# 5.0 ALTERNATIVES ANALYSIS

This section evaluates alternatives to the proposed action, including the methodology and criteria applied for selecting the overall Project site, as well as individual turbine locations. The alternatives offer a potential range and scope of development and are evaluated in the level of detail to allow for comparative analysis and consideration, as prescribed by the SEQRA provisions explained below.

## 5.1 SEQRA ALTERNATIVES ANALYSIS REQUIREMENTS

SEQRA (6 NYCRR Part 617) requires that an EIS evaluate reasonable project alternatives. In determining the scope of alternatives to be considered, the emphasis is on what is "reasonable". As described in §617.9 (b)(5)(v), an EIS must contain a description and evaluation of the range of reasonable alternatives to the action that are feasible, considering the objectives and capabilities of the Project sponsor. As stated in Section 2, the objective of the proposed action is to take advantage of the unique wind resource in the Horse Creek Project site and New York bulk power transmission system availability, in order to create an economically viable wind-powered electrical-generating facility that will provide a significant source of renewable energy to the New York power grid, as well as benefits to the local community and taxing jurisdictions.

The Project's location east of Lake Ontario and the St. Lawrence Seaway places it in a unique position to assist the State in meeting many policy objectives (including the State Energy Plan, Renewable Portfolio Standard targets and other Executive Orders[1]) encouraging the development of renewable energy and wind projects while minimizing potential environmental impacts and impacts of local concern typically associated with wind-powered electric generating facility siting, including visual and noise impacts. The goal of the Project is to take maximum advantage of the unique wind resource within the Project area, which is one of the few viable locations in New York with a Class III wind resource[2] and the ability to construct a facility with a nameplate capacity of 96 MWs of wind powered renewable energy.

[1] The New York State Energy Plan can be found at www.nysenergyplan.com. Former Governor Paterson's Executive Order No. 24 can be found at http://www.state.ny.us/governor/executive_orders/exeorders/eo_24.html. A description of the New York Renewable Portfolio Standard can be found on NYSERDA's website at http://www.nyserda.org/rps/index.asp and on the NYSPC's website at http://www3.dps.state.ny.us/W/PSCWeb.nsf/All/1008ED2F934294AE85257687006F38BD?OpenDocument

[2] One way wind at a potential site is measured is by calculating the wind power density. The wind power density, measured in watts per square meter, indicates how much energy is available at the site for conversion by a wind turbine. This number is then classified into 7 recognized "classes" to indicate the relative strength of the wind resource at a particular site (Class 1-7). A high class indicates a stronger wind resource. In general, sites with a Wind Power Class rating of 3 or 4 or higher are preferred for large-scale wind facilities.

As a general matter, wind project developers in New York that have secured site control generally aim to maximize the size of the project in order to take advantage of a favorable wind resource which is relatively rare in NY. This is a prudent approach as economies of scale generally lower costs and the concomitant price a project operator must charge for energy produced, making a project more competitive and capable of delivering lower cost energy to the grid as well as potentially maximizing the return on investment. Furthermore, such projects are generally in a position to support a larger investment in local communities, through PILOT payments or other community benefit enhancements, than smaller projects. Here, for example, the PILOT will provide payment of approximately $768,000 annually to the local taxing jurisdictions. The key parameters for a favorable site in New York are:

- sites located in jurisdictions where the local governments in charge of permitting are not opposed to wind development;
- sites that demonstrate an adequate wind resource;
- sites where landowners are willing to enter agreements allowing use of their land for project development (turbine construction and operation);
- sites that are located proximate to power grid interconnections with bulk power lines having the capacity to accept electric generation from the project without excessive upgrade costs;
- sites that are located on areas that do not have undue environmental and cultural restraints.

In the case of wind powered electric generation facilities, the facilities are best sited where a unique (Class 3 minimum) wind resource can be found. In short, like other public utility infrastructure, wind turbines are very location sensitive and must be located where the wind resource is in order to utilize the resource and provide the service. New York has limited locations with an adequate wind resource for project development and those are mostly in the northern and western regions of the state (www.awstruewind.com/inner/windmaps/NewYork.htm). However, even these limited locations are further reduced by virtue of the fact that many sites in these locations do not have the other essentials for development mentioned above or have a limited availability of one or more of these essential features. Thus, taking into account the above factors, Atlantic Wind submitted a 126 MW interconnection request with NYISO, and this 126 MW request was based on the anticipated capacity that the Project site could likely accommodate (as estimated at the time the request was submitted).

Additionally, §617.9 (b)(5)(v) provides that the description and evaluation of each alternative should be at a level of detail sufficient to permit a comparative assessment of the alternatives discussed. It is well-established law under SEQRA that “the degree of detail with which each alternative must be

discussed will vary with the circumstances and nature of each proposal." (*King v Saratoga County Bd. of Sup'rs*, 223 AD2d 894 [3d Dept 1996], *affd* 89 NY2d 341 [1996]; Impact Review, § 5.14 [3].)

SEQRA requires analysis of the no action alternative, and otherwise prescribes the range of other alternatives that may be evaluated as appropriate to a given action. The no action alternative analysis should evaluate both the adverse and beneficial changes to the Project site that are likely to occur in the reasonably foreseeable future, in the absence of the proposed action. The range of other alternatives may also include, as appropriate, alternative sites, technology, scale or magnitude, design, timing, use and types of actions. Project site alternatives, however, may be limited to parcels owned by, or under option to, a private project sponsor (See SEQRA §617.9[b][5][v]).

The discussion that follows presents the no action alternative, and a range of "reasonable" alternatives as appropriate with regard to the nature of a wind energy project. These alternatives to the proposed action are evaluated in this DEIS in furtherance of a comparative assessment of each alternative explored, and with a focus on those specific environmental impacts identified that have the potential to be significant. Consistent with SEQRA, this DEIS will assess the following alternatives:

- Alternative Project Site
    - Alternative Project Design, including:
    - Preferred Alternative (48 turbines) – The site layout that was selected based upon the maximum MW production based upon the land within the current Project site, site constraints, landowner participation, wind resource assessment, with impacts to environmental resources minimized to the maximum extent practicable.
    - Larger Project Site Alternative (62 turbines) – The site layout that places the maximum number of turbines to achieve a larger MW production in a land area that extends into the Town of Orleans. Additionally, in this alternative, lower turbine heights were evaluated (due to turbine availability during consideration of this alternative). This site layout alternative considers impacts to environmental and aesthetic resources and area residents.
    - Fewer Turbine Alternative (25 turbines) – A layout that focuses on using the Preferred Alternative, and reducing the number of turbines to 50% to evaluate the potential for further reducing impacts to land use, wetlands, forested areas, and area residents.

- Alternative Technologies
- Alternative Construction Phasing
- No Action Alternative

## 5.2 ALTERNATIVE PROJECT SITE

Under 6 NYCRR § 617.9(b)(5)(v)(g), site alternatives addressed in an EIS may be limited to parcels owned by, or under option to, a private project sponsor. We have discussed Atlantic Wind's other properties which are included in the 62-turbine Project alternative (see analysis below), and Dutch Gap properties (described in Section 8 Cumulative Impacts), Atlantic Wind has obtained interests in other parcels in the region but at this time, on account of isolation, unknown/yet unmeasured wind characteristics, adverse regulatory climate, sensitive site features and other factors these parcels are not sufficiently advanced for consolidation or inclusion in a Project. Accordingly, there is no requirement to evaluate any additional alternative Project areas. Nonetheless, this section provides background information on Atlantic Wind's selection of the Project site to facilitate understanding of the criteria that was employed in choosing a site that would best maximize the capture and utilization of a unique wind resource while recognizing existing siting constraints.

As mentioned above, the selection of a wind project site is constrained by several factors that are essential to the success of a wind energy production facility Site. These factors include the following:

- adequate wind resource
- adequate access to the bulk power transmission system, from the standpoints of proximity and ability of the system to accommodate the interconnection and accept and transmit the power from the Project
- contiguous areas of available land with sufficient space to minimize impacts on area residences
- compatible land use and zoning and limited environmental/site constraints
- willing land lease participants and host communities

Atlantic Wind began a search within the Jefferson County area for appropriate Project sites that had these characteristics. The analysis of potential sites concluded that many other locations in the region presented significant constraints on wind power development, including incompatible land uses, lack of contiguous land, proximity to population centers, a lack of adequate wind resource, or unsuitable transmission facilities (either too far to connect or in need of major system upgrades).

Atlantic Wind selected the proposed Project site because of the quality of the wind resource, the ease of access to the site, relatively low population density, availability of suitable transmission facilities, and positive feed-back from landowners and town officials. These factors combined to make the proposed site desirable from the standpoint of wind power development. Based upon the result of the site evaluations performed in the region, other potential locations do not have the same combination of desirable features.

## 5.3 ALTERNATIVE PROJECT DESIGN

### *5.3.1 Project Design Process*

To assess project layout alternatives and associated impacts, it is important to first understand project design development. The proposed location and spacing of the wind turbines and support facilities is based upon site constraints, landowner participation, and site-specific design considerations. The steps involved in determining the final location of project components (wind turbines, electrical lines, access roads, O&M facility, and collection station/interconnection substation) generally include:

1. Measure site-specific wind resource patterns and quantities.
2. Obtain substantial volunteer landowner and neighbor agreements.
3. Perform a site constraint analysis.
4. Develop a preliminary turbine layout.
5. Develop a preliminary access road and electrical layout.
6. Perform site specific studies and data collection
7. Minimize impacts to identified constraints; revise layout as required.
8. Review layout changes with participating landowners, revise layout as required.

Once the overall project area was evaluated for initial siting criteria, the Project sponsor installed wind measurement/meteorological towers to collect site-specific data to develop a turbine array design (site layout for individual turbines or strings of turbines). During the array development, the Project sponsor developed voluntary agreements with willing landowners and neighbors that would allow for the construction and operation of all project components including turbines, buried electrical lines, access roads, and the collection substation/switching station. A substantial participation effort on the part of the landowners and neighbors was obtained prior to development of a preliminary site layout.

After landowner participation status was substantially advanced, a site constraint analysis was performed to identify suitable preliminary locations for wind turbines only. Site constraints include, but are not limited to, *wetlands and streams, local law setback requirements to property lines/roads, proximity to non-participating permanent residential structures, microwave paths (Fresnel zones), agricultural land and steep slopes.* Preliminary turbine siting is intended to maximize/optimize wind resource and landowner participation, while avoiding site constraints to the maximum extent practicable.

Based solely upon land area and minimum turbine spacing requirements, a 9,450-acre project area can accommodate up to approximately 70 turbines (assuming 135 acres of land needed per turbine). Through an analysis of site constraints, landowner participation, wind resource assessment, environmental resource factors, and review of the site's zoning constraints, a site development constraint analysis was prepared. Of the 9,450 acres within the Project area, approximately 5,486 acres are owned by participating landowners. Of these 5,486 acres, 3,392 acres are constrained by required zoning setbacks, Fresnel zones, and wetland/waterbody features or other construction related constraints. Approximately 2,094 acres (portions of 39 parcels of land) of the 9,450-acre Project area were determined to have some area of potential development for wind turbine component siting. Essentially, utilizing only those portions of land parcels identified as potentially developable areas, Atlantic Wind prepared a proposed layout of all Project components.

Preliminary siting for other project components including the O&M facility and the collection substation/switching station largely follow the same process. The collection substation/switching station is required to be located on a private land parcel immediately adjacent to the National Grid Lyme Tap (Perch Lake) – Lyme (Rockledge) 115 kV transmission line ultimately delivering the generated power to the New York Grid. Several suitably sized parcels were identified, and ultimately site selection was based upon volunteer landowner willingness and a parcel clear of significant site constraints as mentioned above. Similarly, the O&M facility needs to be centrally located within the project area on private land with a willing landowner, suitable acreage, and relatively void of significant site constraints.

Once a preliminary turbine layout is identified through the constraint analysis and optimization process, access roads and electrical collection lines are defined. The Project sponsor has several engineering criteria required in initial access road and electrical line layout, including designing the alignments to minimize installation/material costs (shortest sections of road and electrical lines possible). After this initial access road and electrical line layout, modifications are made to avoid or minimize impacts to the identified site resources and to meet landowner requirements for individual

siting on private land. Additionally, site modifications are made to minimize impacts including co-locating electrical lines with access roads (where feasible), minimizing new wetland crossings, and using existing farm drives or other level areas for proposed Project access roads. All preliminary layout efforts were reviewed on site with the landowners, Project engineering and environmental consultants, and relevant agency personnel (including the NYSDEC), to minimize impacts to identified site resources and meet landowner requirements.

Based upon this process, several project alternatives were explored. Three project alternatives are described below, along with a comparative assessment of their temporary and permanent impacts and benefits.

### *5.3.2 Preferred Alternative (48 turbines)*

The Preferred Alternative maximizes the benefit derived from the wind and land resources, while minimizing impacts to wetlands, forestland, and wildlife resources. As previously discussed, based solely upon land area and minimum turbine spacing requirements, a 9,450-acre project area can accommodate up to approximately 70 turbines (assuming 135 acres of land needed per turbine). However, based on the project design process (including land easement agreements), the currently defined 9,450-acre Project site will support approximately 48 turbines. The Project sponsor proposes to use a Gamesa G90 or G97 wind turbine, each with a rated capacity of 2.0 MW. This layout is presented in Figures 3 and 14 and is analyzed throughout this DEIS as the proposed "Project".

All of the 48 potential turbine sites are located a minimum of 500 feet from existing roads, and all but one are located at least 1,250 feet from nonparticipating neighboring residential structures. Additionally, all 48 wind turbines are located within the Town's Wind Power Overlay district. In addition to the 48 wind turbines, the Preferred Alternative also consists of 13.6 miles of access roads, 16.1 miles of buried electrical collection lines, 5.5 miles of overhead electrical collection lines, a collector substation/switching station, a permanent met tower, up to three construction staging/laydown areas, a concrete batch plant, and a 6,000 square foot O&M facility.

<u>Impacts</u>

Impacts from the preferred alternative are described in detail in Section 3.0 by resource type. As noted in Section 4 (Unavoidable Adverse Impacts), and in the relevant subsections in Section 3, the majority of the adverse environmental impacts associated with the Project will be localized and temporary, and will result from construction activities. Site preparation (e.g., clearing, grading),

improvement of local roads, and the installation of roads, turbines, electrical interconnects, staging areas, the O&M facility, meteorological tower, and the collection substation/interconnection station will have short-term and localized adverse impacts on the soil, water, agricultural and ecological resources of the site. Construction of the Project will result in total (temporary and permanent) disturbance of up to 467.5 acres of soil and 498.5 acres of vegetation, most of which is in agricultural fields. In addition, approximately 48.5 acres of forest and 5 acres of wetland could be disturbed by Project construction.

Long-term unavoidable impacts associated with operation and maintenance of the Project includes turbine visibility from many locations within the town and surrounding areas. Within 10 miles of the Preferred Alternative Project area, 40% of the land area will experience some visibility of the project (based upon maximum turbine height, considering existing vegetation and topography). The presence of the turbines will result in a change in perceived land use from some areas. The Project also may function to keep land within the Project site in rural and agricultural uses, thus protecting open space and existing land use patterns. Project development will also result in an increased level of sound at some receptor locations (residences) within the study area, although none will exceed the local noise ordinance level of 50 dBA. Based upon the Preferred Alternative layout, the Gamesa G90 will have potential adverse shadow flicker on area residences located in the southwest corner of the Project site and up to 10 houses may experience shadow flicker in excess of 30 hours per year (5 for G90 and 10 for G97 Gamesa models). Additionally, a minor loss of agricultural and forest land, wildlife habitat changes, will occur. The Preferred Alternative will result in the conversion of approximately 49 acres of land to built facilities. A total of approximately 34.5 acres of agricultural land will be converted to non-agricultural use/built facilities (e.g., roads, turbines, substation, etc.), and a total of approximately 3 acres of forest will be converted to built facilities. Permanent wetland impacts are estimated to be approximately 0.5 acres.

Finally, some level of avian and/or bat mortality associated with bird/bat collisions with the turbines will occur as a result of the operation of the Preferred Alternative. Based upon post construction studies conducted between 2006 and 2009 at seven wind farms operating in New York, it is assumed that between 1.1 and 5.81 bird fatalities per megawatt could occur annually. Assuming a 100-megawatt project is developed, between 106 and 558 bird fatalities may occur annually. Based upon the results of these same post construction studies, between 0.46 and 15.0 bat fatalities per megawatt may occur. Assuming a 100-megawatt project is developed, between 44 and 1,407 bat fatalities may occur annually. (Jain et al. 2007, Jain et al. 2008, Jain et al. 2009a, Jain et al. 2009b, Jain et al. 2009c, Jain et al. 2010a, Jain et al. 2010b, Stantec 2009, and Stantec 2010).

Benefits

The Preferred Alternative will deliver up to 96 MW of electrical power to the New York state grid without generating emissions from operation. Total net generation delivered to National Grid's existing 115 kV line is expected to be approximately 252,290 MWh, or enough electricity to meet the average annual consumption of between approximately 22,500 and 35,000 average NYS households (based on average annual electric consumption of 7.2 MWh for New York and 11.2 MWh for the U.S.; Energy Information Administration [EIA], 2009). The Project is expected to generate approximately $768,000 per year (more than $15 million over the life of the contract) in PILOT revenues to local taxing jurisdictions, while requiring very little in terms of municipal services. The Preferred Alternative will maximize the opportunity to assist the State in meeting State policy objectives (including the State Energy Plan, Renewable Portfolio Standard targets and other Executive Orders) while minimizing potential environmental impacts and impacts of local concern typically associated with wind-powered electric generating facility siting, including visual and noise impacts, and development in New York State. In addition, the benefits of the preferred alternative include positive impacts on air quality (through reduction of emissions from fossil-fuel-burning power plants), and climate (reduction of greenhouse gases that contribute to global warming). These project benefits are discussed in more detail in Section 2.0.

### *5.3.3 Larger Project Site Alternative (62 turbines)*

A Larger Project Site Alternative was considered and places a larger number of turbines in a larger project area that extends into the Town of Orleans. In this alternative, 62-2.1 MW wind turbines would be sited within an expanded project area of approximately 11,800 acres resulting in a project that can generate approximately 130 MW[3]. This Alternative would include 54 turbines in the Town of Clayton and 8 turbines in the Town of Orleans, as depicted in Figure 15. Under this alternative, a slightly shorter turbine was considered with an overall foundation to blade tip height of 407 feet (based upon 2007 turbine availability). Two permanent meteorological towers would also be installed, along with an O&M Facility, a system of gravel access road, buried electrical lines (electrical interconnect), and an interconnection substation adjacent to the existing National Grid Lyme Tap (Perch Lake) – Lyme (Rockledge) 115 kV transmission line. All of the potential turbine sites associated with this alternative are located a minimum of 500 feet from existing roads and at least 1,250 feet from nonparticipating neighboring residential structures, and are all located within the Wind Power Overlay districts of Clayton and Orleans.

[3] The Larger Project Site Alternative is the project as proposed in the Draft Generic Environmental Impact Statement accepted as complete by the Town of Clayton in February 2007.

Impacts

Impacts from the Larger Project Site Alternative are similar in nature to the Preferred Alternative. However, because of the shorter turbine, impact assumptions (e.g. anticipated areas of disturbance per component) may be somewhat reduced. Under this alternative, temporary construction activities will result in total (temporary and permanent) disturbance of up to 330 acres of soil and 399 acres of vegetation, most of which is in agricultural fields. In addition, approximately 33 acres of forest and less than one acre of wetland (including one state regulated wetlands) could be disturbed by Project construction. However, most of this disturbance will be temporary.

As with the Preferred Alternative, operation of the Larger Project Site Alternative will result in a minor loss of agricultural and forestland, wildlife habitat changes, will occur. This alternative will result in the conversion of approximately 56 acres of land to built facilities. A total of approximately 42 acres of agricultural land will be converted to non-agricultural use/built facilities (e.g., roads, turbines, substation, etc.), and a total of approximately 4 acres of forest will be converted to built facilities. Permanent wetland impacts are estimated to be approximately 1.8 acres.

The operation of this alternative is also expected to result in a proportionately higher level of avian and bat collision mortality as the Preferred Alternative. Assuming that between 1.1 and 5.81 bird fatalities per megawatt could occur annually (based upon the above referenced post construction fatality surveys), the 130 MW project would result between 143 and 755 bird fatalities annually. Based upon the results of these same post construction studies, between 0.46 and 15.0 bat fatalities per megawatt may occur. Therefore Larger Project Alternative would result in between 60 and 1,950 bat fatalities may occur annually.

The turbines in this alternative will be visible from many locations within the surrounding area, but will also be fully or partially screened from viewers in many locations. Within 10 miles of the Preferred Alternative Project area, 60% of the land area will experience some visibility of the project (based upon maximum turbine height, considering existing vegetation and topography). Only 4 receptors have the potential to experience over 30 hours of shadow flicker annually, and turbine-related sound is not predicted to exceed 50 decibels at adjacent residences.

Benefits

The Preferred Alternative will deliver up to 130 MW of electrical power to the New York state grid without generating emissions from operation. Total net generation delivered to National Grid's existing 115 kV line is expected to be approximately 341,640 MWh, or enough electricity to meet the average annual consumption of between approximately 30,500 and 47,450 average NYS

households (based on average annual electric consumption of 7.2 MWh for New York and 11.2 MWh for the U.S.; Energy Information Administration [EIA], 2009). This alternative would be expected to generate approximately $1 million per year (more than $20 million over the life of the contract) in PILOT revenues to local taxing jurisdictions, while requiring very little in terms of municipal services.

### *5.3.4 Fewer Turbines Alternative (25 turbines)*

The Fewer Turbines Alternative was designed to maximize the benefit derived from the project, while minimizing impacts associated with shadow flicker on area residents, and to sensitive habitats (specifically to forestland and wetlands). This alternative would involve the construction of 25-2.0 MW wind turbines, with at total installed capacity of 50 MW. The wind turbines for this layout were selected based upon the current locations of the existing Preferred Alternative, but removing turbines that 1) contribute to potentially adverse shadow flicker impacts (over 30 hours annually at nearby residences); 2) have wetlands within their workspace; 3) are located within forested areas; 4) do not comply with local set back requirements; and 5) are located outside of the designated Wind Power Overlay district in the Town of Clayton.

Impacts from the preferred alternative are similar in nature to the Preferred and the Larger Project Site Alternatives as the majority of the adverse environmental impacts associated with the Project will be localized and temporary, and will result from construction activities. It is assumed that construction of the Fewer Turbines Alternative will result in approximately 50% of the anticipated impacts as described for the Preferred Alternative, and are anticipated to result in total (temporary and permanent) disturbance of up to 239 acres of soil and 257 acres of vegetation, most of which is in agricultural fields. In addition, approximately 25 acres of forest and 2 acres of wetland could be disturbed by Project construction.

Long-term unavoidable impacts associated with operation and maintenance of the Fewer Turbines Alternative include turbine visibility from many locations within the town and surrounding areas, but to a lesser degree. Within 10 miles of the Preferred Alternative Project area, 44% of the land area will experience some visibility of the project (based upon maximum turbine height, considering existing vegetation and topography) (only a 3% reduction from the Preferred Alternative). Development of this alternative will also result in an increased level of sound at some receptor locations (residences) within the study area, although, like the other alternatives, none will exceed the local noise ordinance level of 50 dBA. Due to selective turbine eliminations conducted as a part of this alternative, no residences will experience shadow flicker in excess of 30 hours per year.

Additionally, a minor loss of agricultural and forest land, wildlife habitat changes, will occur as a result of the operation of the Fewer Turbines Alternative. For example, there will be a conversion of approximately 25 acres of land to built facilities, including approximately 18 acres of agricultural land and less than 1 acre of forestland. Permanent wetland impacts are estimated to be less than 1/3 acres, as all wetlands in turbine workspaces are eliminated under this alternative.

The operation of this alternative is also expected to result in a proportionately lower level of avian and bat collision mortality than the Preferred Alternative. Assuming that between 1.1 and 5.81 bird fatalities per megawatt could occur annually (based upon the above referenced post construction fatality surveys), the 50 MW project would result between 55 and 291 bird fatalities annually. Based upon the results of these same post construction studies, between 0.46 and 15.0 bat fatalities per megawatt may occur. Therefore, the Fewer Turbine Alternative would result in between 23 and 750 bat fatalities may occur annually.

Benefits

The Fewer Turbine Alternative will deliver up to 50 MW of electrical power to the New York state grid without generating emissions from operation. Total net generation delivered to National Grid's existing 115 kV line is expected to be approximately 131,400 MWh, or enough electricity to meet the average annual consumption of between approximately 11,700 and 18,250 average NYS households (based on average annual electric consumption of 7.2 MWh for New York and 11.2 MWh for the U.S.; Energy Information Administration [EIA], 2009). The Project is expected to generate approximately $400,000 per year (approximately $8 million over the life of the contract) in PILOT revenues to local taxing jurisdictions, while requiring very little in terms of municipal services.

### *5.3.5 Comparison of Alternative Project Layouts and Determination*

The three alternatives result in a similar type of temporary construction related, and permanent operating related impacts. For many resources, impacts are only incrementally larger or smaller when comparing the three alternatives side-by-side, while with others, impacts are eliminated or significantly reduced. Table 31 provides a direct comparison between various comparison criteria (project components, impacts, and benefits).

**Table 31. Comparison of Alternative Project Layouts Based Upon Select Comparison Criteria**

| Comparison Criteria | Preferred Alternative (48 Turbines) | Larger Project Site Alternative (62 Turbines) | Fewer Turbine Alternative (25 Turbines) |
|---|---|---|---|
| Proposed Turbine and MW Output | Gamesa 2.0 MW (G90 or G97) | Siemens 2.1 MW | Gamesa 2.0 MW (G90 or G97) |
| Maximum Rated Output | 96 MW | 130 MW | 50 MW |
| Maximum Turbine Height (Feet) | 476 | 406 | 476 |
| Project Area (Acres) | 9,450 | 11,800 | 6,767 |
| Access Road Length (Miles) | 13.6 | 16 | 7 |
| Electrical Lines Length (Miles) | 21.6 | 28 | 12 |
| Number of Wind Measurement Towers | 1 | 2 | 1 |
| Total Soil Disturbance (Acres) | 467.5 | 330 | 239 |
| Temporary Vegetation Clearing (Acres) | 404.5 | 399 | 257 |
| Permanent Soil Disturbance (Acres) | 48.5 | 56 | 25 |
| Permanent Conversion of Forestland (Acres) | 3 | 4 | <1 |
| Permanent Conversion of Agricultural Land (Acres) | 34.5 | 41 | 18 |
| Permanent Wetland Loss (Acres) | <1 | <2 | <1 |
| % of Visibility in 10 mile viewshed[1] | 47 | 40 | 44 |
| Number of Receptors with Shadow Flicker Hours over 30 Annually[2] | 5-10 | 4 | 0 |
| Number of Receptors with Noise Levels Exceeding Local Ordinance Limits | 0 | 0 | 0 |
| Potential Annual Bird Mortality Range | 106 to 558 | 143 to 755 | 55 to 291 |
| Potential Annual Bat Mortality Range | 44 to 1,407 | 60 to 1,950 | 23 to 750 |
| Projected Annual PILOT Payments | $768,000 | $1,040,000 | $400,000 |
| Projected Number of Homes Powered by Project | 22,500 – 35,000 | 30,500 – 47,500 | 11,700 – 18,200 |

Notes:
1 Based upon maximum turbine height and considering the effects of topography and vegetation in the 10-mile viewshed.
2 Under the Preferred Alternative, two turbine types and sizes are considered; therefore the resulting range is given.

The impacts of concern for the Project are as indicated in Table 31, and are associated with potential mortality to avian and bat resources, potential project visibility, noise impacts, shadow flicker impacts, and impacts to forest land, agricultural land and wetlands. As can be seen from the analysis above, as a general matter, the impacts associated with three alternatives are not significantly different, while the benefits that result from each alternative do vary more dramatically.

Given this circumstance, it might be concluded that the Larger Project Site Alternative could be the preferable option because it best utilizes the wind resource in the Project area and produces the greatest benefits, without significantly increasing impacts, as compared to the other alternatives. Unfortunately, this option would require use of properties that the Project sponsor has leased in the Town of Orleans. Recently the Town of Orleans Town Board has expressed strong opposition to wind development, indicating that it would be adopting legislation aimed at prohibiting development in the Town. Because of this regulatory uncertainty regarding wind project development in the Town of Orleans the larger project (62 turbine) alternative, it is not a feasible alternative at this time.

As is clear from the analysis above, the Fewer Turbine Alternative (25 turbine) project would provide only incremental reductions in Project impacts. It is not anticipated that there will be an appreciable visual difference between having 25 or 48 turbines. However a decrease in the number of turbines by nearly 50% from the Preferred Alternative would generally cut in half the Project benefits including its contribution to NY's policy goals, delivery of clean, "home grown" renewable energy, PILOT payments and landowner royalties. As such, the 25-turbine alternative does not significantly reduce impacts sufficient to warrant the significant reduction in Project benefits.

## 5.4 ALTERNATIVE TECHNOLOGIES

The turbines proposed for the Project will utilize the latest in wind power generation technology to enhance Project efficiency and safety and minimize impacts such as noise. The Applicant is proposing to develop 96 MW of renewable energy. Alternative power generation technologies, such as fossil-fuel and biomass combustion, would not meet the goals of the Project, are not the area of expertise of the Project sponsor, and would pose more significant adverse environmental impacts, particularly on air quality but also on land use and water resources. Most fossil fuel-fired generating facilities would require significant amounts of water to operate, the use of which may pose impacts to surface water or groundwater resources as well as fish and other aquatic organisms. Conventional power plants also would not advance the RPS goal of generating 25% of the state's power by 2013. According to the NYS Renewable Portfolio Standard 2008 Performance Report, renewable energy production only reached 25% of its annual target in 2007 although it is projected to reach 75% of the 2008 main tier target (NYSERDA, 2008). Approval of projects such as the Horse Creek Wind Farm project is needed in order to help meet New York State's RPS goals.

In regard to other renewable sources of generation, hydroelectric plants have significant impacts on terrestrial and aquatic ecological resources, land use, and aesthetics. Like wind power projects they

are also resource dependent, and can also only be developed in places with appropriate water volumes and topographic conditions (which do not exist within the Project site). Other renewable energy technologies, such as solar power and hydrogen, are still either cost-prohibitive or in development. Aside from cost constraints, utility-scale solar power may not be feasible in an area such as upstate New York, where available sunshine is limited. Currently, wind is the only renewable energy source that can help meet energy needs in a technologically and economically efficient manner. It can also do this without the emission of greenhouse gases and other environmental impacts that alternative power generation technologies would create.

## 5.5 ALTERNATIVE CONSTRUCTION PHASING

Atlantic Wind proposes to construct the Project in a single phase during a single construction season. Single phase construction will result in a more efficient construction process, with a shorter duration of construction-related impacts, than a multiple phase construction approach, and will allow resources, such as soils, wildlife, and vegetation, that are temporarily impacted by construction, to begin to recover and/or habituate sooner. In contrast, a multiple phase construction process would result in a longer period of construction disturbance, and would be less economically efficient for both Atlantic Wind and the local beneficiaries of the direct and indirect economic benefits of the Project.

## 5.6 NO ACTION

The no action alternative assumes that the Project site would continue to exist as rural, active agricultural land, residential property, and vacant/underdeveloped land. This no action alternative would not affect ambient noise conditions, traffic or public road conditions, wildlife or wildlife habitat, or television/communication systems, and would maintain community character, economic and energy-generating conditions as they currently exist.

Under this alternative, no wind turbines or infrastructure (e.g., roads, buried or above ground electrical interconnects, and substations) would be developed on the site. Consequently, none of the environmental impacts associated with Project construction and operation would occur. If the Project were not built, the State would lose the opportunity for adding a significant source of clean, renewable energy to New York State's energy mix that would lessen the State's dependence on imported fossil fuels. There would also be a lost opportunity to reduce emissions of greenhouse gases, SO2 and NOx as discussed in Sections 2 and 3.4 of this DEIS. Finally, the no action alternative would be contrary to the State's goals in the RPS program, since the Project represents one of the best wind resources remaining to be developed in New York State.

In addition, no economic benefits would accrue to the area. These unrealized economic benefits would include loss of approximately 150 construction and up to 11 permanent jobs, lease payments to the landowners, and annual PILOT payments to the affected towns, school districts, and county. Annual revenues to the Town of Clayton, Jefferson County, and the area school districts remain to be negotiated in the final terms of a PILOT agreement, but are anticipated to be in the range of $768,000 per year. Under the no action alternative, multiplier effects from these economic benefits would also not be realized (as described in Section 3.9). In addition, to the extent that the Project helps supplement farm income and keeps land in active agricultural use, the no action alternative could have an adverse impact on land use and grassland bird habitat. As family farms go out of business, the land is incorporated into larger corporate farming operations, converted to residential use, or allowed to revert to successional communities. All of these possibilities would result in a change to the existing character and available wildlife habitat.

Given the short-term nature of anticipated construction impacts and the generally minor long-term impacts of Project operation, as compared to the significant economic benefits that the Project would generate, the no action alternative is not a reasonable alternative.