FY 2024 Port Infrastructure Development Program

Discretionary Grant

Benefit Cost Analysis Narrative

Dirigo Atlantic Floating Offshore Wind Port Planning

Sears Island, Maine

FY25-26 Multimodal Project Discretionary Grant Program
Dirigo Atlantic Floating Offshore Wind Port
Maine Department of Transportation

Benefit Cost Analysis Narrative

Project Description

The Maine Department of Transportation (MaineDOT) is requesting a **$15,913,600** Port Infrastructure Development Program award toward a **$19,892,000** port planning grant to plan for a **$760,000,000** port project to construct a new port facility in rural Maine that will be able to accommodate the movement of floating offshore wind turbines. This BCA is based on the full construction cost of *The Dirigo Atlantic Floating Offshore Wind Port* project, at $760,000,000.

The Biden Administration created the *Floating Offshore Wind Energy Shot*, a comprehensive interagency group to pursue policies to lower costs of floating offshore wind by 70 percent, advance lease areas in deep waters to deploy floating offshore wind platforms and support floating offshore wind research and development.[1] The interagency group includes U.S. Departments of Transportation (DOT), Energy (DOE), Interior (DOI), and Commerce (DOC). The state of Maine has set its own aggressive goals that complement the Biden Administration's. *The Maine Offshore Wind Initiative* was launched in 2019 by Governor Janet Mills and included planning activities; stakeholder engagement; research and collaboration with educational institutions and non-governmental organizations; and a goal of preserving the maritime industry and protecting the environment. The Maine legislature recently mandated the production of 3 gigawatts (GW) of wind energy by 2040.[2] A major impetus for the legislation was the Biden Administration's ambitious effort to tackle the growing climate crisis, including the U.S. Nationally Determined Contribution pursuant to the Paris Climate Agreement to reduce greenhouse gas (GHG) emissions by 50-52 percent below 2005 levels by 2030, and a carbon pollution-free power sector by 2035.[3] Consistent with these goals, the Biden Administration has established a goal of deploying 30 GW of offshore wind by 2030, an additional 15 GW of offshore wind by 2035, and a final 110 GW of offshore wind by 2050. The construction of an offshore wind port is essential to meet these milestones. Port infrastructure is necessary to fulfill the renewable energy mandates set by this Administration and the state of Maine.

The Dirigo Atlantic Floating Offshore Wind Port project is the ideal project to move these goals forward. With deepwater access to the port development site at Sears Island, Maine will establish a premier location for the industry and help meet growing demand for offshore wind port infrastructure. This project will allow for the installation of a floating offshore wind turbine

[1] The White House, FACT SHEET: Biden-Harris Administration Announces New Actions to Expand U.S. Offshore Wind Energy, https://www.whitehouse.gov/briefing-room/statements-releases/2022/09/15/fact-sheet-biden-harris-administration-announces-new-actions-to-expand-u-s-offshore-wind-energy/; Governor's Energy Office, Offshore Wind, https://www.maine.gov/energy/initiatives/offshorewind

[2] The *Maine Energy Plan: Pathway to 2040* identifies the need for at least 3 GW of OSW in multiple scenarios with the goal of 100 percent clean energy by 2040. Maine has statutory authority to procure 3 GW of FOSW power by 2040.

[3] The White House, FACT SHEET,: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/

development in the Gulf of Maine while reducing the cost to implement offshore wind production by constructing a purpose-built port on Sears Island that will have the capacity and capability to construct offshore wind turbines and deliver them to the lease area in the Gulf of Maine. There is no other port on the East Coast that can effectively lower the cost of floating offshore wind and reduce the continued delays to produce wind energy.

The reasonable alternative ports that may in the future be able to accommodate floating offshore wind are located in the New Jersey and Massachusetts areas. The most likely port in New Jersey is 520 nautical miles from the Gulf of Maine Wind Energy Area. This BCA used this distance as the No Build scenario and compared it with the Build scenario of the port on Sears Island which is 110 nautical miles from the Gulf of Maine Wind Energy Area. This BCA used these ditances, the number of tugs required for each wind turbine platform to be hauled out to sea, and the number of wind turbines installed per year based on the estimates from the State of Maine, to reach the 3 GW goal, to calculate the savings in reduced tugboat emissions and reduced operating and salary costs (or travel time costs).

Initial Capital Costs

The initial capital cost will be $760,000,000. The total amount has been divided into the four-year period of the project. The last 2 years of the project will see the most construction and therefore, will be the most capital intensive at $255,000,000 in each of the last two years. The capital costs are estimated on the 30 percent design and engineering that has been completed.

Tugboat Emissions Savings

The project will reduce tugboat emissions by ensuring that the floating offshore wind turbines are assembled and deployed as close to the Maine Wind Energy Area (WEA) as possible. Each floating wind turbine will require three (3) tugboats to haul it to the WEA. The number of tugboats necessary is based on the size of the floating platforms and the weight of the platform and the wind turbine which reaches up to 900 feet.

Tugboats emit a significant amount of GHG emissions including Carbon, Nitrous Oxide and Particulate Matter.

Most marine transportation is powered by diesel engines, which are major sources of emissions of nitrogen oxides (NO_x), Carbon (CO2), and particulate matter (PM). Nitrogen oxide and volatile organic compounds form ground-level ozone, or smog. Ground-level ozone can trigger a variety of health problems, including aggravated asthma, reduced lung capacity, and increased likelihood of pulmonary diseases such as asthma, pneumonia, and bronchitis.[4]

[4] *See* U.S. DEP'T. OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION, CHAPTER 2: NATIONAL FREIGHT TRANSPORTATION TRENDS AND EMISSIONS, https://www.fhwa.dot.gov/environment/air_quality/publications/effects_of_freight_movement/chapter02.cfm.

Transportation engines are a major source of greenhouse gas (GHG) emissions, which contribute to pollution. Emissions of nitrogen oxide, particulate matter and carbon will be reduced through this project.

Tugboats produce 14,124 grams/hour of nitrogen oxide at 100 percent load and 9,450 grams/hour or nitrogen oxide at 75 percent load. The PIDP BCA Guidance values the cost of NOx reduction to be approximately $22,000 per metric ton.

Therefore the cost of not building the port thus, unnecessarily elongating the distance between the assembly port and the WEA, in nitrogen oxide emissions cost is more than $36 million over the 30 years. The cost of particulate matter reduction over the same period is more than $21 million. Carbon reduction due to this project is more than $34,000 over the course of the construction project.

Tugboat Travel Time Savings

Savings are also found in travel time and operating expenses for tugboat operators. On average tugboats will have six (6) seamen with one captain earning $38/hour and $50/hour respectively. As noted, each floating wind turbine requires three (3) tugboats. Each tugboat if not originating from Sears Island but rather from the next closest, capable port, will travel 520 nautical miles one way to deploy the turbine. If the turbines originate in Sears Island the tugboat will travel 110 nautical miles. Not only does this reduction in nautical miles dramatically reduce the hours at sea but reduces the fossil fuel usage. This equates to a savings of over $175 million over the course of the construction project.

Wind Energy Reduction in Emissions

Ultimately the most significant savings comes in the form of creating port infrastructure to accommodate wind energy, a renewable energy source that this Administration seeks utilize and fully realize to displace fossil fuel energy. Without port infrastructure this displacement cannot happen, and the U.S. will not harness the incredible energy potential off the Eastern Seaboard.

This project will dramatically reduce energy emissions by displacing fossil fuel created energy with wind energy. Wind energy has a zero carbon and emissions footprint. This project will allow for the production of energy to power homes in Maine equating to more than $7.3 billion in savings over the course of the project. These savings account for the NOx, CO2, and SO2 not emitted in the production of wind energy. The calculations are based on the number of wind turbines deployed annually and the effects are cumulative. Unlike in other transportation projects where the positive impacts of a project are often diluted because there is not an absolute shift, the result of this port project will be a direct displacement of fossil fuels to wind energy which will build on itself year over year.

As noted, GHG emissions are significantly damaging to society, and particularly damaging to the most vulnerable parts of society. The deployment of the floating offshore wind is dependent on a port that can handle the turbines. Today, there exists no such port on the East Coast of the U.S. impeding the ability to realize these savings. The investment in this project will directly impact

the state of Maine and the U.S.' ability to realize these savings by proving the transportation infrastructure needed to deploy the clean energy.

Residual Value

The residual value of the project is significant on the port side of the project. The barge project has no residual value because the life of the barge project is 30 years which matches the USDOT mandatory project life for a newly built project. However, the port has a project life of 50 years which affords a residual value of 20 years. The residual value of the port of nearly $100 million on an NPV basis.

Scrap Value

The barge, while having no residual value, does have scrap value based on the average of 5 percent value for vessels at the end of life for scrap. At that rate, on an NPV basis the scrap value adds another $3.5 million in benefits to the project.

Lease Payments

Finally, the State of Maine has analyzed the potential for lease payments of the Gulf of Maine Wind Energy Area. These payments while not included in the BCA as they can be considered a transfer, will be significant to the State in its ability to fund the project. And so they will be a benefit to the state itself. Finally, the barge will be U.S.-flagged and Jones Act- compliant. This will be very significant as it will be the only one of its kind. Again, the potential to lease the barge out while not in use to move floating offshore wind turbines is great but not included in the BCA calculations due to the transfer nature of the payments. Nonetheless, these lease payments should be noted.