Scaling Renewable Energy

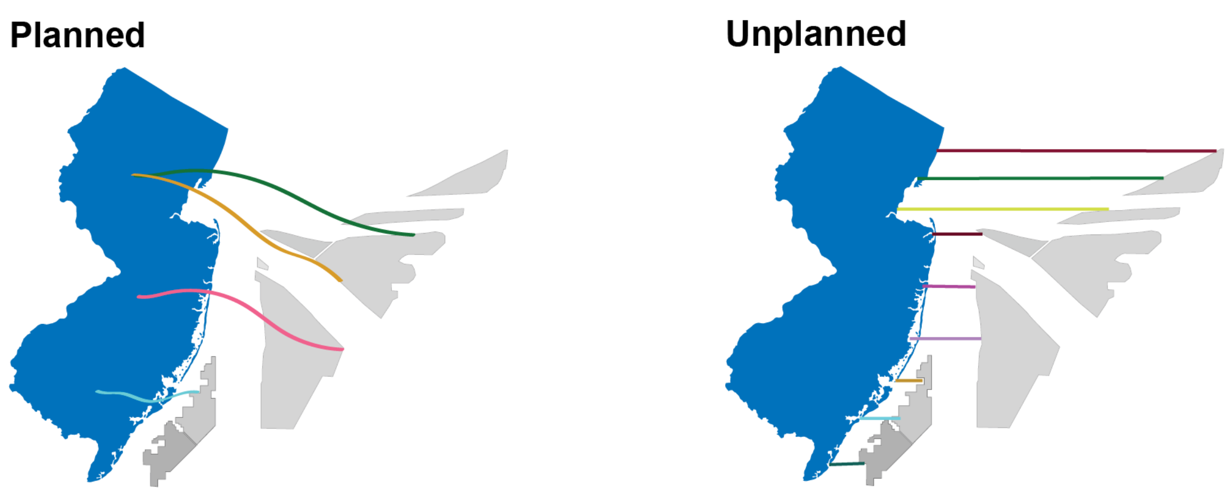
December 1, 2019

To: New Jersey Board of Public Utilities
From: Anbaric Development Partners
Re: Offshore Wind Transmission Stakeholder Meeting Comments

Anbaric Development Partners (Anbaric) respectfully provides these comments in response to questions posed for the November 12, 2019 Offshore Wind Transmission Stakeholder Meeting.

Offshore wind is a critical component of New Jersey's energy future. Achieving a clean energy economy by 2050 will require a significant increase in non-emitting generation sources. Governor Murphy's recent expansion of New Jersey's offshore wind goal to 7.5GW by 2035 is an important step towards a decarbonized grid. With New Jersey now seeking to interconnect an additional 6.4GW of offshore wind over the next 15 years, the time for planning is now. Continuing under the status quo of bundling transmission and generation will result in a lack of coordination and greater impacts on the environment and shoreline communities in comparison to a planned approach that rationalizes cable routes and points of interconnection (POIs) (see Figure 1 below). Furthermore, attempting to integrate project-specific transmission with a larger, planned offshore grid in the future will be more technically and commercially challenging than planning now.

Figure 1: Illustrative planned versus unplanned offshore transmission for additional 6.4GW of wind



Extending the benefits of a grid into the offshore wind areas, and upgrading the onshore energy grid are critical to integrating the higher levels of offshore wind now embraced by the Murphy Administration. Strategically planned and competitively procured transmission will enable New Jersey to integrate a significant amount of offshore wind at the lowest total cost by minimizing transmission bottlenecks, reducing grid connection risks, minimizing environmental and fisheries impacts, and increasing competition between wind farm developers. Further, if planned network designs are used, ratepayers in the state will unlock the power system reliability and resilience benefits that planned transmission can provide, allowing the state to more confidently utilize these resources to replace its current fossil generation fleet. New Jersey can draw on a number of successful precedents and regulatory models to ensure that the state achieves its offshore wind and broader climate and energy objectives

Anbaric's comments center on the following key points, with additional detail following specific questions raised by BPU:

- Proven policy precedents from Europe and the United States provide ready models to inform planned transmission for offshore wind in New Jersey
- Planning transmission will minimize impacts of development and maximize competition, and can be undertaken through an expeditious process
- Both the onshore and offshore grid must be selectively upgraded to integrate large quantities of offshore wind at the lowest total cost
- Available regulatory models can be adapted to New Jersey in order to appropriately allocate costs and benefits of offshore transmission and minimize risk to ratepayers, but legislation is required to make these tools available to New Jersey.

1. *Other Jurisdictions' Efforts to Connect Geographically Remote Generation through Shared Transmission Facilities:*

Planning and competitive procurement have enabled multiple jurisdictions to efficiently connect geographically remote generation utilizing shared transmission facilities. Policy mechanisms and technical configurations vary by regulatory context and geography, but in each case planning and competitive procurement led to more efficient integration of remote resources, increased competition between generators, and reduced wholesale energy costs.

European countries evidence several approaches to connecting offshore wind. Denmark, Germany, the Netherlands and the United Kingdom each show the need for, and logic of planning in different ways. It is, however, worth noting that the Transmission System Operator (TSO) model that predominates in Europe does not promote competitive transmission development and, when adopting policy precedents from Europe, the role of competitive transmission should be preserved in order to increase competition and reduce costs.

Denmark

Denmark has experience with bundling generation and transmission and fully separating transmission from generation. Denmark's initial projects were relatively small and near to shore, and modest interconnection requirements were addressed by generation developers. As project sizes increased, Denmark transitioned to a planning-based approach, with the national grid operator Energienet providing full grid connection service for offshore wind generators. In the latest round of offshore wind development, while Denmark is proposing to increase offshore generators' scope to include offshore substations and export cables, the vast majority of onshore cost and risk remains with the state grid operator Energienet.[i]

Denmark's continued reliance on planning for the more complex and high-risk elements of grid connection shows the logic of planning, even for a country with an extensive shoreline and relatively low population density (347 per square mile). For comparison, New Jersey has a coastline of 130 miles and a population density of 1,213 people per square mile,[ii] making development of onshore transmission more difficult.

Germany

Uncoordinated offshore wind development and grid connection resulted in early challenges for the German offshore wind industry, which had deployed only 500MW by 2014. However, since 2014 Germany has utilized a planned transmission approach, resulting in 6,658MW of cumulative capacity installed as of June 30, 2019. Furthermore, the development of separate offshore grid interconnection capability has resulted in significant competition between developers and zero-subsidy bids in the latest round of tenders.[iii]

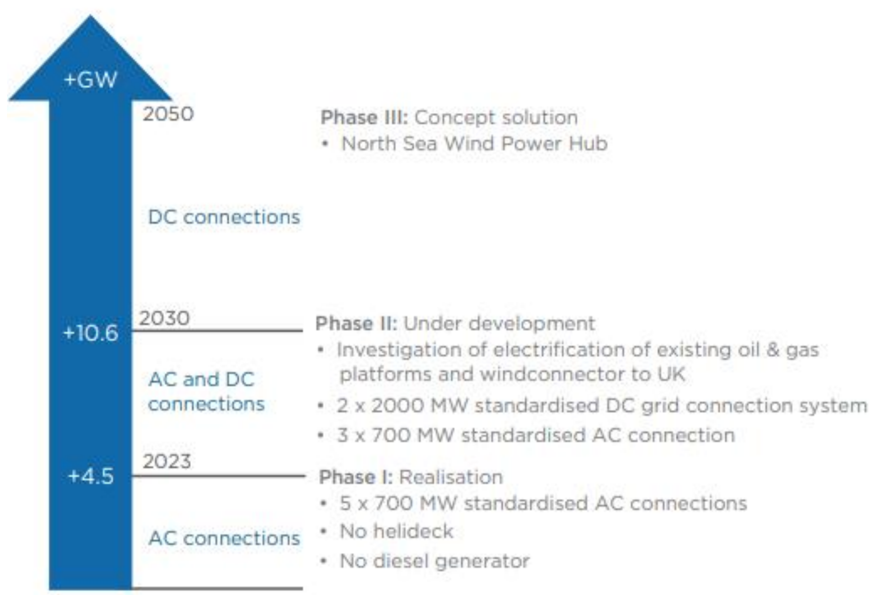
While the offshore wind market is just getting started in the US, shared transmission should similarly depress prices for offshore wind by increasing competition between developers. To date, the absence of shared transmission has likely had a negative effect on competition by advantaging leaseholders closer to shore. This appears to have played out in the recent Massachusetts and Connecticut offshore wind procurements where one of the leaseholders with a lease area farthest from shore declined to bid, thus reducing competition between developers. As new lease areas are auctioned by BOEM in the New York Bight a similar dynamic could emerge for New Jersey, where entities holding leases closer to shore are able to exercise market power over new leaseholders, thus depriving New Jersey consumers of the benefits of full competition between developers.

The Netherlands

The Netherlands benefitted from a rational and coordinated approach to scaling offshore wind, resulting in unsubsidized bids in the latest rounds of tenders. The Netherlands' approach to transmission was set in the Offshore Wind Energy Law (2015), which designated the grid operator TenneT to develop and operate the future offshore transmission system. In accordance with the Dutch offshore wind target of 4.5 GW by 2023, TenneT started developing five 700 MW standardized high voltage alternating current grid connections.

Connecting future offshore wind farms will require a different technical approach as the wind energy development zones will have greater capacity and will be located further from shore. This 6.1 GW of new offshore wind capacity will be connected to the Dutch high voltage grid between 2024 and 2030. TenneT will develop a world's first standardized 2 GW HVDC grid connection concept to facilitate secure and cost-efficient grid integration.[iv]

Figure: Offshore grid development timeline



Source: Navigant analysis

North Sea Wind Power Hub

In planning for Europe's long-term decarbonization goals, TenneT has partnered with Energienet and the Port of Rotterdam to develop a hub-and-spoke model to enable up to 100+GW of offshore wind, with hubs capable of integrating up to 36GW each.[v]

United Kingdom

With extensive coastline and available points of interconnection the United Kingdom initially delegated grid connections to offshore wind generators, but local impacts of onshore infrastructure projects have prompted a reevaluation of the current model. To date, offshore wind generators have developed their own grid connections, but this model of uncoordinated development is coming under stress as cabling proliferates on the sea floor (see Figure 2).

The limitations of the "OFTO" model are coming under additional scrutiny due to onshore impacts, diminishing availability of interconnection points, and inability to connect multiple projects. Uncoordinated generator lead lines require each project to develop onshore interconnection facilities and cabling. The lack of coordination in in development of offshore infrastructure is estimated to cost consumers £0.5 billion to £3.5 billion.[vi] Additionally, land use and siting issues have led to increasing local opposition, recently prompting the government to initiate a review of its transmission model, including consideration of an offshore grid approach.[vii] Developers have questioned whether the "case-by-case, beach-by-beach" approach will be adequate to achieve 30GW of offshore wind,[viii] and Wind Europe's *Industry position on how offshore grids should develop*[ix] notes that the OFTO model "does not lend itself to incorporating innovation – such as hybrid sites with storage or meshed grid solutions" and is inconsistent with the evolution of the offshore grid toward larger networks serving multiple wind farms.

Texas

Texas Competitive Renewable Energy Zone (CREZ) transmission-first program has enabled Texas to develop more wind than any other state in the nation – 25GW and counting – and the cost-reduction benefits of wind enabled by CREZ have far outweighed the costs of building transmission. Low-cost wind brought online by CREZ reduces electric costs by $1.7 billion annually, and CREZ has enabled an additional $5 billion in economic development.[x]

The process used to design the CREZ system provides a model for how to plan and procure transmission to achieve mandated targets, while incorporating expandability to achieve longer-term goals. Texas started by defining an organizational structure, scope and goals. The organizational structure consisted of the PUC (at the direction of the legislature) leading the effort to plan and procure transmission, with the grid operator (the Electric Reliability Council of Texas, ERCOT) providing technical support. Based on analysis of the available wind resource potential, the PUC requested ERCOT to design transmission system configurations to integrate 5,150MW, 11,553MW and 17,956MW of capacity from the Renewable Energy Zones. Importantly, ERCOT identified technical components of the system designed to integrate 17,956MW that would initially integrate 5,150MW, thus providing expandability to achieve scalable expansion in the future.[xi] System designs were evaluated for cost, feasibility, environmental impact, and other relevant metrics. Following evaluation, the PUC selected the desired configuration and awarded projects to competitive transmission developers and incumbents.

CREZ additionally shows that planned (but still competitive) transmission procurements can serve as a platform for third-party power purchase agreements (PPAs), thus enabling financing and deployment of offshore wind without relying on state-led procurements. In Texas, CREZ enabled over 2,000MW of onshore wind energy PPAs from 22 corporate buyers, and in the neighboring Southwest Power Pool transmission investments enabled 2,500MW of corporate PPAs.[xii] In the Netherlands planned transmission has enabled corporate PPAs for offshore wind, most recently between Shell and Microsoft.[xiii]

Anbaric has already been approached by third party buyers in the Northeast asking whether planned transmission could enable them to meet sustainability requirements with local offshore wind resources. For offshore wind in particular, it is worth noting that independent, planned transmission is needed to enable small and mid-sized procurements pursued by third-party buyers. High voltage alternating current (HVAC) transmission systems are most economical in the 300MW to 500MW range, and high voltage direct current (HVDC) systems are most economical in the 1000MW to 1400MW range, both of which are far larger than most third-party buyer can support. However, by making transmission available to serve as a platform for procurement, states can enable third-party purchases and unlock a large source of demand.

Maine

Maine's onshore wind efforts over the last decade provide a cautionary tale about the importance of transmission. In 2008, Maine attempted to create an onshore wind industry almost from scratch, targeting installation of 2,000 megawatts of onshore wind by 2015. Over a decade later, Maine has 923MW of onshore wind, less than half of the 2015 goal. And only a small amount – 22.8 MW – has been built since 2016. The largest impediment to the development of wind in Maine has been the lack of an adequate transmission system. At least five large wind projects were cancelled because transmission constraints prevented their electricity from reaching customers. Combined, these projects would have created an estimated 2,000 jobs and 2,034MW of clean energy in northern and western Maine while providing over $44.7 million in taxes and land-lease payments each year. Over 25 years, this amount to $1.1 billion in financial benefits lost due to insufficient transmission.

2. *Offshore Wind Transmission Framework:*

Anbaric respectfully suggests that planned transmission will enable New Jersey to attain its 7,500 MW goal with fewer environmental impacts, greater competition, and lower costs than the alternative, a series of separate radial connections developed and built on a project-by-project basis.

The New Jersey transmission grid was designed to bring power from west to the east, essentially from where generation is located to load centers. The deployment of offshore wind at the thousands-of-megawatt level changes this paradigm and brings power from the east, the Atlantic Ocean, to the west, New Jersey's shoreline and inland, to population centers.

This new direction of power flow challenges to the grid's ability along the shoreline to absorb this quantity of electricity. While one or more substations may have the ability to absorb 1,100 MWs, when that happens two, three or seven times along the shoreline, very substantial upgrades will be required at the substation level and across the grid. The first offshore wind project or two will be able to deliver power, depending on the injection point, with relatively modest upgrades; the remaining projects will each likely face upgrades in the range of hundreds of millions of dollars or greater.

Under an unplanned project-by-project approach, first movers will have extraordinary advantages compared to the rest of the industry. First movers will be able to secure ideal, low cost injection points with easy access. If these injections points are utilized for relatively small injections or are set aside for future use, first movers will be able to develop permitting and local supply chain advantages and be able to exercise market power over other entrants. In addition, valuable routes and rights-of-way will be taken up to carry small (400MW) amounts of power, when with a planned approach they could carry 1200 or more MWs.

A planned transmission system will provide both an upgraded grid onshore and an offshore series of lines that extend from the best POIs to impartially chosen collector station locations. These collector station locations should minimize distance to lease areas to the greatest practical extent. Any remaining discrepancies in distance between the collector station locations and lease areas can be addressed in the course of procuring offshore wind energy by including in the bid evaluation process a slider that compensates for differences in distances. The selection of locations for collector stations can additionally be phased over time to account for new areas leased by BOEM and usage of available acreage in existing lease areas. It further bears noting that as acreage in existing lease areas is used up relatively small parcels will remain undeveloped. These parcels may be too small to fill a 400MW HVAC transmission cable, and in the absence of shared transmission may either not be developed, nor interconnected to the onshore grid.

A planned transmission approach can be implemented quickly through concrete steps. The BPU can issue an RFP for a consultant to create planned onshore and offshore grid configuration plans. The plan would describe a transmission system configuration that would enable achievement of the mid-term (7.5GW by 2035) and include expandability to achieve potentially larger targets over the long term. From this configuration New Jersey could select and procure system components that align with anticipated offshore wind energy procurements. As a practical matter, New Jersey's system planning consultants, electric utilities, and independent developers already know the best places to inject power onto the grid and how to allocate upgrades on the onshore grid; likewise its environmental experts know the coastline's ecosystems, the conditions in state waters, and the needs of its economy, communities, and fishing interests, and how to plan routes from offshore to the best substations onshore to address these issues. And without addressing them at the start, the issues will only become more contested and acute with each new project.

Finally, given the current tensions between PJM and the NYISO springing from PJM's regional transmission expansion planning or RTEP process, it's difficult to imagine how a regional approach to expanding the onshore grid and developing an offshore grid would surmount the cost allocation issues now present. While Europe is now developing regional offshore wind projects – and a regional approach has great benefits – Anbaric would respectfully recommend that a regional approach be delayed until cost allocation matters have been resolved.

3. Technical Considerations for Offshore Transmission Facilities:

Integrating a large amount offshore wind requires careful coordination of the onshore and offshore grids, and by utilizing state-of-the-art technology New Jersey can reduce the costs and impacts of development.

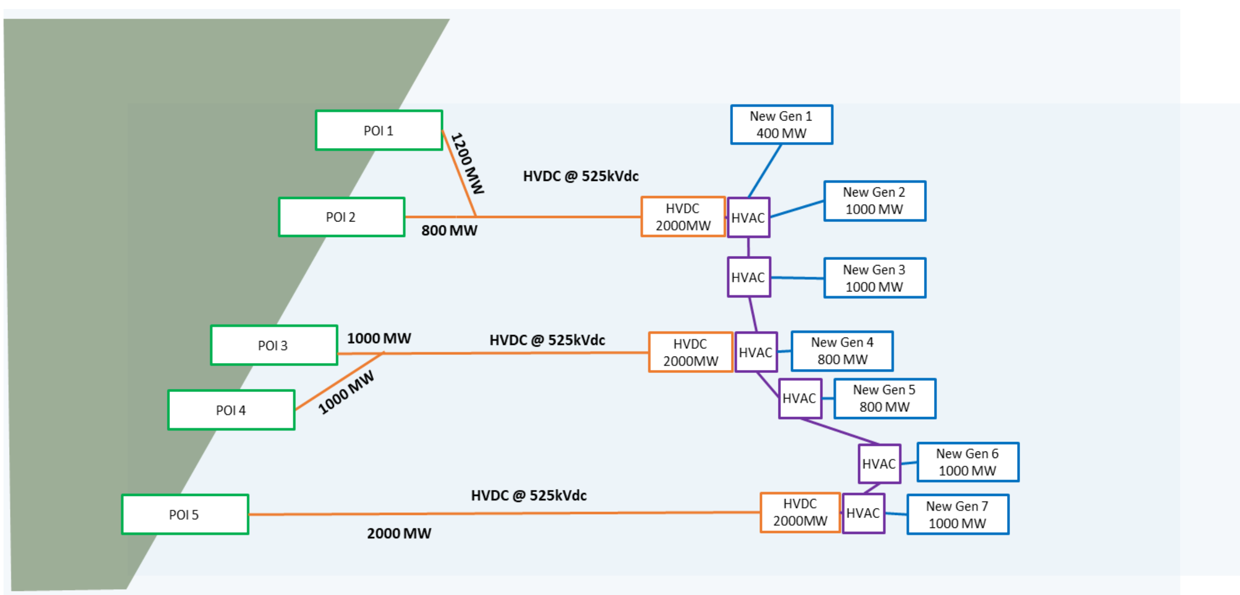
a. Technical considerations

Planned offshore transmission provides multiple benefits by harmonizing onshore and offshore grid development, optimizing use of available interconnections, reducing the need for difficult onshore transmission projects, and strengthening resiliency. Integrating 7.5GW of offshore wind in New

Jersey – in addition to quantities sought by other states – will require coordination of both onshore and offshore transmission rather than focus on just one half of the system. The challenge is not deciding whether to reinforce onshore transmission *or* focus on offshore transmission, but rather how to utilize planning to harmonize onshore and offshore transmission development. Through harmonized planning and development, the offshore network can be built to align with and meet the needs of the onshore grid through strategic use of available POIs and available transfer capacity of the onshore grid, and accommodation of onshore generation.

Offshore network capability can be built into technical design requirements at minimal cost in order to enable a phased build-out of the offshore grid. The transmission platforms can be constructed to enable future networking at costs similar to current offshore platforms, thus enabling an offshore AC network to be developed in phases to match offshore wind deployment goals. Energy can then be transmitted from offshore platforms to shore either via HVAC for shorter runs or HVDC for longer runs (see Figure 3).

Figure 3: Illustrative concept for 6,000MW offshore grid



As the offshore wind industry matures, the US market will have larger wind turbines with higher voltage outputs and larger wind projects than Europe. This will require a US-centric plan that will lead to more cost-effective projects with less, but larger, transmission infrastructure. With 2,000MW converter stations under development, this larger infrastructure will be available to accommodate larger project sizes while preserving the ability to serve multiple projects.

b. Shared use of facilities meant for radial use

A planned transmission system would be designed from the beginning as an open-access system for any generator that has a BOEM wind lease area to utilize, with networking and scaling capability built in from the outset. This differs from radial transmission, where the line is bundled with the generation project and designed for use only by the generation project (i.e. without the interconnection of other generation in mind). The design used in the first New Jersey procurement forecloses the ability of other generators to later utilize or tie into the transmission by sizing the transmission for only one user.

Further, FERC Order No. 807 (*Open Access and Priority Rights on an Interconnection Customer's Interconnection* Facilities, 150 FERC ¶ 61,211, (2015)) provides a five-year safe harbor from open-access requests for the use of bundled radials. This limitation recognizes that bundled radials are designed and paid for as tools for interconnecting a single specific generator and not as grid expansions for wider use. This limitation is avoided by planned transmission.

In addition, adding networked capability to radial interconnection facilities as a later project is more expensive, and may not be feasible. Designing a transmission project from the start to include the ability to interconnect with other projects would be more cost-effective. Retroactively trying to build in networking capability would fail to realize the other benefits of planned transmission: fewer cables at a lower overall cost, fewer ocean trenches, maximization of limited onshore interconnection points.

c. Standards

State or regional standards can help streamline development, but standards should retain flexibility to promote innovation.

d. AC vs. DC

The offshore network should consider and compel the use of both AC and DC for appropriate functions. They each have their own characteristics that will benefit different portions of the offshore network, onshore grid, generators, and operators.

The use of HVDC may include mono-pole, bi-pole and multi-pole configurations that will operate at widely varying power levels and offer reactive power support. HVDC configurations can also be established to link onshore POIs to each other through the offshore network, thus bolstering the resiliency of the onshore grid and offering alternate power flows.

e. Interregional transmission

Given the disputes between PJM and the NYISO about onshore transmission, it's not prudent to plan for them to cooperate about a regional approach to transmission for offshore wind.

4. Cost Responsibility and Business Model Considerations:

Available and proven models can be adapted to New Jersey in order to appropriately allocate costs and benefits of offshore transmission and minimize risk to ratepayers.

a. Allocation and assignment of costs and benefits

Costs and benefits of any shared offshore transmission facilities could be allocated and assigned through mechanisms which are discussed in section 4e below. It bears noting that under the current approach ratepayers are exposed to a significant amount of risk, as New Jersey's first award includes a transmission system upgrade cost sharing agreement, under which ratepayers must cover 30% of upgrade costs over $10 million, 50% of costs over $130 million and 100% of costs over $174 million. With adequate planning, the costs of interconnection will be better known, reducing or removing entirely the need for uncapped risk exposure. Additionally, planning and analysis can help determine the likely accrual of benefits, which in turn could be used to inform cost allocation.

That said, New Jersey could control the allocation of costs and benefits of planned offshore transmission either on its own, independently of the PJM process, or within the PJM process. Within the PJM process, the result could be allocation of costs to all New Jersey ratepayers, or allocation of costs more widely within PJM (which obviously depends on the willingness of neighboring states to develop a collaborative cost allocation process under the aegis of Order 1000).

b. Assignment of costs to interconnecting parties

As discussed under 4 a and 4e below, the New Jersey BPU could allocate the costs of offshore transmission to all NJ ratepayers, to selected ratepayers (i.e., those receiving offshore wind directly), or more broadly to other ratepayers via the PJM process.

It could also develop a cost-sharing arrangement with the state of New York on a case by case, project by project basis, or as part of a long-term multi-state arrangement. The development of offshore wind by several states in PJM, by New York, and by several states in the ISO-NE region obviously creates an opportunity for a ground-breaking new approach to renewable energy development. The complexity and difficulty of such a task will be obvious to all market participants, and detailed discussion is beyond the scope of this response.

Within the realm of the more immediately feasible, it is important to note that the process used in the initial offshore wind procurement – the OREC process – imposes the costs of transmission on all New Jersey ratepayers. While the generator bears the cost of providing MWhs at the price levels implied by the OREC contract, the cost responsibility for the transmission component of the project is shared between the generator and the ratepayer, as noted in 4a above. Such an implied subsidy was not a necessary condition of procuring transmission: in the US market today, transmission developers have been assigned a more substantial share of the cost responsibility of their projects than was assigned to the winner of the first offshore wind project in New Jersey. The NJBPU, therefore, can assign more cost responsibility on the transmission component to a transmission developer as discussed below.

c. Planning authority

The potential benefits of creating a new planning authority should be weighed against the constraints that could result from creating such a new entity. Technical design and cost allocation analyses could alternatively be covered through dedicated working groups and staff hires in existing governmental agencies and retention of expert consultants.

d. Existing regulations

Cost allocation for radial, bundled interconnection facilities is provided for in the PJM Tariff. While initial cost allocation for direct interconnect costs and associated network upgrades for a radial gen-tie are covered under PJM's interconnection procedures and resulting interconnection agreements, those procedures don't speak to how such costs might be allocated between the initial generator using that interconnect and later generators that share use of that interconnect. It would appear safe to assume that the first mover, i.e. the initial generator, would have substantial leverage in any negotiation.

It is worth noting that in California, the development of the Tehachapi transmission system for a promising renewable energy zone was carried out by a transmission developer under the aegis of a transmission cost allocation system designed by the CAISO and approved by FERC.

California took serious steps to spread costs of transmission broadly.

- First, the rate basing of the transmission for Tehachapi, that is the Location-Constrained Resource Interconnection Facilities or "LCRIFs" and their associated network upgrade costs, was done through the CAISO Tariff's Transmission Access Charge ("TAC"), which is used to recover the Transmission Revenue Requirements of entities that own transmission facilities or entitlements under the control of the CAISO.
- Second, the initial cost assignment via the CAISO Tariff with cost recovery via the TAC, meant that the cost/risk for a LCRIF was initially borne by all CAISO customers who pay the TAC (not the transmission provider who is constructing the LCRIF and including its cost in its Transmission Revenue Requirement).
- Third, the hope and expectation was that LCRIFs would at some point become network transmission facilities, such that their costs would ultimately be recovered through the TAC (i.e., later connecting generators would pay to interconnect with/use the LCRIFs only to the extent that they continued to be radial facilities).

e. Ownership structures

Developing the offshore grid as rate-based transmission open to competition by qualified transmission developers would combine the benefits of competition with the regulatory and financial certainty needed to build transmission.

Rate based

In a traditional, rate-based approach to financing transmission, a qualified utility is assigned a project by a state or an Independent System Operator. The utility estimates the cost of the project, initially within a defined plus/minus range (for example, 50%). As the project proceeds and the actual costs become evident the utility has substantial leeway to develop the project at costs within that range. If events cause the project to exceed that range (for example, if community opposition results in an agreement to bury parts of the project), the utility typically must go back to the authorizing agency and obtain permission for that cost over-run.

The development of offshore wind transmission in Germany and the Netherlands largely follows this model. Policymakers determined that offshore transmission should be separately owned from generation, and then gave the assignment to build that transmission to the state-owned Transmission System Operator (TSO) monopoly. In the Netherlands, that is TenneT; in the western part of Germany's offshore, a TenneT subsidiary has that role, and in the east, a company called 50-hertz.

The BPU would be following best policy practices (not only in Europe but also in Texas and California) if it decides to organize offshore wind transmission separately from generation. An American variation on this European model, however, is to maximize the discipline created by competition even in the transmission sphere in order to benefit consumers through lower costs. This approach would be consistent with the policy direction of the Federal Energy Regulatory Commission (FERC), which recently initiated inquiry into actions of PJM and other regional transmission organizations that grant transmission to incumbent utilities without adequate competition.[xiv]

The BPU could enable competition by issuing a request for offshore transmission proposals from any qualified transmission development company. In such RFPs, the BPU has many different options on the allocation of risk between the developer and captive ratepayers. If it followed the Texas (CREZ) model, it could place constraints and limits on the developer's ability to pass cost over-runs on to the ratepayer. These constraints could range from absolute fixed price and schedule to fixed prices with a small number of designated "sliders" (such as, changes interest rates beyond a predetermined range).

A non-utility or merchant approach

If "merchant" is defined as a project that does not have a credit-worthy, long-term credit stream, it is unlikely that any developer today would undertake such a project. Contrary to expectations early in the electricity restructuring era, merchant transmission built entirely to capture energy or capacity market arbitrage between control areas, or between regions within control areas, has not emerged. This is largely because transmission is essentially infrastructure, and financing 50-100 year infrastructure projects on the basis of uncertain market revenues such as Financial Transmission Rights has not proven viable.

However, a number of "non-utility" transmission projects have been very efficiently developed over the years. This includes transmission lines in Texas that were expressly designed by Texas policymakers and the ERCOT independent system operator. This transmission infrastructure was apportioned through a competitive process to qualified market entrants who were willing and able to bid on building the projects on acceptable terms.

BPU could consider combining the "rate based" and the "non-utility" approach into a single category for the purpose of evaluating the offshore wind transmission options available to the NJ BPU by pursuing rate-based transmission open to competition by qualified transmission developers. This would enable the BPU to combine the desirable traits of the utility model with the desirable traits of the competitive market practices.

A bundled approach

Experience from other jurisdictions that have scaled up offshore wind argues against continuing the practice of bundling offshore wind generation and transmission. As described above in section 1, offshore wind markets such as the Netherlands and Germany have separated transmission from generation in order to increase competition and streamline grid integration and have benefited from unsubsidized bids as a result. In the United Kingdom the generator-led development of transmission is being reevaluated as local land use impacts of uncoordinated development draw scrutiny and developers question the fitness of the OFTO model for continuing to scale the industry. More broadly, moving beyond the bundled approach is consistent with the desire of policymakers in many states and countries to keep transmission and generation under separate ownership and regulation, as they are distinct assets with different characteristics. Transmission has a 50 to 100 year lifespan, while generation produces one commodity (energy) that can be and should be subject to the rigors of day to day pricing and ongoing competition.

By employing a bundled approach, state regulators freeze the price of electric power at whatever levels the payment structures determine. In other areas, like the Netherlands, Texas, and California, the unbundling of generation and transmission has enabled transmission to play its traditional role: as the foundation for competition in the commodity sphere. Energy, whether it's oil, or gas, or electric power, has generally been a commodity whose prices, while volatile, has been shown to be mean reverting if not declining in real terms. Separating transmission from generation can enable New Jersey to benefit from technological and market advances that exert similar pressures on the price of offshore wind energy.

The NJBPU can best protect New Jersey electricity consumers by unbundling generation and transmission, developing a transmission network for offshore wind, and then letting offshore wind generators compete for market access across that transmission platform. The transmission cost can be provided by ORECs, as long as the NJBPU recognizes that transmission infrastructure is best paid for via a largely or entirely fixed capacity basis.

f. Solicitation process reforms

According to the BPU's response to Question 35 in the Question and Answer section to the first OSW solicitation,[xv] OWEDA as written only allows for the BPU to pursue bundled generation and transmission responses to OSW solicitations.

As demonstrated by the robust discussion at the stakeholder conference convened on November 12th, there are numerous transmission options for the BPU to consider, particularly in light of the Governor's increased OSW goal of bringing 7,500 MWs onto the New Jersey grid. In order to allow in future solicitations for varied proposals for OSW transmission other than bundled, generator lead line options, the BPU must allow for legislative changes. These changes, such as those put forth in S3985 (Smith), could simply allow for increased competition among bidders and allow for transmission and generation to be submitted in separate bids, while allowing for the BPU to retain the authority to determine the best scenario for each bid. This allows the BPU to continue to work with stakeholders and experts to develop the ideal OSW transmission framework and have the ability to accept bids under any construct the BPU pursues.

---

[i] Specific responsibilities for grid connection are described in detailed materials developed for the first of the Thor Market dialogues. Available at: https://ens.dk/en/our-responsibilities/wind-power/ongoing-offshore-wind-tenders/thor-offshore-wind-farm/thor-market

[ii] See: http://worldpopulationreview.com/

[iii] See: https://www.nytimes.com/2017/04/14/business/energy-environment/offshore-wind-subsidy-dong-energy.html

[iv] Navigant's 2019 Dutch Offshore Wind Market Update, available at: https://www.navigant.com/-/media/www/site/downloads/energy/2019/navigant-dutch-offshore-wind-market-update-2019.pdf

[v] See: https://northseawindpowerhub.eu/project/

[vi] Strbac, G., Pollitt, M., Konstantinidis, C.V., Konstantelos, I., Moreno, R., Newbery, D., Green, R., 2014. Electricity Transmission Arrangements in Great Britain: Time for Change?, *Energy Policy*, Vol. 73, pp. 298-311. DOI: 10.1016/j.enpol.2014.06.014

[vii] See: https://www.telegraph.co.uk/news/2019/11/10/review-launched-onshore-impact-offshore-wind-farms/

[viii] Comments of Jonathan Cole, managing director of Iberdrola's global offshore business at RenewableUK's Global Offshore Wind conference in June, 2019. See: https://www.windpowermonthly.com/article/1591932/offshore-transmission-owner-system-unfit-purpose

[ix] Available at: https://windeurope.org/policy/position-papers/industry-position-on-how-offshore-grids-should-develop/

[x] See: https://cleanenergygrid.org/texas-national-model-bringing-clean-energy-grid/

[xi] See ERCOT 2008 CREZ Transmission Optimization Study, available at: https://www.nrc.gov/docs/ML0914/ML091420467.pdf

[xii] See *Corporate Renewable Procurement and Transmission Planning,* 2019, available at: https://windsolaralliance.org/wp-content/uploads/2018/10/Corporates-Renewable-Procurement-and-Transmission-Report-FINAL.pdf

[xiii] See: https://cleantechnica.com/2019/05/28/microsoft-announces-new-offshore-wind-energy-agreement-in-the-netherlands/

[xiv] ISO New England Inc., et al., Docket No. EL19-90-000, et al. See: https://www.ferc.gov/CalendarFiles/20191017104251-meeting-summaries.pdf

[xv] Link to the Q&A - https://www.njoffshorewind.com/questions-and-answers/