PUBLIC VERSION

May 20, 2022

Aida Camacho-Welch

Board Secretary
Board of Public Utilities 44
South Clinton Ave.
3rd Floor, Suite 314
Trenton, NJ 08625-0350

Re: In The Matter Of Declaring Transmission To Support Offshore Wind A Public Policy Of The State Of New Jersey, Docket No. QO20100630.

On April 27, 2022, the New Jersey Board of Public Utilities ("BPU") issued a "Request for Additional Information" setting forth specific questions to "inform the Board's eventual decision" on the PJM Interconnection, LLC ("PJM") State Agreement Approach ("SAA"). NextEra Energy Transmission MidAtlantic Holdings, LLC ("NEETMA") appreciates the opportunity to provide these responses to the BPU's questions.

Respectfully,

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Assistant Vice President
NextEra Energy Transmission MidAtlantic Holdings, LLC

JohnBinh Vu
Executive Director, Transmission Development
NextEra Energy Transmission

NEXTera ENERGY TRANSMISSION MIDATLANTIC

Q1. Project-on-Project Risk: Interconnection Queue

For new Bureau of Ocean Energy Management ("BOEM") leaseholders, are there concerns about obtaining a PJM queue position given that a Board decision on the SAA may constrain the potential points of interconnection ("POIs") for future New Jersey OSW projects? Please describe the considerations related to utilizing SAA POIs and how OSW developers might switch from their queue positions (if already acquired) to the SAA-provided POI.

NEETMA Response: BPU can assign transmission capacity created by the SAA project to an OSW developer of their choice but could also take a strategic approach to address future interconnection risks by selecting an SAA project that exceeds 7,500 MW in total OSW for New Jersey.

The State Agreement Approach ("SAA") process alleviates concerns related to interconnection queue risks or concerns. It allows the New Jersey Board of Public Utilities ("BPU") to assign any transmission capacity to any offshore wind developer selected by BPU and allows BPU to build out the necessary transmission to exceed New Jersey's 7,500 MW offshore wind energy goal. The recent Federal Energy Regulatory Commission ("FERC") filing by PJM secures the capacity created by the SAA process for Offshore Wind ("OSW") projects selected by BPU for a period of two years following the BPU OSW solicitation award[1]. Therefore, the interconnection process will be streamlined, and because the SAA process will include system upgrade solutions, OSW developers can propose interconnections to the SAA process without exposure to significant system upgrade costs. As such, queue position risk is mitigated as OSW developers will not be responsible for the required network upgrades to a point of interconnection – providing schedule and cost certainty to the OSW developers.

[redacted]

[1] FERC Docket No. ER22-902

[redacted]

Q2. Project-on-Project Risk: Transmission/Generator Coordination

What are the most significant risks to completing your OSW generation project(s) on time and within budget if your project relies on one or more SAA transmission projects? How can those risks be best mitigated?

How might a selected SAA project manage and mitigate material and equipment supply chain risks and any associated costs, particularly as they might related to HVDC?

NEETMA Response: The most significant risk for OSW generators will be to ensure that the SAA project is available in advance of the OSW project. [redacted]

The primary risk for the SAA transmission project is achieving an on-time in-service date to ensure the transmission project is available in advance of an OSW project. [redacted]

Q3. Project-on-Project Risk: Transmission/Generator Coordination

How should the Board ensure that projects are completed on schedule given upcoming OSW generation projects' timelines? Please explain how changes in a future OSW generation project schedule may affect a selected SAA project, if at all.

NEETMA Response: NEETMA has significant experience coordinating with generation developers for interconnections to ensure projects are completed in time for the OSW generator's interconnection.

NEETMA's affiliates have experience coordinating transmission interconnections with generation developers. This includes managing interconnections for the Florida Power & Light, Lonestar Transmission, NextEra Energy Transmission New York, Inc and GridLiance West transmission systems around the country. While the physical mechanics of interconnecting to an offshore substation is slightly different, the processes used to communicate requirements, standards, schedule, and

[3] As indicated in NEETMA's April 29, 2022 comments, NEETMA has obtained letters of support from the Borough of South River, the Township of South Brunswick, Middlesex County, the City of Asbury Park, Neptune Township and Pleasantville. These letters have been provided to the NJBPU in Docket No. QO20100630.

project updates to a generation developer is the same.

If an OSW project schedule is delayed, it will not affect permitting and construction of an SAA transmission project. [redacted]

Q4. Project-on-Project Risk: Flexible Platform Location Considerations

How should the Board consider the optimal locations for Option 2 substations? Should such determinations occur at the time of the Board's SAA decision or following the Board's OSW generation solicitations? If the location is determined *after* the generation solicitations, what type of coordination between generation and transmission developers would be required?

NEETMA Response: NEETMA's proposal offers a flexible platform design that provides cost benefits and reduced environmental impacts while providing more competitive bid locations for OSW procurement. There is sufficient time to meet BPU's desired in-service dates utilizing flexible platform locations.

It is important for permitting and engineering purposes to agree to the location of the offshore platform as soon as practicable. [redacted]

[redacted]

[redacted]

[redacted]

Q5. Project on Project Risk: Permitting Risk

How does the selection of an Option 2 transmission solution affect the permitting risk for OSW generation projects? What about an Option 1b?

NEETMA Response: In addition, there will be no impacts to future OSW procurements since both the transmission developer and OSW developer has sufficient time to coordinate and finalize the design to support its GAP and COP.

For future OSW solicitations, as mentioned in Q4, the BPU's schedule allows sufficient timing to ensure permitting coordination between the OSW developer and the transmission developer. Transmission projects obtain a Right of Way and/or Right of Use Easements ("ROW/RUE") via approval of a General Activities Plan ("GAP") from BOEM. Currently, this process is parallel to the wind developers' approval of a Construction Operations Plan ("COP") for use of the wind lease area, but coordination would ensure mutual success of projects. Throughout the permitting process, projects that minimize the number of cables and platforms are at significantly reduced risk of permitting delays and being challenged. High Voltage Direct Current ("HVDC") projects will reduce these risks considerably by reducing the miles of cable trenching and the number of platforms required.

Q6. Project-on-Project Risk: Risk Management/Mitigation

How might a selected SAA project manage financial risk, including, but not limited to, market and interest rate dynamics, labor costs, raw material and supply chain costs, land procurement costs, and insurance?

NEETMA Response: As one of the largest infrastructure developers in the United States, NEETMA is best positioned to mitigate impacts and has the strongest supplier and banking relationships in the industry which dampens market impacts. In addition, NEETMA has provided significant cost protections to minimize impacts to customers.

[redacted]

[redacted]

[redacted]

Q7. Project-on-Project Risk: Platform Connection Considerations

For the build out of transmission facilities under the current generator radial lines approach, please provide additional details and considerations on the costs, feasibility, timing and operability of requiring OSW developers of future projects to utilize certain specified technology types, including potentially identifying common Original Equipment Manufacturers ("OEM"), requiring mesh-ready[5] offshore substations, or other future-proofing specifications. Further, please detail the anticipated coordination that would be required to eventually interconnect between mesh-ready substations, including any anticipated unavailability of OSW generation or other foreseeable risks.

NEETMA Response: NEETMA's proposed design includes the cost and design of a "mesh-ready" platform that allows BPU to connect platforms in the future. Locating platforms closer to the lease areas reduces overall costs of procuring offshore wind.

[redacted]

The multiple benefits utilizing an AC-to-AC platform design to connect two converter stations compared to a DC-to-DC platform design is outlined in Table 7-1 below:

[5] Offshore wind collector substations are "mesh-ready" when sized and designed to be able to eventually interconnect to other mesh-ready offshore wind collector substations

[redacted]

Table 7-1: HVAC vs HVDC: Connections for HVDC Platforms

Item	AC-to-AC Platform Connections	DC-to-DC Platform Connections
Viable Proven Technology Today	Yes	No – DC breakers are expected to be commercially available after 2030[7]
Can accommodate different converter OEMs	Yes[8]	No – Not Currently[9]
Can be located on same platform as converter	Yes	Not likely – DC circuit breakers are significantly larger
Redundancy for fault at offshore converter station	Yes	No
Redundancy for fault at onshore converter station	Yes	Yes
Redundancy for fault on DC cable	Yes	Yes

Furthermore, on January 20, 2022, the New York Public Service Commission ("NYPSC") issued an order directing the New York State Energy Research and Development Authority ("NYSERDA") to require all proposals to utilize HVDC technology to minimize the number of cables needed, but to also include a "mesh-ready" design in its future offshore wind procurements[10]. NYSERDA is currently updating its offshore wind solicitation package, recommending a "mesh-ready" design similar to what is proposed for the NJSC by NEETMA, whereby offshore converter stations have the capability of interconnecting to each other on the AC side of the platforms.[11]

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7 Promotion – Progress on Meshed HVDC Offshore Transmission Networks, *Final Deployment Plan*, September 14, 2020, p. xxxvii.

8 Cigre publication B4-138, Paris 2020.

9 Promotion – Progress on Meshed HVDC Offshore Transmission Networks, *Final Deployment Plan*, September 14, 2020, p. xxxvi.

10 Order on Power Grid Study Recommendations, January 20, 2022, page 14.

11 *DRAFT - Appendix G - Meshed Ready Technical Requirements* (https://www.nyserda.ny.gov/offshore-wind-2022-solicitation).

Q8. HVAC vs HVDC: Cable Failures

Describe how risks of cable outages are managed with HVAC versus HVDC technology, particularly where using large single HVDC lines for any offshore segment.

NEETMA Response: [redacted]

[redacted]

[redacted]

[redacted]

Q9. HVAC vs HVDC: Outages and economic implications

How should the Board evaluate the risk of failure and associated economic implications of HVAC versus HVDC transmission solutions?

Through what mechanisms should the risk of Option 2 or Option 3 cable failures be allocated? Does the potential risk for failure impact the preference for HVAC versus HVDC cables?

NEETMA Response: NEETMA has a proven track record of reliable operations and maintenance and is the developer that can leverage existing operational experience of existing Voltage-Sourced Converter ("VSC") HVDC submarine transmission facilities in the United States.

There should be no mechanisms to share lost revenues due to cable failures. Offshore wind developers have the same risk of cable failures as the HVDC project proposed by NEETMA. A common corridor reduces the risk by being able to identify its location more easily with shipping and fishing industries and actively monitoring it. The risk increases significantly by having multiple lines spread throughout the ocean in various paths. It becomes much more difficult for shipping and fishing industries to avoid.

Any assertions that competitive transmission providers are less responsible and would provide a lower transmission availability rate than an offshore wind developer is unsubstantiated and false. In fact, NEETMA's affiliate Florida Power and Light Company acquired Gulf Power in January 2019, and has improved service reliability by 50%[14], including 2020 when Gulf Power experienced its best

[14] *Review of Florida's Investor-Owned Electric Utilities 2020 Service Reliability Reports*, August 2021, pages

reliability performance in company history[15]. NEETMA's affiliates have a proven track record of operational excellence and will leverage its expertise and best practices for the SAA project. No other developer in the SAA process has an affiliate that has been awarded the prestigious ReliabilityOne® National Reliability Award six times for providing the nation's most reliable service.

However, the transmission concerns raised by offshore wind developers highlights the importance of selecting a transmission developer who has experience operating transmission systems. Through NEETMA's affiliate Trans Bay Cable, NEETMA is the only developer in the SAA process who currently owns and operates submarine HVDC VSC technology within the U.S. today. Selecting an experienced developer can help alleviate fears from an OSW developer regarding transmission availability.

Q10. HVAC vs HVDC: Accounting for Cost Differences

How should the Board evaluate the cost differences of HVAC versus HVDC transmission solutions?

NEETMA Response: [redacted]

[redacted]

44-53 shows consistent improvement across various reliability metrics starting 2019.

15 https://newsroom.nexteraenergy.com/2022-01-01-FPL-completes-integration-of-Gulf-Power-expands-Americas-best-energy-value-to-Northwest-Florida.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Q11. HVAC vs HVDC: Multi-state or Multi-regional Offshore Grids

For an Option 2 or Option 3 scenario, please address whether an HVAC or HVDC would better integrate into a multi-state or multi-regional offshore wind transmission grid? Should coordination or future compatibility opportunities affect the Board's evaluation of proposals?

NEETMA Response: An HVDC design can more easily integrate into a multi-state/regional grid than HVAC – which has significant stability concerns and lack the ability to control power flows

Having the optionality to explore a future grid between states/regions for little-to-no incremental cost should be an important consideration when considering the flexibility and expandability of a proposal. NEETMA's NJSC proposal provides a design that can be expanded for a multi-regional/state transmission grid, and provide the requisite control for operators to take advantage of a multi-regional/state transmission grid.

Several studies performed in the US[21] [22] and Europe[23] conclude that there can be economic and reliability benefits with an offshore grid. However, the ability to optimize these benefits is dependent upon granting grid-operators the ability to control power flows between the different regions or states. As such, an HVAC system as proposed in the SAA process lacks the ability to

[21] Brattle *et al*, "The Benefit and Cost of Preserving the Option to Create a Meshed Offshore Grid for New York".

[22] Brattle *et al*, "Initial Report on the New York Power Grid Study".

[23] Promotion – Progress on Meshed HVDC Offshore Transmission Networks, *Final report*.

provide grid-operators the control necessary and would require additional platforms or a change in scope to grant grid-operators control. The ability for grid operators to have the control of power flows is important. Such power flow control will address grid operators concerns regarding unintended loop flows and the control of power into a region or state as desired. This allows for increased reliability, grid flexibility, and operational control. In addition, as more offshore wind and get connected to an HVAC system, and more cables and reactive equipment are connected to an HVAC offshore grid, there are significant concerns regarding grid stability as it relates to voltage instability or frequency instability. In contrast, VSC HVDC technology avoids those issues by providing dynamic reactive power which helps improve frequency and/or voltage instability concerns. See Attachment 2 for additional details on the advantages of HVDC technology for OSW applications.

Q12. Evaluation: Consideration of Different Factors

How should the Board evaluate Option 2 transmission solutions that have less impact on the public (i.e., avoid beach crossings), but inherently entail greater costs?

How should the Board weigh Option 1b transmission solutions against each other that have less impact on the environment (i.e., wetlands), but may inherently entail greater costs?

How should the Board evaluate the costs of the SAA versus the baseline scenario (radial export cables) and how should the Board consider non-price benefits?

NEETMA Response: The Board should conduct a direct comparison of various options. A comparison of similar geographically-located proposals allows BPU to do an apples-to-apples comparison to weigh the strengths and weaknesses of each proposal.

While PJM's various combination scenarios provide BPU the cost impacts of the different combinations identified by PJM, PJM does not provide an analysis of where there are multiple proposals at the same geographic location (e.g., Deans). Accordingly, NEETMA recommends that BPU/PJM conduct side-by-side comparison of geographically similar proposals to identify the strengths and weaknesses of similar geographic proposals. [redacted]

[redacted]

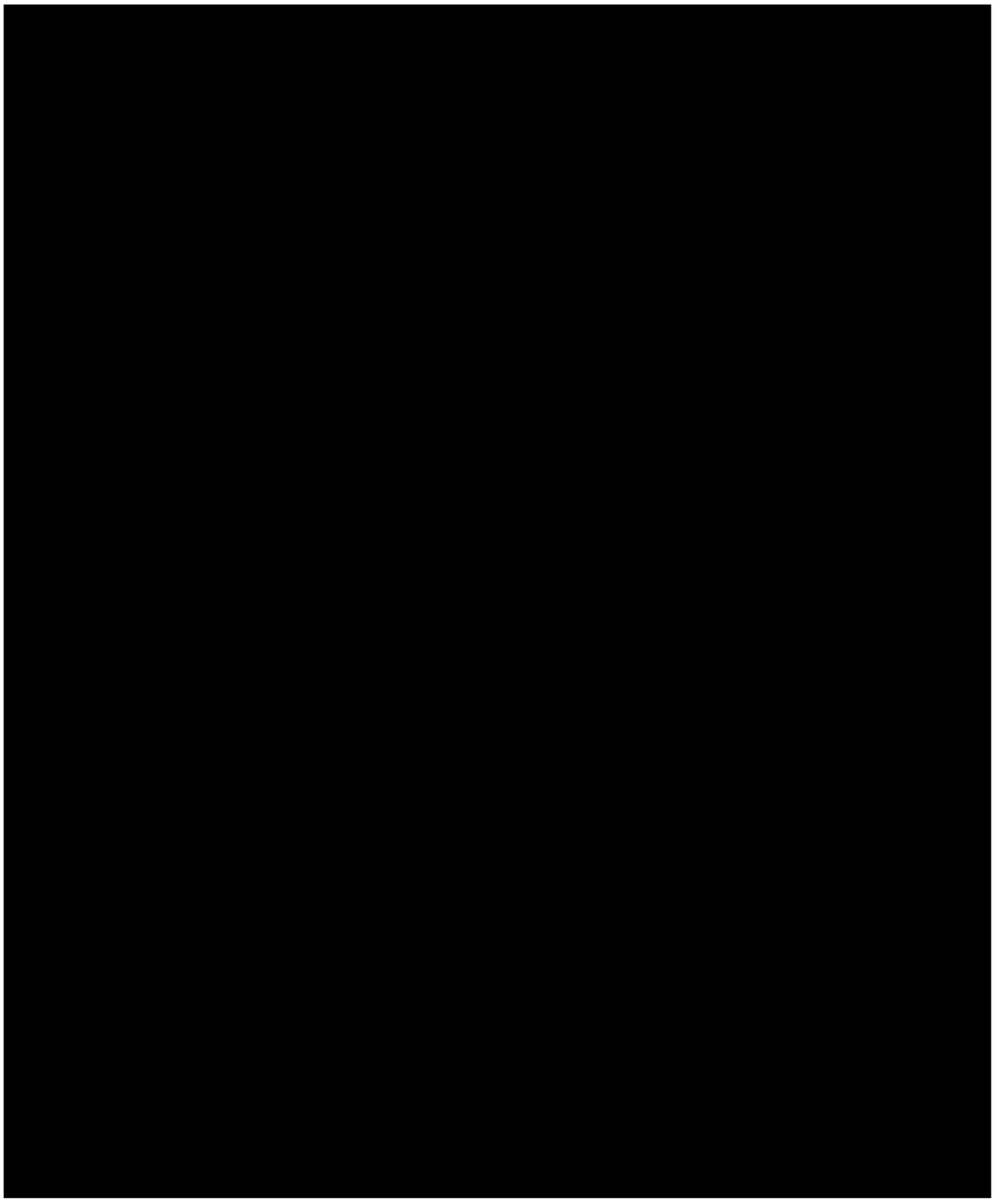
Q13. Evaluation: Intangible and Economic Benefits

How should the Board weigh intangible or other economic benefits (parks, recreation opportunities, and economic development) against proposal costs?

NEETMA Response: Intangible and economic benefits are difficult to quantify and should only be a minor consideration in the evaluation process. However, NEETMA understands the importance of these benefits and has already engaged with the communities on potential ideas that could be implemented

Because it is unclear if each developer will incorporate intangible or other economic benefits into its project costs, the comparison of intangible benefits of various proposals may inadvertently produce inaccurate comparisons. In addition, intangible and economic are difficult to quantify. A project could be less efficiently designed and cost more but claim more intangible and economic benefits than a more efficient design that saves New Jersey ratepayers significant dollars. The claim is hard to substantiate until the benefits are realized and could lead to an inefficient project decision for New Jersey.

However, NEETMA understands that economic and community benefits are an important part of any large infrastructure project. Such projects often bring local jobs, ancillary investments in the community's quality of life, and sometimes investments in local schools, local academic institutions and other local organizations. While these secondary investments are important, the BPU should not make a multi-billion dollar and complex project decision based on those factors. Bringing a trusted and financial capable partner will naturally bring these benefits to bear in any large infrastructure project.



Q14. Federal Funding: HVDC as Innovative Technology

For an Option 2 or Option 3 scenario, do you believe that the selection of High Voltage Alternating Current ("HVAC") or High Voltage Direct Current ("HVDC") will affect the ability to receive federal funding that may prioritize "innovative" technologies? Please address availability of federal funding for transmission and/or federally-backed loans/loan guarantees.

NEETMA Response: [redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted]

Q15. Federal Funding: Potential Opportunities

Please outline any anticipated changes in tax policy and any federal sources of money transmission developers might seek for a selected SAA project —or that New Jersey could seek.

How might transmission developers explore the availability of federal funding opportunities that may be available to support transmission projects? How would receipt of such funding be incorporated into bids or financing arrangements? How might the Board coordinate on applying for such opportunities?

How might transmission developers explore the availability of federally-backed loans for loan guarantees that may be available to support transmission projects? How should developers and the Board coordinate on applying for such opportunities? How would receipt of such loans or loan guarantees be incorporated into bids or financing arrangements?

NEETMA Response: NEETMA's affiliates has experience utilizing federal tax credits to maximize customer benefits and will monitor any potential opportunities for the NJSC proposal. [redacted]

A project of this magnitude requires an experienced partner that is familiar with all available financing options and opportunities. For example, NEETMA's affiliate NEE, is the largest user of ITCs in the industry, and is intimately familiar with utilizing federal tax credits to lower the cost of its projects which reduces what customers ultimately pay. Currently, NEETMA has identified the following two potential financing opportunities for the NJSC project that could result in lower costs to New Jersey customers:

1. Transmission Investment Tax Credit ("ITC"): A Transmission ITC is currently being contemplated as part of Congress' budget reconciliation process. Under the proposed Transmission ITC, up to 30% ITC would apply to capital expenditures for transmission lines and related property: (1) capable of transmitting electricity at a voltage of not less than 275 kV or is a superconducting line, and (2) has a transmission capacity of not less than 500 MW. The proposed Transmission ITC would generally apply to property placed in service after 2021 and that begins construction before 2032. As currently proposed, the Transmission ITC would provide developers the ability to monetize the Transmission ITC regardless of the taxpayer's federal income tax liability through a direct pay concept. The direct pay concept is contingent on satisfying domestic content requirements (subject to a phase-in of such requirements). If enacted, the proposed Transmission ITC would lower the overall cost of the project and therefore reduce rates for customers. The Transmission ITC would be an offset to rate base and returned to customers under prescribed Internal Revenue Service and FERC tax normalization provisions.

[redacted]

ATTACHMENTS

[redacted]

[redacted]

ATTACHMENT 2 –HVDC Technology Advantages for Offshore Wind Applications

Metric	Advantages of HVDC systems
Reliability and Resilience	HVDC systems utilize reduced number of offshore cables and cable joints significantly decreasing probability of cable failures due to anchor strike or joint failure. HVDC reduces the number of potential failure points by requiring less reactive power equipment, fewer transformers, and fewer platforms. HVDC system also provide ancillary services such as dynamic reactive power which cannot be provided by HVAC system without addition of more devices, thereby increasing cost and failure points.
Enhance economic, operational, and ancillary services benefits	Meshed HVDC offers full controllability and deliverability of power into multiple injection points. This increases the probability of increased revenue to OSW developers by: (1) reducing curtailment risks; and (2) mitigating onshore congestion and loop-flows.
Electric and Magnetic field Impact	The static electric field for HVDC system is contained within the cable due to the metal sheathing, however, the alternating current in HVAC submarine cables will still induce an electric field in the surrounding marine environment near the buried cable. 25,26,27 The magnetic fields of HVDC are lower than Earth's natural magnetic field28,29.

25 CSA Ocean Sciences Inc. and Exponent, 2019

26 Mayfield Offshore wind Appendix P2 HVDC EMF Assessment available at www.boem.gov

27 Cigre publication, B4.44, "HVDC Environmental Planning Guidelines"

28 Cigre publication B1-4, "Electromagnetic fields of DC cable systems"

29 Ergrid, East West HVDC submarine interconnector, available online at eirgridgroup.com

Metric	Advantages of HVDC systems
Operating and Maintenance Costs	HVAC deploying large synchronous condensers require significant auxiliary system care and oversight and long outages for tear down and refurbishment. Modern VSC HVDC systems are primarily solid-state with a subsystem redundancy design. This limits outage maintenance, providing a lower lifetime outage maintenance requirement. HVAC system subject OSW generators to higher equipment stress due to slower fault recovery and potentially impacting life expectancy of the equipment.