

9-2010

## The Impacts of Wind Power Development in Maine 2003-2010

Charles Colgan  
*University of Southern Maine*

Follow this and additional works at: <https://digitalcommons.usm.maine.edu/impact>



Part of the [Energy Policy Commons](#), [Environmental Policy Commons](#), [Growth and Development Commons](#), [Natural Resource Economics Commons](#), and the [Natural Resources Management and Policy Commons](#)

---

### Recommended Citation

Colgan, C. (2010). The Impacts of Wind Power Development in Maine 2003-2010. Portland, ME: University of Southern Maine, Muskie School of Public Service, Maine Center for Business and Economic Research.

This Report is brought to you for free and open access by the Maine Center for Business and Economic Research (MCBER) at USM Digital Commons. It has been accepted for inclusion in Economic Impact Analysis by an authorized administrator of USM Digital Commons. For more information, please contact [jessica.c.hovey@maine.edu](mailto:jessica.c.hovey@maine.edu).

# **The Impacts of Wind Power Development in Maine 2003-2010**

Charles S. Colgan PhD  
Maine Center for Business and Economic Research  
University of Southern Maine

For

First Wind, Inc  
TransCanada Maine Wind Development Inc.

September 2010

The development of wind power in Maine has emerged as a significant economic opportunity in the past several years, providing one of the few growing sectors in the latter half of the last decade. The impact of this development has been estimated in regulatory filings before, but has not been examined in detail using data on actual expenditures for wind power development. This report examines the economic impacts of three major wind power projects: Mars Hill in Aroostook County, Stetson Mountain in Washington County, and Kibby Mountain in Franklin County. (Stetson and Kibby were undertaken in two phases) These projects together provide 257 megawatts of installed generating capacity.

The first two projects were developed by First Wind and the third project by TransCanada Maine Wind Development Inc. Mars Hill was the first utility-scale wind project in Maine and construction was completed in 2006. The Stetson Mountain project has been constructed during 2008-2009, while the Kibby Project was built in 2009-2010. However, planning for these projects stretched back to 2003. Together the projects required development expenditures of over \$642 million for the purchase of generation and transmission equipment and for the construction of the wind turbines and associated transmission lines.

In sum, over the eight years of planning and construction for these three major wind power projects, an average of 240 jobs per year were created or supported in the Maine economy, and the value added in the Maine economy (net of all imported goods and services) was increased by a total of over \$60 million. During the peak years of construction activity in 2008 and 2009, both years of severe distress in the Maine economy brought on by the national recession, wind power construction created or supported an average of over 600 jobs. Over the planning and construction period, the projects contributed \$235,000 to the Maine economy per megawatt installed; during the years of peak construction activity, the contribution was \$195,000 per MW. Employment impacts during the peak construction years averaged 2 direct and indirect jobs per installed MW for all projects

To estimate the economic impacts of these projects, data on project expenditures was obtained from the two development companies plus Reed & Reed Inc., the construction company for all three projects. This data was then analyzed with economic models of the Maine economy developed by Regional Economic Models Inc. (REMI) of Amherst, MA and maintained by the Maine Center for Business and Economic Research (MCBER) at the University of Southern Maine. These models allow comparisons of the level of economic activity in seven regions of Maine with and without projects such as wind power construction.

For purposes of analysis, three major industries are considered to be affected by the projects:

- Construction
- Project planning and permitting services provided by the professional and technical services industry.
- Food and accommodation for construction workers who require accommodation while constructing the project

Table 1 shows the expenditures in each of these areas in Maine for the three projects over the period of development and construction. These represent expenditures in Maine for Maine-supplied goods and services related to the projects. These figures do not include expenditures for turbines, blades, towers, and transformers, which are sourced outside of Maine.

	Total 2003-2010
Construction	\$197.82
Food & Lodging	\$1.31
Professional & Technical Services	\$23.67
Total	\$222.79

Table 1 Wind Power Development and Construction Expenditures in Maine (\$ Millions, excludes equipment manufactured outside Maine)

The figures in Table 1 represent that portion of the total costs of the projects that was spent on Maine-provided goods and services. The total cost of the projects was \$642 million. The difference between this total and the total in Figure 1 represents the turbines, towers, and transmission equipment that are manufactured outside of Maine.

The economic impacts of a project can be divided among three categories:

- Direct impacts are the result of the direct expenditures on the project. Direct employment represents the people who are hired to work on the project at any stage.
- Indirect impacts are the result of the “multiplier” effect. Indirect impacts are formed from two effects. The first is the employment in companies that supply goods and services to form the “direct” expenditures. For example, construction projects require the purchase of a variety of supplies such as fuel, materials, etc., and these “backward” linkages of supply purchases have their own additional backward links. Fuel used for construction vehicles must be purchased from local dealers who buy it from

wholesalers, who must pay for the transportation of the fuel from ports where the fuel is landed from refineries. The second source is the employment supported by the expenditures of both the direct and indirect employment for personal consumption.

- Total effects are the sum of direct and indirect effects.

Table 2 shows the employment and output impacts from the three projects in the Maine economy. The table shows direct, indirect and total employment effects estimated by the REMI model based on the expenditures in Table 1.

<b>Maine</b>								
	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010<sup>1</sup></b>
Direct Employment								
Construction				220	5	450	490	110
Food & Lodging						15	20	5
Prof & Tech Services	3	5	10	30	30	45	25	10
<b>Total Direct</b>	<b>3</b>	<b>5</b>	<b>10</b>	<b>250</b>	<b>35</b>	<b>510</b>	<b>535</b>	<b>125</b>
Indirect Employment	2	10	5	75	15	160	145	25
<b>Total Employment</b>	<b>5</b>	<b>15</b>	<b>15</b>	<b>325</b>	<b>50</b>	<b>670</b>	<b>680</b>	<b>150</b>
Real GDP ( Millions \$2000)		\$1.0	\$1.0	\$9.0	\$3.0	\$21.0	\$20.0	\$5.0

Table 2 Estimated Job and Output Impacts of Wind Power Projects

The employment estimated includes both “new” and “supported” employment. “New” employment includes jobs that would not exist but for the wind power projects. These are primarily the jobs directly engaged in the construction activity. Other jobs in the service industries and industries such as retail trade (part of indirect employment) are not created by the projects, but a portion of the incomes earned in these jobs is derived from the spending associated with the projects.

The contribution to Maine Gross Domestic Product (GDP) is shown in millions of constant dollars and totals \$60 million over 2004-2010.<sup>2</sup> The contribution to the GDP is the portion of the expenditures on Maine goods and services net of the costs of purchasing goods and services from other industries. It is based on the concept of “value added” and is the addition to economic activity within Maine at each step of the project development process. “Value added” prevents double counting of expenditures in different industries so only the net gain to the economy as a whole is shown. (See Note 5)

Once constructed, the Mars Hill, Stetson, and Kibby projects will require about 20 people for operations, including conducting routine maintenance and assuring safe operations of the turbines. These operational period jobs will support an annual average 11 additional “indirect” jobs. It should also be noted that over the lifetime of these projects there will be

<sup>1</sup> Through July 2010. This figure excludes the Rollins Project under development by First Wind.

<sup>2</sup> Constant dollars remove the effects of inflation.

periodic major repair, maintenance and overhaul projects that will take place from time to time. During those periods, employment levels comparable to the construction period peaks may be experienced. The timing and magnitude of such projects cannot be accurately predicted at this time because the projects are all relatively new. But total employment impacts over a 20-30 year project operational period will be higher than indicated by these regular annual figures.

The wind power projects examined here primarily affected four regions: Aroostook County (Mars Hill), Eastern Maine (Stetson I and II), Western Maine (Kibby Mountain), and Cumberland County, where much of the professional and technical service support is provided. Reed & Reed and Cianbro, with headquarters in Sagadahoc and Somerset counties respectively, provided much of the major construction services, but smaller firms located in virtually all other Maine counties supplied parts or services to the construction projects.

The relatively remote sites for the Stetson and Kibby projects brought workers into these areas who lived throughout Maine and their spending in both the local communities such as Mars Hill, Eustis, Farmington, Calais and Machias while working on the project and in their home communities also spread the economic impacts of wind power construction widely through the state. Retail centers such as Bangor, Presque Isle, and Lewiston-Auburn also received some of the economic impacts.

## Notes

1. The installed capacity for the four projects is:

	Megawatts Installed Capacity
Kibby	132
Mars Hill	42
Stetson I	57
Stetson II	26
Total	257

2. Four regions of the seven regions in the REMI models for Maine are directly affected by the wind power projects:
  - Aroostook County
  - Eastern Maine (Penobscot, Piscataquis, Hancock, and Washington counties)
  - Western Maine (Androscoggin, Franklin, and Oxford counties)
  - Cumberland county
3. Employment in this analysis is the Bureau of Economic Analysis “total employment” concept, which includes self employment as well as wage & salary employment. It includes both full and part time jobs without distinction.
4. For purposes of analyzing the “professional and technical services” industry, expenditures for such purposes as meteorological monitoring and soils testing were assigned to the region where the project was constructed. Other professional and technical service expenditures were assigned to Cumberland County, where most of the professional services are located. Some of the expenditures in this category may have been made in other regions of Maine, but records do not indicate where specific expenditures were made. Employment in professional and technical services is reported in the statewide totals.
5. The GDP at the state level is calculated as the sum of payments to labor, returns to capital plus taxes. It is a measure designed to prevent double counting of economic activity. For example, in the construction of the wind turbines, construction companies

will purchase fuel for trucks and other equipment. That is part of the total expenditure on the project, but the fuel is an input cost to the construction company. It is also the sales of the fuel suppliers, but they have to pay wholesalers and transportation companies, each of whom adds a portion of the final value. Since all fuel is imported into Maine, the total value added from this portion of the construction cost in Maine is much smaller than the total expenditure on fuel.