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**Regional Economic Impact Analysis  
for the  
Georgia Mountain Community Wind Project  
Proposed by  
Georgia Mountain Community Wind, LLC**

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## **Executive Summary**

The proposed Georgia Mountain Community Wind Project will install up to five wind turbines on Georgia Mountain. A typical project with five turbines would be rated at 8.25 MW. The permitting and construction of such a project is estimated to cost \$21.4 million at 2008 prices.

The purpose of this analysis is to estimate the economic impacts of the proposed wind project on the state of Vermont for presentation to the Vermont Public Service Board as part of the application for a Section 248 Certificate of Public Good.

A typical five turbine project will bring significant economic benefits to the host towns, the neighboring region, and the state of Vermont. The permitting and construction of the wind project will lead to the creation of 27 jobs in 2009 and 35 jobs in 2010. Operation of the facility will create 2 jobs from 2011 forward. The increase in state tax revenues from the project is estimated to total approximately \$716,000 from the permitting year through the first ten years of operation of the facility. The actual state revenues will depend on the number of turbines, turbine capacity, and the contract rate for power.

The project will clearly have positive fiscal impacts on the host towns of Georgia and Milton, paying more in annual municipal property taxes than demanding in municipal services. The project will not have any negative impacts on local tourism or local property values.

While the project is small, it will be a positive contribution to Vermont's efforts to meet future electricity demand, diversify its power generation sources, and maintain a clean energy generation portfolio.

Should the project use fewer than five turbines, the basic findings of this analysis still hold. The project will be an economic benefit to the host towns and the state of Vermont. Should three turbines be chosen, it is our opinion that the benefits will be approximately 60% of that shown in this report for a five turbine project.

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## **I. Introduction**

Georgia Mountain Community Wind LLC proposes to construct and operate up to five megawatt-scale wind turbines on the top of Georgia Mountain in the Towns of Milton and Georgia. The proposed project is on two parcels of land and straddles the border of Chittenden and Franklin Counties. The project will be accessed off of the Westford Road in the Town of Milton via Ted Road. An access road will be constructed from the northerly end of Ted Road to the turbine sites. The proposed wind turbines will be located more than 3,400 feet from the nearest residences.

Georgia Mountain Community Wind will be submitting an application for a Section 248 Certificate of Public Good from the Vermont Public Service Board. The application requires an economic benefit analysis of the project. This report presents the results of such an analysis. In section II we describe the project in detail. In section III we provide a brief economic and demographic description of the region in order to put this project's impact into perspective. In section IV we present our estimate of the impact of the proposed wind project on economic activity in the county and state during both its construction and operating phases.

In section V we discuss the importance of this project in meeting Vermont's energy generation needs and goals. In Section VI we analyze the impact of this project on local tourism and property values. We summarize our findings in section VII.

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## II. Detailed Project Description

Georgia Mountain Community Wind LLC proposes to construct up to five megawatt-scale wind turbines on the top of Georgia Mountain in the Towns of Milton and Georgia. Based on the site plan for the project, the following observations are made:

1. The project is located in the northwestern part of an undeveloped area generally referred to as Georgia Mountain. The general area is essentially bounded by Georgia Mountain Road to the north, North Road to the west, the Westford Road to the south, and the Milton/Westford border to the east.
2. The proposed wind turbines will be sited more than half a mile from any residence
  - The nearest residences to the proposed wind turbines are located to the west along North Road. The nearest residence on North Road is 3,400 feet away.
  - The turbines will be accessed from the south by a road constructed from the northerly end of Ted Road. The nearest home to the turbines on Ted Road is 3,400 feet from a turbine.
  - To the north, there is a series of single family homes along Georgia Mountain Road. These home are more than 4,000 feet away from the turbines.
  - The residences to the east are substantially further removed from the turbines than any reference above.
- Should five turbines be constructed, the anticipated location of three of the turbines will be in the Town of Milton at the high elevations of Georgia Mountain. The location of the other two turbines will be just a few hundred feet into the Town of Georgia (and, therefore, Franklin County), also at the high elevations of Georgia Mountain.
- A proposed control building will be constructed at the point where the access road for the existing Verizon cell tower splits from the access road for this project.

- An overhead power line will be constructed from the wind turbine area to the interconnection point near the entrance to the Husky plant on North Road.

The project is currently in the permitting stage of its development. Permitting is projected to be completed before Spring 2010. The site will be prepared, roads built, foundations poured, turbines erected and tested during the spring through fall of 2010. The project is projected to begin operating at the end of November 2010.

At this time, it is expected that at least three turbines and at most five turbines will be used for this project. We prepared this economic analysis assuming five turbines would be erected at the site. The impact from a smaller project would be reduced proportionately from that presented here.

Base on current cost information provided by VERA, we estimate a project with five turbines will cost approximately \$21.4 million to develop and construct in 2008 prices. The expense per task and percent expected to be performed by Vermont firms is as given below. During the construction phase, the project will have a significant impact on local employment even though the major payment for the turbines will go to out-of-state firms.

<b>Task or item</b>	<b>Total Expense</b>	<b>Percent from Vermont Firms</b>	<b>Expenditure in Vermont</b>
Development costs	\$2,200,000	100%	\$2,200,000
Site work and roads	\$1,700,000	100%	\$1,700,000
Foundations	\$825,000	100%	\$825,000
Wind turbines to site	\$12,684,500	5%	\$634,225
Crane and erection	\$925,000	50%	\$462,500
Utility interconnection	\$400,000	50%	\$200,000
Financing and fees	\$860,000	100%	\$860,000
Contingency	\$1,800,000	20%	\$360,000
<b>Totals =</b>	<b>\$21,394,500</b>	<b>34%</b>	<b>\$7,241,725</b>

The major economic impact of this project on the local and regional economy will come during its construction phase. During its day-to-day operation the economic impact will be limited. This finding is consistent with the construction and operation of wind turbine projects across the U.S. It is estimated that the annual operating expenses of the project will equal approximately \$650,000 (in 2008 prices). We estimate that 61% of this will be performed by Vermont firms. The turbines will require limited employment expense to operate on a day-to-day basis. It is assumed the supplier of the turbines will also provide maintenance under annual contracts.

The key impact of this project during its operation is the production of electricity in a manner that diversifies Vermont's electricity generation in a non-polluting manner.

### III. The Regional Economy and Demographics

The Georgia Mountain Community Wind Project will be built on lands straddling the border of Chittenden and Franklin Counties in the towns of Milton and Georgia. In order to put the economic impact of the projects into perspective, we briefly present some key summary statistics on the demographics and economics of the two counties.

Chittenden County is the most populous county in the state of Vermont. It is home to about one-quarter of the state's population. Franklin County is the fifth largest county in terms of population. Both counties grew faster than the state from 2000 to 2007, but all three are slow growing regions compared to growth in the U.S. (averaging about 1% per year in the same period). All population data are from the U.S. Census.

Regional Population Growth			
Area	July 1, 2000 Population	July 1, 2007 Population	Annual Growth Rate
Chittenden County	147,058	151,826	0.5%
Franklin County	45,578	47,934	0.7%
State of Vermont	609,909	621,254	0.3%

Chittenden County is also home to the largest share of Vermont's payroll employment. (See the table on the following page). In 2007 nearly one-third of Vermont's jobs were in that county. With only one-quarter of the state's population, it is clear that many residents of neighboring counties commute to Chittenden County for work. Over the last economic growth period (2002 to 2007), jobs in Chittenden County grew at a slower rate in the county than in the state as a whole. All employment data are from the Vermont Department of Labor.

Franklin County is home to 5% of the state's jobs, less than its 8% share of the state's population. Many Franklin County residents commute to Chittenden County for work. In the last growth cycle, payroll employment grew faster in Franklin County than either in the state or in Chittenden County. However, these growth rates are still low by historical standards.

<b>Regional Employment Growth</b>			
Area	2002 Employment	2007 Employment	Annual Growth Rate
Chittenden County	94,083	95,112	0.2%
Franklin County	15,341	16,052	0.9%
State of Vermont	295,443	303,438	0.5%

Chittenden County’s industrial structure is very similar to that of the state as a whole (in part because the county is home to one-third of the total employment). Employment at goods-producing firms (mostly construction and manufacturing companies) made up 22% of total private employment in the county and state. Employment at service-producing firms (trade, professional services, health care, tourism, etc) accounted for the remaining 78% of employment. In Franklin County, the industrial structure is tilted more towards goods-producing firms (29%) than towards service-producing firms (71%).

We note that statewide, the leisure and hospitality industry (denoted as “tourism”) accounts for 13% of all private sector employment. This consists of employment at lodging establishments, eating and drinking establishments, and at recreation and amusement establishments. In Chittenden County the tourism sector makes up 11% of all employment, with likely a disproportionate share due to business travel rather than leisure travel. In Franklin County the tourism sector accounts for 9% of total employment.

<b>Regional Employment Structure 2007 (Private sector only)</b>			
Area	Goods- producing industries	Service- producing industries	Note: Tourism industries
Chittenden County	22%	78%	11%
Franklin County	29%	71%	9%
State of Vermont	22%	78%	13%

Finally, according to the Vermont Tax Department median family income in 2007 was 28% considerably higher in Chittenden County (at \$73,524) than in the state as a whole (at \$57,433). In Franklin County median family income (at \$54,432) was 5% lower than in the state.

Over the last seven years, median family income grew fairly consistently in the two counties and the state, ranging from an annual rate of 3.1% in Chittenden County to 3.5% in Franklin County.

<b>Regional Median Family Income Growth</b>			
Area	2000 Income	2007 Income	Annual Growth Rate
Chittenden County	\$59,460	\$73,524	3.1%
Franklin County	\$42,820	\$54,432	3.5%
State of Vermont	\$46,113	\$57,433	3.2%

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## **IV. Economic Impacts in Vermont**

### **A. Economic Model Inputs**

We estimate the impact of the proposed Georgia Mountain Community Wind Project on the Vermont economy by use of a regional economic model maintained by Regional Dynamics Inc. (REDYN). The REDYN model is a dynamic, multi-regional, endogenous, Input-Output economic and demographic model based on the North American Industrial Classification System (NAICS). The model uses data primarily from the U.S. Bureau of Economic Analysis and the U.S. Census.

The model estimates a range of economic impacts of concern to this analysis: employment, output, income, tax revenues, etc. It also estimates demographic impacts. The inputs to this model were developed with project data supplied by Georgia Mountain Community Wind and in consultation with REDYN staff.

The model inputs included all construction and development costs, equipment purchases, and expected operational expenditures. As presented earlier, \$7.2 million of the \$21.4 million in construction, equipment, and development costs would result in direct impacts on the Vermont economy. In addition, we estimate that 61% of the operational expenditures result in direct impacts on the Vermont economy.

Based on these inputs, we estimated with the REDYN model the indirect economic impacts for the region and the state as well as the demographic impacts.

For purposes of this analysis we used a REDYN model with the following three regions: the core counties of Chittenden and Franklin, the rest of Vermont, and the rest of the U.S. Also, because the REDYN model operates on an annual basis, we assume all permitting occurs in 2009, construction in 2010, and operations start in January 1, 2011.

**B. Economic Model Outputs**

We show the major economic and demographic impacts that are of interest to this analysis from the proposed Georgia Mountain Community Wind Project in the table below.

During the permitting phase of this project, employment will increase by 27 in the core counties of Chittenden and Franklin. Then during the construction phase employment will increase by 18 in the core counties of Chittenden and Franklin and 35 throughout the entire state of Vermont, (this includes the 18 from the core counties). Then in 2011 and the following years, the operation and general maintenance of the wind turbine project will generate one (1) job in the core counties and a total of two (2) jobs statewide. This is a reflection of the limited expenditure needed to operate and maintain the project.

<b>Economic Impacts of the Georgia Mountain Community Wind Project (Changes from the Baseline)</b>						
Variable	Region	2009	2010	2011	2012	Ongoing
Employment	Core counties	27	18	1	1	1
"	All Vermont	0	35	2	2	2
Wages (\$000)	Core counties	\$1,206	\$795	\$38	\$38	\$38
"	All Vermont	\$1,144	\$610	\$72	\$72	\$72
Disp Income (\$000)	Core counties	\$1,051	\$700	\$321	\$324	\$338
	All Vermont	\$1,137	\$1,346	\$395	\$399	\$416
State Taxes (\$000)	All Vermont	\$128	\$135	\$43	\$44	\$45
Population	Core Counties	3	4	5	3	2
"	All Vermont	3	6	7	5	3

Wage gains follow the employment pattern. During the permitting and construction periods, wages paid in the state rise by \$1.1 million and \$0.6 million, respectively. With the operation of the wind turbine project in 2011 the wage gain in the state totals \$72,000. Wages then grow with general wage inflation.

Disposable income includes more than wages (such as profits, etc.) and thus is larger than wages. In the state disposable income will rise by \$1.1 million and \$1.3 million in 2009 and 2010, respectively. Then with operation of the project disposable income will rise by \$395,000 in 2011 and increase with inflation into the future.

The project will generate new tax revenues from its construction and operation in the core counties and from the economic activity elsewhere in the state. The REDYN model estimates that tax payments to the state will be approximately \$125,000 and \$135,000 greater in 2009 and 2010 than otherwise. This will decline to approximately \$43 million in 2011 then grow with inflation into the future. Over the period 2009 through 2020 (the permitting, construction, and first ten years of operation of the facility) the State of Vermont will receive approximately \$716,000 more in tax revenues with this project than it would otherwise.<sup>1</sup>

Finally, with the REDYN model, we estimate there will be a small demographic impact from the project. By 2011 population will rise by 5 people in the core counties and 7 in total throughout the state. Then the population gain decreases to a long term gain of just 2 people in the core counties and 3 in total in the state.

### **C. Consistency of Estimates with Other Wind Projects**

Two other wind turbine projects have submitted applications to the Vermont Public Service Board. In these submissions, the applicants have provided studies of the jobs to be created by their projects. We briefly review these projects' economic impacts below to see if our estimates are generally consistent with them. In addition, we add to this analysis one project from the state of Maine that is actually operating (as of January 2009).

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<sup>1</sup> The state tax revenue is based upon estimates produced by the REDYN model. Actual revenues may vary up or down depending upon the number of turbines, capacity, and power costs. The value will always remain positive.

The basic parameters of the projects and the resulting estimated or actual employment are shown below. Our estimate of the construction jobs and operating jobs from the Georgia Mountain project fall in the range of those estimated by other applicants or actually created at these other projects. For example, these three project suggest a five turbine wind project (Georgia Mountain's number) would create between 15 and 85 construction jobs. We estimate 35 for Georgia Mountain. In addition, these three project suggest a five turbine project would create 1 to 5 ongoing jobs during its operation. We estimate 2 jobs for Georgia Mountain.

Economic Impacts of Various Wind Projects (Changes from the Baseline)						
Project	Turbines	Capacity MW	Construction Phase Jobs	Operating Jobs	Construction Phase Jobs per Turbine	Operating Phase Jobs per Turbine
Deerfield Wind, VT	15	30	256	9	17.1	0.6
Sheffield Wind Farm, VT	26	52	80	24	3.1	0.9
Stetson Wind, ME	38	57	350	6*	9.2	0.2
<i>Georgia Mountain</i>	5	8+	<i>Implied for GMCWP =</i>		15 to 85	1 to 5
* Operating jobs are just those at the site, no multiplier included						

**D. Fiscal Impact on the Host Towns of Georgia and Milton**

The proposed Georgia Mountain project will be sited in the Towns of Georgia and Milton. These towns will be impacted by any tax revenues generated by the project and any demands for town services from the project or any new residents attracted to the towns by the project.

- **Revenues** — The two towns will receive municipal tax revenues from the project.<sup>2</sup>

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<sup>2</sup> Because three of the five turbines will be in Milton and because Milton has a higher municipal tax rate than Georgia, it will receive higher municipal tax revenues.

- **Expenses** — First, we do not expect that the project will result in any additional municipal costs to the towns of Georgia and Milton directly from the project.
  - While the turbines are located just a few hundred feet into the Town of Georgia, the access to the turbines is from Milton. The turbines will not impact Georgia town services in any substantial manner.<sup>3</sup>
  - The wind project will also not increase the demand for municipal services from the Town of Milton in any substantial manner. Without any permanent employees on site, there will be virtually no traffic to and from the wind project site. The demand for police, fire, and rescue services from the project will be negligible and the town has the capacity to provide these services (see letters from the departments). These services alone comprised 53% of municipal expenses in FY09.

There is no reason to expect any substantial increase in demand for municipal services from new residents of these towns stemming from the construction and operation of the wind project. The REDYN estimates showed a maximum of 2 new residents by 2013 in the core counties of Chittenden and Franklin. This is less than the size of one typical household in the region. We cannot say for sure where these new residents will locate. If they do reside in Milton or Georgia, they will pay municipal taxes like any other household.

Thus, most if not all of the revenues generated from the typical project in the form of local property taxes will be a net gain to the two communities of Georgia and Milton.

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<sup>3</sup> The major municipal costs in Georgia according the 2008 Annual Town Report are for roads, police, fire and rescue. These made up 51% of the town municipal budget in 2008.

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## V. Vermont Energy Market Considerations

The Vermont economy needs to have reliable and competitively priced electricity in order to promote economic growth and the well-being of its citizens. In addition, Vermonters have expressed their desire to have clean, non-polluting sources of this power to the extent possible. Several salient characteristics of the state's provision of electricity are:

- The cost of electricity in Vermont has been above the national average since at least 1970 according to the U.S. Energy Information Administration. The latest data (2005) show the cost runs about 45% higher in Vermont than the national average.
- The demand for electricity in Vermont has steadily grown at a 1.5% annual rate since 1989. According to the ISO New England 2005 Regional System Plan, regional demand for electricity will continue to grow at this pace through at least 2014.
- Vermont's sources of electric power generation is highly concentrated from two producers: Entergy Yankee (nuclear) and Hydro-Quebec (hydroelectric). In 2004 the former generated 70% of the state's power and the latter 26%. Both produce power without emitting greenhouse gases.
- Entergy Yankee's license to operate ends in March 2012. The question of renewing this license is before the state's legislature and regulatory board. The contracts with Hydro-Quebec begin to expire in 2015. Negotiations for a contract are in process.

In sum, the future supply of electrical power to Vermont is uncertain. In any outcome, securing a more diverse portfolio of power is a prudent action. One of the major priorities of the 2005 Vermont Electric Plan prepared by the Vermont Department of Public Service is to "ensure that Vermont's overall energy portfolio is sufficiently diverse..."

Part of the answer to the future of electrical generation in Vermont is likely to include wind power. This would help replace some of the lost electrical power (or meet the future growth in demand for electrical power), aid in the goal of diversifying power sources, and keep the Vermont power generation portfolio "clean." The Georgia Mountain Community Wind Project is a small, but important part of Vermont's long term electrical energy production.

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## **VI. Tourism and Property Valuation Impacts**

Two frequently raised concerns about new electrical generation (and other) facilities in regulatory hearings in Vermont are the potential impacts they could have on tourism and property valuations. While this project is small and located a considerable distance from the nearest structures, we provide a brief review of these two concerns.

### **A. Potential Tourism Impacts**

The potential impact on the local tourism economy from a wind turbine project has been discussed with every wind turbine project proposed to date in Vermont. Opponents of the wind turbine projects usually characterize them as “industrial” projects and claim negative impacts on tourism. Proponents of the wind turbine projects usually characterize them as “green” projects which will attract tourists.

The experience in New England with wind turbines is limited. There is no academic literature from the economics profession that measures the impacts that actually resulted from a project. We note that this project is remotely located from tourism centers in Vermont, limiting the potential negative impact. We also note that with many projects coming on line, the potential for positive impacts from the novelty of the “green” nature of the project is also limited and fleeting.

There are three concrete reasons not to expect any potential negative impacts from the Georgia Mountain project on the tourism economy.

1. This project is not in major tourism center in Vermont. Defining a tourism center as one which generates significant revenues from the lodging industry (hotels, motels, B&B’s, etc.), the host towns of Milton and Georgia do not fall in this category. According to the Vermont Department of Taxes annual report on tax collections from the meals and rooms tax (the most recent is for 2007), neither of these two towns is one of the sixty Vermont towns for which data on rooms revenues are even reported. Our own examination area surrounding Georgia Mountain found no tourism businesses along the roads bordering the area.
2. This project is not near a major tourism center in Vermont. The nearest major tourism destinations are Colchester (Malletts Bay) and Jeffersonville (Smugglers Notch) . They are more than 10 miles and 20 miles, respectively from the site by highway.

3. The surrounding countryside is a mixture of pleasant rural lands and single family homes. There are no major tourist destinations nearby such as state parks, etc.

Therefore, we conclude there will be no positive or negative impact from the proposed Georgia Mountain Community Wind Project on the local tourism economy.

## **B. Potential Property Valuation Impacts**

Another concern often raised with wind turbine projects is the potential negative impact of the project on local property values. Often a claim is made that the wind turbines will be negatively perceived, thus the demand for local properties will fall, and hence, local property valuations will fall.

This will not be the case with the proposed project for three reasons.

1. The proposed turbines are far removed from the nearest inhabited structures. The nearest house is 3,400 feet away.
2. Rigorous, unbiased studies on the impact of wind turbines on property values point to a negligible impact, although few studies have been completed to date.<sup>4</sup> The two most insightful studies were by Ben Hoen of Bard College and by Ryan Wisler and Ben Hoen of the Lawrence Berkeley National Laboratory.<sup>5</sup> The later study has examined more than 7,000 home sales from ten wind turbine sites in the U.S. While still considered preliminary by the authors, the study found no evidence that a property near (within ¼, ½, and 1 mile) a wind turbine project or one that had a view of the wind turbine project had its value reduced because of the presence of the wind turbine project.

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<sup>4</sup> There has been much written on this subject by opponents and proponents of wind turbines. Most of these writings are based on anecdotal information. We do not consider these sources reliable.

<sup>5</sup> Ben Hoen and Ryan Wisler, "The Impact of Wind Facilities on Residential Property Values," Lawrence Berkeley National Laboratory, November 14, 2008

3. There has been no peer-reviewed academic literature published on the potential negative effects of wind turbines on neighboring property values. We note that there has been several studies on the impact of high tension electrical transmission lines.<sup>6</sup> These studies found that being located right next to a transmission tower caused a decrease in property values, but being removed a short distance away (generally about 500 feet) was sufficient to see no drop in values. The results found by Wisner and Hoen for wind turbines are consistent with those found for high tension transmission lines.

Therefore, we conclude there will be no negative impact from the proposed Georgia Mountain Community Wind Project on neighboring property values.

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<sup>6</sup> Francois Des Rosiers, "Power Lines, Visual Encumbrance and House Values," *Journal of Real Estate Research*, Volume 23, Number 3, 2002; Peter F. Coldwell, "Power Lines and Land Value," *Journal of Real Estate Research*, Volume 5, Number 1, 1990; Charles Delaney and Douglas Timmons, "High Voltage Power Lines: Do They Affect Property Value?" *Journal of Real Estate Research*, Volume 7, Number 3, 1992.

## **VII. Summary and Findings**

The proposed Georgia Mountain Community Wind Project will install up to five wind turbines on Georgia Mountain. A typical project of that size would be rated at 8.25 MW. The development and construction of a typical project is estimated to cost \$21.4 million at 2008 prices.

The permitting and construction of the wind project will lead to the creation of 27 jobs in 2009 and 35 in 2010. Operation of the facility will create 2 new jobs from 2011 forward. The total increase in state tax revenues generated from the project will total \$716,000 during the permitting, construction, and first ten years of operation of the facility.

The project will have positive fiscal impacts on the host towns of Georgia and Milton, easily paying more in local property taxes than demanding in municipal services.

The project will not have any negative impacts on local tourism or local property values. But, while the project is small, it will make a positive contribution to the state's efforts to meet future electricity demand, diversify its power generation sources, and maintain a clean energy generation portfolio.

Should the project use fewer than five turbines, the basic findings of this analysis still hold. The project will be an economic benefit to the host towns and the state of Vermont. Should three turbines be chosen, it is our opinion that the economic benefits will be approximately 60% of that shown in this report for a five turbine project.