LS Power Grid Comments in Response to
New England States Transmission Initiative
Request for Information
October 28, 2022

Introduction

LS Power Grid, LLC ("LS Power Grid") is pleased to provide the following comments in response to the New England States Transmission Initiative Notice of Request for Information as revised September 22, 2022. LS Power Grid is an active participant in competitive transmission processes throughout the United States.

- An LS Power Grid subsidiary was a participant in the New Jersey State Agreement Approach ("SAA") Process, which planned for transmission expansion for 7,500 MW of Offshore Wind ("OSW") delivery to New Jersey. A case study of the New Jersey SAA Process is included as Attachment A.
- LS Power Grid subsidiary is participating in the NYISO Long Island Export Public Policy Transmission Need ("PPTN") Process, which is planning for integration of at least 3,000 MW of OSW into the New York grid. A case study of the Long Island Export PPTN Process is included as Attachment B.

LS Power Grid provides these comments from the perspective of a transmission developer, with lessons learned from other OSW transmission planning processes. A broad Request for Proposals ("RFP) for OSW transmission is the best approach to OSW transmission planning to achieve the New England States' goals. An open-ended approach will allow the market to identify innovate approaches, and will also provide other benefits such as cost containment and risk mitigation. The RFP should have as few constraints as possible and seek solutions for OSW transmission to identify the ultimate, least-cost least-risk plan for New England.

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

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.

   In competitive transmission processes, transmission developers and utilities have been willing to provide significant risk mitigation to ratepayers through a variety of cost containment measures.

   The table on the following page identifies cost containment proposed by developers in the New Jersey SAA Process (described more fully in Attachment A), which included hard cost caps, caps on the rate of return on equity, caps on the amount of equity in rates, and even caps on the total annual revenue requirement. This includes both non-incumbent transmission developers and incumbents such as PSEG and ConEd,[1] *which have not proposed these types of risk mitigation measures for traditional cost-of-service regulated projects.*

[1] ConEd subsidiary Rockland Utilities is an incumbent utility in New Jersey.

Table 3. **Cost Containment by Developer**

Cost Containment by Developer[1]

Category	Anbaric (2&3)	NEETMH (1A,2&3)	LS Power[3] (1B&2)	PSEG-Orsted[4] (2&3)	MAOD (2&3)	RILPOW[5] (1B)	ConEd (2)	APT[6] (2)
Project Cost Cap ($2021)	$84M-$2.2B (125-130% of bid cost range applies to PJM modeled proposals)	$84M-$5.3B (range applies to PJM modeled proposals)	$1.3-2.2B (range applies to PJM modeled proposals)	$4.8-7.1B (range applies to PJM modeled proposals)	$6.6B (115% of bid cost; applies to MAOD #321)	$28M-1.3B (partial cap; range applies to PJM modeled proposals)	$824M (soft cap, 30% of bid cost)	
ATRR Cap			Capped for first 10 yrs					Capped for entire 40-yrs
ROE Cap (inclusive of adders)	8.5% (relieved from the cap if Anbaric can't secure financing with current cap. Structure)	9.8%	8.95%	9.9% Capped for first 15 yrs		9.75% Capped for first 6 yrs		
Equity Ratio Cap	45%	40% (1A) 30%[2] (2&3)	40%	48.35%		50%		
O&M Cap		Capped for first 15 yrs						
Exceptions	Taxes, AFUDC, Escalation, Uncontrollable force, SOW change	Taxes, AFUDC, Uncontrollable force, SOW change	Property Tax, Uncontrollable force, SOW change,	Taxes, AFUDC, Escalation, Uncontrollable force, SOW change, Award Delay, Forex risk	Taxes, AFUDC, Escalation, Uncontrollable force, SOW change	Taxes, AFUDC, Escalation, Uncontrollable force, SOW change	Taxes, AFUDC, ROW, Uncontrollable force, SOW change	Uncontrollable force, SOW/change, One-time adjustment factor
Other Mechanism/Issues	ROE to be increased or reduced based on actual project cost and schedule delays; ROE cap applies to AFUDC	Debt expense sharing mechanism; Seek recovery of Depreciation, Cost of Debt if actual project cost exceeds cap; AFUDC capped by 100% debt	If actual costs in any given year are lower than TRR Cap, the difference is rolled forward; ROE cap applies to AFUDC	Project cost cap subject to change based on inflation, foreign exchange rates; ROE to be increased if actual cost is lower; ROE cap applies to AFUDC	Open to alternatives, e.g., multiple-tier cost allocation structure with higher hard cap	Project cost cap applies to the material & equipment and construction & commission cost of certain components; ROE cap applies to AFUDC	Sharing mechanism only effective when cost is 5% higher than bid amount.	ATRR schedule subject to change based on foreign exchange rates and commodity price fluctuations

Note: (1) AE, Transource, PPL, PSEG, and JCPL proposals are not included in this table due to lack of cost containment.
(2) NEETMH option 2 & 3 proposals offer a soft equity cap of 30% - stated as a target.
(3) Only LS Power option 1B & 2 proposals offer the caps above, option 1A proposals capped only project cost.
(4) PSEG-Orsted only offers the above cost containment for the combined Option 2 and 3 proposals. The above cost cap applies to #683 and 871. PSEG Option 1A have no capping mechanism.
(5) RILPOW offers partial project cost cap for #171 and #490.
(6) APT's ATRR cap increases by 0.5% annually, based on the first COD year RR cap.

https://www.pjm.com/-/media/committees-groups/committees/teac/2022/20220906/nj-osw-financial-analysis-report-september-final.ashx

The Long Island Export PPTN Process (described more fully in Attachment B) also provided an opportunity for developers to proposed cost containment under the NYISO tariff, which has not been provided for typical cost-of-service transmission outside of a competitive process.

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?

There is not a simple answer for when an AC or DC approach is best suited to a specific situation. In general, the existing transmission grid is AC and an AC approach would provide a low cost solution that integrates seamlessly with the existing grid. An AC approach also ensures compatibility with future transmission system elements, as discussed in response to Question 7 below. However, due to technical limitations, AC cables are less effective over very long distances, in which case a DC approach would be required. A DC approach typically has a higher cost due to the cost of DC converters, which is somewhat offset by savings in cable procurement and installation cost due to having fewer cables. DC equipment also brings other benefits such as controllability and black start capability.

LS Power Grid has proposed both an AC approach and a DC approach for OSW. In the New Jersey SAA Process, an LS Power Grid subsidiary identified significant cost savings from an AC approach, and was the only developer to propose an entirely AC solution. In the Long Island Export PPTN Process, an LS Power Grid subsidiary proposed a DC solution for new transmission lines on the interface between Long Island and Westchester County due to its low cost per MW of transfer, *high controllability, and other benefits.*

Constraining the process by having a requirement such as requiring 525 kV HVDC lines could limit innovation in proposals and result in a potentially higher-cost to ratepayers.

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.

The sequencing of projects should be a function of maximizing benefits for ratepayers. LS Power recommends the New England States issue an open-ended request for proposals, similar to the New Jersey SAA Process identified in Attachment A, allow the market to identify the least cost, least risk plan. Once the transmission plan has been identified, it can be described to generators in future OSW procurements, allowing for generators to bid for delivery to the selected POIs. Transmission construction can be phased ahead of when it is needed by contracted OSW generation. Priority of projects should not be based on items such as the need for on-shore upgrades, but should be sequenced to match generation.

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.

One advantage of having on-shore HVDC converters is the ability to provide ancillary services such as black start capability to the network in the event of a blackout. However this benefit should be considered as an additional benefit if such an approach is identified as the best plan, and not a driver of the overall technology selection for the system.

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

One drawback of offshore HVDC transmission lines is increased complexity for future interregional transmission. HVDC breakers are not currently commercially available, and if they are developed they likely present other challenges in offshore deployment due to their size. As identified in Question 13, HVDC converters do not currently have a standard for compatibility among different manufacturers. AC transmission lines offer more flexibility with regard to future system compatibility. The use of AC transmission lines for interregional transmission in the future (even in combination with offshore HVDC transmission) could avoid this issue.

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

Having developers identify on-shore and off-shore solutions for OSW transmission is the best way to develop transmission to maximize the reliability and economic benefits of regional clean energy resources. System reliability and economic benefits can be analyzed in the evaluation of proposals. Reliability is not a specific metric in that its difficult to measure the reliability benefit of discrete elements, but the analysis should ensure that all required reliability upgrades are identified, and the cost of such upgrades included in the evaluation of proposals and identification of the best plan. Production cost modeling of proposals will allow for identification of economic benefits of alternatives, including reduced congestion or reduced curtailment (and therefore higher delivery) of clean energy resources.

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.

    Both the New Jersey SAA Process and New York Long Island Export PPTN Process provide lessons learned on the approach to POIs.

    In the SAA Process, PJM and New Jersey identified default POIs as well as injection amounts that informed, but did not constrain the process. The RFP explicitly contemplated the possibility of alternative POIs. Interestingly, none of the proposals exactly matched the default POIs and injection amounts. A large number of alternative POIs were identified, with more than half of the analyzed scenarios including at least one alternative POI. By allowing developers the latitude to identify innovative approaches, there was a wide variety of plans with a wide variety of capital costs and lifetime costs. As discussed in Attachment B, the most expensive plan on a new present value basis was an incumbent plan that had nearly three times the expected cost of the least cost plan.

    Similarly, the Long Island Export PPTN Process identified expected POIs for OSW in Long Island for an expansion case, which provided for up to 6,000 MW of OSW injection into Long Island. This case provided guidance to proposers, but did not constrain the process, and developers proposed a wide variety of proposals to integrate OSW generation from different POIs.

    The New England states should take a similar approach, and provide the MOWIP and other analysis to bidders to inform the process, but they should not constrain the process. The market should be used to identify the POIs for the best plan.

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.

    There are likely benefits to integrating offshore wind deeper into the regional grid, the primary benefit being reduction of on-shore upgrades. This is particularly likely to be the case after interconnection points near the shore become saturated with offshore wind generation. As identified in response to Question 9, reliability and economic benefits should be considerations in the evaluation of proposals.

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.

    The best way to identify corridor options and associated impacts would be through evaluation of actionable proposals from developers. Avoidance areas can be identified in the proposal requirements as necessary. Having real world, actionable proposals will allow for the identification of tradeoffs between corridor options in the identification of the best plan.

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.

The New Jersey SAA Process described in Attachment A included the ability for developers to proposal "Option 3" proposals for interconnections between offshore converters. This allowed a real world evaluation of such connections based on actionable proposals, and would allow the New England states to identify the benefits and costs of such elements in the near term.

To preserve the potential benefits of future interconnections, a planning process should value flexibility and expandability. Currently, HVDC converters from competing manufactures cannot communicate with one another due to the lack of a standard. However, the international standards organization CIGRE is working on a standard to provide for this in the future. Further, AC interconnections between offshore converters would avoid this problem.

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.

Different ownership structures will have little impact on the overall performance and cost of the system. To the extent there are tangible benefits from an ownership structure, bidders will have an incentive to include such provisions to advantage their proposals.

U.S.DOE's anchor tenant authorization of the Infrastructure and Investment Jobs Act would not necessarily apply to new transmission for offshore wind procured by the New England states, due to the requirement that DOE make a determination that an eligible project is unlikely to be constructed in the absence of DOE funding. In addition, the DOE Transmission Facilitation Program funding is in the form of a loan to be repaid (with interest), which provides limited savings relative to a direct subsidy or grant.