UNIVERSITY OF DELAWARE | College of Earth, Ocean, & Environment

SPECIAL INITIATIVE ON OFFSHORE WIND

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Hon. Kathleen H. Burgess
Secretary to the Commission
New York Public Service Commission
Three Empire State Plaza Albany, New York 12223

Re: Case 15-E-0302 In the Matter of the Implementation of Large-Scale Renewable Program.

Dear Secretary Burgess:

The Special Initiative on Offshore Wind (SIOW) is pleased to provide comments regarding New York State's (NYS) *Large Scale Renewables Energy Development Options and Assessment: Final Report,* which outlined a variety of design principles, methods, and options to promote and support the development of LSR in New York. The SIOW is an independent project at the University of Delaware that supports the advancement of offshore wind as part of a comprehensive solution to the most pressing energy problems facing the United States. SIOW provides expertise, analysis, information sharing, and strategic partnership with industry, advocacy and government stakeholders to build understanding and drive the deployment of offshore wind.

While NYSERDA's Large Scale Renewables (LSR) paper is directed at LSR's generally, SIOW's comments are limited to how the design principles, methods and options can either support or hinder the development of offshore wind (OSW) energy in NYS. NYS's OSW resource presents substantial potential for production of zero-emission electricity. Indeed, many believe that OSW energy could become the most viable option for delivering utility-scale renewable electric generation to the densely populated downstate region of New York.

SIOW's comments were developed in consultation with Green Giraffe. Green Giraffe has been a consultant to more than 30 offshore wind projects at different stages of development with a cumulative capacity of more than 10 GW. The company's work has

included raising equity, arranging debt, bidding for tariffs, selecting offshore wind contracts, and negotiating commercial contracts. Green Giraffe has been similarly involved in a substantial number of the projects that have been considered in the U.S.

2. **Comments on design principles and strategies**

The LSR paper proposes the following design principles and strategies in order to leverage NYS's existing programs and authority, provide revenue certainty for project developers, advance new contracting and ownership models for renewables, and create new opportunities for large end users to buy the renewable energy products their shareholders demand:

1) Bundled power purchase agreements (PPAs) to reduce costs and electricity price volatility
2) Flexible procurements to foster competition and ensure the selection of lowest-cost projects
3) Centralized project solicitation/evaluation by a third party
4) Procurement conducted based on a planned budget, system needs, and other considerations
5) New mechanism to facilitate voluntary market activity
6) Securitization to lower the cost of project debt.
7) Long term budget commitment to stimulate greater investment in New York and put LSR resources on a path to grid-parity.

The design principles that are most critical for OSW development are bundled power purchase agreements (PPAs) and long-term budget commitments.

1. **Bundled PPAs**: This design principle is arguably one of the most important approaches – if not the most important -- to developing offshore wind energy at least cost. Most importantly, bundled PPA's will have a material impact on the cost of energy from OSW, by lowering financing costs. By creating a fixed price PPA, it will attract cheaper capital and facilitate long term debt financing, as well as provide a cap on the price of power.

   Research conducted by the SIOW for NYSERDA found that adoption of an offshore wind revenue policy that includes reduced investor risk, which a bundled PPA does, can reduce the Levelized Cost of Energy (LCOE) of a New York-area project from 17-18%.[1] Long term contracts and commitments also attract IRR investors, which seek lower returns compared to venture capital investors. IRR-driven investors have lower return requirements than venture capital investors due to their risk preferences, which favor projects with lower returns but limited risk. Venture capital investors, the current investors for offshore wind, by contrast are willing to invest in projects that

[1] McClellan, Stephanie; Ozkan, Deniz; Kempton, Willett; Levitt, Andrew; Thomson, Heather. 2015. New York Offshore Wind Cost Reduction Study. Prepared for New York Energy Research and Development Authority. February. Page. 45

carry higher risks but require larger returns to justify this investment. Since this is the case, policies should be directed at making offshore wind projects more favorable to IRR-driven investors relative to venture capital investors by reducing risk and uncertainty associated with the project. The longer the PPA term, the more effective this policy choice would be, as it allows IRR investors with long-term horizons to invest to secure the low, but predictable, returns OSW projects can generate.

Lastly, a consistent approach to PPAs can also produce a more efficient process for developers.

2. **Long-term budget commitments** similarly reduce financial costs and contribute to a reduction in LCOE. Long term budget commitments 1) provide clear market visibility for a pipeline of projects, and 2) create a community of dedicated stakeholders, with experience to do subsequent projects better, a type of learning by doing which results in its own set of cost reductions.

   Market visibility refers to certainty of size and timing for future market demand, a critical key in investment decisions. The SIOW found that market visibility has the potential to reduce capital expenditures (CAPEX) by up to 15%, operating expenditures (OPEX) by up to 20%, and can yield reductions in LCOE of a project by up to 30%.[2] Market visibility reduces cost by two primary levers. First, it is likely to spur competition by encouraging participation of more supply chain bidders for U.S. projects than has existed to for "one-off" OSW projects to date.

   Second, clear market visibility lowers cost by attracting repeat investment by those who obtain sector knowledge and experience and thus will accept a lower return for risk they understand and can manage better, as discussed in the above section on IRR investors.

   A sizable and sustained market also is likely to attract European suppliers to locate in that market, lowering the cost of transporting components and of providing the long term maintenance service and guarantees which are essential to offshore wind operations.[3]

Whereas bundled PPAs and long-term budget commitments are the design principles proposed in the LSR paper that we believe are most critical to successfully deploying large scale, cost effective offshore wind, the additional proposed design principles may support OSW development. To do so, their implementation should consider the following:

- **Centralized project solicitations** can benefit OSW, reducing costs by creating a more predictable and transparent process for project approval. However, to do so, centralized project solicitations would need to provide clear guidance to bidders on how these solicitations would be approved, and the timeline for approvals. Timing and consistency of solicitations are extremely important especially for a

[2] Ibid. Page.40
[3] SIOW did not quantify this impact in its New York Offshore Wind Cost Reduction Study.

capital-intensive investment like OSW.

- **Procurement based on planned budget, system needs, and other considerations** are not likely to have a direct impact on the LCOE of an OSW project; however it is relevant to prioritize procurement based on system needs, such as meeting peak demand needs, when the most expensive and polluting power sources are used. Meteorological towers have confirmed strong, consistent wind speeds off New York during critical high electricity demand periods — afternoons, summer heat waves, and winter cold snaps. A procurement system based on meeting system needs can better recognize the value of OSW. [4]

- **Voluntary market activity** will not directly impact LCOE, but may yield indirect reductions. Voluntary market activity will allow third party entities (utilities for example) to more willingly (or cheaply) offer options such as long term bundled PPAs, thanks to improved liquidity for RECs, or other such components derived from these PPAs. It will still require that PPA bundling be possible.

- **Securitization** is a strategy that may benefit OSW by reducing its costs. However, the ability of securitization to do so is strongly dependent upon its structure. Securitization as discussed in the LSR paper appears to be based on refinancing of a portfolio of project debt. This method works well for technologies that already have an established portfolio of project debt within the state -- such as hydro, wind, and solar – by (i) lower financing costs for such existing projects and transferring the gains to ratepayers and (ii) demonstrating to new projects that such cheaper refinancing will be available with high probability, allowing them to take the impact of such refinancing when setting their initial price. But this would not work for new technologies like OSW as the potential refinancing benefit could not be demonstrated until several projects are operational, and would not be taken into account for many years by projects to be built.

  Given that the fund created by securitization would benefit from a dedicated revenue stream (fees from ratepayers), it would appear that a better alternative is one that would have the fund indicate its availability to directly support project finance debt for qualifying projects (i.e. those that win the tenders run under the rules selected by the NYS regulators). This would likely have the same end result, but would not require a portfolio of debt-financed projects. An example of such a program is the KfW offshore wind program in Germany. Under such a program banks that lend to projects can be funded at low rates by the program and

[4] Cape Wind. Cape Wind Would Supply Large Amounts of Electricity as Heat Wave Sends Electric Demand Soaring. (July 22, 2011); Deepwater Wind. As Temperatures Soar in the Northeast, Offshore Wind Farm Would Produce Massive Amount of Electricity. (July 18, 2012) http://www.dwwind.com/news/as-temperatures-soar-in-the-northeast- offshore-wind-farm-would-produce-massive-amount-of-electricity

required to pass on that lower cost of funding to the project. By doing this, the bank keeps the risk on the project and the funding entity (New York State supported by fees from ratepayers) would only take on risk of the lenders. Another option is to fund the project directly alongside commercial banks on the same terms as them (in which case the fund bears project risk), but with a lower priced tranche benefitting from the lower cost of funding of the program. The KfW program (where both options are available) is designed to be "market neutral", not affecting commercial terms. The end result of the program is that it lowers lending costs (and LCOE) substantially, while providing liquidity to the sector and comfort to the commercial banks participating alongside it

By implementing a program similar to KfW in New York would pass the favorable borrowing conditions of NYS to lending banks, resulting in a cheaper funding pool which banks would then pass on to the projects, while still maintaining the project risk.[5] Gains to the ratepayer accrue in the beginning from lower prices, and the funding entity has the freedom to choose to take on project risk or risk associated with the lending institution. Analysis by the SIOW for NYSERDA of a KfW-type program shows reductions of financing costs for New York-area projects ranging from 0.2-0.4% and reductions in LCOE ranging from 1.8%-2.6%. [6]

3. **Comments on methods for LSR policy**

According to the NYSERDA LSR paper, an LSR policy could utilize, either alone or in combination, these methods:

- Target-driven objectives
- Investment-driven objectives
- Integrated Resource Planning (IRP)

With respect to developing NYS's OSW resource cost effectively, targets (whether percentage or investment-driven objectives) are critical: they establish long-term market visibility. As discussed previously, long-term market visibility yields substantial reductions in project costs and overall LCOE.

While targets can either be megawatt (MW) or investment dollar-based, an investment-based target should consider secondary benefits of technologies. Otherwise an investment-based target may favor cheaper technologies over more expensive technologies that may have other benefits not captured by the technology price.

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[5] McClellan, Stephanie; Ozkan, Deniz; Kempton, Willett; Levitt, Andrew; Thomson, Heather. 2015. New York Offshore Wind Cost Reduction Study. Prepared for New York Energy Research and Development Authority. February. Page 46

[6] McClellan, Stephanie; Ozkan, Deniz; Kempton, Willett; Levitt, Andrew; Thomson, Heather. 2015. New York Offshore Wind Cost Reduction Study. Prepared for New York Energy Research and Development Authority. February. Page 47

Again, with respect to OSW, Integrated Resource Planning (IRP) may not be as effective in reducing offshore wind energy costs. It may be harder for outsiders to assess and can lead to uncertainty, which could produce fewer and more expensive OSW bids. In order to achieve the greatest cost reductions, attracting a wide field of competitive bidders is necessary.

4. **Comments on structural options for policy**

In reviewing the structural options for LSR policy vis a vis their impact on OSW, we note the following:

> **Tiered support**: If different approaches are taken for different technologies, the different approaches need to be clearly defined and promote stability. A tiered system that is not stable erodes confidence and increases a perception of risk.
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> **Evaluating and contracting entity**: If the approach is taken to separate the evaluation and contracting entities, it must be acknowledged that termination authority lay with the contracting entity. Financiers tend to scrutinize termination risk heavily, and the buy-in of the off-taker is important. The appearance of a lack of buy-in by the off-taker is a risk that financiers tend to avoid. If this risk is not well managed in the design of such a strategy, a project in which the evaluating and contracting entities are separated could have higher financing costs or even be unable to obtain financing. Managing the risk in the upfront design of the strategy means finding ways to ensure that off-takers are comfortable in taking on that role and will not be looking for avenues to drop the obligation (e.g., litigation or overzealous enforcement of minor contractual rules).
>
> **Terminal value**: Well-defined, transparent rules for decommissioning costs are important in determining terminal value and keeping costs down by providing equity investors a clear picture of valuation of the project.

Additional comments on cost-containment strategies for OSW

The ratepayer-funding mechanism is another key dimension of the LSR support structure. This mechanism should be considered based on the development option selected (discussed below). Since the cost of the LSR resource is generally fixed, changes in market prices are offset by a premium that falls when the rest of the bill increases, and rises when the rest of the bill decreases. In a bundled PPA or utility-owned generation approach, the ratepayer funding mechanism provides a partial hedge to customers because of this offset premium. In a REC-only model, the ratepayer funding mechanism yields a fixed premium expenditure, which remains constant over the lifetime of the project. The collection of this ratepayer funds needs to be contained in order to: 1) fulfill and honor PPAs and REC contracts, and 2) not require an increase to ratepayers midway through the project to assure contract repayment which would be counter productive to the goal of growing the LSR at a reasonable cost.

Beyond cost containment methods already discussed in the LSR paper, another is to put a

cap on the price for the REC component, to ensure it is always within the agreed budget. This leaves some market price risk on projects, but this has been accepted in Europe and financed by banks (for instance for the EUR 2.8 bn Gemini project in the Netherlands in 2014). Another option is to "bank" the differences, allowing them to be netted out over the years. "Banking" refers to payments being capped each year, with the unpaid amount being claimed at a later year, when that year's claims are lower than expected. Conversely, if a year's payments are low, the unpaid amount can be used later when needs are larger than planned. These innovative approaches to OSW policy are successfully being implemented in the Netherlands.

5. **Comments on development options**

SIOW recommends that in order to develop OSW and reap its energy, climate and economic value for the state, NYS must craft development options that value offshore wind's production profile, which matches demand quite well.

The LSR report outlines three options for possible policy development. SIOW asks that the following be considered regarding Option 1 and Option 3.

Option 1: NYSERDA conducts solicitation and enters into long-term contracts with renewable energy developers

In evaluating potential changes to the Business-as-Usual Option 1, the LSR paper suggests the option of "using a NYSERDA REC CfD, in which NYSERDA could purchase RECs from a seller while providing an indexed payment of the value of energy, thus providing an effective hedge on energy." There is very little in the study about CfDs, beyond that CFDs are a financial instrument subject to regulation and likely subject to Frank-Dodd. SIOW would recommend that any option including CfD's consider their risks, with respect to offshore wind. Those risks include:

Volume risk: the risk associated with the ability of the project to sell all of its production and/or RECs on the wholesale markets, even though its actual production may differ from its previously designated volumes due to the imperfect predictability of wind and wholesale markets typically apply a penalty to such gap ("balancing risk"). Financiers cannot evaluate this risk and require projects to enter into long-term contracts with a credible partner to ensure the full and actual production can be sold in the market at the market price, without penalty. This can be done for the power component, with a small discount, but the CFD itself would need to include a similar mechanism that ensures that it covers the actual production exactly.

Index risk: the risk associated with the potential discrepancy between the index used to calculate the price reference under the CFD (typically a monthly or yearly average) and that used to sell the underlying power or RECs that needs to be covered under the long-term PPA (usually a spot market index or short term average thereof). It is materially helpful to projects if the index used for the CFD is one that is customarily used by market players and can thus be easily included in a long term PPA.

Counterparty risk: referring to risk associated with the entity paying under the CfD and its long-term creditworthiness.

Option 3: State entity/EDC solicitations for long-term PPAs and utility-owned generation.

Offshore wind tends to behave more like a utility-type plant (given its scale and its daily and yearly production profile) and thus fits into a utility's portfolio more naturally. If utility-owned generation is the desired policy options, then mechanisms should be selected that allow offshore wind projects to behave more like standard utility-type generators in terms of revenue generation and financing.