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May 18, 2023

Committee on Energy, Utilities, and Technology
c/o Office of Fiscal and Program Review
5 State House Station
Augusta, ME 04333

RE: Support of LD 1895, An Act Regarding the Procurement of Energy from Offshore Wind Resources

Dear Senator Lawrence, Representative Zeigler, and other members of the Committee,

My name is Steve Clemmer, Director of Energy Research in the Union of Concerned Scientists (UCS) Climate and Energy Program, and I live in Prospect Harbor Maine. UCS is the nation's leading science based non-profit organization with more than a half a million supporters, including more than 2,500 in Maine. I offer this testimony in support of the Sponsor's Amendment to LD 1895.

LD 1895's procurement targets for offshore wind are critical for meeting Maine's climate and energy goals, while helping to stabilize energy costs, create high quality jobs, and ensure development is responsible and equitable.

LD 1895 builds on the recommendations from Maine's Offshore Wind Roadmap and policies adopted in other leading states. The roadmap was developed over the past two years by the Governor's Energy Office based on extensive input from a wide range of stakeholders. As a member of the Energy Markets and Strategies Working Group for the roadmap, I can tell you that adopting a procurement requirement for offshore wind development in Maine was the working group's highest priority recommendation.

Here are five reasons why LD 1895 is so important for Maine:

Offshore wind is critical for meeting Maine's climate and clean energy goals.
Climate change is one of the biggest threats to Maine's environment and economy. As described in Maine's Climate Action Plan, the Gulf of Maine is warming faster than 99% of the world's oceans. Increasing ocean acidification is also harming Maine's lobster and fishing industry, while warming waters and temperatures are driving species further north. Coastal communities are already experiencing the impacts of coastal flooding due to sea level rise and stronger storms fueled by climate change, which are projected to get worse over time.

To limit the worst impacts of climate change, recent studies by the Intergovernmental Panel on Climate Change (IPCC) show that we need to cut global heat-trapping emissions in half by

2030 and reach net zero emissions economy-wide no later than 2050.[1] Multiple studies also show that achieving these targets will require decarbonizing the power sector as soon as possible and replacing fossil fuels with zero-carbon electricity in transportation, buildings, and industry.

Maine's climate and clean energy laws are well-aligned with these science-based targets and strategies, as described in Maine's Climate Action Plan, which I helped shape as a member of the Energy Working Group. A recent UCS report shows that Maine has one of the strongest climate action plans in New England.[2]

Offshore wind development will be critical for meeting state and regional climate and clean energy requirements. Recent studies show that offshore wind development in Maine could range from 500 megawatts (MW) to 1,000 MW in 2030 to 5,000 MW to 8,000 MW by 2050.[3] With 2,800 MW installed and operating by 2040, offshore wind would provide more than half of Maine's electricity demand, even with demand more than doubling as is projected when the state moves to replace fossil fuels with clean electricity for transportation and heating.

Procurement targets are a proven and effective strategy

More than two decades of adopting and implementing renewable electricity standards in 30 states shows that procurement targets have been a key driver for deploying land-based wind and solar, achieving economies of scale, increasing technology innovation, and lowering costs.[4] By adopting a procurement requirement, Maine will have a much better chance to compete in the race with other states to develop offshore wind and related supply chain infrastructure in the US.

At least 10 other states, including six states in the Northeast, have adopted offshore wind procurement targets totaling 81,000 MW over the next 20 years, according to the American Clean Power Association.[5] These targets range from 1,400 MW by 2030 in Rhode Island to 11,000 MW by 2040 in New Jersey to 25,000 MW by 2045 in California (see Exhibit A).

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[1] IPCC, 2018: Summary for Policymakers. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3-24, doi:10.1017/9781009157940.001.

[2] Israel, Miriam Silverman, Jo Field, and Roger Stephenson. 2022. *New England State Climate Action Assessment Using the UCS Resilience Gap Framework*. Durham, New Hampshire. University of New Hampshire Sustainability Institute. https://www.ucsusa.org/node/14868

[3] DNV, 2022. *Wind Energy Needs Assessment.* Prepared for the Maine Governor's Energy Office and the Maine Offshore Wind Roadmap; *Massachusetts Clean Energy and Climate Plan for 2025 and 2030*; Synapse Energy Economics. 2020. *Volume 3: Mitigation Modeling Consolidated Energy Sectors Modeling Results*. Prepared for the Maine Climate Action Plan. *State of Maine Renewable Energy Goals Market Assessment*. 2021. Prepared by Energy & Environmental Economics (E3) and Applied Economics Clinic (AEC) for the Governor's Energy Office; and Silkman, Richard. 2019. *A New Energy Policy Direction for Maine: A Pathway to a Zero-Carbon Economy by 2050*.

[4] Barbose, Galen. 2022. *U.S. Renewables Portfolio Standards 2021 Status Update: Early Release*. Lawrence Berkeley National Laboratory: Berkeley CA. https://emp.lbl.gov/publications/us-renewables-portfolio-standards-3

[5] American Clean Power Association. 2023. *Offshore Wind Market Report*. https://cleanpower.org/resources/offshore-wind-market-report-2023/

While the 2,800 MW by 2035 procurement target in LD 1895 is more modest, most of the other states with higher targets have much larger populations and greater energy demand. Most states also have interim targets that ramp-up over time, which gives the industry more investment certainty and will be necessary to build out the offshore wind supply chain.

According to ACP, more than 51,000 MW of offshore wind is currently under development in the United States, 84 percent of which is on the East Coast. This includes 938 MW currently under construction, 18 projects in advanced development representing 16,564 MW, and 18 projects in early development totaling 33,875 MW. While only a few floating offshore wind projects are currently operating globally, the development pipeline more than doubled over the past year from 91,000 MW from 120 projects to 185,000 MW from 230 projects.

Developing floating offshore wind projects in the Gulf of Maine will be important to meet state and regional targets and build on the University of Maine's leadership in developing the technology. While floating offshore wind is more challenging to develop than fixed-bottom projects, the Gulf of Maine has the highest, most consistent wind speeds on the East Coast. According to the National Renewable Energy Laboratory (NREL), floating offshore wind represents 63 percent of the total technical potential for offshore wind in the North Atlantic and 65 percent at the national level.[6] A 2022 deep decarbonization study for Massachusetts projected that floating offshore wind could account for more than 40 percent of total offshore wind deployment needed to meet New England's climate and energy goals in 2035 and about 70 percent in 2050.[7]

Maine can capitalize on falling costs and federal incentives

Like we have seen with land-based wind and solar photovoltaics, the cost of offshore wind is projected to fall rapidly over time as the technology matures and the supply chain grows. The cost of fixed-bottom offshore wind projects has already fallen by 48 percent, from $162 per megawatt-hour (MWh) in 2010 to $84/MWh in 2021 due to development in other countries.[8]

While the costs of floating offshore wind projects are currently higher than fixed-bottom projects, they are projected to be similar by 2035. NREL and DNV expect floating offshore wind costs to dip to $60 to $80/MWh by 2030 and $45 to $50/MWh by 2035 (see Exhibit B).[9] The Biden administration, which set a goal of 15,000 MW of floating offshore wind by 2035, also has set a price target for floating offshore wind power at $45/MWh by 2035, which is less than the costs of electricity from new natural gas plants.[10]

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[6] Lopez, A., R. Green, T. Williams, E. Lantz, G. Buster, and B. Roberts. 2022. *Offshore Wind Technical Potential for the Contiguous United States*. National Renewable Energy Laboratory: Golden CO. https://www.nrel.gov/docs/fy22osti/83650.pdf

[7] *Massachusetts Clean Energy and Climate Plan for 2025 and 2030*. 2022. https://www.mass.gov/info-details/massachusetts-clean-energy-and-climate-plan-for-2025-and-2030#clean-energy-and-climate-plan-for-2025-and-2030-

[8] Musial, W., P. Spitsen, P. Duffy, P. Beiter, M. Marquis, R. Hammond, and M. Shields. 2022. Offshore Wind Market Report: 2022 Edition. Prepared by the National Renewable Energy Laboratory for the US Department of Energy Wind Technologies Office. https://www.nrel.gov/wind/offshore-market-assessment.html

[9] DNV. 2022. *State of the Offshore Wind Industry: Today through 2050*. Prepared for the Maine Governor's Energy Office and the Maine Offshore Wind Roadmap.

[10] https://www.whitehouse.gov/briefing-room/statements-releases/2023/02/22/fact-sheet-biden-harris-administration-announces-actions-to-expand-offshore-wind-nationally-and-harness-more-reliable-affordable-clean-energy.

Clean energy incentives in the historic federal Inflation Reduction Act passed last fall will help lower the costs even further. In fact, the timing of Maine's offshore wind procurement targets in LD 1895 is designed to take advantage of federal tax credits, which could lower the capital costs of projects built in the Gulf of Maine by at least 30 percent. Federal funding is also available in this time frame to help build out Maine's supply chain and offshore wind component manufacturing, spur investments in port infrastructure, and encourage transmission planning.

While the cost of offshore wind projects has increased in the past two years due to inflation, rising commodity prices, and supply chain pressures, UCS expects these effects to be temporary. Land-based wind similarly experienced temporary cost increases during the 2008 economic recession. But since 2009, the cost of land-based wind has fallen by over two-thirds as inflationary pressures eased, the technology advanced, and the US-based supply chain matured.[11]

Offshore wind can help stabilize energy costs

In addition to becoming increasingly cost-competitive over time, offshore wind also can help stabilize energy costs for households and businesses by reducing regional reliance on imported gas and oil. Dependence on gas for about half of the power generation in New England resulted in an 83-percent supply-rate increase in Maine last year, and a 49-percent supply-rate increase this year, representing a $32 jump in a typical household's monthly electricity bill.[12] Offshore wind power has no fuel costs, so power costs are more stable and predictable over time than fossil fuel-fired power. Wind also can help protect ratepayers from price volatility caused by such events as the Russian war in Ukraine or extreme weather (See Exhibit C). Moreover, offshore wind also would produce more electricity during the winter heating months when New England energy demand is greatest.

Offshore wind development resulting from LD 1895 also could put downward pressure on electricity and gas prices—and save ratepayers money. Electricity generation is dispatched at the regional level according to increasing costs. Since wind and solar have no fuel costs and low operating costs, utilities typically dispatch them first. Gas generators, on the other hand, have relatively high fuel and operating costs, so utilities typically dispatch them last to meet demand, thereby setting the market price of electricity. Thus, by reducing the need for more expensive gas generators that are on the margin, offshore wind could lower wholesale electricity prices.

- For example, a 2020 NREL study found that deploying 2,000 MW of offshore wind in ISO-New England would reduce regional wholesale electricity prices by 1 percent and result in total electricity production cost savings of over 5 percent when import

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[11] Wiser, R., M. Bolinger, B.Hoen, D. Millstein, J. Rand, G. Barbose, N. Darghouth, W. Gorman, S. Jeong, and B. Paulos. 2022. *Land-Based Wind Market Report: 2022 Edition*. Prepared by Lawrence Berkeley Laboratory for the Wind Energy Technologies Office of the U.S. Department of Energy. https://www.energy.gov/eere/wind/articles/land-based-wind-market-report-2022-edition

[12] Governor's Energy Office webpage on electricity prices: https://www.maine.gov/energy/electricity-prices#:~:text=The%20PUC%20recently%20announced%20the,%240.176%20from%20%240.118%20in%202022

costs were considered.[13] When offshore wind deployment was increased to 7,000 MW, wholesale electricity price reductions grew to 13 percent and production cost savings increased to 18 percent.

- An analysis by ISO-NE found that if 1,600 MW of offshore wind had been online during the 2018 cold snap, consumers in New England would have saved more than $80 million, carbon dioxide emissions would have been 11 percent lower, and more reserves would have been available to maintain a stronger reliability margin.[14]

Ensuring responsible and equitable development of offshore wind

As someone who lives in a small coastal fishing community near Maine's Acadia National Park, I can see up close the importance of developing offshore wind in a responsible and equitable way that includes strong labor and environmental standards and protections for the fishing industry, local communities, and tribes. The project labor agreements (PLA) and labor "peace" agreements in LD 1895 are supported by the BlueGreen Alliance (of which UCS is a founding member) and have been adopted by other states to ensure offshore wind projects are built with strong labor standards and are able to maximize federal incentives available through the Inflation Reduction Act and infrastructure laws.

LD 1895 wisely includes tax incentives that would encourage wind development outside of Lobster Management Area 1 and offset the modest additional costs of locating projects further offshore. In addition, the bill would provide funding for local fishing communities, which would create new jobs and tax revenue, and for independent scientific research to determine the best way for Maine to embrace the vast benefits of wind power while protecting wildlife, fisheries and the environment.

The number of turbines and area needed in the Gulf of Maine to meet Maine's targets in LD 1895 is relatively small. With the 15 MW wind turbines that are becoming the industry standard, meeting the targets in the bill would only require 67 turbines for 1,000 MW of projects under contract by 2030 and 187 turbines for 2,800 MW under contract by 2035. Data from NREL and BOEM leases in other parts of the country suggest the area needed to meet the 2,800 MW target is approximately 226,800 acres or 2.3 percent of the parts in the Gulf of Maine under consideration by BOEM, the federal agency that oversees energy activities in the Outer Continental Shelf around the country. While more area would be needed to meet regional targets, clearly there is more than enough space to site projects in a way that avoids or minimizes impacts on environmentally sensitive and high-density fishing areas.

LD 1895 also guarantees a place at the table for federal recognized and state acknowledged tribes and would require developers to consult with tribes every step of the way. Further, the bill includes workforce development, employment, and contracting opportunities, as well as financial and technical assistance to support robust monitoring of the fisheries that local tribes care about most.

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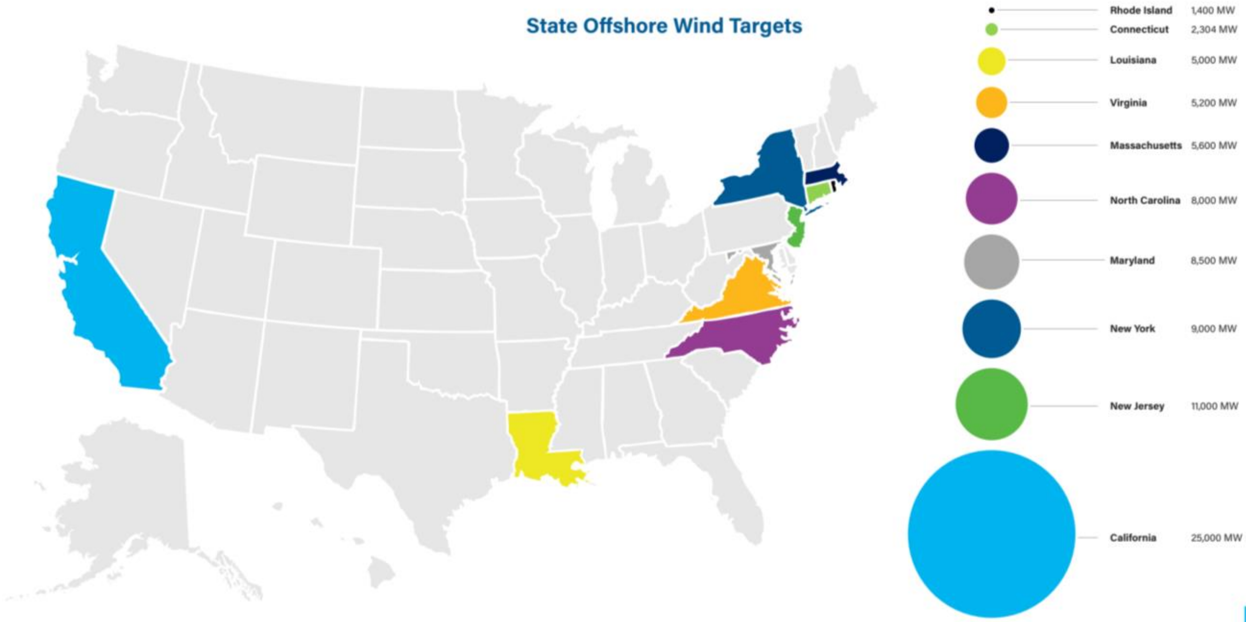
[13] Beiter, P., J. Lau, J. Novacheck, Q. Yu, G. Stephan, J. Jorgenson, W. Musial, and E. Lantz. The Potential of Offshore Wind Energy on a Future Power System in the U.S. Northeast. National Renewable Energy Laboratory: Golden CO. https://www.nrel.gov/docs/fy20osti/74191.pdf

[14] ISO New England System Planning Department. "High-Level Assessment of Potential Impacts of Offshore Wind Additions to the New England Power System During the 2017-2018 Cold Spell." December 17, 2018. https://acrobat.adobe.com/link/review?uri=urn:aaid:scds:US:bfdc8f71-5dc1-3118-8886-351097f10e73

While these provisions are a good start, more engagement with the tribes is clearly needed to avoid, minimize, and compensate for any negative impacts from offshore wind development. Tribal nations must be included in the development, permitting, and management of offshore wind projects. Likewise, more data and research is needed to ensure impacts to cultural resources are adequately considered in the US Bureau of Ocean Energy Management's suitability analysis to identify potential offshore wind leasing areas.

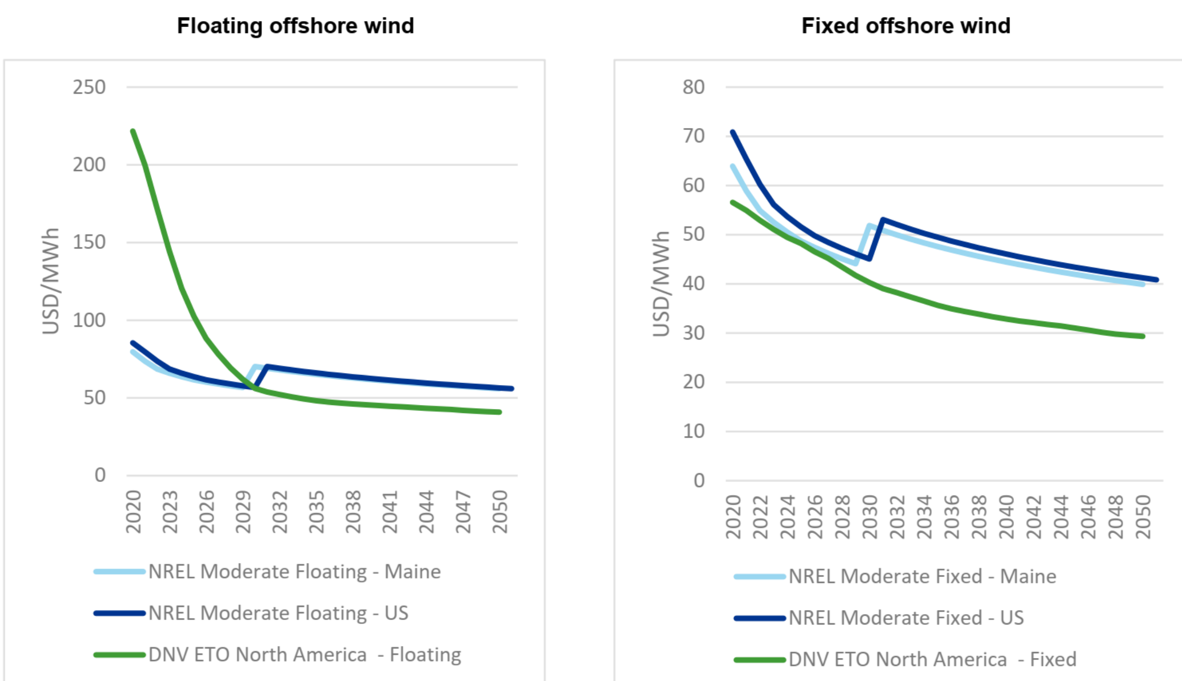
It's time to make offshore wind a reality in Maine, and LD 1895 offers a strong path forward for responsible and equitable development of this key resource. Thank you for the opportunity to testify in support of the Sponsor's Amendment to LD 1895.

Exhibit A: State Offshore Wind Targets



Source: American Clean Power Association. 2023. *Offshore Wind Market Report*.

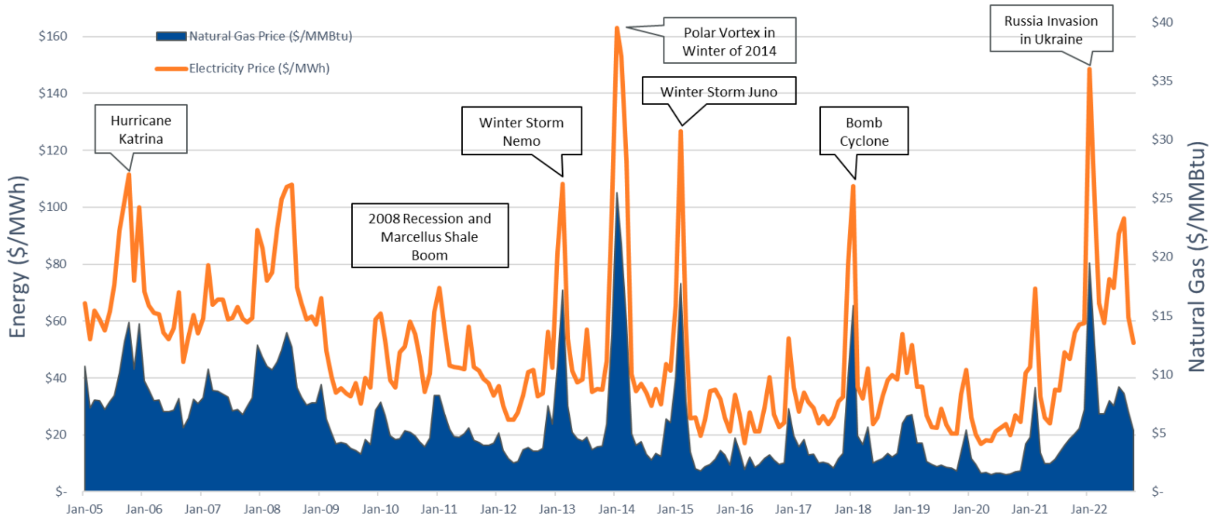
Exhibit B: NREL and DNV Projections of the Cost of Electricity from Offshore Wind



Source: DNV. 2022. *State of the Offshore Wind Industry: Today through 2050*. NREL's projections include the federal investment tax credit (ITC) until 2030. DNV's projections do not include the ITC.

Exhibit C: Natural Gas and Electricity Prices Are Volatile to External Events

Natural gas prices drive electricity prices and are subject to many sources of volatility. Domestic and reliable renewable contracts can hedge against rising prices and volatility.



Historical Natural Gas and Electricity prices were pulled from S&P using their screener function. The price of energy is at ISO-NE Internal Hub. The price of natural gas is at Algonquin City Gates.

Source: RENEW Northeast and Daymark Energy Advisors. 2023 *Benefits of Offshore Wind for New England*.