

Energy Markets and Strategies Working Group

Draft Initial Recommendations – February 24, 2022

Purpose of this draft

This document sets forth the initial draft recommendations of the Maine Offshore Wind Roadmap Energy Markets and Strategies Working Group (EWG). These initial draft recommendations reflect feedback from the Maine Offshore Wind Roadmap Advisory Committee and will benefit from further input from a range of stakeholders.

Context and rationale

These initial draft recommendations reflect the Working Group’s discussions around offshore wind and its role in delivering carbon reduction and achieving renewable energy goals for Maine in a cost-effective manner, in the context of a broader regional transition away from fossil fuels.

- Under Maine law, enacted with bipartisan support, 80% of electricity used in the state must be from renewable sources by 2030, with a goal of 100% by 2050.¹ Other New England states have established similar requirements.²
- Maine has also enacted, with bipartisan support, greenhouse gas emission reduction requirements of 45% below 1990 levels by 2030 and 80% by 2050.³ *Maine Won’t Wait*, the four-year climate action plan released by the Maine Climate Council in December 2020, states “sectors with high greenhouse gas emissions, such as transportation and heating, must shift their energy sources from fossil fuels to electricity and low-carbon fuels to achieve Maine’s climate goals.”⁴ This strategy, often referred to as “beneficial” or “strategic electrification,” in addition to enabling decarbonization, can lower overall consumer energy expenditures.⁵ Modeling conducted for the Maine Climate Council suggests electricity demand in Maine will approximately double by 2050 as a result of beneficial electrification needed to meet Maine’s 2030 greenhouse gas reduction targets.⁶
- The Working Group reviewed initial technical analysis that anticipates deployment of offshore wind in the Gulf of Maine under almost any scenario of New England’s shift to renewable energy in the coming years. These recommendations can be further refined as additional analysis related to energy needs is completed.

¹ [35-A MRSA §3210](#).

² https://www.iso-ne.com/static-assets/documents/2021/03/2021_reo.pdf

³ [38 MRSA §576](#)

⁴ https://www.maine.gov/climateplan/sites/maine.gov.climateplan/files/inline-files/MaineWontWait_December2020_printable_12.1.20.pdf

⁵ See e.g. <https://www.raponline.org/be/>

⁶ https://www.maine.gov/energy/sites/maine.gov.energy/files/inline-files/GEO_State%20of%20Maine%20Renewable%20Energy%20Goals%20Market%20Assessment_Final_March%202021_1.pdf#page=26

- Offshore wind not only can provide clean power to New England but can also be a major economic driver for Maine creating good-paying jobs around the state. Maine has the 7th highest offshore wind energy potential in the United States.⁷
- Offshore wind has significantly higher production during winter months, while the region’s natural gas supplies face growing competition for electricity production and heating in these months, often leading to unsustainable price volatility.^{8,9} This makes offshore wind uniquely positioned to help achieve Maine’s climate goals.

Offshore wind costs have fallen dramatically over the last decade, and with increasing global deployment of both fixed and floating foundations, costs are forecast to continue to drop considerably over the next decade. Multiple offshore wind cost forecasts, including those of the U.S. National Renewable Energy Laboratory, predict the Levelized Cost of Electricity¹⁰ from floating offshore wind in the Gulf of Maine will drop significantly by the end of the decade.^{11,12}

In this context, the initial recommendations seek to achieve a balanced approach of sending clear signals about Maine’s intent around offshore wind (recommendation #1), while taking steps to help achieve cost-effective offshore wind deployment (recommendation #2) and recognizing the importance of regional coordination to advance Maine’s interests (recommendation #3). The Working Group remains engaged in other topics, including discussing additional recommendations around transmission and permitting.

Recommendation #1: Establish and initiate a floating offshore wind requirement and procurement process.

Overview of recommendation

In order to meet its renewable energy and job creation targets Maine should establish both

- (i) a binding floating offshore wind capacity (MW) or production (MWh) target and
- (ii) a procurement process to achieve that target.

The capacity or production target should be equal to a meaningful percentage of Maine’s forecasted electricity needs by 2050. The procurement process should solicit phased-in incremental installed and

⁷ https://www.maine.gov/energy/sites/maine.gov.energy/files/inline-files/Maine%20OSW%20DNV%20Task%201%20-%20State%20of%20the%20OSW%20Industry_Final.pdf

⁸ See e.g. https://www.iso-ne.com/static-assets/documents/2018/12/2018_iso-ne_offshore_wind_assessment_mass_cec_production_estimates_12_17_2018_public.pdf

⁹ <https://www.eia.gov/todayinenergy/detail.php?id=51158>

¹⁰ Levelized Cost of Energy, or LCOE, refers to the estimates of the revenue required to build and operate a generator over a specified cost recovery period, according to the EIA. It is useful for comparing the expected costs of different generation but does not account for related infrastructure and externalities such as transmission lines, carbon costs or environmental harm, additional pipeline capacity for gas power or costs of backup or standby generation. In the case of fossil fuel technologies LCOE is heavily influenced by expectations about future fuel prices.

¹¹ https://www.maine.gov/energy/sites/maine.gov.energy/files/inline-files/Maine%20OSW%20DNV%20Task%201%20-%20State%20of%20the%20OSW%20Industry_Final.pdf

¹² See also e.g. <https://www.bloomberg.com/news/articles/2021-06-23/building-new-renewables-cheaper-than-running-fossil-fuel-plants>

operating capacity between 2030 and 2050 to take advantage of falling costs and increased electricity demand. The first procurement tranche should open no later than 2026, or within one year of any federal water offshore lease grants. The procurement should be conducted by the Maine Public Utilities Commission, preferably in coordination with other states, and conducted on a competitive basis with sufficient specificity and prescription to attract highly qualified bidders that can deliver offshore wind at the lowest possible cost.

Rationale/Key Assumptions

- Gulf of Maine floating offshore wind is necessary for New England states to meet their legislated climate change and clean energy targets, including increased electricity demand associated with transport and heating electrification.
- Maine's electricity demand will approximately double by 2050, requiring substantial new renewable energy resources, of which offshore wind is likely an important component, particularly as costs decline over the long term.
- Given the Gulf of Maine water depths and seabed topography, floating offshore wind is anticipated to be required for future offshore wind projects in federal waters in the Gulf of Maine.
- A bold policy commitment to secure a significant volume of floating offshore wind backed by long-term power sales contracts and financing is necessary to attract offshore wind development and low-cost long-term investors, and to create an environment for supply and service chain investment (e.g., manufacturing, ships, port facilities, service bases) in Maine.
- A predictable and stable policy and regulatory environment is key to attracting necessary investments, given the extended time periods for (i) Federal Bureau of Ocean Energy Management seabed leasing; (ii) necessary port, transmission, other infrastructure and supply chain investments and related permitting and siting; and (iii) site evaluation (seabed conditions, wind, aquatic and fishery impact), permitting, and stakeholder consultation.
- Maine's floating offshore wind procurement should be phased over time to take advantage of the declining costs and lower the average cost to Maine's consumers and businesses.

Additional considerations/continuing efforts

- The EWG has engaged technical experts to investigate two areas that will continue to inform refinements to this recommendation. These include:
 - Scenario modeling on the role of floating offshore wind in the Gulf of Maine to serve both Maine and New England energy needs through 2050.
 - Identifying best practices for procurement or other development strategies. This review, which includes strategies and tactics from other states and European offshore leaders and interviews with key actors identified in collaboration with the working group, will inform the EWG's refinement of supporting actions to enable this and other recommendations.
- The EWG has discussed various mechanisms to minimize potential cost exposure to ratepayers. Those ideas are included in Recommendation #2.

Recommendation #2: Pursue policy and programmatic designs to achieve cost-effective offshore wind deployment.

Overview of recommendation

Globally, the LCOE of floating offshore wind has decreased substantially over the past decade due to improvements in technology, increasing efficiency, and knowledge gained from pilot projects in Europe.¹³ Global floating technology costs are declining, at a similar scale to other technologies, based on investments in research and development from the public sector and commercially scaling the technology.

Maine should pursue policy and design programs to achieve cost-effective offshore wind deployment in the Gulf of Maine in the context of achieving renewable energy and emission reductions targets locally and throughout New England. Collaboration with the Department of Energy and other national or international interests, opportunities for leveraging public investment in research, and strategically phased procurement schedules can aid in lowering costs. At a local and regional level, cost declines can arise from establishing the local infrastructure, supply chain, and workforce to support the deployment of floating offshore wind at a commercial scale.

The benefits of supporting the development of the industry are likely to be substantial; however, a proactive strategy to reduce the cost of procurements would be beneficial, particularly around the initial procurement phase. Today Maine electric customers face several trends that are driving up electric and energy bills, highlighting the importance of being attentive to costs and who bears them. To be sure, many of the drivers for cost reductions will come from outside Maine, particularly as other markets move aggressively to deploy floating offshore wind at scale. However, specific actions under consideration for Maine are:

- Consider all funding and cost containment mechanisms to support aspects of the industry build out, including transmission infrastructure. The mechanisms can include:
 - Actively pursue – and encourage industry to pursue – federal funding, tax credits, and other mechanisms.
 - Investment Tax Credits, Production Tax Credits and federal loan guarantees are potentially powerful mechanisms. Maine should encourage its federal delegation to develop and support federal funding, tax and loan guarantee opportunities that are specifically geared toward innovative floating technology, given that the technology is at an earlier phase of development than fixed bottom systems, and floating technology will be critical to meeting the country’s offshore wind goals.
 - Consider reducing costs, such as financing and insurance, through state mechanisms such as bonds. There is a strong argument that this support will spur economic activity and provide numerous benefits to future generations.
 - Consider and pursue opportunities to lower offshore wind deployment costs through targeted investments in workforce development, ports and infrastructure, and other

¹³ https://www.maine.gov/energy/sites/maine.gov.energy/files/inline-files/Maine%20OSW%20DNV%20Task%201%20-%20State%20of%20the%20OSW%20Industry_Final.pdf

aspects of the offshore wind supply chain that will create economic benefits in both the short- and long-term.

- Facilitate direct contract offtake by private, institutional or governmental entities. Examine ways to streamline these opportunities.
- Consider coordinating purchases with other states, by vesting authority with PUC to allow for Power Purchase Agreement contingency approval (i.e. OSW PPA is approved if Maine contracts for half, and 'X' state/entity contracts for the other half).
- There are tried and true ways that the PUC currently employs to conduct a procurement to ensure competitiveness and bring more companies and technologies to the table. For instance, it must not dictate specific technologies.
- Explore additional revenue streams to lower project costs (e.g. hydrogen development).
- Work regionally and internationally to help achieve economies of scale as quickly as possible.
- Continue to support the state-led Research Array to advance the nation's first floating offshore wind research site, establishing Maine as a leader. The Research Array will provide critical data on how floating offshore wind interacts with the Gulf of Maine's marine environment (e.g., fishing industry, shipping, and navigation routes) while advancing Maine's offshore wind economy and informing responsible growth in the United States and beyond.
- Create a Center of Excellence in Maine on floating wind that can be a conduit for research dollars and source of cost-saving innovations. Establishing Maine as a hub for testing and refining new technologies may be beneficial, with further consideration of specific target technologies and other considerations needed.
- Cultivate new and expanded public-private partnerships to accelerate research and development in support of the offshore wind industry. Partnerships could include private funding matched by public dollars and/or sharing of environmental or production data. Maine has initiated a number of partnerships to support offshore wind, including a recent Memorandum of Understanding with the United Kingdom, membership in the National Offshore Wind Research & Development Consortium, Business Network of Offshore Wind Supply Chain Portal, the Regional Wildlife Science Entity, and more.

Rationale/Key Assumptions

Costs are expected to fall for deploying floating offshore wind, and this Roadmap will take steps to accelerate this decline. This is particularly important given that Maine and New England are experiencing unusually high electricity prices primarily due to fossil fuel price volatility. Achieving beneficial electrification necessary to meet decarbonization objectives requires a careful balance between managing electricity costs while transitioning electricity generation to renewable resources.

Fixed seabed foundation offshore wind went through a similar cost reduction cycle in Europe, with costs per kWh falling 75% over 10 years. Floating offshore wind is anticipated to also continue experiencing rapid cost declines, and other countries are making commitments to deploy at scale.¹⁴ Targeted strategic investments in ports, fabrication technologies, grid infrastructure, and workforce training will accelerate

¹⁴ E.g. 15 GW of floating offshore wind commitments from ScotWind: <https://www.crownstatescotland.com/news/scotwind-offshore-wind-leasing-delivers-major-boost-to-scotlands-net-zero-aspirations>

the cost reduction and allow Maine to benefit economically from meeting its own energy needs as well as exporting technology and experience.

Recommendation #3: Continue to accelerate regional collaboration in support of offshore wind industry development.

Overview of recommendation

In addition to Maine’s goals summarized above, the other five New England states all have statutory requirements for clean energy resources, with most requiring similarly significant portions as Maine. All six New England states are participants in the common wholesale energy markets administered by ISO-New England and are thus closely linked from an energy perspective. Recent studies completed on behalf of other states in New England demonstrate the likelihood of significant offshore wind deployment to achieve energy policy and decarbonization objectives, including both fixed foundation resources in southern New England as well as floating resources including the Gulf of Maine.¹⁵ The continued acceleration of renewable energy generation deployment and pursuit of beneficial electrification in Maine and neighboring states will have significant impacts on both the regional transmission and local distribution networks as well as the existing and future generation fleets. The state is therefore best positioned to achieve its own objectives, as well as facilitate and potentially benefit from achievement of other New England states’ complementary objectives, by actively pursuing and engaging in regional collaborative efforts in this area.

Maine’s efforts in pursuit of regional collaboration should include building upon existing efforts through the New England States’ Committee on Electricity (NESCOE) to advance reforms to coordinate regional electricity markets and state laws, as well as transmission analysis and development in furtherance of state policy objectives. Maine should pursue other venues as well, considering new opportunities where appropriate, such as coordinating procurement or transmission to reduce costs.

- Regional coordination is an essential component of offshore wind development in the Gulf of Maine. As such, Maine should work to actively advance specific strategies to achieve regional collaboration around renewable energy.
- Explore specific opportunities to work collaboratively with other states on topics related to offshore wind deployment, including opportunities to maximize regional economic benefits from OSW, joint procurement, and joint analysis. These conversations might lead to a memorandum of understanding or another output. One example of such an MOU is between Maryland, Virginia, and North Carolina.¹⁶ GEO can take the first step by coordinating with other relevant agencies to identify opportunities.
- Existing transmission studies require additional attention to Gulf of Maine issues.
 - The Department of Energy Wind Energy Technologies Office is funding an East Coast feasibility study, led by the National Renewable Energy Laboratory, in which the

¹⁵ See e.g. <https://www.mass.gov/doc/energy-pathways-for-deep-decarbonization-report/download>, <https://portal.ct.gov/-/media/DEEP/energy/IRP/2020-IRP/2020-Connecticut-Integrated-Resources-Plan-10-7-2021.pdf>, <https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/offshore-wind-deployment-report.pdf>

¹⁶ https://files.nc.gov/governor/documents/files/SMART-POWER-MOU_FINAL.pdf

Governor’s Energy Office is participating as a technical review committee member.¹⁷ ISO New England is working with states to develop and complete a 2050 transmission study.¹⁸ Maine should help to ensure planning for the Gulf of Maine is fully incorporated into those studies and others as appropriate.

- Onshore grid updates will likely be required to provide grid reliability for the injection of significant new renewable energy, including offshore wind in the Gulf of Maine as well as southern New England. There are ongoing studies at ISO-New England to examine grid upgrades necessary to support the integration of wind as well as other onshore resources through 2050. Maine should actively seek to participate in these studies and planning processes.
- The Maine PUC should be given explicit authority and direction to work with other states conducting offshore wind solicitations to increase opportunities for collaboration through coordinated purchases that span more than one state.
- Maine should prioritize workforce and infrastructure development with eye toward regional collaboration with southern New England partners.

Rationale/Key Assumptions

- Maine should seek to build on existing and past efforts, including utilizing and strengthening existing venues such as NESCOE, the New England Conference of Public Utility Commissioners (NECPUC), and ISO New England.
- Interest in the Gulf of Maine spans multiple states. Effective collaboration between states, and between relevant state agencies or actors as appropriate, can support cost-effective deployment that accounts for the interests of multiple states, lowers development risks, and increases overall benefits across the region.
- Maine should seek to keep pace with other states, leading in strategic areas and collaborating where possible without falling behind or taking unnecessary risks.
- Although more study is needed, much is already known about where the potential renewable energy resources are and where the demand for electricity is. At this point, Maine should focus its regional collaboration on supply chain issues, procurement, and transmission options.

Additional considerations/continuing efforts

- The research described under continuing efforts associated with Recommendation #1 above is also expected to inform additional potential actions the EWG may consider in support of this recommendation.

¹⁷ <https://www.nrel.gov/wind/atlantic-offshore-wind-transmission-study.html>

¹⁸ <https://www.iso-ne.com/system-planning/transmission-planning/longer-term-transmission-studies/>

Emerging areas for additional future recommendations

Developing and prioritizing a clear and efficient process and rules for siting, permitting, and mitigating potential adverse impacts

- EWG members have and will continue to discuss whether existing processes for engaging the public and key stakeholders in various permitting, siting, and related decision-making are adequate.
- EWG members have also discussed the importance of transparent, stable, and robust permitting requirements, and the processes for establishing such requirements, for fostering both meaningful stakeholder engagement and a favorable environment for investment. Members of other working groups have surfaced similar concepts.
- Discussion on these topics have included, but are not limited to, the importance of clear requirements and setting achievable expectations for developers, signaling stable conditions for investment, and the importance of building and sustaining public support and mitigating areas of potential conflict.
- Ongoing research into best practices deployed in other jurisdictions, as well as continued discussion within the EWG, are expected to support refinement of these discussions into one or more recommendations.

Developing an offshore wind transmission development strategy that prioritizes cost-effectiveness and market deliverability as well as minimizes impacts

- EWG members have discussed how transmission strategies have cross-cutting implications for many of the other recommendations. The technical consultants are preparing transmission analyses that will inform the EWG's consideration of this topic, including reviews of best practices from other jurisdictions and high-level analyses of potential topologies for the Gulf of Maine. This research, as well as continued discussion within the EWG, are expected to support refinement of these discussions into one or more recommendations.
- One aspect to consider closely is how to avoid partially utilizing existing landing points in ways that undermine their full potential. Considerations should be taken for coordinated offshore transmission to take advantage of all available interconnection capacity. A clear understanding of the full capabilities of landing points should be analyzed before putting out an RFP.