



**Trelina Solar Energy Center, LLC**

**Case No. 19-F-0336**

**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.....	3
17(c) Emissions by Combustion Sources at the Facility .....	5
17(d) Assessment of the Potential Impacts to Ambient Air Quality That May Result from Pollutant Emissions from the Facility .....	5
17(e) Off-site Consequence Analysis for Ammonia Stored Onsite.....	8

## Tables

Table 17-1. Trelina Solar Energy Center Displaced Emissions Summary, 2023-2050 .....	6
Table 17-2. Trelina Solar Energy Center Displaced Vehicle Summary, 2023-2050 .....	8

## **Exhibit 17: Air Emissions**

This Exhibit will track the requirements of proposed Stipulation 17, dated June 19, 2020, and therefore the requirements of 16 New York Codes, Rules and Regulations (NYCRR) § 1001.17. This Exhibit contains a discussion of potential temporary impacts to ambient air quality resulting from the construction of the Trelina Solar Energy Center (Trelina Solar Energy Center or Project). Construction impacts on ambient air quality will be typical of a commercial construction project. Impacts could occur as a result of emissions of engine exhaust, from the generation of fugitive dust during earth moving activities, and travel on unpaved roads. There will be no back-up generator installed for operation of the Project. The appropriate control and mitigation measures to minimize potential adverse impacts are identified.

### **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 U.S. Environmental Protection Agency (EPA) to develop technology-based New Source Performance Standards (NSPS), which apply to new, modified, and reconstructed affected facilities in specified source categories. The NSPS are codified at 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 solar panels, as solar panels do not emit air pollutants or greenhouse gases (GHGs) while in operation.

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 (NESHAPs) are established to control the emissions of air toxins from sources in an industry group or source category. NESHAPs are codified at 40 CFR Parts 61 and 63. There are no NESHAPs that apply to solar panels.

The Acid Rain Program (ARP) was established by Title IV of the 1990 CAA Amendments to reduce power sector emissions of sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>), the primary precursors of acid rain from the power sector. The ARP program caps the total amount of SO<sub>2</sub> that may be emitted by electric generating units (EGUs) in the contiguous United States. NO<sub>x</sub>

reductions under the ARP are achieved through a program that applies to certain coal fired EGUs. The ARP will not apply to the Project because it will not burn fossil fuels or emit either SO<sub>2</sub> or NO<sub>x</sub>.

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

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

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 State'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" (NYSEPB, 2015). 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 by 40% from 1990 levels and generating 50% of the State's electricity from renewable resources by 2030 (NYSEPB, 2015). 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 ..." (NYSEPB, 2015).

#### (ii) Clean Energy Standard (CES)

In August 2016 the New York State Public Service Commission (NYSPSC) adopted the CES to ensure that New York will achieve the SEP's 50% by 2030 goal (NYSPSC, 2016). "The chief focus of the CES initiative is on building new renewable resource power generation facilities" (NYSPSC, 2016). The CES states, "One of the primary benefits of the CES will be a reduction in total emissions of air pollutants resulting from fossil fuel combustion" (NYSPSC, 2016).

The CES employs two related mechanisms to reach the SEP's renewables goal. First, it requires that load-serving entities (LSEs) procure an increasing percentage of their total electrical load service from renewable energy suppliers (NYSPSC, 2016). LSEs demonstrate compliance by buying renewable energy credits (RECs) or by making alternative compliance payments to New York State Energy Research and Development Authority (NYSERDA). Second, to ensure that an increasing number of RECs are available to LSEs, the CES authorizes NYSEDA to solicit the long-term procurement of RECs (NYSPSC, 2016). Renewable energy facilities sited within New York are eligible to sell RECs under this program (NYSPSC, 2016).

In 2016, the PSC's highest projection for installed utility-scale solar to help reach the then 50% renewables mandate was 6,865 megawatts (MW) (NYSPSC, 2016). The NYSPSC notes that even if 100% of these projects were sited on New York agricultural lands, only about 0.16% of such lands would be converted to utility-scale solar (NYSPSC, 2016).

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

On July 18, 2019, the Governor Andrew Cuomo signed into law the Climate Leadership and Community Protection Act (CLCPA) (S6599, 2019). The CLCPA requires that 70% percent of the electric generation secured by LSE regulated by the Public Service Commission be produced by renewable energy systems by 2030, and that the statewide electrical demand system will be zero emissions by 2040. The CLCPA is expected to incentivize the procurement of 6,000-MW of distributed photovoltaic (PV) solar generation by 2025.

(iv) Air Permitting

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 air quality regulatory requirements applicable to 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. Solar panels generate electricity without emitting air pollutants. Therefore, the Project will not require a Title V Facility Permit, State Facility Permit, or a Facility Registration.

***Local Regulatory Requirements***

Neither the Town of Waterloo nor Seneca County have local regulatory requirements pertaining to air emissions.

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

Under authority of the CAA, the EPA sets 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.

NYSDEC DAR monitors criteria pollutant 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. 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 2018* (NYSDEC, 2019). This report summarizes ambient air quality levels and trends by NYSDEC region. The Project would be located in NYSDEC Region 8<sup>1</sup>, where the following sites monitor for the specified pollutants:

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

In addition, the Cayuga East Station (Site Number 5456-01) in Tompkins County (NYSDEC Region 7) is located near the Project. It is a source-oriented monitor established in 2017 to track compliance with the 1-hour  $SO_2$  NAAQS.

During 2016 - 2018, the ambient air quality data collected at the aforementioned monitoring stations were reported within the acceptable levels defined by the NAAQS (NYSDEC, 2019).

---

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

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

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

The Project's solar panels will generate electricity without combusting fuel. Therefore, a table indicating the rates and amount of emissions as specified by 16 NYCRR § 1001.17(c) is not applicable to the 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 Project's solar panels will generate electricity without releasing pollutants to the ambient air. Therefore, operation of the Project will 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, typical of construction projects. Impacts from fugitive dust created during site preparation and travel on access roads and unpaved town roads could occur. Diesel generators may 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 durations and during daylight hours. Additionally, minor 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 the preliminary Stormwater Pollution Prevention Plan (SWPPP) which is provided as Appendix 23-3.

These sources of temporary emissions would not require an air permit or registration. The construction contractor will be instructed to not leave mobile generators idling when they are not needed. As a result, adverse impacts to air quality are not anticipated.

**Operation-Related Impacts**

The Project is expected to commence commercial operation in late 2022. 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. See Exhibit 8 for the analysis required by the Article 10 regulations.

To supplement that analysis, forecasted emissions and generation data were obtained from EPA’s Integrated Planning Model (IPM) v.5.15. Using an in-house program, these data were used to analyze the New York Independent System Operator, Inc. (NYISO) electricity generators through 2050. The IPM predicts that all oil and coal units will be retired prior to the date on which the Project commences commercial operation. Because the calculated emissions rates are based solely on a natural gas system, the total displaced emissions are likely more conservative than actuality. The average emission rates predicted for 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)
- 1.91 lb/MWh of NO<sub>x</sub>
- 5.60E-04 lb/MWh of SO<sub>2</sub>

The average annual capacity factor for solar PV in New York State during the period 2014 through 2018 was 16.8%. (EIA, 2019a). The Project’s maximum generating capability is 79.5 to 80 MW. Using these values and the data from the EPA IPM, emissions displaced by the Project were estimated. Table 17-1 summarizes the predicted emissions displacements through 2050<sup>3</sup>.

**Table 17-1. Trelina Solar Energy Center Displaced Emissions Summary, 2023-2050**

Year	CO2 (lb/MWh)	NOx (lb/MWh)	SO2 (lb/MWh)	CO2 (tons)	NOx (tons)	SO2 (tons)
2023	1,124	1.91	5.60E-04	66,167	112.4	3.30E-02
2025	1,120	1.90	5.35E-04	65,944	111.8	3.15E-02

<sup>2</sup> EPA Integrated Planning Model v.5.15 was used to calculate predicted emission displacement through 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, (80 MW x 8,760 h x 0.168 x 1,124 lb CO<sub>2</sub>e /MWh) / 2,000 lb/ton = 66,167 tons CO<sub>2</sub>e.



**Table 17-1. Trelina Solar Energy Center Displaced Emissions Summary, 2023-2050**

Year	CO2 (lb/MWh)	NOx (lb/MWh)	SO2 (lb/MWh)	CO2 (tons)	NOx (tons)	SO2 (tons)
2030	1,138	1.68	3.73E-04	66,983	98.9	2.20E-02
2040	1,101	2.07	4.46E-04	64,840	121.9	2.63E-02
2050	1,074	1.97	7.15E-04	63,211	116.0	4.21E-02

The emissions displaced will vary slightly on an annual basis depending on the average emission rates from fossil fuel-powered generators that supply electric power to the NYISO grid and the actual capacity factor of the Project. The projected annual emission displacement is based on the calculation of emissions data from the 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 EPA issued the final rule regulating mercury (Hg) and other toxic metal emissions from 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 prior to the date on which the Project 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 (EPA, 2015) computer model simulation, the estimated CO<sub>2</sub> and NO<sub>x</sub> emission rates for passenger cars driven in New York State through 2050 are summarized in Table 17-2. 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) estimates that an average motor vehicle in New York State travels 12,610 miles per year (FHWA, 2018). Using this value, it is predicted that operation of the Project in 2023 would displace CO<sub>2</sub>e and NO<sub>x</sub> emissions from the operation of

approximately 16,844 and 132,170 passenger cars<sup>4</sup>, respectively. Estimates for additional years are provided in Table 17-2.

**Table 17-2. Trelina Solar Energy Center Displaced Vehicle Summary, 2023-2050**

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†	NO <sub>x</sub> Vehicle Offset†
2023	66,167	112.4	282.6	0.0612	16,844	132,170
2025	65,944	111.8	252.7	0.0477	18,774	168,689
2030	66,983	98.9	214.3	0.0305	22,486	233,271
2040	64,840	121.9	187.7	0.0191	24,852	458,975
2050	63,211	116.0	186.0	0.0181	24,449	460,935

\* 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 2018 an average New York State residential customer consumed 7.25 megawatt-hours (MWh) of electricity (EIA, 2019b). During the ten-year period 2009 - 2018, transmission distribution losses in New York State averaged 5.12% (EIA, 2019a). Using the maximum Project generating capability of 80 MW and an annual capacity factor of 16.8%, the Project would be expected to supply the annual electrical power needs of approximately 15,316 residential customers<sup>5</sup>.

**17(e) Off-site Consequence Analysis for Ammonia Stored Onsite**

Ammonia would not be stored or used on site during Project construction or operation.

<sup>4</sup> For example, (66,167 ton/year CO<sub>2</sub>e x 2,000 lb/ton x 453.59 gram/lb) / (12,610 miles/passenger car-year x 282.6 gram/mile) = 16,844 passenger cars

<sup>5</sup> (80 MW x 8,760 h x 0.168) x (1-0.0512) / (7.25 MWh/residential customer) = 15,316 residential customers

## References

- Energy Information Agency (EIA) (2019a). *New York Electricity Profile 2017*. Available at: <https://www.eia.gov/electricity/state/>. (Accessed: January 2020). See “Full data tables 1-14”.
- EIA (2019b). *2018 Utility Bundled Retail Sales - Residential*. Available at: <https://www.eia.gov/electricity/data.php>. (Accessed: January 2020).
- Environmental Protection Agency (EPA) (2015). *MOVES and Related Models*. Available at: <https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves>. (Accessed: January 2020).
- Federal Highway Administration (FHWA) (2018), *State & Urbanized Area Statistics*. <https://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm>. (Accessed: January 2020)
- New York State Senate. 2019. *New York Session Laws Chapter 106 (Senate Bill S6599)*. <https://www.nysenate.gov/legislation/bills/2019/s6599>. Accessed June 2020.
- New York State Department of Environmental Conservation (NYSDEC) (2019). *New York State Ambient Air Quality Report For 2018*. Available at: [https://www.dec.ny.gov/docs/air\\_pdf/2018airqualreport.pdf](https://www.dec.ny.gov/docs/air_pdf/2018airqualreport.pdf). (Accessed: January 2020).
- New York State Energy Planning Board (NYSEPB) (2015). *2015 New York State Energy Plan*. Available at: <https://energyplan.ny.gov/>. (Accessed: January 2020).
- New York State Public Service Commission (NYSPSC) (2016). *Clean Energy Standard*. Available at: <https://www.nyserda.ny.gov/All-Programs/Programs/Clean-Energy-Standard>. (Accessed: January 2020).
- New York Session Laws Chapter 106 Senate Bill S6599 (S6599) (2019). Available at: <https://www.nysenate.gov/legislation/bills/2019/s6599>. (Accessed: January 2020).