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VIA ELECTRONIC MAIL:

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Comments from Con Edison Transmission, Inc.
in Response to
New England States Transmission Initiative,
Request for Information to Integrate Clean Energy Resources

Comments on Changes and Upgrades to the Regional Electric Transmission System Needed to Integrate Renewable Energy Resources

Con Edison Transmission ("CET") is responding to this request for information as a Transmission Developer experienced in offshore wind transmission and developing transmission solutions for New England. CET has participated each of NYSERDA's OSW procurements as an active transmission partner with an offshore wind developer. CET has brought considerable expertise to our OSW partners to propose reliable, effective interconnections into the New York transmission system.

Through our affiliate, NY Transco (CET is the largest owner) owns and operates overhead transmission in NY and is currently constructing transmission in the mid-Hudson region. NY Transco also has six active transmission proposals in the LIPA PPTN solicitation that were deemed viable and sufficient by the NYISO. CET is the developer of the Clean Link New Jersey project which was proposed in the PJM-BPU solicitation for offshore transmission networks. While the New Jersey BPU declined at this time to move forward with any transmission corridor solutions, it acknowledged the value and importance of these solutions and signaled its intention to pursue them in the future. Con Edison's Clean Link New Jersey project was identified in the PJM evaluation materials as one of the most cost-effective proposals to deliver OSW energy to the onshore PJM grid using a robust transmission corridor, and one of the first proposals to offer an offshore AC mesh network for reliability.

CET is also the developer of the Maine Power Link project and the Maine Power Express project which are innovative projects that deliver large amounts of renewables to the ISO-NE grid in Maine, with extension options to the transmission grid in Boston. For over 5 years, CET has been an active developer of innovative transmission solutions that deliver renewable power to customers in New England.

1. Comment on how individual states, Participating States, or the region can best position themselves to access U.S. DOE funding or other DOE project participation options relating to transmission, financing, technical support, and other opportunities available through the federal Infrastructure and Investment Jobs Act; and

There are several DOE funding opportunities and loan programs that would support transmission projects needed to integrate clean energy projects. While each of these programs is unique with respect to eligibility and what it can offer to advance transmission, a common element in unlocking the potential of these programs will rely on the successful coordination between Participating States, generators, and transmission developers. As a Transmission Developer, we offer some specific comments on DOE programs, how each could facilitate coordinated transmission in New England, and what the Participating States can do to capture these benefits, particularly for integration of offshore wind.

- **The DOE Transmission Facilitation Program**, created in the Infrastructure and Investment Jobs Act is a $2 billion fund that positions the DOE to serve as an anchor tenant for transmission capacity until that capacity can be resold to other subscribers. This concept could be useful in New England to establish cost recovery certainty for coordinated transmission while States determine voluntary cost allocation. The anchor tenant concept can also potentially serve as a temporary construct that allows smaller voluntary C&I customers to subscribe to transmission capacity, followed by backstop subscription by the States through applicable T&D utilities. In order to avail itself of this program, Participating States would likely need to pursue the merchant transmission business model and/or bundled transmission and generation. As we describe in question number 2, we think procuring independently owned transmission utilizing cost-based regulated rate structures is a more cost-efficient model that protects ratepayers. It is also worth noting that the TFP program is currently underway and the funds are limited. It is likely the funds could be targeted toward larger, interregional DC projects elsewhere in the country and may not be broadly available.
- **DOE Infrastructure Loan Programs,** are available through existing programs as well as through the more recent Inflation Reduction Act. These programs can provide loan guarantees to help deploy large-scale energy infrastructure projects in the United States, some of which have already been utilized for the construction of new transmission facilities. Under the Title 17 Innovative Energy Loan Guarantee Program, the DOE is authorized to provide loan guarantees to projects that will expand and improve the transmission grid. Through these programs, the LPO can offer borrowers access to debt capital, flexible financing customized for the specific needs of borrowers, and valuable expertise in energy infrastructure project development. However, it is unclear whether a project can receive loan guarantees in advance of selection.
- **Funding to Support State Permitting,** is offered through both the Infrastructure and Investment Jobs Act as well as through the Inflation Reduction Act. This has potential to expedite the siting of transmission to support offshore wind and other renewables. States can and should apply for this funding, and industry participants can serve as partners and advisors in that endeavor.
- **PTC and ITC Incentives,** were added in the Inflation Reduction Act to include transmission connected with clean energy projects, and an additional 10% adder for utilization of brownfield sites. Particularly with strategic interconnection locations along the New England coast, the utilization of brownfield sites to interconnect offshore wind is a near certainty. The Participating States can facilitate capturing these incentives by anticipating the need for a commercial relationship between independently owned and operated transmission with offshore wind generation. There are a number of ways this commercial relationship could be facilitated post-procurement using a simple TSA, with flow-through cost recovery.

2. Comment on ways to minimize adverse impacts to ratepayers including, but not limited to, risk sharing, ownership and/or contracting structures including cost caps, modular designs, cost sharing, etc.

Establishing independent ownership and operation of transmission for offshore wind, including onshore transmission as well as the converter stations and transmission cables that extend offshore, is vital to protecting ratepayers and minimizing cost.

Incentives must be aligned to achieve efficient and reliable outcomes for customers. OSW generator owners will prioritize commercial contracts to achieve their own maximum value, as it is in their best interest to do so. Transmission owners that are independent of the generation assets will be incentivized to prioritize reliable operation of the transmission grid for all customers connected to it – both supply and demand – and are compensated, generally, independent of usage. Transmission owners are prohibited from providing preference to particular generation suppliers. Decoupling generation and transmission ownership clarifies the long-term interests, keeping generation owners focused on optimal performance of its generation assets and transmission owners focused on transmission asset availability and efficient use in the interest of customers. It also keeps the appropriate expertise aligned with the asset.

Independent ownership is also good for grid design and future investment, especially as transmission links are made offshore between wind farms, and between regions. The independent transmission model leverages the expertise of transmission operators throughout the life of the asset for the benefit of customers and reliability. This model provides a more reliable and efficient mechanism to modify and improve transmission assets – which will certainly arise over the next 25 years.

Importantly, transmission can also be recovered over a longer life, typically 40 or 50 years, under regulated rate structures as opposed to merchant models where cost recovery spans a shorter tenure, such as 20 or 30 years. The regulated transmission model provides customers with an option to spread the cost over a longer time period, resulting in savings and lower annual customer bill impact.

Transmission can be independently developed without adding risk to offshore generation development and meeting offshore wind goals. Transmission and generation may be developed and constructed together, in partnership, or in close coordination to minimize or eliminate project on project risk. Similarly, the offshore transmission components can be operated under a single O&M provider to ensure consistent and reliable operations and maintenance. Dispatch of the generation and transmission would be administered by ISO-NE.

Under this model, the objective remains to capture the full federal Investment Tax Credit (“ITC”) benefits available for an offshore wind generation project, inclusive of any qualifying associated transmission investment. We believe this full benefit can be preserved through innovative commercial structures and close coordination between transmission and generation developers, while maintaining this independent ownership model. Furthermore, policy discussions continue at the federal level about the need for a separate ITC for transmission needed to deliver renewable energy; such a change would simplify the construct and remove any remaining obstacles to adopting model for OSW the benefit of customers.

3. Identify the advantages and disadvantages of utilizing different types of transmission lines, like alternating current (AC) and direct current (DC) options for transmission lines and transmission solutions. Should 1200MW/525kV HVDC lines be a preferred standard in any potential procurement involving offshore transmission lines?;

HVDC is widely becoming the preferred technology to interconnect offshore wind because of the distance of offshore wind leases to shore and the many offshore and onshore constraints along potential routes. HVDC technology drastically reduces line losses over long distance compared to HVAC, and it maximizes power delivery within a small geospatial footprint. This is essential to accommodate both offshore constraints as well as limited landfall opportunities in and around dense shore communities. HVDC technology also has black start capabilities that enhance reliability. Despite the additional cost of converter stations, HVDC is also more cost effective than HVAC for offshore wind due to the need for fewer cables and the reduction in line losses, and HVDC is more easily placed underground through shore communities. Unless the single largest contingency limit of 1200MW is changed in ISO-NE, we don't believe it is necessary to utilize 525kV DC lines; a lower voltage around 350kV is adequate for this level of injection.

It is also important to emphasize that HVDC cables can reliably be co-located in a common offshore to onshore corridor to minimize impact to the surrounding environment and communities, and streamline the permitting process.

However, HVDC is not as cost-effective at creating offshore networks. While some have proposed offshore networks involving HVDC, the cost and lack of development of HVDC breakers limits the feasibility and affordability of the HVDC technology. HVAC is economical for connecting offshore wind farms on the AC side of the HVDC converters. A mesh network of these HVAC linkages is a cost effective method to introduce a level of reliability and resiliency to offshore wind.

4. Comment on whether certain projects should be prioritized and why. For example, should a HVDC offshore project that eliminates the need for major land-based upgrades be prioritized over another HVDC offshore project that does not eliminate such upgrades;

In seeking transmission solutions for offshore wind, the Participating States should be thoughtful and deliberate about what needs are being addressed. The cost effectiveness of a solution that addresses the defined need should be prioritized among other factors such as constructability, impact to the community / environment, and reliability and resiliency.

The hypothetical situation presented in this question suggests that an HVDC offshore wind transmission solution could eliminate planned onshore upgrades to the existing transmission solution, however it is unclear in this hypothetical what the drivers were for said planned upgrade. It is certainly true that large interconnections (HVAC or HVDC) may trigger new upgrades to the existing system because the transmission system may not have been originally designed for that injection. Depending on where these interconnections are made, some projects may trigger more upgrades than others and this should absolutely be considered in the cost effectiveness and overall reliability value of competing solutions. It should be noted however, that system upgrades can often have multiple values, and in some cases strategic investment in local system upgrades can be a cost-effective solution to solve local needs and prepare the system for offshore wind.

Another key priority is the impact to the surrounding community and environment, not only for their long-term benefit but also as an indicator of the viability of the project. Flexibility and expandability of the solution should be prioritized as well. This is particularly important to leverage the concept of power corridors, where a single offshore route, landfall location and onshore corridor can be leveraged to site two or more HVDC lines. Ignoring this coordinated approach could result in single export cables that monopolize key routes and prohibit superior, future solutions of scale needed for achieving the long-term offshore wind resource plan.

5. Identify any regional or interregional benefits or challenges presented by the possibility of using HVDC lines to assist in transmission system restoration following a load shedding or other emergency event and particularly from using the black start capabilities of HVDC lines in the event of a blackout;

HVDC lines bring benefits of better controllability than the AC lines. This benefit when coupled with newer generation of offshore wind technology can provide other grid benefits such as black start capabilities. Our existing AC system relies on spinning reserve of fossil fuel generation that create power quality and reliability support for today's operators. As fewer fossil fuel generators are built and many retire, and our generation mix include more renewable energy, retaining black start capability becomes a key consideration. When HVDC lines are connected to advanced Voltage Source Converter (VSC), they become capable of helping with grid restoration to support isolated AC grid sections with substantial loads fully independent from local generation. VSC technology converters are capable of generating AC voltages without the need to rely on an AC system. These VSC HVDC converters when connected to newer generation of offshore wind turbines that have the grid forming technology can provide the same blackstart capability as conventional generators. The new generation offshore wind turbines come with electronics that do not need external auxiliary power supply and are considered grid forming. Wind turbines when placed in grid-forming mode can set grid voltage and frequency and, if necessary, operate without power from the electric grid. Additionally, the full VSC converter capacity can then be utilized to support the AC grid with both reactive and active power during restoration. The fast voltage control by the converter reduces voltage dips during energization, and over voltages as the grid is gradually expanded during the restoration process. The VSC converter station acts as a strong and fast support point for the islanded grid in terms of reactive power.

6. Identify the benefits and/or challenges presented by using land based HVDC lines or other infrastructure to increase the integration of renewable energy (other than offshore wind) in New England to balance injections of offshore wind;

HVDC lines that enable injections of distant, firm sources of generation, such as hydropower, help to create a diversified resource portfolio that would likely provide better reliability and better overall coverage of renewables for the region. Interregional HVDC links also improve reliability and resiliency between regions. HVDC lines and infrastructure are useful way to transmit large capacities of renewable energy long distances with lower losses and minimal short circuit addition to the Grid. They can be great ways to connect two grids or two areas together and having controllable power flow with system isolation to avoid transient propagation. The converter provides strong and fast reactive power to help support system voltage. Land based HVDC lines can be bidirectional so accommodating sharing of supply between different load areas. Additionally, HVDC transmission lines can often move more power in a smaller right of way than AC transmission lines.

Challenges for HVDC are often real estate and cost of the converter stations. HVDC under system contingencies cannot have various contingency ratings like the AC lines. It does not have long time or short time emergency ratings and cannot respond in the similar manner as our AC lines. This limitation inhibits HVDC's capability to change power flows during contingencies like the loss of line (N-1) event. HVDC has proven to be a great way to get renewable power in between load areas because of its ability to be isolated from the system, its ability to control voltage, and the frequency of its endpoints as required to match or interface systems.

System operators would need to adapt their models and software systems to adapt to both AC and DC systems. Currently DC is typically a long generator lead line or an import cable from a another region which is operated much like long generator lead line.

7. Comment on the region's ability to use offshore HVDC transmission lines to facilitate interregional transmission in the future;

We think the pursuit of HVDC transmission lines to facilitate interregional transmission between ISO-NE and NYISO should be planned after more offshore wind projects come into service, and more robust transmission infrastructure is built to support near-term offshore generation development. Of immediate focus should be the creation of transmission corridors to co-locate HVDC lines from offshore generation to strategic POIs on the existing grid. Offshore, HVAC mesh networks are more cost effective to enhance reliability among the offshore resources. Especially among the projects in the Massachusetts lease areas, HVAC network connections between offshore substations can be a cost-effective step to allow for some offshore wind production to flow over other lines in the event of outages, improving reliability and operational flexibility. Indeed, because some of these wind projects will serve NYISO, creating HVAC offshore network connections between these projects will in effect create a reliability link between resources serving different regions, and we believe will be mutually beneficial.

Offshore HVDC connections between regions will be expensive and require specialized HVDC offshore technology that is not yet commercially viable. As with all interregional projects, significant challenges remain with respect to cost allocation and operational coordination. Further, such large interregional connections won't be of value until key offshore to onshore corridors are established and a foundation of HVAC connections among adjacent wind farms are built. In the future, these interregional HVDC connections may be highly valuable, and should be considered in long-term master plans for offshore wind.

8. Comment on any just-transition, environmental justice, equity, and workforce development considerations or opportunities presented by the transmission system buildout and how these policy priorities are centered in decisions to develop future infrastructure;

CET is experienced and comfortable with developing transmission infrastructure that meets the requirements of public policy objectives including environmental justice, and workforce development considerations. Transmission solutions for offshore wind can prioritize environmental justice and equity in its design, and any competitions for transmission solutions should feature an open and transparent dialogue to ensure these needs are clear and prioritized among the top criteria for any selected solution. Transmission development for offshore wind can and should prioritize workforce development and provide economic development to surrounding communities. Guidance on specific priorities of the Participating States in these areas should be made available in a detailed fashion so that developers can fully incorporate them into transmission solution designs and development plans accordingly.

9. Comment on how to develop transmission solutions that maximize the reliability and economic benefits of regional clean energy resources.

Comprehensive transmission solutions can optimize cost-effective upgrades that may enhance the overall reliability and resiliency of the electric grid, and seek to interconnect low-cost renewable resources at locations that avoid congestion and thereby lower the overall cost of energy for customers. Transmission developers are skilled at developing such solutions through experience and thorough technical and economic analysis of solutions. To the extent Participating States and / or ISO-NE can provide guidance on reliability needs or strategic interconnection points of interest, transmission developers can prioritize this input to develop solutions that best fit the Participating States' needs.

Comments on the Draft MOWIP:

10. Identify potential Points of Interconnection (POIs) in the ISO-NE control area for renewable energy resources, including offshore wind. What are the benefits and weaknesses associated with each identified POI? To the extent your comments rely on any published ISO-NE study, please cite accordingly;

For questions 10-12, we believe that needs-based competitive transmission solicitations are most effective at identifying strong and cost-effective transmission solutions. Needs-based solicitations outline the needs and objectives of the participating States, and private developers leverage experience and innovation to develop solutions. This is different from solutions-based solicitations that utilize (typically) ISO/RTO studies to identify a transmission project of interest, and then request developers to compete on price and execution.
The value of a needs-based solicitation for offshore transmission is best illustrated by New Jersey BPU and PJM's joint SAA procurement for offshore transmission that garnered 80 proposals from 13 different developers. The extensive evaluation documentation published by PJM highlights the innovation and optimization that can be achieved through a competitive transmission process for offshore wind. Con Edison Transmission wishes to compete for offshore and onshore transmission solutions in New England and thus prefers to not comment on its preferred POI or route strategy in this public RFI.

11. Similarly, comment on whether there are benefits to integrating offshore wind deeper into the region's transmission system rather than simply interconnecting at the nearest landfall (*e.g.*, using rivers to run HVDC lines further into the interior of New England). If there are enough benefits to make this approach feasible, please comment on any obstacles, barriers, or issues that Participating States should be aware of regarding such an approach;

See answer to number 10.

12. Identify likely offshore corridor options for transmission lines. Please comment on the potential for such corridor options, include size of the corridor footprint and potential number of cables that can be accommodated, to minimize the number of lines and associated siting and environmental disturbance needed to integrate offshore wind resource. For any offshore corridor identified, please indicate how the corridor avoids or minimizes disturbances to marine resources identified in the applicable plan, including the Connecticut Blue Plan and the Massachusetts Ocean Management Plan;

See answer to number 10.

13. Identify strategies to optimize for future interconnection between offshore converters, either AC or DC, to permit power flow between converters to facilitate the transmission of power from offshore to multiple POIs as needed. Similarly, comment on the ability of offshore converters from competing manufacturers to communicate with one another in this future case;

We recommend utilizing AC links between different offshore stations to increase reliability and operational flexibility between offshore generation resources. HVAC links can be achieved among the offshore wind farms in the Massachusetts lease areas as they are located within the 40 miles of each other, which is within the range of where HVAC makes economic and technical sense. These connections can be made on the AC side of the offshore substations which should eliminate the need to establish communication between HVDC converter stations from competing manufacturers. These connections can be right-sized to deliver approximately the capacity value of the respective wind farms, thereby providing the grid with reliability value without the need to oversizing the AC links or the HVDC export cables. For instance, in New York, the meshed ready design anticipated by NYSERDA and informed by industry participants contemplates 300MW AC links which provide this capacity value in a cost-effective way.

Utilizing DC links between offshore substation is not recommended as the technology to do this is not commercially viable, and therefore would be cost prohibitive and likely less reliable.

14. Comment on the benefits and/or weaknesses of different ownership structures, such as a consortia of developers with transmission owners or use of U.S. DOE participation as an anchor tenant through its authorizations in the federal Infrastructure and Investment Jobs Act, for new offshore transmission lines;

We strongly recommend establishing a principle of independent transmission ownership for offshore transmission. This independent ownership can be established between partners or single independent transmission developers, as is the case in the New Jersey solicitation. As described in more detail in question 2, independent transmission ownership ensures incentives are aligned with customers' needs for reliable and economic operation of the grid. Further, transmission cost can be recovered through regulated rate structures over a longer time horizon (40 years or more) which achieves considerable cost savings to customers overtime.

15. Comment on cost allocation mechanisms that would prevent cost-shifting between the states based on their policy goals and ensure that local and regional benefits remain quantifiably distinct. How should any future potential procurement identify and distinguish local, regional, and state-specific benefits (e.g., reliability) such that ratepayers only pay for services that they benefit from?

As a transmission developer, we advocate for establishing agreed upon, clear cost allocation formulas that minimize changes over time and provide customers and the investment community with certainty about cost recovery to support successful development and operations of critical infrastructure. Cost allocation agreement has been established in many regions including MISO, PJM and NYISO. In all instances, there is some degree of socialization of costs commensurate with the socialized benefits of clean energy. We encourage New England to pull from these recent examples to find its own solution to demonstrate its commitment to developing this critical infrastructure and provide the investment community with certainty. We encourage New England to utilize the FERC construct for cost allocation and cost recovery, which has served other regions well and can facilitate voluntary State cost allocation.

16. Comment on the benefits and/or weaknesses of using a public-private partnership that might include one or more states or U.S. DOE as part owners with private developers or other sources; and

We believe public private partnerships work well when the public partner is a public power organization and can bring to the partnership working knowledge of transmission development and operation. We have entered into similar public private partnerships through our NY Transco partnership with New York Power Authority.

Other public private partnership structures have not been widely adopted for transmission development, so it is uncertain what value or challenges such a structure might bring. What we do know is that private developers have brought innovation and cost-effective transmission solutions to benefit customers.

17. Comment on the co-benefits of landfalling offshore transmission lines, such as improvements to reliability and/or resilience (*i.e.*, through the use of HVDC converters or otherwise), economic development (*e.g.*, port development, hydrogen production, *etc.*) and any local system benefits. Identify ways to measure and maximize these co-benefits when evaluating transmission buildout.

We think is absolutely essential to develop strategic transmission corridors that anticipate co-locating HVDC transmission lines through offshore routes to a common landfall location and through onshore corridors to strategic POIs. First and foremost, this approach minimizes the impact to the environment and surrounding communities, and improves project viability. It also lends itself to co-locating other important grid assets such as battery storage and hydrogen storage. Simply put this approach should be a focus if not a requirement of any offshore transmission solicitation.

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Respectfully submitted,

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