

**STATE OF MINNESOTA  
ENVIRONMENTAL QUALITY BOARD**

In the Matter of the Application  
of Trimont Wind I, LLC  
for a Site Permit for a 100.5-Megawatt  
Large Wind Energy Conversion  
System in Martin and Jackson  
Counties, Minnesota

**FINDINGS OF FACT,  
CONCLUSIONS  
AND ORDER ISSUING A  
SITE PERMIT TO  
TRIMONT WIND I, LLC**

**EQB DOCKET NO.  
03-72-LWECS-TRIMONT**

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The above-entitled matter came before the Minnesota Environmental Quality Board (EQB) pursuant to an application by Trimont Wind I, LLC (Trimont) for a site permit to construct, operate, maintain and manage a 100.5-Megawatt (MW) nameplate capacity Large Wind Energy Conversion System (LWECS) and associated facilities in Martin and Jackson counties. The permit is to be issued in the name of Trimont Wind I, LLC.

All of the proposed wind turbines, foundations, transformers, feeder lines and collection lines will be located in Jackson and Martin Counties. The energy from the proposed 100.5 MW project will be delivered to Xcel's Martin County substation located in section 19 of Cedar Township in Martin County, Minnesota. Trimont will deliver power from this project to Great River Energy.

**STATEMENT OF ISSUE**

Should Trimont be granted a site permit under Minnesota Statutes section 116C.694 to construct a 100.5 MW Large Wind Energy Conversion System in northwestern Martin County and northeastern Jackson County?

Based upon the record and proceedings created in this proceeding, the EQB makes the following:

**FINDINGS OF FACT**

**Background and Procedure**

1. On November 18, 2003, Trimont applied for a Certificate of Need from the Minnesota Public Utilities Commission (PUC). Trimont and PUC requested that the EQB prepare the Environmental Report. EQB held a public scoping meeting on the project in Trimont, MN on February 3, 2004, acting as the responsible

party for creating an Environmental Report at the Certificate of Need Stage, pursuant to Minnesota Rules, part 4400.7020. At this meeting, attended by 45-50 people, several topics relevant to site permitting were raised by attendees. EQB staff and Trimont representatives responded at that meeting to questions about access roads, project timing, easement agreements and conditions, location of distribution and feeder lines, and project decommissioning. Other questions raised at that meeting included satellite interference, aerial spraying, lighting, cattle fencing, waterfowl and wildlife impact, wake loss considerations and setback requirements.

2. On March 12, 2004, Trimont filed a site permit application with the Minnesota Environmental Quality Board for up to 100.5 MW of nameplate wind power generating capacity. The LWECS application consists of one project in Jackson and Martin Counties.
3. EQB staff reviewed the application and determined that it complied with the application requirements of EQB rules. On March 22, 2002, EQB staff recommended that the EQB Chair accept Trimont's application. (Exhibit 1)
4. On March 22, 2004, the EQB chair accepted the application and notified Trimont that its application for a site permit for a 100.5 MW LWECS and associated facilities was accepted. (Exhibit 2)
5. Trimont's application was distributed to EQB members. On April 14, 2004, Trimont mailed a copy of the application and notice of its acceptance by the Chair to the Southwest Regional Development Commission, Region Nine Development Commission, the auditors of Jackson and Martin counties, the Trimont city clerk, and each landowner affected by the proposed project. (Exhibit 3)
6. On April 26, 2004, the EQB staff made a draft site permit available on the EQB website for public review and comment and distributed the draft site permit to EQB members, Martin and Jackson County auditors and the city of Trimont. The EQB also mailed notice of the site permit application, the EQB public information meeting and an opportunity to comment on the draft site permit to other interested persons on the EQB's Trimont docket distribution list. (Exhibit 4) The published notice provided: a) location and date of the public information meeting; b) description of the proposed project; c) deadline for public comments on the draft site permit; d) description of the EQB site permit review process; and e) identification of the project manager and public advisor.
7. The EQB published notice of the site permit application, the EQB public information meeting, and an opportunity to comment on the draft site permit in the *Fairmont Sentinel* in Martin County on April 22, 2004. (Exhibit 5)

8. The EQB published notice of the site permit application, the EQB public information meeting, and an opportunity to comment on the draft site permit in the *Jackson Pilot* in Jackson County on April 29, 2004. (Exhibit 6)
9. On April 26, 2004, the EQB published in the *EQB Monitor*, Volume 28, No. 9, notice of the site permit application, the EQB public information meeting, and an opportunity to comment on the draft site permit. (Exhibit 7)
10. The EQB held a public information meeting on May 10, 2004, in Trimont, Minnesota, to receive comments on the site permit application and draft site permit. Approximately 15 people attended the meeting. Representatives from Trimont Wind I, LLC, were also present. Questions were raised at the meeting by one couple claiming their property value had already gone down. They also raised questions about possible future projects and questioned requirements of permitting and project “expansion” as addressed in Minnesota Rules, part 4401.0300, subp. 3. No other attendees raised any questions.

### **The Permittee**

11. PPM Energy, Inc., of Portland, Oregon has formed a general-purpose limited liability company called Trimont Wind I, LLC, which will own and operate the Trimont Project, subject to the participation rights vested in the landowner partnership, Trimont Area Wind Farm, LLC. Landowners in this instance have a financial stake in the project. Landowners in typical wind projects in Minnesota have been merely lessors of their wind rights to an operating company.
12. Trimont Wind I, LLC, has a power purchase agreement with Great River Energy to supply electricity generated by the project.

### **Project Description**

13. The proposed 100.5 MW Trimont Project will consist of up to 67 1.5 MW or larger wind turbine generators mounted on freestanding tubular towers. The project outline area is 22,400 acres over 35 sections in Martin County and Jackson County.
14. The height of each turbine will be approximately 262 feet (80-meters) hub height above grade. Turbine rotor diameter will be approximately 230 (70-meters) to 262 feet (80-meters) across. The overall height of the tower, nacelle and blade will be approximately 377 to 394 feet (115 to 120 meters). The project will also include an underground-automated supervisory control and data acquisition system (SCADA) for communication purposes. Up to two permanent meteorological towers will be used as part of the communication system. Other components of the project include a concrete and steel foundation for each tower, pad-mounted step-up transformers, all weather class 5 roads of gravel or similar

material, and underground electric energy collection system.

15. The proposed wind turbine design is a three-blade, upwind, active yaw, and active aerodynamic control regulated wind turbine with power/torque control capabilities. The rotor utilizes blade pitch regulation and variable speed operation to achieve optimum power output at all wind speeds. The variable speed operation minimizes power and torque spike delivered from the rotor to the drive train resulting in improved long-term reliability.
16. Housed inside the fiberglass nacelle that sits on the top of the tower are the generator, brake system, yaw drive system and other miscellaneous components.
17. Each turbine is equipped with a wind direction sensor. The wind direction sensor communicates with the computer system, which evaluates the measured wind parameters, and with a specified time interval activates the yaw drives to align the nacelle to the wind direction.
18. The blades are made of fiberglass with a smooth layer of gel coat that provides ultraviolet protection. The blades will be either white or black in color. The blades will be equipped with lightning protection. The entire turbine is also grounded and shielded to protect against lightning.
19. Each tower will be secured by a concrete foundation that will vary in size depending on the soil conditions. A control panel that houses communication and electronic circuitry is placed in each tower. In addition, a step-up, pad-mounted transformer is necessary for each turbine to collect the power from the turbine and transfer it to a 34.5 kilovolt (kV) collection system via underground cables.
20. Each turbine is interconnected through an underground electrical collection system at 34.5 kV. At collection points, 34.5 kV overhead feeder lines feed from the project collection system to the independent breaker positions at the substation. The substation steps up the voltage from the collection/feeder system of 34.5 kV to the transmission system level of 345 kV. Trimont is proposing to place the 34.5 kV overhead feeder lines on public road rights-of-way where possible. All of the proposed feeder lines would tie into to the Martin County Substation.
21. All turbines and a meteorological tower system will be interconnected with fiber optic communication cables that will be installed underground. The communication cables will run back to a central host computer either at the substation or at an associated operations and maintenance facility where a supervisory control and data acquisition system will be located.
22. Signals from the current and potential transformers at each of the delivery points will also be fed to the central SCADA [Supervisory Control and Data Acquisition] host computer. The SCADA system will be able to give status

indications of individual wind turbines and the substation and allow for remote control of the wind turbines locally or from a remote computer offsite. This computerized supervisory control and data acquisition system will provide detailed operating and performance information for each wind turbine. Trimont will maintain a computer database for tracking each wind turbine's operations and maintenance history.

### **Wind Resource Considerations**

23. At an elevation of 70 meters above ground level, mean annual wind speed in the project area has been mapped as 7.17 to 7.51 meters/second, or 16 to 16.8 miles/hour. The topography of the area is relatively flat with gently rolling hills and elevations that range between 1,390 and 1,240 feet above sea level. Land use in the area is agricultural with predominately prime farmland. As a result, there are few trees or structures in the proposed project site to inhibit the wind as it passes over the area. Winds show a Midwestern signature in that they blow from many directions rather than a single prevailing direction. The area does show a preference for winds from the south in the summer and northwest in the winter.
24. Wind turbines will be placed along higher elevation features to provide maximum exposure to wind resources. Turbine strings will be typically oriented roughly perpendicular to the prevailing southerly winds. Turbine placement has been designed to provide a minimum of 3 rotor diameters spacing in the east-west direction and a minimum of 6 rotor diameters spacing in the north-south direction, with respect to the predominant energy production directions. Given the prevalence for southerly winds, the spacing is greatest in the north-south direction. Greater spacing between the turbine strings may be used in areas where the terrain dictates the spacing.
25. The separation required between turbines and between strings of turbines under condition III.E.5. of the site permit has varied from one site permit to another. A 3 RD by 6 RD restriction is within the parameters established in other site permits. For example, the NSP Phase III site permit in Pipestone and Lincoln Counties has a minimum spacing of 2 by 6 RD, but most of the turbines are further apart. A 3 by 6 RD separation was authorized in February 2003 for the Moraine Wind project ( Permit No. 01-10-LWECS-NE) in Murray and Pipestone Counties. Generally, because the separation is of concern to the project proposer, the MEQB has accepted the separation requested by the permittee. In this case, Trimont has requested a 3 by 6 RD separation in its application. The purpose of the restriction is to minimize wake loss effects, but there has not been one specific restriction regarding turbine spacing that has been required in all permits.
26. The Project will have a nameplate capacity of 100.5 MW. Assuming net capacity factors of approximately 39 percent projected by the company, average annual output will be approximately 342,000 MW Hours. Gross to net calculations take into account, among other factors, energy losses in the gathering system,

mechanical availability, array losses, and system losses. An industry estimate of energy losses ranges from 8 to 10 percent of maximum output.

27. The project site includes approximately 22,400 acres of land in the townships of Kimball in Jackson County and Cedar in Martin County. The land is predominately agricultural, with some scattered wooded areas mostly around homestead areas, and very few wetlands. The proposed wind turbine site layout in the site permit application shows where the facilities, such as towers, roads and the underground electrical lines, are proposed to be located. These locations are preliminary and subject to change. It is estimated that the proposed facilities will result in the permanent disturbance of approximately 40 acres of land, primarily for roads and towers. Some additional acreage will be temporarily disturbed during construction of the LWECS for contractor staging areas, foundation construction, underground power lines, and tower and turbine assembly. Roads are expected to be about 4.9 meters, or 16 feet, wide Class 5 low profile roads.

### **Land Rights and Easement Agreements**

28. In order to build an LWECS, a developer needs to secure site leases and easement option agreements to ensure access to the site for construction and operation of a proposed project. These lease or easement agreements also prohibit landowners from any activities that might interfere with the execution of the proposed project.
29. Participating landowners are also financial partners in the Trimont Project. They have signed leases and easement options with Trimont Wind I, LLC that provide for annual payments to the landowners, depending on the electricity generated. This arrangement is unique, as no other EQB-permitted wind project has such a relationship between the developer and the landowners.

### **Written Comments and Letters Received by March 26, 2004**

30. By the close of business on March 26, 2004, the EQB had received three comment letters.
31. On May 13, 2004, the Southwest Regional Development Commission forwarded comments from their final review of the project (Exhibit 8). The Board of Directors reviewed the application and found it “consistent with regional policies.”
32. On May 18, 2004, Michelle M. Cords-Swanson of Odin, Minnesota, submitted a comment letter to the EQB (Exhibit 9). The writer is concerned especially with subsequent projects that might create an unacceptable “density” of turbine development around her home. Ms. Cords-Swanson’s other concerns are the long shadows that might be cast by the turbine blades, causing a phenomenon called shadow flicker, and the potentially disorienting effect of turbines operating out of

synchrony.

33. The project as currently configured will place 67 turbines on 19 sections of land (12,260 acres). Considering tower footprints, and access roads, over 99% of the land will remain in its present dominantly agricultural land use.
34. Permit conditions impose setbacks of five rotor diameters from non-participating properties. For the Trimont Project, five rotor diameters are 1,148 to 1,345 feet. While this restriction should avoid shadow flicker on neighboring properties, the EQB will continue to investigate this phenomenon. Also, forcing synchrony in turbine operations would reduce efficiency and production.
35. On May 25, 2004, the Minnesota Department of Natural Resources (DNR) submitted comments on the Project to the EQB (Exhibit 10). DNR states that few sensitive species exist in the project area, primarily due to the minimal availability of natural habitat. DNR “strongly recommends” turbine micro-siting to avoid any remaining sensitive areas. If the preconstruction inventory identifies state-listed bird species nesting in the project vicinity, DNR requests setbacks of 180 meters from the nesting sites.
36. Comparing preliminary turbine siting against aerial photography, DNR noted placement problems with turbines 32, 33, 34 and 36. Trimont responded by re-siting the turbines in question. The DNR prefers 180 meter setbacks from the nearest grasslands, wetlands, waterways and drainage ways. DNR has stated it would like the opportunity to review alignments of overhead feeder lines. Finally, the DNR recommends permit approval. Trimont has orally agreed to comply with the requested 180 meter setback from grasslands, wetlands, waterways and drainage ways.

### **Site Criteria**

37. Minnesota Rules chapter 4401 applies to the siting of Large Wind Energy Conversion Systems. The rules require applicants to provide a substantial amount of information to allow the EQB to determine the potential environmental and human impacts of the proposed project and whether the project is compatible with environmental preservation, sustainable development, and the efficient use of resources. Minn. Rules parts 4401.0450 and 4401.0600. The following analysis addresses the relevant criteria that are to be applied to a LWECS project.

### **Human Settlement, Public Health and Safety**

38. The site is in an area of low population density, with little residential or commercial development on or near the site. As a result, the impact of the proposed LWECS on human settlement, public health and safety will be minimal. The site permit, at part III. C. has conditions for setbacks from residences and roads. The proposed wind turbine layout meets or exceeds those requirements.

39. The Lakefield Junction Generating Station, a GRE-owned Gas and Diesel LEPPG, and the Xcel-owned Martin County Substation are within the project boundaries. The access to transmission and the possibility of compatible upload cycles for the wind project and the generating station were favorable factors in the decision to locate the Trimont project.
40. The proposed project is not expected to affect any water wells or any rural water system that services the area.
41. There will be no displacement of existing residences or structures in siting the wind turbines and related facilities.
42. The project will comply with the Federal Aviation Administration requirements with respect to lighting. See site permit condition III.E.5.
43. Trimont will provide security during construction and operation of the project, including fencing, warning signs, and locks on equipment and facilities. Trimont will also provide landowners and interested persons with safety information about the project and its facilities. See site permit condition III.B.15.
44. In winter months ice may accumulate on the wind turbine blades when the turbines are stopped or operating very slowly. Furthermore, the anemometer may ice up at the same time, causing the turbine to shut down during any icing event. As weather conditions change, any ice will normally drop off the blades in relatively small pieces before the turbines resume operation. This is due to flexing of the blades and the blades' smooth surfaces. Although turbine icing is an infrequent event, it remains important that the turbines are not sited in areas where regular human activity is expected below the turbines or in the immediate proximity during the winter months.
45. Each turbine will be clearly labeled to identify each unit and a map of the site with the labeling system will be provided to local authorities as part of the fire protection plan.

## **Noise**

46. Wind turbines do generate noise. According to sound pressure level tests and estimations provided by Trimont in its application for a site permit, the sound pressure level is expected to be lower than the MPCA nighttime noise standard of 50 dBA at 623 feet. For this project, due to the possibility of cumulative noise levels being generated by the operation of multiple turbines, no turbine will be sited within 672 feet of an occupied residence.

## **Visual Values**

47. The placement of up to 67 turbines will dramatically affect the appearance of the area. The turbine towers and rotor blades will be prominent features on the landscape. There will be expansive views of the turbines to passing motorists on local township and county roads.
48. The visual impact of the wind turbines will be reduced by the use of a neutral paint color. The only lights will be those required by the Federal Aviation Administration. All site permits issued by the EQB require the use of tubular towers; therefore, the turbine towers will be uniform in appearance. The turbine towers will be similar to those used on the PPM Moraine Wind Project in Murray County. The wind turbines in this project, while prominent on the landscape, also blend in with the surrounding area. The project site will retain its rural character.
49. From one perspective, the proposed project might be perceived as a visual intrusion on the natural aesthetic value on the landscape. Wind projects have their own aesthetic quality, distinguishing them from other non-agricultural uses. In the last several years, new wind plants have altered the landscape in the Buffalo Ridge area from agricultural to wind plant/agricultural. This project will add a similar visual impact to the local area. To date, the presence of the wind turbines on Buffalo Ridge has been well accepted by the people who live and work there.
50. Several other measures will be taken to minimize visual intrusion such as: access roads will be low profile and will avoid cuts and fill; the areas affected by construction will be restored after construction is completed; and though turbines are larger than earlier Buffalo Ridge projects, turbine rotor size will require increased turbine spacing to minimize wake loss, therefore the turbines will be spaced further from one another than in some projects on Buffalo Ridge. The visual scale will be similar.

## **Recreational Resources**

51. Recreational opportunities in Martin and Jackson Counties include hunting, fishing, snowmobiling, camping, and hiking. Hunting is permitted in designated state Minnesota Department of Natural Resources wildlife management areas (WMA's), unless otherwise posted.
52. There is only one WMA located within three miles of the external boundary of the project site; there are none within the project boundary. WMA's are managed to provide wildlife habitat, improve wildlife production and provide public hunting and trapping opportunities. These DNR lands were acquired and developed primarily with hunting license fees. WMA's are closed to all-terrain vehicles and horses because of detrimental effects on wildlife habitat.

53. The turbines may be visually noticeable to persons using the WMA. Turbines will not be located in WMA's or any local parks. Turbine operations are not expected to affect the natural areas in any material way and no adverse impact on wildlife management areas or practices is expected.

### **Infrastructure**

54. The proposed wind farm is expected to have a minimal effect on the existing infrastructure. The proposed project will use underground cables for the collector lines on private property within the wind farm. The feeder lines are typically overhead lines and located in public road rights-of-way, but may also be underground if it's necessary to do so. The feeder lines will deliver the energy from the wind farm to the Martin County Substation. Placement of collector and feeder lines is addressed in the site permit at III.E. 8.
55. The project will require the use of public roads to deliver construction supplies and materials to the work site. Site permit condition III.B.8. addresses this topic. Construction of the project requires the addition of several miles of access roads that will be located on private property. The access roads will be routed along the wind turbine strings, fence lines, and field edges to minimize disturbance to agricultural activities. The typical access road will be 16 feet in width and covered in Class 5 gravel (or similar material). The access roads will be low profile roads to allow for the movement of agricultural equipment. The site permit at III.B. 8 (b) addresses this topic. During operation and maintenance of the wind plant, operation and maintenance crews, while inspecting and servicing the wind turbines, will use access roads. Periodic grading or other methods will maintain the roads necessary to maintain road integrity. Trimont may do this work or contract it out.
56. If access roads must be installed across streams or drainage ways, Trimont in consultation with the Minnesota Department of Natural Resources will design, shape and locate the road so as not to alter the original water flow or drainage patterns. Any work required below the ordinary high water line, such as road crossings or culvert installation, will require a permit from the Minnesota Department of Natural Resources.
57. The proposed wind project is not expected to affect water supplies, railroads, radio reception or telecommunication facilities. The presence or operation of the project could potentially impact the quality of television reception in the area. Previous work on this subject indicates that in some cases new antennas or relocation of antennas has solved the problem. Trimont will address the concerns of residents in the area of the project site before and after the project construction to document and mitigate any impacts that might occur. This is addressed in the site permit at III. D. 3.

58. Construction, operation, and maintenance of the proposed wind plant will comply with all required federal and state permit requirements.

### **Community Benefits**

59. The project will provide local tax revenues. No significant adverse impact on public services is expected. Wear and tear on roads will occur as a result of the transport of heavy equipment and other materials. The site permit at III. B. 8. addresses road damages. Landowners with turbines on their property will also receive payments from the Permittee for energy generated by the turbines.
60. To the extent that local workers and local contractors are capable, qualified, and available, Trimont will seek to hire them to construct the proposed project. The hiring of local people will expand employment opportunities in this area of the state and keep money in the local economy. Once constructed, the project will require approximately three operations and maintenance workers.

### **Effects on Land-Based Economies**

61. The wind turbines and access roads will be located so that the most productive farmland will be left as intact as possible. However, the project will displace approximately 40 acres of agricultural land. The site permit at III.B. 2., 3., 4., 5., 6., 7., 8(c), 9., and 10. addresses mitigation measures for agricultural lands. The proposed project does not affect any sand or gravel operations.

### **Archaeological and Historical Resources**

62. All known archaeological and historical sites will be avoided in designing and constructing the project. According to the State Historic Preservation Office (SHPO), there is a good probability that unreported archaeological properties might be present in the project area.
63. SHPO recommends a Phase I archaeology survey for all the proposed turbine locations, access roads, junction boxes and areas of construction impact for the transmission line to document any previously unrecorded archaeological sites within the development site. The site permit at III. D.2. requires an archaeological reconnaissance survey. A Phase I archaeology survey consists of the following tasks: consultation, documentation, and identification.
64. If any archaeological sites are found during the Phase I survey, their integrity and significance will need to be addressed in terms of the site's potential eligibility for listing on the National Register of Historic Places (NRHP). If such sites are found to be eligible for the NRHP, appropriate mitigative measures will need to be developed in consultation with the Minnesota State Historic Preservation Officer, the State Archaeologist, and consulting American Indian communities. The site permit requires the Permittee to stop work and notify the Minnesota

Historical Society and EQB if any unrecorded cultural resources are found during construction.

### **Air and Water Emissions**

65. No harmful air or water emissions are expected from the construction and operation of the LWECS.

### **Animals and Wildlife**

66. Development of the wind farm, including the construction and operation of the project, is expected to produce a minimal impact on wildlife. Based on studies of existing wind power projects in the United States and Europe, the impact to wildlife would be primarily to avian and bat populations. "Final Report-Avian Monitoring Studies at the Buffalo Ridge, Minnesota Wind Resource Area: Results Of A 4-Year Study" (September 2000) identified the following impacts:
- a) Following construction of the wind turbines, there was a reduction in the use of the area within 100 meters of the turbines by seven of 22 species of grassland breeding birds. The authors hypothesized that lower avian use may be associated with avoidance of turbine noise, maintenance activities, and less available habitat. The researchers stated "On a large scale basis, reduced use by birds associated with wind power development appears to be relatively minor and would not likely have any population consequences on a regional level." (p. 44)
  - b) Avian mortality appears to be low on Buffalo Ridge, compared to other wind facilities in the United States, and is primarily related to nocturnal migrants. Resident bird mortality is very low and involves common species. The researchers stated that "based on the estimated number of birds that migrate through Buffalo Ridge each year, the number of wind plant related avian fatalities at Buffalo Ridge is likely inconsequential from a population standpoint". (p. iv)
  - c) Bat mortality was also studied at Buffalo Ridge, instigated by bat collision victims found during the avian monitoring studies. The bat study was conducted in 2001 and 2002. ("Bat Interactions with Wind Turbines at the Buffalo Ridge, Minnesota wind Resource Area," November 2003) The overall conclusion is that bat activity at turbines and the numbers of bat fatalities do not share a statistical relationship. Bat collisions were found to be very rare, given the amount of bat activity documented at the turbines. Most fatalities involved migrating bats, and wind-plant-related mortality "is possibly not sufficient to cause significant, large-scale population declines." (p. 6-1)

67. The impact of wind power development on resident wildlife is expected to be minimal. The only measurable impacts may be a small reduction in the available habitat that some of the resident wildlife use for forage or cover.
68. Mitigation measures are also prescribed in the site permit and include but are not limited to: a) a pre-construction inventory of existing biological resources, native prairie, and wetlands in the project area; b) turbines and associated facilities will not be constructed in wildlife management areas, recreation and state and scientific natural areas; c) trees and shrubs that are important to the wildlife present in the area will not be disturbed; d) sound water and soil conservation practices during construction and operation of the project to protect topsoil and adjacent resources and to minimize soil erosion will be taken. This also applies to any work in proximity to watercourses.

### **Vegetation**

69. No forested land will be affected by the LWECS. No groves of trees or shelterbelts will need to be removed to construct and operate the system. Most of the area has already been reformed through drainage and cultivation. Any remaining native prairie will also be avoided where possible. If native prairie cannot be avoided, the site permit at III. C.6. provides for preparation of a prairie protection and management plan.

### **Soils**

70. Construction of the wind turbines and access roads increases the potential for erosion during construction and converts prime farmland to industrial use. The site permit at III. B. 9. requires a soil erosion and sediment control plan. The project will also require a storm water run-off permit from the Minnesota Pollution Control Agency.

### **Surface Water and Wetlands**

71. No public waters or wetlands are expected to be affected by the LWECS. No towers, access roads or utility lines will be located in surface water or wetlands. See site permit at III.C.5.

### **Future Development and Expansion**

72. The Minnesota Department of Commerce has conducted wind resource assessments (“Wind Resource Analysis Program,” October 2002) and Trimont has done its own review and analysis of meteorological information for the Jackson-Martin County area and the project site. These data suggest that there are windy areas in the counties that are large enough to accommodate more wind facilities.

73. The EQB anticipates more site permit applications under Minnesota Statutes section 116C.694 (a). The EQB is responsible for siting of LWECS "in an orderly manner compatible with environmental preservation, sustainable development, and the efficient use of resources." Minnesota Statutes section 116C.693.
74. Minnesota Statutes section 116C.57, subd. 4 requires consideration of design options that might minimize adverse environmental impacts. By using large turbines, fewer turbines are required per megawatt, reducing siting needs for turbines and related facilities. Turbines must also be designed to minimize noise and aesthetic impacts. Buffers between strings of turbines are designed to protect the turbines' production potential. The site permit also provides for buffers between adjacent wind generation projects to protect production potential. See site permit at III.C.1.
75. The location and spacing of the turbines are critical to the issues of orderly development and the efficient use of wind resources. Turbines are likely to be located in the best winds, and the spacing dictates, among other factors, how much land area the project occupies. There is strong public support for orderly development.
76. One efficiency issue is the loss of wind in the wake of turbines. When wind is converted to rotational energy by the blades of a wind turbine, energy is extracted from the wind. Consequently, the wind flow behind the turbine is not as fast and is more turbulent than the free-flowing wind. This condition persists for some distance behind the turbine as normal wind flow is gradually restored. If a turbine is spaced too close downwind of another, it produces less energy and is less cost-effective. This is the wake loss effect. If the spacing is too far, wind resources are wasted and the projects' footprint on the land is unnecessarily large.
77. For this project, turbine spacing maximizes use of the available wind resources and minimizes wake and array losses within the topographical context of the site. Site topography and wind resources did not lead to a layout involving long strips of turbines running parallel to each other and perpendicular to the prevailing wind. Instead, the site uses shorter strings. The objective was to capture the most net energy possible from the best available wind resource. Allowing for setback from roads and residences and avoiding grasslands and other sensitive areas, Trimont arrived at a minimum turbine spacing of about 3 rotor diameter spacing in the east-west direction and 6 rotor diameter spacing in the north-south direction. Given the prevalence for southerly winds, the spacing between turbines is greatest in the north-south direction. Trimont reports that based upon its own wake loss evaluation, the estimated array losses will be approximately five percent.

78. Other factors that lead to discounts were assumed to be identical for all arrays and include turbine availability (2 %); transformer and line loss (1%); control algorithm, yaw error, turbulence (1.5%); and icing (2%).

### **Maintenance**

79. Maintenance of the turbines will be on a scheduled, rotating basis with one or two units normally off for maintenance each day, if necessary. Maintenance on the interconnection points will be scheduled for low wind periods and coordinated with Great River Energy. Trimont will be staffed with a couple of full time site technicians and a wind plant supervisor.

### **Decommissioning and Restoration**

80. Trimont as the Permittee is responsible for all costs to decommission the Project and associated facilities. Decommissioning activities will include (1) removal of all turbines and towers; (2) removal of all pad mounted transformers; (3) removal of all above-ground distribution facilities; (4) removal of foundations to a depth of four feet below grade; and (5) removal of surface road material and restoration of the roads and turbine sites to previous conditions to the extent feasible. The Permit requires Trimont to submit a Decommissioning Plan to the EQB that describes how Trimont will ensure that the resources are available to pay for decommissioning the project at the appropriate time. Under the landowner agreements, the Lessee (Trimont) must demonstrate to the Lessor (landowner) its financial ability to perform its obligations, which include decommissioning.

### **Site Permit Conditions**

81. Nearly all of the conditions contained in this site permit were established as part of the site permit proceedings of other wind turbine projects permitted by the EQB. The site permit contains conditions that apply to site preparation, construction, cleanup, restoration, operation, maintenance, abandonment, decommissioning and all other aspects of the project. No significant comments were received concerning the requirements in the draft site permit distributed for comment on April 26, 2004.
82. Trimont raised a couple of issues that require some modification in the language of the draft permit. These changes are in conditions III.C.3., III.E.5, and III.H.2.
83. Permit Condition III.C.3. requires a setback from public road rights-of-way of at least 250 feet. The purpose of this requirement is to minimize the possibility of ice being thrown from the turbine blades onto nearby roadways in the winter time and to allow for possibility of the county upgrading the road in the future and requiring a wider right-of-way. The EQB has consistently interpreted this permit condition to apply to the edge of the right-of-way, not the centerline of the road.

84. Trimont has found through micrositing that several preferred locations for turbines are closer than 250 feet from the edge of the right-of-way of the nearest road, although the sites are 250 feet from the centerline. If Trimont were to be required to move these turbines farther from the edge of the road right-of-way, additional turbines in the string would not meet the rotor diameter separation between turbines found in Permit Condition III.E.5, and would have to be moved. Rather than allow the turbines to be closer than 250 feet to the edge of the road right-of-way, a change in Permit Condition III.E.5. is included to allow some turbines to be closer together than the minimum separation. This would allow Trimont to move the turbine closest to the road a few feet to be farther from the road and closer to the adjacent turbine, without having to move any other turbine locations in the string. In order to expedite consideration of a request by the Permittee to place some turbines closer together than the specified separation, it is appropriate to delegate to the EQB Chair the authority to grant that approval. However, it is also appropriate to limit that discretion to a maximum of 10% of the turbines so that a request for additional turbines must be brought to the full Board for consideration.
85. The EQB requires in its wind permits (Permit Condition III.H.2) that the permittee report periodically on various factors relating to turbine performance. Permittees have generally complied with this requirement by providing the EQB with viewer access to its supervisory control and data acquisition (SCADA) system. Trimont has raised some concerns about providing the EQB with access to its SCADA system, although it is perfectly willing to provide hard copies of the data. The major concern is whether Trimont will violate any requirements imposed by the federal government or national utility organizations like the North American Electric Reliability Council. It is appropriate to recognize in the permit that Trimont will not be required to provide access to its SCADA system if to do so would cause Trimont to violate other requirements that are imposed on it. Also, once the Permittee provides the software necessary to provide access, it will be the responsibility of the EQB to maintain its own computer system to continue to have the access required.

Based on the foregoing findings, the Minnesota Environmental Quality Board makes the following:

### **CONCLUSIONS OF LAW**

1. Any of the foregoing findings, which more properly should be designated as conclusions, are hereby adopted as such.
2. The Minnesota Environmental Quality Board has jurisdiction under Minnesota Statutes section 116C.694 over the site permit applied for by Trimont Wind I, LLC.

3. The Trimont Wind I, LLC application for a site permit was properly filed and noticed as required by Minnesota Statutes section 116C.94 and Minnesota Rules parts 4410.0460 subp 2 and 4401.0550 subp 2.
4. The Minnesota Environmental Quality Board has afforded all interested persons an opportunity to participate in the development of the site permit and has complied with all applicable procedural requirements of Minnesota Statutes section 116C.694 and Minnesota Rules Chapter 4401.
5. No objections were filed with the Minnesota Environmental Quality Board by any governmental unit, affected landowner or any other interested person during the 30-day comment period, and no public hearing was requested or is required.
6. The Minnesota Environmental Quality Board is the agency directed to carry out the legislative mandate to site LWECS in an orderly manner compatible with environmental preservation, sustainable development and the efficient use of resources. The proposed Trimont Wind I, LLC, 100.5 MW LWECS project will not create significant human or environmental impacts and is compatible with environmental preservation, sustainable development, and the efficient use of resources.
7. The Minnesota Environmental Quality Board has the authority under Minnesota Statutes section 116C.694 to establish conditions in site permits relating to site layout and construction and operation and maintenance of an LWECS. The conditions contained in the site permit issued to Trimont Wind I, LLC, are appropriate and necessary and within the Minnesota Environmental Quality Board's authority.

Based on the foregoing Findings of Fact and Conclusions of Law, the Minnesota Environmental Quality Board issues the following:

**ORDER**

The Environmental Quality Board hereby issues a site permit to Trimont Wind I, LLC, in the form attached hereto. The site permit authorizes Trimont Wind I, LLC, to construct and operate a 100.5-megawatt large wind energy conversion system in the counties of Jackson and Martin in accordance with the conditions contained in the site permit for EQB Docket No. 03-72-LWECS-Trimont.

Approved and adopted this 17<sup>th</sup> day of June, 2004.

STATE OF MINNESOTA  
ENVIRONMENTAL QUALITY BOARD

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Robert A. Schroeder, Chair