



# **WATKINS GLEN SOLAR ENERGY CENTER**

**Case No. 17-F-0595**

**1001.17 Exhibit 17**

**Air Emissions**

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## **Exhibit 17: Air Emissions**

This Exhibit will track the requirements of Stipulation 17, dated February 21, 2020, and therefore, the requirements of 16 NYCRR § 1001.17. This exhibit discusses the potential temporary impacts to the ambient air quality resulting from construction of the Project, typical of a commercial construction project. Temporary impacts result from engine exhaust emissions, the generation of fugitive dust during earth-moving activities, and travel on unpaved roads. Back-up generators will not be installed for operation of the Project. The appropriate control and mitigation measures have been identified in this Exhibit to avoid or minimize potential adverse impacts to the maximum extent practicable.

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

#### ***Federal Regulatory Requirements***

Section 111 of the Clean Air Act (CAA) authorizes the United States Environmental Protection Agency (USEPA) to develop technology-based standards for specific categories of stationary sources. The standards, known as the New Source Performance Standards (NSPS), are found in Title 40 of the Code of Federal Regulations (40 CFR) Part 60. The USEPA has developed and implemented the NSPS and delegates the standards to the states. Currently, approximately 100 NSPS exist which apply to new, modified, and reconstructed affected facilities within a specific source category. There is not a NSPS for solar panels since the panels do not emit air pollutants or greenhouse gases (GHGs) during operation.

Section 112 of the CAA requires the USEPA to develop and enforce regulations not covered by the National Ambient Air Quality Standards (NAAQS) to protect the public from exposure to airborne contaminants that are known to be hazardous to human health. The National Emission Standards for Hazardous Air Pollutants (NESHAP) have been established to regulate the emissions of air toxins from sources within the industry group or source category. NESHAPs are found in 40 CFR Part 61 and 63, however the NESHAPs do not apply to solar panels.

The Acid Rain Program (ARP) was established by Title IV of the CAA amendments, requiring major emission reductions of sulfur dioxide (SO<sub>2</sub>) and nitrogen dioxide (NO<sub>x</sub>), the primary precursors of acid rain from the power sector. The Program sets a cap on the total amount of SO<sub>2</sub> that can be emitted by electric generating units (EGUs) within the United States. The ARP has a

program specific to NO<sub>x</sub> reductions which applies to certain coal-fires EGUs. The ARP does not apply to the Project since fossil fuels will not be burned and SO<sub>2</sub> and NO<sub>x</sub> will not be emitted.

### ***State Regulatory Requirements***

(i) 2015 New York State Energy Plan (SEP)

As explained more fully in Exhibit 10, the 2015 New York State Energy Plan (SEP), adopted by the New York State Energy Planning Board pursuant to New York State Energy Law § 6-104 in June 2015, details an extensive range of goals for New York's energy system (Senate Bill S6599). The SEP has been developed based on five Guiding Principles: market transformation, community engagement, private sector investment, innovation and technology, and customer value and choice. The SEP "sets out specific initiatives to increase renewables and... decrease GHG emissions" (SEP at 11). The SEP aims to attract private investment in New York's energy sector and combat climate change among other objectives. The SEP calls for reducing statewide GHG emissions 40% from 1990 levels and generating 50% of the State's electricity from renewable resources by 2030 (SEP at 112). These targets were amended in 2020 to reflect the statutory targets in the Climate Leadership and Community Protection Act targets of generating 70% of the State's electricity from renewables and zero- emission electric generation by 2040. According to the SEP, large-scale renewables have several immediate benefits for the State: "economic development and jobs for communities across the State, greater stability in customer bills, [and] cleaner air..." (SEP at 71).

(ii) Clean Energy Standard (CES)

The New York State Public Service Commission (NYPSC) adopted the CES in August 2016 to ensure New York State will achieve the SEP's 50% by the 2030 goal (NYPSC, 2016). The CES primarily focuses on building new renewable resource power generation facilities (CES at 78) and seeks to reduce the "total emissions of air pollutants resulting from fossil fuel combustion" (CES at 3) (NYPSC, 2016).

Two mechanisms are employed by the CES to achieve the SEP's renewables goal. First, load-serving entities (LSEs) are required to obtain an increasing percentage of their electricity from renewable sources. LSEs demonstrate compliance by purchasing renewable energy credits (RECs) from renewable resources (NYPSC, 2016). Second, the CES authorizes the New York State Energy Research and Development Authority (NYSERDA) to procure RECs from renewables to ensure an increasing number of RECs are available to LSEs (NYPSC, 2016).

Renewables sited within New York State are eligible to sell RECs regardless of their location within the State (NYPSC, 2016).

The NYPSC estimates a maximum of approximately 6,900 megawatts (MW) of utility-scale solar would need to be installed in order to reach the 50% renewables mandate (NYPSC, 2016). Even if 100% of the sites were located on New York agricultural lands, the NYPSC estimates roughly 0.16% of such land would be converted to utility-scale solar (NYPSC, 2016).

(iii) New York State Climate Leadership and Community Protection Act

On July 18, 2019, Governor Andrew Cuomo signed into law the Climate Leadership and Community Protection Act (CL&CPA) (Senate Bill S6599). The CL&CPA increases New York State's renewable energy goal to 70% of electricity from renewable sources by 2030, with 6,000 MW of solar generation by 2025. The CL&CPA ultimately requires that the statewide electrical generation system will be zero emissions by 2040. The CL&CPA is expected to incentivize the procurement of 6,000-MW of distributed photovoltaic (PV) solar generation by 2025.

(iv) Title V

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. Major stationary sources (i.e., facilities whose potential air pollution emissions exceeds a certain threshold) must obtain a Title V Facility Permit prior to the commencement of construction. The Permit contains the regulatory requirements applicable to all sources at the Facility. Solar arrays do not emit air pollutants while generating electricity; therefore, a Title V Facility Permit will not be required for the Project.

***Local Regulatory Requirements***

The Town of Dix has regulations regarding odor, fly ash, dust, fumes, vapors, gases, and other forms of air pollution, as detailed in Exhibit 31. Air pollution shall not cause damage or harm to the public, animals, vegetation, and other forms of property. Pollution in the form of odor, fly ash, fumes, vapors, and gases are not expected as a result of the Project. Dust will be controlled as detailed in the Preliminary Stormwater Pollution Prevention Plan (SWPPP) provided as Appendix 23-3. There are no applicable regulatory requirements in Schuyler County pertaining to air emissions.

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

The CAA requires the USEPA to set NAAQS for pollutants considered harmful to public health and the environment. NAAQS apply to criteria pollutants [i.e., particulate matter with a diameter  $\leq 10$  microns ( $PM_{10}$ ), particulate matter with a diameter  $\leq 2.5$  microns ( $PM_{2.5}$ ), nitrogen dioxide ( $NO_2$ ),  $SO_2$ , carbon monoxide (CO), ozone ( $O_3$ ), and lead (Pb)]. Each NAAQS is expressed in terms of a pollutant concentration level and an associated averaging period.

Criteria pollutant and air toxics concentrations are monitored by DAR at more than 50 sites across New York State. The sites are part of the federally-mandated National Air Monitoring Stations Network and the State and Local Air Monitoring Stations Network. In addition, numerous private industrial facilities and utilities monitor air pollution levels.

An annual summary of air quality data for New York State is published by DAR. The most recent summary available is the New York State Air Quality Report for 2018 (NYSDEC, 2018). The report summarizes the ambient air quality levels and trends by NYSDEC region. The Project is located in NYSDEC Region 8<sup>1</sup> which has five sites that monitor for the following pollutants:

- Rochester in Monroe County (Site Number: 2701-22), which reports ambient air concentration data for  $SO_2$ ,  $PM_{10}$ ,  $PM_{2.5}$ , CO,  $O_3$ , and Lead.
- Cayuga West in Seneca County (Site Number: 4950-01), which reports ambient air concentration data for  $SO_2$ .
- Pinnacle in Steuben County (Site Number: 5001-04), which reports ambient air concentration data for  $SO_2$ ,  $PM_{2.5}$ , and CO.
- Rochester Near Road in Monroe County (Site Number: 2701-23), which reports ambient air concentration data for  $PM_{2.5}$ , CO, and  $NO_2$ .
- Williamson in Wayne County (Site Number: 5863-01), which reports ambient air concentration data for  $O_3$ .

In 2018, 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, 2018).

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<sup>1</sup> Chemung, Genesee, Livingston, Monroe, Ontario, Orleans, Schuyler, Seneca, Steuben, Wayne, and Yates Counties.

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

#### **17(c) Emissions by Combustion Sources at the Facility**

Electricity is generated from the Project's solar arrays without fuel combustion. Therefore, a table detailing the rates and emission amounts as specified by 16 NYCRR § 1001.17 (c) is not applicable to the Project and has not been 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 solar arrays for the Project will generate electricity without releasing pollutants into the ambient air, therefore the operation of the Project would not increase air pollutant concentrations or contribute to an exceedance of the air quality standards. The anticipated air quality impacts 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 typical of construction projects. Impacts from fugitive dust created during site preparation and travel on newly created access roads could occur. Diesel generators may be used to provide temporary electrical service to the construction trailers and during solar panel commissioning. Construction trailers would require only a 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. Additionally, engine exhaust emissions from construction vehicles will occur. Fugitive dust and exhaust emissions would be at low levels and for limited durations, therefore a significant impact to local air quality will not occur. Impacts from fugitive dust emissions are anticipated to be short-term and localized, dust control measures will be deployed to minimize impacts as described in the Preliminary SWPPP, provided as Appendix 23-3.

It is anticipated that none of these sources of temporary emissions would require an air permit or registration. The construction contractor will be instructed not to leave generators idling when they are not actively providing power. In addition, exhaust systems on equipment and construction personnel vehicles will be properly maintained. As a result, adverse impacts to air quality are not anticipated.

### **Operation Related Impacts**

Operation of the Project would not generate vented or fugitive air emissions. During operation, the Project is predicted to displace air emissions from fossil fuel-fired power plants. Refer to Exhibit 8 for the analysis required by the Article 10 regulations.

To supplement that analysis, IPM v.5.15 (USEPA, 2015a) provides forecasted emissions and generation data through 2050. Using an in-house program, this data was used to analyze the New York Independent System Operator (NYISO) through 2050. USEPA's model predicts that all oil and coal units are retired by the date when the Project enters service. The total displaced emissions are likely more conservative than reality since the calculated emissions rate will be based solely on a natural gas system. The average emission rates projected for these New York State power plants in 2023 are equal to the following<sup>2</sup>.

- 1,124 pounds per megawatt hour (lb/MWh) of carbon dioxide equivalents (CO<sub>2</sub>e)
- 1.914 lb/MWh of NO<sub>x</sub>
- 5.60E-04 lb/MWh of SO<sub>2</sub>

Using these emission rates, a maximum generating capacity of 50 megawatts (MW), and an annual capacity factor of approximately 26 percent (26%), Table 17-1 provides a timeline of projected emissions displaced by the Facility from 2023 to 2050<sup>3</sup>.

**Table 17-1. Watkins Glen Solar Energy Center Displaced Emissions Summary from 2023 to 2050**

<b>Year</b>	<b>CO<sub>2</sub> (lb/MWh)</b>	<b>NO<sub>x</sub> (lb/MWh)</b>	<b>SO<sub>2</sub> (lb/MWh)</b>	<b>CO<sub>2</sub> (tons)</b>	<b>NO<sub>x</sub> (tons)</b>	<b>SO<sub>2</sub> (tons)</b>
2023	1,124	1.91	5.60E-04	64,000	108.8	0.0319
2025	1,120	1.90	5.35E-04	63,785	108.2	0.0305
2030	1,138	1.68	3.73E-04	64,790	95.7	0.0212
2040	1,101	2.07	4.46E-04	62,718	117.9	0.0254
2050	1,074	1.97	7.15E-04	61,142	112.2	0.0407

<sup>2</sup> USEPA Integrated Planning Model v.5.15 was used to calculate the project emissions displacement from 2023 to 2050. 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.

<sup>3</sup> For example: (50 MW x 8,760 h x 0.26 x 1,124 lb CO<sub>2</sub>e/MWh)/2,000 lb/ton = 64,000 tons CO<sub>2</sub>e.



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 the USEPA Integrated Planning Model (IPM) v.5.15. The displacement of GHG emissions from fossil fuel power plants is an important goal of New York State.

The USEPA issued the final rule regulating mercury (Hg) and other toxic metal emissions from Electric Generating Units (EGUs) on December 16, 2011. The rule and subsequent amendments are codified at Title 40 CFR Subpart UUUUU. This subpart established 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 since they do not emit toxic metals. USEPA's IPM model predicts that all oil and coal EGUs will be retired prior to the date in which the Watkins Glen Solar Energy Center commences commercial operation. 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 Motor Vehicle Emission Simulator (MOVES) 2014b (USEPA, 2015b) computer model simulation, the estimated CO<sub>2e</sub> and NO<sub>x</sub> emission rates for passenger cars driven in New York State from 2023 to 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.

The Federal Highway Administration (FHWA) reports that an average motor vehicle in New York State travels 12,610 miles per year (USDOT, 2000). Assuming that the average distance traveled per year does not change significantly, it is estimated that operation of the facility in 2023 would displace CO<sub>2e</sub> and NO<sub>x</sub> emissions from the operation of approximately 16,293 and 127,843 passenger cars<sup>4</sup> respectively. Estimates for additional years are detailed in Table 17-2, below.

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<sup>4</sup> For example, (64,000 ton/year CO<sub>2e</sub> x 2,000 lb/ton x 453.59 gram/lb) / (12,610 miles/car-year x 282.6 gram/mile) = 16,292 cars. The minor discrepancy with Table 17.2 is the result of round-off.

**Table 17-2. Watkins Glen Solar Energy Center Displaced Vehicles Summary 2023 to 2050**

Year	CO <sub>2</sub> (tons)	NO <sub>x</sub> (tons)	CO <sub>2</sub> (g/VMT)*	NO <sub>x</sub> (g/VMT)*	CO <sub>2</sub> Vehicle Offset <sup>‡</sup>	NO <sub>x</sub> Vehicle Offset <sup>‡</sup>
2023	64,000	108.8	282.6	0.0612	16,293	127,843
2025	63,785	108.2	252.7	0.0477	18,159	163,167
2030	64,790	95.7	214.3	0.0305	21,750	225,634
2040	62,718	117.9	187.7	0.0191	24,038	443,949
2050	61,142	112.2	186.0	0.0181	23,648	445,845

\* gram per vehicle mile traveled.

‡ Number of passenger cars which are predicted to emit CO<sub>2</sub> or NO<sub>x</sub> equivalent to the emissions displaced by operation of the Facility, assuming average passenger car travels 12,610 miles per year.

In New York State in 2018, the average residential customer consumed 7.25 megawatt-hours (MWh) of electricity (EIA, 2019). During the ten-year period 2009–2018, transmission and distribution losses in New York State averaged 5.12% (EIA, 2019). Using the maximum Project generating capability of 50 MW, and an annual capacity factor of approximately 26 percent (26%), the Facility is anticipated to supply the annual electrical power needs of approximately 14,898 households.

**17(e) Offsite Consequence Analysis for Ammonia Stored On-Site**

During construction and operation, there will be no on-site use or storage of ammonia; therefore, offsite consequences have not been analyzed for the Project.

## References

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