

# Wind Initiatives in U.S. Virgin Islands

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# 1. Executive Summary

This document provides recommendations to the U.S. Virgin Islands Energy Office on regulating and permitting commercial sized wind farms. The information presented was culled from other localities that have similar regulations as well as best practices and recommendations from the industry. First, in making a recommendation for drafting regulations for large scale wind energy systems, we provide suggested modifications to the Virgin Islands' proposed Small Wind Energy Systems Rules and Regulations. Second, we include explanations of the relevant changes by discussing issues of specific importance to the Virgin Islands. Third, we provide a detailed application process that will allow the Virgin Islands to assess each individual application in order to select those projects that fit the ambience of the islands. Lastly, we provide information related to public opinion data collection and an overview of the Wind for School Program.

We have located several good examples of large wind system regulations and have attached them in Appendix E. However, the U.S. Virgin Islands already has a good model for regulating small wind energy systems. With just a few modifications to the draft Small Wind Energy System Rules and Regulations, the V.I. Energy Office can establish a sensible regulatory scheme for large scale wind energy systems. In Section 3, we suggest modifications necessary to cover large scale wind development.

In order to identify the unique challenges facing large wind energy developments in the V.I., we reviewed issues of concern to all wind energy projects and applied our findings to a small island setting. In most cases, the challenges are magnified by the scarcity of land, high

population density, and presence of protected wildlife species. We provide an overview of our findings and recommendations in Section 4 below. Our recommendations include:

- Encourage the use of mitigation strategies to help protect wildlife and endangered species.
- Require applicants to submit certification of compliance with all existing federal wildlife preservation laws.
- Develop an appropriate noise assessment plan to study the impacts of proposed wind energy systems.
- Adopt a noise standard with maximum allowable levels not to exceed the lesser of 5 dB above the background noise level or 60 dB at the property line with a provision for a variance of up to 80 dB at the property line.
- Require permit applicants to provide maps and simulated photos of area of visual impact to be made available to the local community.
- Modify height limitations in specific wind overlay areas for wind energy systems.
- Increase setback requirements to 125% of wind energy system total height.
- Require permit applicants to provide maintenance plans and create criteria for compliance inspections.
- Mandate submission of safety and hurricane contingency plans in order to mitigate the risks posed by hurricanes and extreme winds.
- Ensure that the potential costs of removal of wind systems are not absorbed by the local government by requiring credit certification of wind system operators.
- Set minimum standards for liability insurance.

In addition to the modification of the regulations, themselves, we recommend a more vigorous application process to obtain a permit to construct and operate a large wind energy system in order to ensure accountability and confirm minimal impacts to the local community. We provide explanations of the components of the application in Section 5.0 below as well as a sample application in Appendix B.

Positive public opinion of the wind initiative, not only by the residents of the Virgin Islands, but also of the tourists who visit the islands, is important to the Virgin Island's economy. While public opinion tends to be more negative prior to the erection of a wind system, these negative attitudes tend to soften after the system has been operating for a while. We provide a review of select public opinion polls taken from around the world and suggest a strategy for the V.I. Energy Office's implementation of surveys around the islands. In addition, we have

provided sample survey questions for both resident and tourist surveys in Appendix C and Appendix D.

The last section of this document, Section 7, provides information on the Department of Energy's Wind for Schools program, including a discussion of funding difficulties, the criteria for application, and Department of Energy contacts for further information. While the Virgin Islands appears to fit the criteria for application to the Wind for Schools program, at this time, funding for the program is limited. Therefore, expansion to the Virgin Islands may not be feasible. However, the Virgin Islands may still want to contact the Department of Energy in order to highlight their interest in the program to the Department in the event that further funding becomes available.

## 2. Introduction

As the Virgin Islands works to address the dual issues of high electricity prices and increasing greenhouse gas emissions, the V.I. Energy Office and Department of Planning and Natural Resources should prepare for the prospect of commercial scale wind energy developments. Wind power is increasingly cost competitive even in the continental United States where electricity prices are approximately one-third of the prices paid by Virgin Islanders. Large wind projects have the potential to significantly reduce the cost of electricity in the islands while reducing dependence on imported oil, reducing air pollution, and reducing emissions of greenhouse gases. However, the small land area, high population density, presence of protected wildlife species, and dependence on tourism present greater challenges than those faced by typical wind development projects. In this report, we aim to provide information to the government of the V.I. on specific issues related to the installation and operation of wind energy systems to assist in efforts to establish a regulatory and permitting framework to address these challenges.

Creating clear and transparent regulatory procedures benefits citizens, tourists, potential investors, and government agencies. Institutionalizing the approval process reduces transaction costs for developers and minimizes potential damage caused by construction and operation of wind farms.

Included in this document are recommendations for regulations pertaining to the development of commercial wind farms in the Virgin Islands as well as a proposed application process. We recommend that these criteria be made public and accessible to potential investors in order to clarify expectations. Due to the vigorous nature of the application process being recommended, we recommend that the V.I. Energy Office also establish a loose timeline for

approval so that investors can project the timeframe for approval, construction, and commencement of operations. Although we cannot make specific recommendations about a realistic time schedule, allowances should be made for the application process, the review process, and a potential hearing process.

Procedurally, the V.I. Energy Office also should determine what body will review and enforce these regulations. This could be controlled entirely by the office, a state siting board or other entity. In addition to the wide range of criteria included here, this entity should utilize other factors in approving or rejecting development applications that can only be determined locally, including whether there is an identifiable need for additional power and the potential burden on local service and infrastructure.

Although there are many issues to take into account when permitting and regulating large wind systems, it is clear that renewable energy sources will have enormous benefits for the U.S. Virgin Islands and the environment. Creating clear and pragmatic regulations before development begins will have enormous payoffs in the long run. To this end, the U.S. Virgin Islands is already ahead of most of the continental United States in preparing regulations for permitting and siting wind energy systems. Most localities do not have any regulations defining the obligations of wind system operators, but rather list the zoning authority as a mere line item in an agricultural or industrial provision.

The lack of wind regulations and established permitting processes has been the cause of much debate and lengthy delays, such as those encountered by the Cape Wind off-shore energy project. In that case, the State of Massachusetts did not have the appropriate regulatory scheme, resulting in a panoply of corporate, citizen, and government conflict. Due to this debacle, most states and even the federal government have begun taking a closer look at wind regulations. The

draft U.S. Virgin Islands' Small Wind Energy System Rules and Regulations are therefore already well ahead of the rest of the country and, in fact, form the basis of our recommendations on how to prepare a Large Wind Energy System Rules and Regulations code.



### **3. Recommendations for Large Wind Energy Systems Rules and Regulations**

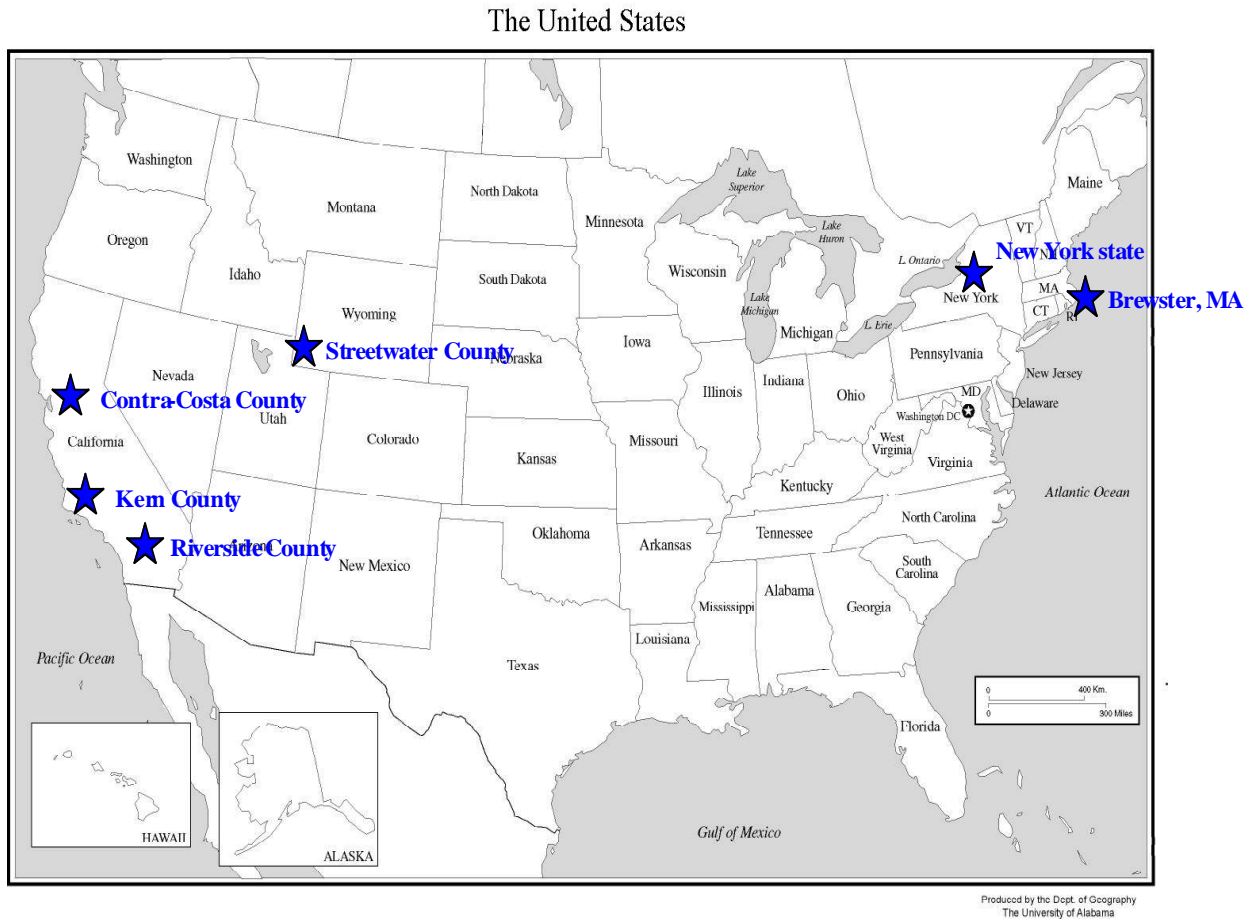
The U.S. Virgin Islands' Small Wind Energy System Rules and Regulations (attached hereto as Appendix A) already addresses many of the requirements necessary for a Large Wind Energy System and is well written in the regulatory language required for authoritative provisions. As such, many of the provisions within that Code should be adopted for the Large Wind Energy System with certain modifications and additions specific to the risks associated with larger turbines.

First, in Section 3.1, we provide contextual information on a range of locations from which we have culled exemplary regulations (included in Appendix E) to emphasize the similarities of each with the U.S. Virgin Islands. Second, in Section 3.2, we detail precisely which components of each locale's regulations are applicable.

#### **3.1 Sample Regulations**

To assist the V.I. Energy Office in crafting language to be added to the Small Wind Energy System Rules and Regulations in order to create the Large Wind Energy System Rules and Regulations, we researched local zoning codes to find regulations that go beyond the line item provision within an agricultural zone. Identifying these regulations was a challenging task since, as discussed above most locations do not have specific regulations relating to wind energy systems. We ultimately identified several regulations which were well written and spoke to the issues we felt should be addressed in the U.S.V.I. code. The following list describes the location of the code and the purpose for bringing the particular code to the attention of the V.I. Energy Office. Each of these regulations is cited in their entirety in Appendix E.

The map below highlights the locations of the places from which we obtained the sample regulations.



Map courtesy of: [http://www.netstate.com/states/maps/images/usa\\_states.jpg](http://www.netstate.com/states/maps/images/usa_states.jpg)

### 3.1.1 California

#### 3.1.1(a) Contra-Costa County

This county is one of the nine counties in the San Francisco-Oakland Bay area. It is the ninth most populous county in the state, with approximately 930,000 residents. It extends from the northeastern shore of San Francisco Bay to the San Joaquin Valley. The western and northern shorelines are dominated by heavy industry, while the interior sections are suburban/residential

and commercial. Contra-Costa County is one of the fastest growing work force areas in the Bay area. Due to the presence of relatively high-wage skilled jobs and relatively wealthy residents, the county achieves high rankings among all California counties on a variety of income measurements.<sup>1</sup> We chose to include the zoning code for Contra-Costa County (see Appendix E, p. 73) because of the similarities to the USVI in terms of income brackets (high income home owners seeking views of the San Francisco Bay area), dense populations, and landscapes. Contra-Costa County attempts to address the balance between the need for renewable energy and the presence of dense population and scenic landscapes by requiring specific details on the characteristics of the site location (see, Section 88-3.412 at p. 74) and funding for any damage (see, e.g., Section 88-3.416 at p. 76).

### **3.1.1(b) Kern County**

Kern County is the third largest county in California. It is located in southern California and has a population of approximately 700,000. Its total area is 8,161 square miles and is bordered by the San Joaquin Valley and both the Sierra Nevada Mountain Range and Mojave Desert. The county is within easy reach of Los Angeles, San Francisco, Las Vegas, Death Valley and the Pacific Coast. The county has a large agricultural base and is a significant producer of oil, natural gas and wind power. The county is also home to the Kern River Valley which serves as the gateway to the Giant Sequoia National Monument. In addition, the county has many state parks and lakes which attract avid outdoorsmen.<sup>2</sup> We chose to include the Kern County regulations (see Appendix E, p. 80) due to its similarity with the USVI with regards to natural beauty and outdoor tourism.

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<sup>1</sup> Contra Costa California website, found at: <http://www.co.contra-costa.ca.us/>

<sup>2</sup> Kern County California Tourist Website, available online at: <http://www.visitkern.com/>

### **3.1.1(c) Riverside County**

Riverside County is located in the southeastern part of California, bordering Orange County to the west and the Colorado River to the east. The county is part of the Riverside-San Bernardino Area and has a population of approximately 1.7 million people. Most of the county is desert and contains most of Joshua Tree National Park. Many people who work in both Los Angeles and San Diego have moved to the county because of its affordable housing. The county is also home to many famous golf resorts and spas such as Palm Springs.<sup>3</sup> The western part of the county is home to many state designated scenic highways.<sup>4</sup> Similar to the Kern County code, we chose to include the Riverside County code (see, Appendix E, p. 90) because of the similarities to the U.S.V.I. with regards to scenic vistas.

The Riverside County code goes above and beyond most other codes in protecting scenic vistas from obstruction by turbines, so the code may be a good example of what too much regulation looks like. For example, Riverside County dictates not only where the wind turbine must be sited on the property, but also where the automobile storage spaces and other business structures should be located (see, Section 17.164.030 at p. 91). The County provides different setback requirements for different characters of lots (see, Section 17.224.040(A) at p. 94) and requires up to 2/3 of a mile of setback from certain scenic locations (see, Section 17.224.040(C) at p. 95). While this type of micromanagement may be appropriate, it may also discourage developers from choosing a site in Riverside County.

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<sup>3</sup> Riverside County, California Wikipedia, available online at: [http://en.wikipedia.org/wiki/Riverside\\_County,\\_California](http://en.wikipedia.org/wiki/Riverside_County,_California)

<sup>4</sup> California State DOT Scenic Highways, available online at: [http://www.dot.ca.gov/hq/LandArch/scenic\\_highways/river.htm](http://www.dot.ca.gov/hq/LandArch/scenic_highways/river.htm)

### **3.1.2 Massachusetts**

#### **3.1.2(a) Town of Brewster**

Brewster, Massachusetts is located in Barnstable County and is centrally located on Cape Cod. It has a population of about 11,000 full time residents and has a total area of about 26 square miles. The county is very much a summer tourist destination and as a result, the seasonal population grows to about 25,000. The town has taken action to protect its historic character by establishing strict site plan review laws. Over one-third of its land has been retained for conservation, open space, recreation and watershed protection. It is home to 400 acres of trails, camping areas and freshwater resources.<sup>5</sup> The small town is also home to 27 golf courses and is surrounded to the north and south by the Cape Cod Bay and Atlantic Oceans. The islands of Martha's Vineyard and Nantucket are also close in proximity. We chose to include the Town of Brewster zoning code (see Appendix E, p. 110) because of its historic characteristics, tourism dependence, and location on oceanfront property. The application process adopted by the Town of Brewster is strict but maintains the character of the town itself and keeps it from being overrun by wind developers.

### **3.1.3 New York**

#### **3.1.3(a) Model Regulations**

These model regulations were prepared by the law firm of Whiteman Osterman & Hanna, LLP. Whiteman Osterman & Hanna is a well respected law firm whose practice focuses on government relations and assisting corporations, non-profits, and universities (including Syracuse University) in regulatory and legislative affairs before the New York State

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<sup>5</sup> Town of Brewster Website, available online at: <http://www.town.brewster.ma.us/content/section/10/53/>

government.<sup>6</sup> The model regulations were presented by Whiteman Osterman & Hanna at the Community Wind Energy 2008 conference in Albany, New York on April 14-16, 2008.<sup>7</sup> The purpose of the conference was to educate New York State zoning officers on how to prepare local regulations for siting wind turbine systems. We included these model regulations (see Appendix E, p. 123) because they provide a good overview of the provisions that should be included in large wind energy regulations as well as language that may be adopted by the V.I. Energy Office.

### **3.1.4 Wyoming**

#### **3.1.4(a) Sweetwater County**

Sweetwater County is located in the southwestern part of Wyoming, with a population of just under 40,000. It is relatively big, with 11,000 square miles, and is the largest county in the state and the sixth largest county nationwide. While the county is large, the population density is very low, with 4 people per square mile.<sup>8</sup> The county is very rustic, with preserved prehistoric pictographs and wagon wheel ruts carved into the landscape. The area is famous for its pioneer and expedition trails that were used by the first cross country explorers of America, dating back 150 to 200 years.<sup>9</sup> The code for Sweetwater County (see Appendix E, p. 143) was not included for its similarity to the Virgin Islands but rather because it is a well written, comprehensive code that may provide good examples of language that the USVI can adopt when drafting its Large Wind Energy System Rules and Regulations.

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<sup>6</sup> See, Whiteman Osterman & Hanna website, available online at: [http://www.woh.com/practice\\_areas/practice\\_group.cfm?ID=10](http://www.woh.com/practice_areas/practice_group.cfm?ID=10)

<sup>7</sup> See, description of Community Wind Energy 2008 conference, available online at: <http://www.windustry.org/cwe2008>

<sup>8</sup> Wikipedia, Sweetwater County, Wyoming, found at: [http://en.wikipedia.org/wiki/Sweetwater\\_County,\\_Wyoming](http://en.wikipedia.org/wiki/Sweetwater_County,_Wyoming)

<sup>9</sup> Area History of Sweetwater County, Tourism Website, found at: <http://www.tourwyoming.com/main.html>

## **3.2 Recommendations for USVI Large Wind Energy System Rules and Regulations**

Our recommendations for drafting the Large Wind Energy System Rules and Regulations include a combination of modifications to the language of the Small Wind Energy System Rules and Regulations (see, Appendix A at p. 63) and adoption of additional provisions that pertain specifically to the Large Wind Energy Systems that are necessarily not currently contained within the Small Wind Energy System Rules and Regulations.

### **3.2.1 Modifications to the Small Wind Energy System Rules and Regulations**

In looking at the Small Wind Energy System Rules and Regulations document, Provisions 1.1, 1.2, 1.3, 1.4, and 2.0 can be adopted for the Large Wind Energy System Rules and Regulations almost in their entirety by changing the references from “small wind” to “large wind”. The definition of “small wind energy system” within Provision 2.0 (Section 3) can be removed in its entirety and replaced with a definition of “large wind energy system” which would increase the capacity to systems over 100 kW. This would also require modification to the language about the use of power solely for onsite to commercial sale of the wind energy supply.

The Design Requirements Provision (3.0) can also be adopted with some modifications. First, the tower height limitation needs to be increased or removed altogether (as discussed in Section 4.2.1) since larger wind turbine systems often exceed the 65 to 80 feet limitation listed for the small wind systems. The Setback requirement should be increased from the “total height of the wind energy system” to “1.25 times the total height of the wind energy system” (as discussed in Section 4.2.2). If the V.I. Energy Office wants to make the Setback requirements more complex based upon the proximity of the wind energy system to certain classes of

properties, it may consider a provision similar to §19.64.140(F) of the Kern County Code (see, p. 84).

The Noise ordinance within Provision 3.0 of the Small Wind Energy Rules and Regulations can remain the same with an additional sentence allowing for the application for a variance up to 80 decibels in the event that the operator exceeds the 60 decibel noise limitation due to the number or size of turbines on the parcel (as discussed in Section 4.1.2) *and* is able to demonstrate both the need for and reasonability of the variance. The Maximum Number of Towers provision should be removed in its entirety, but the Blade Clearance, Electrical Wires, Lighting, Appearance, Color, Finish, Signs, Compliance with Building Code, Compliance with FAA Regulations, Compliance with National Electric Code, and Utility Inter-Connections provisions should remain as written with the language revision to refer to large wind energy systems as opposed to small wind energy systems.

Section (1) of the Permit Requirements provision (4.0) should be replaced with a Permit Application provision, which will be discussed in the “Additions” section below, as well as Section 5 of this document. The Permit Application provision should include the requirements of the additional permits that need to be obtained in order to be approved to install and operate a large wind energy system. Since we recommend that the application process for the large wind energy system be more vigorous and detailed than the smaller wind energy systems due to their liability risks, size, location, and ownership status (e.g., likely to be corporate versus residential), we recommend that the application be included directly within the regulations themselves. A sample application is attached hereto as Appendix B.

Section (2) of the Permit Requirements provision (4.0) should remain but should be renumbered as a separate provision on Permit Revocation following the application process. This



additional provision should include a sub-section (c) which states the V.I. Energy Office may revoke the permit with thirty days notice to the operator upon discovery of a violation of any of these rules and regulations. In addition, the V.I. Energy Office may consider adding a sub-section (d) which would allow for an automatic review of the operator's permit every five years. (See, e.g., §88-3.420 of the Contra-Costa County Code at p. 76) This provision will authorize the V.I. Energy Office to review its decision every five years in the event of changes in circumstance as well as confirming to the operator that the permit does not exist in perpetuity. The five year review is important because it gives the V.I. Energy Office the opportunity to inspect the turbine units to make sure they are still operational and to ensure that the operator still has the appropriate permits and insurance coverage.

The Abandonment and Violations provisions (5.0 and 6.0, respectively) should remain with the change of "small wind" to "large wind". Prior to these provisions, however, we recommend an additional provision regarding requirements for the maintenance and demolition of the wind energy system, as discussed in the "Additions" section below and Sections 4.2.3 and 4.2.5 of this document.

As you can see, the Small Wind Energy System Rules and Regulations provide a good starting point for drafting the Large Wind Energy System Rules and Regulations. The large systems, however, pose public risks that need to be addressed before they can be sited. To that end, we recommend including additional provisions discussed in the following section.

### **3.2.2 Additional Provisions to be included for Large Wind Energy Systems**

A separate provision for the application for a permit to construct a large wind energy system should be included within the rules and regulations themselves. We have attached a sample application as Appendix B to this document. Many of the items included in the

application are specific to the U.S. Virgin Islands including, for example, an environmental assessment addressing impacts to wildlife on the islands, confirmation from the U.S. Fish & Wildlife Service that the survival of threatened and/or endangered species will not be jeopardized by the installation of the wind system (see Section 4.1.1), the preparation of a hurricane contingency plan which will provide for the dismantling or securing of turbine rotor system in the event of an oncoming storm (see Section 4.2.4), the submission of a transportation plan which will address the method for transporting construction materials and wind turbines to the wind energy site (see Section 5.5.3 and §13 of the New York Model Wind Law at pp. 117 and 131, respectively), and confirmation of compliance with the appropriate legal obligations including construction permits and insurance coverage for the installation, operation, and demolition of the wind energy system (see Sections 4.3 below).

The V.I. Energy Office has the option of including the entire application as drafted in Appendix B within the regulations themselves (see, e.g., §88-3.412 of the Contra-Costa County Code at p. 74, §19.64.130 of the Kern County Code at p. 83, §5.0 of the Town of Brewster Code at p. 116, and §1.5.1 of the Sweetwater County Code at p. 148) or a combination of a description within the code along with a reference to a sample application within the appendix to the rules and regulations (see, e.g., §7 of the New York Model Wind Law at p. 125). In addition, the Sweetwater County Code Application process (§1.5.1 at p. 148) requires additional supporting documentation that we did not feel was necessary for this project (e.g., an economic analysis of the costs and benefits of the project to the county and compliance with detailed siting guidelines). We therefore recommend that the V.I. Energy Office look at these additional provisions of the Sweetwater County code to determine if they want to include a requirement for these supporting documents.

Due to the nature of large wind energy systems, the V.I. Energy Office should require within the regulations that the owner and/or operator of the wind energy system properly maintain the system while in operation and dismantle the system when it is no longer operational. The reasoning for our recommendation and guidelines for system maintenance are discussed further in Section 4.2.3 below. Requiring proper maintenance and demolition when no longer in operation prevents the system from becoming a liability to the public or a blight on the community. Sample regulations for maintenance and demolition can be found at §19.64.150 of the Kern County Code at p. 89, and §§7.0 and 8.0 of the Town of Brewster Code at p. 121.

The modification of the Small Wind Energy System Rules and Regulations, along with the addition of the Permit Application and Maintenance and Demolition provisions, should provide the V.I. Energy Office with the comprehensive regulatory code that it needs to commence permitting and siting large wind energy systems in the U.S. Virgin Islands.

## **4. Issues in Commercial Scale Wind Power Regulation**

### **4.1 Environment**

This section provides an overview of common environmental issues associated with wind system construction. Section 4.1.1 begins with generalized guidelines for minimizing wind development impacts on wildlife, provides a short overview of federal wildlife laws relevant to wind power, and then describes the environmental analysis wind developers will likely have to conduct as part of their due diligence. Sections 4.1.2 and 4.1.3 discuss noise and visual considerations in turbine siting respectively. All three of these issues are made more acute in a small, densely populated island setting.

#### **4.1.1 Wildlife Impacts**

##### **4.1.1 (a) Overview of Concern**

Like communications towers, power lines and other tall structures, wind turbines pose a danger to birds. This is of special concern to the U.S. Virgin Islands (USVI) as it, along with Puerto Rico, hosts 78 species (including 10 bird species) protected under the Endangered Species Act as well as species protected under the Migratory Bird Treaty Act.<sup>10</sup> While wind turbine impacts on wildlife are most commonly associated with birds, other types of wildlife may be affected by the construction and operation of wind turbines.

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<sup>10</sup> US Fish and Wildlife Service. “Endangered and Threatened Animal Species Fact Sheets for Puerto Rico and the U.S. Virgin Islands.” [http://www.fws.gov/caribbean-ecoteam/animals\\_FS.htm](http://www.fws.gov/caribbean-ecoteam/animals_FS.htm) (June 2, 2008)

#### **4.1.1 (b) Mitigation Strategies**

When reviewing applications for wind energy systems, the V.I. Energy Office (VIEO) and the Department of Planning and Natural Resources (DPNR) should, to the maximum extent practicable, encourage applicants to implement projects that follow the guidelines below. By favoring proposals that employ these strategies, the VIEO can help minimize the risk to the wildlife populations and, by extension, minimize the threat to wildlife tourism.

Site turbines in degraded areas. When wind resources allow, proposals that site turbines in areas already disturbed by industry or agriculture should be selected over those that site turbines in high quality habitat.

Restore construction sites. In all cases, and especially when the wind farm is constructed on previously undisturbed land, builders should minimize the disturbed areas and, to the maximum extent practicable, restore disturbed areas to reduce runoff, reduce erosion, and to maintain the quality of wildlife habitat. Permit applications should include a plan that shows how developers intend to minimize their impact on land and vegetation.

Favor monopole tower designs. Monopole towers constructed of a single tube without the aid of guy wires present a smaller hazard to birds. Like power lines, guy wires may be difficult for birds to see, especially at night, and pose a high risk of impact. Guy wires should be avoided when possible. Lattice towers may attract birds by presenting nesting opportunities, increasing the likelihood of impact when the turbines are running.<sup>11</sup>

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<sup>11</sup> American Bird Conservancy. "American Bird Conservancy's Wind Energy Policy" [http://www.abcbirds.org/abcprograms/policy/wind/wind\\_policy.html](http://www.abcbirds.org/abcprograms/policy/wind/wind_policy.html) (May 30, 2008)

Arrange towers to minimize impacts when possible. For example, arrange turbines parallel to known flight paths to make the obstacle presented by the farm narrower than a farm arranged perpendicular to known flight paths.<sup>12</sup>

Bury associated power lines when possible. While this may present a challenge in the rocky terrain of the USVI, it will reduce the chances of bird strikes, reduce the visual impacts of the wind developments, and may increase the storm survivability of the system as a whole. Permit applicants wishing to install above-ground power lines should provide documentation demonstrating the technical and/or economic infeasibility of installing underground power lines.

Avoid lighting when possible. The Federal Aviation Administration generally does not require lighting on structures below 200 feet, though there are some exceptions. When lighting is not required, towers should be left unlit. When lighting is required, towers should use only the minimum lighting allowable. If possible, only white lighting should be used at night. Lights should be set at the minimum allowable intensity and set for the minimum allowable flashes per minute.<sup>13</sup> Applications should certify that their proposals will use only the minimum lighting required.

Consider seasonal turbine shutdown. If certain times of year have high bird strike risks, turbine operators should consider shutting down turbines during these times to minimize those risks. If this strategy is deemed useful or necessary, this may also be a potential time to perform routine maintenance on the turbines. See the *Monitoring*, Section 4.1.1 (e) for more on determining seasonal strike risks. While the wind system operator may be compelled to shut down turbines at times under the provisions of a federal *conditional take permit* (see Endangered

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<sup>12</sup> United States Department of the Interior. "Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines." May 3, 2003. <http://www.fws.gov/habitatconservation/wind.pdf> (May 30, 2008)

<sup>13</sup> United States Department of the Interior. "Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines." May 3, 2003. <http://www.fws.gov/habitatconservation/wind.pdf> (May 30, 2008)

Species Act below), this requirement may be a useful tool for protection of animals protected under local codes.

Enhance habitat off site. To reduce the net impact of a wind power project, developers can improve adjacent habitat and flyways. This could involve conservation easements on at-risk land or disturbed land. It might also entail removal of other bird strike hazards (i.e. burial of existing power lines or removal of unused strike hazards). If the VIEO and DPNR determine that areas of high quality habitat are the only viable locations for wind energy systems, they should consider requiring the developer to conduct habitat enhancement projects near the proposed turbine site.

Remove carrion. As mentioned in the monitoring section above. Facility personnel should remove dead animals in the project area to avoid attracting scavenging birds. The government should require carrion removal as part of standard maintenance in the project area.

Use of these strategies will not only help the V.I. protect its wildlife resources but will also help wind energy developers comply with federal laws governing species protection.

#### **4.1.1 (c) Relevant Federal Laws and Liability**

While the government of the V.I. may not be responsible for implementing the federal laws described below, the Energy Office should be aware of the process necessary for responsible large scale wind power installation and should require that developers certify that they have complied with all relevant federal laws and regulations prior to authorizing construction. The three laws summarized below are the laws most pertinent to wind development in the V.I. but, depending on the specifics of any particular proposal, other federal laws and regulations may apply.

### ***Migratory Bird Treaty Act***

The Migratory Bird Treaty Act (MBTA) prohibits the *take* (defined as the intentional or accidental killing, harming, or harassment) of protected bird species. Unlike the ESA, the MBTA does not provide exemptions or offer permits for the take of protected species and penalties for unauthorized take include fines and imprisonment. The FWS guidelines in regard to the MBTA state the following:

“While these Acts have no provision for allowing unauthorized take, the FWS realizes that some birds may be killed even if all reasonable measures to avoid the take are implemented. The FWS Office of Law Enforcement carries out its mission to protect migratory birds not only through investigations and enforcement, but also through fostering relationships with individuals, companies, and industries who seek to eliminate their impacts on migratory birds. Unless the activity is authorized, it is not possible to absolve individuals, companies, or agencies from liability even if they implement avian mortality avoidance or similar conservation measures. However, the Office of Law Enforcement focuses on those individuals, companies, or agencies that take migratory birds with disregard for their actions and the law, especially when conservation measures have been developed but are not properly implemented.”<sup>14</sup>

Developers should be aware that the MBTA employs “strict liability” and therefore will not consider the intent or culpability of the actor when assessing the civil penalty for migratory bird kills.

### ***Endangered Species Act***

Wind power projects expected to have an adverse impact on species protected under the Endangered Species Act (ESA) may be able to proceed if the project developer completes a formal consultation process with the FWS. If the FWS does not make a determination of *jeopardy*, the developer may submit a conservation plan showing planned mitigation efforts and apply to the agency for an “incidental take permit” that will absolve the project of liability for accidental take of specified species as a result of non-negligent project activities.

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<sup>14</sup> United States Department of the Interior. “Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines.” May 3, 2003. <http://www.fws.gov/habitatconservation/wind.pdf> (May 30, 2008), page 35



### ***National Environmental Policy Act***

If a wind project involves federal funding or federal permits, the National Environmental Policy Act (NEPA) may require a full *environmental impact statement* (EIS). This is a lengthy process performed by the federal government. It involves consultation with various federal agencies and provides a period for public comment and hearings.

Because of the potential for large scale wind systems to have a negative impact on bird populations, project developers exercising due diligence will need to consult with the U.S. Fish and Wildlife Service (FWS), the V.I. Department of Planning and Natural Resources (DPNR), conservation groups, and other interested parties. This consultation will help the developers determine their federal legal obligations and liability.

The severity of the danger to wildlife depends largely on location and design characteristics of each individual project proposal. Careful planning, site selection, farm design, construction practices and other mitigation measures can help reduce the overall impact on birds and other wildlife. However, developers should begin planning for wildlife impacts from the earliest stages of their design process to help avoid costly delays later in the project.

#### **4.1.1(d) Factors in Site Selection**

The Energy Office and DPNR should consider the potential impacts to birds and other wildlife when determining appropriate siting for wind farms or when choosing between multiple project proposals. This subsection aims to inform the application review process to help regulators judge the merits of different proposals.

Several factors determine the risks posed at each potential site: presence of a flyway, presence of prey or other food source, topology and local weather. The latter two factors are relatively easy to observe while the former two will likely require more rigorous research. In

general, sites that provide high quality habitat or that tend to concentrate birds should be avoided and sites that are already fragmented or degraded by other development should be favored for turbine siting.

Some land forms tend to concentrate bird use, making them less suitable to turbine placement. FWS guidelines<sup>15</sup> for siting wind turbines on land recommend that developers catalogue all valleys, passes, gaps, ridges, bluffs, and buttes within five miles of a proposed site, and the California Energy Commission<sup>16</sup> recommends noting the presence of peninsulas as these land forms may attract higher bird densities. The topography of the USVI contains many similarities to these features and given the size of the islands it would be difficult or impossible to site land-based turbines more than five miles from a ridge. However, there is precedent for siting at least small numbers of large turbines on ecologically sensitive islands. In an effort to reduce the threat posed by diesel shipments to the Galapagos Islands, Ecuador installed three turbines on the island of San Cristobal.<sup>17</sup> While it is too early to tell what the impacts of these turbines will be, they should be a good source of data in the future.

Topography such as ridges can affect local wind patterns that may cause birds to congregate. For instance, the presence of persistent updrafts may attract birds. Other local weather issues can also affect the danger to birds. Areas prone to low visibility conditions due to fog or low cloud ceiling present an increased risk of bird collision. If possible, developers and the DPNR should avoid siting wind turbines in areas where local weather conditions increase the risk of bird collisions.

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<sup>15</sup> United States Department of the Interior. "Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines." May 3, 2003. <http://www.fws.gov/habitatconservation/wind.pdf> (May 30, 2008)

<sup>16</sup> California Energy Commission "California Guidelines for Reducing Impacts to Birds and Bats from Wind Energy Development." October 2007. <http://www.energy.ca.gov/2007publications/CEC-700-2007-008/CEC-700-2007-008-CMF.PDF> (May 29, 2008)

<sup>17</sup> Doyle, Alister. "Galapagos bird brains survive wind turbines." April 3, 2008. <http://blogs.reuters.com/environment/2008/04/03/galapagos-bird-brains-survive-wind-turbines/> (May 30, 2008)

#### **4.1.1 (e) Biological Assessment**

One significant hurdle to the installation of commercial-scale wind power facilities on the islands is the need for a biological assessment and monitoring data. This subsection and subsection 4.1.1 (f) describe the processes that developers will need to complete to help ensure their compliance with federal wildlife protection laws. These processes will be most difficult for the first wind development. Subsequent developments may be able to proceed with less rigorous reviews and data collection. If the government of the V.I. wishes to facilitate wind energy development, it may consider providing funds to conduct a territory-wide assessment upon which developers could base their proposals.

The proximity to topographic risk factors, presence of endangered species, and lack of similar, nearby wind projects means that an intense level of biological assessment may be necessary prior to construction of a wind farm in the USVI. While the first commercial-scale wind development will likely require deep analysis, once the USVI gains experience with wind farms and is able to judge the biological impact, subsequent developments may be able to proceed more quickly.

In the early stages of the biological assessment, developers should conduct a literature review to determine the areas of greatest interest at the proposed project site and alternate sites. The review will help inform the design of the pre-construction site and monitoring that may (and likely will) be necessary. This is also the time to engage the DPNR, the FWS, conservation organizations, and other interested parties.

To initiate a formal ESA consultation process, the developer must request a list of endangered species and critical habitat in the proposed project area. In the event that the FWS determines there are no endangered species in the proposed site, no further ESA consultation will

be necessary. Keep in mind, however, that the FWS determination that no further ESA will be necessary does not absolve the applicant from its obligations under other Federal laws as discussed in the Federal Laws and Liability section below.

In the more likely event that the FWS produces a list of listed species and/or critical habitat in the proposed area, the agency and developer will have 90 days to consult with one another about the potential impacts of the project on the endangered species, after which the FWS will have 45 days to issue a *biological opinion* (BO).<sup>18</sup> If FWS makes a finding of *jeopardy*, the project cannot proceed. In this case, however, “the biological opinion must identify any reasonable and prudent alternatives that could allow the project to move forward.”<sup>19</sup>

If the BO finds an acceptable level of impact, the developers may apply for an *incidental take permit* from the FWS that will allow the project to proceed even though a certain number of listed species are expected to be harmed or harassed by the project. The applicant must provide a *habitat conservation plan* to receive the permit. This plan will need to demonstrate sufficient mitigation to avoid jeopardizing the affected species. (See Mitigation Strategies below)<sup>20</sup>

#### **4.1.1 (f) Monitoring**

The FWS guidelines recommend an average of three years of monitoring in areas of high bird concentrations. This may include one year of pre-construction monitoring and two years of post-construction monitoring. Monitoring entails collecting data on bird species and numbers that frequent the proposed sites. This can be an expensive process that includes visual counts or use of monitoring technology such as radar. While these guidelines are voluntary and other

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<sup>18</sup> For a more detailed discussion of the consultation process, see the FWS handbook on consultation available at <http://endangered.fws.gov/consultations>.

<sup>19</sup> United States Department of the Interior. “Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines.” May 3, 2003. <http://www.fws.gov/habitatconservation/wind.pdf> (May 30, 2008)

<sup>20</sup> United States Department of the Interior. “Service Interim Guidance on Avoiding and Minimizing Wildlife Impacts from Wind Turbines.” May 3, 2003. <http://www.fws.gov/habitatconservation/wind.pdf> (May 30, 2008)

guidelines note that some sites may need less than one year of monitoring data, this due diligence may be important in the preparation of the biological assessment and will show good faith efforts to mitigate impacts in the event there is any unauthorized incidental take of a protected species.

Pre-construction monitoring should help inform site selection and should also assess the impacts of construction activities on the local environment. These surveys can be used to mark sensitive areas as off-limits to construction equipment and can identify necessary construction site restoration that may be necessary to minimize erosion and impacts on non-avian fauna and flora.

In addition to pre-construction monitoring, post-construction monitoring of the site is important both to determine actual wildlife impacts and to help reduce impacts. Two years of data will help establish seasonal variations in bird strikes that may require seasonal turbine shutdown. Likewise, it will help identify problem turbines that may be involved in a disproportionate number of bird kills.

To conduct post-construction monitoring, personnel should count and remove any carcasses found in the area to help reduce chances that scavenging birds will be attracted to the area by the carrion. To determine the accuracy of counts and to account for scavenger removal carcasses, carcasses should be planted without the knowledge of the personnel responsible for the counting. If the counters do not find the planted carcasses, the site of the plant should be revisited to determine whether or not it was removed by scavengers.

#### **4.1.2 Noise**

When considering regulations for large scale wind turbines, noise is an important siting criterion. As technology has advanced, wind turbines have generally become much quieter but like other environmental concerns, the public's perception of the acoustic impact of wind

turbines is, in part, a subjective determination. Operating sound produced from wind turbines is significantly different when compared to most large scale power plants and turbines are more often sited in less densely populated areas. Furthermore, while noise may be a concern to the public living near the turbines, much of the sound emitted from the turbines is masked by ambient noises or background sounds of the wind itself.<sup>21</sup>

The sounds emitted from operating turbines can generally be divided into two categories: mechanical sounds and aerodynamic sounds. Mechanical sounds, which originate from the motion of mechanical components, can generally be dampened by specially designing the parts to help minimize sound. Recent improvements in the mechanical design of large wind turbines have significantly reduced mechanical sounds. Aerodynamic sounds, on the other hand, are typically the largest component of wind turbine sound emissions and originate from the flow of air around the blades. This type of sound generally increases with rotor speed.<sup>22</sup>

While wind energy system owners can choose to invest in mechanical designs to dampen noise, we recommend the USVI impose noise regulations that coincide with background noise levels of the islands. Existing noise regulations and standards generally state that audible sound emitted from wind energy systems should not exceed the lesser of 5 dB above the background noise level or 60 dB at the property line nearest to the wind energy system. However, if the background noise is low and the 5 dB threshold is unreasonable, it may be appropriate for the USVI to determine the fixed background noise to be between 30 and 40 dB.<sup>23</sup> The background

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<sup>21</sup> *Wind Turbine Acoustic Noise*,” Prepared by the Renewable Energy Research Laboratory, University of Massachusetts at Amherst, June 2000, found at: [http://www.ceere.org/rerl/publications/whitepapers/Wind\\_Turbine\\_Acoustic\\_Noise\\_Rev2006.pdf](http://www.ceere.org/rerl/publications/whitepapers/Wind_Turbine_Acoustic_Noise_Rev2006.pdf). (May 30, 2008)

<sup>22</sup> *Wind Turbine Acoustic Noise*,” Prepared by the Renewable Energy Research Laboratory, University of Massachusetts at Amherst, June 2000, found at: [http://www.ceere.org/rerl/publications/whitepapers/Wind\\_Turbine\\_Acoustic\\_Noise\\_Rev2006.pdf](http://www.ceere.org/rerl/publications/whitepapers/Wind_Turbine_Acoustic_Noise_Rev2006.pdf). (May 30, 2008)

<sup>23</sup> “The Assessment and Rating of Noise From Wind Farms,” Prepared by the Working Group on Wind Turbine Noise, New and Renewable Energy Enquiries Bureau, 1996. Accessed from the British Wind Energy Association Website: <http://www.bwea.com/ref/noise.html>. (May 30, 2008).

noise level is generally calculated by a pre-construction sound and vibration assessment at nearby residences, schools, hospitals and other potentially affected sites during time periods when the wind velocity is sufficient to allow wind turbine operation.<sup>24</sup>

We recommend that the USVI conduct an appropriate noise assessment study near potentially sensitive receptors. This will provide baseline noise levels upon which noise regulations can be based. These types of studies usually contain four major parts of information including:

1. An estimation of the existing ambient background noise levels
2. Prediction of noise levels from the turbines at or near the site
3. Identification of a model for sound propagation
4. Comparing calculated sound pressure levels from the wind turbines with the background sound pressure levels at locations of concern<sup>25</sup>

We further recommend that the USVI consider two actions pertaining to noise regulations. First, the USVI should develop an appropriate noise assessment plan to study the impacts of proposed wind energy systems. Second, the USVI should adopt the generally accepted standard of noise not exceeding the lesser of 5 dB above the background noise level or between 40 and 60 dB at the property line with a provision for the application for a variance in the event that the circumstances justify the exception. Even with the provision for the variance, however, we recommend that the USVI regulation provide that under no circumstance should the noise level at the property line exceed 80 dB.

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<sup>24</sup> “Town of Woodville Wisconsin Wind Energy Systems Licensing Ordinance,” 2007, Section 5, Found at: <http://betterplan.squarespace.com/town-of-woodville-adoped-decem/>. (May 30, 2008).

<sup>25</sup> “Wind Turbine Acoustic Noise,” Prepared by the Renewable Energy Research Laboratory, University of Massachusetts at Amherst, June 2000, found at: [http://www.ceere.org/rerl/publications/whitepapers/Wind\\_Turbine\\_Acoustic\\_Noise\\_Rev2006.pdf](http://www.ceere.org/rerl/publications/whitepapers/Wind_Turbine_Acoustic_Noise_Rev2006.pdf). (May 30, 2008)

### **4.1.3 Visual Impacts**

To some, the sight of a wind farm on the horizon is a beautiful sign of progress. To others, it is a blight on the landscape. Large and small turbines alike are highly visible. That fact, combined with differing views on their contribution to aesthetics is a recipe for conflict. The problem becomes more acute as turbine sites move closer to large populations. The limited land resources in the USVI and the prominence of the tourism industry call for special attention to this issue. (See Section 6.1 for an overview of studies public attitudes toward wind farms, wind farm impacts on property values and wind farm impacts tourism.)

The wind power permitting process should seek to minimize those conflicts by providing guidelines for turbine siting, layout, and design, and by providing a detailed permitting process that allows and encourages public participation and productive dialogue amongst all stakeholders.

Regulators should establish wind resource zones in which visual impacts are relatively low. These zones might include areas in which viewsapes are already degraded by other developments such as industry or heavy agriculture. Alternately, zones shielded from view by hills or other obstacles would make good candidates for these zones.

Permit applications should include maps that show both the location of the proposed turbines and the affected viewshed as visible at 10, 20, and 30 feet above ground level. Site plans showing the range of the shadow flicker from the turbine blades should also be included. In addition to the maps and site plans, applicants should attached photos simulating the appearance of the turbines at 1, 3, and 5 miles. The application should also include similar materials for at least one alternate site unless the applicant demonstrates that no alternate site is feasible.



These maps and photos should be provided in both digital format and hard copy, and should be made available to the public for period of not less than 30 days. The applicant should hold at least two public hearings at which interested parties may make comments and receive responses to their concerns. Transcripts and materials from these meetings should be made available to the public. The DPNR should also accept public comments in writing. (See Section 5.1 for more on public participation.)

In addition, the applicant should abide by the following general guidelines for minimizing visual impact:

- Follow USVI guidelines for small wind turbine color and markings.
- Favor monopole construction over lattice or guy wire towers.
- Site turbines in non-residential and non-tourist areas when possible.
- Site turbines in areas of already degraded viewsheds when possible.
- If doing so does not increase the risk to wildlife or decrease the efficiency of the project, arrange turbines to minimize viewable area and use visually similar turbine designs in areas with more than one turbine.

Abiding by these simple guidelines will minimize the appearance of the wind energy system and the aesthetic impact the systems will have on the islands.

## **4.2 Technical Issues**

### **4.2.1 Tower Height**

The USVI proposed regulation on small wind energy systems provides that turbine towers shall not exceed 80 feet. While this requirement may be sufficient for small wind systems, it will not be feasible for larger commercial scale wind energy systems whose tower height will exceed that limit. Nearly all wind systems in excess of 100 kW require a tower which is greater in height than 80 feet. Tower height generally varies between 40m (131 ft) and 60m (196 ft) depending on the model and physical site requirement for optimal performance.

A potential problem is Title 28, Section 1005 of the USVI Code states that “a tower used in a solar or wind energy system may exceed the height limitation of the district in which it is located by no more than one hundred (100) feet.” (See, 28 USVIC §1005). Most districts within the USVI have height limitations of three stories, but other areas may be more restrictive. A possible solution to the height restrictions which are currently in place may be to create a wind overlay. This designated area will allow the height restrictions to be changed for wind power generation. This has been a successful strategy implemented by other local governments in combination with special use permits. Wind overlays create specific areas where the maximum height restriction can be exceeded for specific land uses.<sup>26</sup> In order to avoid a conflict, we recommend that the V.I. Energy Office consider taking steps to amend existing statutes.

Further considerations for height restrictions should include the possibility of the tower falling and the possible damage it may cause to adjacent property. Several codes include requirements that the height of the wind system shall not exceed the distance to the property line, so that in the case the tower does fail, the damage to adjacent property can be minimized. This requirement may not be practical given the smaller division of property in the U.S. Virgin Islands, but should be enforced when appropriate, particularly for larger wind systems. (For further discussion on setback requirements, see Section 4.2.2.)

Federal law requires turbine towers to comply with Federal Aviation Administration lighting guidelines. Wind systems which are over 200 feet in total height must be inspected and approved by the FAA. It is recommended that wind systems between 150 and 200 feet also be inspected by the FAA and that the owner comply with FAA minimum requirements for lighting.

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<sup>26</sup> Wind Power Facility Siting Case Studies: Community Response. National Wind Coordinating Committee. June 2005. BBC Research & Consulting

The bright white or light off-white paint most often found on wind turbines has been shown to be most effective for daytime visibility, and if used, no lights are required during the daylight hours. Other colors, such as light gray or blue, appear to be significantly less effective in providing daytime warning. However, if darker paint is used, wind turbine marking should be supplemented with daytime lighting, as required.<sup>27</sup>

According to the FAA, nighttime wind turbine obstruction lighting should consist of the preferred FAA L-864 aviation red-colored flashing lights. White strobe fixtures (FAA L-865) may be used in lieu of the preferred L-864 red flashing lights, but must be used alone without any red lights, and must be positioned in the same manner as the red flashing lights.<sup>28</sup>

Depending on the arrangement of wind systems the lighting requirements will vary. Linear, cluster and grid arrangements require different lighting schemes.<sup>29</sup>

In addition to the lighting and inspection requirements, further restrictions may be placed on wind energy systems located in close proximity to airports on St. Croix and St. Thomas. The regional FAA hazard analyst makes final decisions on site specific lighting and siting requirements pertaining to aviation. The analyst takes into account local flight traffic, allowing each decision written to apply to the particular site being considered. Ensuring that these potential aviation hazards are properly marked is in the owner and the FAA's best interest.<sup>30</sup> It is best to consult the regional authority responsible for the local site to ensure compliance.

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<sup>27</sup> AC 70/7460-1K. Obstruction Marking and Lighting. Federal Aviation Administration. February 1, 2007. May 12-30, 2008

<sup>28</sup> AC 70/7460-1K. Obstruction Marking and Lighting. Federal Aviation Administration. February 1, 2007. May 12-30, 2008

<sup>29</sup> AC 70/7460-1K. Obstruction Marking and Lighting. Federal Aviation Administration. February 1, 2007. May 12-30, 2008

<sup>30</sup> Chiasson, Gary. "FAA Lighting Requirements." Flash Technologies. May 12-30, 2008.

## 4.2.2 Setbacks

In preparing a proposed regulation for large scale wind turbine units, the U.S. Virgin Islands should impose a provision requiring that wind turbines be set back a certain distance from the adjoining property line. The draft Small Wind Energy System Rules and Regulations provides that the “setback of small wind energy systems from adjacent property lines shall not be less than the total height of the wind energy system” where the total height refers to “the vertical distance from ground level to the tip of a wind generator blade when the tip is at its highest point.”<sup>31</sup> The purpose of the setback is to protect the public from rotor failure and fragments. The question then is whether the setback for a large 100+ kW generator should be greater than the setback required for the small systems.

Depending on the purpose of the setback, existing regulations range from the total height of the wind turbine to 2/3 of a mile, with the majority of setback requirements set between 1.25 to 3 times the total height of the turbine unit.<sup>32</sup> Given the limited amount of space available on the Virgin Islands, we recommend limiting the setback to a reasonable amount of space necessary to protect the public in the area of the wind turbine. The question is what the reasonable amount of space actually is.

The State of California answered this question when it prepared a report assessing the potential threat of injury from wind energy system rotor or generator failure in an effort to define the minimum setbacks that should be required by law.<sup>33</sup> The main causes of rotor failure include: environmental events such as storms causing lightning strikes, failure of the turbine

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<sup>31</sup> See, draft Small Wind Energy System Rules and Regulations, U.S. Virgin Islands Energy Office publication.

<sup>32</sup> See, e.g., Scenic Highway set back requirements, State of California, Riverside County Zoning Regulations, Section 17.224.100.

<sup>33</sup> See, *Permitting Setback Requirements for Wind Turbines in California*, PIER Interim Project Report, prepared for the California Energy Commission by the California Wind Energy Collaborative, Publication Number CEC-500-2005-184 (November 2006), hereinafter referred to as the California Setback Report.

control or safety systems, human error, manufacturing defects, rotor fatigue, and excessive electrical load capacity.<sup>34</sup> The authors of the report concluded that the probability of rotor failure resulting in the excretion of rotor fragments was only 1 in 1,000 turbine units.<sup>35</sup> Even under a conservative estimate, the authors could only support a finding of 1 in 100 rotors per year.<sup>36</sup> As such, the chance of fragments being released from a rotor is minimal. However, regulators must still consider this possibility when permitting a wind energy system in order to protect the public from such an event.

In determining the distance that should be required for the setback, the authors looked to reports prepared in Europe, and particularly the Netherlands, regarding rotor failure.<sup>37</sup> These reports demonstrated that the maximum trajectory of a rotor blade was 150 meters and the maximum trajectory of a rotor fragment was 500 meters.<sup>38</sup> The authors therefore concluded that the setback required could be based upon a fixed distance, not necessarily tied to the height of the unit itself. This is because the trajectory of a released object will be based upon the velocity of the rotor at the time of release, which speed tends to remain constant based upon the size of the turbine.<sup>39</sup> However, this complex calculation would have to be performed with respect to each individual turbine unit being installed.<sup>40</sup> As such, we recommend that the USVI adopt the generally accepted setback requirement of 1.25 times the total height of the wind energy system.

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<sup>34</sup> See, California Setback Report, p. 16.

<sup>35</sup> See, California Setback Report, p. 2.

<sup>36</sup> See, California Setback Report, p. 16.

<sup>37</sup> See, California Setback Report, pp. 17-18, citing to *Analysis of Risk-Involved Incidents of Wind Turbines*, Prepared by H. Braam and L. W. M. M. Rademakers on behalf of the Energy Research Centre of the Netherlands (January 2005).

<sup>38</sup> See, California Setback Report, p. 18.

<sup>39</sup> See, California Setback Report, p. 20.

<sup>40</sup> See, California Setback Report, p. 29.

### 4.2.3 Maintenance

Larger wind systems require maintenance on a regular basis to ensure their proper and safe function. Included within the ordinances should be provisions for proof of planned routine maintenance. Industry standards recommend semi-annual maintenance, two or three times per year.<sup>41</sup> These routine maintenance procedures should be conducted at the discretion of the private owner. Maintenance procedures will vary by model and specific unit. For your reference in reviewing developer's maintenance plans, the typical maintenance costs for large scale wind systems will vary from 1.5 to 2 percent of the initial investment each year in maintenance costs. Although maintenance costs are usually considered a fixed cost, other estimates are based on productivity, about \$0.01 per kWh.<sup>42</sup> The average life expectancy of a wind turbine is about 20 years. Replacement of major components such as rotors, gearbox, or generators usually requires 15-20 percent of the original total cost.<sup>43</sup> Basic maintenance for all wind systems should include changing oil, lubrication of mechanical components, tower preservation, and maintenance of electrical components.<sup>44</sup>

To ensure that the wind systems receive proper maintenance and do not pose an increased risk to the public, inspections should be conducted by the local government. Using the existing building codes and the newly adopted wind regulations, a condensed clearly organized "standards for compliance" should state the building codes relevant to wind power systems, as

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<sup>41</sup> Danish Wind Industry Association. "Operation and Maintenance." Danish Wind Industry Association. May 12, 2003. May 12-30, 2008. <http://www.windpower.org/en/tour/econ/oandm.htm>

<sup>42</sup> Danish Wind Industry Association. "Operation and Maintenance." Danish Wind Industry Association. May 12, 2003. May 12-30, 2008. <http://www.windpower.org/en/tour/econ/oandm.htm>

<sup>43</sup> Danish Wind Industry Association. "Operation and Maintenance." Danish Wind Industry Association. May 12, 2003. May 12-30, 2008. <http://www.windpower.org/en/tour/econ/oandm.htm>

<sup>44</sup> Kavafyan, Phillippe. "Effective Operation and Maintenance of Wind Turbines Through Use of Advanced Services Technologies." General Electric. February 2006. May 12-30, 2008

well as the suggested required maintenance. These “standards for compliance” should be made available to the wind system owners and management.

Systems should be inspected on an annual basis as well as at random by code enforcement officers. Wind energy systems which fail to meet “standards for compliance” should be fined and/or prevented from operation until all measures to meet “standards for compliance” are met. Clear maintenance requirements will mitigate the risks of accidents which may negatively impact the public as well as reduce the possibility of negative visual impact due to insufficient maintenance of these highly visible structures. In addition, clearly stated requirements will ease developers planning efforts. The following is a sample outline for a “Standard for Compliance” Inspection:

1. Evidence of Proper Maintenance
  - a. Maintenance personnel should have detailed records of performed maintenance which has occurred within the last year available for review upon inspection. These records should accurately reflect the current state of the wind system.
    - i. Action: Review maintenance records
  - b. Inspections should include a tour of the wind systems to ensure that maintenance claimed in the records was carried out.
    - i. Action: Ensure that stated maintenance occurred by examining physical evidence.
2. Current Compliance with Newly Adopted Wind System Regulations
  - a. The criterion for application included within this report should continue to be upheld.
    - i. Action: Review of the As-Built Plans to ensure no changes have occurred on the site. If changes have occurred the owner must apply for a variance to continue operation in violation of the current wind system regulations.
3. Continued Compliance with Pre-Existing Building Codes
  - a. The tower and electrical transmission components should be in compliance with pre-existing codes similar to ordinary code enforcement inspections.
    - i. Action: Standard code enforcement procedures to ensure that the site is well maintained and in compliance with existing codes.

## 4.2.4 Hurricane Resistance

The U.S. Virgin Islands has a history of hurricanes. In the past 20 years, two hurricanes, Hugo and Marilyn, severely damaged St. Croix's infrastructure. Hurricane Hugo destroyed about 90% of the island's buildings and much of the island's population did not have electricity or phone service for upwards of four to six months. Wind speeds of upwards of 200 mph were sustained.<sup>45</sup> On average, St. Croix is affected by a hurricane every 3.5 years and is directly hit by a hurricane every 13.7 years. St. Thomas and St. John also have similar numbers.<sup>46</sup>

Wind turbine damage or failure can occur when extreme wind, from a hurricane for example, produces forces on the wind turbine above the design limits. Failure may not only prohibit the operation of the wind turbines, but could also lead to third party risk, such as property damage or injury. While natural disasters, such as hurricanes, are generally well documented as well as the areas they affect, their occurrence and behavior cannot be predicted with certainty. In addition, the mode of failure of a wind turbine due to hurricanes cannot be generalized. It depends on the turbine type, configuration as well as the specifics of the storm and site conditions.<sup>47</sup>

In order to mitigate the risks that hurricanes pose, the following actions should be considered when siting wind turbines:

1. Remote Siting – For sites located in well known storm areas, a good approach is to assess the remoteness of the potential wind energy system. Remote or rural areas usually tend to reduce the potential for damage in the event of storming winds but areas that are less densely populated or less urbanized would also be appropriate.
2. Physical and Visual Warnings – The use of fencing and visual warning signs, regardless of location, can help the site remain private.

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<sup>45</sup> Hurricane Hugo Haunts Virgin Islands, William Branigin, Washington Post, Oct 1989.

<sup>46</sup> U.S. Virgin Islands with Tropical Storms, HurricaneCity.com.

<sup>47</sup> Extreme Wind Speed: Risk and Mitigation, Report Prepared by GE, Oct 2007.



3. Turbine Deactivation – Turbines should be deactivated in the event of wind speeds over the manufacturer’s suggested wind limit. The control systems designed to protect the equipment should also be kept in good working order.
4. Operator Safety – Access to the site should be restricted to personnel while extreme wind speed conditions exist. In addition, wind turbines should be thoroughly inspected after an extreme event before normal operation is resumed.<sup>48</sup>

These measures should help protect the public from personal injury or property damage due to the failure of a wind system in the event of a hurricane. However, we also recommend that each applicant prepare a hurricane contingency plan and be encouraged, where appropriate, to remove or otherwise secure the rotor blades in the event of an oncoming storm.

#### **4.2.5 Removal**

All permits for large wind systems should include provisions for removal. Derelict wind systems have been a problem in other localities where provisions have not been made to ensure their removal after they had been abandoned.

The most successful provision for removal of abandoned wind systems is to ensure that the owner of the wind system has a letter of credit from a reputable financial institution for the entire assessed cost of removal. This letter of credit will be held as insurance that the cost of removal will not be passed on to the local government.<sup>49</sup>

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<sup>48</sup> Extreme Wind Speed: Risk and Mitigation, Report Prepared by GE, Oct 2007.

<sup>49</sup> From Town of Walworth New York Code §180-10.1

## **4.3 Liability**

### **4.3.1 General Insurance Requirement - Operations**

The owner and/or operator of the wind energy system must be held responsible for any personal injury or property damage arising from the installation, operation, and demolition of the wind energy system. This requirement should be noted directly in the regulations in the form of a provision that requires the applicant to carry a sufficient amount of insurance to cover losses resulting from a generator malfunction or other accident. Given the nature of a large wind farm facility, the applicants are likely to be corporations, condominium associations, or resorts that already carry a comprehensive general liability policy which covers the applicant for personal injury or property damage.

In the application process, we recommend that the applicant provide the name of the insurer, policy number, and type of coverage provided so that the V.I. Energy Office can confirm that there is sufficient funding in the event of an incident. We recommend that private individuals with small units carry at least \$100,000 in coverage, while corporations, condominium associations, and resorts carry \$1M in coverage. In order to avoid setting these figures in stone, the V.I. Energy Office may consider citing a general requirement for the purchase of comprehensive general liability coverage in the regulation itself while applying the recommended coverage amounts as internal guidelines in the permitting process.

### **4.3.2 Insurance for Installation and Demolition**

Unlike the general operation of the wind energy system, the owner and/or operator may not be the primary insurance carrier for installation and demolition activities. These activities are generally conducted by contractors external to the applicant's organization who have their own insurance covering their specific construction duties. It is generally understood in the

construction industry that the contractor responsible for the construction process will name the owner and/or operator of the facility being constructed as an additional insured under their policy so as to provide an additional layer of insurance coverage for the owner in the event that an accident occurs during the construction process. This added layer of protection benefits injured parties both on the job and in the surrounding area.

Therefore, we recommend that in the application process, the applicant be required to provide, prior to the commencement of construction, a certificate of insurance which will confirm that the owner and/or operator of the wind energy system is covered under the policy of the contractor in the event that personal injury or property damage occurs during the installation of the wind energy system. A similar requirement should be included in the provision setting forth the operator's demolition obligations. For obvious reasons, the operator will not be able to provide a certificate of insurance for demolition at the time of application (since demolition is not to be expected for at least twenty years and the operator's insurance profile is likely to change during that time). However, it should be sufficient for the V.I. Energy Office to require the operator to provide evidence that the demolition company has named the operator as an additional insured under their insurance policy prior to the actual demolition activities.

#### **4.3.3 Landowner vs. Lessee Insurance Requirements**

A third category of insurance that must be considered by the V.I. Energy Office with respect to large wind energy systems installations and operations is the possibility that foreign corporations will be leasing space from on-shore land owners in order to install and operate wind farms. In order to prepare for this event and to protect the property owners on the Virgin Islands the V.I. Energy Office should require any operator of a large wind turbine unit to include the property owner as an additional insured under their comprehensive general liability insurance

policy for any accident and/or occurrence arising from the installation, operation, maintenance, and demolition of the wind energy system. This obligation can be documented with a certificate of insurance copied to the V.I. Energy Office.

In addition, the V.I. Energy Office should require an indemnification and hold harmless provision in any lease entered into between the property owner and the wind energy system operator. This requirement ensures that in the event an accident or occurrence is not covered by the insurance, the property owner will not be held liable for the actions of the wind energy system operator. A copy of the lease agreement should be on file with the V.I. Energy Office as part of the permit application process.

## 5. Permitting Process

### 5.1 Community Involvement

Community involvement is an integral part of the wind energy systems siting process. Consultation with the stakeholders enables sites to be developed sensitively and enables changes to be made to plans to help meet the concerns identified by local communities.<sup>50</sup> To notify the public of a proposed wind energy project, we recommend that the applicant publish a notice of intent in the local newspaper and post the intent in public places such as the local library or local government offices. These notices of intent should include an address to which the public can mail comments. We do not recommend holding a public hearing for every proposed project, but instead this should be left to the discretion of the government, though it may be in the best interest of developers to hold hearings with concerned citizens. A public hearing should be held if there is enough cause for concern, which could likely be determined by the nature and number of comments the permitting agency receives.

If a public hearing is held, it should be informative in nature, as many of the concerns will likely stem from the lack of education and experience with wind energy systems. Issues should be clarified, assumptions exposed and uncertainties should be identified. This is also the time to establish and improve communication between the permitting agency, applicant and the surrounding community. According to the British Wind Energy Association, the most contentious issues will most likely center on the economic impacts, environmental impacts, social issues (including health and safety) and property values.<sup>51</sup>

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<sup>50</sup> Best Practice Guidelines for Offshore Wind Energy Developments, Prepared by the British Wind Energy Association.

<sup>51</sup> Best Practice Guidelines for Offshore Wind Energy Developments, Prepared by the British Wind Energy Association.

If there are not enough comments to warrant a hearing, information should still be made available to quell concerns. The information should be brief and expressed in simple terms. Technical terms should be explained and graphics, diagrams and maps should be included. These are often more effective than blocks of text. In addition, commitments should be spelled out, as well as the process that the developer went through to site the wind energy systems. Contact information should also be given for further information.<sup>52</sup>

One way of exposing this information is by a public exhibition. A public exhibition can be an extremely effective way of explaining what a wind energy system development involves. The exhibition should be well advertised and conveniently located. Materials should also be clear and leaflets or pamphlets should be provided to those who want to take the information with them. When planning what information to include and present at the public exhibitions, responses and information collected from both surveys that are attached in the appendix should be taken into account. These surveys have been designed to help the V.I. Energy Office learn more about what the major concerns are of both residents and tourists that live on and visit the islands. Integrating this information into the exhibitions will allow the V.I. Energy Office to target and focus on specific concerns and help quell fears of those who will be particularly affected by the development of the wind energy systems.

In addition, the public exhibition should be staffed at all times by people who are able to answer every type of question. The V.I. Energy Office may also want to consider providing video footage of similar wind energy systems which is a popular way to exhibit information in a user friendly manner. The advantage of hosting a public exhibition rather than a public hearing is that people usually feel more at ease to read materials at their leisure and are generally less

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<sup>52</sup> Best Practice Guidelines for Offshore Wind Energy Developments, Prepared by the British Wind Energy Association.

contentious. Due to the ease of selecting a convenient location and time frame for maximum exposure, exhibitions are also easier to organize and easier for people to attend.<sup>53</sup>

## **5.2 Certification of Compliance with Legal Obligations**

In addition to the insurance requirements discussed in Section 4.3 above, the owner and/or operator of a large wind energy system must be required to demonstrate that they have complied with all applicable legal obligations and permitting requirements. This demonstration can be made in the application process surrounding both the pre-construction and post-construction phase with a certification by the applicant that all such obligations have been met.

The V.I. Energy Office should be looking for certification of compliance with the following:

- Zoning regulations in the specific district in which the wind energy system is being erected;
- Tower height, construction, noise, and setback regulations as set forth in the V.I. Energy Office's Large Wind Energy System Rules and Regulations;
- Uniform Building Code permits and licenses;
- National Electric Code line drawings and component descriptions certified by the wind energy system manufacturer and/or certified electrician;
- Notification to and certification by WAPA in the event of inter-connection to the utility grid (not required for independent systems not so inter-connected);
- V.I. Department of Planning and Natural Resources Coastal Zone Management Approval permit following environmental assessment of the impact of the installation and operation of the wind energy system;
- Earth Change Permit;
- Federal Aviation Administration (FAA) Obstruction Evaluation Services (OES) No Hazard Determination demonstrating no interference with aviation patterns;

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<sup>53</sup> Best Practice Guidelines for Offshore Wind Energy Developments, Prepared by the British Wind Energy Association.

- U.S. Fish and Wildlife Service Threatened and Endangered Species Determination confirming conformance with acceptable impact on endangered species and avian wildlife on the islands; and
- U.S. Army Corps of Engineers Section 10 Permit for any off-shore and shore-line facilities. (This permit is not likely to be needed in the locations that are currently proposed for the U.S. Virgin Islands, but the V.I. Energy Office should keep this in mind for future projects as corporations consider off-shore wind farms).

Placing the burden on the applicant to secure these permits and obtain certification will take the burden off of the V.I. Energy Office for confirming that the applicant is in compliance with all of these obligations. We included this bullet point list in the sample application to place the applicant on notice that they are required to obtain these certifications.

## **5.3 Site Plan**

The most crucial component of an application for a large wind energy system permit is the preparation of a detailed site plan which should be prepared and submitted by the developer. When prepared accurately, a detailed site plan will enable the local government to ensure compliance with all existing regulations and advise the developer before construction of any violations of potential concerns. The site plan should include the following documentation.

### **5.3.1 Pre-construction Plans**

Pre-construction plans provide a detailed description of the plot plan for the location of the wind energy system, the equipment to be installed, the electrical connections to be made, and the facility amenities, such as fencing, lighting, and signage. In addition, pre-construction plans should provide evidence of planning and cooperation with the community and local government. In several case studies a full disclosure agreement was signed by the developer allowing the greatest degree of information to be accessed and communicated from the developer to the local government and citizens. Pre-construction plans may involve several different combinations of



public outreach and education, wind power assessment of the site, wind system selection, and power purchaser agreements.

### **5.3.2 Construction Permits**

After completing the pre-construction details in selecting a site and wind energy system, construction permits must be obtained. The construction of large scale wind power systems must meet the existing construction codes for the U.S. Virgin Islands. Permits should be reviewed and approved by the local government code enforcement officer to ensure that the planned construction will meet the required construction codes.

### **5.3.3 Construction Schedule**

A detailed time table for construction should be made available to the local government. Updates should be communicated between the developer and local government if actual progress deviates from planned progress as the project advances.

### **5.3.4 Underground Line Work**

Most existing power transmission lines from wind power facilities are required to be underground. While they should be buried when possible, transmission lines in the U.S. Virgin Islands should be held to local codes. In the case that a developer plans to excavate or place any lines underground permits to do so must be approved by the local government to avoid any potential accidental damage which may occur to existing underground lines.

### **5.3.5 Transportation Plan**

Large-scale wind power systems will require an extensive transportation plan for construction and any major maintenance. In several instances the size and weight of the wind

system components has caused damage to the roads which were used in transporting materials to the construction site. An agreement should be negotiated with the developer to repair any damage caused by construction. The transportation needs of the developer must be made clear to the local government so that disruption of the local flow of traffic will be kept to a minimum. Planned schedules for delivery and movement of materials as well as a predetermined route for all construction traffic should be disclosed to the local government and communicated to local citizens.

### **5.3.6 As-built Plans**

Any variation from the pre-construction plan in the final installation of the wind energy system must be illustrated in a document known as the As-built plan. This plan should be submitted at the conclusion of the construction project and should catalogue each variation made, showing the cumulative effects of these changes, allowing the local government to ensure compliance with the rules and regulations of large wind energy system siting. If the variations violate the rules and regulations, the V.I. Energy Office has the authority to rescind the permit or offer the developer an opportunity to apply for a variance upon proper showing that the violation was necessary and will not adversely impact the environment or pose a danger to the public.

### **5.3.7 Emergency Response Plan**

As with any regulations governing the operation of energy facilities, the wind farm regulations for the U.S. Virgin Islands should include an emergency response plan section. This section should address potential hazards such as fire, lightning, hurricanes and earthquakes. While many natural disasters such as earthquakes and locations of lightning strikes cannot be predicted, measures can be adopted to mitigate the potential effects or minimize the potential risk

of damage to the wind turbine itself or third parties. In addition, the applicant should provide a copy of the project summary and site plan to the local emergency services, including paid or volunteer fire departments and police. The applicant should also, upon request, cooperate with emergency services to develop and coordinate the implementation of an emergency response plan for the wind energy system which should include:<sup>54</sup>

### **5.3.7(a) Hurricane Contingency Plan**

As discussed in Section 4.2.4 above, the failure of a wind turbine due to extreme winds depends on the type and configuration of the turbine along with the specifics of the extreme event. We recommend the turbines be located in a more remote area if possible and be deactivated at a pre-determined wind speed deemed unsafe for wind speed operation. In addition, in the example permit application, we have recommended that wind energy system developers develop a hurricane contingency plan based on the location and design specifications of their proposed wind energy system.

### **5.3.7(b) Lightning Mitigation and Response Plan**

While lightning prevention, protection and prediction is impossible, a lightning hazard mitigation plan can reduce the threat of injury or damage by lightning. This plan should include but is not limited to personnel training, site analysis, threat warning, safety devices and testing and certification.<sup>55</sup>

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<sup>54</sup> Model Ordinance for Wind Energy Facilities in PA, Found at [http://www.depweb.state.pa.us/energy/lib/energy/docs/wind\\_model\\_ordinance\\_draft\\_\(12-8-06\).doc](http://www.depweb.state.pa.us/energy/lib/energy/docs/wind_model_ordinance_draft_(12-8-06).doc)

<sup>55</sup> Lightning Hazard Reduction at Wind Farms, National Lightning Safety Institute.

### **5.3.7(c) Fire Response Plan**

A construction permit should not be granted unless the applicant has developed fire control and prevention measures. These should include but are not limited to fireproof or fire resistant building materials, buffers or fire retardant landscaping and fire fighting and rescue services, including training for local fire and rescue personnel.<sup>56</sup>

### **5.3.7(d) Earthquake Response Plan**

According to the U.S. Geological Survey, the U.S. Virgin Islands is located on the northeastern corner of the Caribbean plate where motions are complex. While the last major earthquake in the region was in 1953, earthquakes are unpredictable.<sup>57</sup> Therefore, we recommend that all wind energy systems comply with existing regulations and design parameters for seismic activities.

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<sup>56</sup> Town of Chilton Wisconsin Wind Energy Systems Licensing Ordinance, Section 5.

<sup>57</sup> Earthquakes and Tsunamis in Puerto Rico and the U.S. Virgin Islands, U.S. Geological Survey, 2001.

## **6. Survey**

As discussed in Section 5.1: Community Involvement, participation is critical to minimizing public outcry that may arise in opposition to the installation of wind systems. Conducting preliminary surveys of tourists and residents will provide the V.I. Energy Office with specific information on public attitudes towards various aspects of renewable energy and particularly wind energy on the islands. The office should use this information in tailoring educational and public relations materials regarding wind systems.

This section contains brief summaries of findings from surveys that have been conducted on similar topics and issues to consider when conducting a survey of individuals in the U.S. Virgin Islands. Drafts of two surveys – one for residents and one for tourists – are included in Appendices C and D, respectively.

### **6.1 Summary of Findings on Public Opinion of Wind Farms**

Below is a summary of several major studies pertaining to the public opinion of residents and tourists with respect to wind farms; the general conclusions are included in three groups: general public opinions on wind farms, the impact wind farms have on tourism, and the impact wind farms have on property values.

These surveys provide some context for conceptualizing how a survey in the U.S. Virgin Islands should be developed and implemented. The section on property values can also be used in educational materials and public hearings to assuage some of the fears that residents might hold on the location of wind farms near their homes.

### **6.1.1 General Opinions of Wind Farms**

One study conducted on public attitudes towards wind farms in Cape Wind, Massachusetts compared local residents to non-Cape Wind residents of Massachusetts. Cape Wind is a large off-shore wind energy project that is planned to be built near Cape Cod. This area of Massachusetts is highly touristy and received a large amount of opposition from a wealthy minority who, according to journalist Wendy Williams, were concerned with the adverse visual effects and interference with recreational sailing that wind turbines would have.<sup>58</sup> This 2002 study found that the majority (55%) of Cape & Island voters support the offshore wind farm, while 35% of voters do not and 10% are undecided. Throughout the state of Massachusetts 64% of non-Cape and Islands support the project, while 22% oppose it. Further, 42% of Cape & Island voters chose wind as the best electricity-generating options.<sup>59</sup> Because this project has been delayed due to public opposition, other surveys have documented changing attitudes towards the project over time.

Most recently, a nonprofit, nonpartisan think-tank commissioned an independent market research firm to conduct a study on how perceptions changed after the release of a positive and widely publicized draft of an environmental impact study (EIS) was released. In March 2008, they found that 87% of state residents and 77% of Cape and Island voters were more likely to support the project due to the EIS finding that the wind farm would not cause major harms to the environment. This finding might be useful to the U.S. Virgin Islands if there is a large amount of

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<sup>58</sup> Whitcomb, Robert and Wendy Williams. *Cape Wind: Money, Celebrity, Class, Politics, and the Battle for Our Energy Future on Nantucket Sound*. New York: Public Affairs, 2007.

<sup>59</sup> Opinion Dynamics Corporation. "Analysis of voter opinion survey results." October 3, 2002. May 12-30, 2008. [http://www.capewind.org/downloads/public\\_opinion\\_survey.pdf](http://www.capewind.org/downloads/public_opinion_survey.pdf)

opposition to the installations of wind systems. This suggests that conducting an EIS and widely releasing its findings will likely assuage some concerns of residents.<sup>60</sup>

Another study that investigated the range of opinions individuals had depending on the proximity of their house to the wind farm. This survey focused on the ten larger sites (wind farms with nine or more turbines) in Scotland that were operational at the end of 2002. 20% of residents said that wind farms had a positive impact on the area compared to 7% who said that it had a negative impact and most (73%) said that it had neither a positive or negative impact or expressed no opinion.<sup>61</sup>

Regarding the predicted and actual impact, respondents who lived in their homes prior to the wind farm development tended to overestimate their prediction of the problems that they would eventually experience.

“People who lived in their homes before the site was developed say that, in advance of the wind farm development, they thought that problems might be caused by its impact on the landscape (27%), traffic during construction (19%) and noise during construction (15%). However, only 12% say the landscape has been spoiled, 6% say there were problems with additional traffic, and 4% say there was noise or disturbance from traffic during construction.”<sup>62</sup>

This study also found that most individuals are interested in reducing the amount of energy generated by coal, nuclear and oil and increasing the amount of energy generated by wind and ocean power. Also, the most common source of information about wind energy development was the local newspaper.<sup>63</sup> This last finding might be particularly useful to the V.I. Energy Office in developing its strategy to promote wind power publicly.

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<sup>60</sup> “Support for Cape Wind Rises Ahead of Public Hearings, Boosted by Draft Federal Report Showing No Major Environmental Harms,” <http://www.civilsocietyinstitute.org/media/030608release.cfm>

<sup>61</sup> Braunholtz, Simon. “Public Attitudes to Wind Farms: A Survey of Local Residents in Scotland.”2003. May 12-30, 2008. <http://www.scotland.gov.uk/Resource/Doc/47133/0014639.pdf>

<sup>62</sup> Braunholtz, Simon. “Public Attitudes to Wind Farms: A Survey of Local Residents in Scotland.”2003. May 12-30, 2008. <http://www.scotland.gov.uk/Resource/Doc/47133/0014639.pdf>

<sup>63</sup> Braunholtz, Simon. “Public Attitudes to Wind Farms: A Survey of Local Residents in Scotland.”2003. May 12-30, 2008. <http://www.scotland.gov.uk/Resource/Doc/47133/0014639.pdf>

Another survey investigated public attitudes towards wind farms in Sweden in 2004, attempting to understand why the public expresses positive attitudes towards renewable energy but often mobilizes against specific wind power projects. By using a postal survey to gather public opinion, it found that as age and income increase, the probability that an individual is supportive of wind power decreases. Also, individuals who have an interest in the environment are more supportive than average.<sup>64</sup>

### **6.1.2 Impact on Tourism**

Wind farms are often viewed as tourism attractions and have boosted tourism numbers in some areas. For example, a wind farm in California offers daily tours to almost 12,000 tourists every year.<sup>65</sup> Denmark, a small country with over 6,000 wind turbines, has experienced a 50% increase in tourism since 1980<sup>66</sup> and a 25% increase in tourism in or around their wind power farms.<sup>67</sup> While USVI already has a substantial tourism economy, tours of wind farms could be an additional aspect of the islands that attract tourists. For example, USVI's potential use of renewable energy might appeal to eco-conscious tourists who would be more attracted to the USVI over other Caribbean islands that do not utilize clean energy.

One survey conducted by the Institute for Integrated Rural Tourism, sampled tourists in Vermont to look at whether they would be deterred by the presence of wind turbines in the area. They found that 95% of respondents said that they would return to the area regardless of whether or not there were wind turbines. The individuals sampled were told of the wind farm proposal and shown a photographic simulation of the wind farm.

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<sup>64</sup> Ek, Kristina. "Public and private attitudes towards "green" electricity: the case of Swedish wind power." March 19, 2004. May 12- 30, 2008. <http://dx.doi.org> and enter: 10.1016/j.enpol.2004.02.005

<sup>65</sup> Golubcow, Molly. Tourism that Blows. March 1, 2006. May 12-30, 2008. [http://www.acweekly.com/print\\_friendly.php?id=3731](http://www.acweekly.com/print_friendly.php?id=3731)

<sup>66</sup> "Wind Power and Tourism" page 13.

<sup>67</sup> Golubcow, Molly. Tourism that Blows. March 1, 2006. May 12-30, 2008. [http://www.acweekly.com/print\\_friendly.php?id=3731](http://www.acweekly.com/print_friendly.php?id=3731)



Another survey that was conducted by the independent research agency MORI Scotland investigated the awareness and perception of tourists to wind farms in the area to understand the potential impact of wind farms on tourism. This study found that almost half of tourists visited the area due to the “beautiful scenery and views” (48%) but the vast majority (71%) said that there was nothing “unattractive” about the area that was in close proximity to wind farms. Most tourists (about 60%) were unaware of wind farms in the area and more than half of those who were aware (52%) could not recall the locations of the farms. When asked whether the existence of wind farms had a positive or negative effect on their visit 43% said that it had a positive effect, while only 8% reported it having a negative effect (the rest were neutral). Most respondents (91%) reported that the presence of wind farms had no influence on whether they would visit again or not.<sup>68</sup>

### **6.1.3 Impact on Property Values**

Generally, the surveys found that proximity to wind farms does not have any positive or negative impacts on property values. One study conducted by Poletti and Associates used data from two states between the years of 1998 through 2006 to investigate the impact of proximity to wind farms had on property values. By comparing values of homes within close proximity to farms to similar houses that were not in close proximity, they found that there was no difference between property values. In fact, some new-home owners showed a preference for “green energy” developments.<sup>69</sup>

Another survey investigated the impact that visibility of wind farms had on property values. Ben Hoen, the person who conducted this study, visited 280 homes that are located

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<sup>68</sup> “Tourist Attitudes Towards Wind Farms” A report by MORI Scotland. September 2002.

[www.bwea.com/pdf/MORI.pdf](http://www.bwea.com/pdf/MORI.pdf)

<sup>69</sup> “Study Finds That Proximity to Wind Farms Doesn't Deminish a Home's Property Value.”

May 12-30, 2008. <http://www.efficientenergy.org/Study-Finds-That-Proximity-to-Wind-Farms-Doesnt-Deminish-a-Homes-Property-Value>

within five miles of a large wind farm (twenty thirty-MW turbines) in Madison County, New York to assess the visibility of the wind farm from each home. Then, he analyzed the sale price of their home to investigate the impact visibility had on home sales. This study found that there was no positive or negative effect of visibility of the wind farm.<sup>70</sup>

## **6.2 Survey Proposal**

### **6.2.1 Introduction**

A survey should be conducted to gauge public opinion on wind power and the prospects of installing wind turbines throughout the U.S. Virgin Islands. Two surveys have been drafted: one to assess the public opinion of residents (Appendix C) and one to assess the opinions of tourists (Appendix D). The questions were drafted to meet the following goals:

1. To understand what residents and tourists think about renewable energy.
2. To understand the reaction residents and tourists might have to seeing wind turbines throughout the islands.
3. To understand the extent that public education and public relations efforts related to wind energy and turbines will be required.

### **6.2.2 Survey Implementation**

These surveys were drafted to be implemented in the following ways:

- Randomly selected telephone polling
- Random selection of individuals at shopping malls
- Cruise patrons

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<sup>70</sup> Hoen, Ben. "Impacts of Windmill Visibility on Property Values in Madison County, New York." April 30, 2006. May 12-30, 2008.  
[http://www.aceny.org/pdfs/misc/effects\\_windmill\\_vis\\_on\\_prop\\_values\\_hoen2006.pdf](http://www.aceny.org/pdfs/misc/effects_windmill_vis_on_prop_values_hoen2006.pdf)

### **6.2.3 Considerations for Implementation**

In order to obtain unbiased results, it is best if the participants in the survey are selected randomly. Any implementation has potential problems. For example, if the survey is implemented over the phone then individuals who do not have a landline will not be included in the sample, which could exclude individuals who only use cellular phones or could not afford or choose not to own any type of phone (“selection bias”).

Another potential concern is the mobility of some residents. Because a portion of USVI residents reside on the island on a temporary or part-time basis, it is likely that these individuals will be underrepresented in a telephone poll. There are two potential solutions. First, the Energy Office could utilize a stratified random sample whereby they attempt to poll a greater percentage of part-time residents due to the fact that a greater percentage of them will not respond. Ultimately, the goal in this type of sample is to gain a representative sample. Another option is the Energy Office could conduct a mail survey instead, assuming that part-time residents have their mail forwarded to their permanent address.

However, because of the exploratory nature of this survey, it is possible to obtain relevant results on public opinion using any of the above implementation methods, as long as it is acknowledged this does not necessarily accurately represent the views of the entire population.

### **6.2.4 Survey Questions**

The survey questions are similar for both residents and tourists and aim to understand the above-listed three main goals. To that end the questions all fit into at least one of the following categories:

- **Demographic:** these types of questions aim to get a sense of the respondent’s personal characteristics. With this information that the data can be analyzed by taking out the influence of personal characteristics such as income or age.

- USVI-related questions: these questions aim to gather data on respondents' perspectives on the U.S. Virgin Islands and measure the relative importance of various aspects of the island.
- Energy-related questions: these questions aim to measure the importance of energy and environmental concerns to tourists and respondents.

### **6.2.5 Consideration for Analysis: Overestimation of Impact:**

It is possible that, when asked, individuals will overestimate their perception of the negative impact that wind turbines will have on their lives. This is due to the fact that they expect wind turbines to be a hugely invasive structure, which has not been substantiated in studies of both tourists and residents. Since there is a great deal of uncertainty among the public about the impact wind turbines will have on property values, aesthetics, noise, etc., it is advisable that the analysis of the data be conducted with this in mind. Therefore, it is wise to use this as an instrument of information-gathering on the state of public opinion, rather than a scientific investigation into the impact wind energy will have on the U.S. Virgin Islands. Therefore, while we recommend that a survey be conducted for the purposes defined above, it is critical to remember that individuals tend to overestimate the impact that they predict wind turbines to have as compared to the actual impact that they eventually experience.

## 7. Wind for Schools

### 7.1 Description of the Program

Launched in 2005, the Wind for Schools program run by Wind Powering America, a division of the U.S. Department of Energy, provides funding for rural schools to install wind turbines. It is primarily educational in focus and aims to “raise awareness in rural America about the benefits of wind energy while simultaneously developing a wind energy knowledge base in future leaders of our communities, states, and nation.” Due to its educational focus, the turbines typically associated with this project do not significantly offset energy costs for a school. Wind for Schools implements their goals by:

- Creating funding for a Wind Application Center (WAC) which is located at a state university and run by an interested professor. “The WACs provide technical assistance to rural schools (analyzing the wind resource, energy usage, siting, permitting, land use, and financials, as well as overseeing the installation of the power system and the DAS and analyzing the performance data). The WAC will implement a wind energy curriculum and will graduate engineers and systems analysts knowledgeable in the wind application process and hopefully interested in pursuing wind energy as a career. After the 3-year implementation period, the WAC will assume the responsibilities of the state facilitator and will become the primary repository of wind energy applications knowledge and expertise. Schools, small business owners, residential users, state policymakers, regulators, and other stakeholders will view the WAC as the source of information regarding wind energy applications.”<sup>71</sup> Over a number of years, the DOE envisions the wind application center becoming a center of excellence for wind energy throughout the state.
- Providing wind power-related curriculum to participating schools.
- Distributing federal funds through the Department of Energy in the amount of \$15,000, part of which can be used for a tower to assess winds speeds. The Department of Energy expects the school and institutions throughout the state to invest in the hardware for the wind turbine.

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<sup>71</sup> “Wind Energy for Schools” April 18, 2008. May 12-30, 2008  
<http://www.eere.energy.gov/windandhydro/windpoweringamerica/schools.asp>

The Wind for Schools Program is currently limited to six states: Kansas, Nebraska, South Dakota, Idaho, Montana, and Colorado and is not planning to expand in the foreseeable future due to funding constraints. It is possible that the program will obtain additional funding with a new administration, at which point they will expand into more states.

The Department of Energy and Wind Powering America uses three criteria in determining what states to fund for the Wind for Schools program:

1. Does the state already have a significant amount of installed wind systems?
2. Does the state already have good supporting policy for wind energy (i.e. renewable portfolio standards)?
3. Does the state already have an effective in-state advocacy network?

They prefer to fund states that are *not* currently meeting these criteria (states that do not have installed wind systems, do not have good supporting policy yet, etc.) Their main interest is funding states that have potential for wind energy but have not yet taken advantage of that resource or have not been able to pressure local governments to implement it.

## 7.2 Applicability to U.S. Virgin Islands

Pending additional funding of the program, the USVI can make a strong case for inclusion in the Wind for Schools Program. A representative from the program, Marguerite Kelly (employed with the National Renewable Energy Laboratories in

Colorado) suggested that USVI currently meets the above three criteria and emphasizes the importance of renewable energy for island territories due to their current reliance on foreign oil and the high cost of importing. Please keep in mind that the Wind for Schools program supports only a 1.8KW system. Larger units must be fully funded by the school installing the system.

The brochure for the program and the specifications for the suggested wind turbine can be found at the links below.  
**Brochure:**  
[http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/schools/wind\\_for\\_schools.pdf](http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/schools/wind_for_schools.pdf)  
**Specifications:**  
[http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/wpa/schools\\_wind\\_brief.pdf](http://www.eere.energy.gov/windandhydro/windpoweringamerica/pdfs/wpa/schools_wind_brief.pdf)

If the U.S. Virgin Islands would like to participate in this program, they should initiate conversations with Larry Flowers and Phil Dougherty, whose contact information is listed below. They should also consider drafting a more formal proposal making the case for why the Virgin Islands would be an ideal candidate for expansion of the Wind Powering America program.

Contacts:

Phil Dougherty  
Wind Powering America  
National Coordinator  
U.S. Department of Energy  
1000 Independence Avenue, S.W.  
Washington, D.C. 20585  
Tel: (202) 586-7950  
Fax: (202) 586-5124  
E-Mail: phil.dougherty@ee.doe.gov

Larry Flowers  
Wind Powering America Technical Director  
National Renewable Energy Laboratory  
National Wind Technology Center  
1617 Cole Blvd.  
Golden, CO 80401  
Tel: (303) 384-6979

# Appendices

## ***Appendix A: Draft U.S. Virgin Islands Small Wind Energy System Rules and Regulations.***

### **Draft Small Wind Energy System Rules and Regulations**

**1.1 Title.** These regulations may be referred to as Permitted Use Regulations for Small Wind Energy Systems

**1.2 Authority.** These regulations are adopted pursuant to authority granted by 3 VIC Chapter 35.

**1.3 Purpose.** It is the purpose of these regulations to promote the effective and efficient use of small wind energy systems installed to reduce the on-site consumption of utility supplied electricity while balancing the necessity to protect the public safety and welfare of the community.

**1.4 Applicability.** These regulations apply to all lands within the boundaries of The United States Virgin Islands.

#### **2.0 Definitions.**

(1) “Commissioner” means the Commissioner of the Department of Planning and Natural Resources and his or her designee.

(2) “Owner” means the person that owns a small wind energy system or met tower and the property on which the small wind energy system or met tower is located.

(3) “Small Wind Energy System” means a wind energy conversion system consisting of a wind turbine, tower, and associated control or conversion electronics, which has rated capacity of not more than 100 kW and which is intended to primarily reduce on site consumption of utility power. A system is considered a small wind energy system only if it supplies electrical power solely for onsite use, except that when a parcel on which the system is installed also receives electrical power supplied by a utility company, excess electrical power generated and not presently needed for onsite use may be used by the utility company.

(4) “Total Height” means the vertical distance from ground level to the tip of a wind generator blade when the tip is at its highest point.

(5) “Tower” means either the freestanding, guyed, or monopole structure that supports a wind generator.

(6) “Tower Height” The height above grade of the fixed portion of the tower, excluding the wind turbine itself.

(7) “Wind Energy System” means equipment that converts and then stores or transfers energy from the wind into usable forms of energy and includes any base, blade, foundation, generator, nacelle, rotor, tower, transformer, turbine, vane, wire, or other component used in the system.

(8) “Wind Generator” means the mechanical and electrical conversion components mounted at the top of a tower in a wind energy system.

#### **3.0 Design Requirements.**

A small wind energy system shall be a permitted use in all zoning districts, with the exception of the Historic and Architectural Control Districts, subject to the following requirements:



Tower Height: For property sizes of at least a ½ acre but less than two acres, the tower height shall be limited to 65 ft. and for property sizes of two acres or more, the tower height shall be limited to 80 ft., provided that the application includes evidence that the proposed height does not exceed the height recommended by the manufacturer or distributor of the system.

Set-back: The setback of small wind energy systems from adjacent property lines shall not be less than the total height of the wind energy system. No part of the wind energy system structure, including guy wire anchors, may extend closer than the normally allowable setback distances to the property lines of the installation site as designated for the subject zoning district.

Noise: Small wind energy systems shall not exceed 60 decibels, as measured at the property lines of the site in question. The level, however, may be exceeded during short-term events such as utility outages and/or severe storms.

Maximum Number of Towers: The maximum number of wind energy system towers on any one parcel shall be one (1).

Blade Clearance: The vertical distance from ground level to the tip of a wind generator blade when the blade is at its lowest point must be at least 15 feet.

Electrical Wires: All electrical wires associated with a small wind energy system, other than wires necessary to connect the wind generator to the tower wiring, the tower wiring to the disconnect junction box, and the grounding wires shall be located underground.

Lighting: A wind tower and generator shall not be artificially lighted unless such lighting is required by the Federal Aviation Administration.

Appearance, Color, and Finish: The wind generator and tower shall remain painted or finished the color or finish that was originally applied by the manufacturer, unless approved in the building permit.

Signs: All signs, other than the manufacturer's or installer's identification, appropriate warning signs, or owner identification on a wind generator, tower, building, or other structure associated with a small wind energy system shall be prohibited.

Compliance with Building Code: Building permit applications for small wind energy systems shall be accompanied by standard drawings of the wind turbine structure, including the tower, base, and footings. An engineering analysis of the tower showing compliance with the Virgin Islands Building Code and certified by a licensed professional engineer shall also be submitted. However, a wet stamp shall not be required, provided that the application demonstrates that the system is designed to meet the most stringent wind requirements (Uniform Building Code wind exposure D), the requirements for the worst seismic class (Seismic 4), and the weakest soil class, with a soil strength of not more than one thousand pounds per square foot.

Compliance with FAA Regulations: Small wind energy systems must comply with applicable FAA regulations, including any necessary approvals for installations close to airports.

Compliance with National Electric Code: Building permit applications for small wind energy systems shall be accompanied by a line drawing of the electrical components in sufficient detail to allow for a determination that the manner of installation conforms to the National Electrical Code. This information is frequently supplied by the manufacturer.

Utility Inter-Connection: No small wind energy system shall be installed that does not meet the requirements of the utility company for an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.

#### **4.0 Permit Requirements.**

(1) The following permits are required for the installation of a small wind energy system:

- (a) For sites located within Tier 1 of the coastal zone a Coastal Zone Management – Minor Land Permit
- (b) Earth Change Permit
- (c) The applicant needs to obtain a clearance letter from the FAA, if their system is within 20,000 feet of an airport or seaplane base.
- (d) Building Permit

(2) Expiration. A permit issued pursuant to this ordinance shall expire if:

- (a) The small wind energy system is not installed and functioning within 24-months from the date the permit is issued; or,
- (b) The small wind energy system is out of service or otherwise unused for a continuous 12-month period.

#### **5.0 Abandonment.**

(1) A small wind energy system that is out-of-service for a continuous 12-month period will be deemed to have been abandoned. The Administrator may issue a Notice of Abandonment to the owner of a small wind energy system that is deemed to have been abandoned. The Owner shall have the right to respond to the Notice of Abandonment within 30 days from Notice receipt date. The Administrator shall withdraw the Notice of Abandonment and notify the owner that the Notice has been withdrawn if the owner provides information that demonstrates the small wind energy system has not been abandoned.

(2) If the small wind energy system is determined to be abandoned, the owner of a small wind energy system shall remove the wind generator from the tower at the Owner's sole expense within 3 months of receipt of Notice of Abandonment. If the owner fails to remove the wind generator from the tower, the Administrator may pursue a legal action to have the wind generator removed at the Owner's expense.

#### **6.0 Violations.**

It is unlawful for any person to construct, install, or operate a small wind energy system that is not in compliance with these regulations or with any condition contained in a building permit issued pursuant to these regulations.

## ***Appendix B: Sample Permit Application***

### **I. Introductory Information:**

- A. Project Title
- B. Name of Applicant
- C. Project Contact
- D. Location

### **II. Threshold Criteria for Assessment:**

- A. Property Ownership Description
  - 1. If leasing property, copy of lease agreement including indemnification/hold harmless language
  - 2. Certificate of insurance for property owner on behalf of system operator
- B. Site Plan including but not limited to:
  - 1. Maps and Photos of Location
  - 2. Description of neighboring lots, including, but not limited to:
    - a. Residential
    - b. Industrial
    - c. Agricultural
    - d. Commercial
    - e. Historical or other protected sites
  - 2. Construction diagrams and Engineering Plans
  - 3. Wind Energy System manufacturer specifications and testing results
  - 4. Equipment Transportation Statement (i.e., roadway usage for cranes, wind turbine components, and other construction equipment)
- C. Community Notification
- D. Insurance Documentation
  - 1. Name of Insurer
  - 2. Policy Number
  - 3. Description of Coverage Provisions and Policy Limits
- E. Certification of Compliance with Legal Obligations including:
  - 1. Local Zoning Ordinances
  - 2. Uniform Building Code
  - 3. National Electric Code
  - 4. V.I. Department of Planning and Natural Resource Permits and Approval
  - 5. FAA Clearance
  - 6. U.S. Fish & Wildlife Permit

### **III. Permit Selection Criteria for Assessment:**

- A. Community Needs
  - 1. Community Description
  - 2. Community Benefits
- B. Community Impacts

1. Environmental Assessment/Impact Statement, including:
  - a. Avian impacts
  - b. Noise assessment
  - c. Visual/Aesthetic impacts
2. Hurricane Contingency Plan
3. Fire Protection and Emergency Response Plan
- C. Maintenance Plan including, but not limited to, the following:
  1. Identification of internal maintenance position and/or external maintenance company
  2. Description of routine maintenance plan
- D. Decommissioning Plan including, but not limited to, the following:
  1. Anticipated life of the project
  2. Estimated decommissioning costs
  3. Demolition Plans
  4. Availability of Funding
- E. Utility Notification
  1. Explanation of whether the system will be integrated with the grid and if so, what impact the extra electrical capacity will have on the grid and grid maintenance (WAPA certification)
- F. Financial Statement
  1. Cost Assessment
  2. Description of Insurance and/or Financial Ability to Fund Each Phase of Project (Installation, Operation, Demolition)
  3. Other Funding Sources being Utilized (e.g., Federal grants, Nonprofit assistance, or Private funding)
- G. History of Operating Similar Projects

**IV. Post Construction Permit Criteria:**

- A. "As Built" Construction Plan/Certification
- B. Annual Certification of Operations including, but not limited to, the following:
  1. Overview of electricity generated
  2. Description of Net Metering electricity sold back to the grid
  3. Discussion of periods of lack of operations

**V. Additional Information:**

- A. The V.I. Energy Office in conjunction with the V.I. Department of Planning and Natural Resources may require any further information it finds necessary to review the application.

## **Appendix C: Sample Survey Questions for Residents**

1. Which island(s) did you live on?
  - St. Croix
  - St. John
  - St. Thomas
  
2. How long have you lived there?
  - 0-5 Years
  - 6-15 Years
  - 15-30 Years
  - Over 30 Years
  
3. How many months per year do you live on that island?
  
4. Average household income
  - Under \$20,000 per year
  - Between 20,000 and \$40,000
  - Between \$41,000 and \$60,000
  - Between \$61,000 and \$80,000
  - Over \$80,000
  
5. Highest level of education?
  - Less than High School
  - High School Graduate
  - Some College
  - College Diploma
  - Some Graduate School
  - Graduate Degree
  
6. What do you like most about living in the USVI?
  - Beautiful scenery
  - People
  - Culture
  - Location
  - Weather
  
7. What do you like least about living in the USVI?
  - Lack of Amenities
  - Lack of Jobs
  - High cost of living
  
8. What is your opinion on renewable energy sources? (including solar power, wind power, ocean power)
  - Positive

- Negative
- No opinion

9. Have you ever seen a wind farm before?

- Yes
- No
- Don't know

10. What is the most important reason you support renewable energy?

- Cost of electricity
- Pollution of the environment
- Limiting the use of oil
- I don't support renewable energy

11. Currently the U.S. Virgin Islands relies on diesel generated power, which is expensive (electricity prices on the island are \$.34 per kWh and are expected to increase to \$.44 per kWh, compared to prices that average around \$.10 per kWh in the U.S.A. during 2006) and pollutes the environment. Currently the most affordable renewable energy source is wind power, which would require the installations of large wind turbines throughout the islands and might block some scenic views. Without renewable energy, it is possible that the costs of living in the U.S. Virgin Islands will increase (through energy costs). With wind power, it is likely that wind turbines will be visible throughout the island and potentially disrupt scenic views. What is your preference?

- I would prefer to install wind turbines.
- I would prefer to pay 10% more in energy costs, rather than support the installation of wind turbines.
- I would prefer to pay 25% more in energy costs, rather than support the installation of wind turbines.
- I would prefer to pay 50% more in energy costs, rather than support the installation of wind turbines.
- I would prefer to pay 100% more in energy costs, rather than support the installation of wind turbines.

12. Have you seen or heard any information about renewable energy on the USVI? Where?

13. On a scale of 1 to 5 (with one being high concern and 5 being little or no concern). Please rate each of the following issues you anticipate bothering you the most about wind farms being installed in the U.S. Virgin Islands?

- Look of landscape being spoiled**
- |                             |                |
|-----------------------------|----------------|
| High Concern                | Low Concern    |
| 1            2            3 | 4            5 |

- Extra traffic during construction**
- |                             |                |
|-----------------------------|----------------|
| High Concern                | Low Concern    |
| 1            2            3 | 4            5 |



## **Appendix D: Sample Survey Questions For Tourists**

1. Which island(s) did you visit on this trip? (check all that apply)
  - St. Croix
  - St. John
  - St. Thomas
  
2. How did you travel to the U.S. Virgin Islands?
  - Cruise
  - Resort Package
  - Independently (arranged your own flight, hotel, activities, etc.)
  
3. What part of the islands did you visit?
  - Cities
  - Beaches
  - Resorts
  - National Park
  - Residential Areas
  
4. What is the main purpose of your visit?
  - Business
  - Vacation (also check below)
    - Sightseeing
    - Visiting the beach
    - Historical tours
    - Wildlife
  - Visit Family
  
5. What is your opinion on renewable energy sources? (including solar power, wind power, ocean power)
  - Positive
  - Negative
  - No opinion
  
6. Currently the U.S. Virgin Islands relies on diesel generated power, which is expensive (electricity prices on the island are \$.34 per kWh and are expected to increase to \$.44 per kWh, compared to prices that average around \$.10 per kWh in the U.S.A. during 2006) and pollutes the environment. Currently the most affordable renewable energy source is wind power, which would require the installations of large wind turbines throughout the islands and might block some scenic views. Without renewable energy, it is possible that the costs of traveling to the U.S. Virgin Islands will increase (through hotel costs, restaurant costs, etc.) With wind power, it is likely that wind turbines will be visible throughout the island and potentially disrupt scenic views. What is your preference?
  - I would prefer to install wind turbines.



- I would prefer to pay 10% more (\$220 per night for a hotel instead of \$200), rather than support the installation of wind farms.
- I would prefer to pay 25% more (\$250 per night for a hotel instead of \$200), rather than support the installation of wind farms.
- I would prefer to pay 50% more (\$300 per night for a hotel instead of \$200), rather than support the installation of wind farms.
- I would prefer to pay 100% more (\$400 per night for a hotel instead of \$200), rather than support the installation of wind farms.
- I would not come to the U.S. Virgin Islands under either condition.

7. Have you ever seen a wind farm before?

- Yes
- No
- Don't Know

8. How interested would you be in touring a wind farm?

- Very Interested
- Somewhat interested
- Not Interested
- Don't know

9. Have you seen or heard any information about renewable energy on the USVI?

- Yes
- No
- Don't Know
- Where? \_\_\_\_\_

10. What was the main determinant in deciding to visit the U.S. Virgin Islands over another Caribbean island?

- United States territory (no need for passport, money exchange, etc.)
- Proximity to the United States
- Reputation
- Other \_\_\_\_\_

[Show photographic simulation of wind turbines]

11. Would the presence of these wind turbines deter you from visiting the U.S. Virgin Islands?

- If you knew that there were wind turbines on the U.S. Virgin Islands, how likely would you be to choose a different vacation destination?
  - Very Likely
  - Somewhat Likely
  - Somewhat Unlikely
  - Very Unlikely
  - Don't Know

## ***Appendix E: Sample Regulations***

### **STATE OF CALIFORNIA – CONTRA-COSTA COUNTY**

*Contra-Costa County Zoning Code Title 8*, available online at <http://municipalcodes.lexisnexis.com/codes/ccosta>

#### **Chapter 88-3 Wind Energy Conversion Systems**

##### **Article 88-3.2 General**

##### **88-3.202 Short title**

This chapter shall be known and may be cited as the wind energy conversion system (or WECS) ordinance of Contra Costa County. (Ord. 85-39 § 4)

##### **88-3.204 Purpose**

This chapter is adopted pursuant to the planning and zoning law to promote the effective and efficient use of wind energy conversion systems (WECS), regulate the placement of, and promote safeguards for, WECS so that the public health, safety, and welfare of the citizens of Contra Costa County will be insured. (Ord. 85-39 § 4)

##### **88-3.206 Definitions**

As used in this code, unless the context otherwise requires, the following words and phrases shall have the meanings given in this section:

(1) “Commercial WECS” means two or more WECS on one parcel or adjoining parcels under common ownership.

(2) “Height” means the height of the tower and the highest vertical extension of the WECS.

(3) “Residential WECS” means one WECS on a parcel of land when used only as an accessory to an allowable residential or agricultural use.

(4) “Wind energy conversion system” and “WECS” mean a machine, such as a wind turbine or windmill, which converts the kinetic energy in the wind into a usable form of mechanical or electrical energy. These terms include all parts of the system and the tower upon which the system is installed, but do not include power transmission equipment. (Ord. 85-39 § 4, prior code §82-4.281)

## **Article 88-3.4 Permits**

### **88-3.402 Permit--Required**

No person shall establish, maintain, or expand a WECS without first obtaining a land use permit as specified in this chapter, Title 8 and Chapter 26-2. (Ord. 85-39 § 4)

### **88-3.404 Permit--Residential WECS exempted**

A residential WECS is exempt from the provisions of this chapter, except for rotor safety, tower access, electromagnetic interference, noise, and aesthetic standards. A residential WECS may operate only between the hours of eight a.m. and six p.m. (Ord. 85-39 § 4)

### **88-3.406 Permit--Authorized only in agricultural districts**

An application may be submitted and a land use permit may be granted for the establishment, maintenance, or expansion of a WECS only in agricultural land use districts established by Division 84 (A-). (Ord. 85-39 § 4)

### **88-3.408 Permit--Application**

(a) Any person desiring to obtain issuance of a permit required by this chapter shall file a written application with the community development department, which shall administer this chapter.

(b) The owner of a business, the general partner of a partnership, or the president and secretary of a corporation applying for such a permit and all owners of the land upon which the WECS is or will be located shall sign and verify the application. (Ord. 85-39 § 4)

### **88-3.410 Permit--Application compliance**

The application shall comply with the provisions of Article 26-2.20 and Chapter 82-6. (Ord. 85-39 § 4)

### **88-3.412 Permit--Information requirements**

The application shall be accompanied by the following:

- (a) A site plan including the following information:
  - (1) Existing topography, trees, and drainage channels,
  - (2) Direction of prevailing winds across the project site,
  - (3) Location, height, and dimensions of all existing and proposed structures and fencing,
  - (4) Location and height above ground of all proposed WECS and aboveground utility lines,

- (5) Location, grades, and dimensions of all temporary and permanent on-site roads,
- (6) Preliminary grading for all roadways, structures, WECS sites, and other site work,
- (7) Distance to all residences, public and private airports and airstrips, schools and any other uses, as determined by the community development director within one mile of all exterior project boundaries;

(b) A scale profile drawing of the subject site and proposed WECS as seen from the nearest public road and the nearest scenic route;

(c) A projection of the annual production (kwh) of the total WECS project at full buildout;

(d) A regrading and revegetation program for temporary roadways no longer needed after project construction:

(e) A preliminary erosion, drainage, and sediment collection and control plan;

(f) A reclamation plan consistent with Article 88-3.8;

(g) The proposed construction access route from the nearest highway;

(h) A statement by a professional engineer registered in California certifying that the rotor and overspeed controls have been designed and fabricated for the proposed use in accordance with good engineering practice. (Ord. 85-39 § 4)

### **88-3.414 Permit--Cash deposit required**

(a) In granting any permit required by this chapter, the zoning administrator shall condition the permit on the permittee making a cash deposit of three thousand dollars. Said deposit shall be used in the investigation and evaluation of any apparently valid complaint of excess noise or a permit violation.

(b) Upon such use of the deposit, the permittee shall restore the balance of the deposit to three thousand dollars.

(c) In the course of reviewing the permit on the fifth anniversary of its issuance, as provided by Section 88-3.420, the zoning administrator may delete this condition and refund the deposit, without interest, to the permittee or its successor in interest, if, in the zoning administrator's discretion, the record warrants such action.

(d) If the zoning administrator refunds said deposit, permittee shall promptly reimburse the county for any cost subsequently incurred by it for any investigation or evaluation of similar complaints. (Ord. 85-39 § 4)

### **88-3.416 Permit--Roadway fund required--Repairs**

(a) Where a WECS can be reached only by a county maintained road, in granting a permit required by this chapter the zoning administrator may condition the permit upon the furnishing of a cash deposit to cover the estimated cost of repair of roadway damage resulting from work performed pursuant to the permit.

(b) The director of public works shall determine the amount of the deposit, based on such estimated cost.

(c) The director of public works shall compare pre- and post-work inspections of road conditions and shall determine the needed repairs. The permittee shall be responsible for all costs incurred by the county in performing such repairs.

(d) Upon determination of the actual repair cost, including engineering costs, the county shall refund to the permittee any unused portion of the deposit, or the permittee shall pay the difference between the actual cost and its deposit, as the case may be. (Ord. 85-39 § 4)

### **88-3.418 Permit--Approval--Findings**

The zoning administrator, or the division of the planning agency hearing the matter on appeal, shall find the following before granting the permit:

(a) Findings required by Section 26-2.2008 of this code;

(b) That the WECS use will not adversely affect the orderly conduct of existing or planned land uses in the vicinity;

(c) That the reclamation plan and associated guarantees and performance security are sufficient to enable the WECS and subject property to meet the intent and purpose of this chapter and be utilized for the intended long-term use shown in the applicable general plan. (Ord. 85-39 § 4)

### **88-3.420 Permit--Review**

(a) On or before the fifth anniversary of the issuance of the permit, or earlier if the permit so provides, the zoning administrator may review the operation of the WECS.

(b) The purpose of the review shall be to inquire into the permittee's good faith compliance with the terms and conditions of the permit and the provisions of this chapter, and for any other purpose which may be specified in the permit.

(c) Prior to each such review, the community development department shall file a report with the zoning administrator regarding the operation of the WECS since the last review and any

other matters which the department wishes to bring to the zoning administrator's attention. (Ord. 85-39 § 4)

### **88-3.422 Permit--Revocation**

A permit may be revoked or modified by the zoning administrator pursuant to the provisions of Article 26-2.20. (Ord. 85-39 § 4)

## **Article 88-3.6 Standards**

### **88-3.602 Setback requirements**

(a) Setbacks from adjacent parcels. A minimum WECS setback of three times overall machine height (measured from grade to the top of the structure, including the uppermost extension of any blades) or five hundred feet, whichever is greater, shall be maintained from exterior project boundaries.

(b) Setbacks from off-site residence(s) on adjacent parcels. In all cases, regardless of parcel areas, a minimum WECS setback of one thousand feet, from any existing legal off-site residence(s) or general plan designated residential areas shall be maintained. (Ord. 85-39 § 4).

### **88-3.604 Tower access**

Towers must either

- (a) Have tower-climbing apparatus located no closer than twelve feet from the ground;
  - (b) Have a locked anti-climb device installed on the tower;
  - (c) Be completely enclosed by a locked, protective fence at least six feet high; or
  - (d) Have a tower-access limitation program approved by the zoning administrator.
- (Ord. 85-39 § 4)

### **88-3.606 Rotor safety**

Each WECS must be equipped with both manual and automatic controls to limit the rotational speed of the blade within the design limits of the rotor. (Ord. 85-39 § 4)

### **88-3.608 Electromagnetic interference**

The WECS shall be designed, installed and operated so that no disrupting electromagnetic interference is caused. If it has been demonstrated to the zoning administrator that a WECS is causing disruptive interference, the operator shall promptly mitigate the disruptive interference, which may include discontinued operation of one or more WECS. (Ord. 85-39 § 4)

### **88-3.610 Utility notification**

No wind turbine shall be installed until evidence has been given that all affected utility companies have been notified and have indicated that the proposed interconnection is acceptable. (Ord. 85-39 § 4)

### **88-3.612 Noise**

No WECS shall create noise which exceeds a maximum of sixty-five dBA as measured at the lot line. Measurement of sound levels shall not be adjusted for, or average with, nonoperating periods. In the event noise exceeds this standard, the WECS operator shall take all measures necessary to meet this standard, which may include discontinued operation of one or more WECS. A site-specific noise study may be required to confirm compliance with the sixty-five dBA noise standard. Variances from this standard may be granted along property boundaries adjacent to existing or approved WECS where existing residences or general plan designated residential areas will not be adversely affected. (Ord. 85-39 § 4)

### **88-3.614 Site access**

Construction of on-site roadways shall be minimized. Temporary access roads utilized for initial installation shall be regraded and revegetated to a natural condition after completion of installation. (Ord. 85-39 § 4)

### **88-3.616 Parking**

The applicant shall provide a minimum of one on-site parking space for each employee, plus one on-site parking space for each vehicle kept in connection with the use. A minimum of four spaces shall be provided. (Ord. 85-39 § 4)

### **88-3.618 Site aesthetics**

(a) WECS (towers and blades) structures and fencing shall be of a nonreflective, unobtrusive color.

(b) All WECS, buildings, and structures shall be sited to minimize visual impact to residences within one mile, adjacent roadways, and County scenic routes. This may require relocation of one or more proposed WECS. (Ord. 85-39 § 4)

### **88-3.620 Signs**

(a) Signs warning of high voltage electricity shall be posted on stationary portions of the WECS or its tower and at gated entry points to the project site at a height of five feet above the ground.

(b) No advertising sign or logo shall be placed or painted on any WECS or tower. No more than two identification signs relating to the development shall be located on the project site; signs shall not exceed sixteen square feet in surface area or eight feet in height.

(c) Logos may be displayed on WECS generator housings in an unobtrusive manner. (Ord. 85-39 § 4)

## **Article 88-3.8 Site Reclamation**

### **88-3.802 Reclamation plan required**

No person shall establish or expand any WECS without (1) first submitting and obtaining approval of a reclamation plan under this article, and (2) posting a security deposit or bond to insure compliance with the approved plan, as set forth in Section 88-3.806. (Ord. 85-39 § 4)

### **88-3.804 Reclamation plan requirements**

The reclamation plan shall identify the specific properties it applies to and shall indicate removal of all buildings, structures, WECS, and foundations to three feet below finish grade; road repair costs required by Section 88-3.414; and all regrading and revegetation necessary to return the subject property to the condition existing prior to establishment or expansion of the WECS. Reclamation shall reflect the site-specific character including topography, vegetation, drainage, and any unique environmental features. A materials and labor estimate shall be submitted for the total reclamation costs. (Ord. 85-39 § 4)

### **88-3.806 Guarantees and security**

(a) Responsibility. The reclamation plan shall state that the operator, applicant and permittee guarantee and accept responsibility for all reclamation work for a period of two years after completion of reclamation.

(b) Performance Security. A cash deposit or surety bond shall be deposited to insure completion of reclamation work consistent with this article. The amount of security shall be determined by the zoning administrator and shall include all material and labor costs, adjusted for inflation to reflect anticipated total costs at the time of reclamation. Up to eighty percent of the cost of reclamation may be secured by assignment to the county of salvage rights for WECS apparatus. (Ord. 85-39 § 4)



**STATE OF CALIFORNIA – KERN COUNTY**

*Kern County Zoning Code: Title 19*, available online at [ordlink.com/codes/kerncoun](http://ordlink.com/codes/kerncoun)

**Chapter 19.64 WIND ENERGY (WE) COMBINING DISTRICT**

**19.64.010 Purpose and Application**

A. It is the intent of the board of supervisors, in adopting this chapter, to promote the use of proven wind-driven generators for energy recovery, and to promote safeguards ensuring the maintenance of the health, safety and welfare of the citizens of the county. In addition, in adopting this chapter, it is the intent of the board of supervisors to promote the use of an alternative to fossil-fuel-generated electrical power in areas of the county which are identified to have suitable wind resources for production of commercial quantities of wind-generated electrical power. Furthermore, it is the intent of the board of supervisors that site-specific application of this chapter shall occur only in a manner that provides a harmonious balance between the suitability of a project site with existing area land use and physical surroundings.

B. The WE district is a combining district and shall only be applied to the following district classifications: Exclusive Agriculture (A), Industrial (M-1, M-2, and M-3), Natural Resource (NR) with a minimum lot size of twenty (20) acres, Recreation-Forestry (RF) with a minimum lot size of twenty (20) acres, Limited Agriculture (A-1) with a minimum lot size of twenty (20) acres, or Estate (E) with a minimum lot size of twenty (20) acres. The uses allowed and the regulations required in the WE district shall be in addition to the regulations of the base district with which the WE district is combined. The WE district may not be adopted as a single land use designation. (Ord. G-7189 § 59, 2005; prior code § 7145.01)

**19.64.020 Permitted uses**

The following uses and all others determined to be similar to these uses pursuant to Sections 19.08.030 through 19.08.080 of this title are permitted in a WE district:

- A. Wind-driven electrical generators, prototype, as defined in Chapter 19.02 of this title;
- B. Wind-driven electrical generators, production, as defined in Chapter 19.02 of this title;
- C. Accessory administrative and maintenance structures and facilities, electrical substations, transmission lines and other facilities and electrical structures accessory and incidental to the main use;
- D. Uses permitted by the base district with which the WE district is combined. (Prior code § 7145.02)

### **19.64.030 Uses permitted with a conditional use permit**

The following uses and all others determined to be similar to these uses pursuant to Sections 19.08.030 through 19.08.080 of this title are permitted in a WE district subject to securing a conditional use permit in accordance with the standards and procedures set out in Chapter 19.104 of this title:

A. Wind-driven electrical generators, experimental, as defined in Chapter 19.02 of this title, on a temporary basis;

B. Wind-driven electrical generators, manufacture, or assembly;

C. Conditional uses permitted by the base district with which the WE district is combined. (Ord. G-6412 § 56, 1997: prior code § 7145.03)

### **19.64.040 Prohibited uses**

The following uses are prohibited in a WE district:

A. Wind-driven electrical generators, experimental, as defined in Chapter 19.02 of this title, on a permanent basis;

B. All other uses not permitted by Sections 19.64.020 and 19.64.030 of this chapter or accessory thereto under Section 19.08.110 are prohibited in a WE district. (Ord. G-7189 § 61, 2005: prior code § 7145.04)

### **19.64.050 Minimum lot size**

Minimum lot size requirements in a WE district are per the requirements of the base district with which the WE district is combined. (Ord. G-7189 § 62, 2005: prior code § 7145.05)

### **19.64.060 Minimum lot area per dwelling unit**

Requirements for minimum lot area per dwelling unit in a WE district are per the requirements of the base district with which the WE district is combined. (Prior code § 7145.06)

### **19.64.070 Yards and setbacks**

Yard and setback requirements in a WE district are as follows:

A. Wind-driven electrical generators shall comply with the setback requirements specified in Sections 19.64.130 through 19.64.150 of this title;

B. All other structures shall comply with the requirements of the base district with which the WE district is combined. (Prior code § 7145.07)

### **19.64.080 Height limits**

Height limits in a WE district are as follows:

A. Wind-driven electrical generators and associated meteorological towers shall comply with the height limits specified in Section 19.64.140 of this chapter;

B. All other uses and structures shall comply with the requirements of the base district with which the WE district is combined. (Ord. G-7189 § 63, 2005: prior code § 7145.08)

### **19.64.090 Minimum distance between structures**

Requirements for minimum distance between structures in a WE district are as follows:

A. Wind-driven electrical generators shall comply with the requirements specified in Sections 19.64.130 through 19.64.150 of this chapter;

B. All other uses shall comply with the requirements of the base district with which the WE district is combined. (Prior code § 7145.09)

### **19.64.100 Parking**

Parking requirements in a WE district are per the requirements of the base district with which the WE district is combined. (Prior code § 7145.10)

### **19.64.110 Signs**

Sign requirements in a WE district are as follows:

A. Signs in connection with wind-driven electrical generators shall comply with the requirements specified in Sections 19.64.130 through 19.64.150 of this chapter;

B. All other signs shall comply with the requirements of the base district with which the WE district is combined. (Prior code § 7145.11)

### **19.64.120 Landscaping**

Landscaping requirements in a WE district are as follows:

A. None required in connection with wind-driven electrical generators;

B. All other uses shall comply with the requirements of the base district with which the WE district is combined. (Prior code § 7145.12)

### **19.64.130 Detailed plot plan required—Contents**

Prior to issuance of construction permits, the developer shall submit a detailed plot plan for review and approval by the planning director. The plan boundaries shall coincide with those of the project parcel. The following information shall be included in said plan:

- A. Existing topography and drainage channels;
- B. Direction of prevailing winds across the project site;
- C. Location, height and dimensions of all existing structures;
- D. Distance to all residences located within one (1) mile of exterior project boundary;
- E. Manufacturer and model designation, rated KW capacity, overall machine height (grade level to highest tip extension), total blade diameter, hub height, rated maximum rotor RPM, location of proposed structures and buildings and, upon request of the planning director, manufacturer's production record, and/or sufficient manufacturer's data in order to classify machines as experimental, prototype, or production in accordance with the definitions contained in this chapter;
- F. Location, grades and dimensions of all roads and parking areas, both existing and proposed;
- G. Location and extent of known archaeological remains;
- H. Location and type of project security fencing;
- I. Location of site by longitude and latitude coordinates within ten (10) feet and elevation of site above mean sea level within ten (10) feet;
- J. A plan of proposed project phasing;
- K. Any and all reports, approvals or requirements, which may be required by mitigation measures incorporated into an environmental document adopted for implementation of this district for specific parcels; including a plan for implementation of recommendations contained in such reports;
- L. A certificate signed by a registered civil engineer or licensed land surveyor stating that area encompassed by the project has been surveyed under his supervision or that a previous survey was performed by a registered civil engineer or licensed land surveyor and that sufficient monuments have been placed to accurately establish the exterior project boundaries;
- M. A certificate signed by a registered civil engineer or licensed land surveyor stating that the proposed development is in full compliance with the requirements of this chapter. The

director of the Kern County planning department may require the submittal of additional documentation of compliance when deemed necessary;

N. Soil erosion and sedimentation control plan, including re-vegetation plan, as provided for in Section 19.64.140(K) (grading permits only). (Ord. G-7189 § 64, 2005; Ord. G-6077 § 233, 1994; Ord. G-5966 § 119, 1993; Prior code § 7145.13(A))

#### **19.64.140 Development standards and conditions**

Development in the WE combining district shall comply with the following standards:

A. All necessary building and grading permits shall be obtained from the Kern County planning department. For construction and permit purposes, all wind generator towers shall conform to the regulations of the applicable seismic zone of the Uniform Building Code and the applicable ground-shaking zone;

B. Towers and blades shall be painted a nonreflective, unobtrusive color or have a nonreflective surface;

C. Fencing shall be erected for each wind machine or on the perimeter of the total project. Wind project facilities shall be enclosed with a minimum four (4)-foot-high security fence constructed of four (4) strand barbed wire or materials of a higher quality. Fencing erected on the perimeter of the total project shall include minimum eighteen (18)-inch by eighteen (18)-inch signs warning of wind turbine dangers. Such signs shall be located a maximum of three hundred (300) feet apart and at all points of site ingress and egress. Where perimeter fencing is utilized, the planning director may waive this requirement for any portion of the site where unauthorized access is precluded due to topographic conditions;

D. All on-site electrical power lines associated with wind machines shall be installed underground within one hundred fifty (150) feet of a wind turbine and elsewhere when practicable, excepting therefrom "tie-ins" to utility type transmission poles, towers, and lines. However, if project terrain or other factors are found to be unsuitable to accomplish the intent and purpose of this provision, engineered above-ground electrical power lines shall be allowed;

E. Prior to issuance of construction permits, the developer shall provide the Kern County planning department with proof of approved access to the site;

F. Wind generator setback shall be as follows:

1. Setback Where Adjacent Parcels Contain Less Than Forty (40) Acres. A minimum wind generator setback of two (2) times the overall machine height (measured from grade to the top of the structure, including the uppermost extension of any blades) or five hundred (500) feet, whichever is less, shall be maintained from exterior project boundaries where the project site is adjacent to existing parcels of record which contain less than forty (40) acres and are not zoned WE combining district.

The planning director may allow a reduction in this setback, not to exceed a minimum setback of one (1) times the overall machine height (measured from grade to the top of the structure, including the uppermost extension of any blades) if a letter of consent from the owner(s) of record of adjacent parcels is filed with the Kern County planning department.

2. Setback Where Adjacent Parcels Contain Forty (40) Acres or More. A minimum wind generator setback of one and one-half (1½) times the overall machine height (measured from grade to the top of the structure, including the uppermost extension of any blades) or five hundred (500) feet, whichever is less, shall be maintained from all exterior project boundaries.

The planning director may allow a reduction or waiver of this setback requirement in accordance with both of the following provisions:

a. The project exterior boundary is a common property line between two (2) or more approved wind energy projects or both properties are located within the WE district; and

b. The property owner of each affected property has filed a letter of consent to the proposed setback reduction with the planning director.

3. Setback from Off-site Residence(s) On Adjacent Parcels. In all cases, regardless of parcel area, a minimum wind generator setback of one and one-half (1 ½) times the overall machine height (measured from grade to the top of the structure, including the uppermost extension of any blades) or one thousand five hundred (1,500) feet, whichever is greater, shall be maintained from any off-site residence.

The planning director may allow a reduction in this setback, not to exceed a minimum setback of one (1) times the overall machine height, if a letter of consent from the owner(s) of record of the adjacent parcel is filed with the planning director.

4. Project Interior Wind Generator Spacing. Wind generator spacing within the project boundary shall be in accordance with accepted industry practices pertaining to the subject machine.

5. Setback from On-site Residences and Accessory Structures Designed for Human Occupancy. A minimum wind generator setback of one (1) times the overall machine height (measured from grade to the top of the structure, including the uppermost extension of any blade) shall be maintained from any on-site residence or accessory structure designed for human occupancy.

6. Setback from Public Highways and Streets, Public Access Easements, Public Trails, and Railroads. A minimum wind generator setback of one and one-half (1 ½) times the overall machine height (measured from grade to the top of the structure, including the uppermost extension of any blade) shall be maintained from any publicly maintained public highway or street. A minimum wind generator setback of one (1) times the overall machine height shall be maintained from any public access easement or railroad right-of-way. A minimum wind generator setback of one hundred fifty (150) feet shall be maintained from the outermost extension of any blade to any public trail, pedestrian easement, or equestrian easement.

G. Wind generator machine and associated meteorological tower overall height shall not exceed six hundred (600) feet and is subject to Section 19.08.160(B). For the purposes of this chapter, machine height shall be measured as follows:

1. Overall machine height of horizontal axis machines shall be measured from grade to the top of the structure, including the uppermost extension of any blades.

2. Machine height of vertical axis or other machine designs shall be measured from grade to the highest point of the structure.

H. All wind projects including wind generators and towers shall comply with all applicable county, state, and federal laws, ordinances or regulations;

I. One (1) project identification sign, located at each point of project ingress and egress, not to exceed thirty-two (32) square feet in area, may be erected on the project site. No other signs shall be installed other than safety signs and the required warning signs. The developer shall submit a sign elevation drawing to the planning director for review and approval prior to installation;

J. Where a residence, school, church, public library or other sensitive or highly sensitive land use, as identified in the noise element of the county general plan, is located within one (1) mile in a prevailing downwind direction or within one-half (½) mile in any other direction of a project's exterior boundary, an acoustical analysis shall be prepared by a qualified acoustical consultant prior to the issuance of any building permit. The consultant and the resulting report shall be subject to review and approval by the Kern County health department. The report shall address any potential impacts on sensitive or highly sensitive land uses.

In addition, the acoustical report shall demonstrate that the proposed development shall comply with the following criteria:

1. Audible noise due to wind turbine operations shall not be created which causes the exterior noise level to exceed forty-five (45) dBA for more than five (5) minutes out of any one (1) hour time period (L8.3) or to exceed fifty (50) dBA for any period of time when measured within fifty (50) feet of any existing residence, school, hospital, church, or public library.

2. Low frequency noise or infrasound from wind turbine operations shall not be created which causes the exterior noise level to exceed the following limits when measured within fifty (50) feet of any existing residence, school, hospital, church or public library:

One-Third Octave Bank Sound Pressure

<b>Center Frequency (Hz)</b>	<b>Level (dB)</b>
2 to 1	70 (each band)
20	68
25	67

31.5	65
40	62
50	60
63	57
80	55
100	52
125	50

3. In the event audible noise due to wind turbine operations contains a steady pure tone, such as a whine, screech or hum, the standards for audible noise set forth in subparagraph (1) of this subsection shall be reduced by five (5) dBA. A pure tone is defined to exist if the one-third ( $\frac{1}{3}$ ) octave band sound pressure level in the band, including the tone, exceeds the arithmetic average of the sound pressure levels of the two (2) contiguous one-third ( $\frac{1}{3}$ ) octave bands by five (5) dBA for center frequencies of five hundred (500) Hz and above, by eight (8) dBA for center frequencies between one hundred sixty (160)Hz and four hundred (400) Hz, or by fifteen (15) dBA for center frequencies less than or equal to one hundred twenty-five (125) Hz.

4. In the event the audible noise due to wind turbine operations contains repetitive impulsive sounds, the standards for audible noise set forth in subparagraph (1) of this subsection shall be reduced by five (5) dBA.

5. In the event the audible noise due to wind turbine operations contains both a pure tone and repetitive impulsive sounds, the standards for audible noise set forth in subparagraph (1) of this subsection shall be reduced by a total of five (5) dBA.

6. In the event the ambient noise level (exclusive of the development in question) exceeds one (1) of the standards given above, the applicable standard shall be adjusted so as to equal the ambient noise level. For audible noise, the ambient noise level shall be expressed in terms of the highest whole number sound pressure level in dBA which is exceeded for no more than five (5) minutes per hour (L8.3). For low-frequency noise or infrasound, the ambient noise level shall be expressed in terms of the equivalent level (Leq) for the one-third ( $\frac{1}{3}$ ) octave band in question, rounded to the nearest whole decibel. Ambient noise levels shall be measured within fifty (50) feet of potentially affected existing residences, schools, hospitals, churches or public libraries. Ambient noise level measurement techniques shall employ all practical means of reducing the effects of wind-generated noise at the microphone. Ambient noise level measurements may be performed when wind velocities at the proposed project site are sufficient to allow wind turbine operation, provided that the wind velocity does not exceed thirty (30) mph at the ambient noise measurement location.

7. Any noise level falling between two (2) whole decibels shall be the lower of the two (2).

8. In the event that noise levels, resulting from a proposed development, exceed the criteria listed above, a waiver to said levels may be granted by the planning director provided that the following has been accomplished:



a. Written consent from the affected property owners has been obtained stating that they are aware of the proposed development and the noise limitations imposed by this code, and that consent is granted to allow noise levels to exceed the maximum limits allowed;

b. A permanent noise impact easement has been recorded in the County Hall of Records which describes the benefited and burdened properties and which advises all subsequent owners of the burdened property that noise levels in excess of those permitted by this code may exist on or at the burdened property.

K. Prior to the issuance of any grading permit, a plan for the mitigation of potential soil erosion and sedimentation shall be prepared by a registered civil engineer or other professional and submitted for the approval by the director of the engineering and survey services department. The plan shall include provisions for site re-vegetation, including any necessary re-soiling, proposed plant species, proposed plant density and percentage of ground coverage, and the methods and rates of application and shall include sediment collection facilities as may be required by the engineering and survey services department.

The soil erosion and sedimentation control plan shall be consistent with the applicable requirements of the California Regional Water Quality Control Board pertaining to the preparation and approval of storm water pollution prevention plans. Notwithstanding the foregoing, the re-vegetation portion of the soil erosion and sedimentation plan shall be prepared by a professional biologist or other professional approved, in advance, by the engineering and survey services department.

The plan shall include a timetable for full implementation, estimated costs, and a surety bond or other security as approved by the engineering and survey services department in an amount determined by that department to guarantee plan implementation. The soil erosion and sedimentation control plan, including the re-vegetation plan and security instrument, shall be submitted to, and approved by, the floodplain management section of the engineering and survey services department prior to the issuance of any grading permit. The security shall remain on file with the engineering and survey services department until that department has verified that the plan has been successfully implemented;

L. A minimum of on-site roadways shall be constructed. Temporary access roads utilized for initial machine installation shall be revegetated to a natural condition after completion of machine installation. The applicant shall submit a plan of all proposed roads, temporary and permanent, for approval by the planning director prior to the issuance of any building permits;

M. Construction of any slopes steeper than four to one (4:1) shall be prohibited unless specifically authorized by the Kern County planning department and mitigation is provided;

N. Wind project facilities shall be encircled with a ten (10) foot wide fuel break. Subject fuel breaks may be installed for each wind machine or the perimeter of the total project, but in no event shall encompass more than forty (40) acres per block. Permanent access roads may also be considered fuel breaks. This requirement may be modified at the discretion of the Kern County fire chief;

O. No building permits will be issued until the grading has been completed in accordance with the approved plans and “as graded certification” has been made by the engineer. (Ord. G-7189 §§ 65—71, 2005; Ord. G-6077 § 234, 1994: Prior code § 7145.13(B))

#### **19.64.150 Wind turbine maintenance and abandonment**

A. Except for maintenance periods, wind turbines shall be maintained in an operational condition. A turbine or group of turbines seeking, but unable to obtain transmission service or a power purchase agreement and out of service for that reason, shall be considered to be in a maintenance period provided such wind turbines are otherwise viable by general industry practices.

B. Any wind turbine not in operational condition for a consecutive period of twelve (12) months shall be deemed abandoned and shall be removed within sixty (60) days from the date a written notice is sent to the property owner and turbine owner, as well as the project operator, by the county. Within this sixty (60)-day period, the property owner, turbine owner, or project operator may provide the planning director with a written request and justification for an extension for an additional twelve (12) months. The planning director shall consider any such request at a director’s hearing as provided for in Section 19.102.070 of this title. In no case shall the planning director authorize an extension beyond two (2) years from the date the wind turbine was deemed abandoned without requiring financial assurances to guarantee the removal of the wind turbine, and that portion of the support structure lying above the natural grade level, in the form of a corporate surety bond, irrevocable letter of credit, or an irrevocable certificate of deposit wherein the county is named as the sole beneficiary. In no case shall a wind turbine which has been deemed abandoned be permitted to remain in place for more than forty-eight (48) months from the date the wind turbine was first deemed abandoned.

C. If the property owner fails to remove an abandoned wind turbine within the time frame specified above, the county may remove the structure(s) at the property owner’s expense and lien the property to recover all enforcement and removal costs; however, the county shall first notify the property owner of its intent to remove the structure(s) in accordance with this section in writing at least thirty (30) days prior to removing said structure(s). The county shall not issue any grading or building permits for any new development on the subject property until any such lien has been paid in full. (Ord. G-7189 § 73, 2005: prior code § 7145.13(C))

#### **19.64.160 Permit revocation and modification**

Any permit issued pursuant to this chapter may be revoked or modified pursuant to Section 19.102.020 of this title. (Ord. G-7189 § 74, 2005)

**STATE OF CALIFORNIA – RIVERSIDE COUNTY**

*Riverside County Zoning Code: Title 17*, available online at <http://municipalcodes.lexisnexis.com/codes/riversideco>

**Chapter 17.164 W-E WIND ENERGY RESOURCE ZONE**

**17.164.010 Statement of intent**

There are some areas of the county which by virtue of strong prevailing winds and the absence of extensive development are ideally suited for large scale development of wind energy. The Riverside County general plan provides the basis for the development of this resource. The provisions of this chapter are intended to recognize this unique wind resource in the county and the need for the development of alternative energy sources. (Ord. 348.2104, 1982: Ord. 348 § 17.1)

**17.164.020 Uses permitted**

A. Public Utility Uses.

1. Structures necessary to the conservation and development of water such as dams, pipelines, and pumping facilities;
2. Transmission facilities for gas;
3. Transmission facilities for electricity which are subject to the jurisdiction of the California Public Utilities Commission;
4. Electrical substations;
5. Railroads, including the necessary facilities in connection therewith;
6. Cable television transmission facilities.

B. Meteorological Towers.

1. Towers under fifty (50) feet high;
2. Towers fifty (50) feet and higher, provided approval of a plot plan shall first have been granted pursuant to the provisions of Section 17.216.020(A). Such a plot plan shall be valid for a period of two years unless a WECS permit is approved on the underlying property within the two-year period, in which case the plot plan shall be valid as long as the WECS permit is valid.

C. Commercial WECS and WECS arrays with no limit as to rated power output are permitted provided a commercial WECS permit has been granted pursuant to the provisions of Chapter 17.224.

D. Accessory WECS are permitted provided an accessory WECS permit has been granted pursuant to the provisions of Chapter 17.224.

E. The following uses are permitted provided approval of a plot plan shall first have been granted pursuant to the provisions of chapter 17.216:

1. Electrical transmission facilities which are not subject to the jurisdiction of the California Public Utilities Commission and are not included in a commercial WECS permit application;

2. Electrical storage facilities for the temporary storage of power primarily produced upon the land where a permitted WECS or public utility use is established;

3. Storage of trucks and other vehicles, machinery and materials on land where a permitted WECS or public utility use is established;

4. Offices and maintenance shop buildings and structures on land where a permitted WECS or public utility use is established;

5. One-family dwellings for caretakers or watchmen and their families on land where a permitted WECS or public utility use is established, provided no compensation is received for the use of any such dwellings.

F. The following uses are permitted, provided a conditional use permit has been granted pursuant to the provisions of Chapter 17.200:

1. Mining operations which are exempt from the provisions of the California Surface Mining and Reclamation Act of 1975 and County Ordinance No. 555.

G. Mining operations which are subject to the California Surface Mining and Reclamation Act of 1975 are permitted, provided the operator holds a valid permit pursuant to county Ordinance No. 555. (Ord. 348.3567, 1993; Ord. 348.2104, 1982; Ord. 348 § 17.2)

### **17.164.030 Development standards**

The following development standards shall apply in the W-E zone:

#### **A. Height Limits.**

1. No commercial WECS shall exceed five hundred (500) feet in height.  
2. No other building or structure shall exceed twenty (20) feet in height unless a height up to seventy-five (75) feet for buildings or four hundred (400) feet for other structures is specifically permitted under the provisions of Section 17.172.230.

#### **B. Setbacks. Minimum setbacks are as follows:**

1. No building or structure shall be closer than fifty (50) feet from any lot line.  
2. Setbacks for accessory WECS shall be as prescribed by Chapter 17.224.  
3. Setbacks for commercial WECS and WECS arrays of all sizes shall be as prescribed by Chapter 17.224.  
4. Setbacks for a commercial WECS or WECS array used primarily for research or experimentation shall be as prescribed by Chapter 17.224.

C. Automobile storage space shall be provided as required by Chapter 17.188. (Ord. 348.3567, 1993; Ord. 348.2848, 1988; Ord. 348.2104, 1982; Ord. 348 § 17.3)

## **Chapter 17.224 COMMERCIAL WIND ENERGY CONVERSION SYSTEMS (WECS) PERMITS**

### **Article 1: WECS Permits**

#### **17.224.010 Applicability**

A. Notwithstanding any other provision of this title, commercial WECS or WECS arrays having a total rated power output of one hundred (100) kw or less are permitted in all zoning classifications, provided a commercial WECS permit is granted pursuant to this article.

B. Commercial WECS or WECS arrays having a total rated power output of more than one hundred (100) kw are permitted in the W-E zone, and in the W-1 zone, provided a commercial WECS permit is granted pursuant to this article. (Ord. 348.3928 § 2 (part), 2000: Ord. 348 § 18.41(a))

#### **17.224.020 Procedure**

A public hearing shall be held on an application for commercial WECS permit in accordance with the provisions of Chapter 17.192 and all of the procedural requirements and rights of appeal as set forth therein shall apply. In addition to the notice of hearing provided under Chapter 17.192, notice of hearing shall be given by mailing to all owners of real property which is located within one-half mile of the exterior boundaries of the proposed project, as such owners are shown on the last equalized assessment roll and any update. The hearing body shall be the planning commission. (Ord. 348.3928 § 2 (part), 2000: Ord. 348 § 18.41(b))

#### **17.224.030 Application**

Every application for a commercial WECS permit shall be made in writing to the planning director on the forms provided by the planning department and shall be accompanied by the filing fee set forth in county Ordinance No. 671. The permit application shall include the following information:

- A. Name and address of the applicant;
- B. Evidence that the applicant is the owner of the property involved or has written permission of the owner to make such application;
- C. A plot and development plan drawn in sufficient detail to clearly describe the following:
  - 1. Physical dimensions of the property, existing structures, and proposed structures,
  - 2. Location of existing and proposed structures,
  - 3. Location of electrical lines and facilities,
  - 4. Existing topography,
  - 5. Proposed grading and removal of natural vegetation,

6. Wind characteristics and dominant wind direction is the direction from which fifty (50) percent or more of the energy contained in the wind flows,
7. Setbacks,
8. Methods of circulation,
9. Ingress and egress identifying the following factors:
  - a. Location and distance to the nearest county maintained road,
  - b. A description of the access route from the nearest County maintained road to include:
    - i. Road surface material stating the type and amount of surface cover,
    - ii. Width and length of access route,
    - iii. Dust control procedures,
    - iv. A road maintenance schedule or program,
    - v. Utilization of the property under the requested permit;

D. Utility interconnection data and a copy of written notification to the utility of the proposed interconnection;

E. Specific information on the type, size, height, rotor material, rated power output, performance, safety and noise characteristics of each WECS model, tower and electrical transmission equipment;

- F. A geotechnical report that shall at a minimum include the following:
1. Soils engineering and engineering geologic characteristics of the site based upon on-site sampling and testing,
  2. Foundation design criteria for all proposed structures,
  3. Slope stability analysis,
  4. Grading criteria for ground preparation, cuts and fills, soil compaction,
  5. Detailed fault hazard evaluation prepared by a California registered geologist or certified engineering geologist for WECS located within an Alquist-Priolo special studies zone, county fault zone, or within one hundred fifty (150) feet of any other active or potentially active fault,
  6. Seismic hazards evaluation to include regional seismicity, potential for strong groundshaking, and all appropriate primary and secondary seismic hazards,
  7. Recommendations regarding the need for automatic shutdown systems in event of groundshaking greater than the seismic design specifications of the WECS and tower;

G. A location map to scale of all dwellings within one-half mile of the boundary of the property upon which the WECS are to be located;

H. An analysis to reduce air navigation clutter on airport radar facilities;

I. If the planning director determines it is necessary, the application shall be accompanied by a photograph or detailed drawing of each model of WECS including the tower and foundation; and one or more detailed computer or photographic simulation drawing showing the site fully developed with all proposed WECS and accessory structures;

J. If the application includes any WECS with a total height over two hundred (200) feet or any WECS which is located within twenty thousand (20,000) feet of the runway of any airport, the application shall be accompanied by a copy of written notification to the Federal Aviation Administration;

K. If the application includes any WECS which requires the approval of a greater height limit pursuant to Section 17.172.220, the two applications shall be filed concurrently;

L. An application including any WECS which is located within a two miles of any microwave communications link shall be accompanied by a copy of a written notification to the operator of the link;

M. An application including any WECS which is located within a one hundred (100) year flood plain area, as such flood hazard areas are shown on the maps designated in county Ordinance No. 458, shall be accompanied by a detailed report which shall address the potential for wind erosion, water erosion, sedimentation and flooding, and which shall propose mitigation measures for such impacts;

N. Such additional information as shall be required by the planning director. (Ord. 348.3928 § 2 (part), 2000: Ord. 348 § 18.41(c))

**17.224.040 Standards and development criteria**

No person shall erect or maintain a commercial WECS in the unincorporated area of the county of Riverside except in accordance with the following provisions.

A. Safety Setbacks.

1. No commercial WECS shall be located where the center of the tower is within the distances indicated in the following table:

Aboveground Electrical Transmission Line of More than 12kV *	1.25 x Total WECS Height *****
Public Road, Public Highway or Railroad **	1.5 x Total WECS Height or 500 feet whichever is greater
Public Road or Public Highway Classed as an Arterial or Greater with ADT of 7,000 or More ***	1.1 x Total WECS Height
Lot Line Adjoins a Lot Zoned W-E or W-1 Lot Line of any Lot Containing a "Habitable Dwelling" ****	3 x Total WECS Height or 500 feet whichever is greater
All Other Lot Lines	1.1 x Total WECS Height

NOTES:

\* Measured from the outer boundary of the public utility right-of-way or easement.

\*\* Measured from the outer boundary of the public road/highway right-of-way or railroad right-of-way.

\*\*\* "ADT" means average daily trips; based on traffic field measurements as determined by the director of the department of transportation (Information: in 1999, public roads or highways with ADT of 7,000 or more included I-10, Hwy 62, Hwy 111 & Indian Avenue).

\*\*\*\* For the purposes of this subsection, a "habitable dwelling" shall be a dwelling which contains a kitchen and which is deemed fit for human occupancy as determined by the director of the department of building and safety.

\*\*\*\*\* Measurement of the WECS and tower with the blade of a horizontal WECS at 12 o'clock position; measurement of a vertical axis WECS shall be the height of the tower.

B. Wind Access Setbacks.

1. No commercial WECS shall be located where the center of the tower is within a distance of five rotor diameters from a lot line that is perpendicular to and downwind of, or within forty-five (45) degrees of perpendicular to and downwind of, the dominant wind direction.

2. Notwithstanding the provisions of subsection (B)(1) of this section, such setbacks from lot lines do not apply if the application is accompanied by a legally enforceable agreement for a period of twenty-five (25) years or the life of the permit, whichever is longer, that the adjacent landowner agrees to the elimination of the setback and will not develop his or her land in such a way as to decrease wind velocity or increase wind turbulence at the location of the proposed WECS. In addition the provisions of (B)(1) of this section, regarding setbacks from lot lines do not apply if planning commission determines that the characteristics of the downwind property, such as, but not necessarily limited to, topography or use of such property as a transportation corridor, eliminate the ability to develop said downwind property with commercial WECS. Whenever a wind access setback reduction is proposed to the planning commission based on the characteristics of the downwind property, the wind access setback reduction shall be included in all notices regarding the commercial WECS permit, and, if granted, the commercial WECS permit shall specifically state the required alternative wind access setback.

C. Scenic Resource Protection.

1. No commercial WECS array shall be located easterly of Indian Avenue or northerly of Pierson Boulevard and its extension westerly of Highway 62.

2. No commercial WECS array shall be located southerly of Interstate 10 or southerly of Highway 111 in any area that meets both of the following requirements:

a. The area is within Sections 8, 9, 15, 16, 17, 19, 20 and 21, Township 3 South, Range 3 East, San Bernardino Base and Meridian; and



b. The area is within the boundaries of the Santa Rosa and San Jacinto Mountains National Monument, as those boundaries existed on the effective date of this ordinance codified in this section.

3. No commercial WECS shall be located where the center of the tower is within the distances indicated in the following table:

<b>Scenic Setbacks</b>	<b>WECS Total Height of 150 Feet or Less</b>	<b>WECS Total Height of More than 150 Feet</b>
I-10 Easterly of Highway 111	500 feet	1,000 feet
State Highway 111 south of I-10 and north of the City of Palm Springs	2/3 mile	2/3 mile
All other State or County eligible or designated scenic highways *	1/4 mile	1/4 mile

**NOTES:**

\* Scenic highways are those designated in the Scenic Highway Element of the Comprehensive General Plan (Information: in 1999, other designated scenic highways included Hwy 62, I-10 westerly of Highway 111 and Whitewater Canyon Road), and, for the purpose of this subsection, Snow Creek Road.

4. The setback specified in subdivision 3 of this subsection, shall be measured from the outer boundary of the public right-of-way of the designated highway.

5. Notwithstanding the provisions of subdivision 3 of this subsection, the setbacks therein specified may be reduced to 1.25 times the total WECS height if the planning commission determines that the characteristics of the surrounding property eliminate or substantially reduce considerations of scenic value. Whenever a setback reduction is proposed pursuant to this subsection, the setback reduction shall be included in all notices regarding the commercial WECS permit, and, if granted, the commercial WECS permit shall specifically state the required setback.

**D. Safety and Security.**

1. Fencing or other appropriate measures shall be required to prevent unauthorized access to the WECS or WECS array.

2. Guy wires shall be distinctly marked.

3. Signs in English and Spanish warning of the electrical and other hazards associated with the WECS shall be posted at the base of each tower and on fences or barriers.

4. Horizontal-Axis WECS. The lowest extension of the rotor of a horizontal-axis WECS shall be at least twenty-five (25) feet from the ground.

5. Vertical-Axis WECS. A fence or other barrier shall be erected around a vertical-axis WECS whose rotors are less than fifteen (15) feet from the ground.

6. A security patrol or other security measure may be required if specified within the conditions of approval of a commercial WECS permit.

E. Seismic Safety. All WECS including the tower, foundation and accessory structures, shall comply with the requirements of the applicable seismic zone of the Uniform Building Code, the applicable groundshaking zone in the Riverside County Comprehensive General Plan, and with the seismic design recommendation in an approved geotechnical report on the project.

F. Fire Protection. Upon recommendation of the county fire department, commercial WECS and WECS arrays shall include fire control and prevention measures. No construction permit shall be issued for any human occupancy structure upon the property containing commercial WECS and WECS arrays without first establishing fire protection requirements; this requirement includes the establishment of a minimum fire flow per Riverside County Ordinance No. 787. Additional measures required for fire control and prevention shall be stated in the conditions of approval of a commercial WECS permit, and such measures may include, but are not limited to, the following:

1. Areas indicated below to be cleared of vegetation and maintained as a fire/fuel break as long as the WECS or WECS array is in operation:

a. Thirty (30) feet around the periphery of the WECS or WECS array; access driveways and roads that completely surround the project may satisfy this requirement as approved by the county fire department;

b. Ten (10) radius feet around all transformers and WECS towers and their foundations;

c. Thirty (30) feet around all buildings;

d. All buildings or equipment enclosures of substantial size containing control panels, switching equipment, or transmission equipment, without regular human occupancy, shall be equipped with an automatic fire extinguishing system of a Halon or dry chemical type, as approved by the county fire department.

2. Service vehicles assigned to regular maintenance or construction at the WECS or WECS array shall be equipped with a portable fire extinguisher of a 4A40 BC rating.

3. All motor-driven equipment shall be equipped with approved spark arrestors.

G. Interconnection and Electrical Distribution Facilities. All distribution lines, electrical substations, and other interconnection facilities shall be constructed to the specifications of the utility. Interconnection shall conform to procedures and standards established by the Federal Energy Regulatory Commission, the California Independent System Operator and/or the California Public Utilities Commission, as applicable.

## H. Unsafe and Inoperable WECS.

1. Unsafe commercial WECS, inoperable commercial WECS, and commercial WECS for which the permit has expired shall be removed by the owner. All safety hazards created by the installment and operation of the WECS shall be eliminated and the site shall be restored to its natural condition to the extent feasible. A bond or other appropriate form of security may be required to cover the cost of removal and site restoration.

2. Every unsafe commercial WECS and every inoperable commercial WECS is declared to be a public nuisance which shall be subject to abatement by repair, rehabilitation, demolition, or removal in accordance with the procedure contained in Section 3 of county Ordinance No. 457. Every commercial WECS shall be subject to the provisions of this subsection commencing with the date of issuance of final building permit inspection approval. An inoperable commercial WECS shall not be considered a public nuisance provided the owner can demonstrate that modernization, rebuilding or repairs are in progress or planned and will be completed within no more than six months.

a. A commercial WECS constructed pursuant to a commercial WECS permit with an effective date prior to July 23, 1985, shall be deemed inoperable if it has not generated power for twelve (12) consecutive months.

b. A commercial WECS permit constructed pursuant to a commercial WECS permit with an effective date on or after July 23, 1985, shall be deemed inoperable if it has not generated power within the preceding two calendar quarters equal to at least sixty (60) percent of the total projected quarterly production per turbine (kWh) for the two calendar quarters. As used herein, the term "projected quarterly production per turbine (kWh)" shall be defined as provided in Section 1382 of Title 20 of the California Administrative Code.

3. All notices required under Section 3 of county Ordinance No. 457 shall also be given to the concerned utility.

## I. Interference with Navigational Systems.

1. No commercial WECS or WECS array shall be installed or operated in a manner that causes interference with the operation of the VORTAC installation on Edom Hill.

2. All WECS siting shall comply with Federal Aviation Administration regulations for siting structures near an airport or VORTAC installation.

3. All WECS shall include a locking mechanism which prevents the blades from rotating when not producing power, in order to limit airport radar interference or clutter. The planning commission may modify or eliminate the requirement for a locking mechanism if sufficient evidence is presented that no significant airport radar interference or clutter will be caused by the WECS or WECS array.

J. Site Disruption. Prior to the issuance of building permits for a commercial WECS development, all areas where significant site disruption is proposed shall be temporarily

marked off. All construction activities shall be limited to the areas marked off.

#### K. Certification.

1. The foundation, tower and compatibility of the tower with the rotor and rotor-related equipment shall be certified in writing by a structural engineer registered in California that they conform with good engineering practices and comply with the appropriate provisions of the Uniform Building Code that have been adopted by the county.

2. The electrical system shall be certified in writing by an electrical engineer, registered in California, that it conforms with good engineering practices and complies with the appropriate provisions of the National Electrical Code that have been adopted by the county.

3. The rotor overspeed control system shall be certified in writing by a mechanical engineer, registered in any state, that it conforms with good engineering practices.

#### L. Noise.

##### 1. Permit Approval.

a. A commercial WECS permit shall not be granted unless the applicant demonstrates that the proposed WECS or WECS array complies with the setbacks requiring no acoustical studies as set forth in subsection (L)(1)(b) of this section, or that the projected WECS noise level will comply with the noise standards as set forth in subsection (L)(1)(c) of this section. The projected WECS noise level is the level of noise projected to be produced by all commercial WECS proposed under the permit application and shall be calculated in accordance with the technical specifications and criteria adopted pursuant to subsection (L)(3) of this section. A variance from this property development standard may be granted pursuant to the provisions of Chapter 17.196.

b. WECS array setbacks requiring no acoustical studies. WECS arrays with ten (10) or fewer WECS (comprised of WECS designed in accordance with proven good engineering practices) set back (where each WECS in the array are) two thousand (2,000) feet or more from the nearest receptor as set forth in subsection (L)(1)(e) of this section, shall be permitted without an acoustical study. WECS arrays with more than ten (10) WECS (comprised of WECS designed in accordance with proven good engineering practices) can qualify for this condition if each WECS in the array is set back three thousand (3,000) feet or greater. WECS designed with the following characteristics shall be deemed in accordance with proven good engineering practices: at least three blades; upwind rotor; no furling; tapered and twisted blades; airfoils designed to stall softly (defined in technical specifications and criteria adopted pursuant to subsection (L)(3) of this section). WECS arrays approved under this subsection shall have noise standards as set forth in subsection (L)(1)(c) of this section.

c. Noise Standards. The projected WECS noise level to each receptor (as set forth in subsection (L)(1)(e) of this section) shall be at or below fifty-five (55) dB(A) weighted (unless at setback distances as set forth in subsection (L)(1)(b) of this section, are adhered to).

d. The noise standard set forth in subsection (L)(1)(c) of this section, shall be reduced by five dB(A) where it is projected that pure tone noise will be generated. A pure tone shall exist if the one-third octave band sound pressure level in the bandwidth of the tone exceeds the arithmetic average of the sound pressure levels on the two contiguous one-third octave bands by five dB for center frequencies of five hundred (500) Hz and above, and eight dB for center frequencies between one hundred sixty (160) and four hundred (400) Hz, and by fifteen (15) dB for center frequencies less than or equal to one hundred twenty-five (125) Hz.

e. Receptor (the point of measurement) for the calculation of the WECS noise level projected pursuant to subsection (L)(1)(a) of this section shall be determined as follows:

i. Existing structures in the vicinity of the commercial WECS project property which are actually used as a habitable dwelling, hospital, school, library or nursing home shall be identified.

ii. The point of measurement shall be a point ten (10) feet from the outer wall, or equivalent distance, from the WECS being measured to any habitable dwelling, hospital, school, library or nursing home.

f. Low Frequency Noise Criteria. Where acoustical studies are required, and the WECS are not designed in accordance with proven good engineering practices as defined in subsection (L)(1)(b) of this section, the low frequency noise shall not exceed the following at a receptor: 75 dB(C) weighted (five to one hundred (100) hertz) or Predicted C(PC) for nonimpulsive WECS. 67 dB(C) weighted (five to one hundred (100) hertz) or PC for impulsive WECS (as defined in technical specification and criteria adopted pursuant to subsection (L)(3) of this section). WECS array low frequency impacts shall be calculated in accordance with technical specifications and criteria adopted pursuant to subsection (L)(3) of this section.

## 2. Operations.

a. Unless the conditions of approval provide a more restrictive standard, a commercial WECS or WECS array shall not be operated so that noise is created exceeding sixty (60) dB(A) where the point of measurement is a point ten (10) feet from the outer wall, or equivalent distance, from the WECS being measured to any habitable dwelling, hospital, school, library or nursing home.

b. A commercial WECS or WECS array shall not be operated so that impulsive sound below twenty (20) Hz adversely affects the habitability or use of any dwelling unit, hospital, school, library, or nursing home.

3. All noise measurements and noise projections shall be made in accordance with the technical specifications and criteria developed by the county health services agency and adopted by resolution of the board of supervisors.

4. A toll-free telephone number shall be maintained for each commercial WECS project and shall be distributed to surrounding property owners to facilitate the reporting of noise irregularities and equipment malfunctions.

M. Electrical Distribution Lines.

1. Electrical distribution lines on the project site shall be undergrounded up to the low voltage side of the step-up transformer or to the utility interface point of an on-site substation.

2. Any electrical distribution line of less than thirty-four (34) kv, not subject to the jurisdiction of the California Public Utilities Commission, which is located within one mile of a state scenic highway or a highway designated in the scenic highway element of the general plan, or within an area designated by the planning director as visually critical or very critical, shall be installed underground if such installation is feasible.

N. Monitoring. Upon reasonable notice, county officials or their designated representatives may enter a lot on which a commercial WECS permit has been granted for the purpose of monitoring noise environmental impacts, and other impacts which may arise. Twenty-four (24) hours advance notice shall be deemed reasonable notice.

O. Height Limits. A commercial WECS or WECS array shall conform to height limits of the zoning classification in which it is located. A lower height limit may be imposed as a condition of a commercial WECS permit.

P. Development Impacts. A one-time fee and a requirement to provide public works or services may be imposed as a condition of a commercial WECS permit. Such exactions must be related to the public need created by the energy development. The purposes for which the permit exaction may be used include, but are not limited to, providing roads required by the wind development, and establishing and operating a monitoring system, a visitor center that is primarily oriented toward wind development and a wind energy information program for local residents.

Q. Signs. No advertising sign or logo shall be placed or painted on any commercial WECS. A commercial WECS permit may permit the placement of no more than two advertising signs relating to the development on the project site, but no such sign shall exceed fifteen (15) square feet in surface area or eight feet in height.

R. Color and Finish of WECS. All commercial WECS shall be either light environmental colors (such as white, beige or tan), or darker fully saturated colors (such as dark blue, maroon, rust red, or dark green), or galvanized. All commercial WECS shall have a matte or galvanized finish which weathers to a lusterless condition within six (6) months unless such finish adversely affects the performance of the WECS or other good cause is shown to permit any other finish.

S. Contingent Approval. A commercial WECS permit may be granted subject to necessary approvals from the Federal Aviation Administration or other approving authorities and utility acceptance of any electrical interconnection.

T. General Conditions. The county may impose conditions on the granting of a commercial WECS permit in order to achieve the purposes of this title and the general plan and to protect the health, safety or general welfare of the community.

U. Findings. The following findings shall be made in writing prior to granting a commercial WECS permit:

1. The project will be consistent with the comprehensive general plan.
2. The project will not be detrimental to the health, safety or general welfare of the community.
3. The project site is or will be adequately served by roads and other public or private service facilities.

V. Notification. Upon approval of a commercial WECS permit, the planning department shall provide written notice to the California Energy Commission and the concerned utility. (Ord. 348.4042 § 1, 2002; Ord. 348.3884 § 1, 1999; Ord. 348 § 18.41(d))

#### **17.224.050 Use of permit**

A. Any commercial WECS permit that is granted shall be used within two years from the effective date thereof, or within such additional time as may be set in the conditions of approval, which shall not exceed a total of five years; otherwise, the permit shall be null and void.

Notwithstanding the foregoing, if a permit is required to be used within less than five years, the permittee may, prior to its expiration, request an extension of time in which to use the permit. A request for extension of time shall be made to the board of supervisors, on forms provided by the county planning department and shall be filed with the planning director, accompanied by the fee set forth in county Ordinance No. 671. Within thirty (30) days following the filing of a request for an extension, the planning director shall review the application, make a recommendation thereon, and forward the matter on the regular agenda of the board of supervisors. An extension of time may be granted by the board of supervisors upon a determination that valid reason exists for permittee not using the permit within the required period of time. If an extension is granted, the total time allowed for use of the permit shall not exceed a period of five years, calculated from the effective date of the issuance of the permit. The term "use" means the beginning of substantial construction of the use that is authorized, which construction must thereafter be pursued diligently to completion.

B. Life of Permit. A commercial WECS permit shall be valid for the useful life of the WECS included in the permit. The life of the permit shall be determined at the time of approval and shall not exceed thirty (30) years. (Ord. 348.3928 § 2 (part), 2000; Ord. 348 § 18.41(e))

### **17.224.060 Revocation of permit**

A commercial WECS permit may be revoked pursuant to Chapter 17.220. (Ord. 348.3928 § 2 (part), 2000: Ord. 348 § 18.41(f))

## **Article 2: Accessory WECS Permits**

### **17.224.070 Applicability**

Notwithstanding any other provision of this title, an accessory wind energy conversion system (WECS) may be permitted in any zone classification; provided, that an accessory WECS permit is granted pursuant to the provisions of this article. (Ord. 348.3928 § 2 (part), 2000: Ord. 348 § 18.42(a))

### **17.224.080 Procedure**

Applications and permit approval for an accessory WECS permit shall be governed by all the provisions of Chapter 17.216 and of this article. (Ord. 348.3928 § 2 (part), 2000: Ord. 348 § 18.42(b))

### **17.224.090 Application**

Applications for an accessory WECS permit shall be made in writing to the planning director on the forms provided by the county planning department and shall be accompanied by the filing fee set forth in county Ordinance No. 671. In addition to the information specified in Chapter 17.216, the permit application shall include the following:

- A. A photograph or detailed drawing of the WECS including the tower;
- B. Specific information on the WECS including: type, size, rated power output, rotor material, performance, safety and noise characteristics;
- C. Specific information on the type, height and material of the tower;
- D. Proof of notification to the utility of the proposed interconnection;
- E. Dominant wind direction at the site. Dominant wind direction is the direction from which fifty (50) percent or more of the energy contained in the wind flows;
- F. If the WECS requires approval of a greater height limit pursuant to Section 17.172.220, the two applications shall be filed concurrently. (Ord. 348.3928 § 2 (part), 2000: Ord. 348 § 18.42(c))



**17.224.100 Requirements for approval**

No accessory WECS permit shall be approved unless it complies with the following standards:

A. The WECS rotor shall clear the ground by at least fifteen (15) feet.

B. Safety Setbacks.

1. No accessory WECS shall be located where the center of the tower is within the distance indicated in the following table:

ABOVEGROUND ELECTRICAL TRANSMISSION LINE OF MORE THAN 12 kv*	PUBLIC ROAD, PUBLIC HIGHWAY OR RAILROAD**	PUBLIC ROAD OR PUBLIC HIGHWAY CLASSIFIED AS AN ARTERIAL OR GREATER WITH ADT OF 7,000 OR MORE***	LOT LINE ADJOINS A LOT ZONED W-E OR W-1	LOT LINE OF ANY LOT CONTAINING A "HABITABLE DWELLING"****	
1.25 × TOTAL WECS HEIGHT*****	1.25 × TOTAL WECS HEIGHT	1.5 × TOTAL WECS HEIGHT	1.1 × TOTAL WECS HEIGHT	3 × TOTAL WECS HEIGHT	1.25 × TOTAL WECS HEIGHT

NOTES:

\* Measured from the outer boundary of the public utility right-of-way or easement.

\*\* Measured from the outer boundary of the public road/highway right-of-way or railroad right-of-way.

\*\*\* "ADT" means average daily trips; based on traffic field measurements as determined by the director of the department of transportation (Information: in 1999, public roads or highways with ADT of 7,000 or more included I-10, Hwy 62, Hwy 111 & Indian Avenue).

\*\*\*\* For the purposes of this subsection, a "habitable dwelling" shall be a dwelling which contains a kitchen and which is deemed fit for human occupancy as determined by the director of the department of building and safety.

\*\*\*\*\* Measurement of the WECS and tower with the blade of a horizontal WECS at 12 o'clock position; measurement of a vertical axis WECS shall be the height of the tower.

### C. Wind Access Setbacks.

1. No accessory WECS shall be located where the center of the tower is within a distance of five rotor diameters from a lot line that is perpendicular to and downwind of, or within forty-five (45) degrees of perpendicular to and downwind of, the dominant wind direction.

2. Notwithstanding the provisions of subsection (C)(1) of this section, such setbacks from lot lines do not apply if the application is accompanied by a legally enforceable agreement for a period of twenty-five (25) years or the life of the permit, whichever is longer, that the adjacent landowner agrees to the elimination of the setback and will not develop his land in such a way as to decrease wind velocity or increase wind turbulence at the location of the proposed accessory WECS. In addition the provisions of subsection (C)(1) of this section, regarding setbacks from lot lines do not apply if the planning director determines that the characteristics of the downwind property, such as, but not necessarily limited to, topography or use of such property as a transportation corridor, eliminate the ability to develop the downwind property with WECS. Whenever a wind access setback reduction is proposed to the planning director based on the characteristics of the downwind property, the wind access setback reduction shall be included in all notices regarding the accessory WECS permit, and, if granted, the accessory WECS permit shall specifically state the required alternative wind access setback.

### D. Scenic Resource Protection.

1. No accessory WECS or WECS array shall be located easterly of Indian Avenue or northerly of Pierson Boulevard and its extension westerly of Highway 62.

2. No accessory WECS or WECS array shall be located southerly of Interstate 10 or southerly of Highway 111 in any area that meets both of the following requirements:

a. The area with Sections 8, 9, 15, 16, 17, 19, 20 and 21, Township 3 South, Range 3 East, San Bernardino Base and Meridian; and

b. The area is within the boundaries of the Santa Rosa and San Jacinto Mountains National Monument, as those boundaries existed on the effective date of the ordinance codified in this section.

### E. Access to the WECS shall be restricted by one or more of the following means:

1. Tower-climbing apparatus located no closer than twelve (12) feet from the ground;

2. A locking anticlimb device installed on the tower; or

3. Enclosure of the tower by a fence at least six feet high with locking portals.

F. Anchor points for guy wires shall be located within the lot lines and shall be enclosed by a fence at least six feet high. Guy wires shall not cross any above ground electric transmission or distribution line.

G. The WECS shall comply with Federal Aviation Administration (FAA) regulations regarding air traffic interference and with all other applicable federal and state laws.

H. The WECS shall be constructed to withstand the predicted seismically induced ground shaking.

I. All distribution lines and other interconnection facilities shall be constructed to the specifications of the utility. Interconnection shall conform to procedures and standards established by the Federal Energy Regulatory Commission, the California Independent System Operator and/or the California Public Utilities Commission, as applicable.

J. Electrical distribution lines shall be buried underground. Signs warning of high voltage electricity in English and Spanish shall be posted on nonmoving portions of the WECS or its tower at a height of three to five feet above the ground.

K. The WECS shall not be operated in a manner that causes communications interference. In the event that communications interference is caused by the WECS, the operator shall take the necessary steps to remedy the situation or shall terminate operation.

L. The WECS shall not create noise beyond the lot containing the WECS which exceeds sixty (60) db(A) as measured at a point ten (10) feet from the outer wall, or equivalent distance, to any habitable dwelling, hospital, school, library or nursing home.

M. The foundation, tower and compatibility of the tower with the rotor and rotor related equipment shall be certified in writing by a structural engineer registered in California, that they conform with good engineering practices and comply with the appropriate provisions of the Uniform Building Code that have been adopted by the county. The electrical system shall be certified in writing by an electrical engineer, registered in California, that it conforms to good engineering practices and complies with the appropriate provisions of the electrical code adopted by the county. The mechanical system shall be certified in writing by a mechanical engineer, registered in any state, that it conforms to good engineering practices and complies with appropriate provisions of the mechanical code adopted by the county. As an alternative to certification of the mechanical system as provided above, the applicant may present a statement from either a registered engineer or an independent testing laboratory recognized by the county that the system complies with standards developed by the American Wind Energy Association or other accepted standards organization.

N. Every unsafe accessory WECS and every accessory WECS which has been inoperable for six months is declared to be a public nuisance which shall be abated by repair, rehabilitation, demolition or removal in accordance with the procedure contained in Section 3 of county Ordinance No. 457. All notices required by Section 3 of county Ordinance No. 457 shall

also be given to the concerned utility.

O. The WECS shall comply with all applicable provisions of the National Electrical Code including, but not limited to, Article 250 (Grounding).

P. Except as provided in subsection D hereof, notwithstanding any other provisions of this section, an accessory WECS with a total height of eighty (80) feet or less may be permitted in any zone classification. (Ord. 348.4042 §§ 2--4, 2002; Ord. 348.3884 § 2, 1999; Ord. 348 § 18.42(d))

#### **17.224.110 Approval period**

The approval of an accessory WECS permit shall be valid for a period of two years from its effective date, within which time the construction authorized must be substantially begun or the WECS be in use; otherwise, the approval shall be void and of no further effect. (Ord. 348.3928 § 2 (part), 2000; Ord. 348 § 18.42(e))

#### **17.224.120 Revocation of permit**

An accessory WECS permit may be revoked pursuant to Chapter 17.220. (Ord. 348.3928 § 2 (part), 2000; Ord. 348 § 18.42(f))

#### **17.224.130 Modifications to approved commercial and accessory WECS permits**

A request for approval of a modification to an approved wind energy conversion system (WECS) permit, shall be made in accordance with the provisions of this section. A modification under this section means a request for a determination of substantial conformance or a revised permit as further defined herein.

A. Applications. Applications for substantial conformance or a revised permit shall be filed in writing with the planning director, shall be accompanied by the applicable fee set forth in county Ordinance No. 671, and shall include the following:

1. All information required under this title for the filing of a new WECS permit application, unless the planning director determines that the information is duplicative of information previously filed in connection with the approved WECS permit or the planning director otherwise waives the information requirement;

2. A statement explaining the proposed modification and the reason the modification has been requested;

3. A list of names and addresses of all owners of real property located within one half-mile of the exterior boundaries of the proposed project as shown on the last equalized assessment roll and any update issued by the county assessor;

4. A study comparing the cumulative effect of the approved WECS permit on surrounding properties and the cumulative effect of the proposed modification on those same properties. The study shall at a minimum discuss the following issues: height, rotor diameter, turbine noise, and total turbine number;

5. An efficiency study comparing the electrical output of the approved WECS permit and the proposed modification;

6. A removal/abandonment plan if the proposed modification calls for the removal of installed WECS;

7. Such additional information as shall be required by the planning director.

B. Substantial Conformance. "Substantial conformance" means a modification of an approved WECS permit which does not increase the density or intensity of the approved use, which does not increase the number of WECS, which does not result in more environmental impacts than the approved use and which does not have a greater cumulative effect on surrounding property than the approved use. The following shall constitute substantial conformance:

1. The replacement of WECS installed or authorized pursuant to an approved WECS permit when:

a. The replacement WECS meet the noise standards set forth in Resolution No. 93-378,

b. The total number of replacement WECS will be at least twenty-five (25) percent less than the number originally permitted,

c. The replacement WECS will be no greater than two hundred (200) feet high measured at the highest point in the arc of the blades, and

d. WECS installed or authorized within one thousand two hundred (1,200) feet of a residence will be removed, or, in the alternative, such residences are within areas designated "desert" or "mountainous" on the Western Coachella Valley Plan and the planning director determines that the owners of such residences have waived the one thousand two hundred (1,200) foot requirement in writing;

2. The replacement or alteration of all or part of the major component systems of WECS installed or authorized pursuant to an approved WECS permit when:

a. The modified WECS meet the noise standards set forth in Resolution No. 93-378,

b. Rotor diameter of the modified WECS will not be increased by more than fifty (50) percent of its prior size,

c. The replacement WECS will be no greater than two hundred (200) feet high measured at the highest point in the arc of the blades, and

d. WECS installed or authorized within one thousand two hundred (1,200) feet of a residence will be removed, or, in the alternative, such residences are within areas designated "desert" or "mountainous" on the Western Coachella Valley Plan and the

planning director determines that the owners of such residences have waived the one thousand two hundred (1,200) foot requirement in writing. Substantial conformance may also include, but is not limited to, the following:

- i. Other replacement or alteration proposals which fall within the definition of substantial conformance set forth above,
- ii. Modifications necessary to comply with final conditions of approval or
- iii. Modifications to lighting, parking, fencing or landscaping requirements

C. Revised Permits. "Revised permit" means a modification of an approved WECS permit which does not change the basic concept or use allowed by the original approval. A revised permit may include, but is not limited to, on-site reorientation of structures, replacements of WECS, that do not constitute substantial conformance, movement of or alterations to signs, changes to the original conditions of approval that do not constitute to substantial conformance, including extensions to the overall life of the permitted use, increases in the density or intensity of the permitted use or increases in the number of WECS. Applications for extensions of time shall be subject to any restrictions set forth in this title as to the maximum overall life of the original permit.

#### D. Procedure.

##### 1. Substantial Conformance.

a. The planning director shall approve, conditionally approve or disapprove an application for substantial conformance within thirty (30) days after accepting a completed application. The planning director's determination shall be based upon the standards of this section and those standards set forth in the ordinance governing approval of the original application and the conditions of approval applicable to the approved WECS permit. An application for substantial conformance shall not require a public hearing. Notice of the decision shall be filed by the planning director with the clerk of the board of supervisors not more than fifteen (15) days after the decision. A copy of the notice of decision, including the original conditions of approval which remain in effect unless expressly modified and any additional conditions of approval, shall be mailed to the applicant, and to any person who has made written request for a copy of the decision, and to all owners of real property which is located within one-half mile of the exterior boundaries of the project, as such owners are shown on the last equalized tax roll and any update. The clerk of the board shall place the notice of decision on the next agenda of the board of supervisors held five or more days after the clerk receives the notice from the planning director.

b. The decision of the planning director is considered final and no action by the board of supervisors is required unless, within ten (10) days after the notice of decision appears on the board of supervisors' agenda, the applicant or an interested person files an appeal, accompanied by the fee set forth in county Ordinance No. 671, with the clerk of the board or unless the board of supervisors assumes jurisdiction by ordering the matter set for public hearing. If a timely appeal is filed or the board of supervisors assumes jurisdiction, the clerk of the board shall set the matter for public hearing before the board of supervisors not less than thirteen (13) nor more than sixty (60) days thereafter and shall give notice of the time and

place of the hearing in the same manner as the notice was given by the planning director of the notice of decision.

c. The board of supervisors shall hear the matter de novo; however, the documents and other evidence presented to the planning director shall be a part of the board of supervisors record at its hearing on the matter. The board of supervisors shall hear relevant testimony from interested persons and within a reasonable time after the close of the hearing, make its decision sustaining, reversing or modifying the decision of the planning director.

2. Revised Permit. An application for revised permit shall be approved, conditionally approved or disapproved in accordance with the procedures for processing an original permit, including any requirements for public hearing, notice of hearing, and all rights of appeal. A revised permit shall meet the development standards applicable to a new WECS permit; provided, however, that a revised permit may be approved subject to lower development standards where the applicant demonstrates that such approval will reduce adverse impacts on residential properties.

E. Approval Period. The approval of an application for substantial conformance or revised permit shall be valid until the expiration of the original permit, unless an extension of time has been granted by an approved revised permit.

F. Notwithstanding any provision herein to the contrary, an application for substantial conformance may be approved only if the proposed modification is exempt from the provisions of the California Environmental Quality Act. (Ord. 348.3928 § 2 (part), 2000: Ord. 348 § 18.42a)

## STATE OF MASSACHUSETTS – TOWN OF BREWSTER

*Draft Rules & Regulations for Wind Energy Turbines (October 2007)* - available online at <http://www.town.brewster.ma.us/content/view/410/1/>

### **1.0 Rules and regulations.**

After public notice and public hearing, the SPGA shall promulgate rules and regulations to effectuate the purpose of this section, including but not limited to performance standard regulations relative to design, environmental, safety, access and utility standards, reconstruction or replacement of existing towers, and modifications to existing WETs, and regulations governing monitoring and maintenance, abandonment and discontinuance of use, and indemnification, insurance and fee requirements. Public notice shall include publication of all proposed regulations in a newspaper of general circulation in the Town not less than 21 days prior to public hearing. Failure by the SPGA to promulgate such rules and regulations or a legal declaration of their invalidity by a court of law shall not act to suspend or invalidate the effect of this section.

### **1.2 Use, siting and dimensional regulations.**

(1) Use regulations. All WETs shall require a building permit and in all cases may be permitted only as follows:

(a) All WETs under **75 feet** in height shall be allowed as a matter of right in all districts provided they meet the dimensional requirements for lot size and set back.

(b) Municipal WETs are exempt from this section.

(c) Any proposed WET towers and ground-mounted WETs in excess of **130 feet** in total height shall only be allowed in the Large-Scale Wind Energy Turbine Overlay District, as identified in § 03.3 and only upon:

[1] Referral to the Cape Cod Commission for discretionary review;

[2] Pre-filing review by the Development Plan Review Committee in accordance with § 179-40.1F(2) hereunder;

[3] Application and issuance of a special permit by the Special Permit Granting Authority in accordance with Subsections G and H, and in accordance with Subsection L, Rules and regulations, hereunder; [Amended 5-3-2004 ATM, Art. 25]

[4] Application and issuance of a building permit from the Building Commissioner;

[5] Proof of ownership of or control over the WEF site via an existing, lawful easement, lease, license or land use agreement; and

[6] Any other required local, state and federal approvals.

(d) Siting regulations. The Planning Board shall adopt siting and special permit application regulations and requirements after a duly advertised public hearing in accordance with MGL Chapter 40A Section 9



(e) Dimensional requirements. Except as otherwise provided herein or in any subsequent regulations passed by the Planning Board, the height of LWETs shall be as follows:

[1] Height: New WET towers.

(a) WET Towers over 75 feet in total height may be allowed by special permit from the SPGA in the Wind Energy Turbine Overlay District, as identified in section 03.3 of the WET Bylaw, and may be constructed to a total height of up to **300 feet** AGL. Monopoles are the preferred type of mount for such structures. Such structures shall comply with all applicable siting and dimensional requirements set forth in § 3.2 and all applicable performance standards set forth in any regulations promulgated by the Planning Board.

(b) Height: ground-mounted facilities. Proposed ground-mounted WETs may be allowed by special permit from the SPGA in the Large-Scale Wind Energy Conversion Turbine Overlay District, as identified in section 03.3 of this bylaw, provided all ground-mounted WETs shall be surrounded by dense tree growth to screen views of the facility in all directions. These trees may be existing on the subject property or planted on site.

[2] Setbacks. All WETs and their equipment shelters shall comply with the building setback provisions of the underlying zoning district in which the facility is located. In addition, the following setbacks shall be observed:

(a) The layout of any tower site shall be such that, in the event the tower shall fall, it shall fall completely within the confines of the tower site.

(b) To ensure public safety, the minimum distance from the perimeter of the MWET, including any guy wire, anchor or brace to any property line, road or structure, business or institutional use, or public recreational area shall be the height of the MWET, including any rotating blades or appurtenances. The minimum distance from the perimeter of the LWET, including any guy wire, anchor or brace to any property line, road or structure, business or institutional use, or public recreational area shall be the height of the LWET, including any rotating blades or appurtenances, **plus** an additional setback equal to one half (1/2) the total height. (Total LWET setback = 1.5 x Total Height).

(c) Towers and monopoles shall provide a minimum setback equal to the total height of the structure, plus 50 feet

(d) In the event that an existing structure is proposed as a mount for a WECT, a fall zone shall not be required, but the setback provisions of the underlying zoning district shall apply.

## **2.0: Special Permit Regulations**

All Wind Energy Conversion Turbines in excess of 75 feet in total height (MWETs & LWETs) shall comply with the Performance Standards set forth in this section, unless waived by the SPGA as part of the Special Permit review process.

### **2.1: General**

Proposed wind energy conversion facilities shall be consistent with all applicable local, state and federal requirements, including but not limited to all applicable electrical, construction, noise, safety and communications requirements.

## **2.2: Design Standards**

The Planning Board may adopt specific design standards or restrictions which will prohibit or regulate the degree to which WETs may impact views, view-sheds, scenic or historic landscapes which have been identified by the Town as important and having unique character or value.

## **2.3: Visibility**

Wind energy conversion facilities shall be designed and sited consistent with the following:

### **2.3.1 Screening and buffering**

Wherever possible, WETs shall be located to make maximum use of existing vegetation and structures for the purposes of screening the turbines from off-site views. To the greatest extent possible, WETs shall be sited such that mature vegetation and/or existing structures are located between the facility and public and private viewpoints.

A year-round vegetated buffer of sufficient height and depth to screen the facility shall be provided. Height and depth of the required buffer may vary in accordance with the specific project and site conditions. Trees and vegetation may be existing on the subject property or installed as part of the proposed facility or a combination of both. Where vegetation shall be installed, the project proponent shall be required to provide a surety bond sufficient to ensure that if supplemental vegetation is required to replace failed vegetation or to increase visual buffering, funding shall be available. Consideration should be given to providing vegetated buffers nearer to the viewer to get maximum benefit from the screening, while limiting any turbulence in the wind that could effect the efficiency of the wind turbine. The SPGA shall determine the types of trees and plant materials and depth of the needed buffer based on site conditions.

### **2.3.2 Scenic Landscapes and Vistas**

- a. WETs shall be located toward the edge of any defined scenic and open view-sheds.
- b. Any WET that is located within 300 feet of a scenic vista, scenic landscape or scenic road as designated by the town shall not exceed the height of vegetation at the proposed location. If the facility is located farther than 300 feet from the scenic vista, scenic landscape or scenic road, the height regulations described elsewhere in this bylaw will apply.

### **2.3.3 Siting**

WETs shall be located as far away as possible from important views in order to diminish the visual impact of the structure

## **2.4: Color**

WETs shall be painted in a non-reflective, light gray or light blue hue, which blends with sky and clouds.

## **2.5: Equipment Shelters**

All equipment necessary for monitoring and operation of the WET shall be contained within the tower. If this is infeasible, ancillary equipment may be located outside the tower, provided it is contained within an underground vault or behind a year-round landscape or vegetated buffer. The SPGA shall determine the appropriate width and materials for this buffer.

## **2.6: Lighting and Signage**

a) Wind turbines shall be lighted only if required by the Federal Aviation Administration (FAA). The proponent shall provide a copy of the FAA's determination to establish the required markings and/or lights for the structure.

b) Lighting of equipment structures and any other facilities on site shall be shielded from abutting properties. There shall be total cutoff of all light at the property lines of the parcel to be developed, and footcandle measurements at the property line shall be 0.0 initial footcandles when measured at grade.

c) Signs shall be limited to those needed to identify the property and the owner and warn of any danger. All signs shall comply with the requirements of the Town's sign regulations.

## **2.7: Historic Districts**

WETS proposed for locations within the Old King's Highway Regional Historic District (OKHHD) or for locations which will be visible from multiple points within the OKHHDC shall apply to the Old King's Highway Historic District Commission for a certificate of appropriateness.

Proof that a Project Notification Form has been submitted to Massachusetts Historical Commission and the Massachusetts Natural Heritage & Endangered Species Program shall be included with the Special Permit application.

## **3.0: Environmental Standards**

### **05.3.1 Wetlands**

WETs shall not be located in wetlands or wetland buffer areas. Locating wind energy conversion facilities near wetland resources shall be avoided whenever possible in order to minimize any potential impact on bird, bat or rare species. Wetland buffer areas may be used for the purposes of providing a clear area.

### **3.1 Open Space**

WETs shall be designed to minimize fragmentation of open space areas and shall avoid permanently protected open space. Preferred sites are those that have existing roadways and/or transmission facilities in close proximity to avoid clearing of vegetation for these purposes. Land clearing for the purposes of reducing wind turbulence in the vicinity of the turbine is prohibited, unless the proponent can adequately demonstrate it is essential to operational requirements, does not adversely affect the natural resources in the area and if adequate erosion controls are proposed.

### **3.2 Storm-water**

Storm-water run-off shall be contained on-site.

### **3.3 Noise**

The WET and associated equipment shall not generate noise in excess of 10 db above pre-construction ambient sound levels at ground level at the property line, or at the nearest residence. The project shall also meet all applicable state noise regulations. An analysis, prepared by a qualified engineer, shall be presented that demonstrates compliance with these noise standards.

### **3.4 Shadowing/Flicker**

Wind energy conversion facilities shall be sited in a manner to produce minimal shadowing or flicker impacts on adjacent habitable buildings. The proponent has the burden of proving that this effect does not negatively impact neighboring uses, and suggesting mitigation that would address the issue.

### **3.5 Rare and Protected Species**

Wind energy conversion facilities shall be located in a manner that does not have negative impacts on rare species in the vicinity (particularly avian species, bats, etc.). All Special Permit applications shall provide proof to the SPGA that the Massachusetts Natural Heritage and Endangered Species Program (NHESP) have been notified of the proposal. The proponent shall have the burden of proving that the project will have no adverse impact on the species in question or its habitat.

## **4.0: Safety Standards**

No hazardous waste shall be discharged on the site of any wind energy conversion facility. If any hazardous materials are to be used on site, there shall be provisions for full containment of such materials. An enclosed containment area shall be provided with a sealed floor, designed to contain at least 110% of the volume of the hazardous materials stored or used on the site.

The wind energy conversion towers shall be designed to prevent unauthorized climbing such as through construction of a fenced enclosure or locked access.

## **5.0: Application Procedures**

### **5.1 Special Permit Granting Authority (SPGA)**

The Special Permit Granting Authority (SPGA) for wind energy conversion facilities shall be the Planning Board.

### **5.2 Pre-Application Conference**

Prior to the submission of an application for a Special Permit under this regulation, the applicant is strongly encouraged to meet with the SPGA at a public meeting to discuss the proposed wind energy conversion facility in general terms and to clarify the filing requirements. The SPGA shall meet with an applicant under this regulation within twenty-one (21) days following a written request submitted to the SPGA and the Town Clerk. If the SPGA fails to meet with an applicant who has requested such a meeting within twenty-one (21) days of said request and said meeting has not been postponed due to mutual agreement, the applicant may proceed with a Special Permit application under this regulation without need for a pre-application conference.

### **5.3 Pre-Application Filing Requirements**

The purpose of the conference is to inform the SPGA as to the preliminary nature of the proposed wind energy conversion facility. As such, no formal filings are required for the pre-application conference. However, the applicant is encouraged to prepare sufficient preliminary architectural and/or engineering drawings to inform the SPGA of the location of the proposed facility, as well as its scale and overall design.

### **5.4 Professional Fees**

The Town may retain a technical expert/consultant to verify information presented by the applicant. The cost for such a technical expert/consultant will be at the expense of the applicant in accordance with MGL Chapter 44 Section G.

### **5.5 Application Filing Requirements**

The following shall be included with an application for a Special Permit for each wind energy conversion facility:

#### **5.5.1 General Filing Requirements**

a) Name, address and telephone number of applicant and any co-applicants as well as any agents for the applicant or co-applicants.

b) Co-applicants may include the landowner of the subject property or the operator of the wind energy conversion facility.

c) Original signatures for the applicant and all co-applicants applying for the Special Permit. If the applicant or co-applicant will be represented by an agent, original signature authorizing the agent to represent the applicant and/or co-applicant is required. Photo-reproductions of signatures will not be accepted.

d) Documentation of the legal right to install and use the proposed facility and proof of control over the clear area, per Section 03.2 of these regulations.

### **5.5.2 Location Filing Requirements**

a) Identify the subject property by including the Town as well as the name of the locality, name of the nearest road or roads, and street address, if any.

b) Tax map and parcel number of subject property.

c) Zoning district designation for the subject parcel (Submit copy of Town zoning map with parcel identified)

d) A line map to scale showing the lot lines of the subject property and all properties within 300 feet of the property lines, as well as the location of all buildings, including accessory structures, on all properties shown.

### **5.5.3 Siting Filing Requirements**

#### **06.5.3.1 Vicinity/Site Map**

A one-inch-equals-40 feet vicinity plan showing the following:

1) Property lines for the subject property.

2) Property lines of all properties adjacent to the subject property within 300 feet.

3) Tree cover on the subject property and adjacent properties within 300 feet, by dominant species and average height, as measured by or available from a verifiable source.

4) Outline of all existing buildings, including purpose (e.g. residential buildings, garages, accessory structures, etc.) on subject property and all adjacent properties within 300 feet.

5) Proposed location of wind energy conversion facility, fencing and all associated ground equipment.

6) Proposed security barrier (if applicable), indicating type, materials and extent, as well as point of controlled entry.

7) Location of all roads, public and private, on the subject property and on all adjacent properties within 300 feet including driveways proposed to serve the wind energy conversion facility.

8) Distances, at grade, from the proposed wind energy conversion facility to each building on the vicinity plan.

9) Contours at each two feet AMSL for the subject property and adjacent properties within 300 feet.

10) All proposed changes to the existing property, including grading, vegetation removal and temporary or permanent roads and driveways.

11) Representations, dimensioned and to scale, of the proposed facility, including cable locations, parking areas and any other construction or development attendant to the wind energy conversion facility.

12) Diagram representing the sight lines referenced below showing viewpoint (point from which view is taken) and visible point (point being viewed)

#### **5.5.3.1 Sight lines and photographs**

Sight lines and photographs as described below:

1) Sight line representation. A sight line representation shall be drawn from representative locations that show the lowest point of the tower visible from each location. These locations shall include a sight line representation from the closest residence and/or occupied building to the facility and any public road or public area within 300 feet. Each sight line shall be depicted in profile, drawn at one inch equals 40 feet. The profiles shall show all intervening trees and buildings. There shall be at least two sight lines from the closest habitable structures or public roads or areas included in the application.

2) Existing (before condition) photographs. Each sight line shall be illustrated by one four-inch by six-inch color photograph of the current view.

3) Proposed (after condition). Each of the existing condition photographs shall have the proposed wind energy conversion facility superimposed on it to accurately simulate the proposed wind energy conversion facility when built.

### **5.5.3.2 Elevations**

Siting elevations, or views at-grade from the north, south, east and west for a 50-foot radius around the proposed wind energy conversion facility plus from all existing public and private roads that serve the subject property

Elevations shall be at either one-quarter inch equals one foot or one-eighth inch equals one foot scale and show the following:

- 1) Wind energy conversion facility and if applicable the security barrier and associated equipment, with total elevation dimensions of all parts of the facility.
- 2) Security barrier. If the security barrier will block views of the wind energy conversion facility, the barrier drawing shall be cut away to show the view behind the barrier.
- 3) Any and all structures on the subject property.
- 4) Existing trees and shrubs at current height and proposed trees and shrubs at proposed height at time of installation, with approximate elevations dimensioned.
- 5) Grade changes, or cuts and fills, to be shown as original grade and new grade line, with two-foot contours above mean sea level.

### **5.6 Design Filing Requirements**

- a) Specifications for the proposed wind energy conversion facility shall be provided for all equipment and attendant facilities
- b) Materials of the proposed wind energy conversion facility specified by type and specific treatment (e.g., anodized aluminum, stained wood, painted fiberglass, etc.). These shall be provided for the tower and all other proposed equipment/facilities.
- c) Colors of the proposed wind energy conversion facility represented by a color board showing actual colors proposed.
- d) Dimensions of the wind energy conversion facility shall be shown on all drawings, specified for all three directions: height, width and breadth. These shall be provided for the antennas, mounts, equipment shelters and security barrier, if any.
- e) Appearance shown by at least two photographic simulations of the wind energy conversion facility within the subject property. The photographic simulations shall be provided for the facility that illustrates the total height, width and breadth of the structures.



f) Landscape plan including existing trees and shrubs and those proposed to be added, identified by size of specimen at installation and species.

g) Within 30 days of the pre-application conference, or within 21 days of filing an application for a Special Permit, the applicant shall arrange for a balloon or crane test at the proposed site to illustrate the height of the proposed facility. The date, time and location of such test shall be advertised in a newspaper of general circulation in the Town at least 14 days, but not more than 21 days prior to the test. In addition, an identical courtesy notice shall be sent to the Town Clerk of all adjacent Towns.

h) If lighting of the site or turbine is proposed, the applicant shall submit a manufacturer's computer-generated point-to-point printout, indicating the horizontal footcandle levels at grade, within the property to be developed and twenty-five (25) feet beyond the property lines. The printout shall indicate the locations and types of luminaires proposed.

### **5.7 Noise Filing Requirements**

The applicant shall provide a statement listing the existing and maximum future projected measurement of noise from the proposed wind energy conversion facility, measured in decibels Ldn (logarithmic scale, accounting for greater sensitivity at night), for the following:

- 1) Existing, or ambient: the measurements of existing noise.
- 2) Existing plus the proposed wind energy conversion facility: maximum estimate of noise from the proposed facility plus the existing noise environment.

Such statement shall be certified and signed by a qualified engineer, stating that noise measurements are accurate and meet the Noise Standards of this Bylaw and applicable state requirements.

### **5.8 Use by Telecommunications Carriers**

Wind energy conversion facilities may be used to locate telecommunications antennas, subject to applicable regulations governing such uses, and subject to the following requirements:

1) All ground-mounted telecommunications equipment shall be located in either a shelter, within the wind turbine tower or otherwise screened from view year-round (either through effective landscaping or existing natural vegetated buffers);

2) Antennas shall be flush-mounted to be in keeping with the design of the tower;  
and

3) All cabling associated with the personal wireless facility shall be contained within the tower structure or enclosed within a conduit painted to match the turbine mount.

## **6.0: Modifications**

A modification to a wind energy conversion facility will require a Special Permit when the following events apply:

- a) The applicant requests the terms of the Special Permit be altered, or,
- b) The applicant requests adding equipment or alter the height, location or exterior appearance of the original design.

## **7.0: Monitoring and Maintenance**

**7.1** After the wind energy conversion facility is operational, the applicant shall submit, within 90 days of the issuance of the Special Permit, and at annual intervals from the date of issuance of the Special Permit, measurements of noise from the facility. Such measurements shall be signed by a qualified engineer, stating that noise measurements are accurate and meet the Noise Standards sub-section of this Bylaw.

**7.2** The applicant shall maintain the wind energy conversion facility in good condition. Such maintenance shall include, but shall not be limited to, painting, structural integrity of the foundation and support structure and security barrier (if applicable), and maintenance of the buffer areas and landscaping if present.

## **8.0: Abandonment or Discontinuation of Use**

**8.1** At such time that a wind energy conversion facility is scheduled to be abandoned or discontinued, the applicant will notify the Town by certified U.S. mail of the proposed date of abandonment or discontinuation of operations. Such notice shall be given no less than 30 days prior to abandonment or discontinuation of operations. In the event that an applicant fails to give such notice, the facility shall be considered abandoned upon such discontinuation of operations.

**8.2** Upon abandonment or discontinuation of use, the carrier shall physically remove the wind energy conversion facility within 90 days from the date of abandonment or discontinuation of use. "Physically remove" shall include, but not be limited to:

- a) Removal of all machinery, equipment, equipment shelters and security barriers from the subject property.
- b) Proper disposal of the waste materials from the site in accordance with local and state solid waste disposal regulations.
- c) Restoring the location of the wind energy conversion facility to its natural condition, except that any landscaping, grading or below grade foundation shall remain in the after-condition.

**8.3** If an applicant fails to remove a wind energy conversion facility in accordance with this section of this Bylaw, the town shall have the authority to enter the subject property and physically remove the facility. The Planning Board may require the applicant to post a bond at the time of construction to cover costs of the removal in the event the Town must remove the facility. The amount of such bond shall be equal to 150% of the cost of compliance with this section. The applicant shall submit a fully-inclusive estimate of the costs associated with removal, prepared by a qualified engineer.

**9.0: Term of Special Permit**

A Special Permit issued for any wind energy conversion facility shall be valid for twenty (20) years. At the end of that time period, the wind energy conversion facility shall be removed by the applicant or a new Special Permit shall be required.

## **STATE OF NEW YORK – MODEL REGULATIONS**

### **MODEL WIND LAW**

(Prepared by the law firm of Whiteman Osterman & Hanna, LLP and distributed for public use during the Community Wind Energy 2008 conference held in Albany, New York on April 14-16, 2008.)

Be it hereby enacted by the Town Board of the Town of XXX, YYY County, New York, as follows:

#### **§ I. Title**

This local law may be cited as the "Town of XXX Wind Energy Facility Law."

#### **§ 2. Purpose**

The purpose of the law is to provide for the construction and operation of Wind Energy Facilities, Small Wind Energy Facilities and Wind Measurement Towers in Town of XXX, subject to reasonable conditions that will protect the public health, safety and welfare.

#### **§ 3. Authority**

The Town Board of the Town of XXX enacts this local law under the authority granted by section 10 of the Municipal Home Rule Law and Article 16 of the Town Law. § 4. Applicability  
The requirements of this law shall apply to all Wind Energy Facilities, Small Wind Energy Facilities and Wind Measurement Towers proposed, operated, modified, or constructed within the municipal boundaries of the Town. Wind Energy Facilities, Small Wind Energy Facilities and Wind Measurement Towers shall be allowed in any Zoning District of the Town, subject to the requirements of this law.

#### **§ 4. Applicability**

The requirements of this law shall apply to all Wind Energy Facilities, Small Wind Energy Facilities and Wind Measurement Towers proposed, operated, modified, or constructed within the municipal boundaries of the Town. Wind Energy Facilities, Small Wind Energy Facilities and Wind Measurement Towers shall be allowed in any Zoning District of the Town, subject to the requirements of this law.

#### **§ 5. Permits**

- A. Permit Requirement. No Wind Facility, Small Wind Energy Facility or Wind Measurement Tower shall be constructed, reconstructed, modified or operated in the Town of XXX except by first obtaining a Wind Energy Facility, Small Wind Energy Facility or Wind Measurement Tower Permit as provided under this law.

- B. Permitting Authority. The Town of XXX Planning Board shall have sole discretion to review, consider and issue Wind Energy Facility, Small Wind Energy Facility and Wind Measurement Tower Permits in accordance with this law.
- C. Exemptions. No permit or other approval shall be required under this law for replacement in-kind of a Wind Energy Facility, Small Wind Energy Facility of Wind Measurement Tower.

## **§ 6. Definitions**

As used in this law, the following terms shall have the meanings indicated:

**ACCESSORY FACILITIES OR EQUIPMENT:** Any structure other than a Wind Turbine, related to the use and purpose of deriving energy from such Wind Turbines, located on the Wind Energy Facility or Small Wind Energy Facility Site.

**PERMIT-A** permit issued pursuant to this law granting the holder the right to construct, maintain and operate a Wind Energy Facility, Small Wind Energy Facility or Wind Measurement Tower.

**RESIDENCE** -Any dwelling suitable for habitation existing on the date a Wind Energy Facility, Small Wind Energy Facility or Wind Measurement Tower application is received, and for which a valid certificate of occupancy has been issued or should have been issued. A residence may be part of a multi-family dwelling or multipurpose building, and shall include buildings such as hotels or motels, hospitals, day care centers, dormitories, sanitariums and nursing homes.

**SITE** -The parcel(s) of land where a Wind Energy Facility, Small Wind Energy Facility or Wind Measurement Tower is to be placed. The Site can be publicly or privately owned by an individual or a group of individuals controlling single or adjacent properties. Where multiple lots are in joint ownership, the combined lots shall be considered as one for purposes of applying setback requirements. Any property which has a Wind Energy Facility, Small Wind Energy Facility or Wind Measurement Tower or has entered an agreement for said facility or a setback agreement shall not be considered off-site.

**SMALL WIND ENERGY FACILITY** -A wind energy conversion system consisting of a Wind Turbine, a tower, and associated control or conversion electronics, which has a rated capacity of not more than 100 kW and which is intended primarily to reduce consumption of utility power at that location.

**TOTAL HEIGHT** -The maximum height of a Wind Energy Facility or Small Wind Energy Facility Wind Turbine tower and blade at the apex of the blade above the nacelle of the tower.

**WIND ENERGY FACILITY** -Any Wind Turbine or array of Wind Turbines designed to deliver electricity to the power grid for sale with a combined production capacity of more than 100kw of energy, including all related infrastructure, electrical collection and distribution lines and substations, access roads and accessory structures.

WIND MEASUREMENT TOWER -A tower used for the measurement of meteorological data such as temperature, wind speed and wind direction.

WIND TURBINE – A wind energy conversion system consisting of a Wind Turbine, a tower, and associated control or conversion electronics.

## **§ 7. Application Requirements**

A complete application for a Wind Energy Facility Permit, Small Wind Energy Facility Permit or Wind Measurement Tower Permit shall include:

- A. A completed application for a Wind Energy Facility Permit on a form provided by the Town Code Enforcement Officer or other designee.
- B. A site plan prepared by a licensed professional engineer, including:
  - 1. Property lines and physical dimensions of the Site;
  - 2. Location, approximate dimensions and types of major existing structures and uses on the Site, public roads, and adjoining properties within 500 feet of the boundaries of any proposed Wind Turbines, or 1 y, times the total height of such Wind Turbines, whichever shall be greater;
  - 3. Location of each proposed Wind Turbine and Wind Measurement Tower;
  - 4. Location of all above and below ground utility lines on the Site as well as transformers, the interconnection point with transmission lines, and other ancillary facilities or structures;
  - 5. Locations of setback distances as required by this law;
  - 6. All proposed facilities, including access roads, electrical substations, storage or maintenance units, and fencing.
- C. The make, model, picture and manufacturer's specifications of the proposed Wind Turbine and tower model(s), including noise decibel data, and material safety data sheet documentation for all materials used in the operation of the equipment shall be provided for each proposed Wind Turbine,
- D. A proposed lighting plan to be submitted to and reviewed by the Federal Aviation Administration for any structure equal to or more than 200 feet above ground.
- E. A construction schedule describing anticipated commencement and completion dates, including a traffic analysis with a description of the routes to be used by construction and delivery vehicles.
- F. An operations and maintenance plan providing for regular periodic maintenance schedules, any special maintenance requirements and procedures and notification requirements for restarts during icing events.
- G. List of property owners, with their mailing address, within 500 feet of the outer boundaries of the proposed Site.
- H. For Wind Energy Facilities only:

1. A decommissioning plan that provides for an estimation of decommissioning costs, the method of ensuring that funds shall be available for decommissioning and restoration, the method by which the decommissioning cost estimate shall be kept current, and the manner in which the Wind Energy Facility shall be decommissioned.
2. A complaint resolution process to address complaints from nearby residents.
3. A transportation plan (see § 15) describing routes to be used in delivery of project components, equipment and building materials and those to be used to provide access to the Site during and after construction. Such plan shall also describe any anticipated improvements to existing roads, bridges or other infrastructure, as well as measures which will be taken to restore damaged/disturbed access routes following construction.
4. A fire protection and emergency response plan.
5. Predicted Wind Turbine Only Noise Analysis:
  - (i) A noise level analysis shall be prepared to determine predicted Wind Turbine-only noise and pure tone components at property lines of the wind development project which abut non-project parcels and existing residences.
  - (ii) Wind Turbine only noise shall be predicted based upon appropriate reference noise levels obtained from field measurements of the Wind Turbine proposed to be installed.
  - (iii) Except as otherwise provided herein, Wind Turbines shall be located so that predicted Wind Turbine only noise at non-project property lines shall not exceed 50 dB(A), and Wind Turbine only noise at existing residences located on non-project parcels shall not exceed 45 dB(A).
  - (iv) In the event that the noise generated by any Wind Turbine contains a pure tone component, as set forth herein, Wind Turbines shall be located so that predicted Wind Turbine only noise at non-project property lines shall not exceed 45dB(A), and Wind Turbine only noise at existing residences located on non-project parcels shall not exceed 40 dB(A).
  - (v) A pure tone is defined to exist when a one-third (1/3) octave band noise level exceeds the arithmetic average of

the two adjacent one-third (1/3) octave band levels by the following:

<u>Band Range</u>	<u>Exceedence</u>
31.5 -125 Hz	15 dB(A)
160-400 Hz	8 dB(A)
500 -8,000 Hz	5 dB(A)

6. A post construction noise monitoring plan.

## **§ 7. Environmental Review**

- A. Compliance with the State Environmental Quality Review Act shall be required.
- B. Applicants shall submit the following materials to the Town of XXX Planning Board:
  1. Small Wind Energy Facilities and Wind Measurement Towers: Applicants shall be required to prepare and submit Part I of a full Environmental Assessment Form.
  2. Wind Energy Facilities: Applicants shall be required to prepare and submit a Draft and Final Environmental Impact Statement. Such Draft Environmental Impact Statement shall contain, but not be limited to:
    - (i) Visual Impact Analysis, including:
      - a. Mapping of scenic resources of statewide significance, as defined by the NYS Department of Environmental Conservation (DEC) Visual Policy (Policy DEP-00-2.), and of local significance, as officially listed by the relevant municipality within the study area.
      - b. Viewshed mapping and/or cross section analysis to identify areas (including the significant resources identified above) with potential views of the project.
      - c. Description of the character and quality of the affected landscape.
      - d. Photographic simulations of what the proposed project will look like from a reasonable number of representative viewpoints within the 5 -mile radius study area to be selected in consultation with the Planning Board.



- e. Evaluation of the project's visual impact based on the viewshed mapping and photographic simulations described above.
  - f. Recommended visual mitigation measures (in accordance with DEC Policy DEP -00-2), if warranted, based on the results of the impact evaluation described above.
- (ii) Bird Migration Study: Appropriate bird migration studies shall be submitted. The Applicant shall solicit input from the New York State Department of Environmental Conservation on such studies.
  - (iii) Archaeological and Architectural Impact Analysis: The Applicant shall solicit input from the New York State Historic Preservation Office.
  - (iv) Fiscal and Economic Impact Analysis.
  - (v) An assessment of potential electromagnetic interference with microwave, radio, television, personal communication systems, 911 and other wireless communication.

**§ 9. Application Review Process**

- A. Applicants must arrange a pre-application meeting with the Planning Board and consultants retained by the Town for application review.
- B. Following the pre-application meeting, ten copies of the complete application shall be submitted to the Town Clerk. Payment of all application fees shall be made at the time of submission.
- C. The Planning Board shall, within 180 days of receipt of a complete application, or such longer time as may be accepted by the applicant, determine if all information required hereunder is included in the application. If the application is deemed incomplete, the applicant shall be provided with a written statement listing missing data. If the applicant fails to provide data within 180 days after receipt of such notice, the application shall expire. Upon submission of a complete application, the Planning Board shall proceed with its review.
- D. The Planning Board shall hold at least one public hearing on the application. Notice shall be published in the Town's official newspaper, no less than 10 days before any hearing, but, where any hearing is adjourned by the Planning Board to hear additional comments, no further publication shall be required. The public hearing may be combined with public hearings on any Environmental Impact Statement or requested waivers. All adjoining property owners within 500 feet of the outer boundary of a proposed Wind Energy Facility shall be given written notice of a public hearing via certified mail at the expense of the applicant.

- E. Notice of the project shall also be given, if applicable, to the YYY County Planning Commission, as required by General Municipal Law § 239-m, and to all neighboring municipalities.
- F. Following the holding of the public hearing and completion of the SEQRA process, the Planning Board may approve, approve with conditions, or deny the Wind Energy Facility Permit application, in accordance with the standards in this law. All approvals and denials shall be in writing setting forth competent reasons for such approval or denial.

**§ 10. Wind Energy Facility Development Standards**

The following standards shall apply to Wind Energy Facilities in the Town of XXX.

- A. All power transmission lines from the tower to any building, substation, or other structure shall be located underground in accordance with National Electrical Code Standards, unless an environmental constraint requires such transmission lines to be located above ground.
- B. Wind Turbines and towers must be white in color.
- C. No advertising signs are allowed on any part of the Wind Energy Facility, including fencing and support structures.
- D. No tower shall be lit except to comply with Federal Aviation Administration (FAA) requirements. Minimum security lighting for ground level facilities shall be allowed as approved on the Wind Energy Facility development plan.
- E. Guy wires shall not be permitted except to address unique safety issues and then only with specific permission by the Planning Board in the form of a waiver.
- F. The Wind Energy Facility shall be designed to minimize the impacts of land clearing and the loss of important open spaces. Development on agricultural lands shall follow the Guidelines for Agricultural Mitigation for Windpower Projects published by the New York State Department of Agriculture and Markets.
- G. Storm water run-off and erosion control shall be managed in a manner consistent with all applicable state and federal laws and regulations and such standards as shall be applied by the Planning Board on the advice of the Town Engineer and other Town consultants.
- H. Wind Turbines shall be located in a manner that minimizes shadow flicker on off-site residences. It is desirable to have less than 25 hours of shadow flicker on off-site residences annually.

**§ 11. Setbacks, Noise and Height Limits**

- A. Except as provided herein, each Wind Turbine associated with a Wind Energy Facility shall be set back as follows:

1. A distance no less than 1,500 feet from off-Site residences.
  2. A distance no less than the greater of one and a half (1.5) times the total height of the Wind Turbine tower or 500 feet from off Site property lines.
  3. A distance no less than the greater of one and a half (1.5) times the total height of the Wind Turbine tower or 500 feet public roads.
- B. Small Wind Energy Facility Wind Turbines and Wind Measurement Towers shall be setback from off-Site property lines and residences at least one and half (1.5) times the structure height
- C. Except as provided herein, the statistical sound pressure level generated by a Wind Energy Facility or Small Wind Energy Facility shall not exceed 50 dB(A) at off Site property lines. Compliance shall periodically be determined by the Town Code Enforcement Officer, or such other officer or employee which the Town Board may designate.

The Code Enforcement Officer, or such other designated officer or employee of the Town, shall take three successive A-weighted fifteen (15) second L<sub>q</sub> measurements at an appropriate position on non-project property lines. If the arithmetic average of noise at non-project property lines is equal to or below 50 dB(A), then the project shall be considered in compliance with this Article. If an arithmetic average of higher than 50 dB(A) is measured, then the project sponsor shall cease operation of the nearest windmill, and the Code Enforcement Officer, or such other designated officer or employee of the Town, shall take another series of three, IS-second L<sub>q</sub> measurements. Appropriate places from which to take the sound measurements include areas where background noise is minimized and constant.

Wind Turbine only noise shall be determined based upon the following formula:

$$10 \text{ Log}\{10^{\circ}1c - 10.1A\}$$

\*C = the recorded ambient noise level when the turbine is on;

A = the recorded noise level when the turbine is off.

- D. An applicant may meet noise and setback standards by obtaining written consents from affected property owners stating they are aware of the Wind Energy Facility and the noise and/or setback limitations imposed by this law, and that consent is granted to allow noise levels to exceed the maximum limits provided herein or reduce setbacks to less than required. Such consents shall be in the form required for easements and be recorded in the County Clerk's Office describing the benefited and burdened properties. Such easements shall be permanent and shall state that they may not be revoked without the consent of the applicant.
- E. Wind Energy Facility Wind Turbines shall not exceed 500 feet in total structure height. Small Wind Energy Facility Wind Turbines and Wind Measurement

Towers shall not exceed 200 feet in total structure height. Any Small Wind Energy Facility Wind Turbine or Wind Measurement Tower which exceeds 200 feet in total structure height shall be reviewed by the Planning Board and considered a Wind Energy Facility for purposes of this law.

### **§ 12. Required Site Safety Measures for Wind Energy Facilities**

The provisions of this section shall apply to Wind Energy Facilities only.

- A. All Wind Turbines shall have an automatic braking, governing or feathering system to prevent uncontrolled rotation, over speeding and excessive pressure on the tower structure, rotor blades and turbine components.
- B. Accessory facilities or equipment shall be gated or fenced to prevent unrestricted public access to the facilities and reduce any attractive nuisance aspects of the use.
- C. Warning signs shall be posted at the entrances to the Wind Energy Facility and at the base of each tower warning of electrical shock or high voltage and containing emergency contact information,
- E. The minimum distance between the ground and any part of the rotor or blade system shall be 30 feet.
- F. Wind Energy Facilities shall be designed to prevent unauthorized external access to electrical and mechanical components and shall have access doors that are kept securely locked at all times.
- G. Prior to issuance of a building permit, the applicant shall provide the Town proof, in the form of a duplicate insurance policy or a certificate issued by an insurance company, of liability insurance, of a level to be determined by the Town Board in consultation with the Town's insurer, to cover damage or injury which might result from the failure of a Wind Energy Facility.
- H. Prior to the issuance of a building permit, the applicant shall submit a letter of credit or acceptable surety necessary to ensure the cleanup of any environmental contamination which may arise from the discharge of petroleum from a Wind Energy Facility Wind Turbine. An Engineer selected by the Town and Town Attorney shall judge the letter of credit or other surety adequate and satisfactory before a building permit is issued.

### **§ 13. Traffic Routes and Road Maintenance for Wind Energy Facilities**

The provisions of this section shall apply to Wind Energy Facilities only.

- A. Designated traffic routes for construction and delivery vehicles to minimize traffic impacts, wear and tear on local roads and impacts on local business operations shall be proposed by the applicant and reviewed by the Planning Board.

- B. To the extent the designated traffic routes will include use of Town roads, the applicant is responsible for executing a Road Use Agreement with the Town of XXX Town Board which shall provide for the remediation of damaged roads upon completion of the installation or maintenance of a Wind Energy Facility, and for adequate maintenance of the roads during construction of the Wind Energy Facility. Prior to the issuance of any building permit, the cost of remediating road damage shall be secured in the form of a bond or other surety sufficient to compensate the Town for any damage to Town roads.
- C. The applicant shall provide pre-development and post-development photographic evidence of the condition of Town roads to be traveled upon by construction and delivery vehicles.

**§ 14. Issuance of Wind Energy Facility, Small Wind Energy Facility and Wind Measurement Tower Permits**

- A. The Planning Board shall, within 180 days of either issuing SEQRA findings or a SEQRA negative declaration or conditioned negative declaration, issue a written decision with the reasons for approval, conditions of approval or disapproval fully stated. This time period may be extended with consent of the applicant. Should the applicant not consent to such an extension and the time period elapse without a decision, the application shall be considered approved without conditions.
- B. If approved, the Planning Board shall direct the Town Building Inspector to issue a Wind Energy Facility Permit upon satisfaction of all conditions for said Permit, and upon compliance with the New York State Building Code.
- C. The decision of the Planning Board shall be filed within 5 days in the office of the Town Clerk and a copy mailed to the applicant by first class mail.
- D. If any approved Wind Energy Facility, Small Wind Energy Facility or Wind Measurement Tower is not substantially commenced within two years of issuance of the Wind Energy Facility Permit, the Wind Energy Facility Permit shall expire unless the Planning Board shall have granted an extension.

**§ 15. Abatement**

If any Wind Turbine remains non-functional or inoperative for a continuous period of twelve (12) months, the applicant / permittee shall remove said system at its own expense following the requirements of the decommissioning plan.

**§ 16. Permit Revocation**

The Wind Energy Facility shall be maintained in operational condition at all times, subject to reasonable maintenance and repair outages. Operational condition includes meeting all noise requirements and other permit conditions. Should a Wind Turbine become inoperable, any part

of the Wind Energy Facility be damaged, or should a violation of a permit condition occur, the owner or operator shall remedy the failure within 90 days.

**§ 17. Fees**

- A. Wind Energy Facility and Small Wind Energy Facility applicants shall pay a permit fee equal to \$500.00 per megawatt of approved installation capacity. This permit fee shall be in addition to any application fee or other fees or Host Community Payments required of the applicant.
- B. The Planning Board, Building Inspector, Code Enforcement Officer and Town Board may hire any consultant and/or experts necessary to assist the Town in reviewing and evaluating the application, including but not limited to Site inspections, the construction and modification of the Site, once permitted, and any requests for recertification.
- C. An applicant shall deposit with the Town funds sufficient to reimburse the Town for all reasonable costs of consultant and expert evaluation and consultation to the Town in connection with the review of the application.

**§ 18. Waivers**

The Planning Board may, after a public hearing, grant a waiver from the strict application of the provisions of this law to improve the quality of any Wind Energy Facility, Small Wind Energy Facility or Wind Measurement Tower and better protect the health, safety and welfare of the Town. Area requirements (setbacks), noise requirements and height limits shall not be waived by the Planning Board except as described in § 11 of this law.

The Planning Board shall consider the impact of the waiver on the neighborhood, including the potential benefits or detriment to nearby properties, the benefits or detriments to the applicant, feasible alternatives and the magnitude of the request. The Planning Board may attach such conditions as it deems appropriate to waiver approvals to ensure that such waiver adequately protects the public health, safety and welfare.

**§ 19. Enforcement and Penalties**

- A. Enforcement Officer. The Town of XXX Town Board shall designate an officer of the Town to enforce the provisions of this law. Such designated officer may, with the consent of the Town Board, contract with professional consultants to assist in the enforcement and administration of this law. Such professional fees shall be the responsibility of the applicant to pay (see § 17).
- B. Penalties. Any person owning, controlling, operating or managing a Wind Energy Facility, Small Wind Energy Facility or Wind Measurement Tower in violation of this law or in noncompliance with the terms and conditions of any permit issued pursuant to this law, or any order of the enforcement officer, and any person who shall assist in so doing, shall be guilty of a violation of this law and subject to a fine of not more than \$1,000.00. Each day the violation continues shall be deemed a separate violation.

- C. Special Proceeding. The designated enforcement officer may, with the consent of the Town Board, institute an action or proceeding available at law to prevent, correct or abate any unlawful construction, erection, structural alteration, reconstruction, moving and/or use of a Wind Energy Facility in the Town. This shall be in addition to other remedies and penalties herein provided or available at law.

**§ 20. Severability**

Should any provision of this law be declared to be unconstitutional or invalid, the remainder of this law shall remain in effect.

**§ 21. Supersession**

This law shall supersede all prior inconsistent laws or resolutions of the Town of XXX.

**§ 22. Effective Date**

This law shall be effective as provided by law.

**APPROVAL OF WINDMILL FACILITY SPECIAL USE PERMIT APPLICATION**

PERMITTEE:

ISSUED:

THE SPECIAL USE PERMIT APPLICATION for the Wind Farm Project is hereby approved by the Planning Board in accordance with the Decision issued this date. The Code Enforcement Officer is hereby directed to issue the Special Use Permit in accordance with the conditions for approval set forth herein.

The Special use Permit shall authorize construction of the windmills and windmill facilities (as defined in Local Law Nos. \_ of 2008) ("Project"), the locations of which are set forth in the approved site plans, a list of which is set forth as Exhibit A hereto, and shall contain the conditions attached as Exhibit B hereto.

Dated:

TOWN PLANNING BOARD

Chairman

**EXHIBIT A**

Sheet Title	Sheet ID	Page	Of	Page
Cover Sheet				
Turbine layout and Infrastructure				
Access Road and Turbine Grading Plan				
Construction Details				
Substation Grading and Layout Plan				
Substation Layout Plan and Elevation				
Substation Grading and Layout Plan				
Substation Layout Plan and Elevation				
Erosion Control Details				
Cover Sheet				
Other				



## **EXHIBIT B**

### **DEFINITIONS AND TERMS:**

Commercial operation of the Project: shall mean the date specified by the Company in a written notice addressed and delivered to the Zoning Officer as of which (i) all turbine components have been delivered to the Project Site and installed in accordance with applicable installation procedures, (ii) The Company has completed the necessary terminations and connections of the collection lines and the supervisory control and data acquisition ("SCADA") system communication lines into the controller in the base of each turbine tower, (iii) each turbine has been commissioned and accepted by the Company in accordance with applicable commissioning and inspection procedures, (iv) the Project has been interconnected to the utility electric grid, and (v) the Company has commenced the sale of energy from the Project on a commercial (rather than test) basis to one or more purchasers.

Permittee: The Company, its successors and assigns.

Project: Construction, operation and maintenance of up to thirty-five 2.5 Megawatt Wind Turbines and related electrical transmission and distribution and other infrastructure as described more fully in the Final Environmental Impact Statement, accepted by the Town Planning Board on October 27, 2006.

Project related construction: any and all grading, excavating, blasting, movement of earth on Project parcels, substantial tree clearing to accommodate transmission line improvements, access or public road construction, widening or improvement of any kind, excavation or pouring of any windmill foundations, excavation or grading of ground staging areas, construction or erection of windmills, windmill facilities, or operation and maintenance areas, and burial or construction of transmission infrastructure, lines or poles, and other similar activities undertaken within the Town.

### **CONDITIONS:**

1. Permittee shall design, construct, maintain and operate the Project in accordance with this Permit (unless otherwise modified or amended) and with the applicable provisions of local laws, rules and regulations of the Town, including, without limitation, Local Laws Nos. 1 of 2007, as well as with any other applicable federal, state, and local laws, rules and regulations.
2. Permittee shall construct, operate and maintain the Project so as to conform to the Statement of SEQR Findings, including mitigation measures, issued by the Town Planning Board on May 2007, a copy of which is attached hereto as Schedule "1".
3. Prior to the commencement of Project related construction on a Project related parcel of land, Permittee shall:

- A. document to the Town Zoning Officer, Building Inspector and Code Enforcement Officer (collectively, the "Zoning Officer") proof of Permittee's contractual interest in such Project parcel of land as set forth more fully at the site plans referenced in Exhibit "A" to this Permit;
  - B. document to the Town Zoning Officer, compliance with the setback requirements of Local Law No. 1 of 2007, applicable to such parcel, which documentation shall include, as applicable to any such parcel, and without limitation:
    - i. Town Roads:
      - a) proof of abandonment of portions of certain Town roads (as set forth more fully on Schedule "2" attached hereto); and
      - b) conveyance of the Town's remaining interest in said lands, if any, to adjacent landowners;
    - ii. Setback releases from the owners of record of the parcels of land identified in Schedule "3" (said owners shall be the owners of record at the time when such proof of release is provided to the Town).
4. Prior to the commencement of any Project related construction, Permittee shall obtain all federal, state, and local permits and approvals necessary to construct, operate and maintain the Project, except as set forth below:
- A. If Permittee commences construction of the Project before all federal, state and local permits necessary to construct the entire Project are obtained, Permittee shall provide a written acknowledgement to the Zoning Officer that any work undertaken prior to obtaining all federal, state and local permits and approvals necessary to construct the entire Project shall be undertaken at the Permittee's sole risk;
  - B. If, as a result of subsequent permitting action or inaction by a federal or State agency, or a local agency other than the Planning Board, the Project is not fully built or a component of the Project built is later altered, Permittee will restore to pre-existing conditions any disturbed land areas not actively utilized for commercial operation of the Project; and
5. Project related construction shall not occur on a particular Project related parcel of land without the Permittee first obtaining all federal, state, and local permits and approvals necessary to construct, operate and maintain the Project on such parcel, except that the Permittee may undertake work on such parcel outside of areas over which any other federal, state or local agency has jurisdiction and necessary permits and approvals have not been obtained, provided that:
- A. Permittee demonstrates to the satisfaction of the Zoning Officer, that no other permits or approvals are necessary to undertake such work; and

- B. The area of land within which the Permittee may not work is delineated in the field prior to any such work.
6. Prior to the commencement of any Project related construction, Permittee shall enter into and comply with the "Agreement for Road Use, Repair, and Improvement" in the form attached hereto as Schedule "4."
7. Prior to the commencement of any Project related construction, Permittee shall enter into and comply with the "Permit Oversight and Administration Agreement" ("Permit Oversight Agreement") in the form attached hereto as Schedule "5."
8. Prior to the commencement of any Project related construction, Permittee shall enter into and comply with the "Decommissioning Plan" in the form attached hereto as Schedule "6."
9. Throughout Project related construction, Permittee will:
  - A. Implement a Dust Control Plan to minimize the amount of dust generated by construction activities. Dust management activities will include the application of water to Town roads, turbine access roads, and other disturbed areas via a water truck.
  - B. Fence sensitive areas (such as wetlands, cultural resource locations, or other areas in which resources identified in the SEQR Findings as requiring avoidance are located) where no disturbance or vehicular activities are allowed;
  - C. Educate the construction workforce on respecting and adhering to the physical boundaries of the off-limit areas referred to in condition 10(B) above;
  - D. Comply with reasonable guidance provided by environmental monitors with respect to matters addressed in this permit or the SEQRA Findings and Mitigation related to this permit;
  - E. Implement best management practices for sound abatement during construction, including use of appropriate mufflers, and limiting hours of construction to those set forth in the Permit Oversight Agreement;
  - F. Notify landowners of certain construction sound impacts in advance (e.g., if blasting becomes necessary); and
  - G. Implement a survey and avoidance plan to identify nesting grassland bird species, and to avoid any such listed, threatened or endangered nesting grassland bird species.
10. Permittee shall comply with NYS Agriculture and Markets ("NYS A&M") Agricultural Protection Guidelines, as follows:

- A. Permittee shall restore temporarily disturbed agricultural land in accordance with NYSA&M Agricultural Protection Guidelines;
  - B. Permittee shall educate contractors and environmental monitors, with the advice and assistance of the NYSA&M, to promote compliance with the construction plans and soil protection measures;
  - C. Heavy trucks and equipment access to turbine sites shall be prohibited until topsoil has been stripped and access roads have been constructed, except to the extent that such access is necessary to undertake topsoil stripping and the preparation of access roads;
  - D. Stripping of topsoil or passage of cranes across agricultural fields during saturated conditions shall be prohibited when such actions would damage agricultural soils;
  - E. Permittee shall temporarily fence open excavation areas in active pastureland as required to protect livestock;
  - F. Permittee shall wash concrete trucks and dispose of excess concrete outside of active agricultural areas in locations approved by the environmental monitor;
  - G. Erection cranes shall be restricted to designated access roads, crane paths, and work pads at the structure sites for all set-up, erection, and breakdown activities;
  - H. Permittee shall remove and dispose of all construction debris offsite at the completion of restoration;
11. Prior to the commercial operation of the Project, Permittee shall submit to the Town Zoning Officer, a letter of credit or other acceptable surety in an amount sufficient to ensure the remediation and cleanup of any potential environmental contamination by oil associated with the windmills, which surety may be in the form of insurance, the sufficiency of which shall be subject to review by the Town Attorney, Engineer or other designated consultant.
  12. Prior to the commercial operation of the Project, Permittee shall submit the Lighting Plan for the Project that is approved by the FAA to the Zoning Officer. Permittee shall comply with such approved Lighting Plan.
  13. Permittee shall design, construct and maintain the Project in accordance with the site plans referenced at Exhibit "A" to this Permit, or such immaterial alterations thereto as may be approved in accordance with condition 23, below, including, without limitation, the specifications and safety requirements set forth at section 1120(2)(b) of Local Law No. 1 of 2007.
  14. Prior to commercial operation of the first windmill in the Project, Permittee shall design an operations and maintenance building, and present said design to the Town Planning Board for its review, which presentation shall be deemed an application to amend this Permit. The operations and maintenance building shall be designed to appear to be a

traditional agricultural/farm building, and architectural plans shall be submitted to the Planning Board for its review and consideration. Also prior to commercial operation of the first windmill in the Project, Permittee shall identify a storage area that may either be fenced or is otherwise an enclosed area. All maintenance equipment, spare parts, and damaged parts shall be stored in such area or legally disposed of. The design for the storage area shall be presented to the Town Planning Board for its review, which presentation shall be deemed an application to amend this Permit.

15. Prior to commercial operation of the Project, Permittee shall submit documentation to the Zoning Officer that the windmills were erected, commissioned and placed in service in compliance with applicable manufacturer standards, the industry standards of the International Electro-technical Commission applicable to windmills, and New York State and U.S. standards applicable to the construction of windmills, if any, which documentation shall be provided by an independent engineer or other reputable and qualified consultant.
16. Prior to commercial operation of the first windmill in the Project, Permittee shall submit documentation to the Zoning Officer indicating that the Statement of Compliance issued by Germanischer Lloyd for the Wind Turbine remains in force and effect, notwithstanding any and all changes to the design or construction of the Wind Turbine undertaken after issuance of the Statement of Compliance, including, without limitation, the weight of wind turbine blades.
17. Within 60-days after commercial operation of the Project, Permittee shall restore the Project site to preconstruction conditions as required in accordance with the site plans (Exhibit "A");
18. The access door to each tower base shall have a secured entry.
19. Noise Level Limits:
  - A. Windmill only noise levels at non-Project property lines shall not exceed 50 dB(A) when measured in accordance with the procedures and methodology set forth in section 1130(2) of Local Law No. I of 2007. If the windmill only noise level measured in accordance with the procedure set forth under Local Law No. I of 2007 exceeds 50 dB(A) at any non-Project property line, the Permittee shall comply with enforcement action taken by the Zoning Officer, which action may include, but not be limited to, an order to cease and desist operation of said offending windmill, an order to remedy, and/or the imposition of monetary penalties. Permittee will also subsequently propose a follow-up program to the Complaint Resolution Board referenced in the Complaint Resolution Protocol attached hereto as Schedule "7," and Permittee will implement said program as the same may be modified by the Complaint Resolution Board.
20. In the event any windmill is out of active and continuous service for a period of one (1) year, Permittee shall remove said windmill and any and all structures, guy cables, guy anchors and/or enclosures accessory *solely* to such inactive windmill within eighteen (18)

months of cessation of active and continuous service. Permittee shall have no obligation to remove any structure, guy cable, guy anchor and/or enclosure that is in any way accessory to a windmill that is in service. Further, to the extent that any such windmill is out of active and continuous service for a period of one ( 1) year for causes or events that are beyond the reasonable control, and without the fault or negligence, of the Permittee, Permittee may appear before the Planning Board to request an extension of said removal period, or, in the alternative, to place said windmill back in service. Causes and events that are beyond the reasonable control of the Permittee shall include, without limitation: natural disasters; lightning strikes; fire; earthquake; acts of God; unusually or unseasonably severe actions of the elements such as snow, floods, hurricanes or tornadoes; causes or events affecting the performance of third-party supplies of goods or service, sabotage, terrorism, war, riots or public disorders, strikes or other labor disputes; and actions or failure to act (including expropriation and requisition) of any governmental agency.

21. Permittee shall adhere to the Complaint Resolution Protocol, a copy of which is annexed hereto as Schedule "7."
22. Permittee shall submit an inspection report to the Zoning Officer every three years, which report shall be prepared by the turbine supplier, turbine manufacturer, an independent engineer or a reputable consultant qualified to perform such inspection report and which report shall address the structure, operation and mechanical and electronic components of the windmills.
23. The procedures in this section shall govern immaterial alterations to the Project.
  - A The Town Designee as appointed by the Town in accordance with the Permit Oversight Agreement, a copy of which is annexed hereto as Schedule 5, or the Zoning Officer if the Town Designee is not also the Zoning Officer for purposes of the Project ("Town Designee" and "Zoning Officer" are referred to hereinafter as the "Zoning Officer") shall consider requests from the Permittee for immaterial alterations of this Project. All such requests shall be submitted in writing, addressed to the Zoning Officer, with copies to the Chairman of the Planning Board, the Town Clerk, and the Town's designated consultants.
24. Permittee shall develop a plan to mitigate for unavoidable visual impacts to National Register listed or eligible historic structures inventoried within the Project area. This plan will be developed in consultation with OPRHP staff, and shall be presented to and approved by the Planning Board.
25. Permittee shall implement a one year post-construction avian and bat fatality monitoring program.

## **VIOLATIONS:**

Any discrete violation of the Permit shall constitute a violation of the entire Permit, and enforcement action may be taken as it relates to the Project in its entirety.

**DURATION:**

This Permit shall remain in full force and effect unless or until the Project is completely decommissioned.

**SEVERABILITY AND EFFECT:**

If any of the conditions of this Permit are found to be in violation of law, rule or regulation, or are deemed null and void by a court of competent jurisdiction, the conditions shall be deemed severable, and the remaining conditions shall remain in full force and effect. If any portion or provision of Town Local Law No. 1 of 2007, or the Town Zoning Law, are found to be in violation of law, rule or regulation, or are declared null and void by a court of competent jurisdiction, the provisions of those local laws incorporated herein by reference shall remain in full force and effect as if fully stated herein, and the obligations of the Permittee shall in no way be amended, altered or changed as a result of the validity or invalidity of said local laws.

## **STATE OF WYOMING – SWEETWATER COUNTY**

*Sweetwater County - Wind Farm Zoning Regulations*, available online at [http://www.sweet.wy.us/pz/Language\\_Amendments/Adopted\\_Wind\\_Farm\\_Regulations.pdf](http://www.sweet.wy.us/pz/Language_Amendments/Adopted_Wind_Farm_Regulations.pdf)

### **Part 1 Commercial and Non-Commercial Wind Farms**

#### **1.1 Purposes**

It is the purpose of these regulations to promote the safe, effective and efficient use of Commercial and Non-Commercial Wind Farms. Sweetwater County finds that wind energy is an abundant, renewable, and nonpolluting energy resource and that its conversion to electricity will reduce dependence on nonrenewable energy resources and decrease the air and water pollution that results from the use of conventional energy sources.

#### **1.2 Definitions**

For the purposes of this section the following words and terms as used herein shall be defined as follows:

**APPLICANT:** The person, corporation or entity that is responsible for Wind Farm development and operation and has a property interest in the land.

**ANEMOMETER:** An instrument, usually located on a tower, that measures wind speed.

**A-WEIGHTED SOUND LEVEL (dbA):** A measurement of sound pressure level, which has been filtered or weighted to progressively de-emphasize the importance of frequency components below 1000 Hz and above 5000 Hz. This reflects the fact that human hearing is less sensitive at low frequencies and at extremely high frequencies, relative to the midrange of the frequency spectrum. This area of sensitivity also corresponds to the human speech band. This measurement is the most commonly used filter in both industrial noise applications (OSHA) and community noise regulations.

**BOARD OF COUNTY COMMISSIONERS:** The three elected governing officials of Sweetwater County. The Board of County Commissioners is referenced in these regulations as the Board.

**C-WEIGHTED SOUND LEVEL (dbC):** The measurement of sound pressure level which is designed to be more responsive to low-frequency noise. C-weighting is intended to represent how the ear perceives sound at high decibel levels and is also used for evaluating impact or impulse noise such as demolition or mining blasting, artillery firing and bomb explosions using conventional explosives of less than approximately one ton.

**DECIBEL (db):** The measurement of a sound pressure relative to the logarithmic conversion of the sound pressure reference level often set as 0 db (A-weighted). In general, this means the



quietest sound we can hear is near 0 db (A-weighted) and the loudest we can hear without pain is near 120 db (A-weighted). Most sounds in a typical environment range from 30 to 100 db (A-weighted). Normal speech at 3 feet averages about 65 db (A-weighted).

**NACELLE:** The enclosure located at the top of a wind turbine tower that houses the gearbox, generator and other equipment.

**PURE TONE:** A sound whose instantaneous sound pressure is a simple sinusoidal function of the time and is characterized by a single frequency or singleness of pitch. For the purpose of these regulations, a pure tone shall exist if the one-third octave band sound pressure level in the bandwidth of the tone exceeds the arithmetic average of the sound pressure levels on the two contiguous one-third octave bands by 5 db for center frequencies of 500 Hz and above, and 8 db for center frequencies between 160 and 400 Hz, and by 15 db for center frequencies less than or equal to 125 Hz.

**PROJECT IMPACT REVIEW:** A review of existing public professional literature, maps and other information regarding possible impacts that may be related to Wind Farm development and possible impact mitigation techniques and measures. Such information sources may include, among others, federal, state and local agencies.

**PLANNING AND ZONING COMMISSION:** The Planning and Zoning Commission is the five member commission appointed by the Board of County Commissioners to review and make recommendations to the Board on planning and land use issues as authorized by Wyoming Statutes 18-05-201 et seq and 18-05-301 et seq. The Planning and Zoning Commission is also known as the P&Z.

**ROTOR:** The rotating part of a turbine, including the turbine blades.

**STALL-CONTROL:** A braking mechanism on wind turbines where the rotor blades are bolted onto the hub at a fixed angle. The rotor blade profile is aerodynamically designed to ensure that the moment the wind speed becomes too high it creates turbulence on the side of the rotor blade which is not facing the wind. This stall prevents the lifting force of the rotor blade from acting on the rotor.

**TOWER:** With regard to wind energy system, the structure on which the wind system is mounted.

**TURBINE:** A wind driven machine that converts wind energy into electrical power, also known as a wind energy conversion system.

**UPWIND ROTOR:** A design in which the rotor on a wind turbine tower faces into the wind.

**WELL-DESIGNED BRAKING SYSTEM:** The primary braking system, which uses a mechanical brake, pitch-control of the turbine blades, or stall-control to bring the turbine to a stop in such a way that stall-induced vibrations/noise are avoided.

**WIND ENERGY SYSTEM:** A wind driven machine that converts wind energy into electrical power.

**WIND FARM, COMMERCIAL:** A single wind driven machine or a collection of wind driven machines or turbines that convert wind energy into electrical power for the primary purpose of sale, resale or offsite use.

**WIND FARM, NON-COMMERCIAL:** A wind energy conversion system consisting of a wind turbine, a tower, and associated control or conversion electronics, which has a rated capacity of not more than 100 kW and which is intended to primarily reduce on-site consumption of utility power. If all applicable regulations are met a Non-Commercial wind farm may contain more than one wind energy conversion system.

**WIND FARM, TOTAL HEIGHT:** The highest vertical point on the machine, including the rotor blade tips, measured from the tower base.

### **1.3: Anemometers:**

**Anemometers:** An anemometer is a wind speed measuring device used to determine the viability of an area for a Non-Commercial or Commercial wind farm development. This use is permitted in all zoning districts by obtaining an approved Sweetwater County Construction Use Permit through the permit process described in Section 1.4 of these regulations.

### **1.4 Non-Commercial Wind Farm(s)**

Non-Commercial Wind Farm(s) shall be an Accessory Structure in all base zoning districts, and shall be permitted by the issuance of an approved Sweetwater County Construction/Use Permit. The approval of the Sweetwater County Construction/Use permit is subject to compliance with the standard application requirements and compliance with all of the following Non-Commercial wind farm requirements as set forth below:

(a) **Minimum Parcel Size:** The minimum parcel size to establish a Non-Commercial wind farm is one acre.

(b) **Total Height:** There is no limitation on tower height, except as imposed by setback, clear zone and FAA regulations.

(c) **Set-back:** The wind energy system shall be set back a distance equal to one hundred and ten (110) percent of the combined height of the tower plus the length to the tip of the blade from all adjacent property lines. Additionally, no portion of the small wind energy system, including guy wire anchors, may extend closer than ten (10) feet to the property line.

(d) **Clear Zone:** The wind energy system shall maintain a circular clear zone that has a radius which is equivalent to one hundred and ten (110) percent of the combined distance of the tower height plus the length to the tip of the blade. This clear zone shall be maintained free of any

occupied structures, tanks containing combustible flammable liquids, and above ground utility/electrical lines.

(e) Noise: Wind energy systems shall not exceed 60 dBA, as measured at the closest neighboring inhabited dwelling. The level, however, may be exceeded during short-term events such as utility outages and/or severe wind storms.

(f) Tower Security: Any climbing apparatus must be located at least 12 feet above the ground, and the tower must be designed to prevent climbing within the first 12 feet. The tower is recommended to be enclosed with an appropriate fence.

(g) Lighting: Wind energy systems shall not be artificially lighted with accent lighting. For the protection of the flight patterns of aircraft and the protection of heliports, airports and landing strips, wind energy systems must be lighted in accordance to the regulations and guidelines of the Federal Aviation Administration (FAA) regulations or appropriate authorities.

(h) Signs/Advertising: No tower should have any sign, writing, or picture that may be construed as advertising.

(i) Neighborhood Concerns: All reasonable concerns of neighbors must be resolved before a Construction/Use Permit will be issued. To help identify and mitigate neighborhood concerns early in the permitting process after receiving a Construction/Use Permit Application, the Land Use Department will send a request for comment form to all adjacent property owners of record. The Land Use Department will post the applicant's property with a sign that states the nature of the applicant's proposed wind energy project. If the Land Use Department has not received any written objections, during the 21 days following the date of mailing the request for comments, the Department will approve the applicant's request provided all requirements of these rules are met. If any written objections are received, the Land Use Department will schedule a public hearing before the next regularly scheduled Planning and Zoning Commission meeting that allows for 30-day advertised notice. At the public hearing, the Sweetwater County Planning and Zoning Commission will take testimony concerning the objections to the proposed Non-Commercial wind farm. After hearing and considering all testimony from staff and concerned parties, the P&Z will then make a determination, based on the evidence presented, to approve, conditionally approve or deny the application. Any decision by staff or the Planning and Zoning Commission may be appealed to the Board of County Commissioners.

(j) Multiple Wind Energy Systems: Multiple wind energy systems are allowed on a single parcel as long as the owner/operator complies with all Non-Commercial wind farm regulations contained in these regulations. Units shall be installed in compliance with minimum setback and clear zone requirements, as defined by these regulations. The minimum distance between wind energy systems shall be equivalent to one hundred and ten (110) percent of the combined height of the tower plus the blade length.

(k) Approved Wind Turbines: At the time of application, the applicant must present a certification from the manufacturer that the system's turbine and other components equal or exceed the standards of one of the following national certification programs such as the:

California Energy Commission, National Electrical Code (NEC), American National Standards Institute (ANSI), Underwriters Laboratories (UL), or any other small wind certification program recognized by the American Wind Energy Association.

(l) Onsite Electrical Use: On the Construction/Use Permit Application, the applicant must certify that the proposed system will be used primarily to reduce onsite consumption of electricity.

(m) Compliance with FAA Regulations: Small wind energy systems (see letter (r) for definition) must comply with applicable FAA regulations, including any necessary approvals for installations close to airports.

(n) Compliance with the ICBO Electric Code: Construction/Use Permit applications for small wind energy systems shall be accompanied by a line drawing of the electrical components in sufficient detail to allow for a determination that the manner of installation conforms to the National Electrical Code. This information is frequently supplied by the manufacturer.

(o) Plans - Compliance of Wind Energy System Plans with ICBO Building Code: Construction/Use Permit applications for Non-Commercial wind energy systems shall be accompanied by standard drawings of the wind turbine structure, including the tower, base, and footings. An engineering analysis of the tower showing compliance with the ICBO Building Code and certified by a Wyoming Licensed Professional Engineer shall also be submitted. This analysis is frequently supplied by the manufacturer.

(p) Installation - Compliance of Wind Energy System Installation with ICBO Building Code: Property owner must submit a written statement verifying the proposed wind energy system was installed in accordance with the ICBO Building Code.

(q) Utility Notification: No small wind energy system shall be installed until evidence has been given that the utility company has been informed of the customer's intent to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.

(r) Removal of Defective or Abandoned Wind Energy Systems: Any wind energy system found to be unsafe by an authorized County official shall be repaired by the owner to meet federal, state and local safety standards or removed within six months. If any wind energy system is not operated for a continuous period of 12 months, the County will notify the landowner by registered mail and provide 45 days for a response. In such a response, the landowner shall set forth reasons for the operational difficulty and provide a reasonable timetable for corrective action. If the County deems the timetable for corrective action as unreasonable, they must notify the landowner and such landowner shall remove the turbine within 120 days of receipt of notice.

(s) Small Wind Energy System(s): Small Wind Energy System(s) are stand alone systems of less than 2000 watts of capacity, not more than 35 feet in height and located in a manner that complies with all of Section 1.4 of these regulations. Section 1.4 (o) of these regulations may be waived by the Sweetwater County Engineer if, in the County Engineer's evaluation, the system's

plans presented at the time of application demonstrate that the proposed system is structurally safe and sound.

## **1.5 Commercial Wind Farms**

Commercial Wind Farm, or Wind Farms, are hereby classified as large-scale Industrial Uses and will be regulated in the same manner as other Industrial Uses. Commercial Wind Farms are a conditional use in the Agriculture (A) zone district whether they are developed and/or operated by a public utility, private company or individual. They are not allowed in any other zone district.

### **1.5.1 Application Requirements**

Prior to submitting an application for a Wind Farm, the applicant is encouraged to arrange a pre-application meeting with the Sweetwater County Land Use Department. All applications for a Wind Farms shall be accompanied by the following information:

- (a) **Owner Consent:** Evidence that the applicant is the owner of the property or has written permission of the owner(s) to make such application;
- (b) **Applicant/Owner Information:** Name, address and phone number of the applicant and owner and the applicant's contact person for the project.
- (c) **Project Rationale:** Relevant background information on the project, including timeframe and project life, phases of development, likely markets for the electricity produced and the possibilities for future expansion.
- (d) **Plot and Development Plan:** A conceptual development plan of the proposed wind farm drawn to scale and in sufficient detail to provide a clear description of the project:

#### **Requirements:**

- i. Drawing sheets must show the scale, a north arrow and the number of sheets in the sequence. Twelve copies (24" X 36") of the development plan must be submitted with the application.
- ii. Property description which includes a general vicinity map of the project and a legal description of the project boundary (i.e. NW1/4, SE1/4 Sec 2, T42N, R6W), and property acreage.
- iii. Structure location showing setbacks, use, and means of access for the following structures:
  - (a) Existing Structures within Project Boundary.
  - (b) Existing Structures outside of Project Boundary: All occupied/manned structures and all non-occupied structures within 1,500 feet of the project boundary.
  - (c) Proposed Accessory Structures: Accessory structures include support offices, facilities and structures related to the operation of the Wind Farm. A general statement of how the developer will address potable water, sewage/waste disposal, and fire protection for these accessory structures is required.

(d) Proposed Wind Turbine Towers: Include a conceptual site plan of a typical individual wind turbine site and a map showing the approximate location of each turbine. If the exact number or dimensions of wind turbines is not known at the time of application, the site plan shall identify a maximum number and maximum dimensions that will be expected and a range from minimum to the maximum number expected. For review purposes, all wind turbines shall be assigned a reference number.

(e) Existing Utilities, Pipelines and Related Structures. Show the location of all existing underground and above ground utilities, electrical lines, transmission lines, pipelines and any accessory support facilities.

(f) Proposed Utilities, Electrical/Transmission Lines and Related Structures. Show all proposed utilities, electrical lines, transmission lines and any related accessory support facilities; State the approximate voltage of each electrical/transmission line and whether the facilities are proposed to be located above or below ground. Provide a general region/area wide map clearly showing the proposed route of proposed transmission lines and their accessory facilities.

(g) A map showing the existing topography of the project site. USGS or other topographic map sources may be utilized.

iv. A map showing the approximate proposed drainage, grading and natural vegetation removal plan.

v. A map showing wind characteristics and dominant wind direction, which is the direction from which fifty (50) percent or more of the energy contained in the wind flows.

vi. A map showing the location of any delineated 100-year floodplains or wetlands.

(e) **Visual Simulation:** Provide an accurate visual simulation of the project components by showing:

i. views from a reasonable number of key vantage points as determined by the applicant in consultation with staff and approved by the Planning and Zoning Commission. These vantage points must consider a 360 degree view of the project site.

(f) **Economic Analysis:** Provide an estimated economic cost/benefit analysis describing the impact of the project on the local and state economy with respect to the following:

i. the amount of property taxes to be generated by the project.

ii. the amount of sales taxes to be generated by the project.

iii. the amount of other applicable taxes to be generated by the project.

iv. the construction dollars to be spent locally.

v. the number of construction jobs and estimated construction payroll.

vi. the number of permanent jobs and estimated continuing payroll.

vii. costs associated with the impact on roads or other County infrastructure in the area.

(g) **Impacts and Mitigation Measures:** In the absence of a required environmental analysis by a state or federal agency, which encompasses the entire project area, provide a project impact review and a proposed impact mitigation plan. The project impact review and mitigation plan shall address all of the following:

Environment:

- i. wildlife and wildlife habitat on the site and in a biologically significant area surrounding the site.
- ii. any endangered or threatened species on the site and in a biologically significant area surrounding the site.
- iii. avian population, including migratory birds.
- iv. flora on the site.
- v. soil erosion.
- vi. water quality and water supply in the area.
- vii. historic, cultural or archaeological resources within wind farm project area.
- viii. dust from project activities.

Wind Farm:

- ix. A-weighted and C-weighted noise levels at the residence nearest to the project boundary and at the property line of such residence nearest to the project boundary.
- x. any wastes, either municipal solid waste or hazardous waste, generated by the project.
- xi. electromagnetic fields and communications interference generated by the project.
- xii. public safety in regard to the potential hazards to adjacent properties, public roadways, communities, aviation, etc. that may be created.
- xiii. a general discussion of any potential changes to the above assessment items that could be anticipated when considering the cumulative impacts of other adjacent wind energy projects.

**(h) Life of Project and Final Reclamation of Project:** Provide a statement of the useful life of the project, a general description of the decommissioning, and the final land reclamation plan in the event the project is abandoned or terminated. Evidence, acceptable to the Board of County Commissioners, shall be presented demonstrating that the developer has entered into an agreement with the property owner that ensures proper final reclamation of the wind farm project. If the developer does not have a reclamation agreement with the land owner that is suitable to the Board, the developer shall comply with all the provisions of 1.5.5 of these regulations.

**(i) Conceptual Transportation Plan for Construction and Operation Phases:**

Provide a conceptual Construction and Operation Transportation Plan that shows the following:

- i. Anticipated locations of the project's service road ingress and egress access points onto State or County Roads. Any proposed access onto the State or County road system must meet respective requirements.
- ii. The general layout of the proposed wind farm service road system and the extent to which roads are planned to be upgraded. All roads servicing manned or occupied accessory buildings need to be constructed to the standards of the International Fire Code.
- iii. The plan for utilizing existing roadways to service the project area. To the greatest extent possible, the applicant must make use of existing roadways.

- iv. The anticipated volume and designated route for traffic including routes for oversized and heavy equipment needed for construction, maintenance and repairs.
- v. The proposed methodology of assuring, to the public entities responsible for the roads, that repairs and on-going maintenance of roads and bridges to be used in both the construction and operation phases will be carried out.
- vi. The plan for utilizing existing roadways within the project area.

### **1.5.2 Siting Guidelines**

The following guidelines shall be considered by the Planning and Zoning Commission and the Board of County Commissioners in evaluating the appropriateness of proposed locations for Wind Farms and the proposed project components. The purpose of these guidelines is to assist decision-makers in uniformly analyzing the site-specific impacts of each proposed project and thereby arrive at consistent and balanced decisions.

**Natural and Biological Resources** - Wind Farms should not be located in areas that have a large potential for biological conflicts. Wind Farms should not be located in large impact areas such as wilderness study areas, areas of critical environmental concern, County and state parks, historic trails, and special management areas. Wind Farms should not significantly impact important wildlife habitat.

**Visual Impacts** - Wind Farms should avoid those visual corridors that are designated by the P&Z as essential view sheds or scenic areas. Essential view sheds or scenic areas are those areas designated by the P&Z and the Board after analyzing the applicant's wind farm visual simulations and considering public hearing comments. A Wind Farm project should maintain visual unity among clusters of turbines. To promote visual uniformity, the rotors, nacelles and towers of all turbines in an array should appear similar. To avoid visual clutter, intra-project power lines having a voltage of 34,500 volts or less, should be buried unless the applicant can sufficiently demonstrate that burying the lines will violate other guidelines/standards, violate applicable law, render the project economically infeasible or be hidden from public view. To avoid cluttering the skyline, transformers and other electric equipment should be hidden from view or otherwise constructed in harmony with the surrounding landscape.

**Soil Erosion & Water Quality** - Wind Farms should avoid erosion. Disturbance and construction on erodible slopes should be minimized. The number of improved roads and construction staging areas should be kept to a minimum. The grading width of roads should be minimized. One-lane roadways with turn-outs are recommended. The number and size of staging areas and crane pad sites should be minimized.

**Historical, Cultural & Archeological Resources** - Wind Farms should avoid sites with known sensitive historical, cultural or archeological resources.

**Public Safety** – Wind Farms shall be developed in a manner that utilizes sound engineering practices and considers public safety in regard to the potential hazards to adjacent properties, public roadways, communities, aviation, etc. that may be created.



### **1.5.3 Performance Standards**

The following standards are to be achieved by each Wind Farm project without exception. Because they are standards, they are considered to be requirements of any Wind Farm project. The final decision on whether or not a particular standard is achieved by a Wind Farm project shall be made by the Board of County Commissioners after considering the recommendations of the Planning and Zoning Commission.

**Noise Management** - The noise level caused by the operation of the project, measured at five (5) feet above ground level at the property line coincident with or outside the project boundary, shall not exceed 65 decibels (A-weighted) and shall not exceed 50 decibels (A-weighted) if it is determined that a pure tone noise is generated by the project. The level, however, may be exceeded during short-term events such as utility outages and/or severe wind storms. Upon receipt by the Sweetwater County Land Use Department of a complaint regarding noise from an existing Wind Farm project, the Department will investigate the complaint. If the Department determines the complaint to be reasonable, the project owner shall be required, at the owner's expense, to have prepared, by an independent acoustical consultant approved by the Land Use Department, an acoustical study that shall demonstrate compliance with the above noise standard on the basis of equivalent sound pressure levels. "Equivalent sound pressure levels" means the steady sound level that, over 10-minute measurement periods, would produce the same energy equivalence as the fluctuating sound level actually occurring.

**Wind Farm Design:** Wind Farms that are not designed in "accordance with proven good engineering practices" or not purchased from a national manufacturer with a proven track record shall be prohibited. Wind Farms designed with the following characteristics shall be deemed in "accordance with proven good engineering practices":

- i. at least 3 blades.
- ii. upwind rotor.
- iii. no furling, where "furling" means that the wind turbine is designed to limit its power output in high winds by changing the rotor's plane of rotation to a plane that is not perpendicular to the prevailing wind direction.
- iv. tapered and twisted blades.
- v. a well-designed braking system.

**Natural & Biological Resources** – Noxious weed control is required. Appropriate fire measures as required by the Fire Warden shall be implemented. No perches are permitted on the nacelles of turbines. Wind Farms towers shall not use lattice-type construction or other designs that provide perches for avian predators.

**Visual Impacts** - To provide visual order to a Wind Farm project, all individual turbines shall have the same number of rotor blades and all rotor blades shall spin in the same direction (i.e., clockwise or counter-clockwise) in relation to the wind. To promote visual uniformity, all turbines at a similar ground elevation shall have the same height from blade tip to the ground. Except during construction, re-construction or removal, outdoor storage is not permitted within the project boundary except at locations that are screened from view. To avoid cluttering the skyline, inverters and pendant power cables shall be located inside the wind turbine tower, nacelle or structure. No telecommunications dishes, antennas, cellular telephone repeaters or

other similar devices shall be attached to wind turbine towers. Aircraft obstruction markings of the turbines by use of alternating red and white bands shall be prohibited. No Billboards, logos and advertising signs of any kind shall be located on the turbines.

**Soil Erosion & Water Quality** - Construction and maintenance shall be done in strict accordance with the erosion and sediment control plan submitted with the Construction Permit so as to minimize soil erosion and damage to existing vegetation. If vegetation is damaged during construction, in areas not occupied by the Wind Farms and related facilities and roads, it shall be restored after construction is complete. Disturbed areas shall be reseeded to the land owner's or manager's requirements. Dust control on the project site is required.

**Safety** - Individual wind turbines shall be set back from all property lines coincident with or outside of the project boundary a distance equal to 1.5 times the turbine hub height. Individual wind turbines shall be set back from all public roads a distance equal to at least 1.5 times the turbine hub height. Individual wind turbine heights and markings shall comply with Federal Aviation Administration (FAA) regulations. If lighting of turbines, or other structures, is required, "daytime white-nighttime red" shall be the only type of lighting allowed unless prohibited by law. All turbines and towers shall be a shade of white in color.

#### **1.5.4 Review and Approval**

The Land Use Department shall prepare a Conditional Use Permit Application for a Commercial Wind Farm. Upon receipt of a complete application for a conditional use permit for a Wind Farm, the Land Use Department will set the application for hearing before the Planning and Zoning Commission. Notice of the hearing shall be provided in the same manner as for an application to re-zone the project property area. Prior to the hearing, the Land Use Department shall evaluate the application against the requirements and guidelines of these regulations, and will prepare a staff report for the Planning and Zoning Commission. During the hearing, Planning and Zoning Commission shall review the staff report and review the application to determine whether it meets the requirements of these regulations and will make its recommendation to approve, deny or approve with conditions to the Board of County Commissioners. The Board of County Commissioners shall conduct a public hearing on the application and the Planning and Zoning Commission's recommendation. Notice of the hearing before the Board of County Commissioners shall be provided in the same manner as for an application for re-zoning. After considering all evidence, public testimony and the Staff's report, the Board may approve, deny or approve with conditions the Conditional Use Permit.

Upon approval of the Conditional Use Permit for a Wind Farm project, the developer will submit to the Land Use Department a complete Sweetwater County Construction/Use Application that includes all of the following:

- i. all of the special conditions outlined in the Conditional Use Permit authorization.
- ii. a site plan(s), drawn to a suitable scale, which is based on the survey detail used to prepare exhibits for private leases and rights-of-way, as prepared by a professional land surveyor. This site plan must include the site plan information required by the Conditional Use Permit Application and County Construction/Use Permit. The site plan shall include a legal

description based on actual survey of individual tower sites, and a typical footprint detail for each tower site, including the blades.

iii. a final drainage, grading, erosion and sediment control plan prepared and certified by a Wyoming Licensed Professional Engineer.

iv. A final transportation plan coordinated with the land owner and the Sweetwater County Engineer must be provided. This plan must show final road locations and standards to which roads will be constructed. Roadways serving all occupied or manned buildings must meet the International Fire Code. Access permits onto the public system must be obtained from the appropriate public agency.

v. Utility Plan that shows and complies with all standards for crossing or utilizing Sweetwater County Road R.O.W.s.

vi. a final plan for site security.

vii. a final decommissioning and reclamation plan.

viii. documentation of the establishment of the Account/Bond for reclamation; and documentation that the project is in compliance with all of the requirements of all jurisdictional state and federal agencies.

ix. the fee for the Construction/Use Permit shall be based upon the number of turbines in the project charged at the industrial (principal structure) Construction/Use Permit rate for each turbine; and,

x. as-built drawings, prepared by a Wyoming Licensed surveyor, verifying the location and setbacks of all structures must be submitted to the County prior to wind farm operation.

After Land Use Department receives a complete Construction/Use Application, the Department will review it for compliance, and, if approved, the Department will issue a Construction/Use Permit to the developer.

The term of a Wind Farm Conditional Use Permit expires within 5 years of its date of approval by the Board of County Commissioners unless:

i. The developer has substantially commenced Wind Farm Construction under an approved Sweetwater County Construction/Use permit; or,

ii. The developer has submitted evidence acceptable to the Board of County Commissioners that the wind farm project is still viable and the delay in construction is caused by project management or coordination issues that are pending resolution in the near future.

The Board may renew the Conditional Use Permit once up to one additional 5 year term.

If the project is still not complete after the Board's renewal has ended, and the applicant still wishes to proceed with the project, a new Conditional Use Permit must be applied for.

### **1.5.5 Final Project Reclamation**

If, in the assessment of the Board, the applicant cannot provide acceptable evidence demonstrating that the applicant has entered into an agreement with the property owner that ensures proper final reclamation of the wind farm project, the applicant shall comply with the following Final Project Reclamation Requirements:

#### Final Project Reclamation Requirements:

A reclamation bond shall be furnished to Sweetwater County not later than 30 days before commencement of project construction that will be used to restore the site surface to a condition consistent with the pre-construction environment. The purpose of the reclamation bond is to assure that adequate funding is available to pay the costs of site reclamation, including removal of individual turbines and other above-ground project improvements subject to permit in the event of abandonment of individual turbines or the entire project. The reclamation bond shall be in an amount equal to one hundred (100) percent of such costs, where such amount is determined by the Board of County Commissioners based upon estimates from knowledgeable contractors, except that the landowner should be given the option to maintain access roads for demonstrated ranching or farming purposes as approved by the Board of County Commissioners.

The reclamation bond may not be cancelled, released or in any way terminated, without prior written approval from Sweetwater County, and shall continue as long as such turbines or other above-ground improvements exist. The reclamation bond must be written so as to survive any sale or other form of transfer of ownership of such turbines and other improvements. The company providing the reclamation bond must be authorized to provide bonds in the State of Wyoming and be acceptable to the Board of County Commissioners. All underground equipment and foundation systems of Wind Farms shall be removed.

### **Appendix A - Proposed Noise Management Revisions**

#### **Non-Commercial**

□ **1.4 (e) Noise:** Wind energy systems shall not exceed 40 dBA, as measured at the closest neighboring inhabited dwelling. The level, however, may be exceeded during short-term events such as utility outages and/or severe wind storms.

#### **Commercial**

□ **1.5.3 Noise Management:** The noise level caused by the operation of the project, measured at five (5) feet above ground level at the property line coincident with or outside the project boundary, shall not exceed 65 decibels (Aweighted) and shall not exceed 50 decibels (A-weighted) if it is determined that a pure tone noise is generated by the project.

#### **Proposed Non-Commercial Revisions**

□ **Proposed 1.4(m) Compliance with FAA Regulations:** Non-Commercial wind energy systems must comply with applicable FAA regulations, including any necessary approvals for installations close to airports.

□ **Proposed 1.4(n) Compliance with the IBC Electric Code:** Construction/Use Permit applications for non-commercial wind energy systems shall be accompanied by a line drawing of the electrical components in sufficient detail to allow for a determination that the manner of installation conforms to the National Electrical Code. This information is frequently supplied by the manufacturer.

□ **Proposed 1.4(q) Utility Notification:** No non-commercial wind energy system shall be installed until evidence has been given that the utility company has been informed of the

customer's intent to install an interconnected customer-owned generator. Off-grid systems shall be exempt from this requirement.

□ **Existing Text: (l) Onsite Electrical Use:** On the Construction/Use Permit Application, the applicant or property owner must certify that the proposed system will be used primarily to reduce onsite consumption of utility provided electricity.

□ **(p) Installation - Compliance of Wind Energy System Installation with IBC**

**Building Code:** Applicant or Property owner must submit a written statement verifying that the proposed wind energy system was installed in accordance with the IBC Building Code.

### **Proposed Revisions to the Definition Section**

□ **Proposed Definition: Non-Commercial Wind Energy System:** A wind driven machine that converts wind energy into electrical power that has a rated capacity of not more than 100 kW and is intended to primarily reduce on-site consumption of utility provided electricity. A non-commercial wind energy system consists of a wind turbine, a tower, and associated control or conversion electronics.

□ **Proposed Definition: Commercial Wind Energy System:** A wind driven machine that converts wind energy into electrical power for the primary purpose of sale, resale or offsite use. A commercial wind energy system consists of a wind turbine or machine, a tower, and associated control or conversion electronics. A wind energy system with a rated capacity of more than 100kw is considered a commercial wind energy system whether the sale of electrical power is for on or offsite use.

□ **Proposed Definition: Wind Farm, Non-Commercial:** One or more noncommercial wind energy systems that comply with all applicable regulations.

□ **Proposed Definition: Wind Farm, Commercial:** One or more commercial wind energy systems that comply with all applicable regulations.

□ **Add Existing Definition from Sec. 1.4(s): Small Wind Energy System(s):**

Small Wind Energy System(s) are stand alone systems of less than 2000 watts of capacity, not more than 35 feet in height and located in a manner that complies with all of Section 1.4 of these regulations. Section 1.4 (o) of these regulations may be waived by the Sweetwater County Engineer if, in the County Engineer's evaluation, the system's plans presented at the time of application demonstrate that the proposed system is structurally safe and sound.

### **Potential Revision Height Regulations - Commercial**

□ **Proposed Replacement Definition: Wind Energy System, Total Height:** The highest possible vertical point on the machine, including the rotor and blade tips, measured from the tower base.

□ **Proposed Commercial Setback Requirement (1.5.3):** Individual wind turbines shall be set back from all property lines coincident with or outside of the project boundary a distance equal to 110% of the Wind Energy System Total Height.

Individual wind turbines shall be set back from all public roads a distance equal to at least 110% of the Wind Energy System Total Height. Individual wind turbine heights and markings shall comply with Federal Aviation Administration (FAA) regulations.