

BEFORE THE OHIO POWER SITING BOARD
Application of a Certificate of Environmental Compatibility and Public Need
Blue Creek Wind Farm
Table of Contents

	<u>Page No.</u>
List of Figures	xii
List of Tables	xiii
List of Appendices	xv
Glossary	xvi
4906-17-02 Project Summary and Facility Overview	2-1
(A) Project Summary and Overview of the Proposed Project.....	2-1
(1) General Purpose of the Facility.....	2-2
(2) Facility Description.....	2-3
(3) Site Selection Process	2-4
(a) High Quality Wind Resource.....	2-4
(b) Suitable Transmission.....	2-4
(c) Available Land and Land Use Constraints	2-5
(d) Ecological and Environmental Impacts	2-5
(e) Community Support.....	2-6
(f) Site Accessibility	2-6
(4) Principal Environmental and Socioeconomic Considerations	2-7
(a) Ecological	2-7
(b) Land Use and Community Development.....	2-9
(c) Socioeconomic	2-9
(d) Cultural Resources	2-10
(e) Noise	2-11
(f) Visual Impact	2-12
(5) Project Schedule.....	2-13

4906-17-03	Project Description and Schedule	3-1
(A)	Proposed Facility Description.....	3-1
(1)	Project Description.....	3-1
(a)	Types of Turbines	3-1
(b)	Land Area Requirements	3-2
(i)	Access Roads	3-4
(ii)	Temporary Staging and Construction Laydown Area.....	3-5
(iii)	Operation and Maintenance Building	3-5
(iv)	Temporary Concrete Batch Plant.....	3-6
(2)	Description of Equipment.....	3-6
(a)	Wind Energy Turbines.....	3-6
(3)	Description of New Transmission Lines.....	3-7
(4)	Description of New Substations.....	3-8
(5)	Description of Met Tower.....	3-9
(6)	Description of SODAR.....	3-9
(B)	Detailed Project Schedule.....	3-9
(1)	Project Schedule.....	3-9
(2)	Delays	3-12
4906-17-04	Project Area Analyses.....	4-1
(A)	SITE SELECTION STUDY	4-1
(1)	General.....	4-1
(a)	Siting Criteria.....	4-1
(i)	High Quality Wind Resource.....	4-1
(ii)	Suitable Transmission.....	4-2
(iii)	Available Land and Land Use.....	4-2
(iv)	Environmental or Ecological Considerations	4-3
(b)	Relevant Factors in the Site Selection Process	4-4
(i)	Wind Resource.....	4-4

	(ii)	Available Land and Land Use Constraints	4-5
	(iii)	Environmental or Ecological Considerations	4-5
	(iv)	Site Accessibility	4-13
	(v)	Community Support.....	4-14
	(2)	Constraint Map.....	4-14
	(B)	SUMMARY TABLE OF EVALUATED SITES.....	4-15
4906-17-05		Technical Data	5-1
	(A)	PROJECT AREA SITE	5-1
	(1)	Geography and Topography	5-1
	(2)	Aerial Photography	5-2
	(3)	Site Mapping.....	5-2
	(4)	Geology and Seismology	5-2
	(a)	Site Geology.....	5-3
	(b)	Geologic Hazards.....	5-5
	(c)	Soil Suitability	5-8
	(5)	Hydrology and Wind.....	5-10
	(a)	Water Budgets.....	5-10
	(i)	Surface Water Resources	5-10
	(ii)	Groundwater Resources	5-13
	(iii)	Construction Water Usage	5-14
	(iv)	Operation Water Usage.....	5-15
	(b)	Floods and High Winds	5-15
	(i)	Floods.....	5-15
	(ii)	Winds	5-16
	(c)	Maps.....	5-17
	(B)	LAYOUT AND CONSTRUCTION.....	5-17
	(1)	Project Area Site Activities.....	5-17
	(a)	Wind Turbine Foundation.....	5-21
	(b)	Underground Electric Collection System	5-22

(c)	Aboveground Collection Lines	5-23
(d)	Substations	5-24
(e)	O&M Building	5-24
(f)	Test Borings and Cone Penetrating Test.....	5-24
(g)	Removal of Vegetation	5-25
(h)	Grading and Drainage	5-27
(i)	Access Roads	5-27
(j)	Removal and Disposal of Debris	5-28
(k)	Post-Construction Reclamation	5-28
(2)	Layout	5-29
(a)	Wind-Powered Electric Generation Turbines.....	5-29
(b)	Transformers and Collection Lines.....	5-29
(c)	Construction Laydown Areas	5-29
(d)	Transmission Lines	5-29
(e)	Substations	5-30
(f)	Transportation Facilities and Access Roads	5-30
(g)	Security Facilities.....	5-30
(h)	Grade Elevations	5-30
(i)	Other Pertinent Installations	5-30
(3)	Structures	5-31
(a)	Estimated Overall Dimensions	5-31
(b)	Construction Materials.....	5-31
(c)	Color and Texture of Facing Surfaces	5-32
(d)	Photographic Interpretation or Artist’s Pictorial Sketches	5-32
(e)	Unusual Features.....	5-33
(4)	Plans for Construction.....	5-33
(5)	Future Plans	5-34
(C)	EQUIPMENT	5-35
(1)	Wind Powered Generation Equipment	5-35
(a)	Wind Energy Turbines.....	5-35
(i)	Nacelle	5-36

	(ii)	Rotors	5-36
	(iii)	Tower	5-37
	(iv)	Foundation	5-37
	(b)	Electrical Components	5-37
	(i)	34.5 kV Electric Collection System.....	5-37
	(ii)	115 kV Electric Line.....	5-38
	(iii)	Substations	5-38
(2)		Safety Equipment.....	5-39
	(a)	Proposed Major Public Safety Equipment.....	5-40
	(i)	Construction.....	5-41
	(ii)	Operation.....	5-42
	(b)	Reliability of Equipment.....	5-45
	(c)	Turbine Manufacturer’s Safety Standards	5-46
(3)		Any Other Major Equipment	5-46
	(a)	O&M Building.....	5-46
	(b)	Met Tower(s)	5-47
	(c)	SODAR Unit.....	5-47
	(d)	Temporary Concrete Batch Plant.....	5-47
(D)		REGIONAL ELECTRIC POWER SYSTEMS	5-48
	(1)	Interconnection Queue	5-48
	(a)	Name of the Queue	5-48
	(b)	Web Link of the Queue.....	5-48
	(c)	Queue Number	5-48
	(d)	Queue Date.....	5-48
	(2)	System Studies	5-48
	(a)	Feasibility Study	5-49
	(b)	System Impact Study	5-49
	(c)	Facilities Study.....	5-49
4906-17-06		Financial Data	6-1
(A)		OWNERSHIP	6-1

	(B)	CAPITAL AND INTANGIBLE COSTS	6-2
	(1)	Capital and Intangible Cost Estimates	6-2
	(2)	Cost Comparison.....	6-3
	(3)	Tabulation of Present Worth and Annualized Capital Costs	6-5
	(C)	OPERATION AND MAINTENANCE EXPENSES	6-5
	(1)	Estimate of Annual Operation and Maintenance Costs	6-5
	(2)	Cost Comparison.....	6-5
	(3)	Present Worth and Annualized Capital Costs.....	6-5
	(D)	DELAYS.....	6-6
4906-17-07		Environmental Data	7-1
	(A)	GENERAL.....	7-1
	(B)	AIR.....	7-1
	(1)	Preconstruction	7-2
	(a)	Ambient Air Quality	7-2
	(b)	Applicable State/Federal Air Quality Regulations	7-3
	(c)	List of Required Permits	7-5
	(d)	Compliance Plans.....	7-5
	(i)	(d)(1) Concrete Batch Plant Compliance.....	7-5
	(e)	Batch Plant Monitoring, Recordkeeping, and Reporting.....	7-10
	(i)	(d)(2) Unpaved Roadways and Parking Areas Compliance	7-10
	(ii)	Unpaved Roads Monitoring, Recordkeeping, and Reporting.....	7-13
	(2)	Construction.....	7-13
	(3)	Operation.....	7-14
	(C)	WATER	7-16
	(1)	Surface Water.....	7-17
	(2)	Groundwater	7-18

	(3)	Preconstruction	7-18
	(4)	Construction.....	7-19
		(a) Permits	7-19
		(b) Aquatic Discharges	7-21
		(c) Mitigation Plans	7-22
		(d) Changes in Flow Patterns and Erosion	7-23
	(5)	Operation.....	7-23
		(a) Quantitative Flow Diagram.....	7-24
		(b) Conservation Practices.....	7-24
	(D)	SOLID WASTE.....	7-24
		(1) Preconstruction	7-25
		(a) Debris and Solid Waste.....	7-25
		(2) Construction.....	7-25
		(a) Debris and Solid Waste Generated	7-25
		(b) Storage and Disposal Methods.....	7-25
		(3) Operations	7-26
		(a) Solid Wastes Generated	7-26
		(b) Treatment, Transport, and Disposal.....	7-26
		(4) Licenses and Permits.....	7-26
4906-17-08		Social and Ecological Data	8-1
	(A)	HEALTH AND SAFETY.....	8-1
		(1) Demographic Characteristics	8-1
		(2) Noise	8-3
		(a) Construction Noise Levels	8-4
		(i) Blasting activities.....	8-8
		(ii) Operation of earthmoving equipment	8-8
		(iii) Driving of piles	8-9
		(iv) Erection of structures	8-9
		(v) Truck traffic	8-9

	(vi)	Equipment installation	8-9
	(b)	Operational Noise Levels.....	8-9
	(c)	Location of Noise Sensitive Areas.....	8-13
	(d)	Mitigation of Noise Emissions.....	8-13
(3)		Water.....	8-14
	(a)	Impact to Public and Private Water Supplies	8-14
	(b)	Construction Water Impacts	8-16
	(c)	Operation Water Impacts	8-17
(4)		Ice Throw	8-18
(5)		Blade Shear	8-19
(6)		Shadow Flicker	8-20
	(a)	Shadow Flicker Analysis	8-21
	(b)	Shadow Flicker Results.....	8-23
	(c)	Mitigation Measures	8-26
(B)		ECOLOGICAL IMPACT.....	8-26
(1)		Project Site Information.....	8-26
	(a)	Mapping	8-27
	(b)	Vegetative Survey.....	8-27
	(i)	Upland Habitats	8-27
	(ii)	Wetland Habitats.....	8-29
	(c)	Animal Life Survey.....	8-34
	(i)	Mammals.....	8-35
	(ii)	Amphibians.....	8-36
	(iii)	Reptiles	8-38
	(iv)	Birds.....	8-39
	(v)	Raptor Study	8-41
	(d)	Summary of Ecological Studies.....	8-43
	(e)	Major Species List	8-43
	(i)	Commercial Species.....	8-43
	(ii)	Recreational Species	8-45
	(iii)	Federally Listed Species	8-47

	(iv)	State Listed Species	8-48
(2)		Construction.....	8-48
	(a)	Impact of Construction	8-48
		(i) Upland Habitat.....	8-48
		(ii) Wetlands and Waterbodies	8-49
	(b)	Impact of Construction on Major Species	8-51
	(c)	Mitigation of Short and Long-term Construction Impacts	8-52
(3)		Operation.....	8-52
	(a)	Estimate the Impact of Operation on Areas.....	8-52
	(b)	Estimate the Impact of Operation on Major Species	8-53
	(c)	Mitigation of Impacts.....	8-53
	(d)	Post-Construction Monitoring of Wildlife Impacts	8-53
(C)		ECONOMICS, LAND USE AND COMMUNITY DEVELOPMENT	8-55
(1)		Land Uses.....	8-55
	(a)	Land Use Map.....	8-56
	(b)	Residential Structures In Relation to the Boundary of the Proposed Facility	8-56
	(c)	Wind Turbine Structure Locations.....	8-58
		(i) Distance from base to property line	8-58
		(ii) Distance from blade to residential structure	8-58
		(iii) Waiver of minimum setback.....	8-59
	(d)	Impact of Proposed Facility	8-59
	(e)	Identification of Structures to be Removed or Relocated.....	8-60
	(f)	Plans for Future Use.....	8-60
	(g)	Concurrent or Secondary Uses.....	8-61
(2)		Economics.....	8-61
	(a)	Estimated Payroll	8-61
	(b)	Estimated Employment.....	8-62
	(c)	Estimated Tax Revenue	8-63
	(d)	Estimated Economic Impact	8-63
(3)		Public Services and Facilities	8-64

(a)	Sewerage and Sewer Treatment.....	8-64
(b)	Water.....	8-64
(c)	Solid Waste Management.....	8-65
(d)	Police Protection.....	8-66
(e)	Fire Protection and Emergency Response.....	8-66
(f)	Health Care.....	8-67
(g)	Schools.....	8-69
(4)	Impact on Regional Development.....	8-69
(a)	Description.....	8-69
(i)	Housing.....	8-69
(ii)	Commercial and Industrial Development.....	8-70
(iii)	Transportation System Development.....	8-72
(b)	Compatibility with Regional Plans.....	8-74
(D)	CULTURAL IMPACT.....	8-75
(1)	Landmarks of Cultural Significance.....	8-75
(a)	Archeological Investigation.....	8-75
(b)	Architectural Investigation.....	8-78
(i)	Built Resources.....	8-78
(ii)	Historic Districts.....	8-79
(iii)	Rural Schools.....	8-79
(iv)	Agricultural Properties.....	8-80
(v)	Individual Properties.....	8-80
(2)	Estimated Impacts on Landmarks.....	8-80
(a)	Archeological Resources.....	8-80
(b)	Built Resources.....	8-81
(3)	Consideration of Landmarks.....	8-82
(4)	Mapping Landmarks.....	8-83
(5)	Recreational Areas.....	8-83
(6)	Visual Impacts.....	8-84
(E)	PUBLIC RESPONSIBILITY.....	8-84

(1)	Public Information Program	8-84	
(2)	Liability Insurance	8-88	
(3)	Evaluation of Interference with Radio and Television	8-88	
	(a) Microwave	8-89	
	(b) Radio	8-89	
	(c) Television.....	8-89	
	(d) Cellular and Personal Communication Systems	8-90	
(4)	Evaluation of Interference with Military Radar.....	8-91	
(5)	Evaluation of Impact to Roads and Bridges	8-91	
(6)	Plan for Decommissioning.....	8-93	
(F)	AGRICULTURAL DISTRICT IMPACT	8-96	
	(1) Agricultural District Mapping.....	8-96	
	(2) Impact Assessment on Agricultural Land.....	8-96	
		(a) Field Operations.....	8-97
		(b) Irrigation	8-98
		(c) Field Drainage Systems	8-98
	(3) Mitigation for Agricultural Land Impacts.....	8-99	
	(4) Agricultural Land Viability Assessment.....	8-101	
	References.....	9-1	

LIST OF FIGURES

- 2-1 Blue Creek Wind Farm Area Project Location Map
- 2-2 Blue Creek Wind Farm Project Schedule

- 3-1 Blue Creek Wind Farm Area Project Location Map
- 3-2 Blue Creek Wind Farm Project Schedule

- 4-1 Blue Creek Wind Farm Area Constraint Map

- 5-1 Blue Creek Wind Farm Area Geography and Topography
- 5-2 Blue Creek Wind Farm Area Aerial Photography Map
- 5-3 Blue Creek Wind Farm Area Site Map
- 5-4 Blue Creek Wind Farm Area Glacial Drift Thickness
- 5-5 Blue Creek Wind Farm Area Bedrock Geology
- 5-6 Blue Creek Wind Farm Area Seismic Map
- 5-7 Blue Creek Wind Farm Area Problem Soils Map
- 5-8 Blue Creek Wind Farm Area Ground Water Resources
- 5-9 Blue Creek Wind Farm Area Floodplains
- 5-10 Blue Creek Wind Farm Area Layout and Construction

- 6-1 Cost Comparisons for Other IBR Projects

- 8-1 Estimated Construction Noise Levels
- 8-2 Blue Creek Wind Farm Area Sound Sensitive Resources
- 8-3 Blue Creek Wind Farm Area Ecological Map
- 8-4 Blue Creek Wind Farm Area Land Use Map
- 8-5 Blue Creek Wind Farm Area Cultural Resources Map Site Map
- 8-6 Blue Creek Wind Farm Agricultural District Properties

LIST OF TABLES

- 3-1 Wind Turbines under Consideration for the Facility
- 3-2 Anticipated Land Requirements for Construction and Operation of the Blue Creek Wind Farm

- 5-1 Summary of Geotechnical Parameters for Foundation Design
- 5-2 Geologic and Geotechnical Hazards Summary
- 5-3 Relevant Water Quality Data for the Project Area

- 6-1 Cost Comparisons for Other IBR Projects

- 7-1 Ambient Air Monitoring Data near Van Wert and Paulding Counties
- 7-2 Emission Limits Required by General Permit 4.2 for Central Ready Mix Concrete Batch Plants
- 7-3 Emission Limits Required by General Permit 5.1 for Unpaved Roadways
- 7-4 Air Emissions Potentially Avoided by Operation of the Facility (assuming Ohio existing generation fleet)
- 7-5 Air Emissions Potentially Avoided by Operation of the Facility (assuming coal-fired power generation)
- 7-6 Air Emissions Potentially Avoided by Operation of the Facility (assuming natural gas-fired power generation)
- 7-7 Water-Related Permits to be Obtained

- 8-1 Populations of Communities within 5 Miles of the Facility
- 8-2 Definitions of Acoustical Terms
- 8-3 RCNM Construction Equipment Noise Levels
- 8-4 Construction Equipment Noise Levels versus Distance
- 8-5 Summary of Predicted Facility Noise Levels
- 8-6 Predicted Shadow Flicker
- 8-7 Residential Structures within 100 feet of the Facility
- 8-8 Residential Structures near Facility Components

- 8-9 Land Use within 1 Mile of the Project Area
- 8-10 Local Public Services
- 8-11 Recreational Areas within a 5-Mile Radius of the Facility
- 8-12 Public Meetings and Correspondence
- 8-13 Temporary and Permanent Impacts on the Viability of Agricultural Land

LIST OF APPENDICES

A	Typical O&M Building
B	Typical Drawing of Wind Turbine and Tower
C	Product Data Sheet - General Cable PC 189469
D	Typical Drawing of Support Structures
E	General Design Information for the Met Tower Foundation
F	Photo of a Typical SODAR Unit
G	Motion for Waiver
H	IBR Avian and Bat Protection Plan
I	Federal Aviation Administration Studies
J	Visual Impact Assessment Report
K	Shadow Flicker Analysis Report
L	Preliminary Geotechnical Investigation Report
M	Stormwater Pollution Prevention Plan
N	Typical Drawing of Batch Plant
O	Typical Drawing of Substation
P	Typical Drawing of Turbine Tower Foundation
Q	Brochure of G-90 Turbine
R	Interconnect Feasibility Study
S	System Impact Study
T	Noise Analysis Report
U	Plant Species List
V	Wetland Delineation Report
W	Agency Correspondence
X	Interim Bat Acoustic Monitoring Report
Y	Raptor Nest Survey Report
Z	Archaeology and Architecture Reports
AA	Blue Creek Fact Sheet
BB	Comsearch Studies and Communications with NTIA
CC	Area Transportation Study Maps