NEW ENGLAND REGIONAL TRANSMISSION INITIATIVE
NOTICE OF REQUEST FOR INFORMATION and SCOPING MEETING

Notice of Request for Information **New England Energy Vision**

Comments of Avangrid, Inc.
October 28, 2022

Avangrid, Inc. ("Avangrid") submits these comments to the New England Regional Transmission Initiative ("Initiative") established by five New England States[1] (collectively "the Participating States") in response to its Request for Information ("RFI"), in which the Initiative seeks information to inform exploration of investment in electric transmission infrastructure needed to facilitate the integration of renewable energy resources in New England.[2] Avangrid appreciates the opportunity to provide comments responding to the RFI and looks forward to continued active participation in this effort.

Avangrid is a leading, sustainable energy company with $39 billion in assets and operations in 24 U.S. states. Avangrid is part of the Iberdrola Group. Iberdrola, S.A. is an energy pioneer with one of the largest renewable asset bases of any company in the world. Avangrid has two primary lines of business, Avangrid Networks, Inc. ("Avangrid Networks") and Avangrid Renewables, LLC ("Avangrid Renewables").

Avangrid Networks owns eight electric and natural gas utilities, serving 3.3 million

[1] Connecticut, Massachusetts, Maine, New Hampshire, and Rhode Island
[2] *Regional Transmission Initiative,* Notice of Request for Information and Scoping Meeting, September 1, 2022 ("RFI").

customers in New York and New England, including The United Illuminating Company and Central Maine Power Company. It provides interconnection services to generators in its service territories, as well as participates in regional electric transmission planning in New York and New England. Avangrid Renewables is a leading renewable energy company that owns and operates a portfolio of approximately 8,000 MW of renewable energy generation facilities across the U.S. Avangrid Renewables also has a significant pipeline of onshore wind and solar as well as offshore wind projects under development, including the 800 MW Vineyard Wind 1, 1,232 MW Commonwealth Wind, and 804 MW Park City Wind offshore wind projects.

Avangrid hopes that the Participating States find these comments helpful in understanding the changes and upgrades to the New England regional electric transmission system that may be needed to integrate renewable energy resources, including but not limited to offshore wind resources.

I. Background

The New England States have set ambitious clean energy and decarbonization goals. To continue making progress towards these goals in the long-term, offshore wind generation is a resource that is likely to be essential given its hourly generation profile and opportunity for economies of scale. The RFI provides background on recent efforts in the New England region related to developing understanding and insights into offshore wind and related transmission development strategies and pathways. The RFI then seeks comments on a list of questions on various topics relating to, among other transmission-related topics, transmission planning and integration.

II. Comments on RFI

Avangrid organizes its reply comments in accordance with the RFI structure.

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

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, including but not limited to funding, financing, technical support, and other opportunities available through the federal Infrastructure and Investment Jobs Act.*

With the historic levels of federal funding supporting transmission, individual states, participating states, and the region are well positioned to leverage DOE funding opportunities including, but not limited to:

- IIJA Section 40106 Transmission Facilitation Program,
- 40103(b) Grid Resilience and Innovation Partnerships Program,
- Inflation Reduction Act Section 50152, Grants to Facilitate the Siting of Interstate Electricity Transmission Lines, and
- Section 50103 Interregional and Offshore Wind Electricity Transmission Planning, Modeling and Analysis Grants.

Working together, the Participating States can identify and emphasize to the DOE the regional benefits that a coordinated approach to transmission can provide to meet both state and federal climate goals and targets and enhance grid reliability in the region. Additional key actions that could be considered include embracing stated DOE priorities such as the Justice40 Initiative[3] and advancing good-paying jobs. Potential efforts led by the Participating States to convene and thoughtfully engage with a diverse range of stakeholders, including entities representing the interests of disadvantaged communities and industry on a continuing basis throughout the process would align well with the intent of the Justice40 Initiative. Similar convening efforts to develop a diverse and enduring workforce in the region through partnerships across industry and educational institutions including minority serving institutions might also be beneficial. Additional information on this topic can be found in response to Question 8 below.

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.*

Given the substantial investment that will be required as the generation fleet in the region transitions from legacy fossil fuel resources to thousands of megawatts of new renewable generation, a thoughtful approach to this transition that protects ratepayers will be key to its success.

[3] https://www.energy.gov/diversity/justice40-initiative

An important early consideration should be to develop a clear strategy that ensures all project designs are well-coordinated, sufficiently robust, and are readily expandable to accommodate future system needs and renewable generation development. This strategic design foresight will facilitate an efficient thoughtful expansion at the lowest cost to customers.

The experiences of other States can also be used to inform the process adopted by the New England States. For example, New Jersey, in partnership with mid-Atlantic grid operator PJM, has taken a modular approach in its current offshore transmission solicitation to ensure a thoughtful buildout that controls costs in a “no regrets” manner. Bidders were invited to propose onshore upgrades to existing facilities, onshore new transmission connection facilities, offshore new transmission connection facilities, and/or an offshore network. The bid process resulted in 80 proposals and the selection of a portfolio of onshore projects that will enable delivery of 6,400MW of offshore wind at a cost of approximately $1 billion.

The California Independent System Operator (CAISO) is also employing a modular approach in its current competitive solicitation for two HVDC solutions in the San Jose area. CAISO has asked bidders to design projects to meet the initial reliability needs of the project while also designing projects in a way that would accommodate a future state “Ultimate Plan” for the area that would connect the two HVDC projects to each other. Since there is not a current defined need, but a future need is anticipated, projects must accommodate the future state while controlling costs in the current competitive solicitation.

As explained further in the response to Question 13, New York's recent July 27, 2022 solicitation for up to 4.6 GW of offshore wind requires proposed HVDC projects to include the capability to be "mesh ready", thus anticipating the ability for an efficient future expansion. Given the expected modest initial cost increase for this design feature, the benefits of a future offshore mesh network buildout are expected to provide significant long-term savings to customers relative to expanding offshore wind interconnections in New York in a purely radial fashion.

Additionally, optimizing the use of transmission infrastructure with emerging technology such as Dynamic Line Ratings can efficiently maximize the operating capacity of transmission infrastructure based on near-real time ambient conditions resulting in a reduced need for generation curtailment that would otherwise be necessary using conventional seasonal equipment ratings.

Cost caps and cost containment mechanisms are additional tools for protecting ratepayers and are regularly employed in competitive procurements throughout the country. If caps are too restrictive, however, developers may increase project contingencies, and therefore overall prices, due to the higher risks of a fixed-price contract. Cost caps or containment mechanisms that incentivize prudent development while providing a mechanism for cost sharing of overruns resulting from unanticipated challenges can result in lower overall costs for a given project, protect ratepayers, and increase the likelihood that the project is successfully completed.

Mechanisms that enable transmission owners to obtain appropriate cost-of-service recovery for transmission upgrades supporting New England Public Policy investments can also lower risk and cost to ratepayers. The use of Construction Work in Progress (CWIP) reduces financing costs by improving project cash flow and reducing customer rate volatility relative to using Allowance for Funds Used During Construction (AFUDC). Avangrid's experience with Central Maine Power's (CMP) Maine Power Reliability Program (MPRP) is a case in point. Commenced in 2010 and predominantly completed in 2016, the $1.4 billion MPRP was the largest transmission construction project ever undertaken in Maine, more than quadrupling CMP's transmission plant in service, with the construction of four new 345 kV substations, one new 115 kV substation, and related facilities linked by approximately 440 miles of new transmission lines. FERC authorized this project to receive 100% CWIP, which eased pressure on finances because it allowed for the recovery of significant financing costs (both equity and debt) of construction during the construction period, thereby reducing long-term capital costs. CWIP also reduced the interest expense for customers, replacing non-cash AFUDC with cash earnings, spreading the impact of new plant over the entire construction period, reducing the total cost of the Project by an estimated $150 million, and reducing "rate shock" for customers in New England.

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?;*

For shorter routes with lower capacity needs, AC transmission lines are generally found to be the lowest cost solution. However, DC systems have several distinct advantages over traditional AC systems, particularly when power must be transmitted at a high capacity and/or over long distances. These advantages are primarily due to the fact that DC power is not limited by the reactive power losses inherent to AC power transmission, and which can severely limit the capacity of AC systems. Additionally, DC systems are able to make more efficient use of conductor capacity due to the absence of the AC "skin effect" phenomenon that increases the effective impedance of current carrying conductors.

Modern voltage source converter (VSC) HVDC systems also benefit from being readily dispatchable, for both real and reactive power flows, allowing for the flexible transmission of power between regions. This ability to control and direct power flow can be especially beneficial for off-shore "meshed" grid configurations where offshore wind energy can be diverted to different on-shore landing points based on real-time availability, pricing, and system resource needs. In addition to the real power (i.e., MWs) being dispatchable, VSC-HVDC systems can maintain a set voltage schedule and also have the capability to provide dynamic reactive power (i.e., MVArs), which can improve system voltages stability.

However, a DC system requires costly converter stations at the remote terminals of each transmission line(s) in order to interface with the AC offshore wind resource collector station(s) and the AC grid. Ultimately, a benefit-cost analysis would conclude whether an AC or a DC solution provides the most cost-efficient long-term value to ratepayers in consideration of future system needs.

In the current paradigm in New England, offshore wind developers are incentivized to focus only on individual project success at the lowest per-project cost, which is generally the shortest path to the onshore AC grid. This has resulted in a lack of strategic focus on long-term policy objectives to encourage large amounts of offshore wind development by multiple developers in an efficient manner. Specifically, the current approach results in multiple developer projects essentially competing for the same onshore interconnection points, with the least complex interconnection points being exhausted first. While this approach may result in lower initial costs for the first wave of wind projects, it can inherently result in an inefficient and costly system expansion as subsequent future offshore wind projects would require their own dedicated and progressively longer offshore cable routes with increasingly complex and more expensive onshore upgrades. Without a long-term strategy, this inefficient expansion would continue resulting in subsequent future projects becoming increasingly difficult to justify as cost challenges approach prohibitive levels.

As New England moves to a long-term bulk offshore wind development strategy, the relative benefits of an HVDC system will become increasingly appealing despite the high converter station costs. HVDC systems require fewer and smaller cables for a given amount of energy when compared to an AC system, thus reducing the impacts to marine environments on the seabed. These beneficial physical HVDC line attributes also result in reduced onshore overhead line impacts including the ability to use shorter towers and/or narrower corridors than needed for an equivalent AC transmission line. The lower cost per mile of HVDC also makes it better suited for long onshore underground installations when compared to HVAC.

The selection of transmission system voltage standards will be influenced by a number of factors including the established maximum capacity threshold at each onshore landing point (currently set by ISO-NE at 1,200 MW), the desired future offshore transmission system configuration, as well as equipment availability and standardization across manufactures. Now is the time to give careful consideration to the full long term strategic vision of the offshore system including consideration to build a robust meshed network interconnecting offshore wind collector buses and also the potential to expand the system into a future interregional offshore transmission network which could provide many additional long-term benefits.

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;*

Avangrid supports efficient and coordinated solutions to reliability and public policy needs over an appropriate longer term planning horizon (e.g., 20 to 30 years). Rather than focusing on specific POIs or short-term benefits, prioritization strategies for this transmission buildout should consider how each component fits into the larger portfolio of investments needed to realize the region's decarbonization commitments on time while providing maximum value to ratepayers. This long-term strategy will require the development of a robust Benefit Cost Analysis (BCA) to ensure an objective evaluation method of solution alternatives. Some important inputs to the BCA should include the costs of the project itself, network upgrades, and the benefits of the energy delivered from each solution. Additionally, other factors should be considered when comparing project alternatives including permitting complexity, ability to finance a project, the date when the project is required to meet the public policy need, and the projected in-service date. Ultimately, the final selection criteria that will be used to compare and prioritize offshore wind projects should be clearly communicated to all developers from the outset to ensure that the stated objectives are achieved.

Taking a long-term view of transmission needs in various future states can help inform decision making as well. As discussed earlier, New Jersey, New York, and California are taking future system needs into account when undertaking current solicitations. A modular approach ensures that as conditions are met for each set of upgrades to be built, previously constructed system elements can serve as building blocks and reduce the total overall costs for ratepayers.

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;*

Interregional HVDC lines can play an important role in system restoration after a load shedding or emergency event. The controllable nature of the electricity delivered through a converter station allows a system in need of power restoration following an emergency event to tap into an adjacent regional system for support, assuming that neighboring system is operating normally. While HVDC ties to intermittent offshore wind resources cannot compare to the stability benefits of an HVDC connection to a neighboring AC grid in the event of a system emergency, this tie to offshore wind can still provide valuable voltage stability or dynamic reactive support as the system restarts, potentially enabling a faster and smoother recovery for the overall system.

The potential further benefits of HVDC lines connected to intermittent offshore wind resources during a blackstart scenario would need to be confirmed by further study. Note that HVDC blackstart capabilities is an area of ongoing academic research.[4]

To our current knowledge, blackstart capability is a relatively inexpensive feature to build into HVDC converter stations. As such, this capability should be considered as a preferential feature in offshore wind project solicitations should engineering assessments find a black-start capability to be feasible and beneficial.

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;*

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[4] Sanchez Garciarivas, R.; Rasilla Gonzalez, D.; Navarro, J.A.; Soriano, L.A.; Rubio, J.d.J.; Gomez, M.V.; Garcia, V.; Pacheco, J. VSC-HVDC and Its Applications for Black Start Restoration Processes. Appl. Sci. 2021, 11, 5648. https://doi.org/10.3390/app11125648

The general advantages of HVDC are described in Response 3 above and are similar for both onshore and offshore systems, which include the ability to efficiently transmit power over long distances under tightly controlled parameters while also providing reactive support to enhance the stability of the AC system. The reduced loss characteristics of HVDC also permit the use of more compact transmission tower structures and a potentially narrower Right-of-Way (ROW), reducing the per mile cost and environmental impact when compared to a similar performing AC transmission line.

As mentioned, a key benefit of HVDC lines is that the power flow is controllable. The fact that the power can be controlled in a bi-directional manner makes HVDC systems an effective operational tool for balancing resources and load demands within New England and beyond into neighboring systems. For example, at times when electricity demand is high in load centers near the coast in the absence of sufficient OSW resources, the HVDC lines could direct power flow from onshore resources toward these load centers. At other times when the demand in coastal load centers is low and or there is a surplus of offshore wind, the direction of flow on these onshore HVDC lines can be reversed toward other areas in need or even to a remote onshore storage array that may be located in a less populated area where real estate and development costs are lower.

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

Technical potential exists for an offshore transmission backbone to be developed along the US eastern seaboard in a manner that is effective for customers. The National Renewable Energy Laboratory (NREL) Atlantic Offshore Wind Transmission Study[5] may result in insights when it is completed. Given the historical challenges and complexity in determining cost allocation for interregional transmission projects, Avangrid recommends the Participating States focus primarily on addressing the regional needs of New England, while being open to interregional coordination in the future. Note that the development of interregional transmission in the future should be conducted in a manner that does not slow down development of offshore wind generation projects, particularly projects already in development.

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;*

Many of the opportunities for federal funding under the IIJA and IRA contain, or are likely to contain, requirements that advance the Biden Administration's Justice40 Initiative, which seeks to deliver at least 40 percent of overall benefits from federal funding for climate and clean energy to disadvantaged communities. In order to meet these requirements and be in the best position to obtain federal funding, the New England

[5] https://www.nrel.gov/wind/atlantic-offshore-wind-transmission-study.html

states must also prioritize environmental justice and equity concerns in the transmission buildout. This can be achieved through public-private partnerships, including Environmental Justice provisions in RFP requirements, and analysis of project-specific and system-wide benefits.

Including requirements in procurements ensure project benefits are shared by disadvantaged communities. These requirements can focus on direct benefits from a project such as investment in environmental justice or disadvantaged communities or more general benefits created by a particular project that flow to these communities.

Achieving New England's ambitious decarbonization and renewable energy goals will require a transmission and generation buildout over several years, requiring a well-trained workforce. One of the best tools to create that skilled workforce while promoting a just transition is long-term partnerships among trade organizations, private sector employers, government stakeholders, and educational institutions that train the next generation of energy infrastructure workers and are structured to reach disadvantaged and environmental justice communities. A prime example of this is the New York Community Colleges Energy Equity Consortium (NYCCEE). NYCCEE is a consortium of 24 SUNY/CUNY community colleges, employers, community organizations, unions, faith leaders, and state and local governments. NYCCEE's goal is to build a "statewide skills training and jobs on-ramp for New Yorkers who have been left out of the energy transition."[6]

[6] https://nyccee.org/

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

One of the keys to developing transmission solutions that maximize reliability and economic benefits is to focus on long-term planning and robust scenario modeling. Several ongoing and completed studies, as laid out in the introduction to this RFI by the Participating States, have attempted to identify the transmission and generation resources that will be needed, and by when, to meet the region's clean energy needs while maintaining reliability and minimizing costs. These studies form an excellent baseline from which to prioritize projects, focusing on those that perform well across multiple scenarios.

Additionally, it is important that a transmission owner's near-term asset upgrade strategies are sufficiently robust to accommodate potential long-term future grid system needs which can typically be provided at a fractional incremental cost. Alternately, awaiting a future standalone public policy need justification for incremental transmission upgrades will likely result in an inefficient buildout of the system at a much higher total cost to customers. The recommended approach can take many forms, such as increasing the capacity of a line when performing upgrades to address near term asset condition or reliability needs including consideration of higher capacity conductors, structures, and hardware to accommodate future capacity needs. Transmission owners should be encouraged to consider opportunities for right-sizing of transmission projects for potential future needs in the ordinary course of planning system upgrades.

B. Comments on the Draft Modular Offshore Wind Integration Plan ("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;*

Avangrid defers to the various public studies conducted to this point that illustrate potential POIs and potential benefits and weaknesses as identified in those analyses.

In Maine, Avangrid is aware of the 2012 Deepwater Offshore Wind Report[7] with an extensive assessment of interconnection points for 30 MW or less and suggestion that larger projects in the 200-300 MW range most immediately might consider sites in Lincoln County. Further high-level injection analysis of potential POIs in Maine has been conducted as part of Maine's 2022 Offshore Wind Roadmap work in the Offshore Wind Transmission Technical Review – Initial Report.[8] In addition to the former Maine Yankee site infrastructure in Lincoln County, other potential POIs include the Maguire Road or Surowiec substations. These locations benefit from proximity to the existing 345 kV backbone infrastructure as well as their proximity to the coast.

The Maine coast is a logical POI for eventual BOEM lease areas in the Gulf of Maine, but the export constrained nature of Maine's onshore transmission grid limits

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[7] Section 4. Available at Offshore Wind Feasiblity Study (umaine.edu)

[8] Section 6. Available at Maine OSW DNV Offshore Wind Transmission Technical Review Initial Report.pdf

offshore wind to serving native Maine load and the small amount of remaining capacity at the constrained Surowiec South and Maine-New Hampshire interfaces. A coordinated onshore/offshore New England regional development of transmission to integrate renewable generation including offshore wind should include an assessment, plans, and investment to address these constrained interfaces.

ISO-NE has continued to produce analysis of potential POIs. These studies with potential POIs include the NESCOE 2019 Economic Study Request[9] that found 5,800 MW of offshore wind additions interconnecting at Montville, CT, Kent County/Davisville, RI, Brayton Point, MA, and Bourne/Canal/Pilgrim, MA have the potential to be accomplished without major additional 345 kV reinforcements. The ANBARIC 2019 Economic Study Request[10] also included analysis of offshore wind injection at the additional POIs of Millstone, CT and Mystic, MA. The ongoing ISO-NE 2050 Transmission Planning Study identifies various POIs for 2035, 2040, and 2050.[11]

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*

[9] https://www.iso-ne.com/static-assets/documents/2020/06/a4_2019_economic_study_offshore_wind_transmission_interconnection_analysis.pdf

[10] https://www.iso-ne.com/static-assets/documents/2020/03/a8_anbaric_2019_economic_study_prelim_results_marpac.pdf

[11] See slides 50-52 of https://www.iso-ne.com/static-assets/documents/2021/12/draft_2050_transmission_planning_study_scope_of_work_for_pac_rev2_clean.pdf

any obstacles, barriers, or issues that Participating States should be aware of regarding such an approach;

Benefits may exist to interconnecting further inshore but require further study and are likely to be case specific. The Champlain Hudson Power Express transmission project in New York, if continued to completion and operation, will provide valuable lessons in siting, permitting, and construction of using rivers for a HVDC transmission corridor. The higher costs of buried cables to connect to more robust infrastructure deeper inland will need to be assessed against the costs of infrastructure upgrades if interconnecting to weaker network infrastructure closer to shore.

A concern with this approach besides high costs would be the potential environmental impacts of running HVDC lines up rivers and whether these impacts can be appropriately mitigated. Many organizations are dedicated to protecting the rivers of New England and development will need to respect the environmental concerns of these groups regarding the impacts of transmission line construction, including not only acute impacts to aquatic life but also any potential risks related to stirring up old pollutants in rivers that often served as dumping grounds for various types of factory waste decades ago.

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;

Avangrid provides no comment on particular offshore corridor options but notes that valuable information resources for deriving potential offshore corridors include the Northeast Ocean Data Portal[12] and DOE's Energy Zones Mapping Tool.[13]

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;*

A "meshed" or networked offshore system configuration with multiple converter stations and multiple onshore landing points could create significant benefits related to system resiliency, power flow optimization, and flexibility. One approach to optimize for future interconnections is the "mesh ready" approach used in New York. New York officials have recognized the future benefits of a meshed offshore system, and as such are requiring bidders to account for that future state while developing traditional generation lead interconnections. In the New York approach,[14] the "mesh" happens on the AC side

[12] Northeast Ocean Data Portal | Maps and data for ocean planning in the northeastern United States
[13] Energy Zones Mapping Tool (anl.gov)
[14] New York Meshed Ready Technical Requirements are available at https://portal.nyserda.ny.gov/servlet/servlet.FileDownload?file=00P8z000000gjB1EAI

of the project before the connection to the offshore HVDC converter station, mitigating the need to have multiple converter stations communicate with each other.

In general, it is most straightforward and advisable to ensure that the remote terminals of each HVDC line are from the same manufacturer, reducing the need for coordination between different proprietary technologies. This concern can be avoided, for example, by ensuring that the "mesh" connections (assuming this configuration is selected) are made on the offshore AC wind resource collector bus side. This would allow each individual HVDC line to be of a single manufacturer without preventing the sourcing of other HVDC lines from different manufacturers at other points on the offshore meshed AC system to other onshore landing points. Although it may not be impossible for an individual HVDC line to have different remote end manufacturers, we would defer to a thorough future assessment to determine if this coordination between vendors with different proprietary technology could be done in an efficient and practical manner.

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;*

While different ownership structures may have some impact on project development, what matters more are the technical, financial, and experiential qualifications of the developer or consortia of developers. Robust qualification standards in requests for project proposals (RFPs) will help ensure successful project development.

Joint ownership of transmission can work and has precedent. In New York, New York Transco[15] is a consortium of incumbent investor-owned utilities that has provided a successful vector to developing jointly owned transmission projects in New York. In New England, New England utilities have in the past had collaborative ownership structures for major electricity infrastructure projects, including the HQ Phase I/II lines and various nuclear facilities constructed in New England. Joint ownership allows for dispersed risk and the ability to raise more capital to a wider group of entities. Recent offshore wind development has often been done through partnerships.

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?*

Finding a cost allocation mechanism that acceptably prevents cost-shifting between states as perceived by each New England state is a difficult proposition. A cost allocation framework should consider all beneficiaries of transmission solutions that have

[15] https://nytransco.com/

more than one value stream (e.g. projects that have reliability, economic, public policy benefits, and interconnection benefits) in allocating costs commensurate with benefits, and that recognizes that beneficiaries may change over time. One state should not be required to fund the public policies of another state and attempts to do so can derail a clean energy strategy. At the same time, there should not be free riders. One workable approach could be tiered benefits and payment according to tier. For example, in an RTO with three states, in which states A and B have public policies supported by the new transmission investment, and state C does not, costs associated with economic and reliability benefits could be allocated to all three states, while the costs associated with public policy benefits would be allocated to states A and B. In New England this might be a base allocation of costs for the standard reliability benefits akin to the pooled transmission facility regional network service allocation methodology, with incremental allocation of costs associated with public policy benefits (e.g., environmental value) allocated to those States based upon their policy goals.

However, recognizing that a future solicitation may be a solicitation sponsored by one or more states, and not a regional solicitation of a Public Policy Project under ISO-NE's tariff, states that participate in the selection of transmission solutions can of course accept free ridership of one or more other states as a pragmatic means to advance investments in needed infrastructure.

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;*

A benefit of a public-private investment partnership is the potential to more directly engage federal, state and private resources to expedite permitting and development of large-scale projects. This development benefit can be helpful for projects that span multiple utility service territories. Further, such a public-private partnership may help with public stakeholder acceptance of transmission projects (if conveyed and seen as a societal good) and may help garner more government support for transmission projects.

Additional benefits may include helping to defray customer ratepayer costs if participating states or U.S. DOE use capital not raised from electricity rates to help pay for the projects. Further, public-private partnerships can help distinguish a project to be eligible for some grants.

However, governmental entities can be slower to act and secure investment dollars than a private entity; and thus a public-private partnership may be slower in deploying capital investment and executing project development than a solely private entity. Part of this challenge includes needing to match the timing of federal or state dollar allocations and long budgeting cycles from specific programs or sources. For example, funds allocated for transmission projects and the award of those dollars has to line up with the development of a project that has private developer interest.

Rather than partnering on specific projects, another potential model for state and federal partnership is to have the state or federal entity clearly identify a project route and parameters prior to a project's initiation, and pair project selection and approval with a streamlined permitting process. Because the project has been identified as necessary and sited at the direction of or in collaboration with a government authority, permitting can proceed more quickly, substantially mitigating one of the most major risks for any transmission project.

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.*

A planned offshore transmission system utilizing HVDC could enable large incremental offshore integration (e.g., at least 1200 MW increments), thereby leading to greater economic development opportunities. It could also enable more efficient use of scarce onshore landing points with access to robust onshore transmission. Additionally, it could significantly reduce the necessary onshore upgrades, and help mitigate environmental impacts and project risks.

If seeking co-benefits as part of project development it would be helpful to identify these co-benefits and any associated rubric for selection in any solicitation.

Economic development co-benefits may include indirect construction (e.g., port development), and community economic commitments made by a project, which could include property tax commitments, telecommunication investments, or commitments to student education.

III. Conclusion

Avangrid respectfully thanks the New England States for the opportunity to provide information that may be of use in formulating approaches to advance transmission infrastructure in New England so as to better integrate clean energy resources. Avangrid fully supports this initiative and recognizes the need to modernize the region's transmission system for a new energy future. By combining long-range planning that prioritizes a forward-looking approach to system upgrades and harnessing the power and innovation of competition for new buildouts such as a meshed offshore grid, the region can achieve its goals on time while delivering the best value for ratepayers.