Maine Committee on Energy, Utilities, and Technology
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Testimony of Brendan Casey on Behalf of the American Clean Power Association
Support – LD 1710

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Chairman Lawrence, Chairman Berry, and members of the Committee, thank you for the opportunity to offer testimony in support of LD 1710.

My name is Brendan Casey, and I am a research economist with the American Clean Power Association (ACP). ACP, formerly known as the American Wind Energy Association (AWEA), represents wind, solar, transmission, and energy storage manufacturers and developers.

ACP has reviewed LD 1710 and believes it is vital to deploying low-cost generation resources in Maine. LD 1710 would establish the Northern Maine Renewable Energy Development Program to remove obstacles to the use of northern Maine's abundant renewable energy resources. LD 1710 would also require the Maine Public Utilities Commission to issue a request for proposals for the development and construction of a 345-kilovolt double circuit generation line to connect renewable energy resources in northern Maine with the electric grid operated by the New England independent system operator. This legislation would also require the Commission to issue a request for proposals for the development and construction of qualified renewable energy generation projects to connect to and transmit power using the line. An Aroostook County transmission line would unlock a wide array of cost-effective renewable energy resources, which would benefit ratepayers through reduced pricing, and benefit Maine through economic development and increased energy exports.

To help evaluate the economic benefits and ratepayer impacts of LD 1710, ACP submits the following analysis for the Committee's consideration.

While the proposed legislation could result in many combinations of generation and transmission resources through the competitive bidding process, one potential scenario envisioned by LD 1710 is a roughly 200-mile, 345 kV double circuit transmission line to be constructed in northern Maine that would include the construction of a new substation and additional substation upgrades elsewhere. In this scenario, the transmission line could support the addition of at least 1,200 MW of wind capacity.

The construction of a transmission line, and the wind capacity it would enable, would lead to significant economic benefits for the state of Maine, creating good paying jobs and increasing state and local tax revenue. Below, ACP has estimated the costs and benefits of this hypothetical transmission line, the potential cost to ratepayers associated with constructing the transmission line, and the economic benefits that would result from increased wind resource development.

The total construction cost for this hypothetical transmission line is estimated at $495 million. The total construction cost of wind projects totaling 1,200 MW of capacity is estimated at roughly $1.6 billion. Both transmission and wind generation projects also require significant annual operations and maintenance (O&M) investments that will create long-term, permanent employment for residents. Details on how these costs were derived are presented in the appendix.

To estimate the economic benefit potential of these projects, ACP relied on the National Renewable Energy Laboratory's (NREL) Jobs and Economic Development (JEDI) model for cost and spending assumptions. For each component of the projects, assumptions regarding the amount of the purchase made in-state were applied to capture only the portion of that spending that occurs within Maine. It is these in-state purchases of materials and labor that ultimately generate state-level economic impacts. These estimates do not assume that high-value manufactured components such as turbines or transformers are constructed in Maine. Instead, they rely generally on NREL's assumptions of local content and thus should be viewed as conservative estimates. In both the transmission and wind generation projects, construction labor is the driving force behind the economic impacts. This is evidenced in the fact that despite having a lower overall cost, the construction of a 200-mile transmission line would result in higher job impacts due to the significantly higher share of labor costs in transmission development as compared to wind generation development.

The total economic impacts were calculated using Regional Input-Output Modeling System (RIMS II) multipliers, a product of the Bureau of Economic Analysis (BEA). RIMS II multipliers are used by federal, state, and local government agencies, economic development organizations such as chambers of commerce and economic development corporations, and businesses to study the local impacts of a wide range of investment projects. The impacts can be expressed in terms of overall economic activity (output), value added (gross domestic or state product), earnings (wages and salaries, including benefits, paid to employees, contractors, and subcontractors), and employment (full- and part-time jobs). Sales taxes, right of way payments, land lease payments, and property tax estimates were also derived using assumptions provided by NREL. These assumptions are detailed in the appendix.

Below, Tables 1 and 3 highlight the estimated total economic impacts in Maine that would result from the construction of the hypothetical transmission line and the wind resources enabled by its development. Tables 2 and 4 present annual

economic impacts that result from routine O&M activity on the transmission line and wind generation projects, respectively.

Table 1: Total Economic Impacts During Construction – 200 Mile, 345 kV Double Circuit Transmission Line	
Job-years	2,113
Wages, Salaries, and Benefits	$111,618,216
Economic Activity	$254,648,915
Value Added Gross State Product (GSP)	$136,771,367
State and Local Sales Tax	$14,090,662
Right of Way	$5,213,091

The construction of a 200-mile, 345 kV double circuit transmission line in Maine would result in over 2,100 job-years for Mainers during the construction period. These workers would earn nearly $112 million in salaries, wages, and benefits for local workers. The project would generate nearly $255 million in economic activity, adding almost $137 million to the state's gross state product (GSP). Additionally, in-state purchases would result in over $14 million in sales taxes paid within the state and over $5 million in right of way payments to landowners.

Table 2: Annual Economic Impacts During Operations – 200 Mile, 345 kV Double Circuit Transmission Line	
Job-years	13
Wages, Salaries, and Benefits	$640,137
Economic Activity	$2,230,917
Value Added GSP	$1,060,301
State and Local Sales Tax	$6,253,430
Property Tax	$6,158,422

Transmission line O&M activities would support 13 permanent, full-time jobs and add over $1 million to the State's gross product each year. Additionally, in-state purchases of supplies and equipment required to maintain the line would generate

roughly $6.3 million in sales taxes each year. Lastly, based on the total construction cost of the line, nearly $6.2 million in property taxes would be collected each year.

Table 3: Total Economic Impacts During Construction – 1,200 MW Wind Capacity	
Job-years	1,547
Wages, Salaries, and Benefits	$85,417,447
Economic Activity	$323,738,880
Value Added GSP	$139,960,923
State and Local Sales Tax	$71,847,664

The construction of 1,200 MW of wind generation in Maine would result in over 1,500 job-years during the construction period. These workers would earn over $85 million in salaries, wages, and benefits for local workers. The project would generate nearly $324 million in economic activity, adding almost $140 million to GSP. Additionally, in-state purchases of equipment and supplies would result in nearly $72 million in sales taxes paid within the state.

Table 4: Annual Economic Impacts During Operations – 1,200 MW Wind Capacity	
Job-years	52
Wages, Salaries, and Benefits	$2,601,465
Economic Activity	$8,687,009
Value Added GSP	$4,710,374
State and Local Sales Tax	$2,618,512
Property Tax	$22,101,600
Land Lease	$7,801,440

Wind generation O&M activities would support over 50 permanent, full-time jobs and add nearly $5 million to the State's gross product each year. Additionally, in-state purchases of supplies and equipment required to maintain the line would generate roughly $2.6 million in sales taxes each year. Based on average land lease

costs for wind turbines, the project would generate over $7.8 million in land lease payments each year. Lastly, based on the total construction cost of wind generation, over $22 million in property tax could be collected each year. ACP did not estimate the value of a Tax Increment Financing District, which could exceed $100 million over 30 years.

By enabling the addition of emissions-free wind generation, the construction of the transmission line would also lead to significant emissions reductions. These results are presented in Table 5.

Table 5: Annual Emissions Reductions – 1,200 MW Wind Capacity	
Pollutant	**Reduction (tons)**
CO2	1,562,714
NOx	817
SO2	262
PM 2.5	85

Adding 1,200 MW of wind generation would reduce CO2 emissions by over 1.5 million tons per year across New England. This is equivalent to taking over 330,000 cars off the road, based on recent EPA estimates. Additionally, these projects would prevent the release of significant amounts of particulate matter (PM 2.5) and pollutants such as nitrogen oxides (NOx) and sulfur dioxide (SO2) which have serious impacts on our environment and on human health.

To calculate the estimated impacts to Maine ratepayers to finance the construction of the transmission line, we first identified the total electricity sales by customer type (residential, commercial, and industrial) for the latest year of available data from the Energy Information Administration (EIA). This was paired with revenue and customer count data to calculate the share of total sales and average monthly bills for each customer type. This data is presented in Table 6.

Table 6 – Electricity Sales and Revenue by Customer Segment

Customer Type	Number of Customers	Sales (MWh)	Share of Total Sales	Revenue (thousands)	Average Monthly Bill
Residential	710,869	4,793,809	40.9%	857,569	$100.53
Commercial	99,738	4,148,305	35.4%	532,119	$444.60

Industrial	2,893	2,789,926	23.8%	257,281	$7,411.02

For the simplicity of the analysis, the capital cost of the transmission line was rounded to $500 million. To calculate the estimated monthly bill impacts, the amount to be recovered from each customer segment was determined based on their respective share of total sales within the state. That is, 40.9% of the capital cost would be recovered from residential customers, 35.4% from commercial customers, and 23.8% from industrial customers. The amount recovered from each segment was then disaggregated to an average monthly bill increase for the average customer in that segment, based on a recovery period of 20 or 30 years. ACP opted for a simple ratepayer-recovery analysis, not factoring in any federal tax credits currently being considered in legislation or the possibility of lower-cost financing through a public entity. The analysis also does not include any benefits (such as reduced energy costs due to the additional zero marginal-cost renewable resources, payroll from construction and operations or state and local taxes). As such, the projected ratepayer impacts should be considered a conservative estimate. Tables 7 and 8 present the estimated ratepayer impacts.

Table 7 – Average Monthly Bill Increase, 30-Year Recovery Period for Transmission Investment

Customer Type	Total Recovered	Monthly Bill Increase	Percentage Increase
Residential	$204,304,153.41	$0.80	**0.79%**
Commercial	$176,793,848.30	$4.92	**1.11%**
Industrial	$118,901,998.29	$114.17	**1.54%**

Overall, the estimated bill increase for residential ratepayers would be roughly 80 cents – or a percentage increase of 0.79% over the average residential bill, assuming a 30-year cost recovery period. Costs for commercial and industrial customers would rise by 1.11% and 1.54%, respectively.

Table 8 – Average Monthly Bill Increase, 20-Year Recovery Period for Transmission Investment

Customer Type	Total Recovered	Monthly Bill Increase	Percentage Increase
Residential	$204,304,153.41	$1.20	**1.19%**
Commercial	$176,793,848.30	$7.39	**1.66%**

Industrial	$118,901,998.29	$171.25	**2.31%**

Based on a 20-year cost recovery period, this analysis estimates that residential, commercial, and industrial customers would see bill increases of 1.19%, 1.66%, and 2.31%, respectively, over the average bill. However, given that this is a long-term investment, it is more likely that costs would be recovered over 30 years.

Thank you for the opportunity to present ACP's views and the analyses detailed above. Should the Committee have questions about this analysis, please contact me at 202-262-3738 or bcasey@cleanpower.org.

Appendix

To estimate the economic impacts that would result from construction and continued operations and maintenance (O&M) activities, a per-mile construction cost estimate of roughly $2.48 million/mile (2021$) and an annual O&M cost of 0.5% of total construction cost was used. These values were sourced from the National Renewable Energy Laboratory's (NREL) Jobs and Economic Development (JEDI) model for transmission projects in 2015 dollars and inflated to 2021 dollars. As a result, total construction cost for this hypothetical transmission line is estimated at $495,050,000 with annual O&M costs of $2,475,200. Cost assumptions for wind generation projects were also sourced from NREL. Total construction cost is estimated at $1,326/kW, while annual O&M costs are estimated at $44/kW. The total construction cost of wind projects totaling 1,200 MW of capacity is thus estimated at $1,591,200,000 while annual O&M activities at these facilities would total $52,800,000.

Total costs were disaggregated into individual spending categories based on percentage cost shares provided by the JEDI model. For example, on average, roughly 17.5% of the cost of a transmission line project is related to heavy construction (tower erection, conductor stringing, etc.) while 16.2% is related to civil construction (grading, roads, site preparation, foundations, etc.), 16.4% is related to purchasing steel towers, etc. For each of these components, assumptions regarding the amount of the purchase made in-state are applied to capture only the portion of that spending that occurs within Maine. It is these in-state purchases of materials and labor that ultimately generate state-level economic impacts. The same methodology was applied to potential wind generation projects. These estimates do not assume that high-value manufactured components such as turbines or transformers are constructed in Maine. Instead, they rely generally on NREL's assumptions of local content and thus should be viewed as conservative estimates. In both the transmission and wind generation projects, construction labor is the driving force behind the economic impacts. This is evidenced in the fact that despite having a lower overall cost, the construction of a 200-mile transmission line would result in higher job impacts due to the significantly higher share of labor costs in transmission development as compared to wind generation development.

The total economic impacts that result from in-state spending related to construction and O&M for the transmission line project and the wind projects that could be enabled are calculated using Regional Input-Output Modeling System (RIMS II) multipliers. RIMS II multipliers are developed by the U.S. Bureau of Economic Analysis (BEA). Per BEA:

RIMS II, a regional economic model, is a tool used by investors, planners, and elected officials to objectively assess the potential economic impacts of various projects. This model produces multipliers that are used in economic impact studies to estimate the

total impact of a project on a region. The idea behind the results of RIMS II is that an initial change in economic activity results in other rounds of spending – for example, building a new road will lead to increased production of asphalt and concrete. The increased production of asphalt and concrete will lead to more mining.

RIMS II multipliers are used by federal, state, and local government agencies, economic development organizations such as chambers of commerce and economic development corporations, and businesses to study the local impacts of a wide range of investment projects. The impacts can be expressed in terms of output (sales), value added (gross domestic or state product), earnings (wages and salaries, including benefits, paid to workers), and employment (full- and part-time jobs).

RIMS II multipliers are provided for over 370 individual BEA industries. Each multiplier provides the total amount of economic activity (in dollars) that results from a dollar increase in final demand in each sector. In-state spending on each component of the project was mapped to a BEA sector so an appropriate multiplier could be used. Sales taxes are estimated using a tax rate of 5.5%. Right of way payments are estimated assuming that 50% of the transmission line will be constructed on private land and will require a width of 160 feet for 100 miles, or roughly 1,939 acres, at a cost of $2,400/acre in 2015 dollars. This equates to a payment of $2,688/acre in 2021 dollars. NREL estimates that land lease payments for wind projects are, on average, $16,523/turbine. Given a total capacity of 1,200 MW and assuming 2.5 MW turbines, an estimated 480 turbines would be constructed. Finally, property tax rates for transmission and wind projects are estimated using an assumed millage rate of $12.44 per $1000 of total construction cost.

Estimates of emissions reductions are based on non-baseload emissions rates in ISO-NE provided by EPA's eGRID database.