base Case Scenario	Survey of Experts by DOE	$3.1	$2.5	Moderate reduction of the credit beyond 2016
High Cost Scenario	Long-term Historical Trends	$4.3	$2.9	Revert to a pre-federal stimulus level following expiration in 2016

New York Benefit-Cost Analysis

ES-9. Lifetime Cost and Benefit of Base Case Scenario

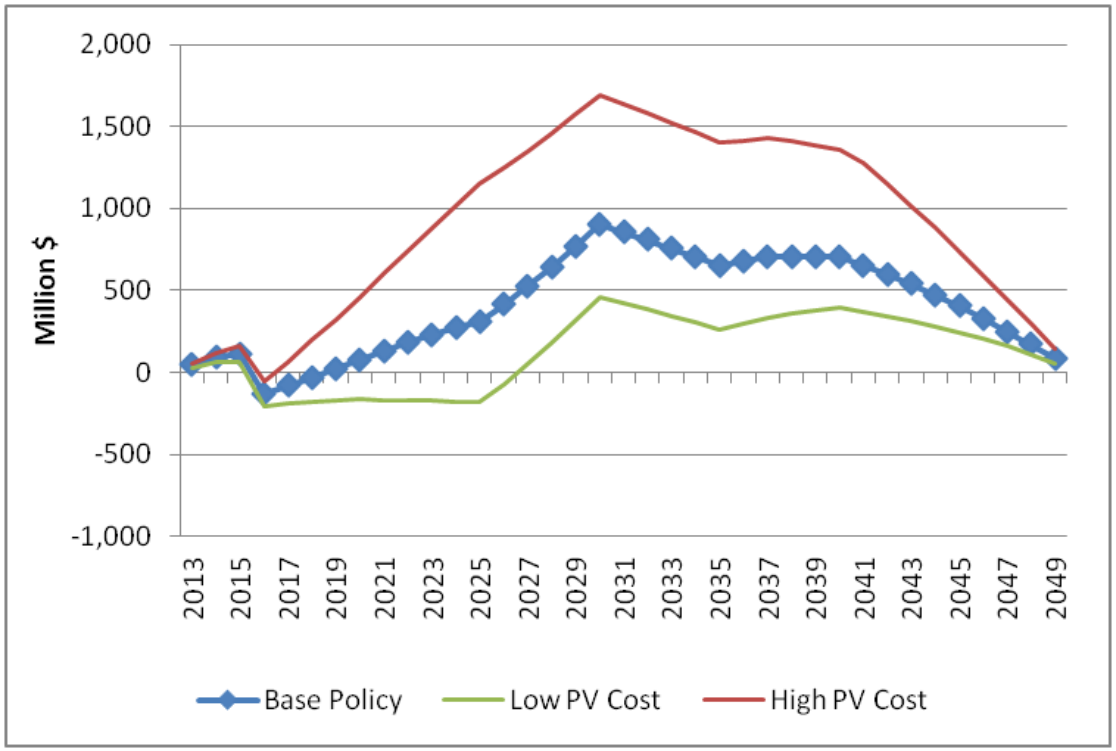


The Base Case scenario showed the cost of achieving a 5,000 MW goal exceeds the benefits over the study period (2013 – 2049)

- The Low Cost scenario had a net benefit
- The High Cost scenario had a net cost four times as high as the Base Case

Retail Rate Impacts

ES-13. Annual Net Rate Impact, 2013-2049 (nominal$)



In the Base Case, achieving a 5,000 MW goal would have a ratepayer impact of $3 billion (2011$) over the study period (2013 – 2049), an average 1% impact on ratepayer electric bills

In any given year, this rate impact could be as much as 3%

- The ratepayer impact under the Low Cost scenario would be approximately $300 million (2011$)
- The ratepayer impact under the High Cost scenario would be approximately $9 billion (2011$)

Jobs and Macroeconomic Impact

- Modeling of the Base Case scenario found that while direct PV jobs would be created, the impact on New York's economy as a whole would be a net negative primarily due to the ratepayer impact
- Economy-wide net jobs would be reduced by 750 through 2049 because of a loss of discretionary income that would have supported employment in other sectors in the economy
- Approximately 2,300 jobs associated directly with PV installation would be created for the installation period through 2025
- The Gross State Product (GSP) would be reduced by $3 billion (2011$) through 2049, representing an annual decrease in GSP of less than 0.1%
- The Low Cost scenario would lead to a creation of 700 jobs economy-wide through 2049 and GSP would be increased by $3 billion (2011$)
- The High Cost scenario would lead to a loss of 2,500 jobs economy-wide through 2049 and GSP would be reduced by $9 billion (2011$)

Environmental Impacts

- Fossil fuel consumption would be reduced by 1,100 trillion Btus (4%)
- Carbon dioxide (CO_2) emissions would be reduced by 47 million tons (3%)
- Nitrogen oxides (NO_x), which produces smog and acid rain, would be reduced by 33,000 tons (4%)
- Sulfur dioxide (SO_2), which also produces smog and acid rain, would be reduced by 67,000 tons (10%)
- Mercury would be reduced by 120 pounds (3%)

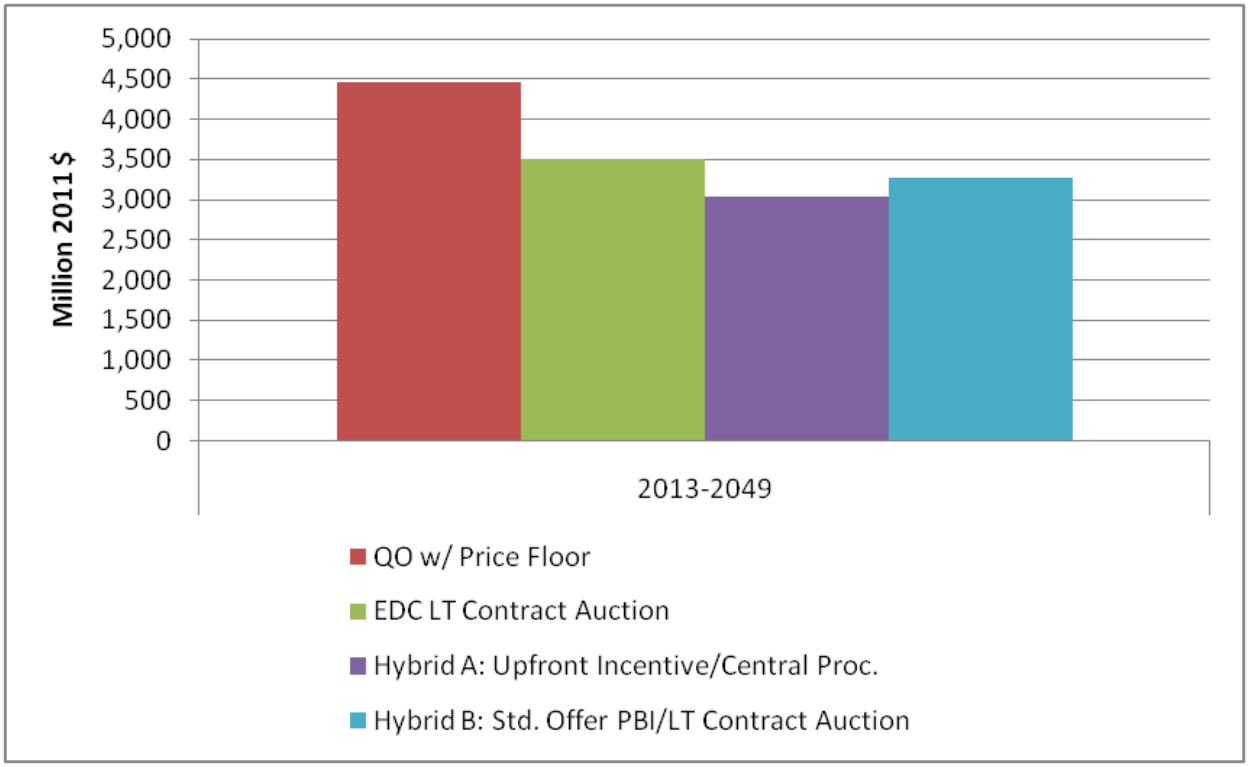
Policy Options

Four specific policy options were analyzed to determine their relative rate impact to New York:

- Solar Quantity Obligation Using Tradable Solar Renewable Energy Credits (SRECS) with a Price Floor Mechanism, similar to approaches adopted in neighboring states
- Auction for Long-Term Contracts by Electric Distribution Companies, similar to an approach adopted by California
- Hybrid Upfront Incentives for Residential and Small Commercial & Industrial (C&I) with a Central Procurement Approach to Large C&I and MW-Scale Installations, similar to New York's current Renewable Portfolio Standard (RPS) approach
- Hybrid Standard Offer Performance-Based Incentives for Residential and Small C&I and Auctions for Long-Term Contracts for Large C&I and MW-Scale Installations, similar to proposals under consideration in the State Legislature

Policy Options (cont'd)

ES-14. Net Ratepayer Impacts of Policy Options



A quantity obligation with price floor is the most expensive policy option and is projected to cost 50% more than the least-cost policy option

- The other three policy options have comparable costs, with hybrid upfront incentives for smaller customers and central procurement for larger customers being the least expensive policy option

Recommendations

- Given the major uncertainties in PV technology cost reductions and the continued availability of federal tax credits over this time period, there is a significant range in the potential cost estimates to ratepayers of meeting a 5,000 MW goal by 2025.
- The magnitude and range of this cost uncertainty ($300 million - $9 billion) is substantial, and strongly suggests the need for a policy response and investment strategy that is both flexible and responsive.
- Nevertheless, even with this range of cost uncertainty, given the many potential benefits that PV has to offer and the long-term potential for lower-cost PV technology, New York State should support continued investment in the steady and measured growth and deployment of PV as part of a sound and balanced renewable energy policy.

Recommendations (cont'd)

- New York should strengthen such investment through continued development of policies such as net metering, sales tax exemptions and interconnection standards that could further reduce the cost of PV installation and remove barriers to reaching the targets.
- This strategy should also be complemented by additional efforts to reduce the balance of system costs for PV, including more streamlined permitting processes, and continued financial support for targeted research and development, workforce training and business development.
- Continued federal incentives will play a critical role in the magnitude and predictability of future PV prices. In addition, the SunShot goal articulated by the DOE is an aggressive and meritorious goal that, if achieved, would substantially reduce PV cost and change the benefit-cost equation. New York State should strongly support continued federal incentives and aggressive federal research efforts to reduce the cost of PV to consumers.