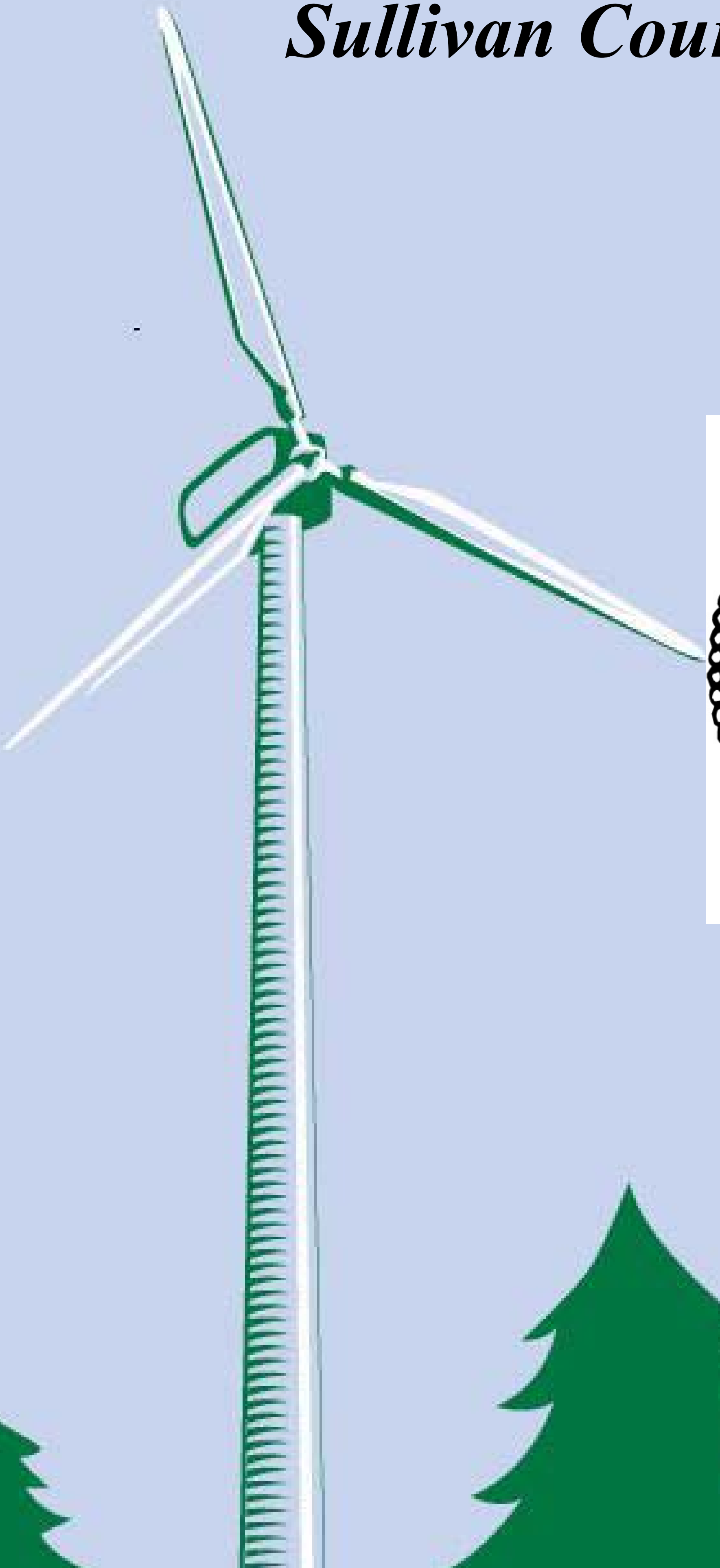
Wind Energy Market Assessment
Sullivan County, NY



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Disclaimer

The information in this report is presented in response to the Agreement for Wind Market Assessment signed by and between the County of Sullivan and Sustainable Energy Developments, Inc. on 3 January 2005. The information presented herein is based on wind development best practices, commercially available information and a preliminary analysis of Sullivan County's wind energy development potential. SED makes no guarantees as to the actual outcome of the processes described in this report.

Table of Contents — Page Number

Figures

Appendices

1.0 Executive Summary

This report will provide Sullivan County with the knowledge necessary to make an informed decision on how or if the pursuit of wind power development is in the County's best interests. SED believes that all aspects of this study show a tremendous amount of wind potential exists within Sullivan County. The amount of potential that is fulfilled and the quality of the benefits will depend entirely upon the level of effort and the amount of personnel resources that the County is willing to put forth towards the projects that are outlined in this report.

Utility-Scale Wind Development Potential
SED has identified 6 potential utility-scale wind farm projects in the County with a maximum total capacity of 336 MW. This section of the report is designed for: 1) Use by the County as a tool to entice commercial wind developers in order to produce positive economic impacts in Sullivan County; and 2) Use by a commercial wind developer to speed the process and reduce the overall development costs of building utility-scale wind farms.

Onsite/Distributed Generation Wind Energy
SED has identified the top 12 facilities - commercial, industrial or large agricultural – that can make use of wind energy as an onsite generation technology in an economically viable and beneficial manner. There are a number of state and national policies that have bolstered these wind turbines' competitiveness with respect to conventional electricity generation. The 12 sites examined could save an estimated $300,000 to $1,800,000 each over their project's 25-year life spans with an estimated total of $12,986,000 that will be saved and ideally, reinvested within the County.

Small Wind
SED believes that the most effective method of marketing small wind systems is to focus materials and efforts to sites or areas that show initial promise for effectively employing the technology. In this light, SED has outlined a marketing campaign that will identify and target the top 150 small wind sites in the County. The environmental benefit of fulfilling all of these sites would be in offsetting the annual emission of: 3 million pounds of Carbon Dioxide; 13,000 pounds of Sulfur Dioxide; and 4,000 pounds of Nitrous Oxide.

Economic Development
Sullivan County stands to profit from the development of its wind resources by: supporting and encouraging current businesses that show the potential to produce components for the utility-scale wind industry; attracting businesses that are dedicated to the booming New York, Pennsylvania and New Jersey wind markets; to reap tremendous rewards in terms of job creation, land lease payments, tax revenues and indirect economic output from the development of utility-scale wind farms; as well as providing small farms, residents, and large electricity consumers with an opportunity to save money on their electricity bills that will ideally be re-invested within the County.

2.0 Large-Scale Wind Development Potential

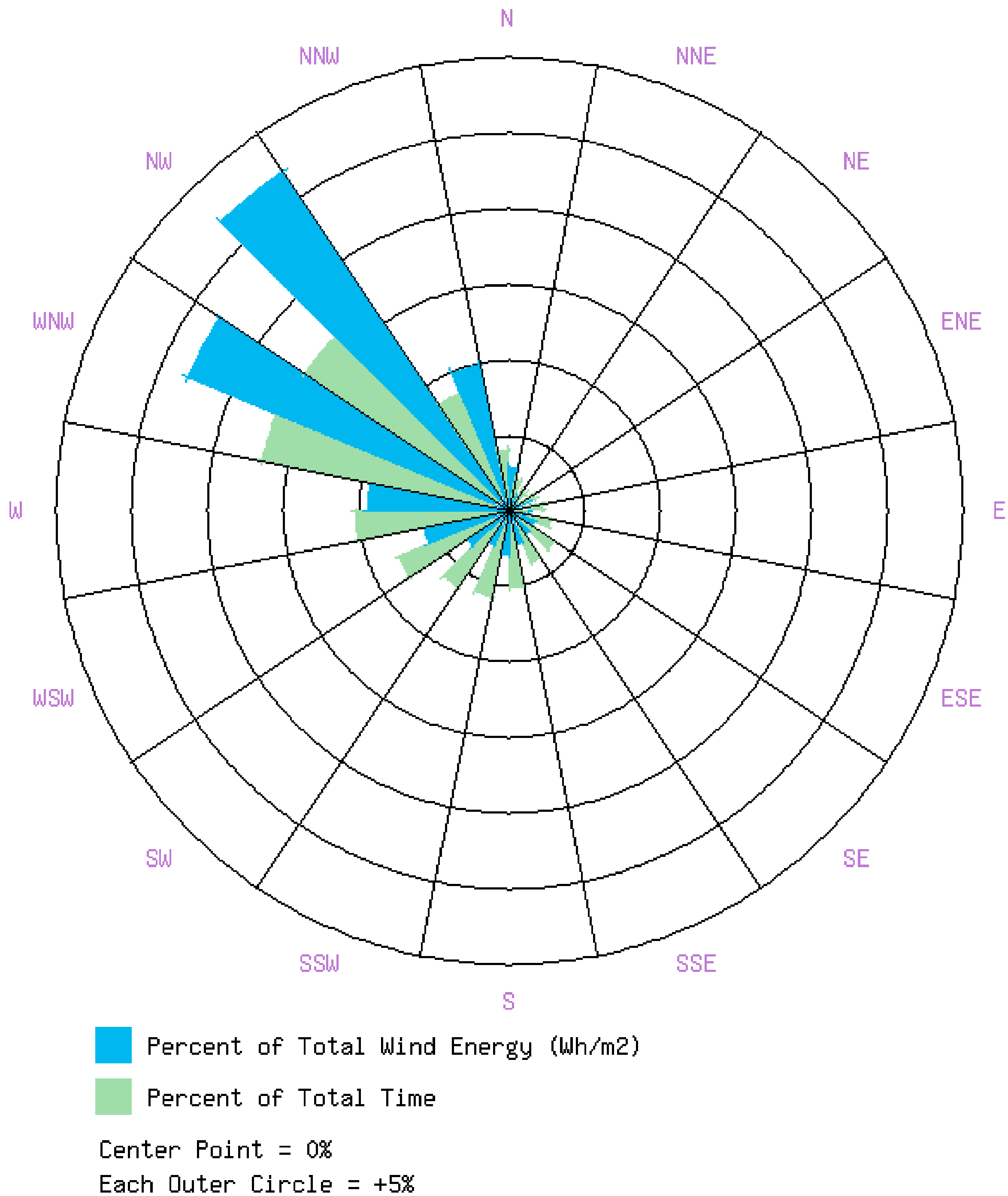
2.1 Site Selection Process

Sullivan County was initially examined using the AWSTruewind New York State Wind Map in order to identify the locations with utility-scale-quality wind regimes. SED was able to identify twelve areas with wind speeds that were high enough to support commercial scale wind development. Site-specific data was attained from the wind map for each of these locations that included: a wind rose; annual wind speeds; and Weibull parameters[1]. Sites were selected based on an average annual wind speed that was greater than 7 m/s.

The review of the wind roses shows that the dominant wind pattern in Sullivan County is from the West-Northwest (approximately 300^{o}). Each of the identified windy areas was then overlaid onto a topographical map in order to select topographical features that matched the prevailing wind patterns. A matching topographical feature runs perpendicular or as close to perpendicular as possible, to the prevailing wind direction.

[1] A statistical indicator of the speed frequency distribution.

Figure 1 – Representative Wind Rose of Sullivan County's Wind Regime



A topographical map review was next performed to determine if any of these areas were within the Catskill Park. All sites within the Catskill Park were excluded from this report in an effort to maintain that area as a valuable and undeveloped resource. SED also assumed that the process of permitting a utility-scale project within the Catskill Park would be extremely exhausting if not a totally unrealistic proposition.

The sites that remained after this series of reviews were examined for proximity to electrical transmission infrastructure, population density/land use characteristics and geographic features that could prevent site access or would pose major obstacles to construction.

The potential Megawatt capacities were then determined for the remaining sites by using a General Electric 1.5MW wind turbine with a 70.5 m rotor diameter. A preliminary project layout was designed for each wind farm site using a 4 rotor diameter spacing (282m between wind turbines) in the direction perpendicular to the prevailing wind and a 10 rotor diameter spacing (705m) in the direction parallel to the prevailing wind direction.

The details of the 6 sites that remained after the initial review process follows. Note that the sites are not ranked in any particular order.

2.2 Top 6 Utility-Scale Wind Sites in Sullivan County

2.2.1 Site 1 – Lily Pond

Site Description: The Lily Pond site encompasses an area from East to West that lies between Livingston Manor and the Neversink Reservoir and North to South from the Catskill Park boundary to Route 17. It comprises the potential for up to 6 strings of wind turbines and a potential capacity of 63MW (42 wind turbines). The 6 strings of wind turbines used to maximize the project layout at this site are all on individual land features that may make the development of smaller, modular segments the ideal choice for this site.

Project Capacity and Layout: A map of the Lily Pond project site, including the 6 wind turbine strings is attached as Appendix A. The potential capacities for each of the individual wind turbine strings are:

- String 1 – Potential Capacity 6MW
- String 2 – Potential Capacity 10.5MW
- String 3 – Potential Capacity 13.5MW
- String 4 – Potential Capacity 6MW
- String 5 – Potential Capacity 16.5MW
- String 6 – Potential Capacity 10.5MW

Public Wind Data Review: According to the AWSTruewind New York State Wind Map the Lily Pond Site should experience average annual wind speeds between 7 and 7.4 meters per second (15.7 and 16.6 mph).

Geographic/Topographic Review: The Lily Pond site will benefit from elevations over 2000 ft. There are no features that will provide for a significant speed up affect at any of the wind turbine sites and wind speeds should be reduced slightly due to the vegetation on the site.

Landowner / Land Use Information: Wind turbines at the Lily Pond site will be within the visible range of areas in the Catskill Park and in some cases the wind turbine strings will run to the park's boundary. The identified site is an area of mixed-use property and contains both private and public landowners. Some wind turbines may be located on lands owned by the Village of Liberty.

Transmission / Point of Delivery: The Lily Pond site would likely interconnect to the utility grid via the Marci South 115kV transmission route owned by New York State Electric and Gas (NYSEG) that is approximately 4.5 miles South of the wind turbine locations. This interconnection location will require the project to attain a right of way to the interconnection point that will have to cross Route 17. If the project is developed in a more modular fashion it may be possible to use local sub-level transmission lines and potentially larger distribution lines for the interconnection.

Accessibility and Feasibility: This site offers a unique access challenge, as each wind turbine string would require a separate access road. These areas all appear to have reasonable gradients for equipment transportation to the turbine sites and public roads should provide adequate access to the project's roads. Although the site is in an area with very few homes, the project will be interlaced with some residences. The layout of wind turbines must provide for a buffer zone from those homes to minimize the projects impacts to local residents. There do not appear to be any structures on the site that would prohibit the construction of a wind power project in the Lily Pond area.

2.2.2 Site 2 – Thunder Hill

Site Description: This project utilizes the topographical feature known as Thunder Hill, an elevated area approximately 3 miles East of the Neversink Reservoir. This is a small, single string, wind project site with a potential capacity of 9MW (6 wind turbines). This site represents a unique opportunity for a publicly owned project or for a project developed under a public-private partnership.

Project Capacity and Layout: A map of this project site, showing the designed turbine layout, is attached as Appendix B.

Public Wind Data Review: According to the AWSTruewind New York State Wind Map the Lily Pond site should experience average annual wind speeds of 7.7 meters per second (17.2mph).

Geographic/Topographic Review: This project will benefit from elevations over 2200 ft. This site should also see a significant speed-up affect as a result of the nearly 900 ft rise in elevation from the valley to the West of the proposed project location. The Thunder Hill site should experience wind speeds close to the wind map predictions since there is very little vegetation that would act to slow the wind.

Landowner / Land Use Information: The entirety of the Thunder Hill Site will be visible from portions of the Catskill Park and the wind turbine string will run to the park's boundary. The project is an area of mixed-use property.

Transmission / Point of Delivery: Due to the size of the Thunder Hill site the interconnection point could potentially be located on the nearest three-phase transmission line at either the sub-transmission or distribution level. The distance to an interconnection point in either case will likely be less than 1 mile.

Accessibility and Feasibility: The Thunder Hill site is not located near houses and rests on open agricultural land. There appears to be no significant obstacles to develop the site. Site access will likely be along the crest of the ridge starting from near the intersection of Thunder Hill Road and Route 42. This route provides the most reasonable gradient to transport project equipment to the site.

2.2.3 Site 3 – Monticello and Forestburg

Site Description: The Monticello-Forestburg site encompasses an area bordered by Route 17 to the North, Route 209 to the East, County Road 48 to the South and Route 42 to the West. The site consists of 4 strings of wind turbines with potential capacity of 84MW (56 wind turbines). This project site has rolling hills and relatively simple terrain. The site could be developed as one large project or two smaller projects. If separated into two projects, they would be divided as one East and the other West of the Neversink River.

Project Capacity and Layout: A map of the project site including is attached as Appendix C. The capacities of each of the individual wind turbine strings are listed below.

- String 1 – Potential Capacity 18MW
- String 2 – Potential Capacity 12
- String 3 – Potential Capacity 19.5MW
- String 4 – Potential Capacity 34.5MW

Public Wind Data Review: According to the AWSTruewind New York State Wind Map the Monticello-Forestburg site should experience average annual wind speeds between 7 and 7.15 meters per second (15.7 and 16 mph).

Geographic/Topographic Review: The Monticello-Forestburg site will benefit from elevations over 1500 ft. There are no features that will provide a significant speed-up affect at any of the potential wind turbine locations and wind speeds would likely be reduced due to the vegetation on the site. Overall project size may be reduced in order to keep all wind turbine locations above 1550ft in elevation.

Landowner / Land Use Information: The Monticello-Forestburg site is in an area with low population density that appears to be used mainly for recreation. There are several registered wetlands in and around the project site, which may cause difficulties during the development process. This area should not be visible from areas within the Catskill Park. The project is an area of mixed-use property and contains both private and public landowners.

Transmission / Point of Delivery: The Monticello-Forestburg site has two possible interconnection points. There is an 115kV system 4.5 miles South and 4.5 miles North of the potential wind turbine locations. Either of these systems would be ideal for interconnection for a project of this size. If the development of this site were split into two projects there would be a potential to utilize both interconnection points. Both lines are part of NYSEG's transmission system.

Accessibility and Feasibility: This site appears to be the easiest area to build a utility-scale wind project in Sullivan County. It benefits from relatively flat ground and rolling hills. Site access offers numerous public roads as options for transporting project equipment. There are no readily apparent structures on this site that would prevent development of a utility-scale wind farm.

2.2.4 Site 4 – Revonah Hill - Liberty

Site Description: The Revonah Hill–Liberty site encompasses an area bordered by Route 17 to the North, Revonah Hill Road to the East, Route 52 to the South and Fox Mountain Road to the West. The project has a capacity for as many as 6 strings of wind turbines for a potential total project size of 45MW. The 6 wind turbine strings would be located on 3 land features providing a greater ease of construction than some of the other identified project locations.

Project Capacity and Layout: A map of the project site is attached as Appendix D. The capacities for each of the individual wind turbine strings are listed below.

- String 1 – Potential Capacity 9MW
- String 2 – Potential Capacity 9MW
- String 3 – Potential Capacity 12MW
- String 4 – Potential Capacity 3MW
- String 5 – Potential Capacity 3MW
- String 6 – Potential Capacity 9MW

Public Wind Data Review: According to the AWSTruewind New York State Wind Map this site should experience average annual wind speeds between 7 and 7.5 meters per second (15.7 and 16.8 mph).

Geographic/Topographic Review: The Revonah Hill-Liberty site will benefit from elevations over 2000 ft. There are no features that will provide a significant speed-up affect at the wind turbine sites and wind speeds will be reduced slightly due to the vegetation on the site.

Landowner / Land Use Information: This location is an area of mixed-use property with both public and private land ownership. There are quite a few residences near the potential project site, which may limit the project's total size.

Transmission / Point of Delivery: The Revonah Hill-Liberty site could interconnect either at the 115kV circuit on the Marci South transmission line that runs approximately two miles South of the project or at the sub-level transmission line running through wind turbine strings 5 and 6.

Accessibility and Feasibility: This project should not provide site access difficulties because it lies in an area where there are adequate public transportation routes at or near project elevation. There are a number of residences in the area, which may limit the project size but should not significantly limit development. There does not appear to be any other structures near the project site that would prohibit development.

2.2.5 Site 5 – Livingston Manor

Site Description: The Livingston Manor site encompasses an area bordered by Delilah Road to the North and East, Midway Road to the South and Cattail Road to the West. The site would have 2 strings of wind turbines with 33 MW of total potential generating capacity. The 2 strings of wind turbines used to layout this project site are both on individual land features but this should not produce significant development difficulties.

Project Capacity and Layout: A map of this project site is attached as Appendix E. The capacities of each individual wind turbine string are listed below.

- String 1 – Potential Capacity 22.5MW
- String 2 – Potential Capacity 10.5MW

Public Wind Data Review: According to the AWSTruewind New York State Wind Map the Livingston Manor site should experience average annual wind speeds between 7 and 7.4 meters per second (15.7 and 16.6 mph).

Geographic/Topographic Review: This site will benefit from elevations over 2000 ft. There are no features that will provide for a significant speed-up affect at the wind turbine locations and wind speeds will be reduced slightly due to the vegetation on the site.

Landowner / Land Use Information: The Livingston Manor site is in an area of mixed-use property with both public and private land ownership. Some of the wind turbines may be located on the Village of Livingston Manor's property at Lenape Lake. There are some residences in the area but the wind project can be appropriately sited to minimize impacts to these project neighbors.

Transmission / Point of Delivery: The Livingston Manor site is split by the Marci South transmission line and is located less than 1 mile from a sub-level transmission line that may also be appropriate for interconnection.

Accessibility and Feasibility: The identified location should not provide access difficulties because it is in an area where there are adequate public transportation routes at or near project elevation. There are a number of residences in the area, which may limit the project size but should not significantly limit development. There does not appear to be any other structures near the project site that would prohibit development.

2.2.6 Big Wind Site 6 – Callicoon - Fremont

Site Description: The Callicoon-Fremont site encompasses a large area bordered by Route 17 to the North and East, the Sullivan-Delaware County Line to the North and West and the Village of Callicoon Center to the South. The area has room for up to thirteen strings of wind turbines for a total potential generating capacity of 102MW. The strings of wind turbines used to layout this project are all on individual land features that may make it easier to develop this area in smaller, modular segments. In addition, there are several other high-elevation windy features in this region that could also be developed in a modular fashion.

Project Capacity and Layout: A map of the project site is attached as Appendix F. The capacities of each of the individual wind turbine strings are listed below.

- String 1 – Potential Capacity 10.5MW
- String 2 – Potential Capacity 6MW
- String 3 – Potential Capacity 3MW
- String 4 – Potential Capacity 10.5MW
- String 5 – Potential Capacity 7.5MW
- String 6 – Potential Capacity 7.5MW
- String 7 – Potential Capacity 6MW
- String 8 – Potential Capacity 15MW
- String 9 – Potential Capacity 7.5MW
- String 10 – Potential Capacity 7.5MW
- String 11 – Potential Capacity 6MW
- String 12 – Potential Capacity 7.5MW
- String 13 – Potential Capacity 7.5MW

Public Wind Data Review: According to the AWSTruewind New York State Wind Map this site should experience average annual wind speeds between 7 and 8 meters per second (15.7 and 17.9 mph).

Geographic/Topographic Review: This site will benefit from elevations over 2000 ft. Many of the features chosen for Site 6 are on features that will provide some acceleration of the winds as a result of lower land to the West and Northwest. There are also some small local features that may produce a tunnel effect in the wind regime and a speed-up over these smaller but defined ridgelines. However, on most strings the wind speeds will be reduced slightly due to the vegetation on the site.

Landowner / Land Use Information: The Callicoon–Fremont site is on mixed-use property with the majority being privately owned. The area is a mix of farm, recreational and residential areas. The project will require appropriate layouts with regards to minimizing the impact to project neighbors.

Transmission / Point of Delivery: This site presents a multitude of options for interconnection. If a large project is developed, there are 115kV NYSEG circuits running within a few miles of the eastern (Marci South) and western borders of the project. If the project is developed modularly it may be able to use local-sub level transmission and distribution lines that are in and around the project site.

Accessibility and Feasibility: The Callicoon–Fremont site offers a unique accessibility challenge, as each wind turbine string would require a separate access road. These areas are a mix of features that have both reasonable and some features that may require more expensive access roads to be built. All of the strings appear to be accessible via public ways that exist in the area. The site is in an area with numerous homes, the project will be interlaced with these residences and the layout of wind turbines will need to provide a buffer zone from those homes to minimize the projects impacts to local residents. There does not appear to be any structures on the site that would prohibit the construction of a wind power project this area.

2.3 Utility-Scale Wind Power Will Help Meet the Goals of Sullivan 2020

1. County's rural atmosphere/open space and environmental quality are among the most appreciated aspects and should stay that way. Both of these issues may be misconstrued to produce a negative vision of wind power development. However, commercial wind development must be viewed as an option to creating positive economic benefits for the County that will allow large tracts of land to remain free of malls, cookie-cutter housing communities and the other monstrosities that generally constitute modern economic development. Utility-scale wind turbines will provide the County and residents with income, jobs and with a tangible method of preserving the environmental quality they so cherish.
2. Many citizens seem to feel that large-scale development (of any kind) should not come at the expense of increasing year-round residents' tax burdens. Therefore, the County must be careful to negotiate relationships with wind developers that will provide fair and positive returns to both project developers and the residents of the County.
3. All signals point to increased residential (year round and seasonal) populations. Commercial wind projects will help fulfill the goals of sustainable development and growth by creating increased tax revenues, employment opportunities, and by satisfying the increased energy demands with clean, fuel-free electricity.
4. Keep younger generations in the County ("Brain Drain"), a goal that is not well supported by the current economy. Commercial wind development will diversify the County's economy and produce quality employment. In addition, the relatively new nature of the modern wind industry will mark the County as being a progressive and active participant in shaping the United States' future. The youth of today lack opportunities to work at something they feel is significant and that they will enjoy. The wind industry will provide Sullivan County's younger generations with the ability to do great things in their own backyards.

3.0 Onsite Generation or Distributed Wind Energy

3.1 Site Selection Process

Similar to the selection for utility-scale wind sites, the site selection process for distributed wind power projects began with the AWSTruewind New York State Wind Map. This map was scanned for windy areas of the county. The primary difference between these two wind resource reviews is that an onsite wind generation site does not require as strong of a wind regime as a utility-scale project due to its ability to offset more expensive retail electric rates. The windy areas identified were then scanned for facilities with potentially large electrical loads. The chosen sites were compiled from four lists:

- A group of fourteen large farms in windy areas supplied by Rick Bishop of the Sullivan County Planning Department
- The list of all municipal water facilities in Sullivan County provided by Heather Brown of the Sullivan County Planning Department
- A list of commercial facilities in windy areas compiled by Heather Brown of the Sullivan County Planning Department
- SED's review of windy areas to identify potential sites not provided on the lists above.

The wind map was then used to identify the wind resource at each of the identified locations. This data was adjusted to account for site elevation so that a more accurate wind speed at potential wind turbine sites could be determined for each of the forty-five sites. SED analyzed the forty-five potential projects and determined that projects with wind speeds below 6.2 m/s would not yield beneficial project returns. The economic returns from farms will allow for wind speeds below this mark because they are eligible to receive higher levels of state and federal funding. Twelve project sites of the forty-five initially identified had wind speeds at or above 6.2 m/s. A preliminary feasibility study was performed on each of these sites. The details of those studies are listed below.

Figure 2– The Top 12 Onsite Wind Generation Sites in Sullivan County

Commercial Sites	**EASTING**	**NORTHING**	**Elevation (**	**Truewind speed (**	**Truewind K**	**Truewind elevation (**	**Adjusted Speed(**	**Projected Turbine Size**
Sullivan County Community College	527659	4623711	469	6.176	2.201	458	6.356	1MW
The Concord	528513	4613358	457	6.232	2.197	437	6.560	660kW
Kutshers	525408	4617170	486	6.411	2.234	470	6.673	660kW
Crystal Run Medical Center	534498	4608103	456	6.363	2.178	437	6.675	250kW
Villa Roma High Point	503195	4622668	460	5.733	2.206	405	6.635	1MW
Bethel Woods Performing Arts Center	509693	4615852	440	5.758	2.215	413	6.201	1MW
Lanza's Country Inn	510756	4635951	649	7.096	2.277	670	6.752	100kW
Tennanah Lake Golf and Country Club	503429	4637265	717	7.158	2.26	654	8.191	100kW
Water Facilities								
Lily Pond Rd.	521130	4636255	660	6.9	2.221	646	7.130	250kW
Large Farms								
AGY	521627	4622463	466	5.827	2.22	436	6.319	660MW
Ackerman	504742	4617232	439	5.854	2.237	405	6.412	660kW
Hughson	507338	4623481	482	5.982	2.23	438	6.704	250kW

SED identified an additional 5 sites that show strong potential for being economically beneficial onsite wind projects. However, further data on these sites will need to be collected before they can be deemed viable projects.

Figure 3 – 5 Second Tier Onsite Generation Sites

Commercial Sites	EASTING	NORTHING	Elevation	Truewind speed	Truewind K	Truewind elevation	Adjusted Speed
Grossingers Resort	522681	4626954	496	5.583	2.194	459	6.190
Center For Discovery	523042	4616775	427	5.922	2.231	415	6.119
Duraclean Fabric Specialists	498602	4618425	409	5.94	2.212	396	6.153
Water Facilities							
Callicoon	509972	4628791	442	5.399	2.225	404	6.022
Large Farms							
Bella	521730	4620224	457	6.006	2.24	450	6.121

3.2 Economic Analyses

SED analyzed each of the twelve potential projects in order to understand the financing methods and structure that would yield the most beneficial project economics for each specific site. The data that was input into these calculations is based on industry best practices and SED's understanding of how best to fulfill these projects' potential. For each site two prospective financing structures were considered:

- Self-Financing – The wind turbine would be financed and owned by the host site. The return on the host site's investment is based on the wind-generated electricity that offsets the purchase of electricity at retail prices. This mechanism is best suited for site hosts that may not have the ability to use extra tax incentives/credits. The analysis is dependent upon the projects receiving grant funding and being eligible for New York's Renewable Portfolio Standard (RPS).

- Third Party Financed – A third party would own the wind turbine and the generated electricity would be sold to the host site under a long term power purchase agreement. This allows the third party financier to take advantage of incentives provided by the Federal Production Tax Credit and share those incentives with the host site in the form of a lower power purchase value. Projects under this arrangement will show the host site an economic benefit in year 1 but are highly dependent on the financial status of the host site. For these sites there are 2 cash flow sheets provided. One model shows the cash flow of the third party owner and the second shows the cash flow for the host site under a likely long-term power purchase agreement.

The analysis for each site defines a value for the power that will be associated with wind generated electricity. For each site a wind turbine was chosen that would produce approximately 50% of the site's total needs. This was done to maximize the amount of power that will be utilized by the site and minimize the amount that is pushed back to the grid. As a result of a 2003 regulatory decision in New York State, NYSEG customers are able to put up a wind turbine up to 1MW in size and their electric rate structure will remain the same as that prior to its installation.

An assumption was made for the total amount of electricity consumed on an annual basis for each site based on the size and type of the facility. For sites that SED assumed use less than

500,000kWh a rate of $0.09/kWh was assumed based on two thirds of the power being consumed onsite and one third being sold back to the grid. For sites assumed to use more than 500,000kWh per year a rate of $0.07/kWh was assumed based on two thirds of the power being consumed on the site and one third being sold back to the grid.

Also considered in the analysis of these sites were incentive programs available to onsite wind power projects on a state and national level.

- USDA Section 9006 Funding – This program provides a 25% grant for renewable energy projects up to a maximum of $500,000 and is available to farms and rural small businesses.
- NYSERDA PON 792 – This program provides 15% of the total installed cost up to $100,000 for distributed wind power projects of the size considered in this analysis.
- New York State Renewable Portfolio Standard (RPS) – This state wide regulation requires the State to produce of 25% of its power from renewable energy sources such as wind energy by 2013. This program provides value to the to wind energy projects in the form of green tags or renewable energy credits. For this analysis the value of this program was assumed to be $0.02/kWh for the first 8 years of project life or until the end of the RPS in 2013. Although distributed wind power projects greater than 300kW were left out of the original RPS plan, SED expects that all the projects analyzed in this report will be eligible when the full implementation plan is issued by the Public Service Commission in the Fall of 2005.

SED recommends that any site on this list interested in moving forward work with SED to use NYSERDA PON 858 to fund half of the development cost for their prospective projects. SED has designed a scope of works and pricing schedule for this program that will be made available to the specific sites upon request. This program has an application deadline every six months with the next round concluding on 31 May 2005.

3.3 Commercial Sites

Commercial facilities can use wind power to benefit their operations by: reducing overhead expenses; modernizing business infrastructure; promoting sustainable development; and by adding a unique attraction to their current facilities.

3.3.1 Sullivan County Community College

SED has been engaged in discussions with Sullivan County Community College for nearly a year. A 1MW wind turbine is proposed that could show significant cost savings to the college in comparison to their current electric bills. SCCC also has the unique ability to use a wind turbine as a teaching tool.

- Estimated Electricity Consumption – 8,000,000 kWh/yr
- Estimated Wind Resource – 6.356m/s (14.2mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Third Party
- Wind Turbine Used – Fuhrländer FL 1000+ 1MW on 80 meter tower
- Estimated Wind Turbine Production – 1,900,000kWh/yr
- Total Installed Cost - $2,000,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available - NYSERDA
- Savings to Host Year 1 – $12,000
- Savings to Host Lifetime - $1,800,000
- Return on Investment (Third Party Owner)– 14.4%
- Payback for Third Party – Between Years 4 and 5

A site map, wind cad model and cash flow analysis for this site can be found in Appendix G.

3.3.2 The Concord

- Estimated Electricity Consumption – 2,500,000 kWh/yr
- Estimated Wind Resource – 6.560m/s (14.7mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Self Financed
- Wind Turbine Used – Vestas V47 660kW on 65 Meter Tower
- Estimated Wind Turbine Production – 1,190,000kWh/yr
- Total Installed Cost - $1,400,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA and USDA
- Savings to Host Lifetime - $1,700,000
- Return on Investment – 22.7%
- Payback– Between Years 3 and 4

A site map, wind cad model and cash flow analysis for this site can be found in Appendix H.

3.3.3 Kutshers

- Estimated Electricity Consumption – 2,500,000 kWh/yr
- Estimated Wind Resource – 6.670m/s (14.9mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Self Financed
- Wind Turbine Used – Vestas V47 660kW on 65 Meter Tower
- Estimated Wind Turbine Production – 1,100,000kWh/yr
- Total Installed Cost - $1,400,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA and USDA
- Savings to Host Lifetime - $1,500,000
- Return on Investment– 20.0%
- Payback – Between Years 4 and 5

A site map, wind cad model and cash flow analysis for this site can be found in Appendix I.

3.3.4 Crystal Run Medical Center

This location is ideally suited to host a high visibility project that could be seen from Route 17.

- Estimated Electricity Consumption – 1,000,000 kWh/yr
- Estimated Wind Resource – 6.68m/s (14.9mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Third Party
- Wind Turbine Used – Fuhrländer FL 250kW 50 meter tower
- Estimated Wind Turbine Production – 380,000kWh/yr
- Total Installed Cost - $625,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA and USDA
- Savings to Host Year 1 – $2,500
- Savings to Host Lifetime - $375,000
- Return on Investment (Third Party Owner)– 13.8%
- Payback for Third Party – Between Years 4 and 5

A site map, wind cad model and cash flow analysis for this site can be found in Appendix J.

3.3.5 Villa Roma

- Estimated Electricity Consumption – 5,000,000 kWh/yr
- Estimated Wind Resource – 6.64m/s (14.9mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Self Financed
- Wind Turbine Used – Fuhrländer FL 1000+ 1MW on 80 meter tower
- Estimated Wind Turbine Production – 2,050,000kWh/yr
- Total Installed Cost - $2,000,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA
- Savings to Host Lifetime - $900,000
- Return on Investment– 16.3%
- Payback – Between Years 4 and 5

A site map, wind cad model and cash flow analysis for this site can be found in Appendix K.

3.3.6 Bethel Woods Performing Arts Center

The new Bethel Woods Performing Arts center has been identified as having a unique opportunity to utilize distributed wind power. Although the museum and educational facility are focused on the promotion of the arts this site can further educate its many visitors as to the benefits of onsite wind power and other types of renewable energy.

- Estimated Electricity Consumption – 4,000,000 kWh/yr
- Estimated Wind Resource – 6.2m/s (13.9mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Third Party
- Wind Turbine Used – Fuhrländer FL 1000+ 1MW on 80 meter tower
- Estimated Wind Turbine Production – 1,800,000kWh/yr
- Total Installed Cost - $2,000,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA
- Savings to Host Year 1 – $11,800
- Savings to Host Lifetime - $1,750,000
- Return on Investment (Third Party Owner)– 12.3%
- Payback for Third Party – Between Years 6 and 7

A site map, wind cad model and cash flow analysis for this site can be found in Appendix L.

3.3.7 Lanza's Country Inn

- Estimated Electricity Consumption – 200,000 kWh/yr
- Estimated Wind Resource – 6.75m/s (15.1mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Self Financed
- Wind Turbine Used – Fuhrländer FL 100kW on 35 m tower
- Estimated Wind Turbine Production – 178,000kWh/yr
- Total Installed Cost - $400,000
- Electricity Value - $0.09/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA and USDA
- Savings to Host Lifetime - $300,000
- Return on Investment– 16.4%
- Payback – Between Years 4 and 5

A site map, wind cad model and cash flow analysis for this site can be found in Appendix M.

3.3.8 Tennanah Lake Golf and Country Club, Inn and Restaurant

- Estimated Electricity Consumption – 300,000 kWh/yr
- Estimated Wind Resource – 8.19m/s (18.3mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Self Financed

- Wind Turbine Used – Fuhrländer FL 100kW on 35 m tower
- Estimated Wind Turbine Production – 250,000kWh/yr
- Total Installed Cost - $400,000
- Electricity Value - $0.09/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA and USDA
- Savings to Host Lifetime - $530,000
- Return on Investment– 27.9%
- Payback – Between Years 2 and 3

A site map, wind cad model and cash flow analysis for this site can be found in Appendix N.

3.4 Municipal Water Facilities

3.4.1 Lily Pond Water Treatment Facility – Village of Liberty

The Lily Pond Water Treatment Facility is owned and operated by the Village of Liberty. This facility presents one of the best opportunities to employ distributed wind power for a number of reasons. First, water treatment facilities generally run at constant electrical demand allowing them to absorb wind generated electricity whenever it is produced. Secondly, the ability of a municipal entity to work with a private partner under a public-private partnership provides projects like this with a strong economic basis.

- Estimated Electricity Consumption –800,000 kWh/yr
- Estimated Wind Resource – 7.130m/s (15.9mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Third Party
- Wind Turbine Used – Fuhrländer FL 250kW 50 meter tower
- Estimated Wind Turbine Production – 435,000kWh/yr
- Total Installed Cost - $625,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA
- Savings to Host Year 1 – $2,800
- Savings to Host Lifetime - $431,000
- Return on Investment (Third Party Owner)– 21.5%
- Payback for Third Party – Between Years 3 and 4

A site map, wind cad model and cash flow analysis for this site can be found in Appendix O.

3.5 Large Farms

The incorporation of wind technology is a natural fit for farmers, as they are adept at utilizing available resources to produce value. With the help from available incentives, farms can enjoy the benefits from a low-risk, long-term investment in wind power that provides payback periods fewer than 5 years with a machine life expectancy of 25 years. The farms identified in this section have large electrical demands that will allow them to consume most of the electricity produced by an onsite wind turbine in order to further enhance the economic benefits of these systems.

3.5.1 AGY Farm

- Estimated Electricity Consumption – 2,500,000 kWh/yr
- Estimated Wind Resource – 6.70m/s (15.0mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Self Financed
- Wind Turbine Used – Fuhrländer FL 250kW 50 meter tower
- Estimated Wind Turbine Production – 1,090,000kWh/yr
- Total Installed Cost - $1,400,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA and USDA
- Savings to Host Lifetime - $1,500,000
- Return on Investment– 19.7%
- Payback – Between Years 4 and 5

A site map, wind cad model and cash flow analysis for this site can be found in Appendix P.

3.5.2 Ackerman Farm

- Estimated Electricity Consumption – 2,500,000 kWh/yr
- Estimated Wind Resource – 6.41m/s (14.3mph)
- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Self Financed
- Wind Turbine Used – Vestas V47 660kW on 65 Meter Tower
- Estimated Wind Turbine Production – 1,130,000kWh/yr
- Total Installed Cost - $1,400,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA and USDA
- Savings to Host Llifetime - $1,600,000
- Return on Investment– 20.9%
- Payback – Between Years 3 and 4

A site map, wind cad model and cash flow analysis for this site can be found in Appendix Q.

3.5.3 Hughson Farm

- Estimated Electricity Consumption – 750,000 kWh/yr
- Estimated Wind Resource – 6.41m/s (14.3mph)

- Amount of Available Land – Adequate amount of land to provide appropriate setbacks

Economic Summary:

- Ownership Structure – Self Financed
- Wind Turbine Used – Fuhrländer FL 250kW 50 meter tower
- Estimated Wind Turbine Production – 1,130,000kWh/yr
- Total Installed Cost - $430,000
- Electricity Value - $0.07/kWh (67% of wind power used onsite)
- Grants Available – NYSERDA and USDA
- Savings to Host Lifetime - $600,000
- Return on Investment– 21.5%
- Payback – Between Years 3 and 4

A site map, wind cad model and cash flow analysis for this site can be found in Appendix R.

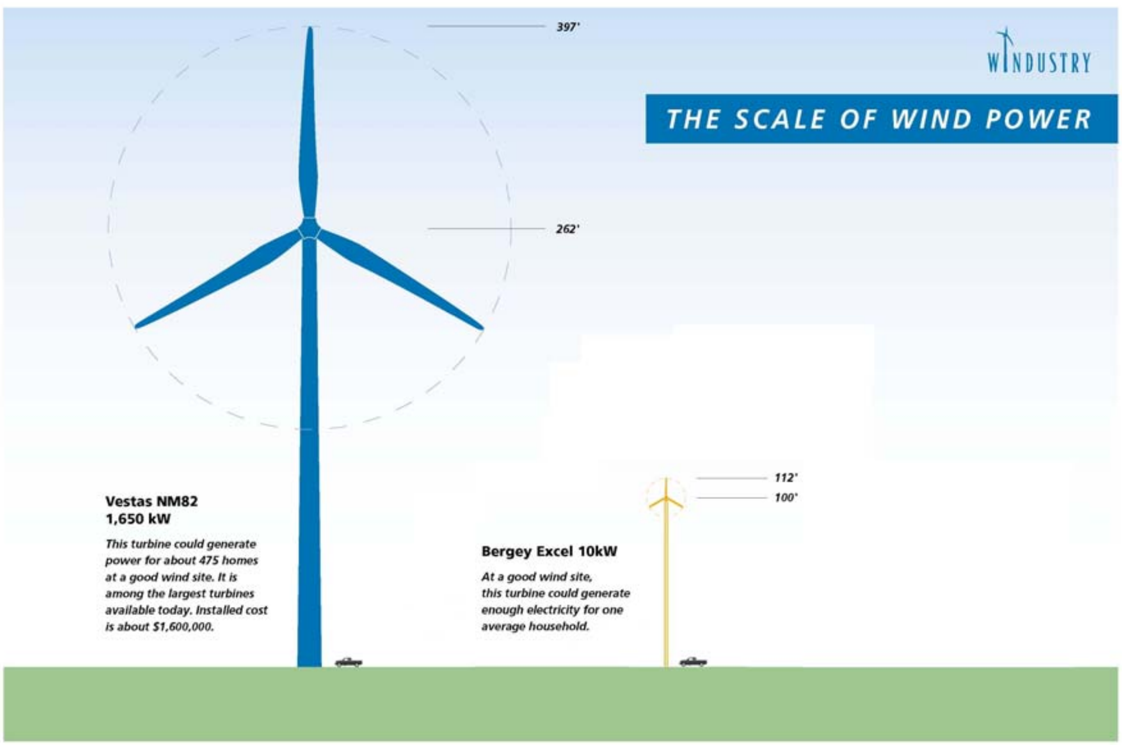
4.0 Small Wind

4.1 Small Wind Turbine Background Information

Distributed wind generation, as a model would not be complete without the inclusion of small wind turbine technologies. These machines differ greatly from larger wind turbine generators not only in size, but also in their application to the onsite/distributed generation market. These differences are substantial when considering the essential predevelopment tasks for a wind project.

The obvious characteristic distinguishing these turbines is their size. A typical utility-scale wind turbine has a rotor height of more than 250 feet and blade length of more than 100 feet whereas a small wind turbine has its rotors at 100 feet and blades measuring 10 feet. The swept area of a wind turbine is the circular area that the blades pass through as they rotate. This swept area is a function of the length of the blade length and increases exponentially as the blade length is increased.

Figure 4 – Wind Turbine Size Comparison chart produced by Windustry.[2]



One aspect of this relatively small swept area is the impact of small wind turbines on avian populations. While large wind farms necessitate migratory studies, species impact analyses and appropriate siting considerations, small wind turbines should require no studies at all. In fact, there is no evidence of any significant impact to bird populations by small wind turbines. This is most

[2] Windustry is a non-profit organization that works to promote wind energy as an economic benefit to rural communities. http://www.windustry.com/basics/01-introduction.htm

likely due to the small swept area, low rotor height, and increased rotational speed of the blades that increases swept area visibility.

Visual concerns are typically limited to local zoning laws and adjacent wildlife or historic areas. Zoning laws can vary considerably, and normally require some discourse with town boards. Historic and wildlife areas are occasional factors due to the small amount of soil disruption for tower and anchor foundations and wildlife areas may require approval if the turbine can be seen from any designated wildlife sanctuaries. These issues rarely cause problems, however, and are typically addressed and approved within the early stages of development.

Noise issues are rarely a concern due to industry accepted siting guidelines that provide a setback requirement of 300 feet from any residence. At this distance, the sound emissions of small wind turbines are indistinguishable from the sound of the wind blowing through trees or around buildings. These substantial differences between large and small wind turbines necessitate a different approach and perspective when examining small wind opportunities.

4.2 Grants and Incentives Available to Small Wind Projects

Many grants and incentives exist for wind projects in agricultural sectors in New York. These incentives can help foster a sustainable rural environment, improving and diversifying agri-business, while preserving open space and grazing lands vital to individual farmers and the rural community as a whole. Electricity bills for farmers are substantial, accounting for large portions of their operating costs. Increases in the cost of electricity can affect farmers considerably, burdening them with increased bills in an already difficult industry. The incorporation of wind technology is a natural fit for farmers, as they are adept at utilizing available resources to produce goods. With the help from available incentives, farms can enjoy the benefits from a low-risk, long-term investment such as wind power and payback periods fewer than 15 years with a machine life expectancy of 25 years. A pro forma economic analysis for a small agricultural wind project can be found in Appendix S.

Grants are currently available for farmers and rural small businesses from the US Department of Agriculture (as Section 9006 of the 2005 Farm Bill)-up to 25% of the total installed cost of a wind turbine installation and New York State Energy Research and Development Authority (PON 792)-up to 60% of total installed cost. In addition, low interest loans are offered by both of these funding agencies and recent legislation provides farmers with the ability to net meter a wind turbine up to 125kW in size. This allows farmers to essentially use the grid as a battery to store excess electricity during the windy seasons for use during the summer months.

For residential locations wind power can offer: a valuable hedge against the volatility of retail electricity prices; the satisfaction and independence of on-site power generation; as well as the benefit of offsetting the pollution generated by traditional fuel-based electricity production. The New York State Research and Development Authority offers grants for residential sites for up to 50% of a small wind system's total installed cost as well as low interest loans. Residences can also take advantage of net metering for wind turbines up to 25kW in size. A pro forma economic analysis for a small residential wind project can be found in Appendix T.

4.3 Advertising Campaign to Market Small Wind Systems in Sullivan County

SED believes that the most effective method of marketing small wind systems is to focus materials and efforts to sites that show initial promise for effectively employing the technology. Wind turbines produce electricity and positive economic returns in locations that have strong wind resources. Therefore, Sullivan County should pursue the following course of work:

1. Identify the top 150 agricultural and residential sites

The identification process should be aimed at selecting locations that meet pre-determined thresholds in terms of: wind resource (an annual average of at least 5.5 m/s); available and suitable land (1 acre or more); grid connection (locations that are not connected to the grid or do not pay into New York's System Benefits Charge are not eligible to receive grants from the State); as well as estimated electricity consumption. An initial list of locations should be created that identify the regions of the County that have a suitable wind resource with the other filters then applied to the initial list. This process should be performed via a desk study to determine the windy regions and land availability for sites in addition to a site visit to confirm the desk study's findings and to determine the type and size of the building(s) at the locations. An additional step of a telephone or site-visit survey could be added to this list to validate all findings performed in the selection process.

2. Create marketing packet that educates recipients

Initially, this project will need to address informational barriers, whether a lack of familiarity with wind energy, misconceptions about wind turbines, the perception of wind power as a fringe technology or as a technology only applicable in large, rural utility-scale settings. It is likely that a large percentage of the locations contacted will have never considered that a wind turbine could provide them with electricity, let alone that they have a good site. The materials should include a basic introduction to wind power, its economic and environmental benefits, local and national benefits, as well as the process for further pursuing wind power for their site. A packet of information should include:

- Informational brochure – NYSRDA has produced just such a pamphlet that could likely be used by the County free of charge or the County could produce a customized version that better suits local projects.
- Manufacturer's materials – The two most reputable small wind turbine manufacturers in the US, Bergey Windpower and Southwest Windpower could provide pamphlets describing their products.
- Sullivan County specific pamphlet or cover letter that outlines why the County is supporting this marketing/educational effort.

3. Inform local government authorities

In conjunction with contacting the 150 identified locations, this effort should also aim to educate local government authorities on permitting and regulating small wind turbines. There are several available permitting toolboxes and state zoning laws (California, Nebraska and Wisconsin) that outline the major issues of concern for this type of technology in other states and markets that could be adjusted to the specific nature of Sullivan County. The local government agents should at a minimum be educated on: industry accepted wind turbine siting guidelines; tower height requirements; set-backs; noise emissions; approved wind turbine technologies; Federal Aviation Administration regulations; local and state electric utility regulations; as well as compliance with the Uniform Building Code and the National Electric Code. This effort should be geared toward designating small wind turbines as a specifically permitted use that is subject to standard requirements so that the process for permitting and installing a small wind system can be streamlined for both landowners and government officials.

4. Follow up

The first contact (materials packet) should reference a follow-up event that will act as an open house for interested individuals who received the marketing materials in the mail. This open house should bring together small wind installers/experts, officials from NYSERDA and local government officials to act as a resource for landowners to further explore the technology. The open house can be further advertised to the identified landowners with a follow up postcard invitation or by telephone. An ideal location for such an open house would be at a location where a small wind turbine has been installed, such as Apple Pond Farm in Callicoon Center.

5. County sponsored incentives

In addition to NYSERDA and USDA financial grants for small wind turbine installations, Sullivan County could develop other types of incentives based on the green attributes (Renewable Energy Credits or RECs) of wind power that could include purchasing the REC's from small turbine owners for a fixed price over a given period of time and/or managing the sale of RECs from landowners to local businesses. The County can use its involvement in this marketing effort and additional incentives to build support and to infuse the proliferation of small wind systems in the County with the feel of a community project in which everyone plays a crucial role and receives benefits.

5.0 Economic Development

The assessment of the potential economic development opportunities for Sullivan County has been analyzed based on: 1) The county's existing capability to contribute to a nation-wide wind energy economy by expanding/altering current business's focus; 2) The impacts of harnessing the County's utility-scale wind energy potential (as detailed in previous sections); 3) The economic savings for large onsite wind generation; 4) The economic savings and impacts of small onsite wind generation and 5) The estimated property tax revenue based on developing all of the County's wind resource opportunities.

5.1 Contribution to the National Wind Economy

Sullivan County possesses a medium to strong wind resource, complex terrain features, and a fairly high population density, characteristics that will make the development of utility-scale wind projects attractive to developers but potentially complicated in terms of actually constructing projects. These characteristics are shared by most of the windy regions in the eastern United States and the shared obstacles to development have certainly slowed wind power development throughout the region. Despite the readily apparent challenges to developing utility-scale wind farms, the wind industry has shown no signs of abandoning the Northeast's rich wind potential. The discussion of obstacles is not presented to dissuade interest in the utility-scale development but rather to show the expanding interest in this industry. In addition, one must assume that if the industry is growing in the limited lands and dense populations of the eastern US market, it must be exploding in the vast windy expanses of the upper Midwest.

As the wind industry continues to grow to fulfill the increasing demands of America's electricity users a nationwide network of component manufacturers, specialized construction workers and maintenance technicians will be established. The potential for job creation as a result of the growth of the wind industry would be comparable to booms experienced by the automobile industry in the early 20th Century or the computer industry of the 1990s. Granted, the pace of development necessary for such a boom in the wind industry would require a major, nation-wide initiative to promote wind power and to demote traditional fuel sources to the waste bins of history.[3] However, considering that more than thirteen states, including New York and Pennsylvania, now have laws on the books that require a percentage of their electricity to be produced from wind power and other renewable technologies, the nation's wind energy boom appears to be well underway.

The US wind industry's development to date totals more than 7,000MW of installed capacity, a figure that translates to an investment of more than $7 billion. The state mandated standards are expected to produce 13,280MW of new renewable energy generation within the next decade, a figure that would require an investment of more than $13 billion and is estimated to create more

[3] This type of major nation wide initiative appears most likely to conjoin with the promotion of a "hydrogen-based economy". Wherein wind generated electricity would be used to separate hydrogen from water molecules through electrolysis. This process is currently performed using traditional fossil fuel generated electricity, which incidentally makes hydrogen fuel cells, as currently envisioned no cleaner than current forms of electricity generation.

than: 39,000 jobs in manufacturing; 9,000 jobs in construction; and 8,000 jobs in operations and maintenance.[4]

The strongest and most developable wind resource in the U.S. is located in the upper Midwest region. This area would likely experience the greatest impacts in terms of construction and operation & maintenance jobs but the manufacturing investments (jobs and associated support mechanisms) could be located throughout the country. In addition, the development of new wind power across the country will require wind-specific developing, engineering and legal expertise.

Opportunities to join this new industrial boom will be geographically dispersed through a number of factors that include: proximity to emerging wind markets (construction, O&M); transportation infrastructure (large manufacturing); availability of labor (both small and large manufacturing); and quality of life issues (professionals).

5.1.1 Best Option for Contributing to the Nation's Wind Economy

SED believes that the most effective method for Sullivan County to immediately tap into the national wind market is to identify existing businesses within the county that have the potential technical capabilities to manufacture components or provide essential services to the wind industry. These businesses should then be provided assistance (financial or technical) to explore opportunities in the wind industry.

SED has identified 4 Sullivan County businesses that match the North American Industrial Classification System (NAICS) 6-digit code list for the components of a utility-scale wind turbine.[5] SED is in the process of identifying the 4 Sullivan County businesses that resulted from this search but at the time of this report's publication this detail was not available. The names of these 4 businesses will be passed on to the County as soon as they become available. Through previous work, SED has identified one of these businesses as Innovative Metal Products, a company that has the potential capability to manufacture wind turbine towers.

The list of NAICS 6-digit codes for companies that have the technical capability to manufacture components for utility-scale wind turbines are:

- 326199 –All other Plastics Products
- 331511- Iron Foundries
- 332312- Fabricated Structural Metal
- 332991-Ball and Roller Bearings
- 333412-Industrial and Commercial Fans and Blowers
- 333611-Turbines, and Turbine Generators, and Turbine Generator Sets
- 333612-Speed Changer, Industrial
- 333613-Power Transmission Equipment

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[4] Sterzinger, George and Matt Svrcek. "Wind Turbine Development: Location of Manufacturing Activity." Published by the Renewable Energy Policy Project, September 2004. pg. 5.

[5] Beginning in 1997, the **Standard Industrial Classification** (SIC) was replaced by the **North American Industry Classification System** (NAICS). This six-digit code provides for newer industries and also reorganizes the categories on a production/process-oriented basis. This classification system has been designed as the index for statistical reporting of all economic activities of the U.S., Canada, and Mexico.

- 334418-Printed circuits and electronics assemblies
- 334519-Measuring and Controlling Devices
- 335312-Motors and generators
- 335999-Electronic Equipment and Components, NEC

5.1.2 Other Options for Contributing to the Nation's Wind Economy

If Sullivan County decides to pursue the national wind market beyond supporting existing businesses, the methods used to attract new businesses are numerous and varied. The characteristics that make Sullivan County an attractive location to wind energy businesses include:

- Geographically well positioned to provide services and/or minor components to both the emerging northeastern utility-scale wind markets. The entire northeastern United States is poised for significant wind development, with New York, New Jersey and Pennsylvania being the ripest of the bunch.
- High quality of rural life in close proximity to major metropolitan area and airports.
- 67,400 underemployed persons that appear to possess the skills, education and experience to enable them to upgrade employment.

These characteristics would likely be attractive to businesses in the wind industry that focus on research and development, operations and management, light industry and service providers. These categories could take the form of: developer's field offices; wind turbine maintenance firms; wind turbine technology testing and education center; tower manufacturing (existing county business capability); consulting firms; legal firms; and financing institutions.

Options such as a wind turbine technology testing and education center could be used as an initial branding action that would stamp the County as being an aggressive advocate and focal point of the wind industry. The development of this type of facility in the northeast United States could: attract financing through a number of federal and state agencies; create high-quality employment opportunities; serve as a unique destination to draw visitors to the county; and promote sustainable, environmentally friendly development. Through the development of this type of facility, Sullivan County could gain a significant and positive identity in the wind industry.

SED feels that the northeastern market has a great need for a centralized maintenance firm that has crane capability for utility-scale wind turbines, manufacturer's certified technicians, and repair facilities. This firm would then represent the only capable and locally based firm in the entire region that could provide O&M services to the booming New York and Pennsylvania markets. Most projections forecast that the NY and PA markets will see nearly 700 MW of new wind installed by 2006.

Without a major port facility nor major highway system, the County does not appear to be well suited for large-scale manufacturing and distribution operations. In addition, attracting such companies from their current overseas markets may require significant financial concessions from the County (with the trickle-down rewards sought unsubstantiated at best and at the cost of decreasing public services to current residents). According to the Sullivan 2020 Report, the employment experience and skills of the population could support this type of development but

SED believes that significant resources should not be spent in this arena because of the transportation deficiencies listed above and because it has the potential to decrease the overall rural nature and quality of life issues that the county wishes to build its future upon.

5.1.3 Recommendations – Follow On Scope of Works

- Further investigate the nature of the 4 identified companies' current capabilities and attitude towards this type of shift in order to more specifically quantify the economic benefits to the County.
    - Provide industry contacts, technical advice and general consulting to these businesses to aid in the transition
- Wind Turbine Technology and Education Center – Develop a business plan and contact NYSERDA, USDA, Department of Energy and other government agencies, as well as wind turbine manufacturers to determine the costs and available funding to this type of endeavor.
- Operation and Maintenance – Understand the required capabilities and the costs necessary for equipment, training and facilities to fulfill the industry needs.

5.2 Harnessing Sullivan County's Utility-Scale Wind Potential

SED used the National Renewable Energy Laboratory's (NREL) Jobs and Economic Development Impact (JEDI) model to quantify the economic benefits that utility-scale wind development would bring to the county. The JEDI model was designed to show the benefits of wind development during the construction and operations & management (O&M) phases to local economies by evaluating direct, indirect and induced effects as well as state specific multipliers and personal expenditure patterns. The model results are summarized in terms of jobs, earnings, land lease payments, property taxes and economic activity (output). The model's summary outputs provide county level data that can indicate general benefits based on predetermined wind potential. The model is capable of producing much more specific levels of output data when county specific data that allows for the influence of multiplier effects are input.[6] SED input the following data into the JEDI model: the county's potential wind capacity-336 MW; estimated year of construction-2007; wind turbine size-1.5MW; number of turbines-200; Construction cost ($/kW)-$1,400; Annual direct O&M costs ($/kW)-$12.50; and Money value (year)-2007.

The Project Data Summary based on the input values above shows that Sullivan County could expect to experience the following financial impacts if 336 MW of wind power were developed.

- $55 million in local construction costs – this refers to actual dollars spent on goods and services in the county
    - The actual benefit will depend upon the business capabilities of the County to provide the necessary materials and services that include:
        - Heavy equipment for site preparation and road building
        - Concrete and rebar for turbine foundations
        - Electrical materials and expertise
        - Engineering and legal services

[6] The county specific data can be purchased from Minnesota IMPLAN Group, Inc. www.implan.com

- $2.6 million in direct local Operations and Management costs per year
- $896,000 in land lease payments per year

According to the JEDI Model the direct, indirect and induced job creation, earnings and economic output resulting from this level of wind development during the construction phase would be:

- Jobs - 936 full-time equivalent jobs for one year
- Earnings - $40.42 million in wages or salary
- Output - $118.14 million
    - The economic output of this development refers to the economic activity or the value of production in the local economy. This represents the actual dollars spent in the local economy where the project is built on goods and services. The economic output is heavily reliant upon project ownership and local capabilities; local ownership will significantly increase a project's economic output as will the county's ability to supply necessary materials, services and skilled labor without having to attract these project components from outside the county.

During the approximately 25 years in which these wind projects would be operational the annual economic impacts for the direct, indirect and induced job creation, earnings and output would annually amount to:

- Jobs – 126 full-time equivalent jobs for one year
- Earnings - $4.72 million in wages or salaries
- Output - $9.9 million

Definitions[7]

Direct Effects: Onsite or immediate effects created by a given project expenditure
Indirect Effects: Increase in economic activity that occurs when a directly affected entity receives payment for goods or services and is, in turn, able to pay others for goods and services that support the directly affected entity.
Induced Effects: Refers to the change in wealth and/or income that occurs, or is induced, by the spending of entities directly and indirectly affected by a given project.

The Project Data Summary for the simple input data whose main results are listed above can be found in Appendix U. The JEDI model and the white paper describing its use are attached to the electronic version of this report.

5.2.1 Recommendations – Follow On Scope of Works

- Inform the community and local businesses as to the specific activities and results that can be taken to maximize their roles during the various phases of the wind development process
- Educate landowners about the intricacies of land leases for wind farm development
- Evaluate tax codes to optimize Sullivan County's returns without jeopardizing relationships with potential project developers
- Explore the possibility of local ownership shares or of 100% local project ownership

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[7] M. Costanti *'Quantifying the Economic Development Impacts in Six Rural Montana Counties Using NREL's JEDI Model'*. September 2004

- Finance projects (or portions of projects) through local financial institutions
- Take significant steps to get the community behind development so that the likelihood of more than one project being developed and built becomes reality. Multiple projects bring more local opportunity and justify educating a local workforce to meet projects' needs.

5.3 Economic Benefits of Large Onsite Wind Generation

In this subsection, SED has examined the economic savings of large onsite wind power projects in terms of the cost-savings to the systems' owners as well as the economic impacts of the construction and O&M phases to the County's economy. The economic benefits of this type of wind development for the County, beyond those experienced in the construction and O&M phases cannot be accurately quantified without knowing how the potential savings will be spent.

Distributed Generation (DG) wind projects are designed to allow large consumers of electricity to avoid retail electric rates by installing wind turbines onsite that connect behind the utility electric meter. DG wind projects avoid retail electricity rates without having to compete on the wholesale electricity market as is necessary for utility-scale wind farms to be profitable.

The cost savings provided by the onsite wind systems will let these facilities reduce overhead expenditures, providing room for these businesses to grow. In examining these projects to determine economic savings, SED has designed systems that maximize the economic benefits to the turbine owner. On average, the 12 sites examined could save from $300,000 to $1,800,000 each over their project's 25-year life spans with a total of $12,986,000 that will be saved and ideally, reinvested within the County. Sullivan County could see the 'trickle-down' benefits of this cost savings in the form of business growth and increased employment.

In addition, the fulfillment of this onsite wind potential would offset the emission of harmful pollutants normally emitted during the production of a similar amount of electricity by traditional, fuel-based, means. The projects envisioned for these 12 sites would annually offset the emission of: 21,000,000 pounds of Carbon Dioxide; 90,000 pounds of Sulfur Dioxide; and 29,000 pounds of Nitrous Oxide. This offsetting of emissions would be equivalent to planting 422,000 trees or reducing automobile travel by 12.6 million miles.

SED measured the economic impacts of the construction and O&M phases of this level of wind development using the JEDI model by examining a single project of 660kW as being representative of the entire group. This was done because onsite wind development will likely not occur en masse, with project completion being scattered and therefore not providing for the economies of scale usually experienced in utility-scale project construction. In addition, the size of the projects at the 12 identified locations could range from 50kW to 1MW depending upon site-specific data and the maximizing of individual project returns.

SED input the following data into the JEDI model: wind capacity- 660kW; estimated year of construction-2007; wind turbine size- 660kW; number of turbines-1; Construction cost ($/kW)-$2,121; Annual direct O&M costs ($/kW)-$30; and Money value (year)-2007.

The Project Data Summary based on the input values above shows that Sullivan County could expect to experience the following financial impacts from this single turbine project.

- $163,000 in local construction costs – this refers to actual dollars spent on goods and services in the county
    - The actual benefit will depend upon the business capabilities of the county to provide the necessary materials and services that include:
        - Heavy equipment for site preparation and road building
        - Concrete and rebar for turbine foundations
        - Electrical materials and expertise
        - Engineering and legal services
- $12,300 in direct local Operations and Management costs per year

According to the JEDI Model the direct, indirect and induced job creation, earnings and economic output resulting from this level of wind development during the construction phase would be:

- Jobs - 3 full-time equivalent jobs for one year
- Earnings - $120,000 in wages or salary
- Output - $350,000
    - The economic output of this development refers to the economic activity or the value of production in the local economy. This represents the actual dollars spent in the local economy where the project is built on goods and services. The economic output is heavily reliant upon project ownership and local capabilities; local ownership will significantly increase a project's economic output as will the county's ability to supply necessary materials, services and skilled labor without having to attract these project components from outside the county.

During the approximately 25 years in which these wind projects would be operational the annual economic impacts for the direct, indirect and induced job creation, earnings and output would annually amount to:

- Jobs – 1 full-time equivalent jobs for one year
- Earnings - $20,000 in wages or salaries
- Output - $40,000

The working JEDI model can be found in the electronic version of this report. The full Project Data Summary can be found in Appendix V.

The demand for large onsite wind turbine projects is gaining momentum in the American energy market for several reasons. There are a number of state and national policies that have bolstered these wind turbines' competitiveness with respect to conventional electricity generation. These policies include state buy down programs, net-metering, standardized interconnection applications, the emergence of Renewable Portfolio Standards and various tax credits.

Finally, the use of distributed renewables built in modular fashion provides energy security and independence on at least four levels. First, it diversifies our energy mix, making New York State and individual customers less vulnerable to the price volatility of fuels. Second, localized renewables are not subject to international market swings as are fuel-based energy sources. Third, distributed renewables are less vulnerable to supply disruptions due to labor, transportation, or market constraints. Fourth, because of the smaller scale and decentralization of medium sized renewable electricity generation, they are less vulnerable to sabotage or the accidental disruptions experienced by larger fossil fuel and nuclear power plants. If used in a distributed fashion, wind power could support the grid in the case of partial grid failure if the penetration rate were high enough.

5.3.1 Recommendations – Follow On Scope of Works

- Survey identified locations as to how potential savings may be spent.
- Explore additional incentives such as the sale Renewable Energy Credits to or via the County.
- Identify business capabilities and expertise – educate potential materials and service providers as to the benefits their businesses may receive as well as how they may best prepare for this type of work.
- Explore methods for attracting local third party owners and local financing institutions to these projects so that more benefits will remain local.

5.4 Economic Benefits of Small Onsite Wind Generation

The economic savings created by small onsite wind systems would be approximately $31,000 per location over the course of the systems' life spans[8]. SED used preliminary wind speed figures that would likely be used to identify the 150 small wind sites as described earlier in this report and an average retail electricity rate of $.11/kWh in order to calculate the cost savings. As in the examination of the Large Onsite Wind Generation it is difficult to quantify how or where these cost savings will be spent. The argument can be made that this cost savings will eventually make its way back into the local economy in the form of increased consumer spending just as easily as one could argue that the savings will be hidden in individual's basements.

The environmental benefit of fulfilling all 150 sites identified as Sullivan County's small wind potential would be in offsetting the annual emission of: 3 million pounds of Carbon Dioxide; 13,000 pounds of Sulfur Dioxide; and 4,000 pounds of Nitrous Oxide. This offsetting of emissions would be equivalent to planting 61,000 trees or reducing automobile travel by 1.8 million miles per year.

In addition, the installation of one 10kW wind turbine generator would produce the following local economic benefits:

- Foundation – materials (concrete, rebar and forms); equipment; labor = $4,000
- Electrical – wire; conduit; fittings and other electrical supplies = $1,800
- Wire Run – labor and equipment = $2,000
- Crane = $2,000
- Permitting; funding applications; installation; and O&M (5 years) = $5,000
- Total = $14,800

If the entire small wind potential of the County is fulfilled the economic benefit would be $ 2.22 million. The ability of the County to keep this economic benefit from seeping into other regions will depend entirely upon the capabilities and expertise of local businesses.

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[8] This figure assumes: a 10kW Bergey wind turbine generator on a 27m tower; an average wind speed of 5.5 m/s; a 50% rebate from NYSERDA of the total installed cost of $53,150.

5.4.1 Recommendations – Follow On Scope of Works

- Identify business capabilities and expertise – educate potential materials and service providers as to the benefits their businesses may receive as well as how they may best prepare for this type of work.

5.5 Tax Revenue from Utility-Scale Development

The JEDI model calculates local tax payments by first determining the assessed project value as being 85% of the construction cost. The model then determines that the taxable value is 1/3 of this assessed project value. Using a 1% property tax rate yields an annual tax payment of $1.33 million. Over an estimated 25-year project lifespan this would yield $33.25 million in property tax revenues for Sullivan County. This tax rate is likely based on values determined from utility-scale projects in the Mid-West and should be considered a reasonable estimation of the tax conditions in Sullivan County.

New York law states that wind farms are exempt from paying property taxes. However, wind farm developers are obligated to provide some type of payment in lieu of these property tax payments. In New York and other states where similar laws are in place this payment is generally calculated as 3.5-4% of project revenue on an annual basis, although the general figures listed above are probably a good working number at this stage.

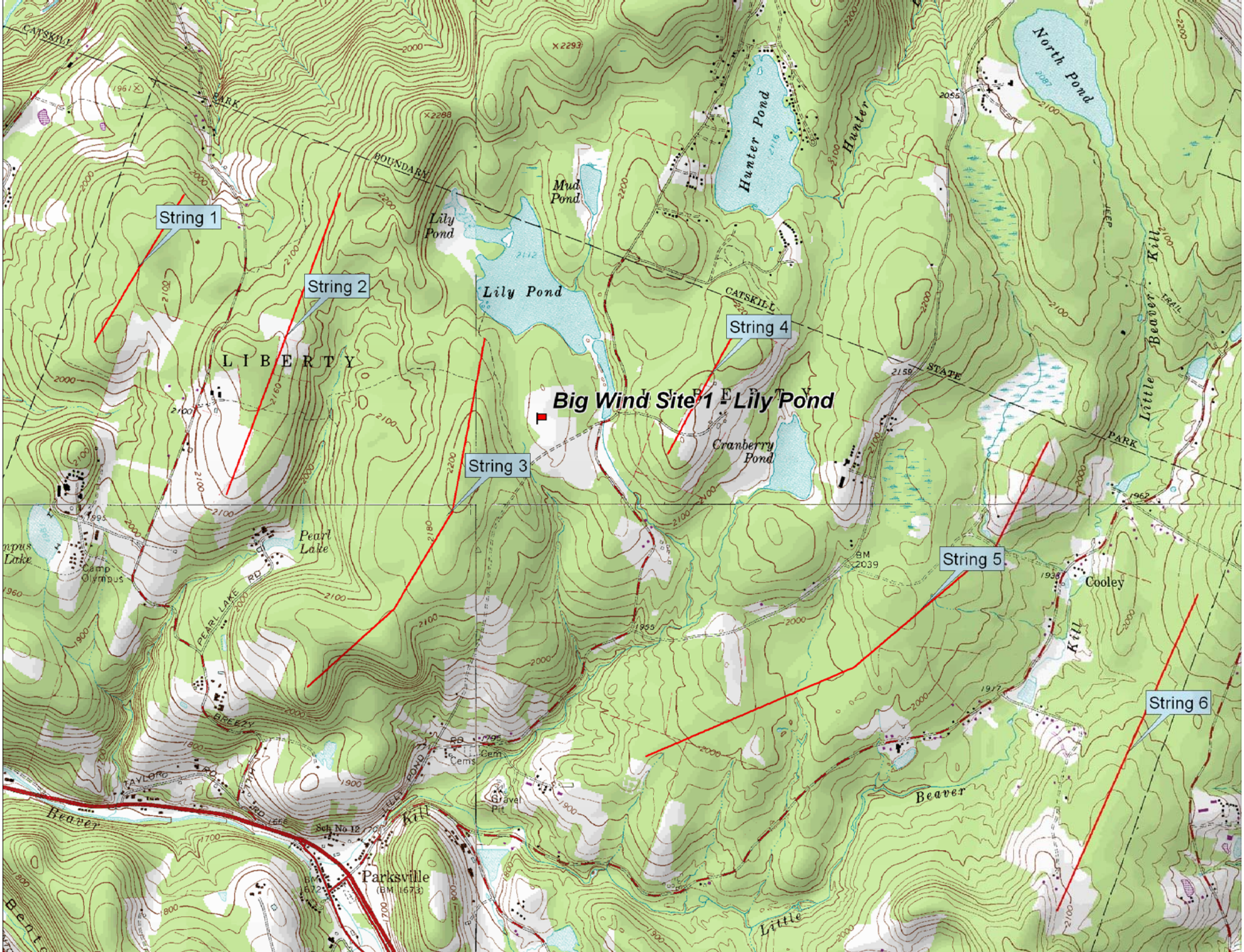
The County should assume that no significant tax revenues would be generated by either the small or onsite wind models because this additional cost will generally increase total project costs beyond an economically viable limit. The additional burden of property taxes onto projects of this scale would likely cause them to not be built.

5.5.1 Recommendations – Follow On Scope of Works

- Evaluate different options for collecting tax payments or payments in lieu of taxes that will maximize the County’s benefit without harming developer’s ability to construct economically viable projects.
    - Survey similar developer and local government relationships in the northeastern markets.

Appendix A

Site 1 – Lily Pond Map


Big Wind Site 1 - Lily Pond
String 1
String 2
String 3
String 4
String 5
String 6
Lily Pond
Mud Pond
Hunter Pond
North Pond
Cranberry Pond
Pearl Lake
LIBERTY
Parksville
Cooley
Camp Olympus
PEARL LAKE RD
Little Beaver Kill
Beaver Kill
CATSKILL PARK BOUNDARY
STATE
Sch No 12
Gravel Pit
Cems
BM 2039

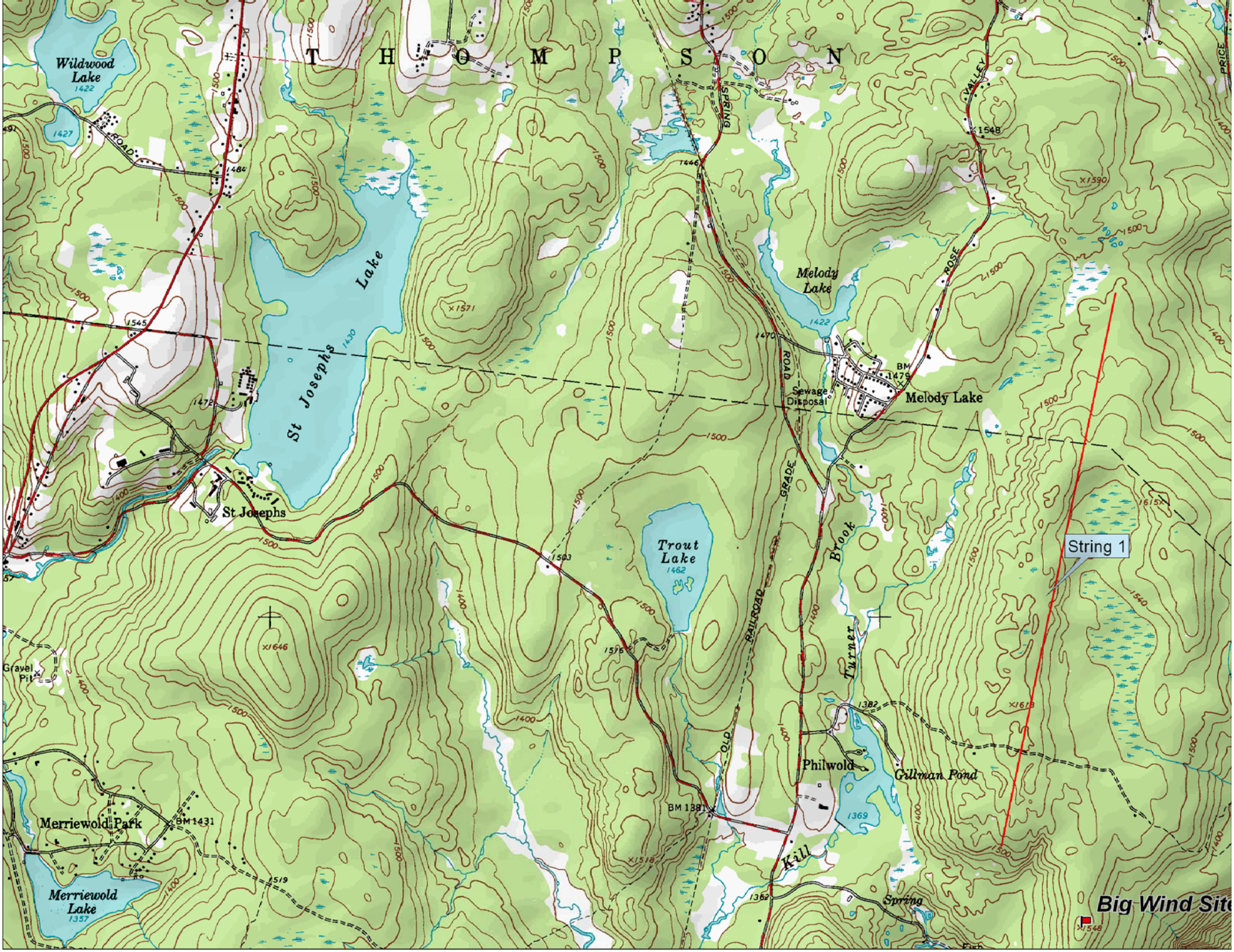
Appendix B

Site 2 – Thunder Hill Map

Big Wind Site 2 - Thunder Hill
Thunder Hill
Radio Tower
NEVERSINK
PARK
RONDOUT
AQUEDUCT
Lake Paradise
NEVERSINK ROAD
HOLLOW
Brook
Grahamsville
Tri Valley Sch
Rural Cem
Gaging Sta
Sewage Disposal
Substa
Powerplant
Creek
Red Brook
Beaverdam Pond
Neversink
Chestnut
Cem

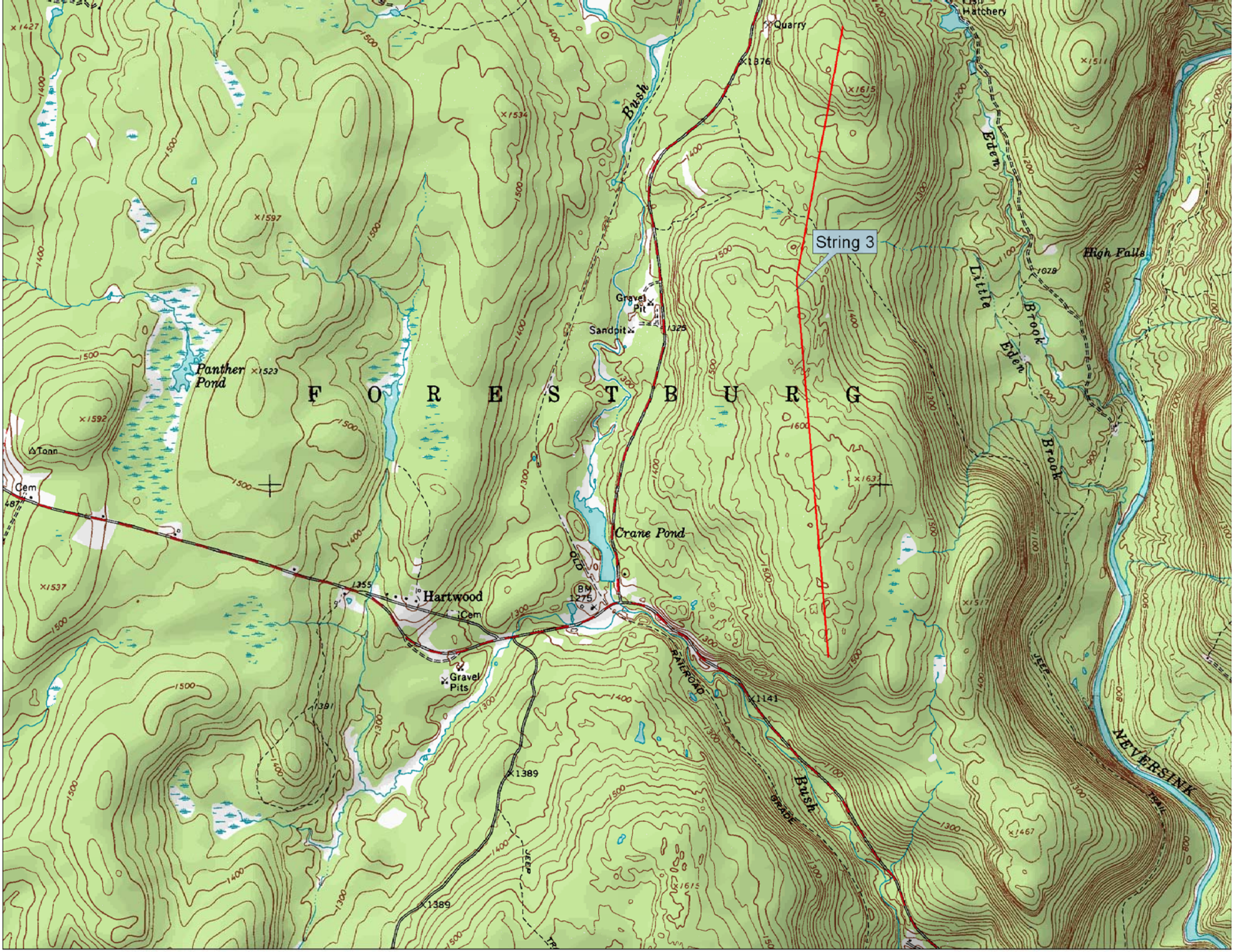
Appendix C

Site 3 – Monticello and Forestburg Map

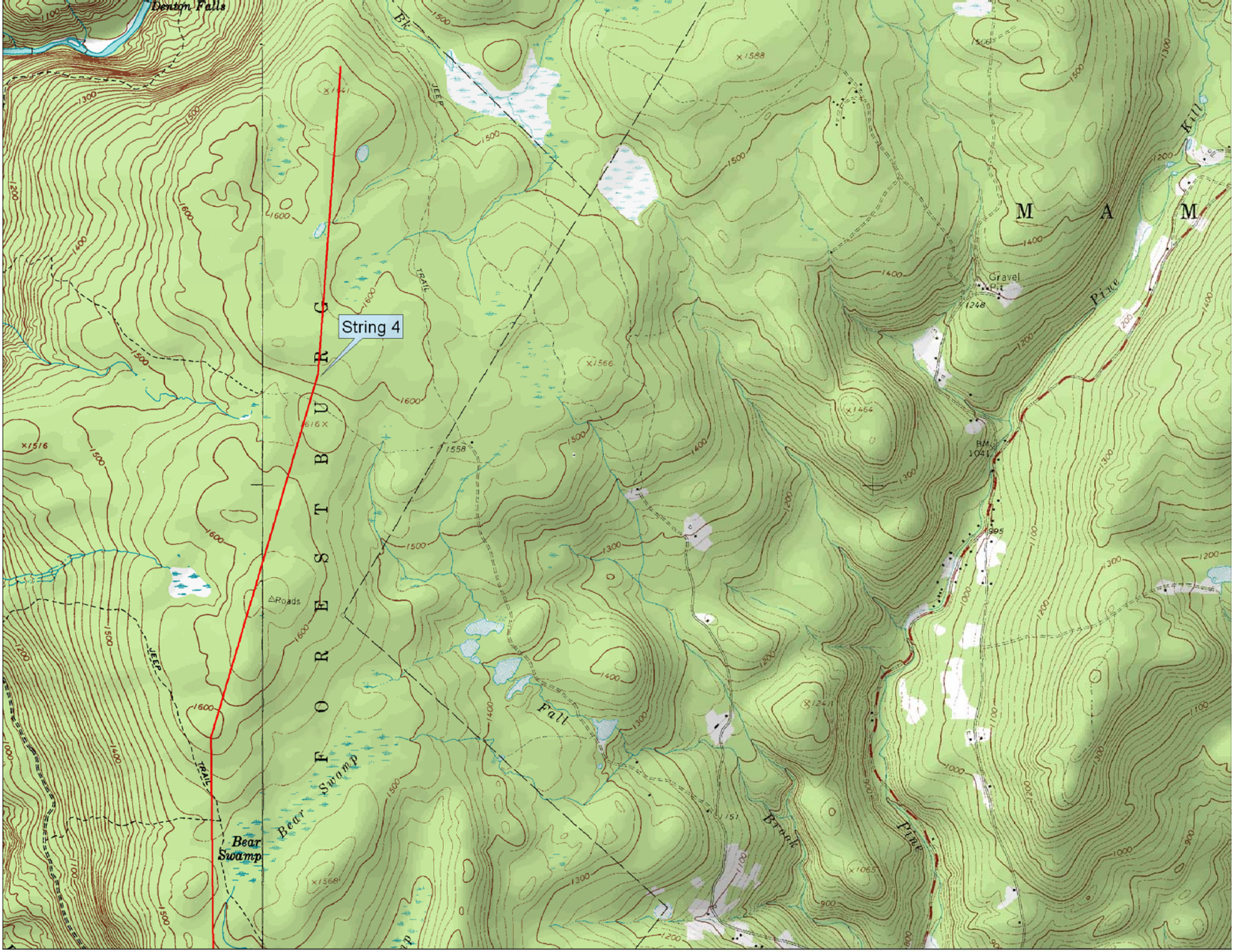


Map Rotation: 0° Magnetic Declination: 13.3°W

Map Rotation: 0° Magnetic Declination: 13.3°W



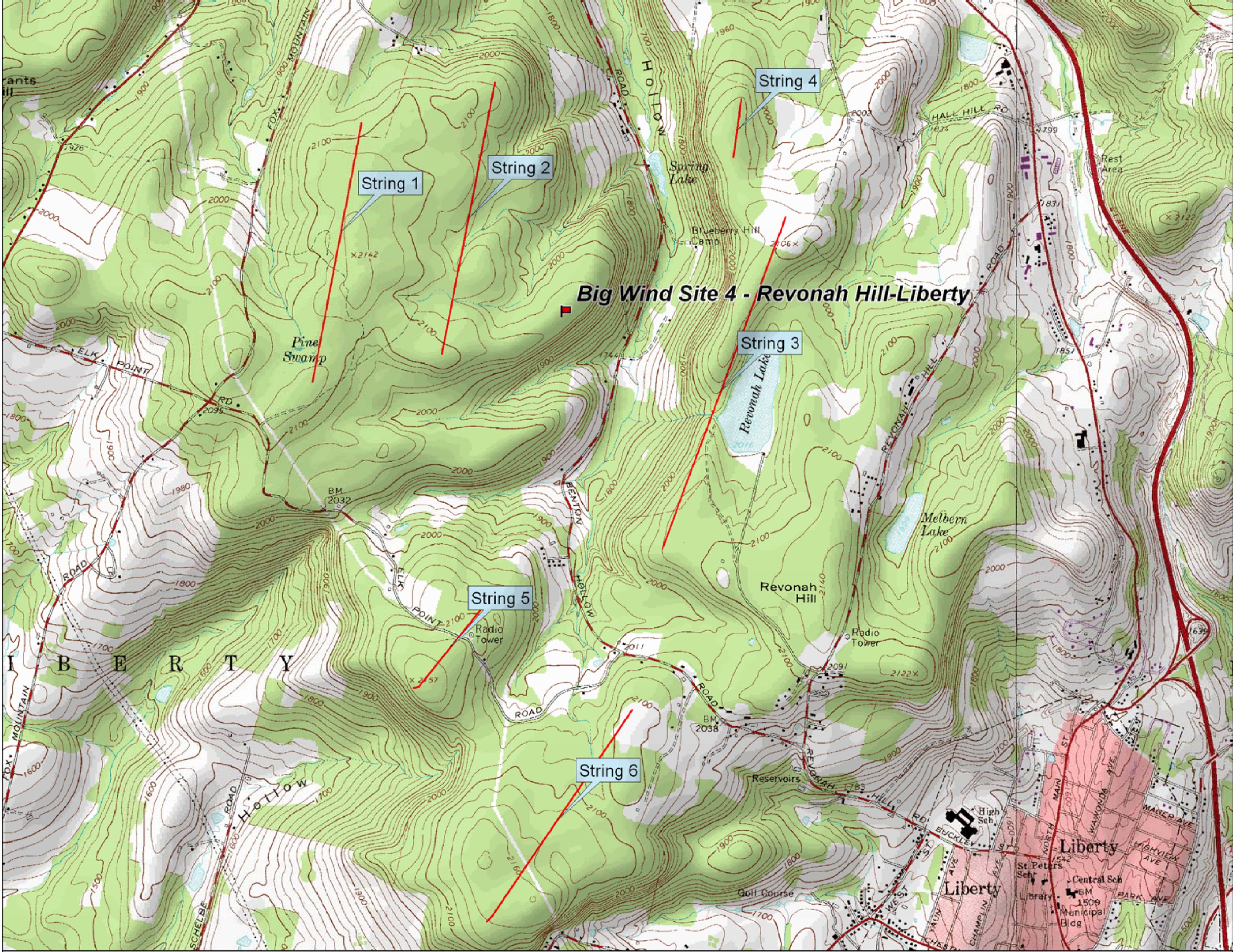
Map Rotation: 0° Magnetic Declination: 13.2°W



Map Rotation: 0° Magnetic Declination: 13.3°W

Appendix D

Site 4 – Revonah Hill-Liberty Map


Big Wind Site 4 - Revonah Hill-Liberty
String 1
String 2
String 3
String 4
String 5
String 6
Pine Swamp
Spring Lake
Blueberry Hill Camp
Revonah Lake
Revonah Hill
Melbern Lake
Radio Tower
Reservoirs
Golf Course
High Sch
Liberty
L I B E R T Y
FOX MOUNTAIN ROAD
ELK POINT RD
BENTON HOLLOW ROAD
REVONAH HILL RD
HALL HILL RD
SCHELBE ROAD
Hollow
Rest Area
BM 2032
BM 2038
BM 1509

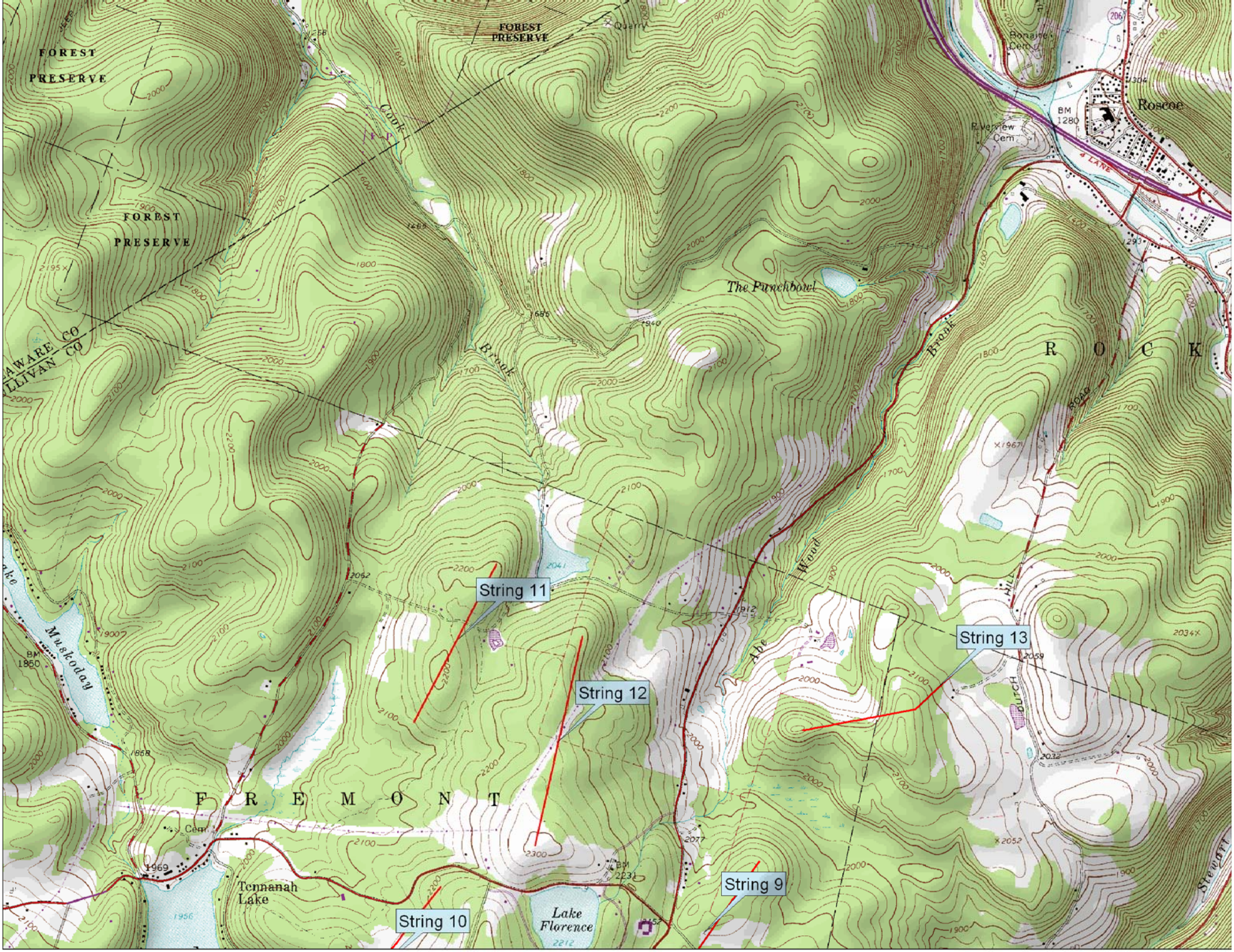
Appendix E

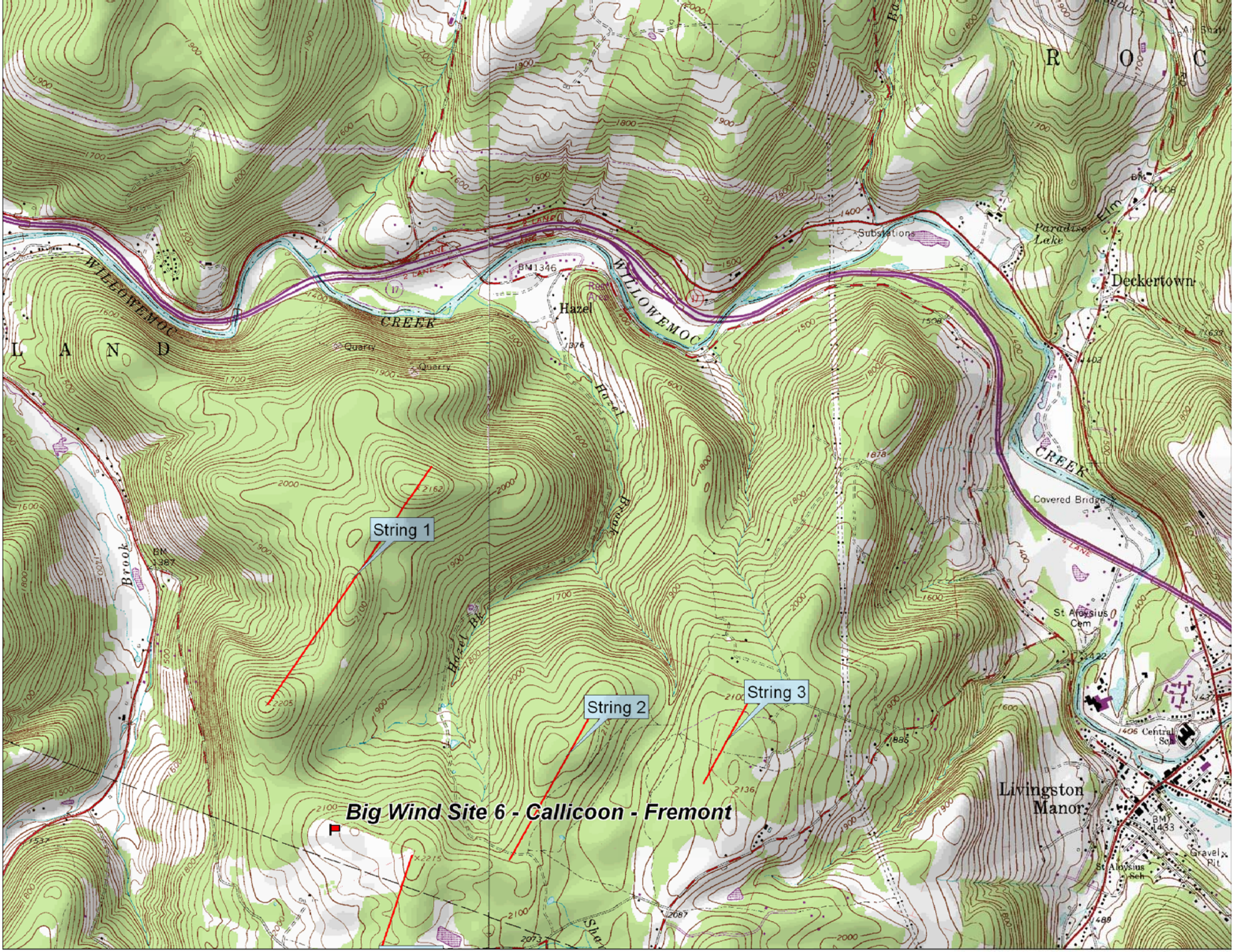
Site 5 – Livingston Manor Map

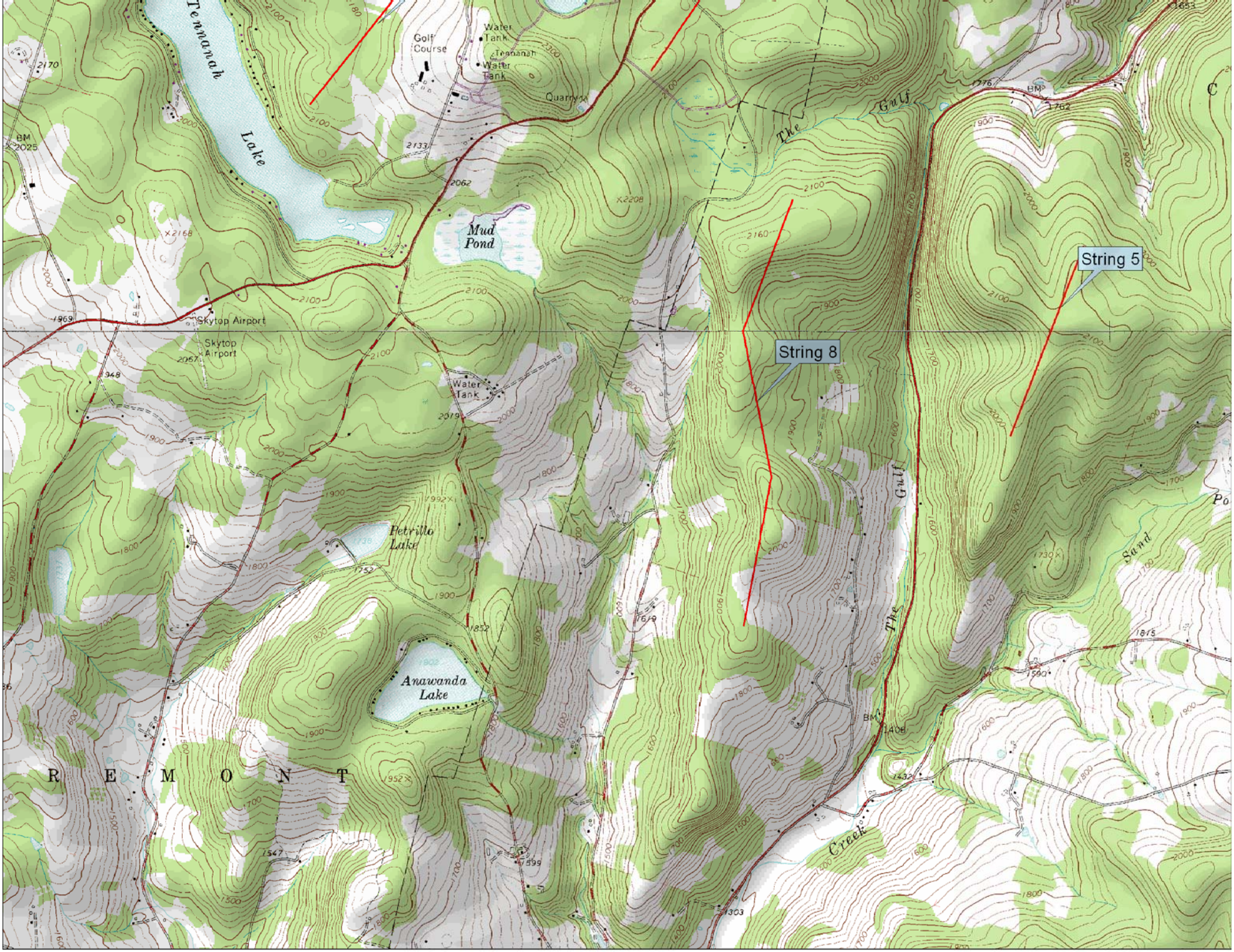

Big Wind Site 5 - Livingston Manor
String 1
String 2
String 1
Lenape Lake
Matawa Lake
Denman Lake
Pine Swamp
Pine Swamp
Grants Hill
LIBERTY
ROCKLAND
LICOON
Cattail Brook
INTERCHANGE 97
LENAPE
FOX MOUNTAIN
KLEIN

Appendix F

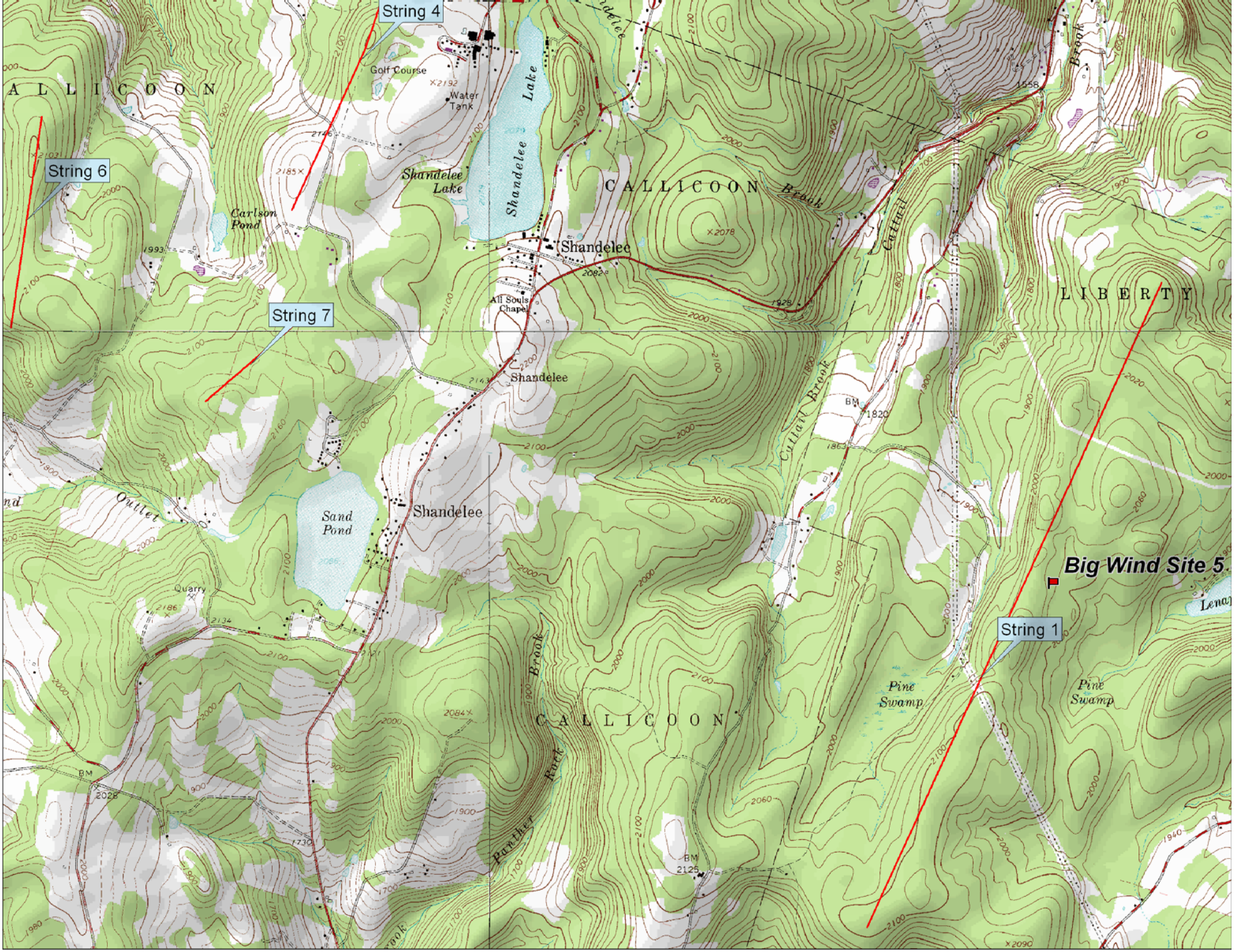
Site 6 – Callicoon-Fremont Map


FOREST
PRESERVE
FOREST
PRESERVE
FOREST
PRESERVE
Quarry
Roscoe
Riverview
Cem
Bonaire
Cem
Cook
Brook
The Punchbowl
R O C K
F R E M O N T
Muskoday
Tennanah
Lake
Lake
Florence
Abe
Wood
Brook
DUTCH
HILL
ROAD
Stewart
String 9
String 10
String 11
String 12
String 13


Big Wind Site 6 - Callicoon - Fremont
String 1
String 2
String 3
WILLOWEMOC
CREEK
Hazel
Deckertown
Paradise Lake
Substations
Covered Bridge
St Aloysius Cem
Livingston Manor
Quarry
Brook
Hazel Bk



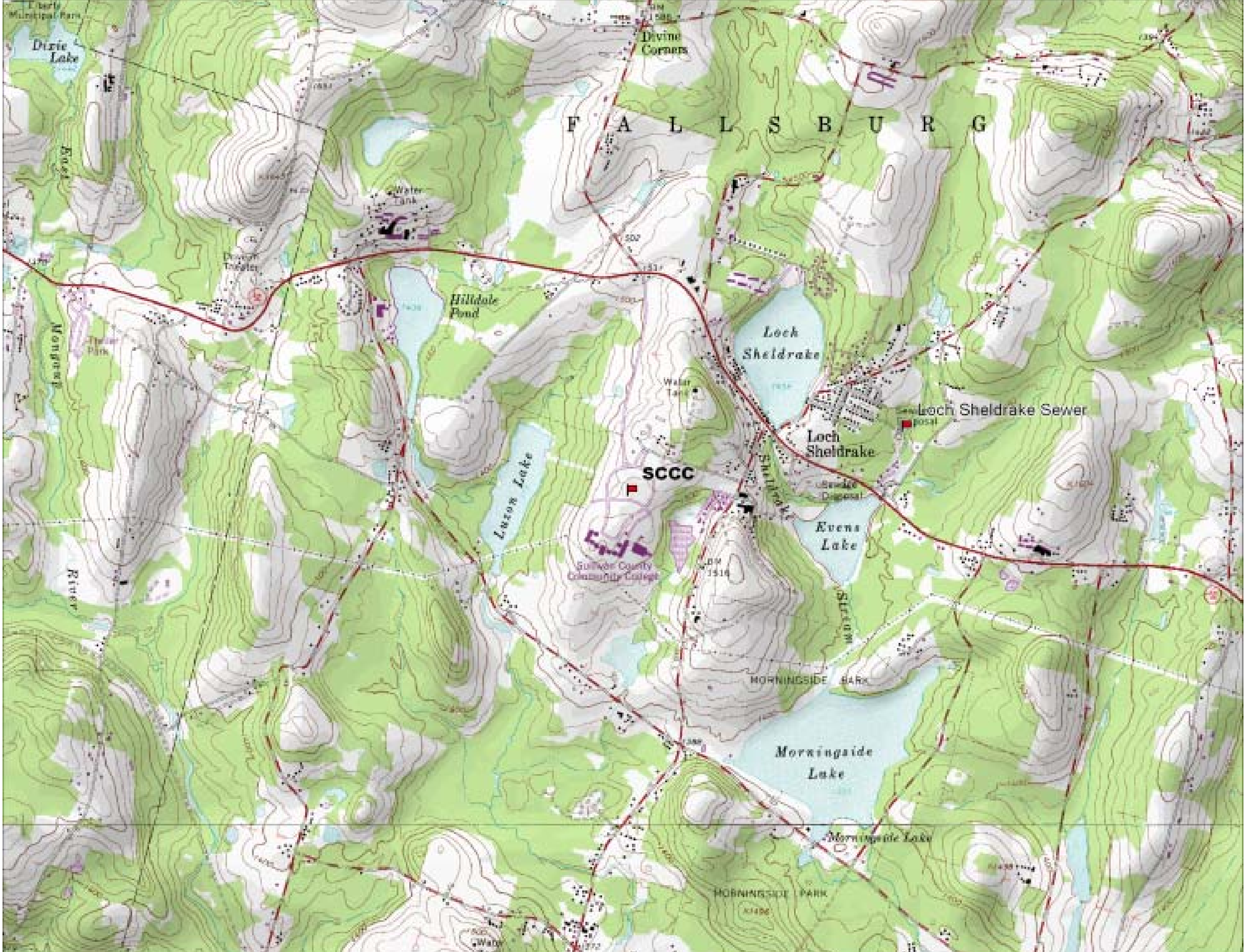
Map Rotation: 0° Magnetic Declination: 13.2°W



Map Rotation: 0° Magnetic Declination: 13.2°W

Appendix G

Sullivan County Community College


Dixie Lake
Divine Corners
F A L L S B U R G
Water Tank
Hilldale Pond
Loch Sheldrake
Loch Sheldrake Sewer
Loch Sheldrake
Water Tank
SCCC
Luzon Lake
Sullivan County Community College
Evens Lake
Stream
East Mongaup River
MORNINGSIDE PARK
Morningside Lake
Morningside Lake
MORNINGSIDE PARK

WindCad Turbine Performance Model

Fuhrlaender FL 1000^{PLUS} Wind Turbine, 58 m rotor diameter

Prepared For:	**SCCC**
Site Location:	**Campus**
Data Source:	**Truewind**
Date:	**4/29/2005**

1000 kW

Inputs:

Ave. Wind (m/s) =	6.356
Weibull K =	2.201
Site Altitude (m) =	458
Wind Shear Exp. =	0.180
Anem. Height (m) =	65
Tower Height (m) =	80
Turbulence Factor =	20.0%

Results:

Hub Average Wind Speed (m/s) =	6.60
Air Density Factor =	-4%
Average Output Power (kW) =	217.65
Daily Energy Output (kWh) =	**5223.5**
Annual Energy Output (kWh) =	1,906,582
Monthly Energy Output =	158,882
Percent Operating Time =	82.6%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.64%	0.000
2	0.00	5.82%	0.000
3	0.00	8.74%	0.000
4	22.22	10.94%	2.432
5	54.41	12.15%	6.612
6	105.76	12.29%	13.000
7	182.39	11.48%	20.937
8	276.66	9.97%	27.588
9	388.55	8.10%	31.455
10	515.76	6.16%	31.766
11	659.07	4.40%	28.993
12	767.13	2.95%	22.653
13	767.13	1.86%	14.302
14	767.13	1.11%	8.495
15	767.13	0.62%	4.748
16	767.13	0.33%	2.498
17	767.13	0.16%	1.236
18	767.13	0.08%	0.576
19	767.13	0.03%	0.252
20	767.13	0.01%	0.104
	Totals:	99.85%	217.646

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Inputs

Average Wind Speed:	Use annual or monthly average wind speeds.
Weibull K Factor:	K=2 is used for inland sites, K=3 for coastal sites, K=4 for island sites and trade wind regimes.
Site Altitude:	In meters above sea Level.
Wind Shear Exponent	1/7 or 0.143 is used for normal terrain, 0.167 for rough terrain, 0.110 for open water.
Anemometer Height	Is the sensor height at which the average wind speed was measured.
Tower Height	Is nominal hub height.
Turbulence Factor:	Is for derating for turbulence, wire run losses and other performance influencing factors.

Results

Hub Ave. Wind Speed	Is corrected for wind shear and used to calculate the Weibull wind speed probability.
Air Density Factor	Is the reduction from sea level performance.
Average Power Output	Is the average 24-hour power produced, without the performance safety margin adjustment.
Daily Energy Output	Includes all deratings and is the primary performance parameter.
Monthly Energy Output	Is calculated from Daily Energy Output.
Annual Energy Output	Is calculated from Daily Energy Output.
Percent Operating Time	Is the time the wind turbine should be producing some power.

Use only with annual or monthly averages wind speeds to get proper long term Weibull distribution curve calculations.

SCCC Cashflow

Assumptions (Inputs)

Project Size (MW):	1
Annual Energy Output (kWh):	1,900,000
Energy Savings Value ($/kWh):	$0.0700
Energy Inflation Rate (%):	4
PPA Price ($/kWh):	$0.0700
PPA Escalator(%):	1
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years):	8
Green Tag Ownership(%):	33
Property Tax Rate (%):	0

Year	Energy Savings from Utility	Energy Payment to Third Party	Green Tag Revenue	Annual Cashflow	Project Cumulative Cashflow
1	$133,000.00	-$133,000.00	$12,540.00	$12,540.00	$12,540.00
2	$138,320.00	-$134,330.00	$12,540.00	$16,530.00	$29,070.00
3	$143,852.80	-$135,673.30	$12,540.00	$20,719.50	$49,789.50
4	$149,606.91	-$137,030.03	$12,540.00	$25,116.88	$74,906.38
5	$155,591.19	-$138,400.33	$12,540.00	$29,730.86	$104,637.23
6	$161,814.84	-$139,784.34	$12,540.00	$34,570.50	$139,207.73
7	$168,287.43	-$141,182.18	$12,540.00	$39,645.25	$178,852.98
8	$175,018.93	-$142,594.00	$12,540.00	$44,964.92	$223,817.91
9	$182,019.68	-$144,019.94	$0.00	$37,999.74	$261,817.65
10	$189,300.47	-$145,460.14	$0.00	$43,840.33	$305,657.98
11	$196,872.49	-$146,914.74	$0.00	$49,957.75	$355,615.73
12	$204,747.39	-$148,383.89	$0.00	$56,363.50	$411,979.23
13	$212,937.29	-$149,867.73	$0.00	$63,069.56	$475,048.78
14	$221,454.78	-$151,366.41	$0.00	$70,088.37	$545,137.15
15	$230,312.97	-$152,880.07	$0.00	$77,432.90	$622,570.05
16	$239,525.49	-$154,408.87	$0.00	$85,116.62	$707,686.66
17	$249,106.51	-$155,952.96	$0.00	$93,153.55	$800,840.21
18	$259,070.77	-$157,512.49	$0.00	$101,558.28	$902,398.49
19	$269,433.60	-$159,087.61	$0.00	$110,345.98	$1,012,744.47
20	$280,210.94	-$160,678.49	$0.00	$119,532.45	$1,132,276.92
21	$291,419.38	-$162,285.28	$0.00	$129,134.10	$1,261,411.02
22	$303,076.15	-$163,908.13	$0.00	$139,168.03	$1,400,579.05
23	$315,199.20	-$165,547.21	$0.00	$149,651.99	$1,550,231.04
24	$327,807.17	-$167,202.68	$0.00	$160,604.49	$1,710,835.52
25	$340,919.45	-$168,874.71	$0.00	$172,044.75	$1,882,880.27

FL 1000+ on 80m Tower

Prepared for: **SCCC**
Date: **4/29/2005**

Third Party Financed

Assumptions (Inputs)

Project Size (MW):	1
Total Installed Cost ($):	$2,000,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	1,900,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	1
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	67
Loan Downpayment (%):	35
Down Payment ($):	$700,000
Amount of Loan ($):	$1,235,000
Interest Rate (%):	6.5
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0.018
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	5.00
State Tax Credit (%):	0
Federal Tax Credit (%):	0

Results

Loan Payments

Monthly Payment ($):	($14,023)
Value of Interest Deduction ($):	$1,378
Net Monthly Payment ($):	($12,645)

Ave. Monthly Savings on Bill

Year 1 ($):	$11,083
Year 10 ($):	$12,243
Year 20 ($):	$13,524
Year 25 ($):	$14,939

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($665,000)	($665,000)
1	$133,000	$25,460	($19,000)	($10,000)	($151,744)	$292,600	$34,200	$0	$0	$304,516	($360,484)
2	$134,330	$25,460	($19,570)	($10,300)	($151,744)	$148,960	$34,200	$0	$0	$161,336	($199,147)
3	$135,673	$25,460	($20,157)	($10,609)	($151,744)	$89,376	$34,200	$0	$0	$102,200	($96,948)
4	$137,030	$25,460	($20,762)	($10,927)	($151,744)	$53,626	$34,200	$0	$0	$66,883	($30,065)
5	$138,400	$25,460	($21,385)	($11,255)	($151,744)	$53,626	$34,200	$0	$0	$67,303	$37,238
6	$139,784	$25,460	($22,026)	($11,593)	($151,744)	$26,879	$34,200	$0	$0	$40,961	$78,199
7	$141,182	$25,460	($22,687)	($11,941)	($151,744)	$0	$34,200	$0	$0	$14,471	$92,670
8	$142,594	$25,460	($23,368)	($12,299)	($151,744)	$0	$34,200	$0	$0	$14,844	$107,514
9	$144,020	$0	($24,069)	($12,668)	($151,744)	$0	$34,200	$0	$0	($10,260)	$97,254
10	$145,460	$0	($24,791)	($13,048)	($151,744)	$0	$34,200	$0	$0	($9,922)	$87,333
11	$146,915	$0	($25,534)	($13,439)	$0	$0	$0	$0	($37,779)	$70,162	$157,494
12	$148,384	$0	($26,300)	($13,842)	$0	$0	$0	$0	($37,884)	$70,357	$227,851
13	$149,868	$0	($27,089)	($14,258)	$0	$0	$0	$0	($37,982)	$70,538	$298,389
14	$151,366	$0	($27,902)	($14,685)	$0	$0	$0	$0	($38,073)	$70,706	$369,096
15	$152,880	$0	($28,739)	($15,126)	$0	$0	$0	$0	($38,155)	$70,860	$439,955
16	$154,409	$0	($29,601)	($15,580)	$0	$0	$0	$0	($38,230)	$70,998	$510,954
17	$155,953	$0	($30,489)	($16,047)	$0	$0	$0	$0	($38,296)	$71,121	$582,074
18	$157,512	$0	($31,404)	($16,528)	$0	$0	$0	$0	($38,353)	$71,227	$653,301
19	$159,088	$0	($32,346)	($17,024)	$0	$0	$0	$0	($38,401)	$71,316	$724,617
20	$160,678	$0	($33,317)	($17,535)	$0	$0	$0	$0	($38,439)	$71,387	$796,005
21	$162,285	$0	($34,316)	($18,061)	$0	$0	$0	$0	($38,468)	$71,440	$867,445
22	$163,908	$0	($35,346)	($18,603)	$0	$0	$0	$0	($38,486)	$71,474	$938,919
23	$165,547	$0	($36,406)	($19,161)	$0	$0	$0	$0	($38,493)	$71,487	$1,010,406
24	$167,203	$0	($37,498)	($19,736)	$0	$0	$0	$0	($38,489)	$71,480	$1,081,885
25	$168,875	$0	($38,623)	($20,328)	$0	$0	$0	$0	($38,473)	$71,450	$1,153,336

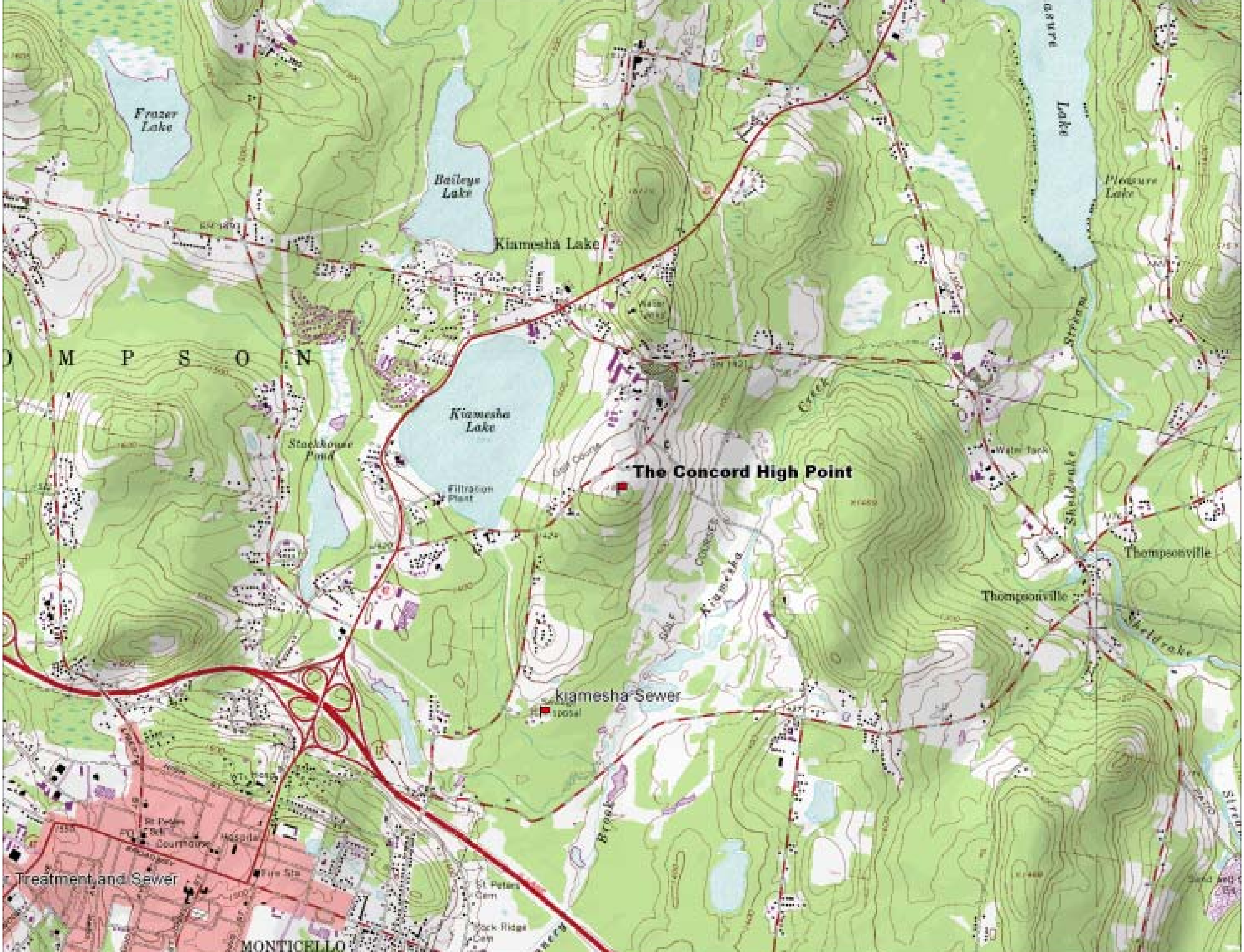
Blue shading indicates a column that shows a tax value not a cash transaction

Internal Rate of Retrurn

Years 1 - 25:	14.4%

Appendix H

The Concord



Frazer Lake
Baileys Lake
Kiamesha Lake
O M P S O N
Kiamesha Lake
Stackhouse Pond
Filtration Plant
The Concord High Point
Creek
Kiamesha
Kiamesha Sewer
Water Tank
Stream
Pleasure Lake
Lake
Thompsonville
Thompsonville
Sheldrake
Brook
Treatment and Sewer
Hospital
Courthouse
Fire Sta
St Peters Cem
Rock Ridge Cem
MONTICELLO

WindCad Turbine Performance Model

Vestas V47 on 65m Tower

Prepared For:	**The Concord**
Site Location:	**The Concord**
Data Source:	**Truewind**
Date:	**4/29/2005**

660 kW

Inputs:

Ave. Wind (m/s) =	6.56
Weibull K =	2.197
Site Altitude (m) =	457
Wind Shear Exp. =	0.220
Anem. Height (m) =	65
Tower Height (m) =	65
urbulence Intensity =	20.0%

Results:

Hub Average Wind Speed (m/s) =	6.56
Air Density Factor =	-4%
Average Output Power (kW) =	136.18
Daily Energy Output (kWh) =	3268.3
Annual Energy Output (kWh) =	**1,192,916**
Monthly Energy Output =	99,410
Percent Operating Time =	91.2%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.69%	0.000
2	0.00	5.91%	0.000
3	0.00	8.85%	0.000
4	4.06	11.05%	0.449
5	34.41	12.23%	4.209
6	73.12	12.33%	9.016
7	123.40	11.47%	14.160
8	185.48	9.93%	18.419
9	255.99	8.03%	20.553
10	326.50	6.08%	19.856
11	391.65	4.32%	16.932
12	442.23	2.89%	12.771
13	475.19	1.81%	8.618
14	493.59	1.07%	5.288
15	501.25	0.60%	2.985
16	504.32	0.31%	1.570
17	505.85	0.15%	0.775
18	505.85	0.07%	0.358
19	505.85	0.03%	0.156
20	505.85	0.01%	0.064
2000, BWC	Totals:	99.84%	136.178

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Instructions:

Inputs: Use annual or monthly **Average Wind** speeds. If **Weibull K** is not known, use K = 2 for inland sites, use 3 for coastal sites, and use 4 for island sites and trade wind regimes. **Site Altitude** is meters above sea level. **Wind Shear Exponent** is best assumed as "1/7" or 0.143. For rough terrain or high turbulence use 0.18. For very smooth terrain or open water use 0.110. **Anemometer Height** is for the data used for the **Average Wind** speed. If unknown, use 10 meters. **Tower Height** is the nominal height, eg.: 24 meters. **Turbulence Factor** is a derating for turbulence, product variability, and other performance influencing factors. Use 0.1 (10%) - 0.15 (15%) is most cases. Setting this factor to 0% will over-predict performance for most situations.

Results: Hub Average Wind Speed is corrected for wind shear and used to calculate the Weibull wind speed probability. **Air Density Factor** is the reduction from sea level performance. **Average Power Output** is the average continuous equivalent output of the turbine. **Daily Energy Output** is the average energy produced per day. **Annual** and **Monthly Energy Outputs** are calculated using the Daily value. **Percent Operating Time** is the time the turbine should be producing some power.

Limitations: This model uses a mathmatical idealization of the wind speed probability. The validity of this assumption is reduced as the time period under consideration (ie, the wind speed averaging period) is reduced. This model is best used with annual or monthly average wind speeds. Use of this model with daily or hourly average wind speed data is not recommended because the wind will not follow a Weibull distribution over short periods. Consult Bergey Windpower Co. for special needs. ***Your performance may vary.***

Vestas V47 on 65m Tower

Prepared for: **The Concord**
Date: **4/29/2005**

Self Financed

Assumptions (Inputs)

Project Size (MW):	0.66
Total Installed Cost ($):	$1,400,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	1,190,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	3
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	100
Loan Downpayment (%):	35
Down Payment ($):	$490,000
Amount of Loan ($):	$618,800
Interest Rate (%):	6.5
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	7.00
State Tax Credit (%):	0
Federal Tax Credit (%):	25

Results

Loan Payments

Monthly Payment ($):	($7,026)
Value of Interest Deduction ($):	$690
Net Monthly Payment ($):	($6,336)

Ave. Monthly Savings on Bill

Year 1 ($):	$6,942
Year 10 ($):	$9,329
Year 20 ($):	$12,537
Year 25 ($):	$16,849

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($341,775)	($341,775)
1	$83,300	$23,800	($11,900)	($6,600)	($76,032)	$150,381	$0	$0	$0	$162,949	($178,826)
2	$85,799	$23,800	($12,257)	($6,798)	($76,032)	$76,558	$0	$0	$0	$91,070	($87,755)
3	$88,373	$23,800	($12,625)	($7,002)	($76,032)	$45,935	$0	$0	$0	$62,449	($25,306)
4	$91,024	$23,800	($13,003)	($7,212)	($76,032)	$27,561	$0	$0	$0	$46,138	$20,832
5	$93,755	$23,800	($13,394)	($7,428)	($76,032)	$27,561	$0	$0	$0	$48,262	$69,094
6	$96,568	$23,800	($13,795)	($7,651)	($76,032)	$13,815	$0	$0	$0	$36,704	$105,798
7	$99,465	$23,800	($14,209)	($7,881)	($76,032)	$0	$0	$0	$0	$25,143	$130,941
8	$102,448	$23,800	($14,635)	($8,117)	($76,032)	$0	$0	$0	$0	$27,464	$158,405
9	$105,522	$0	($15,075)	($8,361)	($76,032)	$0	$0	$0	$0	$6,055	$164,461
10	$108,688	$0	($15,527)	($8,612)	($76,032)	$0	$0	$0	$0	$8,518	$172,978
11	$111,948	$0	($15,993)	($8,870)	$0	$0	$0	$0	$0	$87,086	$260,064
12	$115,307	$0	($16,472)	($9,136)	$0	$0	$0	$0	$0	$89,698	$349,763
13	$118,766	$0	($16,967)	($9,410)	$0	$0	$0	$0	$0	$92,389	$442,152
14	$122,329	$0	($17,476)	($9,692)	$0	$0	$0	$0	$0	$95,161	$537,313
15	$125,999	$0	($18,000)	($9,983)	$0	$0	$0	$0	$0	$98,016	$635,329
16	$129,779	$0	($18,540)	($10,283)	$0	$0	$0	$0	$0	$100,956	$736,285
17	$133,672	$0	($19,096)	($10,591)	$0	$0	$0	$0	$0	$103,985	$840,270
18	$137,682	$0	($19,669)	($10,909)	$0	$0	$0	$0	$0	$107,105	$947,374
19	$141,813	$0	($20,259)	($11,236)	$0	$0	$0	$0	$0	$110,318	$1,057,692
20	$146,067	$0	($20,867)	($11,573)	$0	$0	$0	$0	$0	$113,627	$1,171,319
21	$150,449	$0	($21,493)	($11,920)	$0	$0	$0	$0	$0	$117,036	$1,288,355
22	$154,963	$0	($22,138)	($12,278)	$0	$0	$0	$0	$0	$120,547	$1,408,902
23	$159,611	$0	($22,802)	($12,646)	$0	$0	$0	$0	$0	$124,164	$1,533,066
24	$164,400	$0	($23,486)	($13,026)	$0	$0	$0	$0	$0	$127,888	$1,660,954
25	$169,332	$0	($24,190)	($13,416)	$0	$0	$0	$0	$0	$131,725	$1,792,679

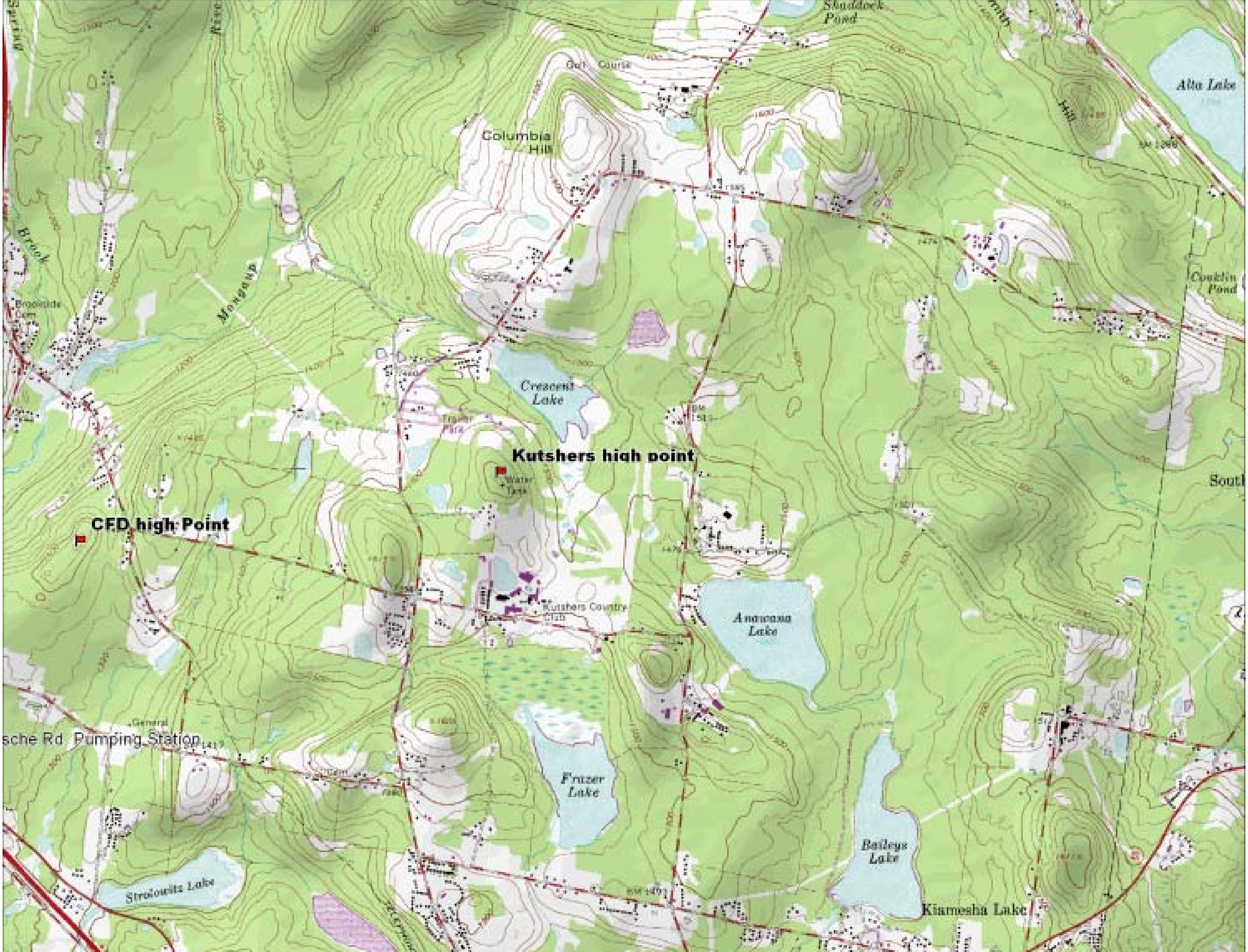
Blue shading indicates a column that shows a tax value not a cash transaction

Internal Rate of Return

Years 1 - 25:	22.7%

Appendix I

Kutshers


Kutshers high point
CFD high Point
Columbia Hill
Crescent Lake
Anawana Lake
Frazer Lake
Baileys Lake
Kiamesha Lake
Strolowitz Lake
Alta Lake
Shaddock Pond
Conklin Pond
Mongaup
Brook
Brookside Cem
Water Tank
Kutshers Country Club
sche Rd Pumping Station
General
Golf Course
South

WindCad Turbine Performance Model

Vestas V47 on 65m Tower

Prepared For:	**Kutshers**
Site Location:	**Kutshers**
Data Source:	**Truewind**
Date:	**4/29/2005**

660 kW

Inputs:	
Ave. Wind (m/s) =	6.67
Weibull K =	2.197
Site Altitude (m) =	457
Wind Shear Exp. =	0.180
Anem. Height (m) =	85
Tower Height (m) =	65
urbulence Intensity =	20.0%

Results:	
Hub Average Wind Speed (m/s) =	6.36
Air Density Factor =	-4%
Average Output Power (kW) =	126.68
Daily Energy Output (kWh) =	3040.4
Annual Energy Output (kWh) =	**1,109,747**
Monthly Energy Output =	92,479
Percent Operating Time =	90.6%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.89%	0.000
2	0.00	6.31%	0.000
3	0.00	9.39%	0.000
4	4.06	11.62%	0.472
5	34.41	12.71%	4.375
6	73.12	12.63%	9.233
7	123.40	11.54%	14.234
8	185.48	9.77%	18.114
9	255.99	7.70%	19.705
10	326.50	5.66%	18.491
11	391.65	3.90%	15.259
12	442.23	2.51%	11.096
13	475.19	1.51%	7.191
14	493.59	0.86%	4.221
15	501.25	0.45%	2.270
16	504.32	0.22%	1.133
17	505.85	0.10%	0.529
18	505.85	0.05%	0.230
19	505.85	0.02%	0.094
20	505.85	0.01%	0.036
2000, BWC	Totals:	99.83%	126.683

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Instructions:

Inputs: Use annual or monthly **Average Wind** speeds. If **Weibull K** is not known, use K = 2 for inland sites, use 3 for coastal sites, and use 4 for island sites and trade wind regimes. **Site Altitude** is meters above sea level. **Wind Shear Exponent** is best assumed as "1/7" or 0.143. For rough terrain or high turbulence use 0.18. For very smooth terrain or open water use 0.110. **Anemometer Height** is for the data used for the **Average Wind** speed. If unknown, use 10 meters. **Tower Height** is the nominal height, eg.: 24 meters. **Turbulence Factor** is a derating for turbulence, product variability, and other performance influencing factors. Use 0.1 (10%) - 0.15 (15%) is most cases. Setting this factor to 0% will over-predict performance for most situations.

Results: Hub Average Wind Speed is corrected for wind shear and used to calculate the Weibull wind speed probability. **Air Density Factor** is the reduction from sea level performance. **Average Power Output** is the average continuous equivalent output of the turbine. **Daily Energy Output** is the average energy produced per day. **Annual** and **Monthly Energy Outputs** are calculated using the Daily value. **Percent Operating Time** is the time the turbine should be producing some power.

Limitations: This model uses a mathmatical idealization of the wind speed probability. The validity of this assumption is reduced as the time period under consideration (ie, the wind speed averaging period) is reduced. This model is best used with annual or monthly average wind speeds. Use of this model with daily or hourly average wind speed data is not recommended because the wind will not follow a Weibull distribution over short periods. Consult Bergey Windpower Co. for special needs. ***Your performance may vary.***

Vestas V47 on 65m Tower

Prepared for: **Kutshers**
Date: **4/29/2005**

Self Financed

Assumptions (Inputs)

Project Size (MW):	0.66
Total Installed Cost ($):	$1,400,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	1,100,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	3
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	100
Loan Downpayment (%):	35
Down Payment ($):	$490,000
Amount of Loan ($):	$618,800
Interest Rate (%):	6.5
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	7.00
State Tax Credit (%):	0
Federal Tax Credit (%):	25

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($341,775)	($341,775)
1	$77,000	$22,000	($11,000)	($6,600)	($76,032)	$150,381	$0	$0	$0	$155,749	($186,026)
2	$79,310	$22,000	($11,330)	($6,798)	($76,032)	$76,558	$0	$0	$0	$83,708	($102,317)
3	$81,689	$22,000	($11,670)	($7,002)	($76,032)	$45,935	$0	$0	$0	$54,921	($47,397)
4	$84,140	$22,000	($12,020)	($7,212)	($76,032)	$27,561	$0	$0	$0	$38,437	($8,960)
5	$86,664	$22,000	($12,381)	($7,428)	($76,032)	$27,561	$0	$0	$0	$40,384	$31,425
6	$89,264	$22,000	($12,752)	($7,651)	($76,032)	$13,815	$0	$0	$0	$28,644	$60,069
7	$91,942	$22,000	($13,135)	($7,881)	($76,032)	$0	$0	$0	$0	$16,895	$76,964
8	$94,700	$22,000	($13,529)	($8,117)	($76,032)	$0	$0	$0	$0	$19,023	$95,987
9	$97,541	$0	($13,934)	($8,361)	($76,032)	$0	$0	$0	$0	($785)	$95,201
10	$100,468	$0	($14,353)	($8,612)	($76,032)	$0	$0	$0	$0	$1,472	$96,673
11	$103,482	$0	($14,783)	($8,870)	$0	$0	$0	$0	$0	$79,829	$176,502
12	$106,586	$0	($15,227)	($9,136)	$0	$0	$0	$0	$0	$82,223	$258,726
13	$109,784	$0	($15,683)	($9,410)	$0	$0	$0	$0	$0	$84,690	$343,416
14	$113,077	$0	($16,154)	($9,692)	$0	$0	$0	$0	$0	$87,231	$430,647
15	$116,469	$0	($16,638)	($9,983)	$0	$0	$0	$0	$0	$89,848	$520,494
16	$119,963	$0	($17,138)	($10,283)	$0	$0	$0	$0	$0	$92,543	$613,038
17	$123,562	$0	($17,652)	($10,591)	$0	$0	$0	$0	$0	$95,320	$708,357
18	$127,269	$0	($18,181)	($10,909)	$0	$0	$0	$0	$0	$98,179	$806,536
19	$131,087	$0	($18,727)	($11,236)	$0	$0	$0	$0	$0	$101,125	$907,661
20	$135,020	$0	($19,289)	($11,573)	$0	$0	$0	$0	$0	$104,158	$1,011,819
21	$139,071	$0	($19,867)	($11,920)	$0	$0	$0	$0	$0	$107,283	$1,119,102
22	$143,243	$0	($20,463)	($12,278)	$0	$0	$0	$0	$0	$110,501	$1,229,604
23	$147,540	$0	($21,077)	($12,646)	$0	$0	$0	$0	$0	$113,817	$1,343,420
24	$151,966	$0	($21,709)	($13,026)	$0	$0	$0	$0	$0	$117,231	$1,460,651
25	$156,525	$0	($22,361)	($13,416)	$0	$0	$0	$0	$0	$120,748	$1,581,399

Blue shading indicates a column that shows a tax value not a cash transaction

Results

Loan Payments

Monthly Payment ($):	($7,026)
Value of Interest Deduction ($):	$690
Net Monthly Payment ($):	($6,336)

Ave. Monthly Savings on Bill

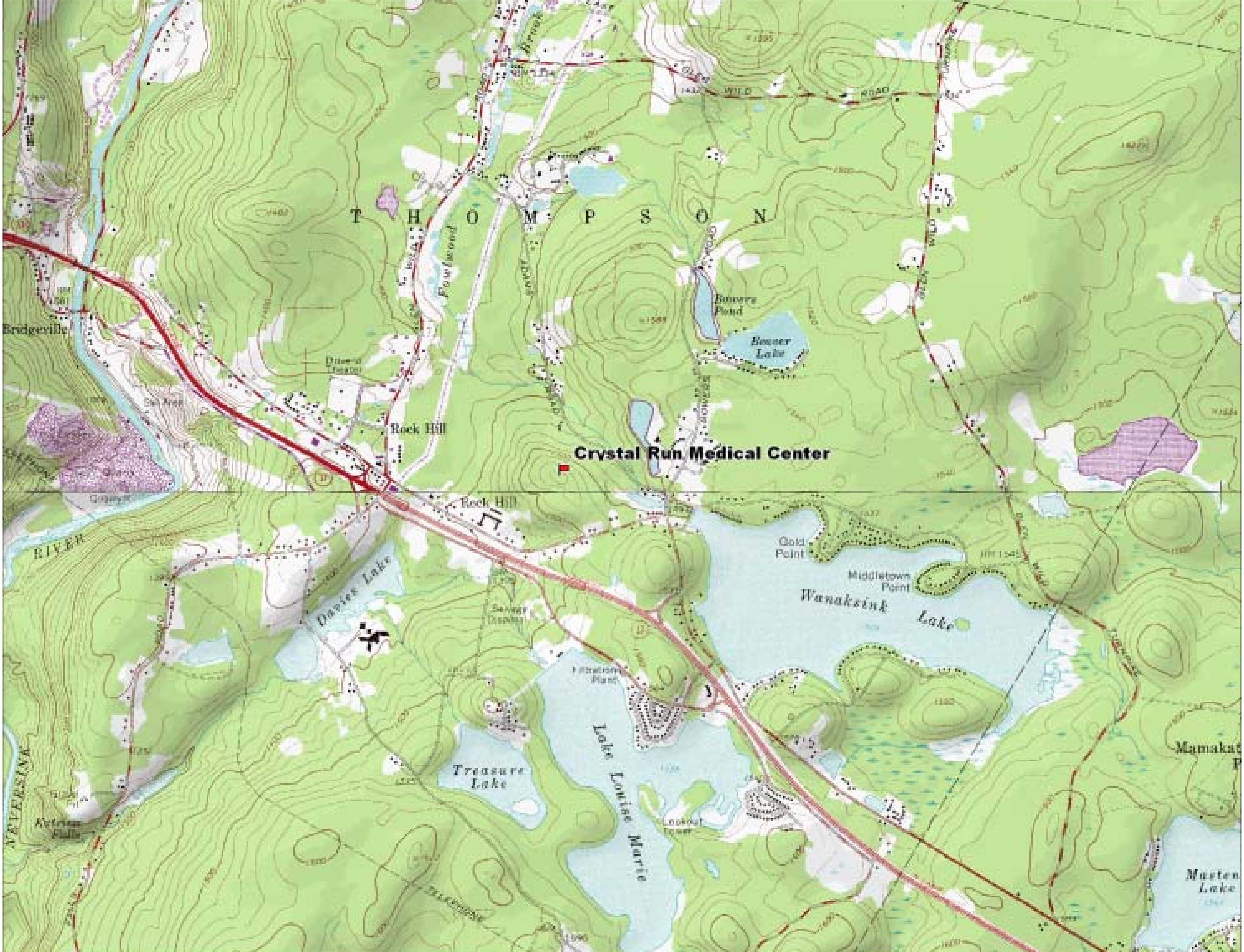
Year 1 ($):	$6,417
Year 10 ($):	$8,623
Year 20 ($):	$11,589
Year 25 ($):	$15,575

Internal Rate of Return

Years 1 - 25:	20.0%

Appendix J

Crystal Run Medical Center


Crystal Run Medical Center
T H O M P S O N
Bridgeville
Rock Hill
Rock Hill
Fowlwood
Bowers Pond
Bowers Lake
Davies Lake
Treasure Lake
Lake Louise Marie
Wanaksink Lake
Gold Point
Middletown Point
Masten Lake
RIVER
NEVERSINK

WindCad Turbine Performance Model

Fuhrlaender FL 250 Wind Turbine, 29.5 m rotor diameter

Prepared For: **Crystal Run Medical Center**
Site Location: **Behind cul-de-sac**
Data Source: **Truewind**
Date: **4/29/2005**

250 kW

Inputs:

Ave. Wind (m/s) =	6.675
Weibull K =	2.178
Site Altitude (m) =	456
Wind Shear Exp. =	0.180
Anem. Height (m) =	85
Tower Height (m) =	50
Turbulence Factor =	20.0%

Results:

Hub Average Wind Speed (m/s) =	6.07
Air Density Factor =	-4%
Average Output Power (kW) =	43.91
Daily Energy Output (kWh) =	**1053.8**
Annual Energy Output (kWh) =	384,629
Monthly Energy Output =	32,052
Percent Operating Time =	79.2%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	3.28%	0.000
2	0.00	7.03%	0.000
3	0.77	10.28%	0.079
4	5.37	12.47%	0.669
5	19.16	13.33%	2.554
6	26.83	12.89%	3.458
7	45.22	11.43%	5.168
8	69.75	9.35%	6.524
9	97.35	7.10%	6.911
10	122.64	5.01%	6.146
11	145.64	3.30%	4.799
12	167.10	2.02%	3.376
13	174.76	1.16%	2.020
14	182.43	0.62%	1.126
15	190.86	0.31%	0.587
16	195.46	0.14%	0.280
17	205.43	0.06%	0.128
18	210.79	0.03%	0.053
19	222.29	0.01%	0.021
20	229.19	0.00%	0.008
	Totals:	99.81%	43.907

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Inputs

Average Wind Speed:	Use annual or monthly average wind speeds.
Weibull K Factor:	K=2 is used for inland sites, K=3 for coastal sites,
Site Altitude:	In meters above sea Level.
Wind Shear Exponent	1/7 or 0.143 is used for normal terrain, 0.167 for rough terrain, 0.110 for open water.
Anemometer Height	Is the sensor height at which the average wind speed was measured.
Tower Height	Is nominal hub height.
Turbulence Factor:	Iderating for turbulence, wire run losses and performance influencing factors.

Results

Hub Ave. Wind Speed	Is corrected for wind shear and used to calculate the Weibull wind speed probabilit
Air Density Factor	Is the reduction from sea level performance.
Average Power Output	Is the average 24-hour power produced,
Daily Energy Output	Includes all deratings and is the primary performance parameter.
Monthly Energy Output	Is calculated from Daily Energy Output.
Annual Energy Output	Is calculated from Daily Energy Output.
Percent Operating Time	Is the time the wind turbine should be producing some power.

FL 250kW+ on 50m Tower

Prepared for: **Crystal Run MC**
Date: **4/29/2005**

Third Party Financed

Assumptions (Inputs)

Project Size (MW):	0.25
Total Installed Cost ($):	$625,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	380,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	1
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	67
Loan Downpayment (%):	35
Down Payment ($):	$218,750
Amount of Loan ($):	$243,750
Interest Rate (%):	6.5
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0.018
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	15.00
State Tax Credit (%):	0
Federal Tax Credit (%):	25

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($139,453)	($139,453)
1	$26,600	$5,092	($3,800)	($2,500)	($29,949)	$61,359	$6,840	$0	$0	$63,642	($75,811)
2	$26,866	$5,092	($3,914)	($2,575)	($29,949)	$31,238	$6,840	$0	$0	$33,597	($42,214)
3	$27,135	$5,092	($4,031)	($2,652)	($29,949)	$18,743	$6,840	$0	$0	$21,176	($21,038)
4	$27,406	$5,092	($4,152)	($2,732)	($29,949)	$11,246	$6,840	$0	$0	$13,750	($7,288)
5	$27,680	$5,092	($4,277)	($2,814)	($29,949)	$11,246	$6,840	$0	$0	$13,817	$6,529
6	$27,957	$5,092	($4,405)	($2,898)	($29,949)	$5,637	$6,840	$0	$0	$8,273	$14,802
7	$28,236	$5,092	($4,537)	($2,985)	($29,949)	$0	$6,840	$0	$0	$2,697	$17,499
8	$28,519	$5,092	($4,674)	($3,075)	($29,949)	$0	$6,840	$0	$0	$2,753	$20,252
9	$28,804	$0	($4,814)	($3,167)	($29,949)	$0	$6,840	$0	$0	($2,286)	$17,966
10	$29,092	$0	($4,958)	($3,262)	($29,949)	$0	$6,840	$0	$0	($2,237)	$15,728
11	$29,383	$0	($5,107)	($3,360)	$0	$0	$0	$0	($7,321)	$13,596	$29,324
12	$29,677	$0	($5,260)	($3,461)	$0	$0	$0	$0	($7,335)	$13,621	$42,946
13	$29,974	$0	($5,418)	($3,564)	$0	$0	$0	$0	($7,347)	$13,644	$56,590
14	$30,273	$0	($5,580)	($3,671)	$0	$0	$0	$0	($7,358)	$13,664	$70,254
15	$30,576	$0	($5,748)	($3,781)	$0	$0	$0	$0	($7,366)	$13,680	$83,934
16	$30,882	$0	($5,920)	($3,895)	$0	$0	$0	$0	($7,373)	$13,693	$97,627
17	$31,191	$0	($6,098)	($4,012)	$0	$0	$0	$0	($7,378)	$13,703	$111,330
18	$31,502	$0	($6,281)	($4,132)	$0	$0	$0	$0	($7,381)	$13,708	$125,038
19	$31,818	$0	($6,469)	($4,256)	$0	$0	$0	$0	($7,382)	$13,710	$138,748
20	$32,136	$0	($6,663)	($4,384)	$0	$0	$0	$0	($7,381)	$13,708	$152,456
21	$32,457	$0	($6,863)	($4,515)	$0	$0	$0	$0	($7,377)	$13,701	$166,157
22	$32,782	$0	($7,069)	($4,651)	$0	$0	$0	$0	($7,372)	$13,690	$179,847
23	$33,109	$0	($7,281)	($4,790)	$0	$0	$0	$0	($7,363)	$13,675	$193,522
24	$33,441	$0	($7,500)	($4,934)	$0	$0	$0	$0	($7,352)	$13,655	$207,176
25	$33,775	$0	($7,725)	($5,082)	$0	$0	$0	$0	($7,339)	$13,629	$220,806

Blue shading indicates a column that shows a tax value not a cash transaction

Results

Loan Payments

Monthly Payment ($):	($2,768)
Value of Interest Deduction ($):	$272
Net Monthly Payment ($):	($2,496)

Ave. Monthly Savings on Bill

Year 1 ($):	$2,217
Year 10 ($):	$2,449
Year 20 ($):	$2,705
Year 25 ($):	$2,988

Internal Rate of Return

Years 1 - 25:	13.8%

Crystal Run Cashflow

Assumptions (Inputs)

Project Size (MW):	**0.25**
Annual Energy Output (kWh):	**380,000**
Energy Savings Value ($/kWh):	**$0.0700**
Energy Inflation Rate (%):	**4**
PPA Price ($/kWh):	**$0.0700**
PPA Escalator(%):	**1**
Green Tag or REC Value ($/kWh):	**$0.0200**
Length of Green Tag Contract (Years):	**8**
Green Tag Ownership(%):	**33**
Property Tax Rate (%):	**0**

Year	Energy Savings from Utility	Energy Payment to Third Party	Green Tag Revenue	Annual Cashflow	Project Cumulative Cashflow
1	$26,600.00	-$26,600.00	$2,508.00	$2,508.00	$2,508.00
2	$27,664.00	-$26,866.00	$2,508.00	$3,306.00	$5,814.00
3	$28,770.56	-$27,134.66	$2,508.00	$4,143.90	$9,957.90
4	$29,921.38	-$27,406.01	$2,508.00	$5,023.38	$14,981.28
5	$31,118.24	-$27,680.07	$2,508.00	$5,946.17	$20,927.45
6	$32,362.97	-$27,956.87	$2,508.00	$6,914.10	$27,841.55
7	$33,657.49	-$28,236.44	$2,508.00	$7,929.05	$35,770.60
8	$35,003.79	-$28,518.80	$2,508.00	$8,992.98	$44,763.58
9	$36,403.94	-$28,803.99	$0.00	$7,599.95	$52,363.53
10	$37,860.09	-$29,092.03	$0.00	$8,768.07	$61,131.60
11	$39,374.50	-$29,382.95	$0.00	$9,991.55	$71,123.15
12	$40,949.48	-$29,676.78	$0.00	$11,272.70	$82,395.85
13	$42,587.46	-$29,973.55	$0.00	$12,613.91	$95,009.76
14	$44,290.96	-$30,273.28	$0.00	$14,017.67	$109,027.43
15	$46,062.59	-$30,576.01	$0.00	$15,486.58	$124,514.01
16	$47,905.10	-$30,881.77	$0.00	$17,023.32	$141,537.33
17	$49,821.30	-$31,190.59	$0.00	$18,630.71	$160,168.04
18	$51,814.15	-$31,502.50	$0.00	$20,311.66	$180,479.70
19	$53,886.72	-$31,817.52	$0.00	$22,069.20	$202,548.89
20	$56,042.19	-$32,135.70	$0.00	$23,906.49	$226,455.38
21	$58,283.88	-$32,457.06	$0.00	$25,826.82	$252,282.20
22	$60,615.23	-$32,781.63	$0.00	$27,833.61	$280,115.81
23	$63,039.84	-$33,109.44	$0.00	$29,930.40	$310,046.21
24	$65,561.43	-$33,440.54	$0.00	$32,120.90	$342,167.10
25	$68,183.89	-$33,774.94	$0.00	$34,408.95	$376,576.05

Appendix K

Villa Roma


Villa Roma High point
Baldy
D E L A W A R E
Jeffersonville
Kohlertown
Swiss Hill
Lake Jefferson
Upper Beechwood
Lower Beechwood
Brook
Jones
CALLICOON
CREEK
EAST
BRANCH

WindCad Turbine Performance Model

Fuhrlaender FL 1000PLUS Wind Turbine, 58 m rotor diameter

Prepared For:	**Villa Roma**
Site Location:	**Villa Roma**
Data Source:	**Truewind**
Date:	**4/29/2005**

1000 kW

Inputs:

Ave. Wind (m/s) =	6.635
Weibull K =	2.206
Site Altitude (m) =	460
Wind Shear Exp. =	0.180
Anem. Height (m) =	65
Tower Height (m) =	80
Turbulence Factor =	20.0%

Results:

Hub Average Wind Speed (m/s) =	6.89
Air Density Factor =	-4%
Average Output Power (kW) =	239.02
Daily Energy Output (kWh) =	**5736.4**
Annual Energy Output (kWh) =	2,093,775
Monthly Energy Output =	174,481
Percent Operating Time =	84.1%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.39%	0.000
2	0.00	5.30%	0.000
3	0.00	8.03%	0.000
4	22.22	10.19%	2.263
5	54.40	11.49%	6.253
6	105.74	11.86%	12.535
7	182.36	11.33%	20.665
8	276.60	10.12%	27.983
9	388.47	8.47%	32.918
10	515.66	6.68%	34.442
11	658.95	4.96%	32.705
12	766.98	3.48%	26.700
13	766.98	2.31%	17.689
14	766.98	1.44%	11.075
15	766.98	0.85%	6.553
16	766.98	0.48%	3.666
17	766.98	0.25%	1.938
18	766.98	0.13%	0.969
19	766.98	0.06%	0.457
20	766.98	0.03%	0.204
	Totals:	99.85%	239.015

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Inputs

Average Wind Speed:	Use annual or monthly average wind speeds.
Weibull K Factor:	K=2 is used for inland sites, K=3 for coastal sites, K=4 for island sites and trade wind regimes.
Site Altitude:	In meters above sea Level.
Wind Shear Exponent	1/7 or 0.143 is used for normal terrain, 0.167 for rough terrain, 0.110 for open water.
Anemometer Height	Is the sensor height at which the average wind speed was measured.
Tower Height	Is nominal hub height.
Turbulence Factor:	Is for derating for turbulence, wire run losses and other performance influencing factors.

Results

Hub Ave. Wind Speed	Is corrected for wind shear and used to calculate the Weibull wind speed probability.
Air Density Factor	Is the reduction from sea level performance.
Average Power Output	Is the average 24-hour power produced, without the performance safety margin adjustment.
Daily Energy Output	Includes all deratings and is the primary performance parameter.
Monthly Energy Output	Is calculated from Daily Energy Output.
Annual Energy Output	Is calculated from Daily Energy Output.
Percent Operating Time	Is the time the wind turbine should be producing some power.

Use only with annual or monthly averages wind speeds to get proper long term Weibull distribution curve calculations.

Vestas V47 on 65m Tower

Prepared for: **Villa Roma**
Date: **4/29/2005**

Self Financed

Assumptions (Inputs)

Project Size (MW):	1
Total Installed Cost ($):	$2,000,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	2,050,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	3
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	100
Loan Downpayment (%):	35
Down Payment ($):	$700,000
Amount of Loan ($):	$1,209,000
Interest Rate (%):	6.5
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	7.00
State Tax Credit (%):	0
Federal Tax Credit (%):	0

Results

Loan Payments

Monthly Payment ($):	($13,728)
Value of Interest Deduction ($):	$1,349
Net Monthly Payment ($):	($12,379)

Ave. Monthly Savings on Bill

Year 1 ($):	$11,958
Year 10 ($):	$16,071
Year 20 ($):	$21,598
Year 25 ($):	$29,026

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($651,000)	($651,000)
1	$143,500	$41,000	($20,500)	($10,000)	($148,549)	$286,440	$0	$0	($1,908)	$289,983	($361,017)
2	$147,805	$41,000	($21,115)	($10,300)	($148,549)	$145,824	$0	$0	($3,094)	$151,571	($209,446)
3	$152,239	$41,000	($21,748)	($10,609)	($148,549)	$87,494	$0	$0	($4,316)	$95,511	($113,935)
4	$156,806	$41,000	($22,401)	($10,927)	($148,549)	$52,497	$0	$0	($5,575)	$62,851	($51,085)
5	$161,511	$41,000	($23,073)	($11,255)	($148,549)	$52,497	$0	$0	($6,872)	$65,258	$14,174
6	$166,356	$41,000	($23,765)	($11,593)	($148,549)	$26,313	$0	$0	($8,207)	$41,555	$55,729
7	$171,347	$41,000	($24,478)	($11,941)	($148,549)	$0	$0	$0	($9,583)	$17,796	$73,525
8	$176,487	$41,000	($25,212)	($12,299)	($148,549)	$0	$0	$0	($10,999)	$20,427	$93,953
9	$181,782	$0	($25,969)	($12,668)	($148,549)	$0	$0	$0	$0	($5,404)	$88,549
10	$187,235	$0	($26,748)	($13,048)	($148,549)	$0	$0	$0	$0	($1,110)	$87,439
11	$192,852	$0	($27,550)	($13,439)	$0	$0	$0	$0	($53,152)	$98,711	$186,150
12	$198,638	$0	($28,377)	($13,842)	$0	$0	$0	$0	($54,746)	$101,672	$287,822
13	$204,597	$0	($29,228)	($14,258)	$0	$0	$0	$0	($56,389)	$104,722	$392,544
14	$210,735	$0	($30,105)	($14,685)	$0	$0	$0	$0	($58,081)	$107,864	$500,408
15	$217,057	$0	($31,008)	($15,126)	$0	$0	$0	$0	($59,823)	$111,100	$611,507
16	$223,568	$0	($31,938)	($15,580)	$0	$0	$0	$0	($61,618)	$114,433	$725,940
17	$230,275	$0	($32,896)	($16,047)	$0	$0	$0	$0	($63,466)	$117,866	$843,806
18	$237,184	$0	($33,883)	($16,528)	$0	$0	$0	$0	($65,370)	$121,402	$965,207
19	$244,299	$0	($34,900)	($17,024)	$0	$0	$0	$0	($67,331)	$125,044	$1,090,251
20	$251,628	$0	($35,947)	($17,535)	$0	$0	$0	$0	($69,351)	$128,795	$1,219,046
21	$259,177	$0	($37,025)	($18,061)	$0	$0	$0	$0	($71,432)	$132,659	$1,351,705
22	$266,952	$0	($38,136)	($18,603)	$0	$0	$0	$0	($73,575)	$136,639	$1,488,344
23	$274,961	$0	($39,280)	($19,161)	$0	$0	$0	$0	($75,782)	$140,738	$1,629,081
24	$283,210	$0	($40,459)	($19,736)	$0	$0	$0	$0	($78,055)	$144,960	$1,774,041
25	$291,706	$0	($41,672)	($20,328)	$0	$0	$0	$0	($80,397)	$149,309	$1,923,350

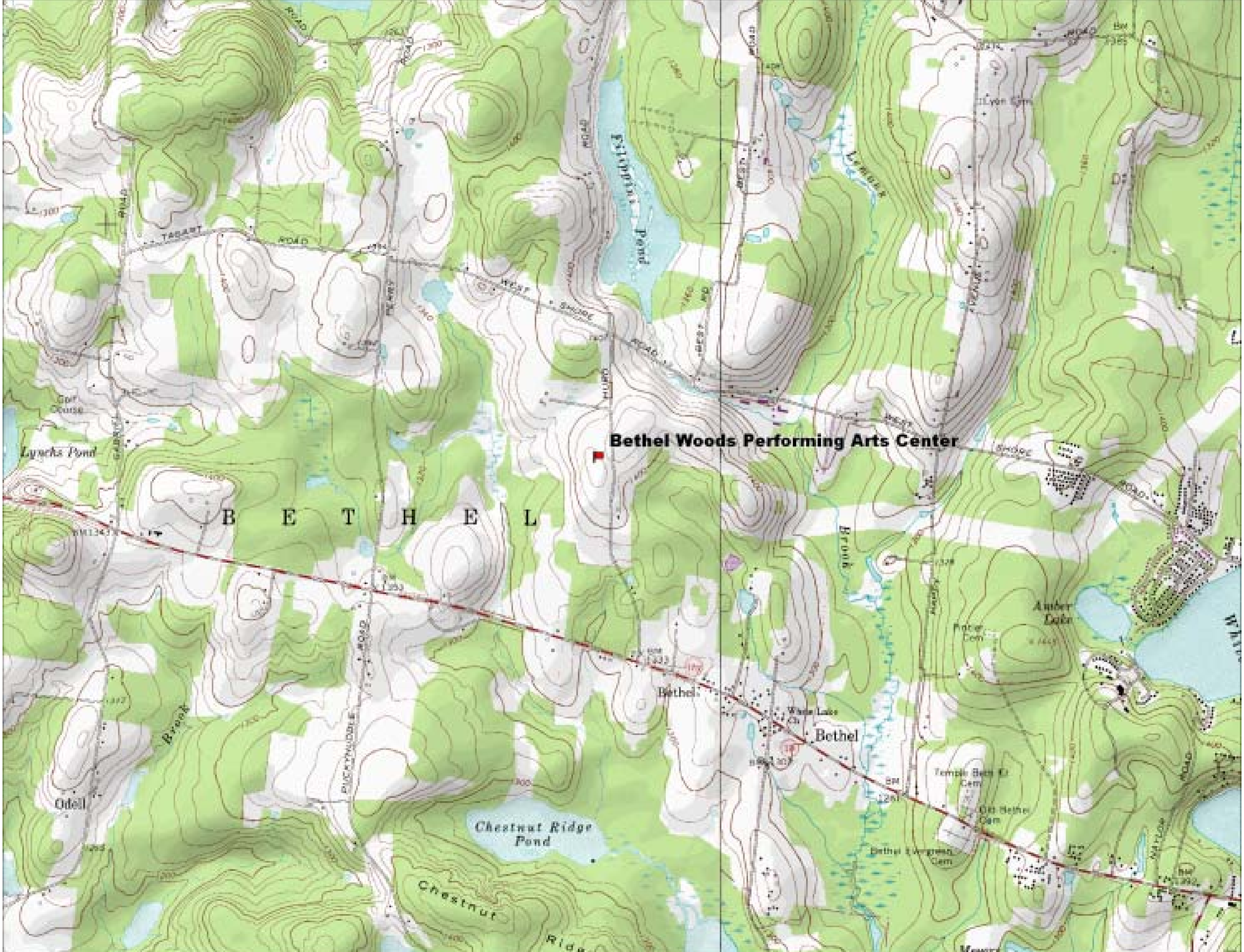
Blue shading indicates a column that shows a tax value not a cash transaction

Internal Rate of Return

Years 1 - 25: **16.3%**

Appendix L

Bethel Woods Performing Arts Center



Bethel Woods Performing Arts Center
B E T H E L
Filippini Pond
Lynchs Pond
Chestnut Ridge Pond
Chestnut Ridge
Amber Lake
Bethel
Odell
Brook
Golf Course
TAGGART ROAD
WEST SHORE ROAD
PERRY ROAD
PUCKYHUDDLE ROAD
GABRIEL ROAD
HURD ROAD
BEST ROAD
NAYLOR ROAD
Temple Beth El Cem
Old Bethel Cem
Bethel Evergreen Cem
White Lake Ch
Lyon Cem
Meyers

WindCad Turbine Performance Model

Fuhrlaender FL 1000PLUS Wind Turbine, 58 m rotor diameter

Prepared For:	**Bethel Woods**
Site Location:	**Bethel Woods**
Data Source:	**Truewind**
Date:	**4/29/2005**

1000 kW

Inputs:

Ave. Wind (m/s) =	6.201
Weibull K =	2.215
Site Altitude (m) =	440
Wind Shear Exp. =	0.180
Anem. Height (m) =	65
Tower Height (m) =	80
Turbulence Factor =	20.0%

Results:

Hub Average Wind Speed (m/s) =	6.44
Air Density Factor =	-4%
Average Output Power (kW) =	205.66
Daily Energy Output (kWh) =	**4935.7**
Annual Energy Output (kWh) =	1,801,546
Monthly Energy Output =	150,129
Percent Operating Time =	81.9%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.73%	0.000
2	0.00	6.06%	0.000
3	0.00	9.12%	0.000
4	22.26	11.39%	2.536
5	54.51	12.58%	6.855
6	105.94	12.60%	13.349
7	182.71	11.61%	21.214
8	277.13	9.92%	27.479
9	389.22	7.88%	30.676
10	516.65	5.85%	30.209
11	660.21	4.06%	26.773
12	768.45	2.63%	20.225
13	768.45	1.60%	12.290
14	768.45	0.91%	6.994
15	768.45	0.49%	3.728
16	768.45	0.24%	1.861
17	768.45	0.11%	0.870
18	768.45	0.05%	0.381
19	768.45	0.02%	0.156
20	768.45	0.01%	0.060
	Totals:	99.85%	205.656

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Inputs

Average Wind Speed:	Use annual or monthly average wind speeds.
Weibull K Factor:	K=2 is used for inland sites,
Site Altitude:	In meters above sea Level.
Wind Shear Exponent	1/7 or 0.143 is used for normal terrain, 0.167 for rough terrain, 0.110 for open water.
Anemometer Height	Is the sensor height at which the average wind speed was measured.
Tower Height	Is nominal hub height.
Turbulence Factor:	for derating of turbulence, wire run losses and other performance influencing factors.

Results

Hub Ave. Wind Speed	corrected for wind shear and used to calculate the Weibull wind speed probability.
Air Density Factor	Is the reduction from sea level performance.
Average Power Output	average 24-hour power produced, withoutperformance safety margin adjustment.
Daily Energy Output	Includes all deratings and is the primary performance parameter.
Monthly Energy Output	Is calculated from Daily Energy Output.
Annual Energy Output	Is calculated from Daily Energy Output.
Percent Operating Time	Is the time the wind turbine should be producing some power.

Use only with annual or monthly averages to get proper long term Weibull distribution curve

FL 1000+ on 80 m tower

Prepared for: **Bethel Woods**
Date: **4/29/2005**

Third Party Financed

Assumptions (Inputs)

Project Size (MW):	1
Total Installed Cost ($):	$2,000,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	1,800,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	1
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	67
Loan Downpayment (%):	35
Down Payment ($):	$700,000
Amount of Loan ($):	$1,235,000
Interest Rate (%):	6.5
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0.018
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	5.00
State Tax Credit (%):	0
Federal Tax Credit (%):	0

Results

Loan Payments

Monthly Payment ($):	($14,023)
Value of Interest Deduction ($):	$1,378
Net Monthly Payment ($):	($12,645)

Ave. Monthly Savings on Bill

Year 1 ($):	$10,500
Year 10 ($):	$11,599
Year 20 ($):	$12,812
Year 25 ($):	$14,152

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($665,000)	($665,000)
1	$126,000	$24,120	($18,000)	($10,000)	($151,744)	$292,600	$32,400	$0	$0	$295,376	($369,624)
2	$127,260	$24,120	($18,540)	($10,300)	($151,744)	$148,960	$32,400	$0	$0	$152,156	($217,467)
3	$128,533	$24,120	($19,096)	($10,609)	($151,744)	$89,376	$32,400	$0	$0	$92,980	($124,487)
4	$129,818	$24,120	($19,669)	($10,927)	($151,744)	$53,626	$32,400	$0	$0	$57,624	($66,864)
5	$131,116	$24,120	($20,259)	($11,255)	($151,744)	$53,626	$32,400	$0	$0	$58,004	($8,860)
6	$132,427	$24,120	($20,867)	($11,593)	($151,744)	$26,879	$32,400	$0	$0	$31,623	$22,763
7	$133,752	$24,120	($21,493)	($11,941)	($151,744)	$0	$32,400	$0	$0	$5,094	$27,858
8	$135,089	$24,120	($22,138)	($12,299)	($151,744)	$0	$32,400	$0	$0	$5,429	$33,287
9	$136,440	$0	($22,802)	($12,668)	($151,744)	$0	$32,400	$0	$0	($18,373)	$14,914
10	$137,804	$0	($23,486)	($13,048)	($151,744)	$0	$32,400	$0	$0	($18,073)	($3,159)
11	$139,182	$0	($24,190)	($13,439)	$0	$0	$0	$0	($35,543)	$66,009	$62,850
12	$140,574	$0	($24,916)	($13,842)	$0	$0	$0	$0	($35,635)	$66,180	$129,030
13	$141,980	$0	($25,664)	($14,258)	$0	$0	$0	$0	($35,721)	$66,338	$195,368
14	$143,400	$0	($26,434)	($14,685)	$0	$0	$0	$0	($35,798)	$66,483	$261,851
15	$144,834	$0	($27,227)	($15,126)	$0	$0	$0	$0	($35,868)	$66,613	$328,464
16	$146,282	$0	($28,043)	($15,580)	$0	$0	$0	$0	($35,931)	$66,728	$395,192
17	$147,745	$0	($28,885)	($16,047)	$0	$0	$0	$0	($35,985)	$66,829	$462,021
18	$149,222	$0	($29,751)	($16,528)	$0	$0	$0	$0	($36,030)	$66,913	$528,933
19	$150,715	$0	($30,644)	($17,024)	$0	$0	$0	$0	($36,066)	$66,980	$595,914
20	$152,222	$0	($31,563)	($17,535)	$0	$0	$0	$0	($36,093)	$67,030	$662,944
21	$153,744	$0	($32,510)	($18,061)	$0	$0	$0	$0	($36,110)	$67,062	$730,006
22	$155,281	$0	($33,485)	($18,603)	$0	$0	$0	$0	($36,118)	$67,076	$797,082
23	$156,834	$0	($34,490)	($19,161)	$0	$0	$0	$0	($36,114)	$67,069	$864,151
24	$158,403	$0	($35,525)	($19,736)	$0	$0	$0	$0	($36,100)	$67,042	$931,193
25	$159,987	$0	($36,590)	($20,328)	$0	$0	$0	$0	($36,074)	$66,994	$998,188

Blue shading indicates a column that shows a tax value not a cash transaction

Internal Rate of Return

Years 1 - 25:	12.3%

Bethel Woods Cashflow

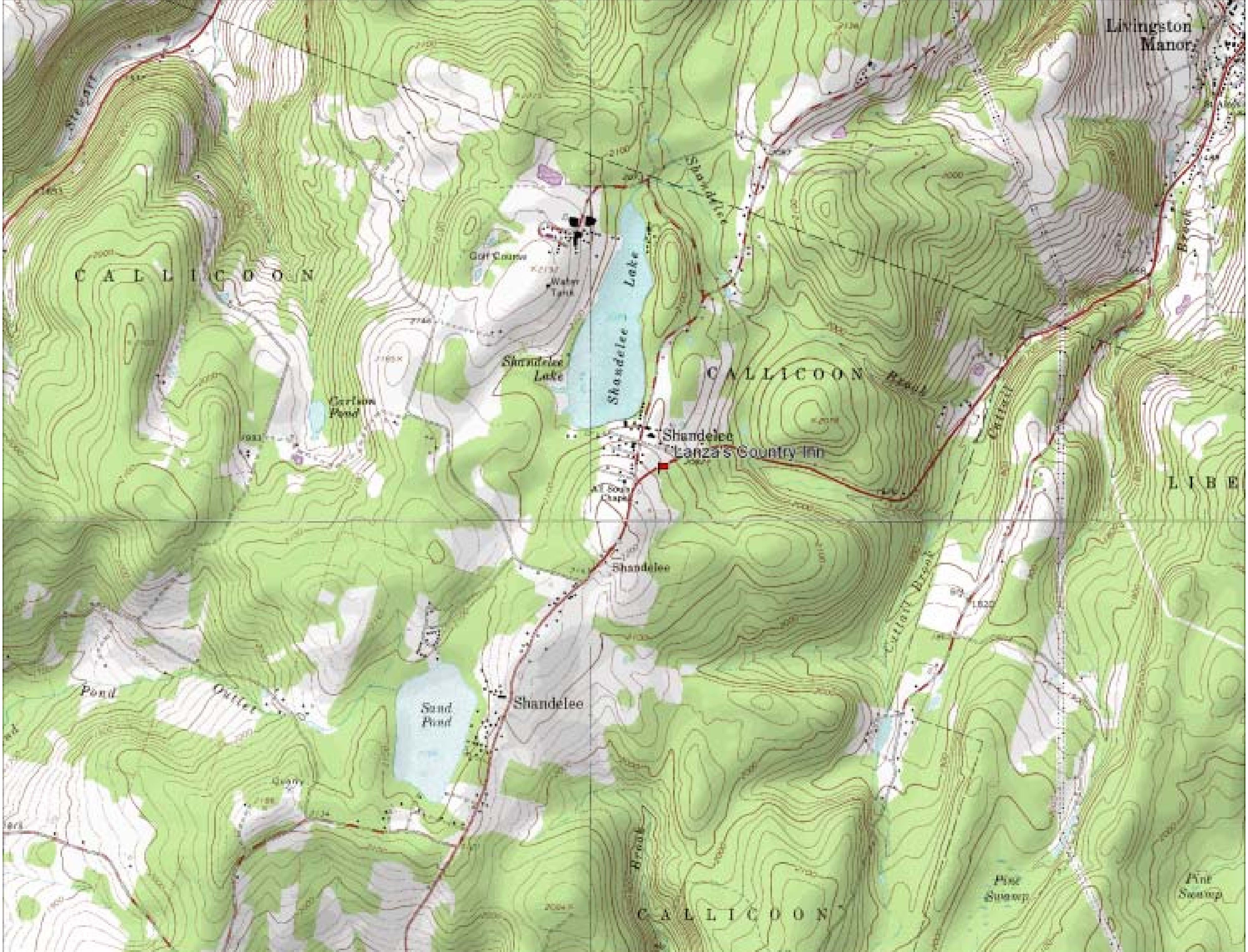
Assumptions (Inputs)

Project Size (MW):	**1**
Annual Energy Output (kWh):	**1,800,000**
Energy Savings Value ($/kWh):	**$0.0700**
Energy Inflation Rate (%):	**4**
PPA Price ($/kWh):	**$0.0700**
PPA Escalator(%):	**1**
Green Tag or REC Value ($/kWh):	**$0.0200**
Length of Green Tag Contract (Years):	**8**
Green Tag Ownership(%):	**33**
Property Tax Rate (%):	**0**

Year	Energy Savings from Utility	Energy Payment to Third Party	Green Tag Revenue	Annual Cashflow	Project Cumulative Cashflow
1	$126,000.00	-$126,000.00	$11,880.00	$11,880.00	$11,880.00
2	$131,040.00	-$127,260.00	$11,880.00	$15,660.00	$27,540.00
3	$136,281.60	-$128,532.60	$11,880.00	$19,629.00	$47,169.00
4	$141,732.86	-$129,817.93	$11,880.00	$23,794.94	$70,963.94
5	$147,402.18	-$131,116.11	$11,880.00	$28,166.07	$99,130.01
6	$153,298.27	-$132,427.27	$11,880.00	$32,751.00	$131,881.01
7	$159,430.20	-$133,751.54	$11,880.00	$37,558.66	$169,439.67
8	$165,807.40	-$135,089.05	$11,880.00	$42,598.35	$212,038.02
9	$172,439.70	-$136,439.94	$0.00	$35,999.76	$248,037.77
10	$179,337.29	-$137,804.34	$0.00	$41,532.94	$289,570.72
11	$186,510.78	-$139,182.39	$0.00	$47,328.39	$336,899.11
12	$193,971.21	-$140,574.21	$0.00	$53,397.00	$390,296.11
13	$201,730.06	-$141,979.95	$0.00	$59,750.11	$450,046.21
14	$209,799.26	-$143,399.75	$0.00	$66,399.51	$516,445.72
15	$218,191.23	-$144,833.75	$0.00	$73,357.48	$589,803.20
16	$226,918.88	-$146,282.09	$0.00	$80,636.79	$670,440.00
17	$235,995.64	-$147,744.91	$0.00	$88,250.73	$758,690.73
18	$245,435.46	-$149,222.36	$0.00	$96,213.10	$854,903.83
19	$255,252.88	-$150,714.58	$0.00	$104,538.30	$959,442.13
20	$265,463.00	-$152,221.73	$0.00	$113,241.27	$1,072,683.40
21	$276,081.52	-$153,743.95	$0.00	$122,337.57	$1,195,020.97
22	$287,124.78	-$155,281.38	$0.00	$131,843.39	$1,326,864.36
23	$298,609.77	-$156,834.20	$0.00	$141,775.57	$1,468,639.93
24	$310,554.16	-$158,402.54	$0.00	$152,151.62	$1,620,791.55
25	$322,976.32	-$159,986.57	$0.00	$162,989.76	$1,783,781.31

Appendix M

Lanza's Country Inn



Livingston Manor
CALLICOON
Golf Course
Water Tank
Shandelee Lake
Shandelee Lake
Carlson Pond
CALLICOON
Brook
Shandelee
Lanza's Country Inn
All Souls Chapel
Shandelee
Cattail
Cattail Brook
LIBE
Sand Pond
Shandelee
Pond
Outlet
Brook
CALLICOON
Pine Swamp
Pine Swamp

DELORME

WindCad Turbine Performance Model

Fuhrländer FL 100 Wind Turbine, 21m rotor diameter

Prepared For:	**Lanza's**
Site Location:	**Lanza's**
Data Source:	**Truewind**
Date:	**4/29/2005**

100 kW

Inputs:

Ave. Wind (m/s) =	6.75
Weibull K =	2.277
Site Altitude (m) =	649
Wind Shear Exp. =	0.180
Anem. Height (m) =	65
Tower Height (m) =	35
Turbulence Factor =	20.0%

Results:

Hub Average Wind Speed (m/s) =	6.04
Air Density Factor =	-6%
Average Output Power (kW) =	20.33
Daily Energy Output (kWh) =	**488.0**
Annual Energy Output (kWh) =	178,106
Monthly Energy Output =	14,842
Percent Operating Time =	80.2%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.87%	0.000
2	0.00	6.63%	0.000
3	0.75	10.13%	0.076
4	1.50	12.66%	0.190
5	6.02	13.80%	0.830
6	12.79	13.47%	1.723
7	22.57	11.94%	2.694
8	33.86	9.66%	3.272
9	47.40	7.18%	3.403
10	59.43	4.90%	2.914
11	70.72	3.08%	2.179
12	81.25	1.78%	1.448
13	89.90	0.95%	0.853
14	94.04	0.46%	0.437
15	91.79	0.21%	0.192
16	90.28	0.09%	0.078
17	84.26	0.03%	0.028
18	80.50	0.01%	0.009
19	75.99	0.00%	0.003
20	72.98	0.00%	0.001
	Totals:	99.87%	20.332

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Inputs

Average Wind Speed:	Use annual or monthly average wind speeds.
Weibull K Factor:	K=2 is used for inland sites, K=3 for coastal sites,
Site Altitude:	In meters above sea Level.
Wind Shear Exponent	1/7 or 0.143 is used for normal terrain, 0.167 for rough terrain, 0.110 for open water.
Anemometer Height	Is the sensor height at which the average wind speed was measured.
Tower Height	Is nominal hub height.
Turbulence Factor:	derating for turbulence, wire run losses and performance influencing factors.

Results

Hub Ave. Wind Speed	Is corrected for wind shear and used to calculate the Weibull wind speed probability.
Air Density Factor	Is the reduction from sea level performance.
Average Power Output	average 24-hour power produced, without the performance safety margin .
Daily Energy Output	Includes all deratings and is the primary performance parameter.
Monthly Energy Output	Is calculated from Daily Energy Output.
Annual Energy Output	Is calculated from Daily Energy Output.
Percent Operating Time	Is the time the wind turbine should be producing some power.

Vestas V47 on 65m Tower

Prepared for: **Lanzas**
Date: **4/29/2005**

Self Financed

Assumptions (Inputs)

Project Size (MW):	0.1
Total Installed Cost ($):	$400,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	178,000
PPA Value ($/kWh):	$0.0900
PPA Escalator (%):	3
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	100
Loan Downpayment (%):	35
Down Payment ($):	$140,000
Amount of Loan ($):	$156,000
Interest Rate (%):	6.5
Loan Term (Years):	12
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	15.00
State Tax Credit (%):	0
Federal Tax Credit (%):	25

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($89,250)	($89,250)
1	$16,020	$3,560	($1,780)	($1,000)	($16,617)	$39,270	$0	$0	$0	$39,453	($49,797)
2	$16,501	$3,560	($1,833)	($1,030)	($16,617)	$19,992	$0	$0	$0	$20,573	($29,224)
3	$16,996	$3,560	($1,888)	($1,061)	($16,617)	$11,995	$0	$0	$0	$12,985	($16,239)
4	$17,505	$3,560	($1,945)	($1,093)	($16,617)	$7,197	$0	$0	$0	$8,608	($7,631)
5	$18,031	$3,560	($2,003)	($1,126)	($16,617)	$7,197	$0	$0	$0	$9,042	$1,411
6	$18,572	$3,560	($2,064)	($1,159)	($16,617)	$3,607	$0	$0	$0	$5,900	$7,311
7	$19,129	$3,560	($2,125)	($1,194)	($16,617)	$0	$0	$0	$0	$2,753	$10,063
8	$19,703	$3,560	($2,189)	($1,230)	($16,617)	$0	$0	$0	$0	$3,227	$13,290
9	$20,294	$0	($2,255)	($1,267)	($16,617)	$0	$0	$0	$0	$155	$13,445
10	$20,902	$0	($2,322)	($1,305)	($16,617)	$0	$0	$0	$0	$659	$14,104
11	$21,530	$0	($2,392)	($1,344)	($16,617)	$0	$0	$0	$0	$1,177	$15,281
12	$22,175	$0	($2,464)	($1,384)	($16,617)	$0	$0	$0	$0	$1,711	$16,991
13	$22,841	$0	($2,538)	($1,426)	$0	$0	$0	$0	$0	$18,877	$35,868
14	$23,526	$0	($2,614)	($1,469)	$0	$0	$0	$0	$0	$19,443	$55,312
15	$24,232	$0	($2,692)	($1,513)	$0	$0	$0	$0	$0	$20,027	$75,338
16	$24,959	$0	($2,773)	($1,558)	$0	$0	$0	$0	$0	$20,627	$95,966
17	$25,707	$0	($2,856)	($1,605)	$0	$0	$0	$0	$0	$21,246	$117,212
18	$26,479	$0	($2,942)	($1,653)	$0	$0	$0	$0	$0	$21,884	$139,096
19	$27,273	$0	($3,030)	($1,702)	$0	$0	$0	$0	$0	$22,540	$161,636
20	$28,091	$0	($3,121)	($1,754)	$0	$0	$0	$0	$0	$23,216	$184,852
21	$28,934	$0	($3,215)	($1,806)	$0	$0	$0	$0	$0	$23,913	$208,765
22	$29,802	$0	($3,311)	($1,860)	$0	$0	$0	$0	$0	$24,630	$233,396
23	$30,696	$0	($3,411)	($1,916)	$0	$0	$0	$0	$0	$25,369	$258,765
24	$31,617	$0	($3,513)	($1,974)	$0	$0	$0	$0	$0	$26,130	$284,895
25	$32,565	$0	($3,618)	($2,033)	$0	$0	$0	$0	$0	$26,914	$311,809

Blue shading indicates a column that shows a tax value not a cash transaction

Results

Loan Payments

Monthly Payment ($):	($1,563)
Value of Interest Deduction ($):	$178
Net Monthly Payment ($):	($1,385)

Ave. Monthly Savings on Bill

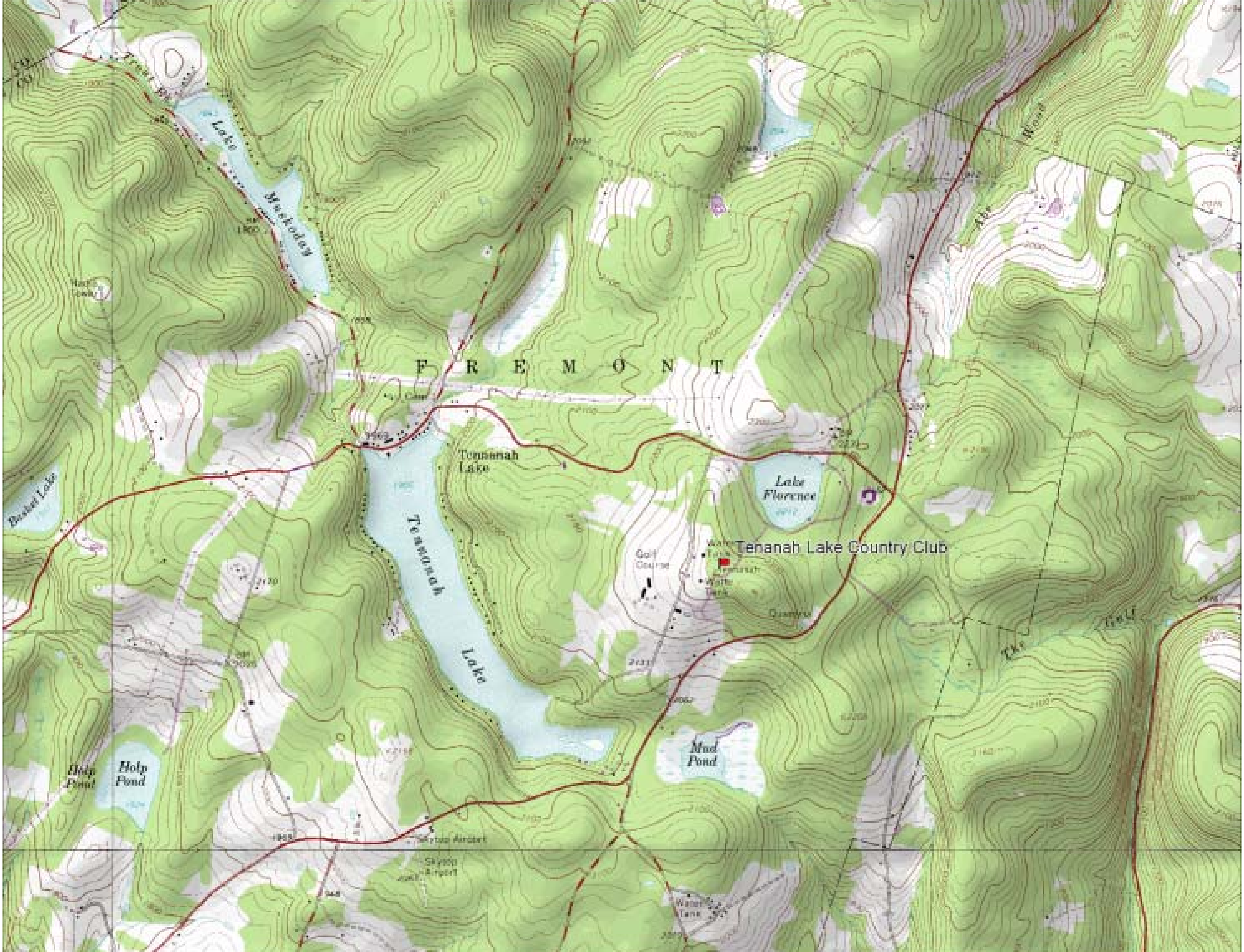
Year 1 ($):	$1,335
Year 10 ($):	$1,794
Year 20 ($):	$2,411
Year 25 ($):	$3,240

Internal Rate of Return

Years 1 - 25:	16.4%

Appendix N

Tennanah Lake Golf and Country Club, Inn and Restaurant


FREMONT
Tennanah Lake
Tennanah Lake
Tenanah Lake Country Club
Lake Florence
Mud Pond
Holp Pond
Holp Pond
Lake Muskoday
Basket Lake
Golf Course
Skytop Airport
The Gulf

WindCad Turbine Performance Model

Fuhrländer FL 100 Wind Turbine, 21m rotor diameter

Prepared For:	**Tennanah Lake**
Site Location:	**Tennanah Lake**
Data Source:	**Truewind**
Date:	**4/29/2005**

100 kW

Inputs:

Ave. Wind (m/s) =	8.19
Weibull K =	2.26
Site Altitude (m) =	717
Wind Shear Exp. =	0.180
Anem. Height (m) =	80
Tower Height (m) =	35
Turbulence Factor =	20.0%

Results:

Hub Average Wind Speed (m/s) =	7.06
Air Density Factor =	-7%
Average Output Power (kW) =	28.92
Daily Energy Output (kWh) =	**694.2**
Annual Energy Output (kWh) =	253,376
Monthly Energy Output =	21,115
Percent Operating Time =	85.5%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.08%	0.000
2	0.00	4.81%	0.000
3	0.75	7.49%	0.056
4	1.49	9.72%	0.145
5	5.98	11.20%	0.670
6	12.70	11.78%	1.496
7	22.42	11.45%	2.568
8	33.63	10.39%	3.494
9	47.08	8.83%	4.158
10	59.04	7.05%	4.162
11	70.25	5.30%	3.721
12	80.71	3.75%	3.026
13	89.31	2.50%	2.233
14	93.42	1.57%	1.469
15	91.18	0.93%	0.850
16	89.68	0.52%	0.467
17	83.70	0.27%	0.230
18	79.97	0.14%	0.109
19	75.48	0.06%	0.048
20	72.49	0.03%	0.020
	Totals:	99.88%	28.924

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Inputs

Average Wind Speed:	Use annual or monthly average wind speeds.
Weibull K Factor:	K=2 is used for inland sites, K=3 for coastal sites, K=4 for island sites and trade wind regimes.
Site Altitude:	In meters above sea Level.
Wind Shear Exponent	1/7 or 0.143 is used for normal terrain, 0.167 for rough terrain, 0.110 for open water.
Anemometer Height	Is the sensor height at which the average wind speed was measured.
Tower Height	Is nominal hub height.
Turbulence Factor:	Is for derating for turbulence, wire run losses and other performance influencing factors.

Results

Hub Ave. Wind Speed	Is corrected for wind shear and used to calculate the Weibull wind speed probability.
Air Density Factor	Is the reduction from sea level performance.
Average Power Output	Is the average 24-hour power produced, without the performance safety margin adjustment.
Daily Energy Output	Includes all deratings and is the primary performance parameter.
Monthly Energy Output	Is calculated from Daily Energy Output.
Annual Energy Output	Is calculated from Daily Energy Output.
Percent Operating Time	Is the time the wind turbine should be producing some power.

Use only with annual or monthly averages wind speeds to get proper long term Weibull distribution curve calculations.

FL 100kW on 35 m tower

Prepared for: **Tenanah Lake**
Date: **4/29/2005**

Self Financed

Assumptions (Inputs)

Project Size (MW):	0.1
Total Installed Cost ($):	$400,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	250,000
PPA Value ($/kWh):	$0.0900
PPA Escalator (%):	3
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	100
Loan Downpayment (%):	35
Down Payment ($):	$140,000
Amount of Loan ($):	$156,000
Interest Rate (%):	6.5
Loan Term (Years):	12
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	15.00
State Tax Credit (%):	0
Federal Tax Credit (%):	25

Results

Loan Payments

Monthly Payment ($):	($1,563)
Value of Interest Deduction ($):	$178
Net Monthly Payment ($):	($1,385)

Ave. Monthly Savings on Bill

Year 1 ($):	$1,875
Year 10 ($):	$2,520
Year 20 ($):	$3,386
Year 25 ($):	$4,551

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($89,250)	($89,250)
1	$22,500	$5,000	($2,500)	($1,000)	($16,617)	$39,270	$0	$0	$0	$46,653	($42,597)
2	$23,175	$5,000	($2,575)	($1,030)	($16,617)	$19,992	$0	$0	$0	$27,945	($14,651)
3	$23,870	$5,000	($2,652)	($1,061)	($16,617)	$11,995	$0	$0	$0	$20,536	$5,884
4	$24,586	$5,000	($2,732)	($1,093)	($16,617)	$7,197	$0	$0	$0	$16,342	$22,226
5	$25,324	$5,000	($2,814)	($1,126)	($16,617)	$7,197	$0	$0	$0	$16,965	$39,192
6	$26,084	$5,000	($2,898)	($1,159)	($16,617)	$3,607	$0	$0	$0	$14,017	$53,209
7	$26,866	$5,000	($2,985)	($1,194)	($16,617)	$0	$0	$0	$0	$11,070	$64,279
8	$27,672	$5,000	($3,075)	($1,230)	($16,617)	$0	$0	$0	$0	$11,751	$76,030
9	$28,502	$0	($3,167)	($1,267)	($16,617)	$0	$0	$0	$0	$7,452	$83,482
10	$29,357	$0	($3,262)	($1,305)	($16,617)	$0	$0	$0	$0	$8,174	$91,656
11	$30,238	$0	($3,360)	($1,344)	($16,617)	$0	$0	$0	$0	$8,918	$100,574
12	$31,145	$0	($3,461)	($1,384)	($16,617)	$0	$0	$0	$0	$9,684	$110,257
13	$32,080	$0	($3,564)	($1,426)	$0	$0	$0	$0	$0	$27,089	$137,347
14	$33,042	$0	($3,671)	($1,469)	$0	$0	$0	$0	$0	$27,902	$165,249
15	$34,033	$0	($3,781)	($1,513)	$0	$0	$0	$0	$0	$28,739	$193,988
16	$35,054	$0	($3,895)	($1,558)	$0	$0	$0	$0	$0	$29,601	$223,589
17	$36,106	$0	($4,012)	($1,605)	$0	$0	$0	$0	$0	$30,489	$254,079
18	$37,189	$0	($4,132)	($1,653)	$0	$0	$0	$0	$0	$31,404	$285,483
19	$38,305	$0	($4,256)	($1,702)	$0	$0	$0	$0	$0	$32,346	$317,829
20	$39,454	$0	($4,384)	($1,754)	$0	$0	$0	$0	$0	$33,317	$351,146
21	$40,638	$0	($4,515)	($1,806)	$0	$0	$0	$0	$0	$34,316	$385,462
22	$41,857	$0	($4,651)	($1,860)	$0	$0	$0	$0	$0	$35,346	$420,808
23	$43,112	$0	($4,790)	($1,916)	$0	$0	$0	$0	$0	$36,406	$457,214
24	$44,406	$0	($4,934)	($1,974)	$0	$0	$0	$0	$0	$37,498	$494,712
25	$45,738	$0	($5,082)	($2,033)	$0	$0	$0	$0	$0	$38,623	$533,335

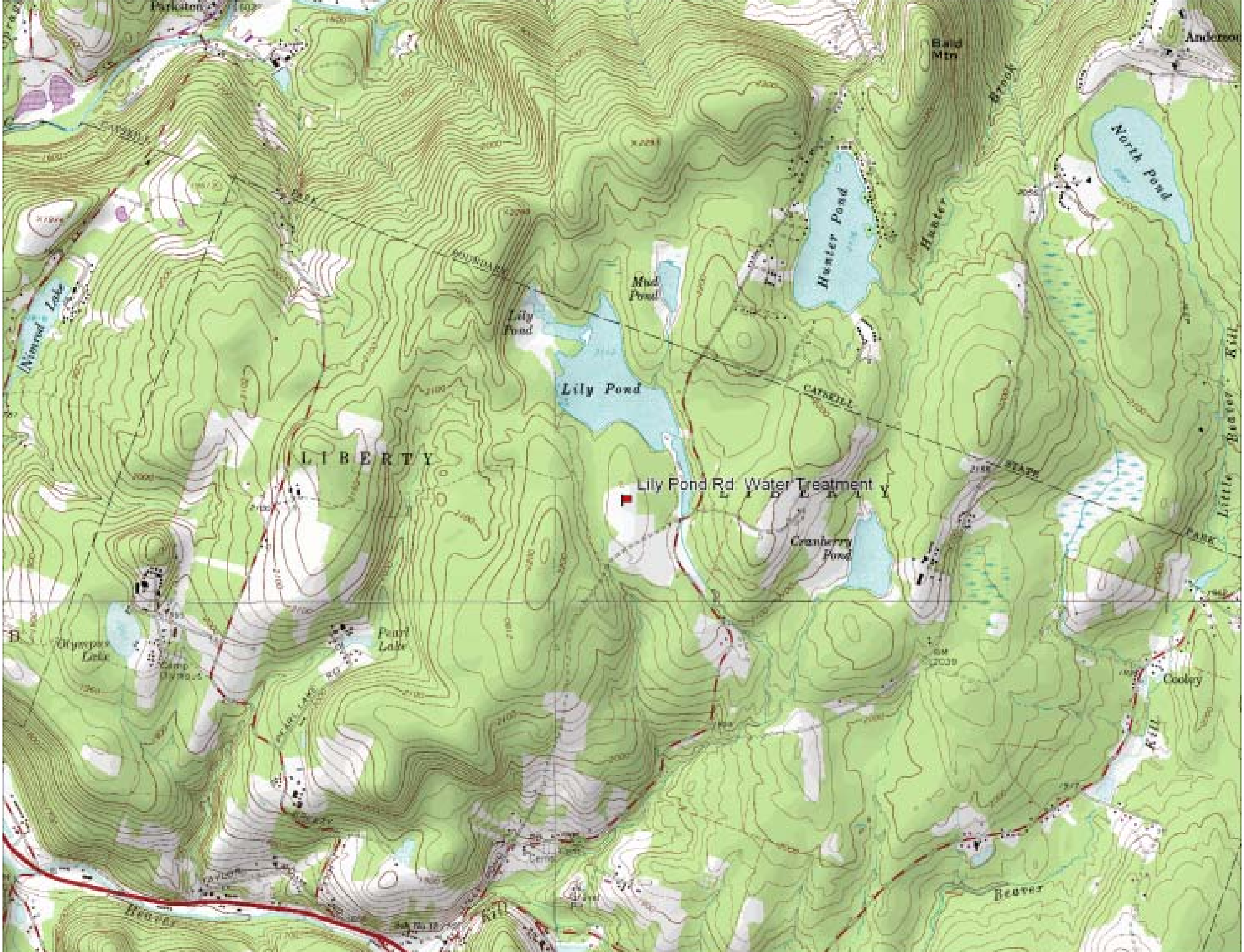
Blue shading indicates a column that shows a tax value not a cash transaction

Internal Rate of Return

Years 1 - 25:	27.9%

Appendix O

Lily Pond Water Treatment Facility – Village of Liberty


Lily Pond Rd Water Treatment
Lily Pond
Lily Pond
Mud Pond
Hunter Pond
North Pond
Cranberry Pond
Pearl Lake
Olympus Lake
Nimrod Lake
LIBERTY
Bald Mtn
Hunter Brook
Little Beaver Kill
Beaver Kill
Cooley
Anderson
Parksville
CATSKILL STATE PARK BOUNDARY

WindCad Turbine Performance Model

Fuhrlaender FL 250 Wind Turbine, 29.5 m rotor diameter

Prepared For:	**Lily Pond Water Treatment**
Site Location:	**Lily Pond Water Treatment**
Data Source:	**Truewind**
Date:	**4/29/2005**

250 kW

Inputs:

Ave. Wind (m/s) =	7.13
Weibull K =	2.221
Site Altitude (m) =	660
Wind Shear Exp. =	0.180
Anem. Height (m) =	85
Tower Height (m) =	50
Turbulence Factor =	20.0%

Results:

Hub Average Wind Speed (m/s) =	6.48
Air Density Factor =	-6%
Average Output Power (kW) =	49.77
Daily Energy Output (kWh) =	**1194.4**
Annual Energy Output (kWh) =	435,965
Monthly Energy Output =	36,330
Percent Operating Time =	82.3%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.67%	0.000
2	0.00	5.95%	0.000
3	0.75	8.99%	0.068
4	5.26	11.27%	0.593
5	18.79	12.49%	2.347
6	26.30	12.56%	3.305
7	44.34	11.63%	5.156
8	68.39	9.98%	6.823
9	95.44	7.97%	7.606
10	120.24	5.94%	7.145
11	142.79	4.14%	5.916
12	163.83	2.70%	4.430
13	171.35	1.65%	2.832
14	178.86	0.95%	1.692
15	187.13	0.51%	0.950
16	191.64	0.25%	0.488
17	201.41	0.12%	0.241
18	206.67	0.05%	0.109
19	217.94	0.02%	0.047
20	224.71	0.01%	0.019
	Totals:	99.85%	49.768

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Inputs

Average Wind Speed:	Use annual or monthly average wind speeds.
Weibull K Factor:	K=2 is used for inland sites, K=3 for coastal sites,
Site Altitude:	In meters above sea Level.
Wind Shear Exponent	1/7 or 0.143 is used for normal terrain, 0.167 for rough terrain, 0.110 for open water.
Anemometer Height	Is the sensor height at which the average wind speed was measured.
Tower Height	Is nominal hub height.
Turbulence Factor:	Iderating for turbulence, wire run losses and other performance influencing factors.

Results

Hub Ave. Wind Speed	orrected for wind shear and used to calculate the Weibull wind speed probability.
Air Density Factor	Is the reduction from sea level performance.
Average Power Output	average 24-hour power produced, without performance safety margin adjustment.
Daily Energy Output	Includes all deratings and is the primary performance parameter.
Monthly Energy Output	Is calculated from Daily Energy Output.
Annual Energy Output	Is calculated from Daily Energy Output.
Percent Operating Time	Is the time the wind turbine should be producing some power.

FL 250kW+ on 50m Tower

Prepared for: **Lily Pond**
Date: **4/29/2005**

Third Party Financed

Assumptions (Inputs)

Project Size (MW):	0.25
Total Installed Cost ($):	$625,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	435,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	1
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	67
Loan Downpayment (%):	35
Down Payment ($):	$218,750
Amount of Loan ($):	$243,750
Interest Rate (%):	3.5
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0.018
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	15.00
State Tax Credit (%):	0
Federal Tax Credit (%):	25

Results

Loan Payments

Monthly Payment ($):	($2,410)
Value of Interest Deduction ($):	$137
Net Monthly Payment ($):	($2,273)

Ave. Monthly Savings on Bill

Year 1 ($):	$2,538
Year 10 ($):	$2,803
Year 20 ($):	$3,096
Year 25 ($):	$3,420

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($139,453)	($139,453)
1	$30,450	$5,829	($4,350)	($2,500)	($27,276)	$61,359	$7,830	$0	($753)	$70,589	($68,865)
2	$30,755	$5,829	($4,481)	($2,575)	($27,276)	$31,238	$7,830	$0	($788)	$40,531	($28,333)
3	$31,062	$5,829	($4,615)	($2,652)	($27,276)	$18,743	$7,830	$0	($822)	$28,098	($235)
4	$31,373	$5,829	($4,753)	($2,732)	($27,276)	$11,246	$7,830	$0	($854)	$20,662	$20,427
5	$31,686	$5,829	($4,896)	($2,814)	($27,276)	$11,246	$7,830	$0	($885)	$20,720	$41,146
6	$32,003	$5,829	($5,043)	($2,898)	($27,276)	$5,637	$7,830	$0	($915)	$15,166	$56,313
7	$32,323	$5,829	($5,194)	($2,985)	($27,276)	$0	$7,830	$0	($944)	$9,583	$65,895
8	$32,647	$5,829	($5,350)	($3,075)	($27,276)	$0	$7,830	$0	($971)	$9,633	$75,529
9	$32,973	$0	($5,510)	($3,167)	($27,276)	$0	$7,830	$0	$0	$4,849	$80,378
10	$33,303	$0	($5,676)	($3,262)	($27,276)	$0	$7,830	$0	$0	$4,919	$85,297
11	$33,636	$0	($5,846)	($3,360)	$0	$0	$0	$0	($8,550)	$15,879	$101,176
12	$33,972	$0	($6,021)	($3,461)	$0	$0	$0	$0	($8,572)	$15,919	$117,095
13	$34,312	$0	($6,202)	($3,564)	$0	$0	$0	$0	($8,591)	$15,954	$133,049
14	$34,655	$0	($6,388)	($3,671)	$0	$0	$0	$0	($8,608)	$15,987	$149,036
15	$35,001	$0	($6,580)	($3,781)	$0	$0	$0	$0	($8,624)	$16,016	$165,053
16	$35,352	$0	($6,777)	($3,895)	$0	$0	$0	$0	($8,638)	$16,042	$181,094
17	$35,705	$0	($6,980)	($4,012)	$0	$0	$0	$0	($8,649)	$16,063	$197,158
18	$36,062	$0	($7,190)	($4,132)	$0	$0	$0	$0	($8,659)	$16,081	$213,239
19	$36,423	$0	($7,406)	($4,256)	$0	$0	$0	$0	($8,666)	$16,095	$229,333
20	$36,787	$0	($7,628)	($4,384)	$0	$0	$0	$0	($8,671)	$16,104	$245,437
21	$37,155	$0	($7,857)	($4,515)	$0	$0	$0	$0	($8,674)	$16,109	$261,546
22	$37,526	$0	($8,092)	($4,651)	$0	$0	$0	$0	($8,674)	$16,109	$277,655
23	$37,902	$0	($8,335)	($4,790)	$0	$0	$0	$0	($8,672)	$16,105	$293,760
24	$38,281	$0	($8,585)	($4,934)	$0	$0	$0	$0	($8,667)	$16,095	$309,855
25	$38,663	$0	($8,843)	($5,082)	$0	$0	$0	$0	($8,659)	$16,080	$325,935

Blue shading indicates a column that shows a tax value not a cash transaction

Internal Rate of Return

Years 1 - 25: **21.5%**

Village of Liberty Cashflow

Assumptions (Inputs)

Project Size (MW):	0.25
Annual Energy Output (kWh):	435,000
Energy Savings Value ($/kWh):	$0.0700
Energy Inflation Rate (%):	4
PPA Price ($/kWh):	$0.0700
PPA Escalator(%):	1
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years):	8
Green Tag Ownership(%):	33
Property Tax Rate (%):	0

Year	Energy Savings from Utility	Energy Payment to Third Party	Green Tag Revenue	Annual Cashflow	Project Cumulative Cashflow
1	$30,450.00	-$30,450.00	$2,871.00	$2,871.00	$2,871.00
2	$31,668.00	-$30,754.50	$2,871.00	$3,784.50	$6,655.50
3	$32,934.72	-$31,062.05	$2,871.00	$4,743.68	$11,399.18
4	$34,252.11	-$31,372.67	$2,871.00	$5,750.44	$17,149.62
5	$35,622.19	-$31,686.39	$2,871.00	$6,806.80	$23,956.42
6	$37,047.08	-$32,003.26	$2,871.00	$7,914.82	$31,871.24
7	$38,528.96	-$32,323.29	$2,871.00	$9,076.68	$40,947.92
8	$40,070.12	-$32,646.52	$2,871.00	$10,294.60	$51,242.52
9	$41,672.93	-$32,972.99	$0.00	$8,699.94	$59,942.46
10	$43,339.84	-$33,302.72	$0.00	$10,037.13	$69,979.59
11	$45,073.44	-$33,635.74	$0.00	$11,437.69	$81,417.28
12	$46,876.38	-$33,972.10	$0.00	$12,904.27	$94,321.56
13	$48,751.43	-$34,311.82	$0.00	$14,439.61	$108,761.17
14	$50,701.49	-$34,654.94	$0.00	$16,046.55	$124,807.72
15	$52,729.55	-$35,001.49	$0.00	$17,728.06	$142,535.77
16	$54,838.73	-$35,351.50	$0.00	$19,487.23	$162,023.00
17	$57,032.28	-$35,705.02	$0.00	$21,327.26	$183,350.26
18	$59,313.57	-$36,062.07	$0.00	$23,251.50	$206,601.76
19	$61,686.11	-$36,422.69	$0.00	$25,263.42	$231,865.18
20	$64,153.56	-$36,786.92	$0.00	$27,366.64	$259,231.82
21	$66,719.70	-$37,154.79	$0.00	$29,564.91	$288,796.73
22	$69,388.49	-$37,526.33	$0.00	$31,862.15	$320,658.89
23	$72,164.03	-$37,901.60	$0.00	$34,262.43	$354,921.32
24	$75,050.59	-$38,280.61	$0.00	$36,769.97	$391,691.29
25	$78,052.61	-$38,663.42	$0.00	$39,389.19	$431,080.48

Appendix P

AGY Farm

Swan Lake Sewer
Swan Lake
Fieldston Lake
Lake Earanbe
Ferndale
AGY
LIBERTY
L I B E R T Y
Middle
Mongaup
River
Bella Poultry
OLD RAILROAD GRADE

Vestas V47 on 65m Tower

Prepared for: **AGY**
Date: **4/29/2005**

Self Financed

Assumptions (Inputs)

Project Size (MW):	0.66
Total Installed Cost ($):	$1,400,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	1,090,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	3
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	100
Loan Downpayment (%):	35
Down Payment ($):	$490,000
Amount of Loan ($):	$618,800
Interest Rate (%):	6.5
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	7.00
State Tax Credit (%):	0
Federal Tax Credit (%):	25

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($341,775)	($341,775)
1	$76,300	$21,800	($10,900)	($6,600)	($76,032)	$150,381	$0	$0	$0	$154,949	($186,826)
2	$78,589	$21,800	($11,227)	($6,798)	($76,032)	$76,558	$0	$0	$0	$82,890	($103,935)
3	$80,947	$21,800	($11,564)	($7,002)	($76,032)	$45,935	$0	$0	$0	$54,084	($49,851)
4	$83,375	$21,800	($11,911)	($7,212)	($76,032)	$27,561	$0	$0	$0	$37,582	($12,270)
5	$85,876	$21,800	($12,268)	($7,428)	($76,032)	$27,561	$0	$0	$0	$39,509	$27,239
6	$88,453	$21,800	($12,636)	($7,651)	($76,032)	$13,815	$0	$0	$0	$27,748	$54,988
7	$91,106	$21,800	($13,015)	($7,881)	($76,032)	$0	$0	$0	$0	$15,979	$70,966
8	$93,839	$21,800	($13,406)	($8,117)	($76,032)	$0	$0	$0	$0	$18,085	$89,051
9	$96,655	$0	($13,808)	($8,361)	($76,032)	$0	$0	$0	$0	($1,545)	$87,506
10	$99,554	$0	($14,222)	($8,612)	($76,032)	$0	$0	$0	$0	$689	$88,195
11	$102,541	$0	($14,649)	($8,870)	$0	$0	$0	$0	$0	$79,022	$167,217
12	$105,617	$0	($15,088)	($9,136)	$0	$0	$0	$0	$0	$81,393	$248,610
13	$108,786	$0	($15,541)	($9,410)	$0	$0	$0	$0	$0	$83,835	$332,445
14	$112,049	$0	($16,007)	($9,692)	$0	$0	$0	$0	$0	$86,350	$418,795
15	$115,411	$0	($16,487)	($9,983)	$0	$0	$0	$0	$0	$88,940	$507,735
16	$118,873	$0	($16,982)	($10,283)	$0	$0	$0	$0	$0	$91,608	$599,344
17	$122,439	$0	($17,491)	($10,591)	$0	$0	$0	$0	$0	$94,357	$693,700
18	$126,112	$0	($18,016)	($10,909)	$0	$0	$0	$0	$0	$97,187	$790,888
19	$129,896	$0	($18,557)	($11,236)	$0	$0	$0	$0	$0	$100,103	$890,991
20	$133,793	$0	($19,113)	($11,573)	$0	$0	$0	$0	$0	$103,106	$994,097
21	$137,806	$0	($19,687)	($11,920)	$0	$0	$0	$0	$0	$106,199	$1,100,296
22	$141,940	$0	($20,277)	($12,278)	$0	$0	$0	$0	$0	$109,385	$1,209,682
23	$146,199	$0	($20,886)	($12,646)	$0	$0	$0	$0	$0	$112,667	$1,322,349
24	$150,585	$0	($21,512)	($13,026)	$0	$0	$0	$0	$0	$116,047	$1,438,395
25	$155,102	$0	($22,157)	($13,416)	$0	$0	$0	$0	$0	$119,528	$1,557,924

Blue shading indicates a column that shows a tax value not a cash transaction

Results

Loan Payments

Monthly Payment ($):	($7,026)
Value of Interest Deduction ($):	$690
Net Monthly Payment ($):	($6,336)

Ave. Monthly Savings on Bill

Year 1 ($):	$6,358
Year 10 ($):	$8,545
Year 20 ($):	$11,484
Year 25 ($):	$15,433

Internal Rate of Return

Years 1 - 25:	19.7%

WindCad Turbine Performance Model

Vestas V47 on 65m Tower

Prepared For:	**AGY**
Site Location:	**AGY**
Data Source:	**Truewind**
Date:	**4/29/2005**

660 kW

Inputs:

Ave. Wind (m/s) =	6.32
Weibull K =	2.22
Site Altitude (m) =	466
Wind Shear Exp. =	0.180
Anem. Height (m) =	65
Tower Height (m) =	65
urbulence Intensity =	20.0%

Results:

Hub Average Wind Speed (m/s) =	6.32
Air Density Factor =	-4%
Average Output Power (kW) =	124.58
Daily Energy Output (kWh) =	2989.9
Annual Energy Output (kWh) =	**1,091,303**
Monthly Energy Output =	90,942
Percent Operating Time =	90.7%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.82%	0.000
2	0.00	6.27%	0.000
3	0.00	9.43%	0.000
4	4.06	11.73%	0.476
5	34.38	12.88%	4.428
6	73.06	12.79%	9.346
7	123.29	11.66%	14.377
8	185.32	9.82%	18.207
9	255.77	7.68%	19.655
10	326.22	5.59%	18.251
11	391.31	3.80%	14.859
12	441.85	2.40%	10.625
13	474.78	1.42%	6.750
14	493.16	0.78%	3.870
15	500.82	0.40%	2.026
16	503.88	0.19%	0.981
17	505.41	0.09%	0.442
18	505.41	0.04%	0.185
19	505.41	0.01%	0.072
20	505.41	0.01%	0.026
2000, BWC	Totals:	99.85%	124.578

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Instructions:

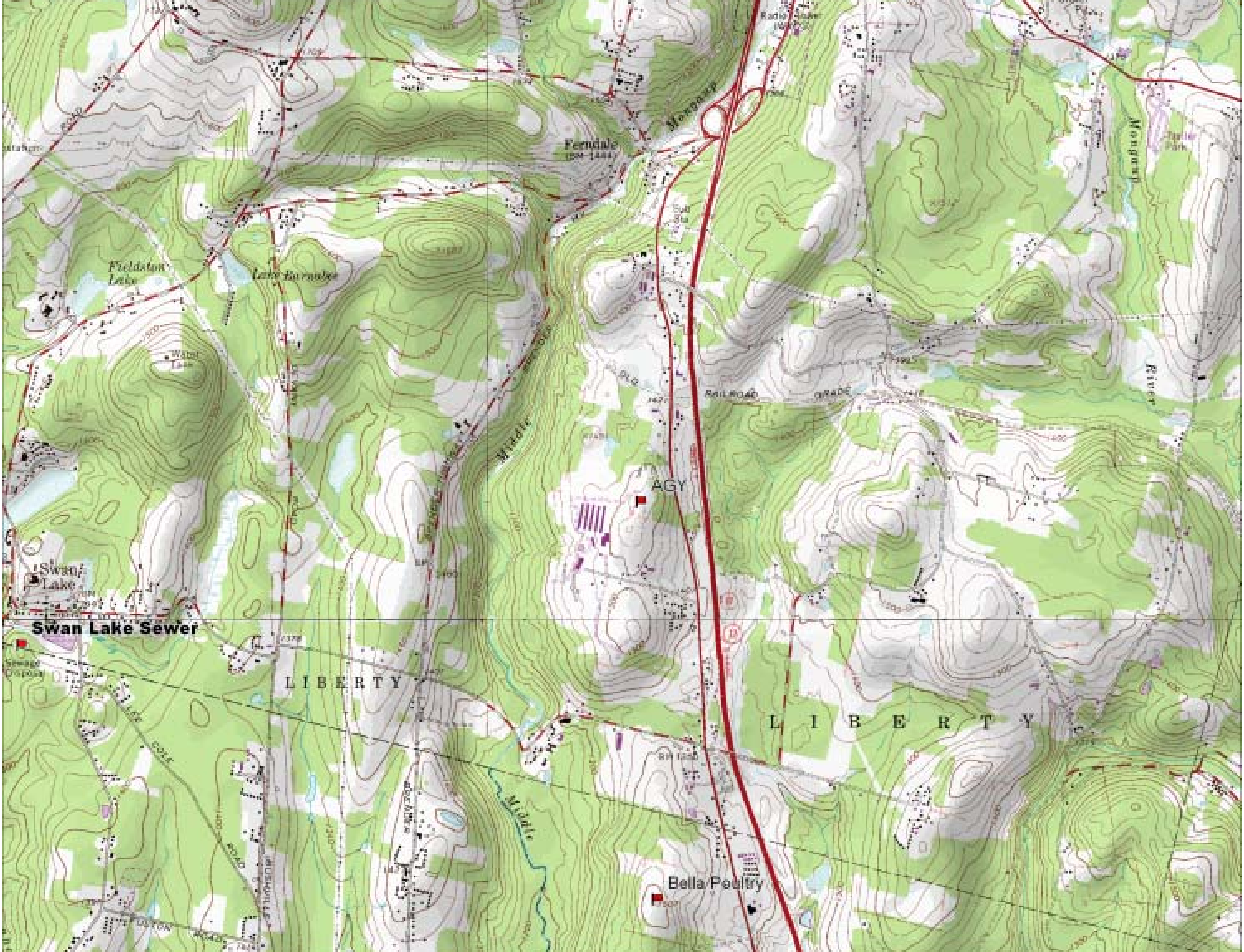
Inputs: Use annual or monthly **Average Wind** speeds. If **Weibull K** is not known, use K = 2 for inland sites, use 3 for coastal sites, and use 4 for island sites and trade wind regimes. **Site Altitude** is meters above sea level. **Wind Shear Exponent** is best assumed as "1/7" or 0.143. For rough terrain or high turbulence use 0.18. For very smooth terrain or open water use 0.110. **Anemometer Height** is for the data used for the **Average Wind** speed. If unknown, use 10 meters. **Tower Height** is the nominal height, eg.: 24 meters. **Turbulence Factor** is a derating for turbulence, product variability, and other performance influencing factors. Use 0.1 (10%) - 0.15 (15%) is most cases. Setting this factor to 0% will over-predict performance for most situations.

Results: Hub Average Wind Speed is corrected for wind shear and used to calculate the Weibull wind speed probability. **Air Density Factor** is the reduction from sea level performance. **Average Power Output** is the average continuous equivalent output of the turbine. **Daily Energy Output** is the average energy produced per day. **Annual** and **Monthly Energy Outputs** are calculated using the Daily value. **Percent Operating Time** is the time the turbine should be producing some power.

Limitations: This model uses a mathmatical idealization of the wind speed probability. The validity of this assumption is reduced as the time period under consideration (ie, the wind speed averaging period) is reduced. This model is best used with annual or monthly average wind speeds. Use of this model with daily or hourly average wind speed data is not recommended because the wind will not follow a Weibull distribution over short periods. Consult Bergey Windpower Co. for special needs. ***Your performance may vary.***

Appendix Q

Ackerman Farm


Swan Lake Sewer
Swan Lake
Fieldston Lake
Lake Ecrondas
Ferndale
Mongaup
Middle
LIBERTY
L I B E R T Y
AGY
RAILROAD GRADE
Bella Poultry
River

WindCad Turbine Performance Model

Vestas V47 on 65m Tower

Prepared For:	**AGY**
Site Location:	**AGY**
Data Source:	**Truewind**
Date:	**4/29/2005**

660 kW

Inputs:

Ave. Wind (m/s) =	6.32
Weibull K =	2.22
Site Altitude (m) =	466
Wind Shear Exp. =	0.180
Anem. Height (m) =	65
Tower Height (m) =	65
urbulence Intensity =	20.0%

Results:

Hub Average Wind Speed (m/s) =	6.32
Air Density Factor =	-4%
Average Output Power (kW) =	124.58
Daily Energy Output (kWh) =	2989.9
Annual Energy Output (kWh) =	**1,091,303**
Monthly Energy Output =	90,942
Percent Operating Time =	90.7%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.82%	0.000
2	0.00	6.27%	0.000
3	0.00	9.43%	0.000
4	4.06	11.73%	0.476
5	34.38	12.88%	4.428
6	73.06	12.79%	9.346
7	123.29	11.66%	14.377
8	185.32	9.82%	18.207
9	255.77	7.68%	19.655
10	326.22	5.59%	18.251
11	391.31	3.80%	14.859
12	441.85	2.40%	10.625
13	474.78	1.42%	6.750
14	493.16	0.78%	3.870
15	500.82	0.40%	2.026
16	503.88	0.19%	0.981
17	505.41	0.09%	0.442
18	505.41	0.04%	0.185
19	505.41	0.01%	0.072
20	505.41	0.01%	0.026
2000, BWC	Totals:	99.85%	124.578

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each wind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Instructions:

Inputs: Use annual or monthly **Average Wind** speeds. If **Weibull K** is not known, use K = 2 for inland sites, use 3 for coastal sites, and use 4 for island sites and trade wind regimes. **Site Altitude** is meters above sea level. **Wind Shear Exponent** is best assumed as "1/7" or 0.143. For rough terrain or high turbulence use 0.18. For very smooth terrain or open water use 0.110. **Anemometer Height** is for the data used for the **Average Wind** speed. If unknown, use 10 meters. **Tower Height** is the nominal height, eg.: 24 meters. **Turbulence Factor** is a derating for turbulence, product variability, and other performance influencing factors. Use 0.1 (10%) - 0.15 (15%) is most cases. Setting this factor to 0% will over-predict performance for most situations.

Results: Hub Average Wind Speed is corrected for wind shear and used to calculate the Weibull wind speed probability. **Air Density Factor** is the reduction from sea level performance. **Average Power Output** is the average continuous equivalent output of the turbine. **Daily Energy Output** is the average energy produced per day. **Annual** and **Monthly Energy Outputs** are calculated using the Daily value. **Percent Operating Time** is the time the turbine should be producing some power.

Limitations: This model uses a mathmatical idealization of the wind speed probability. The validity of this assumption is reduced as the time period under consideration (ie, the wind speed averaging period) is reduced. This model is best used with annual or monthly average wind speeds. Use of this model with daily or hourly average wind speed data is not recommended because the wind will not follow a Weibull distribution over short periods. Consult Bergey Windpower Co. for special needs. ***Your performance may vary.***

Vestas V47 on 65m Tower

Prepared for: AGY
Date: 4/29/2005

Self Financed

Assumptions (Inputs)

Project Size (MW):	0.66
Total Installed Cost ($):	$1,400,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	1,090,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	3
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	100
Loan Downpayment (%):	35
Down Payment ($):	$490,000
Amount of Loan ($):	$618,800
Interest Rate (%):	6.5
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	7.00
State Tax Credit (%):	0
Federal Tax Credit (%):	25

Results

Loan Payments

Monthly Payment ($):	($7,026)
Value of Interest Deduction ($):	$690
Net Monthly Payment ($):	($6,336)

Ave. Monthly Savings on Bill

Year 1 ($):	$6,358
Year 10 ($):	$8,545
Year 20 ($):	$11,484
Year 25 ($):	$15,433

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($341,775)	($341,775)
1	$76,300	$21,800	($10,900)	($6,600)	($76,032)	$150,381	$0	$0	$0	$154,949	($186,826)
2	$78,589	$21,800	($11,227)	($6,798)	($76,032)	$76,558	$0	$0	$0	$82,890	($103,935)
3	$80,947	$21,800	($11,564)	($7,002)	($76,032)	$45,935	$0	$0	$0	$54,084	($49,851)
4	$83,375	$21,800	($11,911)	($7,212)	($76,032)	$27,561	$0	$0	$0	$37,582	($12,270)
5	$85,876	$21,800	($12,268)	($7,428)	($76,032)	$27,561	$0	$0	$0	$39,509	$27,239
6	$88,453	$21,800	($12,636)	($7,651)	($76,032)	$13,815	$0	$0	$0	$27,748	$54,988
7	$91,106	$21,800	($13,015)	($7,881)	($76,032)	$0	$0	$0	$0	$15,979	$70,966
8	$93,839	$21,800	($13,406)	($8,117)	($76,032)	$0	$0	$0	$0	$18,085	$89,051
9	$96,655	$0	($13,808)	($8,361)	($76,032)	$0	$0	$0	$0	($1,545)	$87,506
10	$99,554	$0	($14,222)	($8,612)	($76,032)	$0	$0	$0	$0	$689	$88,195
11	$102,541	$0	($14,649)	($8,870)	$0	$0	$0	$0	$0	$79,022	$167,217
12	$105,617	$0	($15,088)	($9,136)	$0	$0	$0	$0	$0	$81,393	$248,610
13	$108,786	$0	($15,541)	($9,410)	$0	$0	$0	$0	$0	$83,835	$332,445
14	$112,049	$0	($16,007)	($9,692)	$0	$0	$0	$0	$0	$86,350	$418,795
15	$115,411	$0	($16,487)	($9,983)	$0	$0	$0	$0	$0	$88,940	$507,735
16	$118,873	$0	($16,982)	($10,283)	$0	$0	$0	$0	$0	$91,608	$599,344
17	$122,439	$0	($17,491)	($10,591)	$0	$0	$0	$0	$0	$94,357	$693,700
18	$126,112	$0	($18,016)	($10,909)	$0	$0	$0	$0	$0	$97,187	$790,888
19	$129,896	$0	($18,557)	($11,236)	$0	$0	$0	$0	$0	$100,103	$890,991
20	$133,793	$0	($19,113)	($11,573)	$0	$0	$0	$0	$0	$103,106	$994,097
21	$137,806	$0	($19,687)	($11,920)	$0	$0	$0	$0	$0	$106,199	$1,100,296
22	$141,940	$0	($20,277)	($12,278)	$0	$0	$0	$0	$0	$109,385	$1,209,682
23	$146,199	$0	($20,886)	($12,646)	$0	$0	$0	$0	$0	$112,667	$1,322,349
24	$150,585	$0	($21,512)	($13,026)	$0	$0	$0	$0	$0	$116,047	$1,438,395
25	$155,102	$0	($22,157)	($13,416)	$0	$0	$0	$0	$0	$119,528	$1,557,924

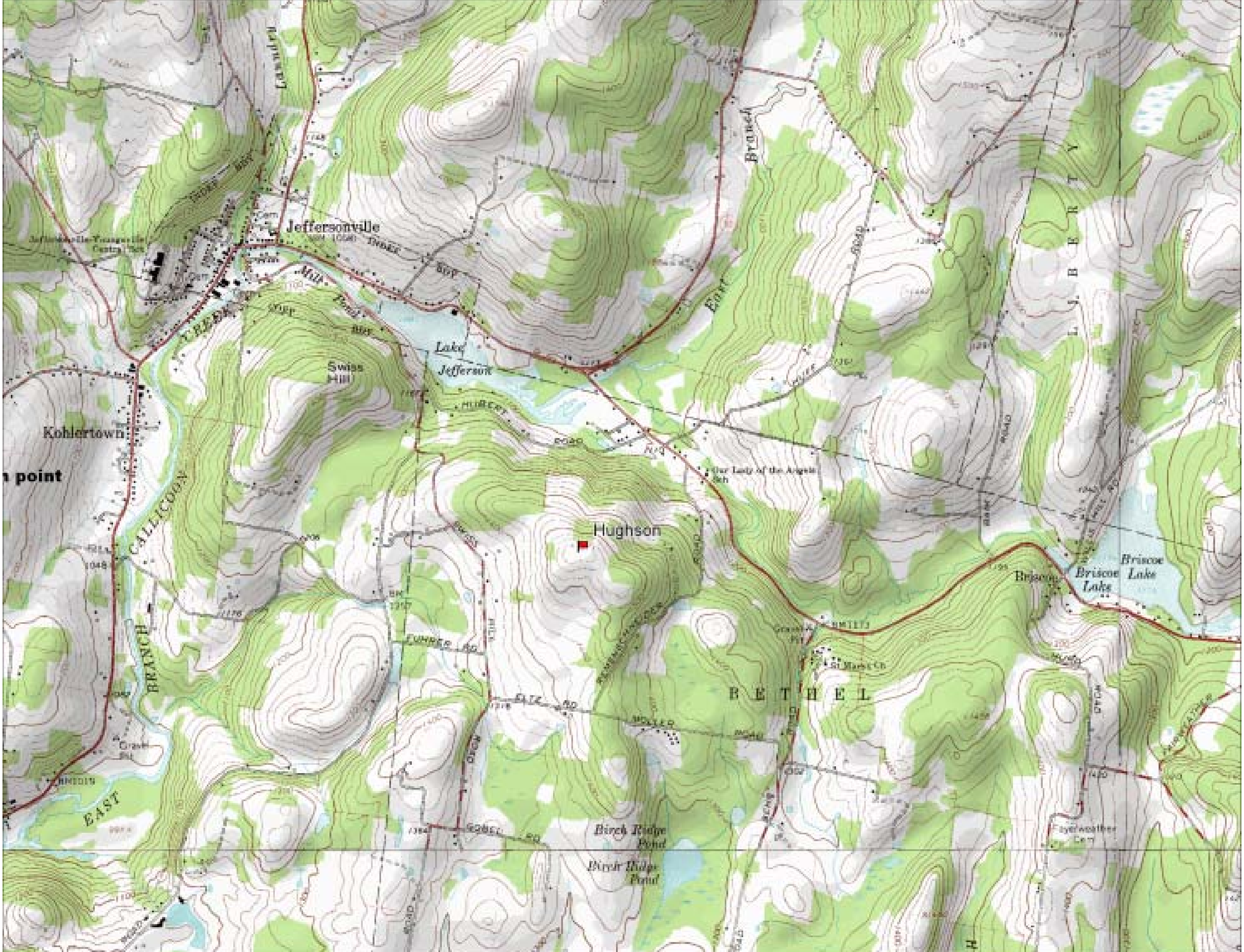
Blue shading indicates a column that shows a tax value not a cash transaction

Internal Rate of Return

Years 1 - 25:	19.7%

Appendix R

Hughson Farm


Jeffersonville
Swiss Hill
Lake Jefferson
Kohlertown
n point
CALLICOON
BRANCH
EAST
CREEK
Mill Pond
East Branch
Laundry
Hughson
HUBERT ROAD
Our Lady of the Angels Sch
FUMBER RD
EATZ RD
MOLLER ROAD
GOBEL RD
Birch Ridge Pond
BETHEL
LIBERTY
Briscoe
Briscoe Lake
St Marks Ch
Fayerweather Cem
Gravel Pit
BM 1173

WindCad Turbine Performance Model

Fuhrlaender FL 250 Wind Turbine, 29.5 m rotor diameter

Prepared For:	**Hughson**
Site Location:	**Hughson**
Data Source:	**Truewind**
Date:	**4/29/2005**

250 kW

Inputs:	
Ave. Wind (m/s) =	6.704
Weibull K =	2.23
Site Altitude (m) =	482
Wind Shear Exp. =	0.180
Anem. Height (m) =	65
Tower Height (m) =	50
Turbulence Factor =	20.0%

Results:	
Hub Average Wind Speed (m/s) =	6.39
Air Density Factor =	-4%
Average Output Power (kW) =	49.10
Daily Energy Output (kWh) =	**1178.5**
Annual Energy Output (kWh) =	430,156
Monthly Energy Output =	35,846
Percent Operating Time =	81.9%

Weibull Performance Calculations

Wind Speed Bin (m/s)	Power (kW)	Wind Probability (f)	Net kW @ V
1	0.00	2.71%	0.000
2	0.00	6.08%	0.000
3	0.76	9.19%	0.070
4	5.35	11.52%	0.616
5	19.12	12.73%	2.433
6	26.76	12.74%	3.408
7	45.11	11.70%	5.278
8	69.58	9.94%	6.916
9	97.10	7.84%	7.617
10	122.34	5.76%	7.052
11	145.27	3.95%	5.740
12	166.68	2.53%	4.214
13	174.33	1.51%	2.634
14	181.98	0.84%	1.535
15	190.39	0.44%	0.837
16	194.97	0.21%	0.417
17	204.91	0.10%	0.199
18	210.27	0.04%	0.087
19	221.73	0.02%	0.036
20	228.62	0.01%	0.014
	Totals:	99.86%	49.105

Weibull Calculations:
Wind speed probability is calculated as a Weibull curve defined by the average wind speed and a shape factor, K. To facilitate piece-wise integration, the wind speed range is broken down into "bins" of 1 m/s in width (Column 1). For each ind speed bin, instantaneous wind turbine power (W, Column 2)) is multiplied by the Weibull wind speed probability (f, Column 3). This cross product (Net W, Column 4) is the contribution to average turbine power output contributed by wind speeds in that bin. The sum of these contributions is the average power output of the turbine on a continuous, 24 hour, basis.
Best results are achieved using annual or monthly average wind speeds. Use of daily or hourly average speeds is not recommended.

Inputs

Average Wind Speed:	Use annual or monthly average wind speeds.
Weibull K Factor:	K=2 is used for inland sites, K=3 for coastal sites,
Site Altitude:	In meters above sea Level.
Wind Shear Exponent	1/7 or 0.143 is used for normal terrain, 0.167 for rough terrain, 0.110 for open water.
Anemometer Height	Is the sensor height at which the average wind speed was measured.
Tower Height	Is nominal hub height.
Turbulence Factor:	derating for turbulence, wire run losses and performance influencing factors.

Results

Hub Ave. Wind Speed	corrected for wind shear and used to calculate the Weibull wind speed probability.
Air Density Factor	Is the reduction from sea level performance.
Average Power Output	24-hour power produced, without the performance safety margin adjustment.
Daily Energy Output	Includes all deratings and is the primary performance parameter.
Monthly Energy Output	Is calculated from Daily Energy Output.
Annual Energy Output	Is calculated from Daily Energy Output.
Percent Operating Time	Is the time the wind turbine should be producing some power.

FL 250kW on 50 m tower

Prepared for: Hughson
Date: 4/29/2005

Self Financed

Assumptions (Inputs)

Project Size (MW):	0.25
Total Installed Cost ($):	$625,000
Allocation to Business (%):	100
Annual Energy Output (kWh):	430,000
PPA Value ($/kWh):	$0.0700
PPA Escalator (%):	3
Green Tag or REC Value ($/kWh):	$0.0200
Length of Green Tag Contract (Years)	8
Green Tag Ownership (%)	100
Loan Downpayment (%):	35
Down Payment ($):	$218,750
Amount of Loan ($):	$243,750
Interest Rate (%):	6.5
Loan Term (Years):	12
Month Installed:	0
Net Federal Tax Rate (%):	35
Net State Tax Rate (%):	8
PTC Value ($/kWh):	0
O & M Cost ($/kWh):	$0.010
O & M Inflation Rate (%):	3
Insurance Cost ($/MW)	10000
Insurance Inflation Rate (%)	3
State Rebate (%):	15.00
State Tax Credit (%):	0
Federal Tax Credit (%):	25

Results

Loan Payments

Monthly Payment ($):	($2,442)
Value of Interest Deduction ($):	$279
Net Monthly Payment ($):	($2,164)

Ave. Monthly Savings on Bill

Year 1 ($):	$2,508
Year 10 ($):	$3,371
Year 20 ($):	$4,530
Year 25 ($):	$6,088

Annual Cash Flow Model

Year	Net Energy	Green Tag Sales	O&M Costs	Insurance Costs	Net Loan Payments	Net Deprec.	Production Tax Credit	Sales Tax	Income Tax	Annual Cash Flow	Total Cash Flow
0										($139,453)	($139,453)
1	$30,100	$8,600	($4,300)	($2,500)	($25,964)	$61,359	$0	$0	$0	$67,296	($72,157)
2	$31,003	$8,600	($4,429)	($2,575)	($25,964)	$31,238	$0	$0	$0	$37,873	($34,284)
3	$31,933	$8,600	($4,562)	($2,652)	($25,964)	$18,743	$0	$0	$0	$26,098	($8,186)
4	$32,891	$8,600	($4,699)	($2,732)	($25,964)	$11,246	$0	$0	$0	$19,342	$11,156
5	$33,878	$8,600	($4,840)	($2,814)	($25,964)	$11,246	$0	$0	$0	$20,106	$31,262
6	$34,894	$8,600	($4,985)	($2,898)	($25,964)	$5,637	$0	$0	$0	$15,284	$46,546
7	$35,941	$8,600	($5,134)	($2,985)	($25,964)	$0	$0	$0	$0	$10,458	$57,004
8	$37,019	$8,600	($5,288)	($3,075)	($25,964)	$0	$0	$0	$0	$11,292	$68,297
9	$38,130	$0	($5,447)	($3,167)	($25,964)	$0	$0	$0	$0	$3,552	$71,849
10	$39,274	$0	($5,611)	($3,262)	($25,964)	$0	$0	$0	$0	$4,438	$76,287
11	$40,452	$0	($5,779)	($3,360)	($25,964)	$0	$0	$0	$0	$5,350	$81,636
12	$41,665	$0	($5,952)	($3,461)	($25,964)	$0	$0	$0	$0	$6,289	$87,925
13	$42,915	$0	($6,131)	($3,564)	$0	$0	$0	$0	$0	$33,220	$121,146
14	$44,203	$0	($6,315)	($3,671)	$0	$0	$0	$0	$0	$34,217	$155,362
15	$45,529	$0	($6,504)	($3,781)	$0	$0	$0	$0	$0	$35,243	$190,606
16	$46,895	$0	($6,699)	($3,895)	$0	$0	$0	$0	$0	$36,301	$226,906
17	$48,302	$0	($6,900)	($4,012)	$0	$0	$0	$0	$0	$37,390	$264,296
18	$49,751	$0	($7,107)	($4,132)	$0	$0	$0	$0	$0	$38,511	$302,807
19	$51,243	$0	($7,320)	($4,256)	$0	$0	$0	$0	$0	$39,667	$342,474
20	$52,781	$0	($7,540)	($4,384)	$0	$0	$0	$0	$0	$40,857	$383,331
21	$54,364	$0	($7,766)	($4,515)	$0	$0	$0	$0	$0	$42,082	$425,413
22	$55,995	$0	($7,999)	($4,651)	$0	$0	$0	$0	$0	$43,345	$468,758
23	$57,675	$0	($8,239)	($4,790)	$0	$0	$0	$0	$0	$44,645	$513,403
24	$59,405	$0	($8,486)	($4,934)	$0	$0	$0	$0	$0	$45,985	$559,388
25	$61,187	$0	($8,741)	($5,082)	$0	$0	$0	$0	$0	$47,364	$606,752

Blue shading indicates a column that shows a tax value not a cash transaction

Internal Rate of Retrurn

Years 1 - 25:	21.5%

Appendix S

Economic Pro Forma Analysis – Small Agricultural Site

BWC 10 kW GridTek System Cash Flow

Prepared for: **Sample Farm-Sullivan County, NY**

Assumptions (Inputs)

Total Installed Cost ($):	$53,150
Allocation to Business (%):	0
Annual Energy Output (kWh):	12,299
Electricity Cost ($/kWh):	$0.1100
Electricity Inflation Rate (%):	5
Down Payment (%):	100
Down Payment ($):	$21,260
Amount of Loan ($):	$0
Interest Rate (%):	2
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	25
Net State Tax Rate (%):	8
O & M Cost ($/kWh):	$0.016
O & M Inflation Rate (%):	3
State Rebate (%):	60
State Tax Credit (%):	0
Federal Tax Credit (%):	0

Results

Loan Payments

Monthly Payment ($):	$0
Value of Interest Deduction ($):	$0
Net Monthly Payment ($):	$0

Ave. Monthly Savings on Bill

Year 1 ($):	$113
Year 10 ($):	$184
Year 20 ($):	$299
Year 30 ($):	$487

Internal Rate of Retrurn

Years 1 - 30:	8.6%

Annual Cash Flow Model

Year	Net Energy	O&M Costs	Net Deprec.	Net Loan Payments	Annual Cash Flow	Total Cash Flow
0					($21,260)	($21,260)
1	$1,353	$0	$0	$0	$1,353	($19,907)
2	$1,421	($203)	$0	$0	$1,218	($18,689)
3	$1,492	($209)	$0	$0	$1,283	($17,406)
4	$1,566	($215)	$0	$0	$1,351	($16,055)
5	$1,644	($221)	$0	$0	$1,423	($14,632)
6	$1,727	($228)	$0	$0	$1,499	($13,134)
7	$1,813	($235)	$0	$0	$1,578	($11,556)
8	$1,904	($242)	$0	$0	$1,662	($9,894)
9	$1,999	($249)	$0	$0	$1,750	($8,145)
10	$2,099	($257)	$0	$0	$1,842	($6,303)
11	$2,204	($264)	$0	$0	$1,939	($4,363)
12	$2,314	($272)	$0	$0	$2,042	($2,322)
13	$2,430	($281)	$0	$0	$2,149	($173)
14	$2,551	($289)	$0	$0	$2,262	$2,089
15	$2,679	($298)	$0	$0	$2,381	$4,470
16	$2,813	($307)	$0	$0	$2,506	$6,976
17	$2,953	($316)	$0	$0	$2,637	$9,614
18	$3,101	($325)	$0	$0	$2,776	$12,389
19	$3,256	($335)	$0	$0	$2,921	$15,310
20	$3,419	($345)	$0	$0	$3,074	$18,384
21	$3,590	($355)	$0	$0	$3,234	$21,618
22	$3,769	($366)	$0	$0	$3,403	$25,021
23	$3,958	($377)	$0	$0	$3,580	$28,601
24	$4,155	($388)	$0	$0	$3,767	$32,369
25	$4,363	($400)	$0	$0	$3,963	$36,332
26	$4,581	($412)	$0	$0	$4,169	$40,501
27	$4,810	($424)	$0	$0	$4,386	$44,887
28	$5,051	($437)	$0	$0	$4,614	$49,501
29	$5,304	($450)	$0	$0	$4,853	$54,354
30	$5,569	($464)	$0	$0	$5,105	$59,459

Conservative assumption of no scrap value after 30 years.

Cash flow analysis is pre-tax.

Appendix T

Economic Pro Forma Analysis – Residential

10 kW System Cash Flow

Prepared for: **Sample Residence-Sullivan County, NY**

Assumptions (Inputs)

Total Installed Cost ($):	$53,150
Allocation to Business (%):	0
Annual Energy Output (kWh):	12,299
Electricity Cost ($/kWh):	$0.1100
Electricity Inflation Rate (%):	5
Down Payment (%):	100
Down Payment ($):	$26,575
Amount of Loan ($):	$0
Interest Rate (%):	2
Loan Term (Years):	10
Month Installed:	0
Net Federal Tax Rate (%):	25
Net State Tax Rate (%):	8
O & M Cost ($/kWh):	$0.016
O & M Inflation Rate (%):	3
State Rebate (%):	50
State Tax Credit (%):	0
Federal Tax Credit (%):	0

Results

Loan Payments

Monthly Payment ($):	$0
Value of Interest Deduction ($):	$0
Net Monthly Payment ($):	$0

Ave. Monthly Savings on Bill

Year 1 ($):	$113
Year 10 ($):	$184
Year 20 ($):	$299
Year 30 ($):	$487

Internal Rate of Retrurn

Years 1 - 30:	6.9%

Annual Cash Flow Model

Year	Net Energy	O&M Costs	Net Deprec.	Net Loan Payments	Annual Cash Flow	Total Cash Flow
0					($26,575)	($26,575)
1	$1,353	$0	$0	$0	$1,353	($25,222)
2	$1,421	($203)	$0	$0	$1,218	($24,004)
3	$1,492	($209)	$0	$0	$1,283	($22,721)
4	$1,566	($215)	$0	$0	$1,351	($21,370)
5	$1,644	($221)	$0	$0	$1,423	($19,947)
6	$1,727	($228)	$0	$0	$1,499	($18,449)
7	$1,813	($235)	$0	$0	$1,578	($16,871)
8	$1,904	($242)	$0	$0	$1,662	($15,209)
9	$1,999	($249)	$0	$0	$1,750	($13,460)
10	$2,099	($257)	$0	$0	$1,842	($11,618)
11	$2,204	($264)	$0	$0	$1,939	($9,678)
12	$2,314	($272)	$0	$0	$2,042	($7,637)
13	$2,430	($281)	$0	$0	$2,149	($5,488)
14	$2,551	($289)	$0	$0	$2,262	($3,226)
15	$2,679	($298)	$0	$0	$2,381	($845)
16	$2,813	($307)	$0	$0	$2,506	$1,661
17	$2,953	($316)	$0	$0	$2,637	$4,299
18	$3,101	($325)	$0	$0	$2,776	$7,074
19	$3,256	($335)	$0	$0	$2,921	$9,995
20	$3,419	($345)	$0	$0	$3,074	$13,069
21	$3,590	($355)	$0	$0	$3,234	$16,303
22	$3,769	($366)	$0	$0	$3,403	$19,706
23	$3,958	($377)	$0	$0	$3,580	$23,286
24	$4,155	($388)	$0	$0	$3,767	$27,054
25	$4,363	($400)	$0	$0	$3,963	$31,017
26	$4,581	($412)	$0	$0	$4,169	$35,186
27	$4,810	($424)	$0	$0	$4,386	$39,572
28	$5,051	($437)	$0	$0	$4,614	$44,186
29	$5,304	($450)	$0	$0	$4,853	$49,039
30	$5,569	($464)	$0	$0	$5,105	$54,144

Conservative assumption of no scrap value after 30 years.

Cash flow analysis is pre-tax.

Appendix U

JEDI Project Data Summary – Utility-Scale Wind Development

Utility Scale Wind Plant - Project Data Summary			
Year of Construction		2007	
Project Location		NEW YORK	
Project Size - Nameplate Capacity (MW)		336.0	
Turbine Size (KW)		1500	
Number of Turbines		224	
Construction Cost ($/KW)		$1,400	
Annual Direct O&M Cost ($/KW)		$12.50	
Money Value (Dollar Year)		2007	
Project Construction Cost		$470,400,000	
Local Spending		$55,002,261	
Total Annual Operational Expenses		$77,176,960	
Direct Operating and Maintenance Costs		$4,200,000	
Local Spending		$2,626,253	
Other Annual Costs		$72,976,960	
Local Spending		$2,228,800	
Debt and Equity Payments		$0	
Property Taxes		$1,332,800	
Land Lease		$896,000	

Local Economic Impacts - Summary Results			
	Jobs	**Earnings**	**Output**
During construction period			
Direct Impacts	431	$17.90	$53.75
Construction Sector Only	400	$16.72	$50.39
Indirect Impacts	211	$10.16	$30.20
Induced Impacts	294	$12.35	$34.19
Total Impacts (Direct, Indirect, Induced)	**936**	**$40.42**	**$118.14**
During operating years (annual)			
Direct Impacts	82	$2.81	$4.48
Plant Workers Only	68	$2.09	$2.09
Indirect Impacts	11	$0.54	$1.63
Induced Impacts	33	$1.37	$3.79
Total Impacts (Direct, Indirect, Induced)	**126**	**$4.72**	**$9.90**

Notes: Earnings and Output values are millions of dollars in year 2007 dollars. Jobs are full-time equivalent for one year.

Plant workers includes field technicians, administration and management.

Economic impacts "During operating years" represent impacts that occur from plant operations/expenditures.

The analysis does not include impacts associated with spending of plant "profits" and assumes no tax abatement.

Totals may not add up due to independent rounding.

Detailed Wind Plant Project Data Costs		NEW YORK	
Construction Costs		**Cost**	**Local Share**
Materials			
Construction (concrete rebar, equip, roads and site prep)		$24,713,133	90%
Transformer		$6,242,865	0%
Electrical (drop cable, wire,)		$2,927,688	100%
HV line extension		$5,381,780	100%
Materials Subtotal		$39,265,466	
Labor			
Foundation		$2,152,712	100%
Erection		$2,152,712	75%
Electrical		$2,367,983	75%
Management/supervision		$1,291,627	0%
Labor Subtotal		$7,965,034	
Construction Subtotal		$47,230,500	
Equipment Costs			
Turbines		$258,390,720	0%
Blades		$86,130,240	0%
Towers		$54,096,000	0%
Equipment Subtotal		$398,616,960	
Other Costs			
HV Sub/Interconnection		$17,221,695	100%
Engineering		$5,644,800	0%
Legal Services		$437,472	100%
Land Easements		$0	100%
Site Certificate		$1,248,573	100%
Other Subtotal		$24,552,540	
Total Project Costs		**$470,400,000**	
Wind Plant Annual Operating and Maintenance Costs			
		Cost	**Local Share**
Personnel			
Field Salaries		$1,628,571	100%
Adminstrative		$428,571	100%
Manangement		$1,285,714	100%
Personnel Subtotal		$3,342,857	
Materials and Services			
Vehicles		$60,000	100%
Misc. Services		$171,429	80%
Fees, Permits, Licenses		$60,000	100%
Misc. Materials		$171,429	100%
Insurance		$257,143	0%
Fuel (gals)		$42,857	100%
Tools and Misc. Supplies		$68,571	100%
Spare Parts Inventory		$25,714	2%
Materials and Services Subtotal		$857,143	
Debt Payment (average annual)		$54,566,400	0%
Equity Payment - Individuals		$0	100%
Equity Payment - Corporate		$16,181,760	0%
Property Taxes		$1,332,800	100%
Land Lease		$896,000	100%
Total Annual Operating and Maintenance Costs		**$77,176,960**	

Other Parameters			
			Local Share
Financial Parameters			
Debt Financing			
Percentage financed		80%	0%
Years financed (term)		10	
Interest rate		10%	
Equity Financing			
Percentage equity		20%	
Individual Investors (percent of total equity)		0%	100%
Corporate Investors (percent of total equity)		100%	0%
Return on equity (annual interest rate)		16%	
Repayment term (years)		10	
Tax Parameters			
Local Property/Other Tax Rate (percent of taxable value)		1.0%	
Assessed value (percent of construction cost)		85%	
Taxable Value (percent of assessed value)		33%	
Taxable Value		$133,280,000	
Local Taxes		$1,332,800	100%
Land Lease Parameters			
Land Lease Cost (per tubine)		$4,000	
Land Lease (total cost)		$896,000	
Lease Payment recipient (F = farmer/household, O = Other)		F	100%
Payroll Parameters		**Base Wage per Hour**	**Annual Wage**
Field Salaries (technicians, other)		$15.50	$32,240
Adminstrative		$11.04	$22,968
Manangement		$26.00	$54,080

Appendix V

JEDI Project Data Summary – Onsite Example

Onsite 'Wind Plant - Project Data Summary			
Year of Construction		2007	
Project Location		NEW YORK	
Project Size - Nameplate Capacity (MW)		0.7	
Turbine Size (KW)		660	
Number of Turbines		1	
Construction Cost ($/KW)		$2,121	
Annual Direct O&M Cost ($/KW)		$30.00	
Money Value (Dollar Year)		2007	
Project Construction Cost		$1,399,860	
Local Spending		$163,681	
Total Annual Operational Expenses		$236,065	
Direct Operating and Maintenance Costs		$19,800	
Local Spending		$12,381	
Other Annual Costs		$216,265	
Local Spending		$5,726	
Debt and Equity Payments		$0	
Property Taxes		$3,966	
Land Lease		$1,760	
Local Economic Impacts - Summary Results			
	Jobs	**Earnings**	**Output**
During construction period			
Direct Impacts	1	$0.05	$0.16
Construction Sector Only	1	$0.05	$0.15
Indirect Impacts	1	$0.03	$0.09
Induced Impacts	1	$0.04	$0.10
Total Impacts (Direct, Indirect, Induced)	**3**	**$0.12**	**$0.35**
During operating years (annual)			
Direct Impacts	0.36566	$0.01	$0.02
Plant Workers Only	0.318433	$0.01	$0.01
Indirect Impacts	0.044267	$0.00	$0.01
Induced Impacts	0.125596	$0.01	$0.01
Total Impacts (Direct, Indirect, Induced)	**0.535522**	**$0.02**	**$0.04**
Notes: Earnings and Output values are millions of dollars in year 2007 dollars. Jobs are full-time equivalent for one year.			
Plant workers includes field technicians, administration and management.			
Economic impacts "During operating years" represent impacts that occur from plant operations/expenditures.			
The analysis does not include impacts associated with spending of plant "profits" and assumes no tax abatement.			
Totals may not add up due to independent rounding.			

Detailed Wind Plant Project Data Costs		NEW YORK	
Construction Costs		**Cost**	**Local Share**
Materials			
Construction (concrete rebar, equip, roads and site prep)		$73,544	90%
Transformer		$18,578	0%
Electrical (drop cable, wire,)		$8,712	100%
HV line extension		$16,016	100%
Materials Subtotal		$116,850	
Labor			
Foundation		$6,406	100%
Erection		$6,406	75%
Electrical		$7,047	75%
Management/supervision		$3,844	0%
Labor Subtotal		$23,703	
Construction Subtotal		$140,553	
Equipment Costs			
Turbines		$768,943	0%
Blades		$256,314	0%
Towers		$160,984	0%
Equipment Subtotal		$1,186,241	
Other Costs			
HV Sub/Interconnection		$51,250	100%
Engineering		$16,798	0%
Legal Services		$1,302	100%
Land Easements		$0	100%
Site Certificate		$3,716	100%
Other Subtotal		$73,066	
Total Project Costs		**$1,399,860**	
Wind Plant Annual Operating and Maintenance Costs			
		Cost	**Local Share**
Personnel			
Field Salaries		$7,678	100%
Adminstrative		$2,020	100%
Manangement		$6,061	100%
Personnel Subtotal		$15,759	
Materials and Services			
Vehicles		$283	100%
Misc. Services		$808	80%
Fees, Permits, Licenses		$283	100%
Misc. Materials		$808	100%
Insurance		$1,212	0%
Fuel (gals)		$202	100%
Tools and Misc. Supplies		$323	100%
Spare Parts Inventory		$121	2%
Materials and Services Subtotal		$4,041	
Debt Payment (average annual)		$162,384	0%
Equity Payment - Individuals		$0	100%
Equity Payment - Corporate		$48,155	0%
Property Taxes		$3,966	100%
Land Lease		$1,760	100%
Total Annual Operating and Maintenance Costs		**$236,065**	

Other Parameters			
			Local Share
Financial Parameters			
Debt Financing			
Percentage financed		80%	0%
Years financed (term)		10	
Interest rate		10%	
Equity Financing			
Percentage equity		20%	
Individual Investors (percent of total equity)		0%	100%
Corporate Investors (percent of total equity)		100%	0%
Return on equity (annual interest rate)		16%	
Repayment term (years)		10	
Tax Parameters			
Local Property/Other Tax Rate (percent of taxable value)		1.0%	
Assessed value (percent of construction cost)		85%	
Taxable Value (percent of assessed value)		33%	
Taxable Value		$396,627	
Local Taxes		$3,966	100%
Land Lease Parameters			
Land Lease Cost (per tubine)		$1,760	
Land Lease (total cost)		$1,760	
Lease Payment recipient (F = farmer/household, O = Other)		F	100%
Payroll Parameters		**Base Wage per Hour**	**Annual Wage**
Field Salaries (technicians, other)		$15.50	$32,240
Adminstrative		$11.04	$22,968
Manangement		$26.00	$54,080