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October 30, 2024

Dear NESCOE Members,

This letter is to provide the requested feedback on your memo to Al McBride, VP of System Planning at ISO New England dated October 16, 2024, about Potential Transmission Needs for a Longer-Term Transmission Planning RFP and cc'd to the ISO-New England Planning Advisory Committee (PAC).

[a03_pac_nescoe_rfp_letter.pdf](#)

The following are my recommendations as you approach the design of any final Request for Proposals (RFP) under the Longer-term Transmission planning process (LTPP) that is contemplated within this memo:

1. Completion of the Loss of Source Limitations study as described in the March 22, 2024, joint letter from New York ISO (NYISO), PJM Interconnection L.L.C (PJM) and ISO New England (ISO-NE), prior to the issuance of an RFP. This study is to determine the feasibility of raising the minimum loss of source value for New England from an existing level of 1,200 MW to a proposed level of 2,000 MW.
[2024_03_22_letter_to_ne_states_collaborative_letter_on_interregional_planning_combined.pdf](#)
2. Completion of the Transitional Cluster Study (or a comparable study), as described in the Third Maine Resource Integration Study dated June 20, 2024, modified to account for what is proposed in the NESCOE memo, prior to issuance of an RFP. The NESCOE memo describes some criteria that a potential bidder will need to know (#1 & #2 interface capacity values/locations, #3 generation capacity and #4 interconnection of incremental generation), however a completed study may provide additional details which may further help to facilitate a successful RFP process. Any such study should allow for the flexibility of using both an HVAC and a HVDC design. [a02_third_maine_resource_integration_study_june2024_non_ceii.pdf](#)
3. An update to the 2050 Transmission Study Results from Additional Analysis on Offshore Wind Screening dated August 21, 2024 to determine whether on the order of 3,000 MW of potential Northern Maine renewable energy, and at least 6,800 MW (6,800 MW represents the total from the October 29, 2024 BOEM auction provisional leases) of potential Gulf of Maine offshore wind (OSW), can both interconnect in Maine, and/or elsewhere in eastern New England, and if so at

which points of interconnection (POI) in Maine, and/or elsewhere in eastern New England, is it recommended that the onshore and OSW POI's preferably occur, prior to issuance of an RFP.

The August screening identified up to four potential OSW POI's located in Maine (Maine Yankee, Surowiec, Yarmouth and Raven Farm) that could each potentially accommodate 1,200 MW of OSW interconnection without significant added upgrade costs and one, Surowiec, that could potentially accommodate up to either two separate 1,200 MW POI's or a singular 2,000 MW POI. However, when viewed on the more expanded Eastern ISO-NE level, Surowiec was suggested for one 1,200 MW OSW POI, while seven other 1,200 MW OSW POI's, totaling an additional 8,400 MW, were identified south of Maine. Given the results of the August screening, and of the BOEM OSW auction, one might presume the Surowiec, Ward Hill, Wakefield Junction, Mystic, and Carver substations as being the initial possible POI's for consideration of the Gulf of Maine OSW BOEM auction provisional lease areas.

This screening specifically indicated that new Northern Maine wind was **not** included in the snapshots. As noted by ISO-NE in their response to PAC Stakeholder Comments to a question I asked (answer posted date on 10/25/24) ISO-NE said, "It is difficult to say exactly what impacts connecting the northern Maine onshore wind at Coopers Mills or other more northern substations would have on interconnection offshore wind; it is likely that this would decrease the ability to interconnect other offshore wind in Maine since most of the energy produced would decrease the ability to interconnect other offshore wind in Maine since most of the energy produced would compete for available headroom on the transmission constraints in southern Maine, New Hampshire and across the New Hampshire-Massachusetts border. The extent of this decrease is unknown based on this high-level screening analysis." Therefore, it is unknown what impact interconnecting on the order of 3,000 MW of Northern Maine renewable energy generation and interconnecting on the order of at least 6,800 MW of OSW into Maine, and/or elsewhere in eastern New England, will have. Note that the Maine wind energy generation goals include at least 3,000 MW of Gulf of Maine OSW by December 31, 2040 (LD 1895), but it provides no policy goal for onshore wind energy generation. Considering grid capacity limitations and reliability requirements relative to projected upgrade costs, as determined by ISO-NE, it would seem appropriate for ISO-NE/NESCOE to collaborate with the New England state Public Utility Commissions to proactively help guide state renewable energy generation policy that is based on a comprehensive ISO-NE region engineering study conducted by, or at the direction of ISO-NE/NESCOE. This should help to guide legislative action that creates achievable results and avoids reworking legislative action that may otherwise unintentionally create long term sunk costs that ratepayers would be responsible to pay. [a07 2050 additional poi analysis.pdf](#), [Governor Mills Signs Bill to Create Jobs, Advance Clean Energy and Fight Climate Change Through Responsible Offshore Wind | Office of Governor Janet T. Mills, getPDF.asp; response_to_stakeholder_comments_2050_additional_analysis_pac_presentations.pdf](#)

4. I am encouraged that at the October 23, 2024, PAC meeting, when the question was asked as to whether both HVAC and HVDC are transmission options for the proposed RFP, that the answer was yes. I **highly recommend** that the RFP encourage design ideas that include HVDC where

appropriate. I will point out the following quote found in a January 24, 2023 Brattle Group report, link referenced further below, regarding the benefits of HVDC, “As Invenergy explains in a recent request for a FERC technical conference on HVDC transmission, the benefits of HVDC lines, which in large part stem from advanced converter technologies, include, in addition to the reliability and resiliency benefits of interregional transfer capability: “(1) dynamic voltage support to the AC system, thereby increasing its transfer capability; (2) frequency support through fast ramp rates; (3) improved transient stability and reactive performance; (4) AC system (oscillation) damping; (5) ‘decoupling’ of the interconnected system so that faults and frequency variations between the wind farms and the AC network or between different parts of the AC network do not affect each other and otherwise providing a ‘firewall’ to limit the spread of system disturbances; and (6) black start capability to re-energize a 100% blacked-out portion of the network.” I will add that HVDC is acknowledged as having a lower energy line loss than HVAC. Note that Invenergy is one of the Gulf of Maine OSW BOEM bid winners. [Connecting the Country with HVDC | Department of Energy](#)

5. I **highly recommend** that the RFP encourage design ideas that incorporate the interconnection of Northern Maine renewable energy transmission with Gulf of Maine OSW transmission and other regional and interregional transmission. HVDC, in companion with a HVAC, with interconnecting Northern Maine transmission, Gulf of Maine transmission, and other regional and interregional opportunities, may allow for the greatest flexibility and longer-term benefits to ratepayers as the build out of the ISO-NE, and interregional transmission system, continues towards 2050 and beyond. For an example of a few route/design ideas see Exhibits A, B & C. More specifically on this subject:
 - a. I encourage NESCOE and ISO-NE to include in the RFP consideration for a bi-directional design that can provide for the flexibility of a potential future connection to the NMISA grid.
 - b. I encourage NESCOE and ISO-NE to include in the RFP consideration for a bi-directional design that leverages existing and new connections with Canada. By example, a design that enhances interconnections with New Brunswick Power, Hydro-Quebec and other Canadian provinces may provide a variety of benefits as discussed in the New England Governors and Eastern Canadian Premiers Resolution 45-1. [NEG-ECP-Resolution-45-1-Energy-Signed-EN.pdf](#)
 - c. I encourage NESCOE and ISO-NE to include in the RFP consideration for a bi-directional design that interconnects with Gulf of Maine OSW Multi-Terminal(s), should those terminal(s) be constructed as a part of the BOEM Gulf of Maine OSW 6,800 MW provisional lease awards. [Gulf of Maine | Bureau of Ocean Energy Management](#)
 - d. I encourage NESCOE and ISO-NE to keep in mind the Atlantic Offshore Wind Transmission Study Backbone Topology 2050 bi-directional design and how the proposed RFP may create an opportunity to leverage this design. This design includes a bi-directional HVDC underwater “backbone” line from Maine to South Carolina. [a02_ipsac_atlantic_offshore_wind_transmission_study.pdf](#)
 - e. Although certainly a far more uncertain and longer-term idea, I would also encourage NESCOE and ISO-NE to keep abreast of the NATO-L 8,000 MW HVDC bi-directional trans-

Atlantic Europe to Canada/U.S. transmission line concept that is being discussed in Europe, as it could have implications on longer-term transmission planning for ISO-NE. [NATO-L](#)

- f. For a more detailed discussion of the benefits of longer-term transmission planning and regional and interregional interconnections, and the benefits of HVDC, please see The Brattle Group Report regarding the Benefit and Urgency of Planned Offshore Transmission dated January 24, 2023. In addition to the quote about HVDC noted earlier in my comments, the following quote from this Brattle Group report touches on the benefits of regional and interregional interconnections: “As summarized in this report, numerous regional and national studies confirm that expanding regional and interregional transmission capabilities offer substantial benefits that increase grid resilience, reduce system-wide costs, and mitigate increases in electricity rates as the U.S. transitions to a more decarbonized electric sector by 2035 and—as called for by state policies and the federal administration—aims to achieve a substantially decarbonized economy by 2050. If planned proactively and holistically, multi-purpose transmission links between OSW facilities can offer the lowest-cost, lowest-impact, and most feasible solutions for adding such regional and interregional transfer capabilities to the existing grid.” [The Benefit and Urgency of Planned Offshore Transmission:](#)
6. I encourage an RFP that includes a requirement that bidders identify Grid Enhancing Technologies (GETs) and reconductoring opportunities in their responses, in accordance with the Federal-State Modern Grid Deployment Initiative that Maine has agreed to participate in, as described in the May 28, 2024 White House press release. [FACT SHEET: Biden-Harris Administration Launches Federal-State Initiative to Bolster America’s Power Grid | The White House](#)
7. I encourage an RFP that includes a requirement for a community benefits package that is no less comprehensive than the NECEC community benefits package. [Benefits | Cleaner Air — New England Clean Energy Connect](#)
8. Maine LD 1963, An Act Regarding the Future of Renewable Energy Transmission in Northern Maine, approved on April 22, 2024, describes the details for the Maine Public Utilities Commission (PUC) to issue an RFP for both a transmission line(s) and renewable energy generation in Northern Maine. At the October 23, 2024, PAC meeting a question was raised as to whether the PUC would be proceeding with this RFP considering the proposed NESCOE RFP. Chair Bartlett of the PUC indicated that a decision had not been made on this yet. Should a decision be made to essentially incorporate the transmission portion of LD 1963 into the proposed NESCOE RFP, it would be my recommendation that the NESCOE RFP have terms and conditions that are no less prescriptive than the terms and conditions described in LD 1963, in order for the NESCOE RFP to comply with the requirements of LD 1963. Otherwise, the PUC may have no option other than to issue its own RFP for Northern Maine transmission to comply with the intent of LD 1963, which may, or may not be beneficial to the overall goals that NESCOE and LD 1963 are trying to achieve. I will call out one of many terms in LD 1963 which is that the process “Provide community engagement plans and favor use, to the extent practicable, of existing utility and other rights-of-way and other existing transmission corridors in the

construction of the transmission line or lines described in this subsection”. This is particularly important as the cancelled Aroostook Renewable Gateway project ran into significant local opposition for its proposed route, as a material portion of the proposed route was not proposing to use existing utility and other rights-of-way and other existing transmission corridors. Several communities along that proposed route have since established ordinances that require future transmission lines of this size to be installed subsurface. [getPDF.asp](#)

9. Maine LD 2087, An Act to Protect Property Owners by Making Certain Changes to the Laws Governing the Use of Eminent Domain by Transmission and Distribution Utilities was also approved on April 22, 2024. This law was inspired, in part, by the issues of the proposed route for the Aroostook Renewable Gateway project. Given the recent enactment of this law, it would be prudent to ensure that all bidders are aware of this law, as it may influence proposed routes. [getPDF.asp](#)
10. As mentioned above it is unclear, as of this writing, as to whether the PUC will be issuing an RFP for the Northern Maine transmission or instead relying upon the proposed NESCOE RFP. This therefore brings into question: 1) who will be issuing an RFP for the Northern Maine transmission (will it be NESCOE/ISO-NE, the PUC or both), 2) who will be approving the RFP(s) for the Northern Maine transmission, 3) who will be determining that the RFP responses, among other things, “demonstrate(s) the most cost-effective and efficient transmission access to renewable energy resources in northern Maine in a manner that best supports the achievement of the State’s renewable energy goals under Section 3210 and that maximize benefits to the State” (see LD 1963 Section 7 subsection 2, C(1)) and 4) how will the costs be apportioned to ratepayers for the transmission approved in the RFP(s) for Northern Maine. Answers to these questions potentially include: a) NESCOE/ISO-NE issuing and approving a singular RFP and all ISO-NE ratepayers proportionally paying for all of it, b) NESCOE/ISO-NE issuing/approving one RFP and the PUC issuing/approving a separate RFP (presumably to comply with LD 1963 because the NESCOE RFP didn’t comply) and Maine ratepayers potentially paying for all of what the PUC issues/approves plus paying for a proportion of what NESCOE/ISO-NE issues/approves (potentially resulting in a disproportionately higher amount paid by Maine ratepayers than other New England ratepayers) or c) some mix of the above that might include NESCOE/ISO-NE and the PUC jointly issuing and approving a singular RFP. All stakeholders are likely going to want this process sorted out before a final RFP proposal is issued. As a side note, I recall the “whose paying for what” being a problematic issue for the cancelled Aroostook Renewable Gateway project.
11. As mentioned at the October 23, 2024, PAC meeting, some potential bidders have concerns related to rights-of-way use in Maine. My understanding is this was a problematic issue in determining a proposed route, and the project costs, for the cancelled Aroostook Renewable Gateway project. This same subject was a topic of conversation at the Maine Energy, Utilities and Technology (EUT) Legislature Committee meetings held this Spring (2024) that I attended. As you might imagine, the subject was contentious and there was no final resolution, that I am aware of, as to whether a successful non-incumbent bidder can, or cannot, have access to the rights-of-way of an incumbent Transmission and Distribution operator. In my view this issue needs to be resolved, before an RFP is issued, to have a competitive, simple, and flexible bidding process.

Hopefully, the above recommendations will provide significant beneficial value to bidders in the proposed RFP(s) and potentially produce more meaningful competition, simplicity, and a flexible bid process for the benefit of ratepayers. I am available if you should have any questions.

Sincerely,

Steven J. Ingalls

Steven Ingalls

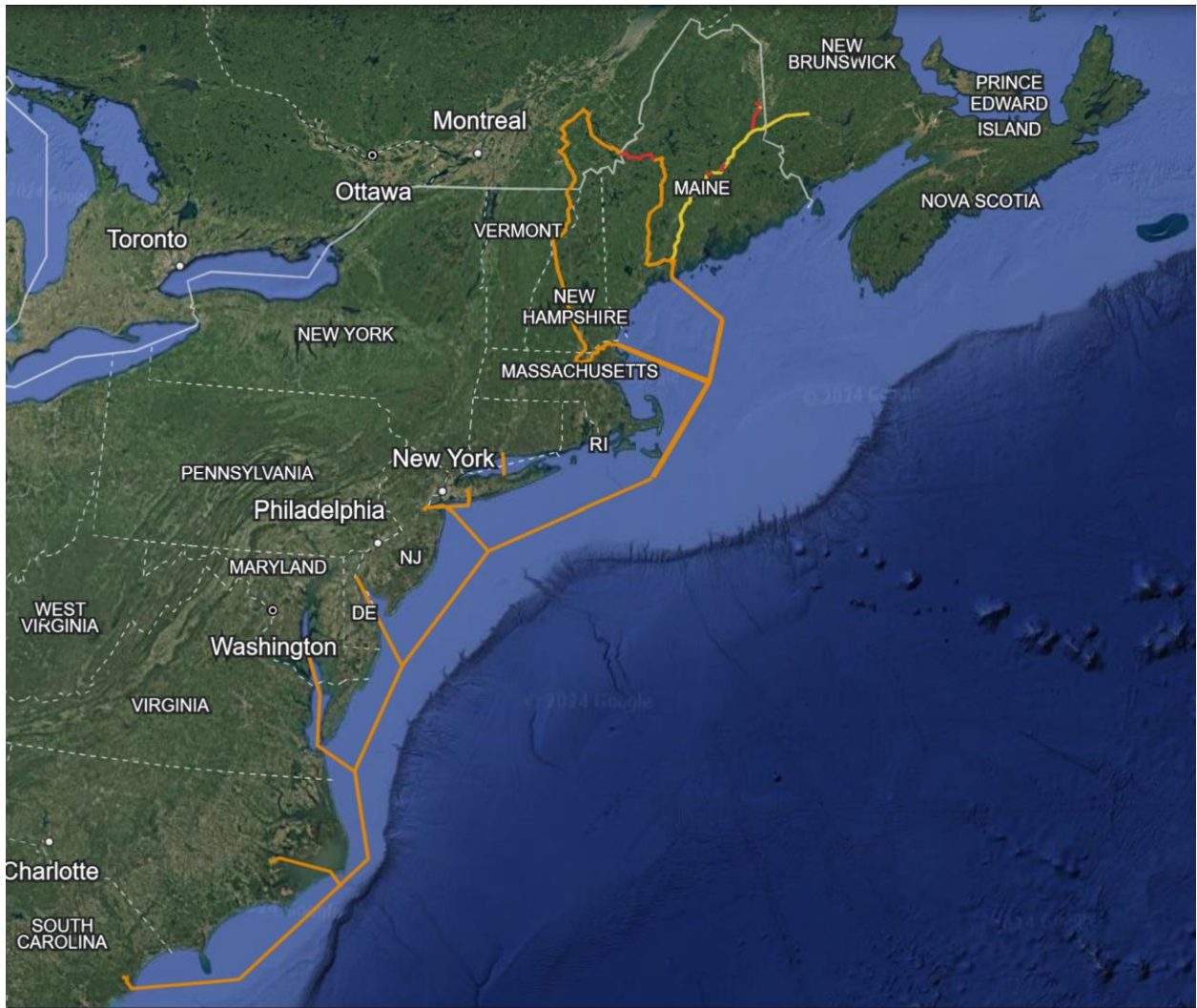
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EXHIBIT A

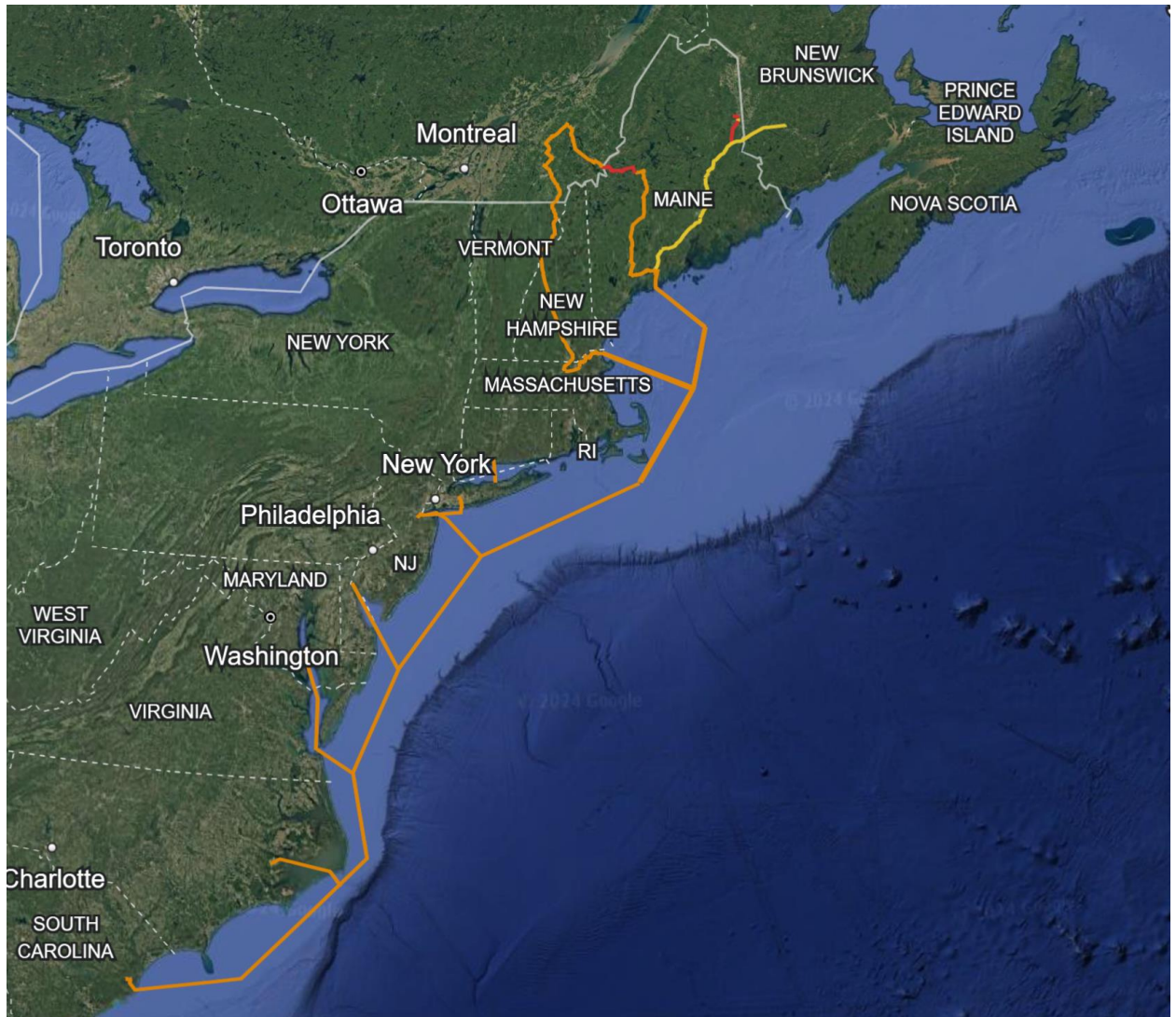
Illustrative Purposes Only Via a Pittsfield Route – Assumes a 2,000 MW Loss of Source Limit



1. 2,000 MW HVAC line(s) from Hammond to Haynesville.
2. 2,000 MW HVAC or HVDC line(s) from Haynesville to Surowiec (via a HVAC substation in Pittsfield or a HVDC converter in Haynesville as applicable). Note an HVAC tie in of up to 2,000 MW from Haynesville to Keswick NB New Brunswick Power is also shown.
3. 2,000 MW HVDC line(s) from Surowiec to a Gulf of Maine OSW Multi-Terminal (if applicable or to #4 directly if not applicable). Note a 1,200 MW HVDC tie in from Surowiec to the Lewiston NECEC HVDC converter is also shown. NECEC 1,200 MW HVDC line from Hydro-Quebec to Lewiston is also shown. Also note a 2,000 MW HVDC tie in from the Surowiec to South Carolina is also shown.
4. 2,000 MW HVDC line(s) from the Gulf of Maine OSW Multi-Terminal (if applicable) to a Tewksbury HVDC converter. Note a 2,000 MW HVDC tie in from Tewksbury to the Sandy Pond Phase II HVDC converter is also shown. Phase II 2,000 MW HVDC line from Hydro-Quebec to Sandy Pond is also shown.

EXHIBIT B

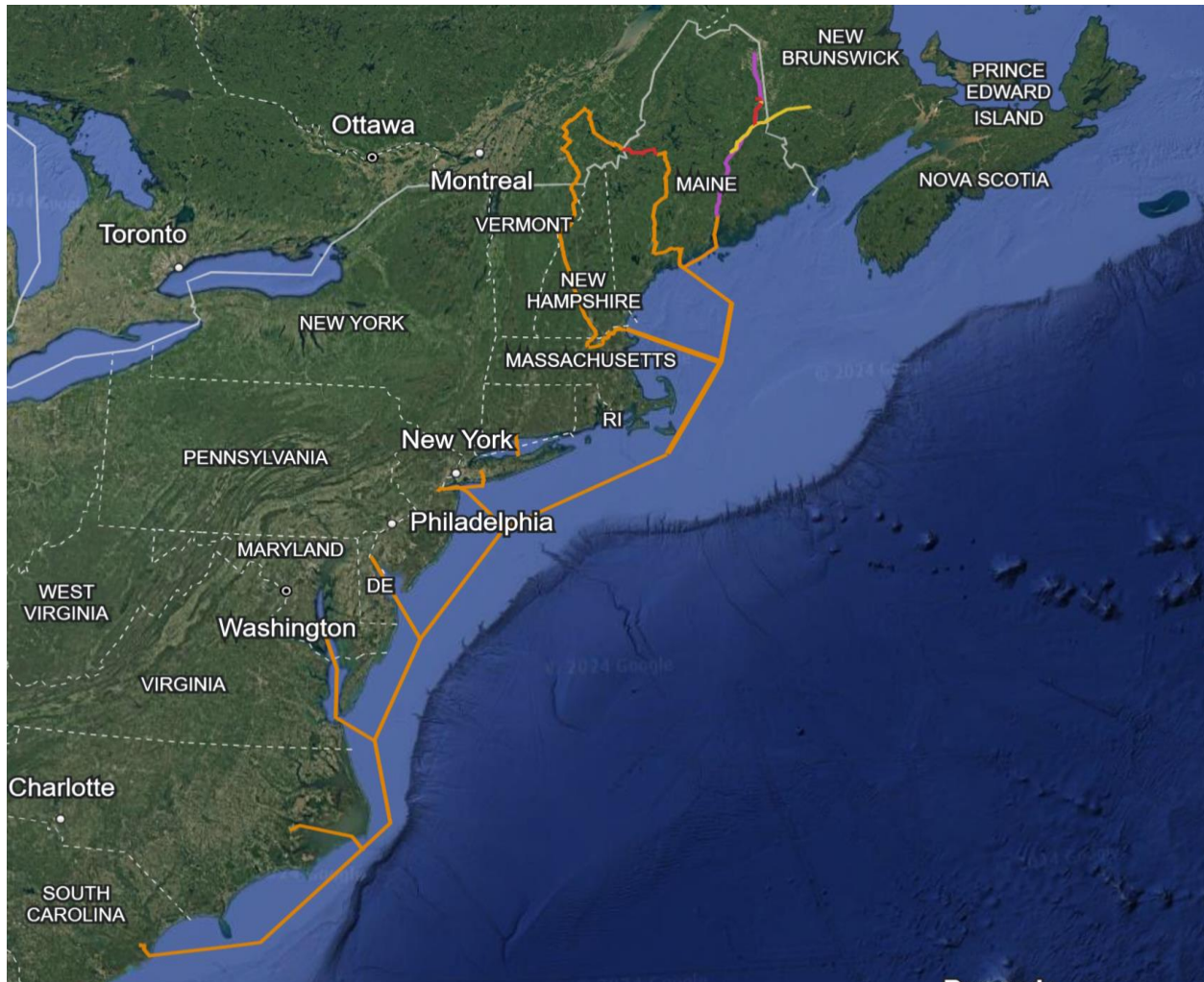
Illustrative Purposes Only Via an Orrington Route – Assumes a 2,000 MW Loss of Source Limit



1. 2,000 MW HVAC line(s) from Hammond to Haynesville.
2. 2,000 MW HVAC or HVDC line(s) from Haynesville to Surowiec (via a HVAC substation in Orrington or a HVDC converter in Haynesville as applicable). Note an HVAC tie in of up to 2,000 MW from Haynesville to Keswick NB New Brunswick Power is also shown.
3. 2,000 MW HVDC line(s) from Surowiec to a Gulf of Maine OSW Multi-Terminal (if applicable or to #4 directly if not applicable). Note a 1,200 MW HVDC tie in from Surowiec to the Lewiston NECEC HVDC converter is also shown. NECEC 1,200 MW HVDC line from Hydro-Quebec to Lewiston is also shown. Also note a 2,000 MW HVDC tie in from Surowiec to South Carolina is also shown.
4. 2,000 MW HVDC line(s) from the Gulf of Maine OSW Multi-Terminal (if applicable) to a Tewksbury HVDC converter. Note a 2,000 MW HVDC tie in from Tewksbury to the Sandy Pond Phase II HVDC converter is also shown. Phase II 2,000 MW HVDC line from Hydro-Quebec to Sandy Pond is also shown.

EXHIBIT C

Illustrative Purposes Only Via Loring Pipeline – Assumes a 2,000 MW Loss of Source Limit



1. 2,000 MW HVAC line(s) subsurface from Hammond to Haynesville. Note Loring pipeline continues north from Hammond to Limestone and is seen in purple.
2. 2,000 MW HVDC subsurface/underwater from Haynesville to Surowiec (via a HVDC converter in Haynesville). Note an HVAC tie in of up to 2,000 MW from Haynesville to Keswick NB New Brunswick Power is also shown.
3. 2,000 MW HVDC line(s) from Surowiec to a Gulf of Maine OSW Multi-Terminal (if applicable or to #4 directly if not applicable). Note a 1,200 MW HVDC tie in from Surowiec to the Lewiston NECEC HVDC converter is also shown. NECEC 1,200 MW HVDC line from Hydro-Quebec to Lewiston is also shown. Also note a 2,000 MW HVDC tie in from Surowiec to South Carolina is also shown.
4. 2,000 MW HVDC line(s) from the Gulf of Maine OSW Multi-Terminal (if applicable) to a Tewksbury HVDC converter. Note a 2,000 MW HVDC tie in from Tewksbury to the Sandy Pond Phase II HVDC converter is also shown. Phase II 2,000 MW HVDC line from Hydro-Quebec to Sandy Pond is also shown.