

STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

CASE 15-E-0302 — In the Matter of the Implementation of a Large-Scale Renewable Program
and a Clean Energy Standard

**COMMENTS ON THE
CLEAN ENERGY STANDARD WHITE PAPER – COST STUDY**

PROVIDED BY

**THE ALLIANCE FOR CLEAN ENERGY NEW YORK, AMERICAN
WIND ENERGY ASSOCIATION, ADVANCED ENERGY ECONOMY
INSTITUTE, SOLAR ENERGY INDUSTRIES ASSOCIATION, NEW
YORK SOLAR ENERGY INDUSTRIES ASSOCIATION, NORTHEAST
CLEAN ENERGY COUNCIL, and VOTE SOLAR**

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I. INTRODUCTION

The Alliance for Clean Energy New York, American Wind Energy Association, Advanced Energy Economy Institute, Solar Energy Industries Association, New York Solar Energy Industries Association, Northeast Clean Energy Council, and Vote Solar, (“Renewable Energy Industry”) respectfully submit the following general comments in the above-referenced proceeding, in response to the New York State Clean Energy Standard White Paper -- Cost Study

(“Cost Study”), released April 8, 2016 in the above referenced proceeding, and the Notice of Comment Period for CES White Paper and Cost Study, also issued April 8th.

First, we commend the Commission and staff at the Department of Public Service (DPS) for their efforts to facilitate a productive discourse regarding the most cost-effective design for the Clean Energy Standard (CES). These efforts have been extensive, including the analysis previously conducted on options for a large-scale renewables program in New York (“LSR Options Paper”); the development of the CES White Paper; the comment and reply comment periods for the White Paper; the development of this Cost Study; the twenty-four well-attended Public Statement Hearings conducted throughout the State in thirteen separate locations; and the four technical conferences held thus far in this proceeding. It has been clear that the DPS has been keenly interested in soliciting, reviewing, and incorporating public input into this process. It has been equally clear that there is a remarkably high level of support for New York State’s efforts to establish and to achieve the 50% renewable energy mandate. In each of these steps in the public discourse, there has been demonstrated resounding support for a transition to a cleaner grid using a diversity of clean and renewable technologies, and support for a program that will achieve the 50% by 2030 mandate.

Our comments on the Cost Study highlight that the

- **Principal finding is that New York can achieve the CES Program with modest bill impacts, which is consistent with experience in other states;**
- **Bundled power purchase agreement (PPA) model is the most cost-effective procurement option from the ratepayer perspective;**
- **Cost Study underestimates total program benefits;**
- **Cost Study highlights the need for a binding energy efficiency target;**
- **Federal tax policy compels a 2017 procurement and front-loaded targets; and that**
- **Costs of renewable energy technologies will continue to come down over time.**

II. COMMENTS ON COST STUDY

a. The primary finding of the Cost Study is that the Clean Energy Standard will have an overall modest impact on ratepayer electric bills, consistent with national studies.

As described in the Executive Summary of the Cost Study, its primary finding is,

The Study estimates that, even in this period of lower electricity prices due to historically low natural gas prices, New York can meet its clean energy targets with less than a 1% impact on electricity bills (or less than \$1 per month for the typical residential customer) in the near term and shows net positive benefit of \$1.8 billion by 2023.¹

Recognizing that comparison of different renewable energy portfolio standard (RPS) policies across states is complicated by a variety of targets and policy designs, it is still worth noting that this Cost Study finding is roughly on target with other assessments of RPS impacts. For example, a 2014 National Renewable Energy Lab (NREL) report titled, *A Survey of State Level Cost and Benefit Estimates of Renewable Portfolio Standards²*, examined the costs and benefits of RPS policies in twenty-five states, which have collectively resulted in the deployment of 46,000 MW of renewable energy through 2012. This assessment had this as a primary finding³:

Over the 2010-2012 period, average estimated incremental RPS compliance costs in the United States were equivalent to 0.9% of retail electricity rates when calculated as a weighted-average (based on revenues from retail electricity sales in each RPS state) or 1.2% when calculated as a simple average, although substantial variation exists around the averages, both from year-to-year and across states. Focusing on the most recent historical year available, estimated incremental RPS compliance costs were less than 2% of average retail rates for the large majority of states.⁴

And,

Among restructured markets, estimated incremental compliance costs ranged from 0.1% to 3.8% of retail rates. Expressed in terms of the cost per unit of renewable energy required, estimated incremental RPS compliance costs in these states ranged from \$2-

¹ Clean Energy Standard White Paper-Cost Study, April 2016. New York Department of Public Service, Page 5.

² May 2014. *A Survey of State-Level Cost and Benefit Estimates of Renewable Portfolio Standards*. J. Heeter, G. Barbose, L. Bird, S. Weaver, F. Flores-Espino, K. Kuskova-Burns, and R. Wisler. Technical Report NREL/TP - 6A20-61042 LBNL -658.

³ Note: The cited report expresses cost impacts as rate impacts rather than bill impacts.

⁴ Ibid. Page v.

\$48/MWh. Variation among those states reflects differences in RPS target levels, REC pricing, the composition of RPS resource tiers, and other factors.⁵

While these citations show that there is a range of rate impacts across different states, and indicate some of the causes of this variability, they also offer a glimpse into the general level of costs that have been experienced in other states, with the Cost Study for New York's CES results falling within this range.

Citing significant out-year uncertainty, the Cost Study focuses on 2023 findings, which is appropriate. Still, longer-term results are covered in Appendix C ("Longer Term Projections"), where total gross costs for Tier 1, for example, are projected through 2049 to total \$2.4 billion. Although \$2.4 billion is significant, this is over a thirty-three year period and compared to a roughly \$20 billion *annual* total electricity expenditure in New York, and thus is still a modest cost. The Cost Study cites a 2030 base case bill impact of 0.94% for all tiers combined, expressed as the average CES gross program cost over the program period as a percentage of 2014 total statewide electricity bill spend.⁶

The total gross program costs, both in the 2023 and 2030 scenarios, are worth comparing to past experience in other states, not only to validate the estimates, but also to assess the public's willingness to pay. Our CES Reply Comments cited recent polling data provided by The Nature Conservancy⁷, which found that New Yorkers are quite supportive of the CES and are willing to pay to support it. Based on these polling results, New Yorkers strongly support using more solar power (94% "support" and 74% "strongly support" it), more wind power (89% "support"), and more hydropower (88% "support"). Based on questioning, support for the CES is nearly universal. Fully 90 percent of New Yorkers support the Governor's goal of 50 percent clean energy by 2030. Perhaps most importantly, based on this polling, many New Yorkers are willing

⁵ Ibid, Page v.

⁶ Cost Study, page 284.

⁷ The Nature Conservancy recently conducted research through polling on key questions related to the REV process and its intended outcomes. The poll was conducted by the bipartisan research team of Fairbank, Maslin, Maullin, Metz & Associates (FM3) and Public Opinion Strategies (POS). The telephone survey reached 801 likely November 2016 general election voters in New York State to assess attitudes toward clean energy and support for Reforming the Energy Vision (REV), as well as the willingness of New York voters to pay for clean energy options, to change energy use behaviors, and to engage in new technologies options.

to pay up to \$10 per month to implement REV or the CES. Seven in ten voters find a \$2 monthly increase “completely acceptable,” and increasing utility bills by \$10 monthly is “completely” or “somewhat acceptable” to 56 percent. The ranges of gross programs costs presented in the Cost Study are well below this demonstrated level of willingness to pay.

b. The Cost Study Illustrates That Power Purchase Agreements (PPAs) are the Most Cost-Effective Procurement Approach.

As described in our Initial Comments and herein, the renewable energy industry recognizes that utility-backed PPAs are a tried and true procurement structure that can accelerate renewable development activity to the scale necessary to achieve the 50% goal, and can do so at least-cost, as borne out in the LSR Options Paper and the Cost Study. Further, the PPA approach can be implemented in a manner that is fully consistent with competitive wholesale markets and federal law, and consistent with existing restrictions on utility-ownership of generation assets. The PPA model can also benefit ratepayers if utilized for Tier 2 procurement, in addition to Tier 1 procurement.

An alternative approach would rely on State procurement through REC-only contracts. While the renewable energy industry would support some portion of the CES obligation being procured under this structure, exclusive reliance on this approach did not achieve the State’s 30% by 2015 goal; did not have accountability and enforceability; cannot likely achieve the scale necessary for CES success (as mentioned in the LSR Options Paper); and will cost more, as borne out by the analysis in both the LSR Options Paper and the Cost Study.

The Cost Study compared the gross program costs for Tier 1 under three procurement scenarios: 100% PPA, 100% REC-only, and a base case that was a 50/50 split. The base case had a projected total gross cost (not accounting for avoided carbon benefits or any other benefits) of \$453 million for the program up to 2023 (including associated costs through 2042 to cover the life of the contracts), which represented a modest 0.45% impact on bills in 2023. In contrast, the procurement model of 100% PPAs had a gross cost of less than zero: a benefit of \$269 million, because the PPAs allowed ratepayers to benefit from the long-term price stability of renewable energy. This scenario had an estimated 2023 bill impact of just 0.28%. The 100% REC-only

procurement was more costly than the base case, with a gross cost of \$1.18 billion and a 2023 bill impact of 0.62%. This analysis is consistent with modeling performed in the LSR Options Paper, which showed that the lower cost of financing associated with PPAs drove a 35% reduction in costs for the modeled resource over a 20-year NYSERDA REC contract. In furtherance of its obligation to pursue New York's clean energy policy goals at the least cost and risk to ratepayers, the Commission should design a program that has, at its core, mandated bundled power purchase agreements, in keeping with the findings of this Cost Study.

The longer-term projections cite a base case bill impact of 0.94% expressed as the average CES gross program cost over the program period as a percentage of 2014 total statewide electricity bill spend. Under the 100% PPA procurement structure this bill impact drops to a negligible level of 0.03%; under the 100% fixed REC procurement this is project at 1.84%.

Future natural gas prices are, of course, not certain, although the Cost Study uses acceptable methods for predicting future prices. Of immense importance to New York's ratepayers is that a bundled PPA can hedge against price fluctuation. Requiring the State's electric distribution companies to enter into long-term bundled PPAs would allow this hedge value to be passed on to ratepayers who would otherwise be exposed to volatile and/or increasing electricity prices that could affect the finances of households. Further, the performance risk for renewable energy PPAs is still on the generators. If generators fail to meet their delivery requirements they will not be paid, and will have no recourse to seek additional financial support to achieve revenue adequacy. Customers, in this case, only incur "price risk", an inherent cost of entering into a hedge and of investing in long-lived infrastructure facilities. However, to the extent solicitations are competitive, this risk is fundamentally muted since customers will be paying the minimal possible amount to bring required renewable energy resources online. Despite analysis in the LSR Options Paper and the Cost Study that showed lower gross costs and higher net benefits for PPAs vs. REC-only long-term contracting, parties may raise issues related to the price risk of PPAs, stating that if energy prices fall meaningfully, the long-term bundled PPA would leave electricity consumers exposed to higher prices through the long-term contract. In that scenario, though, the electricity consumer would simultaneously be experiencing lower energy prices, which would certainly mitigate the exposure to relatively higher PPA prices. Further, the

opposite is also true: if electricity prices rise, then electricity consumers will benefit. In this scenario, the REC-only product is the less beneficial way for the state to obtain clean, renewable energy, since electricity consumers would be paying more for renewable energy than the project's costs and a risk-weighted rate of return, eliminating the hedge value of renewable energy.

One of the primary benefits of renewable energy is that it is the only resource that can provide a long-term, fixed price for up to twenty or twenty-five years. However, electricity consumers best benefit from this unique characteristic if they lock in renewable energy prices over the long term, as illustrated in the finding of the Cost Study that the bundled PPA approach is most cost-effective.

c. The Cost Study Underestimates Net Benefits of the CES

In addition to the modest overall program costs and the cost-effectiveness of the PPAs, the Cost Study clearly demonstrates that the societal benefits outweigh the gross program costs, stating:

The net benefits of the CES to 2023 of \$1.8 billion reflect program costs and the benefits associated with lower carbon emissions. The CES forms a crucial component of efforts to deliver the New York State targets of reducing carbon emissions by 40% by 2030, and 80% by 2050, both by maintaining emission reductions from existing nuclear and renewable energy facilities, and achieving further carbon reductions through new renewable energy deployment. The Study quantifies these carbon benefits using the 'social cost of carbon' as published by the U.S. Environmental Protection Agency.⁸

As cited in the Cost Study, when the societal benefit of avoided carbon emissions are accounted for, the 2023 net program costs for Tier 1 point to a \$65 million benefit for the 100% REC-only procurement model and a \$1.5 billion benefit for the 100% PPA procurement model.⁹ The longer-term projections cite a 2030 net benefit of \$1.88 billion just for Tier 1 and a \$4.39 billion for all tiers.¹⁰ Simply put, the program benefits significantly outweigh costs.

⁸ Cost Study, Page 6.

⁹ Cost Study, Page 39.

¹⁰ We note that carbon benefits were not included for Tier 2, even though keeping existing renewables in operation will avoid carbon emissions by displacing fossil fuel generation. Carbon benefits should be included in the analysis for all tiers.

Again, this finding is consistent with national assessments of RPS policies. A 2016 NREL/LBNL report titled, *A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards* (Wiser et al), examined all U.S. state RPS policies in aggregate, quantifying significant greenhouse gas emissions benefits of 59 million metric tons of CO₂ equivalent in 2013,¹¹ and stating,

These emission reductions in 2013 produced an estimated \$2.2 billion of global benefits in the form of lower future climate change damages when applying a ‘central value’ for the social cost of carbon (SCC). Benefits estimates span \$0.7 billion to \$6.3 billion across the full range of SCC estimates considered here.

Unlike the Cost Study though, Wiser et al included a broader range of societal benefits of aggregate U.S. RPS policies. Certainly including the value of avoided carbon emissions in a cost-benefit analysis is appropriate, but it is not a complete picture of the benefits of renewable energy. As such, by focusing solely on carbon, the Cost Study underestimated the total benefits and the net program benefits of New York’s proposed CES. In addition to avoided carbon emissions, Wiser et al quantifies the aggregate RPS benefits resulting from avoidance of other air pollutants, stating:

Renewable generation used to meet 2013 RPS compliance obligations reduced national emissions of SO₂, NO_x and PM_{2.5} by an estimated 77,400, 43,900, and 4,800 metric tons, respectively. These emissions reductions are estimated –across a range of approaches—to have produced \$2.6 billion to \$9.9 billion in health and environmental benefits (average of \$5.2 billion), including the prevention of 320 to 1,100 premature mortalities. The health and environmental benefits of new RE used to meet RPS requirements are equivalent to 5.3¢/kWh-RE on average, and 2.6 to 10.1¢/kWh-RE across the full range of methods.¹²

By leaving out a quantification of the non-carbon avoided emissions and their associated health benefits, the Cost Study underestimated total program benefits. Similarly, Wiser et al cite the water conservation benefits, stating:

¹¹ Wiser, R., G. Barbose, J. Heeter, T. Mai, L. Bird, M. Bolinger, A. Carpenter, G. Heath, D. Keyser, J. Macknick, A. Mills, and D. Millstein. 2016. *A Retrospective Analysis of the Benefits and Impacts of U.S. Renewable Portfolio Standards*. Lawrence Berkeley National Laboratory and National Renewable Energy Laboratory. NREL/TP-6A20-65005. <http://www.nrel.gov/docs/fy16osti/65005.pdf>.

¹² Wiser et al, 2016.

Renewable generation used to meet 2013 RPS compliance obligations reduced national water withdrawals and consumption by an estimated 830 billion gallons and 27 billion gallons, respectively. These power-sector water use reductions are equivalent to savings of 8,420 gallons of withdrawal and 270 gallons of consumption with each MWh of generation of renewable electricity. Water use reductions vary seasonally and come predominantly from freshwater sources, with reductions varying regionally due to geographic differences in power plant fuel types and cooling system configurations.

The Cost Study also did not integrate a quantification of economic benefits, which is a meaningful source of underestimation of the total net benefits of the CES. As acknowledged in Section 10: Economic and Price Impacts, the CES will have economic benefits. The most relevant and comprehensive assessment cited in this section is NYSERDA's own September 2013 *Renewable Portfolio Standard Main Tier 2013 Program Review* examining New York's own experience with the RPS Main Tier commitments, which have resulted in approximately 1,800 MW of in-state renewable capacity. Key findings over the analysis period (2002-2037) are: (1) on average, approximately 668 more net jobs in the New York State economy are expected in each year; (2) cumulative net GSP gain was expected to be approximately \$2.0 billion, with a NPV of \$921 million; and (3) for every \$1 spent on the acquisition of RECs, the State will capture on average approximately \$3 in direct investments associated with project spending over the project lifetime. The Cost Study states, "Based on these findings, it is possible to estimate the magnitude of potential near-term direct investments associated with the illustrative CES renewable resource deployment scenario. The base case near-term (deployment between 2015- 2020) direct investments are estimated to be greater than a billion dollars."¹³

In a similar vein, the recently issued *Clean Jobs New York Report*¹⁴ highlighted that there are more than 12,500 individuals currently employed in the renewable energy industry in New York State, including solar, wind, bioenergy/biomass, low impact hydro, and geothermal, and that the companies employing these individuals are projecting 6% growth in employment levels in 2016. Creation of the 50% Clean Energy Standard will be a clear market signal to this industry that will result in further job growth, another example of the economic benefits of this policy.

¹³ Cost Study, Page 105.

¹⁴ *Clean Jobs New York: A Comprehensive Analysis of Clean Energy Jobs in New York* was issued in May 2016 and prepared by BW Research Partnership and the Economic Advancement Research Institute for Environmental Entrepreneurs, the Alliance for Clean Energy New York, New York Sustainable Business Alliance, and New Yorkers for Clean Power.

Again, these economic benefits are in line with the national assessment. Wiser et al states:

Renewable generation used to meet 2013 RPS compliance obligations, along with average annual RPS-related capacity additions in 2013 and 2014, supported an estimated 200,000 U.S.-based gross jobs earning average annual salaries of \$60,000, and driving over \$20 billion in GDP. Of these gross jobs, over 30,000 are related to ongoing operations and maintenance (O&M) while the remaining 170,000 are supported by construction activity. Labor-intensive PV installations account for the majority of construction jobs, while established wind plants account for the majority of O&M jobs.¹⁵

Finally, Section 10 of the Cost Study briefly touches on the issue of wholesale price suppression, essentially saying that it is not a societal benefit but a wealth transfer, and is difficult to estimate and only temporary, thus implying it should not be included in a cost-benefit analysis. The Cost Study also states, though, that, “such market price impacts will certainly have a temporary impact on ratepayers’ bills ... when bill impacts are estimated, it is appropriate to acknowledge that such price reductions will temporarily reduce or eliminate these impacts.”¹⁶ Yet these likely impacts are not included in the bill impacts described in the Cost Study.

Wiser et al acknowledges similar dynamics with respect to price suppression impacts, but does still attempt to integrate these impacts in their aggregate assessment, stating:

Renewable generation used to meet 2013 RPS compliance obligations potentially shifted the supply curve for electric power, reducing wholesale electricity prices and yielding an estimated \$0 to \$1.2 billion in savings to electricity consumers across the United States. These consumer savings are equivalent to 0.0 to 1.2¢/kWh-RE. The wide range of estimates reflects bounding assumptions about how the effects of renewable generation on wholesale spot market prices decline over time and the extent to which consumers are exposed to those prices. Importantly, these impacts are best considered wealth transfers from owners or shareholders of electricity generating companies to electricity consumers rather than net societal benefits.

In sum, the very significant net benefits projected by the Cost Study are even more striking considering that several types of benefits were left out of the analysis, including non-carbon avoided emissions, water use reduction, economic impacts, and price suppression impacts.

¹⁵ Wiser et al, 2016, Page 33.

¹⁶ Cost Study, Page 107.

Accounting for all of these benefits will show higher net program benefits and lower bill impacts.

d. The Cost Study's Finding Regarding Load Reductions Highlights the Need for Binding Energy Efficiency Targets.

Section 6 of the Cost Study (Tier 1: System Load) examines the impact of an overall higher system load, which could result from less energy efficiency achievement as compared to the base case, or could result from higher than expected load growth. Not surprisingly, this particular sensitivity analysis had significant impacts on gross program costs. When 22,000 additional GWh of load over the base case is assumed, gross program costs grow from \$453 million to \$1.07 billion. While the net benefits also increase in this scenario (from \$787 million to \$872 million), this doesn't reflect the avoided carbon emissions if the reduced load resulted entirely from energy efficiency, which would clearly also avoid carbon emissions. This particular finding makes the case for the need for binding energy efficiency targets, first to achieve the energy efficiency assumed in the base case (and thus achieve the 50%), but also to achieve cost-effective energy efficiency beyond that assumed in the base case, and thereby reduce overall CES program costs.

At this time, there is not an enforceable mandate to achieve the level of energy efficiency assumed by the CES White Paper Cost Study, which puts achievement of the 50% CES target at risk. Clearly, setting targets for energy efficiency in a similar way to setting targets for renewable energy can help reduce the overall cost of the renewable energy mandate. With greater investment in energy efficiency, the overall system would require less investment in transmission and reduce costs for all consumers. In short, the Commission should establish a more aggressive successor to the Energy Efficiency Portfolio Standard, and we are pleased that this is being explored in the deliberations of the new Clean Energy Advisory Council.

The report by Synapse Energy Economics, *Aiming Higher: Realizing the Full Potential of Cost-Effective Energy in New York* (filed in this proceeding April 22, 2016), highlights that the assumptions utilized in the calculation of the Tier 1 targets of the CES are well above the current

utility efficiency targets approved by the Commission, yet are well below what is deemed cost-effective. If the forecasted efficiency savings are not realized, the 50% renewable energy mandate will not be achieved; and if all cost-effective efficiency was achieved, there would be cost savings for New York ratepayers. Specifically, the analysis finds that, “Higher efficiency targets combined with earnings incentive mechanisms for New York electric utilities could save customers roughly \$3 billion in electricity costs between now and 2030.” This study estimated the higher efficiency savings targets of roughly 3 percent of annual retail sales by 2020, remaining at that annual level through 2030. To put this level in context, the report states, “Program administrators in Massachusetts and Rhode Island, including National Grid (which operates in New York as well), are currently reaching roughly 2.5 to 3 percent savings as a percent of annual sales.”

We further note that the recently released *Clean Energy Jobs Report* cites nearly 70,000 existing jobs in energy efficiency spread across all counties and regions of New York. This workforce includes individuals engaged in advanced building materials and insulation, efficient lighting and energy star appliances, renewable heating and cooling, and efficient heating, ventilation, and cooling. This level of employment is significant and impressive, and represents the type of local jobs that keep energy dollars in-state. Yet, by comparison, with one-third of New York’s population, Massachusetts has a comparable number of energy efficiency workers. Massachusetts has achieved this by consistently setting higher statewide energy savings targets and investing five times more than New York in its energy efficiency economy.

e. Cost Study Findings Regarding Tax Credits Highlight the Need for 2017 Procurement and a Schedule of Evenly-Distributed Targets, Rather than Back-Loaded Targets.

Section 7 of the Cost Study: Federal Tax Credits, analyzed a base case that reflects the current federal tax credit regime applied to Tier 1, as well as two hypothetical scenarios (“no tax credits” and “continued tax credits”). It is unsurprising that the cost of the “no tax credits” scenario is higher; the base case gross program cost to 2023 is \$453 million (with bill impacts of 0.45%),

and the “no tax credits” cost is \$704 million (0.58% bill impacts).¹⁷ A Cost Study observation for Section 7 is, “While the tax credits are currently designed to ramp down over the period to 2023, the ‘continued tax credits’ scenario illustrates that significant additional value would be available if tax credits were maintained at current levels.”¹⁸

There is an obvious but unstated additional observation related to this sensitivity analysis: procurement that occurs while federal tax credits are still available in the existing tax regime will be more cost-effective and will deliver savings for New Yorkers. For this reason, the renewable energy industry strongly suggests that:

- The first procurement takes place in 2017, to take advantage of federal tax credits;
- The 2017 procurement be front-loaded, to take advantage of federal tax credits; and
- The schedule of annual CES procurement targets not be back-loaded.

In 2015, the Commission authorized an additional solicitation for the now expired RPS Main Tier for 2016. This solicitation was intended to continue progress toward reaching renewable energy goals while a new long-term CES structure was being designed, with the first procurement under the CES taking place in 2017 so there is not a gap in procurement nor undue market disruption. The Cost Study provides another strong argument in favor of timely implementation due to the planned phase-down of the production tax credit (PTC) and investment tax credit (ITC). These programs offer real and time-limited economic benefits to New York ratepayers. Front-loading procurement solicitations under the CES will allow New York to maximize the benefit from these tax policies.

The Renewable Energy Industry strongly recommends that the Commission set annual compliance targets out to 2030 with the option to review targets as needed, rather than setting the goals every three years. Our Initial Comments supported the triennial review of targets, but in the context of annual targets being established at the start of the program and criteria articulated regarding what would cause the targets to be adjusted either upwards or downwards. An important strength of the CES mandate is that it can create long-term certainty for renewable energy market participants by establishing a strong market signal through 2030, as RPS policies

¹⁷ Cost Study, Page 77.

¹⁸ Cost Study, Page 78

do in other states. This schedule of annual targets should be designed to take advantage of federal tax policies as much as possible.

f. Renewable Energy Technology Cost Reductions are Significant and Continuing

To varying degrees, the Cost Study assumes reductions in the costs of renewable energy technologies over the study period. For land-based wind, for example, the Cost Study presents three cost projections: conservative, base, and aggressive, utilizing NREL capital expenditure forecasts of low, medium, and high,¹⁹ and uses the base trajectory in all scenarios in this analysis. Similarly, for offshore wind, the analysis assumes that capital costs will decrease over time, although in this case the assumed cost reductions used were significantly less than a 2016 cost reduction trajectory developed by the University of Delaware Special Initiative on Offshore Wind.²⁰ For utility-scale solar, the Cost Study incorporated a trajectory of cost declines that was more aggressive than a 2015 trajectory published by GreenTech Media.²¹

Without commenting in detail on the particular cost declines selected for each technology in this analysis, the Renewable Energy Industry cites that renewable energy technologies have experienced dramatic cost reductions in recent years and will continue to do so. Integrating cost reductions into the Cost Study is therefore appropriate and necessary, and reflects a more accurate future landscape.

- In the case of land-based wind, for example, the cost of wind power has decreased 66% over the past 6 years according to the latest DOE Market Report.²² DOE also found that wind power purchase agreements are now at historic lows, saving consumers money and that wind power is now cost competitive with fossil fuels in many regions.
- For solar, the U.S. Department of Energy (DOE) launched its SunShot Initiative in 2011, with the ambitious goal of making solar electricity cost-competitive with conventional sources of electricity by 2020, aiming for a 75% reduction in costs from 2010 to 2020. “Since then, solar deployment has grown more than tenfold in the U.S. with more than one million solar installations currently operating across the country. The cost of solar energy has also dropped as much as 65%. As a result, the industry is approximately 70% of the way toward meeting the SunShot 2020 goals.”²³

¹⁹ Cost Study, Page 128

²⁰ Cost Study, Page 149.

²¹ Cost Study, Page 158.

²² <http://energy.gov/2014-wind-market-report> – Version 8.0

²³ Sunshot Initiative Vision, accessed at <http://energy.gov/eere/sunshot/sunshot-initiative-mission>.

- Third, although the offshore wind industry has less experience in the United States, it is building on twenty years of experience in Europe, where continued market growth, technology maturation and program innovation has resulted in significant cost reduction. For example, in the United Kingdom, levelized project revenue has declined by 29% in the period 2011-2015, and the Technology Strategy Board reports that the industry is on track to achieve the Crown’s target of £100/Mwh by 2020.²⁴ As part of a global industry, the U.S. offshore wind market will be able to take advantage of this experience curve. Early results of a new LBNL analysis of cost projections were recently presented as *Offshore Wind Technology Advancements and Cost Reductions: What Do the Experts Say?*²⁵ and predicted that current LCOE for offshore wind will decline 10% by 2020, 30% by 2030, and 41% by 2050.²⁶

This evidence of recent and projected cost declines underscores both the commitment of the renewable energy industry to drive down costs, and the importance of integrating declining costs into any forward-looking cost assessment like this Cost Study.

III. CONCLUSION

A future-looking assessment of the costs and benefits of any proposed public policy will necessarily involve quantitative uncertainty, and the CES is no exception. Recognizing this uncertainty, the overarching objective of any study of the projected costs of a new public policy should be to understand if projected benefits will be greater than projected costs; if projected costs will be modest or overwhelming; and what factors, if any, can help mitigate those costs. With this view of the overarching objectives, the CES Cost Study was a successful exercise. Its findings demonstrated that societal benefits will outweigh costs; that gross costs will be affordable; and that certain actions -- namely utilization of PPAs, further pursuit of energy efficiency, and utilization of federal tax policy -- can create a more affordable and cost-effective CES Program.

²⁴ Cost Reduction Monitoring Framework: Special Report to the Offshore Wind Program Board, Offshore Renewable Energy Catapult, February 2015 (report available for download at <https://ore.catapult.org.uk/documents/10619/110659/ORE+Catapult+report+to+the+OWPB/a8c73f4e-ba84-493c-8562-acc87b0c2d76>).

²⁵ Offshore Wind Technology Advancements and Cost Reductions: What Do the Experts Say? Presented by Ryan Wisner, LBNL, at WINDPOWER 2016 in New Orleans, LA. *See also*, Massachusetts Offshore Wind Future Cost Study, University of Delaware Special Initiative on Offshore Wind (projecting LCoE reductions of 33% for a 2,000 MW, 10 –year (2020-30) build-out in Massachusetts).

²⁶ These are preliminary and draft findings from an LBNL/NREL study described as the largest single expert elicitation ever performed on an energy technology in terms of expert participation with 163 wind energy experts. The work was conducted under the auspices of IEA Wind Task 26 on “Cost of Wind Energy.”

Further, because the societal benefits assessed in this exercise were limited to avoided carbon emissions, it is worth highlighting other quantitative and qualitative benefits of investment in renewable energy, such as keeping energy dollars in-state; promoting local economic development, direct investments, local tax payments, and job creation; reducing emissions of other pollutants (such as particulates and oxides of nitrogen) that cause or contribute to public health impacts and reducing water use; diversification of New York's electricity supply in a market increasingly dominated by natural gas; and price suppression.

As described in our previous comments, we strongly believe that the core of the CES program needs to be an enforceable obligation for electric distribution utilities to purchase renewable energy using long-term power purchase agreements in the context of annual obligations laid out from 2017 to 2030. This framework is necessary to attract a robust portfolio of developers and technologies to New York who are willing to invest in the uncertain development process and thereby provide healthy competition for contracts that can drive down prices.

The analysis provided in this proceeding -- in the LSR Options Paper, the CES White Paper, and now in the CES Cost Study --- all point to utility-backed PPAs as the procurement model that properly balance risks between ratepayers, developers, distribution utilities, and load-serving entities, and does so at lowest costs. As shown in these analyses, utility-backed PPAs offer the most chance for success in attracting investment and construction in New York, and can advance renewable energy goals at least cost and risk to New York ratepayers. The CES Cost Study also recognizes that PPAs lower overall costs. The utility-backed PPAs would be competitively procured, with independent power producers offering competitive, least-cost bids.

In closing, we strongly support New York State's pursuit of 50% renewable energy mandate through a Clean Energy Standard program, and we appreciate the opportunity to offer these Comments on the Cost Study.

/s/ Anne Reynolds
Anne Reynolds

Executive Director
Alliance for Clean Energy New York

/s/ Andrew Gohn
Andrew Gohn
Eastern Region Director
American Wind Energy Association

/s/ Ryan Katofsky
Ryan Katofsky
Director, Industry Analysis
Advanced Energy Economy Institute

/s/ David Gahl
David Gahl
Director of State Affairs, Northeast
Solar Energy Industries Association

/s/ Janet Besser
Janet Besser
Executive Vice President
New England Clean Energy Council

/s/ Sean Garren
Sean Garren
Regional Manager – Northeast
Vote Solar

/s/Rob Collier and Melissa Kemp
Policy Co-Chairs,
New York Solar Energy Industries Association