



EIGHT POINT WIND ENERGY CENTER

Case No. 16-F-0062

1001.17 Exhibit 17

Air Emissions

Contents

Exhibit 17: Air Emissions	1
17(a) Demonstration of Compliance with Applicable Federal, State, and Local Regulatory Requirements Regarding Air Emissions	1
17(b) Assessment of Existing Ambient Air Quality Levels and Trends	2
17(c) Emissions by Combustion Sources at the Facility	3
17(d) Assessment of the Potential Impacts to Ambient Air Quality That May Result From Pollutant Emissions from the Facility	3
17(e) Offsite Consequence Analysis for Ammonia Stored Onsite	6
References	7

Tables

Table 17-1. Eight Point Wind Energy Center Displaced Emissions Summary 2020-2050.....	4
Table 17-2. Eight Point Wind Energy Center Displaced Vehicle Summary 2020-2050.....	5

Exhibit 17: Air Emissions

New York State's Goals to Reduce Greenhouse Gas Emissions

New York State has determined that its air and water quality, forests, fish and wildlife habitats, people, and communities, are at risk from climate change (NYSDEC, 2009, 2010). In order to reduce greenhouse gases (GHGs) in the atmosphere from anthropogenic causes, which are widely acknowledged to contribute to global climate change, New York State has set the following GHG emission reduction goals (NYSEPB, 2015):

- 40% reduction of GHG emissions from 1990 levels by 2030,
- 80% reduction of total carbon emissions by 2050, and
- 50% of electricity generation from renewable energy sources by 2030.

This Exhibit demonstrates that the proposed Project would be compatible with these goals.

17(a) Demonstration of Compliance with Applicable Federal, State, and Local Regulatory Requirements Regarding Air Emissions

Section 111 of the Clean Air Act (CAA) authorizes the U.S. Environmental Protection Agency (EPA) to develop technology-based standards which apply to specific categories of stationary sources. These standards are referred to as New Source Performance Standards (NSPS) and are found in Title 40 of the Code of Federal Regulations (40 CFR) Part 60. The NSPS are developed and implemented by the EPA and are delegated to the states. There are approximately 100 NSPS, which apply to new, modified, and reconstructed affected facilities in specific source categories. There are no NSPS which apply to wind turbines.

Section 112 of the CAA requires that the EPA develop and enforce regulations to protect the public from exposure to airborne contaminants that are known to be hazardous to human health and are not covered by the National Ambient Air Quality Standards (NAAQS). National Emission Standards for Hazardous Air Pollutants (NESHAP) are established to control the emissions of air toxics from sources in an industry group or source category. NESHAPs are found in 40 CFR Parts 61 and 63. There are no NESHAPs which apply to wind turbines.

The New York State Department of Environmental Conservation (NYSDEC) Division of Air Resources (DAR) administers an air permitting program under New York State statutes and regulations (most notably, 6 NYCRR Part 201) and the CAA. Prior to commencing construction, a major stationary source (i.e., facility whose potential air pollution emissions exceeds certain thresholds) must obtain a Title V Facility Permit, which contains all regulatory requirements applicable to all sources at the facility. In addition, certain non-major stationary sources must obtain a State Facility Permit prior to commencing construction. Also, some categories of emission sources that do not require an air permit must nevertheless obtain a Facility Registration which requires that the owners notify the Department,

provide information regarding facility operations, and satisfy certain regulatory requirements. Wind turbines generate electricity without emitting air pollutants. Therefore, the proposed Project will not require a Title V Facility Permit, State Facility Permit, or a Facility Registration.

The Acid Rain Program (ARP) was established by Title IV of the 1990 Clean Air Act Amendments. It requires major emission reductions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x), the primary precursors of acid rain, from the power sector. The SO₂ program sets a cap on the total amount of SO₂ that may be emitted by electric generating units (EGUs) in the contiguous United States. NO_x reductions under the ARP are achieved through a program that applies to certain coal-fired EGUs. The ARP will not apply to the proposed Project because it will not burn fossil fuels or emit either SO₂ or NO_x.

There are no applicable local regulatory requirements in Greenwood, West Union or Steuben County pertaining to air emissions.

17(b) Assessment of Existing Ambient Air Quality Levels and Trends

The CAA requires that the EPA set NAAQS for pollutants considered harmful to public health and the environment. NAAQS apply to criteria pollutants [i.e., particulate matter with a diameter ≤ 10 microns (PM₁₀), particulate matter with a diameter ≤ 2.5 microns (PM_{2.5}), nitrogen dioxide (NO₂), SO₂, carbon monoxide (CO), ozone (O₃), and lead (Pb)]. Each NAAQS is expressed in terms of a pollutant concentration level and an associated averaging period.

NYSDEC DAR monitors criteria pollutant and air toxics concentrations at more than 50 sites across New York State. These sites are part of the federally-mandated National Air Monitoring Stations Network and the State and Local Air Monitoring Stations Network. Various private industrial facilities and utilities also monitor air pollution levels. The DAR publishes an annual summary of air quality data for the State. The most recent summary available is the *New York State Air Quality Report for 2016* (NYSDEC, 2017). This report summarizes ambient air quality levels and trends by NYSDEC region. The proposed Project would be located in NYSDEC Region 8¹, where there are four sites that monitor for the following pollutants:

- Pinnacle State Park in Steuben County, which reports ambient air concentration data for O₃, SO₂, CO, and PM_{2.5}.
- Rochester in Monroe County, which reports ambient air concentration data for O₃, SO₂, CO, PM_{2.5}, PM₁₀, and Pb.
- Rochester Near Road in Monroe County, which reports ambient air concentration data for CO and NO₂.
- Williamson in Wayne County, which reports ambient air concentration data for O₃.

¹ Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, and Yates Counties

In 2016, the ambient air quality data collected at the Region 8 monitoring stations were within the acceptable levels defined by the NAAQS for the monitored pollutants (NYSDEC, 2017).

No additional local air monitoring data are available to further define air quality in the immediate vicinity of the proposed Project.

17(c) Emissions by Combustion Sources at the Facility

The proposed Project's wind turbines would generate electricity without combusting fuel. Therefore, a table indicating the rates and amount of emissions as specified by Section 1001.17 paragraph (c) is not applicable to the proposed Project and is not included in this Exhibit.

17(d) Assessment of the Potential Impacts to Ambient Air Quality That May Result From Pollutant Emissions from the Facility

The proposed Project's wind turbines would generate electricity without releasing pollutants to the ambient air. Therefore, operation of the proposed Project would not increase the concentrations of air pollutants in the ambient air or contribute an exceedance of an air quality standard. The anticipated impacts to air quality resulting from Project construction and operation are discussed below.

Construction Related Impacts

Temporary, local, and minor impacts to air quality could result from the operation of construction equipment and vehicles. Impacts from fugitive dust created during site preparation and travel on newly created access roads and unpaved town roads could occur. Additionally, engine exhaust emissions from construction vehicles will occur. Fugitive dust and exhaust emissions would be at low levels and for limited durations, and would not significantly impact local air quality. Any impacts from fugitive dust emissions are anticipated to be short-term and localized, and will be mitigated using dust control measures as described in Exhibit 12.

Two types of temporary emissions sources may be employed during construction. First, diesel generators may provide temporary electrical service to the construction trailers and during wind turbine commissioning. Construction trailers would require only modest amount of electrical power for lighting, heating, cooling, computers, etc. Commissioning activities that require the use of generators typically occur for limited duration and during daylight hours. Second, depending on the proximity, availability and capacity of an acceptable quality ready-mix concrete plant, the Project may require the use of an on-site concrete batch plant. It is anticipated that neither source of temporary emissions would require an air permit or registration. Nevertheless, any required emission controls and mitigation measures would be implemented, and any regulatory approvals would be obtained should the need arise. The construction contractor will be instructed to not leave generators idling when they are not actively providing power. As a result, adverse impacts to air quality are not anticipated.

Operation-Related Impacts

The Project is expected to have almost no operation-related impacts. Small impacts may occur as a result of indirect or direct emissions. Operation of the Project would not generate vented or fugitive air emissions. When operating, the Project would instead displace air emissions from fossil fuel-fired power plants. EPA’s Integrated Planning Model (IPM) v.5.15 (EPA, 2015a), provides forecasted emissions and generation data from 2018 to 2050. Using an in-house program, this data were used to analyze the New York Independent System Operator (NYISO) from 2020 to 2050. EPA’s model predicts that all oil and coal units are retired by 2018. Because the calculated emissions rates are based solely on a natural gas system, the total displaced emissions are likely more conservative than reality. The average emission rates projected for these New York State power plants in 2020 are equal to the following².

- 1,129.7 pounds per megawatt hour (lb/MWh) of carbon dioxide equivalents (CO₂e)
- 1.914 lb/MWh of NO_x
- 5.98 E-04 lb/MWh of SO₂

Using these emission rates, a maximum generating capability of 101.8 megawatts (MW), and an annual capacity factor of approximately 38%, Table 17-1 provides a timeline of projected emissions displaced by the Facility from 2020 to 2050³.

Table 17-1. Eight Point Wind Energy Center Displaced Emissions Summary 2020-2050

Year	CO ₂ (lb/MWh)	NO _x (lb/MWh)	SO ₂ (lb/MWh)	CO ₂ (tons)	NO _x (tons)	SO ₂ (tons)
2020	1,129.68	1.914	5.98E-04	189,394	320.9	0.10
2025	1,120.21	1.90	5.35E-04	187,806	318.5	0.09
2030	1,137.86	1.68	3.73E-04	190,765	281.7	0.06
2040	1,101.47	2.07	4.46E-04	184,664	347.0	0.07
2050	1,073.79	1.97	7.15E-04	180,023	330.3	0.12

The emissions displaced will vary slightly on an annual basis depending on the average emission rates from the electric grid and the actual capacity factor of the Project. The projected annual emission displacement is based on the calculation of emissions data from EPA Integrated Planning Model v.5.15. The displacement of GHG emissions from fossil fuel power plants is an important goal of New York State.

On December 16, 2011 U.S. EPA issued the final rule regulating mercury (Hg) and other toxic metal

² EPA Integrated Planning Model v.5.15 was used to calculate project emission displacement for 2020 -2 050. In the model, the Region Group utilized was NYISO, and the Fuel Type utilized was Natural Gas. Only sources with calculated net capacity factors between 5% and 75% were included in the analysis.

³ For example, (101.8 MW x 8,760 h x 0.376 x 1,129.7 lb CO₂e /MWh) / 2,000 lb/ton= 189,394 tons CO₂e.

emissions from Electric Generating Units (EGUs). The rule and subsequent amendments are codified at Title 40 CFR Subpart UUUUU. Subpart UUUUU establishes emission limits for new and existing EGUs that fire either coal or oil-derived fuels. Limits are not prescribed for EGUs that fire natural gas because they do not emit toxic metals. EPA’s IPM model predicts that all oil and coal EGUs will be retired by 2018. Hence, for the purpose of this Exhibit, it is assumed that operation of the Project would not result in displacement of Pb or Hg emissions.

The expected displaced emissions can be compared to the emissions typical of passenger cars. Based on a MOVES2014a (EPA, 2015b) computer model simulation, the estimated CO₂e and NO_x emission rates for passenger cars driven in New York State during 2020 through 2050 are summarized in Table 2. Note that the emissions profile (i.e., the amount of one pollutant emitted relative to the emissions of other pollutants) of passenger cars is different than the emissions profile of non-baseload power plants.

On average, a licensed driver in New York State drives 11,871 miles per year. While there may not be a single licensed driver for each car, it is reasonable to assume that an average car in New York State travels approximately 12,000 miles per year. Assuming that the average distance traveled per year does not change significantly, it is estimated that operation of the facility in 2020 would displace CO₂e and NO_x emissions from the operation of approximately 47,457 and 251,394 passenger cars⁴ respectively. Estimates for additional years are provided in Table 17-2.

Table 17-2. Eight Point Wind Energy Center Displaced Vehicle Summary 2020-2050

Year	CO ₂ (tons)	NO _x (tons)	CO ₂ (g/VMT)*	NO _x (g/VMT)*	CO ₂ Vehicle Offset [†]	NO _x Vehicle Offset [†]
2020	189,394	320.9	301.7	0.0965	47,457	251,394
2025	187,806	318.5	252.7	0.0477	56,184	504,781
2030	190,765	281.7	214.3	0.0305	67,296	698,231
2040	184,664	347.0	187.7	0.0191	74,376	1,373,436
2050	180,023	330.3	186.0	0.0181	73,169	1,379,565

* gram per vehicle mile traveled

† Number of passenger cars which are predicted to emit CO₂ or NO_x equivalent to the emissions displaced by operation of the Facility, assuming average passenger car travels 12,000 miles per year.

In New York State in 2015, the average residential customer consumed 7.2 megawatt-hours (MWh) of electricity (EIA, 2017a). Using the maximum Project generating capability of 101.8 megawatts (MW), and an annual capacity factor of approximately 38%, the Facility would be expected to supply the annual electrical power needs of approximately 47,000 households.

⁴ For example, (189,394 ton/year CO₂e x 2,000 lb/ton x 453.59 gram/lb) / (12,000 miles/car-year x 301.7 gram/mile) = 47,457 cars.

17(e) Offsite Consequence Analysis for Ammonia Stored Onsite

Ammonia would not be stored or used onsite during Facility construction or operation.

References

- CarInsurance.com (2016). *Average Miles Driven per Year by State*, <http://www.carinsurance.com/Articles/average-miles-driven-per-year-by-state> (Accessed: July 2017).
- EIA (2017a). *2015 Utility Bundled Retail Sales - Residential*. Available at: <https://www.eia.gov/electricity/data.php> (Accessed: July 2017). See “Sales (consumption), revenue, prices & customers”, “Number of customers (annual)”, “Residential sector”.
- EIA (2017b). *Table 10 Supply and Disposition of Electricity, 1990 through 2014*. Available at: <https://www.eia.gov/electricity/state/newyork/> (Accessed: July 2017). See “Full Data Tables 1 - 12”.
- Environmental Protection Agency (EPA) (2015a). *Power Sector Modeling Platform v.5.15. Results Using EPA’s Base Case v.5.15 (Base Case RPE File)* Available at: <https://www.epa.gov/airmarkets/power-sector-modeling-platform-v515> (Accessed: July 2017).
- (EPA) (2015b). *MOVES2014a: Latest Version of Motor Vehicle Emission Simulator (MOVES)*. Available at: <https://www.epa.gov/moves/moves2014a-latest-version-motor-vehicle-emission-simulator-moves> (Accessed: July 2017).
- New York State Department of Environmental Conservation (NYSDEC) (2009). *Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements*. DEC Policy. Issued July 15, 2009.
- NYSDEC (2010). *Climate Change and DEC Action*. DEC Policy CP-49. Issued October 22, 2010.
- NYSDEC (2017). *New York State Ambient Air Quality Report for 2016*. Bureau of Air Quality Surveillance. Available at: http://www.dec.ny.gov/docs/air_pdf/2016airqualreport.pdf (Accessed: July 2017).
- New York State Energy Planning Board (NYSEPB) (2015). *2015 New York State Energy Plan* Available at: energyplan.ny.gov. (Accessed: May 2017).