



Department of  
Environmental  
Conservation

## Proposed 6 NYCRR Part 227-3, Ozone Season Oxides of Nitrogen (NO<sub>x</sub>) Emission Limits for Simple Cycle and Regenerative Combustion Turbines

The Department of Environmental Conservation is proposing 6 NYCRR Subpart 227-3, "Ozone Season Oxides of Nitrogen (NO<sub>x</sub>) Emission Limits for Simple Cycle and Regenerative Combustion Turbines." The primary goal of this proposal is to lower allowable NO<sub>x</sub> emissions from simple cycle and regenerative combustion turbines during the ozone season. The lower emissions from these sources will help to address Clean Air Act (CAA) requirements, ozone nonattainment and protect the health of New York State residents. This proposal is only applicable to simple cycle and regenerative combustion turbines. This is not a mandate on local governments. It applies to any entity that owns or operates a subject source.

Written comments are accepted through 5:00 pm May 20, 2019 and should be directed to:

Ona Papageorgiou, P.E.  
New York State Department of Environmental Conservation  
Division of Air Resources  
625 Broadway  
Albany, NY 12233-3255  
Phone: (518) 402-8396  
E-mail: [Air.Regis@dec.ny.gov](mailto:Air.Regis@dec.ny.gov)

### More about Proposed 6 NYCRR Part 227-3, Ozone Season Oxides of Nitrogen (NO<sub>x</sub>) Emission Limits for Simple Cycle and Regenerative Combustion Turbines:

[Proposed Part 227-3 Express Terms](#) - The Department is proposing 6 NYCRR Subpart 227-3 to establish lower NO<sub>x</sub> emissions standards for simple cycle and regenerative combustion turbines during the ozone season.

[Proposed Part 227-3 Regulatory Impact Statement Summary](#) - Summary of the Regulatory Impact Statement

[Proposed Part 227-3 Regulatory Impact Statement](#) - A general overview of the regulation detailing, among other things, the statutory authority, need for and justification of the proposal, expected cost and recordkeeping/reporting impacts, and compliance schedule.

[Proposed Part 227-3 Job Impact Statement](#) - Necessary for all regulations affecting 100 or more jobs and employment opportunities, this document details the number and categories of jobs affected, regions of the state suffering a disproportionate impact, and measures taken to minimize any impact on jobs and employment opportunities.

[Proposed Part 227-3 Rural Area Flexibility Analysis](#) - Defined as counties with populations of fewer than 200,000 people and towns in non-rural counties where population density is less than 150 people per square mile, this must state any impacts or requirements imposed upon rural areas. This must also express opportunities provided for rural citizens, businesses or organizations to participate in the rulemaking.

[Proposed Part 227-3 Regulatory Flexibility Analysis for Small Businesses and Local Governments](#) - Consideration of, and steps taken by the Department, to minimize any negative impacts on small businesses (independently owned businesses wholly within New York State of 100 employees or fewer) or local

governments. This includes an explanation of what opportunities were provided to these entities to participate in the rulemaking process.



## Proposed Part 227-3 Express Terms

### 227-3.1 Applicability.

- (a) The provisions of this Subpart apply to owners or operators of simple cycle and regenerative combustion turbines (SCCTs) that are electric generating units with a nameplate capacity of 15 megawatts (MW) or greater and that bid into the New York Independent System Operator (NYISO) wholesale market.
- (b) The provisions of this Subpart only apply during the ozone season.

### 227-3.2 Definitions.

- (a) To the extent that they are not inconsistent with the specific definitions in subdivision (b) of this section, the general definitions of Part 200, Part 201, and Subpart 227-2 of this Title apply.
- (b) For the purposes of this Subpart, the following specific definitions apply:
- (1) 'Common control.' Refers to two or more sources that are under the control of a single corporate entity. The corporate entity must:
    - (i) have the right to bid an electricity generating asset into the NYISO wholesale markets and/or decide when to operate the plant; or
    - (ii) have the right to bid an electricity generating asset into the NYISO wholesale markets through a power purchase agreement or other agreement and the entity that owns the asset provides the necessary paperwork required under subdivision 227-3.3(b) of this Subpart.
  - (2) 'Electric storage resource.' A resource capable of receiving electric energy from the grid and storing it for later injection of electric energy back to the grid.
  - (3) 'Hydroelectric energy.' The conversion of potential and kinetic energy in the form of falling or fast-flowing water into mechanical energy which drives turbines producing electricity.
  - (4) 'MWh.' Megawatt hour of electricity.
  - (5) 'NYISO.' New York Independent System Operator.
  - (6) 'ORISPL.' Office of Regulatory Information Systems Plant Code assigned by the Energy Information Administration to electric generating units.
  - (7) 'Ozone season.' May 1 through October 31 of each calendar year.
  - (8) 'Power purchase agreement.' A contract between two entities pursuant to which one entity agrees to produce electricity, or some other power source, for the other entity over a defined period of time.
  - (9) 'Renewable generation resources.' Solar photovoltaic energy, wind energy, tidal energy or hydroelectric energy electricity generating systems.
  - (10) 'Solar photovoltaic energy.' Technology that directly converts the energy radiated by the sun as electromagnetic waves into electricity by means of solar panels.
  - (11) 'Substation.' An area or group of equipment to transform power from one voltage to another or from one system to another.

(12) 'Tidal energy.' The conversion of kinetic energy in the form of tide movement into mechanical energy which drives turbines producing electricity.

(13) 'Wholesale market.' The sum of purchases and sales of energy and capacity for resale along with ancillary services needed to maintain reliability and power quality at the transmission level coordinated together through the NYISO and power exchanges. A party that purchases energy, capacity or ancillary services in the wholesale market to serve its own load is considered to be a participant in the wholesale market.

(14) 'Wind energy.' The conversion of kinetic energy in the form of wind or air flows into mechanical energy which drives turbines producing electricity.

### **227-3.3 Permitting requirements and compliance plan submittal.**

(a) Each facility containing an SCCT subject to this Subpart must have or obtain a permit pursuant to Parts 201 and 621 of this Title that reflects the implementation of the compliance plan required in subdivision 227-3.3(b) of this Subpart prior to the May 1, 2023 compliance date of this Subpart in order to operate on and after the applicable compliance date.

(b) Each facility containing an SCCT subject to this Subpart must submit a compliance plan to the Department by March 2, 2020. Each compliance plan must, at minimum, contain:

(1) a list of each SCCT subject to the requirements of this Subpart that includes any identifying numbers such as ORISPL number, source number and nameplate capacity.

(2) a schedule outlining how the owner or operator will comply with the requirements set forth in this Subpart including which SCCTs will install controls, controls to be installed, the expected NO<sub>x</sub> emission rates, SCCTs to be replaced or repowered, and/or SCCTs to be shut down.

(3) a list of renewable resources to be installed under common control of the permittee to be used in the compliance option described in subdivision 227-3.5 (b) of this Subpart. This list shall include, for each renewable resource:

(i) location;

(ii) nameplate capacity or equivalent; and

(iii) documentation demonstrating common control.

(4) A list of electric storage resources to be installed under common control of the permittee to be used in the compliance option described in subdivision 227-3.5 (b) of this Subpart. This list shall include, for each electric storage source:

(i) location;

(ii) nameplate capacity or equivalent;

(iii) duration of discharge; and

(iv) documentation demonstrating common control.

(5) Pursuant to subparagraph 227-3.2(b)(1)(ii) the entity that owns the asset must provide a letter, as part of the compliance plan, that the bidding and/or dispatch rights have been provided to the entity asserting common control.

### **227-3.4 Control Requirements.**

(a) The following emission limits on a parts per million dry volume basis (ppmvd), corrected to fifteen percent oxygen must be met as a facility-level average of all SCCTs at a facility:

(1) By May 1, 2023

	Emission Limit (ppmvd)
All SCCTs	100

(2) By May 1, 2025

Fuel Type	Emission Limit (ppmvd)
Gaseous fuels	25
Distillate oil or other liquid fuel	42

(3) Compliance with these emission limits must be determined by conducting stack tests, as set forth in subdivision 227-2.6(c) of Subpart 227-2 of this Title, at a minimum of once per permit term. Alternatively, the owner or operator may choose to use a Continuous Emissions Monitoring System (CEMS) consistent with the provisions of subdivision 227-2.6(b) of Subpart 227-2 of this Title.

## 227-3.5 Compliance options.

(a) 'Ozone season stop.' An owner or operator of an existing SCCT may opt to comply with this Subpart by not operating the SCCT during the ozone season. The ozone season stop provision must be included as an enforceable permit condition in a final permit or permit modification issued prior to the applicable compliance deadline of this Subpart.

(b) 'Electric storage and renewable energy resources.' An owner or operator of an SCCT may opt to comply with this Subpart by meeting the following average output-based emission limits on a daily basis pursuant to the following:

(1) Owners and operators must meet the following facility-level daily average emission limits on a pounds of NO<sub>x</sub> per megawatt hour (lb/MWh) basis for all SCCTs at a facility.

(i) By May 1, 2023:

	Emission Limit (lb NO <sub>x</sub> /MWh)
All SCCT	3.0

(ii) By May 1, 2025:

Fuel Type	Effective Daily Emission Limit (lb NO <sub>x</sub> /MWh)
Gaseous fuels	1.5
Distillate oil or other liquid fuel	2.0

(2) The owner or operator of an SCCT that uses electric storage or renewable energy resources to inject electricity to the grid may demonstrate compliance with the applicable effective daily NO<sub>x</sub> emission limits by including the electrical energy, in MWh, injected to the grid from electric storage and/or renewable generation resources in the emission rate calculation provided that:

(i) The renewable generation resource and/or the electric storage resource must be directly connected to the same physical substation as the SCCT with which it is being averaged; or

(ii) within one-half mile radius of the SCCT with which it is being averaged.

(iii) All sources that are averaged under this compliance option must be under common control.

(3) The effective emission rate may be calculated by:

$$(i) \text{ Effective Rate} = \frac{\text{MassNO}_x}{\text{MWh}_{CT} + \text{MWh}_{ST} + \text{MWh}_{RE}}, \text{ where:}$$

('a') MassNO<sub>x</sub> = NO<sub>x</sub> emissions (pounds) each day from all SCCTs at the permitted facility.

('b') MWh<sub>CT</sub> = electrical energy delivered to the grid (in MWh) from SCCTs at the permitted facility each day.

('c') MWh<sub>ST</sub> = electrical energy delivered to the grid (in MWh) from storage resources over each day.

('d') MWh<sub>RE</sub> = electrical energy delivered to the grid (in MWh) from renewable generation each day.

(4) If the owner or operator burns both gaseous fuel and liquid fuel during the same day, a facility electrical energy (MWh) weighted average must be calculated to determine a resultant mix fuel emission rate. The mix fuel rate must first be calculated to determine the allowable emission rate and then calculated again to determine the actual mix fuel emission rate.

$$(i) \text{ Allowable Mix Fuel Rate} = \frac{\text{RateG} \times \text{GenG} + \text{RateO} \times \text{GenO}}{\text{GenG} + \text{GenO}} \text{ where:}$$

('a') RateG = Effective daily emission limit (lb NO<sub>x</sub>/MWh) burning gas as defined in 227-3.5(b) of this Subpart.

('b') RateO = Effective daily emission limit (lb NO<sub>x</sub>/MWh) burning oil as defined in 227-3.5(b) of this Subpart.

('c') GenG = electrical energy (MWh) generated burning gas each day

('d') GenO = electrical energy (MWh) generated burning oil each day

$$(ii) \text{ Actual Mix Fuel Rate} = \frac{\text{RateG} \times \text{GenG} + \text{RateO} \times \text{GenO}}{\text{GenG} + \text{GenO} + \text{GenR} + \text{GenS}} \text{ where:}$$

('a') RateG = lb NO<sub>x</sub>/MWh burning gas

('b') RateO = lb NO<sub>x</sub>/MWh burning oil

('c') GenG = electrical energy (MWh) generated burning gas each day

('d') GenO = electrical energy (MWh) generated burning oil each day

('e') GenR = electrical energy (MWh) injected to the grid from renewable energy resources each day

('f') GenS = electrical energy (MWh) injected to the grid from electric storage resources each day

## 227-3.6 Electric System Reliability

(a) An SCCT may continue to operate after the compliance deadline if:

(1) that SCCT is designated as a reliability source, to temporarily resolve a reliability need, by the NYISO, through its generator deactivation process, or by the local transmission/distribution owner.

(2) a designated reliability source may continue to operate until one of the following provisions are met:

(i) a permanent solution is placed online as determined by the NYISO, the local transmission/distribution owner or the New York State Public Service Commission; or

(ii) two years after the designated compliance date under this Subpart has lapsed.

(b) A designated reliability source may operate an additional two years if:

(1) the NYISO determines that the reliability need still exists,

(2) the source is designated by the NYISO or the transmission/distribution owner as a reliability source, and

(3) a permanent solution has been selected by NYISO, the transmission/distribution owner or the New York State Public Service Commission and that solution is in the process of permitting or construction but not yet online.

## **227-3.7 Testing, monitoring, and reporting requirements**

(a) The owner or operator of each SCCT must measure or monitor daily NO<sub>x</sub> emissions in accordance with paragraphs (1) or (2) below.

(1) Measure in accordance with the emission test requirements described in subdivision 227-2.6(c) of Subpart 227-2 of this Title, or

(2) Monitor with a CEMS as described in subdivision 227-2.6(b) of Subpart 227-2 of this Title or with an equivalent monitoring system acceptable to the Department.

(b) The owner or operator of each SCCT must report operational data to the Department by November 30 of each year. The report must be in a form prescribed by the Department. The operational data must include:

(1) NO<sub>x</sub> emissions from each SCCT for each compliance period.

(2) If the electric storage and renewable resources compliance option is used, report daily electrical generation in MWh injected into the grid from each SCCT and each electric storage and/or renewable resource.

(3) In the event that emissions of air contaminants in excess of any emission standard in this Subpart occur the facility owner or operator shall compile and maintain records of the exceedance and notify the Department as soon as possible during normal working hours, but not later than two working days after becoming aware that the exceedance occurred. When requested by the Department, the facility owner or operator shall submit a written report to the department describing the malfunction, the corrective action taken, identification of air contaminants, and an estimate of the emission rates.

## **227-3.8 Severability**

Each provision of this Subpart shall be deemed severable, and in the event that any provision of this Subpart is held to be invalid, the remainder of this Subpart shall continue in full force and effect.



# Proposed Part 227-3 Regulatory Impact Statement Summary

The New York State Department of Environmental Conservation (DEC) is proposing 6 NYCRR Part 227-3, "Ozone Season Oxides of Nitrogen (NO<sub>x</sub>) Emission Limits for Simple Cycle and Regenerative Combustion Turbines." The primary goal of this proposal is to lower allowable NO<sub>x</sub> emissions from simple cycle and regenerative combustion turbines during the ozone season. The lower emissions from these sources will help to address Clean Air Act (CAA) requirements, ozone nonattainment and protect the health of New York State residents. This proposal is only applicable to simple cycle and regenerative combustion turbines. This is not a mandate on local governments. It applies to any entity that owns or operates a subject source.

## Statutory Authority

The statutory authority for the promulgation of Subpart 227-3 is found in the New York State Environmental Conservation Law (ECL), Sections 1-0101, 3-0301, 19-0103, 19-0105, 19-0301, 19-0303, 19-0305, 19-0311, 71-2103 and 71-2105.

## Legislative Objectives

Article 19 of the ECL was enacted to safeguard the air resources of New York from pollution and ensure the protection of the public health and welfare, the natural resources of the State, physical property, and integrating industrial development with sound environmental practices.

## Needs and Benefits

In March of 2008, the United States Environmental Protection Agency (EPA) lowered the eight-hour ozone National Ambient Air Quality Standard (NAAQS) from 0.08 parts per million (ppm) to 0.075 ppm.<sup>1</sup> Subsequently, on October 1, 2015, the EPA signed a rule that lowered this standard to 0.070 ppm.<sup>2</sup> Ozone NAAQS attainment status is demonstrated by measurements recorded from a monitoring network set up across the United States.

EPA designated the New York-Northern New Jersey-Long Island metropolitan area (New York metropolitan area, or NYMA) as a "marginal" nonattainment area for the 2008 ozone NAAQS effective July 20, 2012. On November 14, 2018 EPA proposed to reclassify the NYMA to "serious" nonattainment.<sup>3</sup> The area was designated as "moderate" nonattainment for the 2015 ozone NAAQS.<sup>4</sup> NYMA monitors are currently reporting ozone concentrations of 0.083 ppm, well above the standard.

Simple cycle and regenerative combustion turbines (SCCTs) sometimes referred to as peaking units, run to meet electric load during periods of peak electricity demand. They typically run on hot summer days when there is a strong likelihood of high ozone readings. Many peaking units in New York have high NO<sub>x</sub> emission rates, are inefficient and are approaching 50 years of age. It is difficult to install after-market controls on most of these units because of their age and site limitations.

New York must fulfill its CAA "good neighbor" obligations which require states to include adequate measures in its state implementation plans (SIPs) prohibiting emissions of air pollutants "in amounts which will...contribute significantly to nonattainment in, or interfere with maintenance by, any other state with respect to" a NAAQS. In addition, New York must meet the 2008 and 2015 ozone NAAQS, for which the New York-Northern New Jersey-Long Island, NY-NJ-CT area is in nonattainment



Because high ozone days significantly impact human health in the NYMA and because older units significantly contribute on these days, DEC assessed the 99 high ozone days between 2011 and 2017. Analysis shown in Table 1.

	NO <sub>x</sub> (tons)	Heat Input (MMBtu)	Gross Load (MWh)
Pre-1986 SCCT*	1,849	7,193,633	580,109
Post-1986 SCCT*	73	6,908,887	1,040,831

\*Values are the sum of high ozone days 2011 - 2017

Table 1: NO<sub>x</sub> emissions from NY SCCTs.<sup>5</sup>

As demonstrated in Table 1, on high ozone days newer SCCTs produced 64 percent of the electricity generated from SCCTs while emitting only 4 percent of NO<sub>x</sub> emissions from these sources<sup>6</sup>.

If the older sources were replaced with newer sources, the total NO<sub>x</sub> emissions from those older sources on the 99 high ozone days assessed would drop from the reported 1,849 tons to between 40 and 60 tons depending on efficiency. This would result in an approximate 1,800-ton reduction of NO<sub>x</sub> emissions over those high ozone days. A reduction of 18 tons of NO<sub>x</sub> emissions on an ozone season day would represent a reduction of over 10 percent of NYMA NO<sub>x</sub> emissions from the electricity generation sector and an overall reduction of 3.5 percent from all sources.<sup>7</sup>

Electric grid reliability:

To adequately assess future reliability needs associated with this rule making is proposing that affected facilities submit compliance plans by March 2, 2020 so that the NYISO may include the compliance solutions selected by facilities in its 2020 Reliability Needs Assessment (RNA).

Proposal:

To address NO<sub>x</sub> emissions from SCCTs on high ozone days, DEC is proposing to develop a new regulation, Subpart 227-3, that will apply to SCCTs with a nameplate capacity of 15 megawatts or greater that bid into the NYISO wholesale market. This regulation will phase in lower emission limits for NO<sub>x</sub> during the ozone season and will limit the current averaging provision found in Subpart 227-2.<sup>8</sup> The sources subject to this proposal will continue to be subject to the requirements of Subpart 227-2 outside of the ozone season. This rulemaking proposes additional requirements for SCCTs during the ozone season allowing more flexibility outside of the ozone season. The requirements are expanded on in the following paragraphs.

Control Requirements:

The NO<sub>x</sub> emission limits for SCCTs will be phased in as shown in Tables 2 and 3 below. These limits may be met by averaging only SCCTs on a facility-wide basis.

**By May 1, 2023**

	NO <sub>x</sub> Emission Limit (ppmvd <sup>9</sup> )
All SCCTs	100

Table 2: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2023

**By May 1, 2025**

Fuel Type	NO <sub>x</sub> Emission Limit (ppmvd)
Gaseous fuels	25
Distillate oil or other liquid fuel	42

Table 3: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2025

Also beginning May 1, 2023, SCCTs will only be able to average emissions with other SCCTs at the facility or, if the facility opts to utilize one of the offered compliance options, then those SCCTs may average with approved electricity storage or renewable energy resources during the ozone season.

#### Compliance Options:

Owners and operators may elect to meet the limits as proposed. To offer flexibility, this rule is proposing two additional compliance options:

- 1) Owners and operators may elect an ozone season stop where it is recorded in the operating permit that the source may not operate during the ozone season.
- 2) Owners and operators may elect to adhere to an output-based NO<sub>x</sub> daily emission rate that includes electric storage and renewable energy under common control with the SCCTs with which they are averaging.

## Costs

Older SCCTs are typically not conducive to the addition of retrofit control technology. DEC expects that most impacted facilities will choose to replace or shutdown the non-compliant older SCCTs. To estimate replacement costs DEC looked to information provided by the NYISO and Department of Energy's Energy Information Administration (EIA).

Table 4 presents costs developed by EIA and NYISO for full replacement of an SCCT.

Source	Overnight Cost (\$/kW)	Notes
EIA	\$1,054 - \$1,558 <sup>10</sup>	Range is specific for the Long Island and New York City area and includes conventional and advanced combustion turbines.
NYISO	\$1,314 - \$1,357 <sup>11</sup>	Range is specific for the Long Island and New York City area and represents replacement with a dual fuel peaking turbine.

Table 4: Estimated range of overnight costs for full replacement of an SCCT

Most SCCTs have a capacity factor of less than 5 percent, meaning that they are used less than 5 percent of the time. In addition, with the implementation of several New York State initiatives,<sup>12</sup> demand for these units should continue to decline so the entire SCCT fleet would likely not need to be replaced.

Owners and operators may opt to install after-market emission control devices such as water injection technology. While costs vary widely depending on location, operation and siting, it has been reported to DEC, anecdotally, that the cost of adding after-market water injection to these older sources is approximately \$2,000,000. Other sources report costs of \$10,000 - \$15,000 per megawatt,<sup>13</sup> however, this data does not include installation and other associated costs.

#### Cost of Nonattainment:

This proposal is part of a suite of New York State efforts to bring the NYMA into attainment for ozone, in order to protect human health. EPA projected a wide array of benefits that would be realized on a national level,

excluding California, if ozone attainment is achieved.<sup>14</sup> The human cost of nonattainment to New York State residents is presented in Table 5.

Attainment Provides Prevention of:	
Deaths from effects of ozone	13 - 22
Deaths from effects of PM2.5	31 - 70
Nonfatal heart attacks	4 - 36
Hospital admissions & emergency room visits	134
Acute bronchitis	48
Upper & lower respiratory symptoms	1,540
Exacerbated asthma	32,200
Missed work & school	26,320
Restricted activity days	86,800

Table 5: Summary of Total Number of Annual Ozone and PM-Related Premature Mortalities and Premature Morbidity: 2025 National Benefits (adapted from EPA, 2015 RIA, p. ES-16)

## Local Government Mandates

The proposed regulation does not contain a mandate on local governments.

## Paperwork

This proposal will require each affected facility to submit a compliance plan to DEC. The compliance plan will state how each facility plans to comply with the new requirements.

Those facilities required to meet new emission limits will be required to submit permit applications to modify its Title V permits to incorporate the newly applicable requirements by the May 1, 2023 compliance date.

Subject facilities that do not use a continuous emissions monitoring system (CEMS) will be required to perform an emissions test to assure compliance with the applicable NO<sub>x</sub> emission limits. Every subject facility will be required to submit test protocols and test reports to the Department for approval.

## Duplication

The proposed Subpart 227-3 does not duplicate or conflict with any other state or federal requirements.

## Alternatives

DEC considered two alternatives in assessing this proposal, leave the emission rates as they are and just lowering emission rate requirements. The first option would leave New York open to CAA Section 126 petitions and if acted upon by EPA could require controls within three years. The second option does not allow for the compliance flexibility and reliability considerations included in the proposal that were developed during the stakeholder process.

## Federal Standards

The proposed rule does not exceed any minimum federal standards.

## Compliance Schedule

March 2, 2020: All impacted sources must submit a compliance plan that must contain minimum data to demonstrate compliance will be achieved.

<sup>1</sup> 73 FR 16436 (March 27, 2008), codified at 40 CFR section 50.15. Attainment of the 2008 ozone NAAQS is determined when the fourth highest daily maximum 8-hour average ambient air quality ozone concentration, averaged over three year, is less than or equal to 0.075 ppm.

<sup>2</sup> 80 FR 65292 (October 26, 2015).

<sup>3</sup> 83 FR 56781 (November 14, 2018).

<sup>4</sup> 83 FR 25776 (June 4, 2018).

<sup>5</sup> EPA Air Markets Program Data. <https://ampd.epa.gov/ampd/>.

<sup>6</sup> Percentages calculated from EPA Air Markets Program Data for days which exceeded the ozone NAAQS. <https://ampd.epa.gov/ampd/>.

<sup>7</sup> "New York State implementation plan for the 2008 ozone national ambient air quality standards." <http://www.dec.ny.gov/chemical/110727.html>.

<sup>8</sup> May 1 - October 31 of each year.

<sup>9</sup> Parts per million on a dry volume basis at fifteen percent oxygen.

<sup>10</sup> EIA, Capital Cost Estimates for Utility Scale Electricity Generating Plants, November 2016.

<sup>11</sup> NYISO, Demand Curve Model - 2019-2020.xlsm. Retrieved (1/3/2019) from: [https://www.nyiso.com/search?time=last-year&sortField=\\_score&resultsLayout=list&q=Demand%20Curve%20Model%202016](https://www.nyiso.com/search?time=last-year&sortField=_score&resultsLayout=list&q=Demand%20Curve%20Model%202016)

<sup>12</sup> Including energy efficiency and energy storage targets, Reforming the Energy Vision and the Clean Energy Standard.

<sup>13</sup> The data provided only includes capital cost. "Gas Turbine Combustion." Lefebvre & Ballal. CRC Press, April 26, 2010.

<sup>14</sup> Regulatory Impact Analysis (RIA) for the 2015 ozone NAAQS.



# Proposed Part 227-3 Regulatory Impact Statement

## Introduction

The New York State Department of Environmental Conservation (DEC) is proposing 6 NYCRR Part 227-3, "Ozone Season Oxides of Nitrogen (NO<sub>x</sub>) Emission Limits for Simple Cycle and Regenerative Combustion Turbines." The primary goal of this proposal is to lower allowable NO<sub>x</sub> emissions from simple cycle and regenerative combustion turbines during the ozone season. The lower emissions from these sources will help to address Clean Air Act (CAA) requirements, including ozone nonattainment, and protect the health of New York State residents. This proposal is only applicable to simple cycle and regenerative combustion turbines. This is not a mandate on local governments. It applies to any entity that owns or operates a subject source.

## Statutory Authority

The statutory authority for the promulgation of Subpart 227-3 is found in the New York State Environmental Conservation Law (ECL), Sections 1-0101, 3-0301, 19-0103, 19-0105, 19-0301, 19-0303, 19-0305, 19-0311, 71-2103 and 71-2105.

ECL Section 1-0101. This Section declares it to be the policy of the state to conserve, improve and protect its natural resources and environment and control air pollution in order to enhance the health, safety and welfare of the people of the State and their overall economic and social well-being. Section 1-0101 further expresses, among other things, that it is the policy of the State to coordinate the State's environmental plans, functions, powers and programs with those of the federal government and other regions and manage air resources so that the State may fulfill its responsibility as trustee of the environment for present and future generations. This Section also provides that it is the policy of the State to foster, promote, create and maintain conditions by which man and nature can thrive in harmony by providing that care is taken for air resources that are shared with other states.

ECL Section 3-0301. This Section empowers the Department to coordinate and develop programs to carry out the environmental policy of New York State set forth in section 1-0101. Section 3-0301 specifically empowers the Department to: provide for the prevention and abatement of air pollution; cooperate with officials and representatives of the federal government, other states and interstate agencies regarding problems affecting the environment of New York State; encourage and undertake scientific investigation and research on the ecological process, pollution prevention and abatement, and other areas essential to understanding and achievement of the environmental policy set forth in section 1-0101; monitor the environment to afford more effective and efficient control practices; identify changes in ecological systems and to warn of emergency conditions; enter into contracts with any person to do all things necessary or convenient to carry out the functions, powers and duties of the Department; and adopt such regulations as may be necessary, convenient or desirable to effectuate the environmental policy of the State.

ECL Section 19-0103. This Section declares that it is the policy of New York State to maintain a reasonable degree of purity of air resources. In carrying out such policy, the Department is required to balance public health and welfare, the industrial development of the State, propagation and protection of flora and fauna, and the protection of personal property and other resources. To that end, the Department is required to use all available practical and reasonable methods to prevent and control air pollution in the State.

ECL Section 19-0105. This Section declares that it is the purpose of Article 19 of the ECL to safeguard the air resources of the State under a program which is consistent with the policy expressed in Section 19-0103 and in accordance with other provisions of Article 19.

ECL Section 19-0301. This Section declares that the Department has the power to promulgate regulations for preventing, controlling or prohibiting air pollution, and shall include in such regulations provisions prescribing the degree of air pollution that may be permitted and the extent to which air contaminants may be emitted to the air by any source in any area of the State.

ECL Section 19-0303. This Section provides that the terms of any air pollution control regulation promulgated by the Department may differentiate between particular types and conditions of air pollution and air contamination sources. Section 19-0303 also provides that the Department, in adopting any regulation which contains a requirement that is more stringent than the CAA or its implementing regulations, must include in the Regulatory Impact Statement (RIS), an evaluation of the cost-effectiveness of the proposed regulation in comparison to the cost-effectiveness of reasonably available alternatives and a review of the reasonably available alternative measures along with an explanation of the reasons for rejecting such alternatives.

ECL Section 19-0305. This Section authorizes the Department to enforce the codes, rules and regulations established in accordance with Article 19. Section 19-0305 also empowers the Department to conduct or cause to be conducted studies and research with respect to air pollution control, abatement or prevention.

ECL Section 19-0311. This Section directs the Department to establish an operating permit program for sources subject to Title V of the CAA (Title V). Section 19-0311 specifically requires that complete permit applications must include, among other things, compliance plans, schedules of compliance, and a compliance certification. This Section further expresses that any permits issued must include, among other things, terms setting emissions limitations or standards, terms for detailed monitoring, record keeping and reporting, and terms allowing Department inspection, entry, and monitoring to assure compliance with Sections 71-2103 and 71-2105 and the terms and conditions of the permit.

ECL Sections 71-2103 and 71-2105. These sections set forth the civil and criminal penalty structures for violations of Article 19.

## Legislative Objectives

Article 19 of the ECL was enacted to safeguard the air resources of New York from pollution and ensure the protection of the public health and welfare, the natural resources of the State, physical property, and integrating industrial development with sound environmental practices. The policy of the State is to require the use of all available, practical and reasonable methods to prevent and control air pollution in New York. To facilitate this policy objective, the Legislature granted specific powers and duties to the Department, including the power to adopt and promulgate regulations for preventing, controlling and prohibiting air pollution. The provisions cited above clearly provide the Department with the authority to create this regulation.

## Needs and Benefits

In March of 2008, the United States Environmental Protection Agency (EPA) lowered the eight-hour ozone National Ambient Air Quality Standard (NAAQS) from 0.08 parts per million (ppm) to 0.075 ppm.<sup>1</sup> Subsequently, on October 1, 2015, the EPA signed a rule that lowered this standard to 0.070 ppm.<sup>2</sup> Ozone NAAQS attainment status is demonstrated by measurements recorded from a monitoring network set up across the United States. The ozone NAAQS is in the form of an eight-hour concentration average. The ozone design value is calculated as the 4th highest daily maximum eight-hour ozone concentration, averaged over three years.<sup>3</sup>

EPA designated the New York-Northern New Jersey-Long Island metropolitan area (New York metropolitan area, or NYMA) as a "marginal" nonattainment area for the 2008 ozone NAAQS effective July 20, 2012. The NYMA failed to attain the NAAQS by the marginal attainment deadline of July 20, 2015, and was, therefore, reclassified to "moderate" nonattainment effective June 3, 2016. With a moderate classification, New York was required to submit a State Implementation Plan (SIP) revision that demonstrated how the NYMA would attain the 2008 NAAQS by July 20, 2018 (based on monitored air quality data from 2015-2017). DEC submitted a SIP on November 10, 2017 that demonstrated that even with emissions reductions nearly double the mandated three

percent per year reduction requirement, based on preliminary 2017 design values and projection modeling, the area would fail to meet its moderate attainment deadline. Certified 2017 monitoring later confirmed this. As part of the SIP submission DEC requested a reclassification to serious nonattainment for the 2008 NAAQS, that carries an attainment deadline of July 20, 2021 (based on monitored air quality data from 2018-2020). On November 14, 2018 EPA proposed to reclassify the NYMA to "serious" nonattainment.<sup>4</sup> The area was designated "moderate" nonattainment for the 2015 ozone NAAQS.<sup>5</sup>

The current design value for the NYMA ozone nonattainment area is 0.083 ppm based upon a monitor in Westport, Connecticut which is located in the shared multi-state nonattainment area. In addition, design values within New York State reached 0.076 ppm at multiple monitors. This demonstrates that despite DEC's past efforts, EPA's failure to address emissions transport has resulted in New York falling short of attaining the ozone NAAQS. Accordingly, more in-state emission reductions are necessary.

Simple cycle and regenerative combustion turbines (SCCTs) sometimes referred to as peaking units, run to meet electric load during periods of peak electricity demand. They typically run on hot summer days when there is a higher demand for air conditioning and when there is a strong likelihood of high ozone readings. Many peaking units in New York have very high NO<sub>x</sub> emission rates, are inefficient and are approaching 50 years of age. It is difficult to install after-market controls on most of these units because of their age and site limitations. Some sources are located on barges where control equipment would physically not fit.

Older SCCTs have adverse impacts on NYMA air quality and make it difficult, if not impossible, for New York to meet air quality goals and CAA requirements. SCCTs are generally located in communities of low to moderate income that are populated predominantly by people of color. The emissions generated by SCCTs can have both regional (ozone) and local nitrogen dioxide impacts. These older sources emit significantly more NO<sub>x</sub> than new, efficient modern SCCTs. The emissions from these units typically occur during high ozone days and are concentrated in the NYMA which, as described above, does not attain the 2008 or 2015 ozone NAAQS.

This rulemaking proposes to lower allowable emission rates for SCCTs during the ozone season with the intention to lower NO<sub>x</sub> emissions from these sources, especially on high ozone days. To better understand the impact of SCCTs on the ambient air DEC used the Community Multiscale Air Quality Modeling system (CMAQ) to model one high ozone day.<sup>6</sup> The high ozone day modeled was July 23, 2011 and the results demonstrated that old SCCTs located in New York State contributed 0.0048 ppm to downwind monitors that currently show nonattainment. With a protective ozone NAAQS, set at a level of 0.070 ppm, it is clear that these sources alone have the ability and potential to significantly impact attainment of the ozone NAAQS.

Section 110(a)(2) of the CAA states that SIPs must contain adequate provisions to prohibit emissions from sources within a state that will contribute significantly to nonattainment in another state. In the preamble to the Cross-State Air Pollution Rule, even though New York has implemented some of the most restrictive ozone control programs in the nation, EPA estimated that New York's largest contribution to a monitor showing nonattainment was 0.0185 ppm.<sup>7</sup> In the Technical Support Document for the Transport Rule,<sup>8</sup> EPA defined one percent of the NAAQS as a significant contribution (i.e., 0.0007 ppm for the 2015 ozone NAAQS). Taking into account that the design value of the NYMA nonattainment monitor is 0.008 ppm above the 2008 ozone NAAQS and 0.013 ppm above the 2015 ozone NAAQS, it is clear that emissions reductions are necessary. These control programs will assist New York in meeting CAA SIP obligations as well as the 2008 and 2015 ozone NAAQS, for which the New York-Northern New Jersey-Long Island area is in nonattainment. New York significantly contributes to nonattainment monitors in the Connecticut portion of this nonattainment area. Currently, attainment must be reached by June 20, 2021 for the 2008 ozone NAAQS and August 3, 2024 for the 2015 ozone NAAQS. DEC is currently working on a suite of regulations, both new and revised rules, in order to further reduce New York's impact on downwind ozone levels

Because high ozone days significantly impact human health in the NYMA and because older units significantly contribute on these days, DEC assessed the 99 high ozone days between 2011 and 2017. An analysis of the



NO<sub>x</sub> emission rates and total emissions from New York State SCCTs on these days gives a better picture of how these units impact air quality during this sensitive time.

	NO <sub>x</sub> (tons)	Heat Input (MMBtu)	Gross Load (MWh)
Pre-1986 SCCT*	1,849	7,193,633	580,109
Post-1986 SCCT*	73	6,908,887	1,040,831

\*Values are the sum of high ozone days 2011 - 2017

Table 1: NO<sub>x</sub> emissions from older and newer New York SCCTs.<sup>9</sup>

As demonstrated in Table 1, on high ozone days newer SCCTs produced 64 percent of the electricity generated from SCCTs while emitting only 4 percent of NO<sub>x</sub> emissions from these sources.<sup>10</sup> It is also well demonstrated that new SCCTs, installed since the late 1980's and early 1990's can meet NO<sub>x</sub> emission rates lower than those proposed here (less than 25 ppmvd).<sup>11</sup>

A similarly sized and newer SCCT will emit significantly lower amounts of NO<sub>x</sub> because the amount of NO<sub>x</sub> emitted per heat input (lb NO<sub>x</sub>/MMBtu) or generation output (lb NO<sub>x</sub>/MWh) is lower. The emission rate data assessment for New York State SCCTs from 2011 through 2017 on high ozone days is presented in Table 2, below.

	Pre-1986 (lb/MMBtu)	Post-1986 (lb/MMBtu)	Pre-1986 (lb/MWHR)	Post-1986 (lb/MWHR)
2011 NO <sub>x</sub> Rate*	0.457	0.026	6.406	0.231
2012 NO <sub>x</sub> Rate*	0.458	0.020	6.590	0.174
2013 NO <sub>x</sub> Rate*	0.460	0.011	6.012	0.102
2014 NO <sub>x</sub> Rate*	0.421	0.010	6.195	0.089
2015 NO <sub>x</sub> Rate*	0.431	0.011	6.890	0.110
2016 NO <sub>x</sub> Rate*	0.401	0.009	5.982	0.096
2017 NO <sub>x</sub> Rate*	0.438	0.013	6.579	0.127

\*Rates are for high ozone days

Table 2: NO<sub>x</sub> emission rates from older and newer SCCT on high ozone days.<sup>12</sup>

If the older (pre-1986) sources were replaced and operated similarly to New York's newer (post-1986) sources, the total emissions from those older sources on the 99 high ozone days assessed would drop from the reported 1,849 tons of NO<sub>x</sub> to between 40 and 60 tons depending on efficiency. This would result in an approximate 1,800-ton reduction of NO<sub>x</sub> emissions on those 99 high ozone days or an average of approximately 18 tons of NO<sub>x</sub> per high ozone day based on 2011-2017 actual use and emissions data. A reduction of 18 tons of NO<sub>x</sub> emissions on an ozone season day would represent a reduction of over 10 percent of NYMA NO<sub>x</sub> emissions from the electricity generation sector and an overall reduction of 3.5 percent from all sources.<sup>13</sup> This represents a significant decrease in NO<sub>x</sub> emissions that would likely lead to reduced ozone formation and lower monitored ozone values downwind.



NO<sub>x</sub> emission limits for SCCTs have not been updated in New York regulations since 1994. In addition, DEC's current regulation that addresses these sources, 6 NYCRR Part 227-2, includes a compliance option that allows impacted facilities to average emission rates from all of their sources, including turbines and boilers. By utilizing this provision, a facility may average its lower emitting, well controlled, sources with higher emitting sources to calculate an average rate that would not be higher than the total allowable NO<sub>x</sub> limits from those sources combined on a daily basis. While this option has offered compliance flexibility to impacted sources, the result remains that New York sources are significantly impacting local air quality and downwind monitors, so in this proposal this option will be restricted to allowing only averaging with other SCCTs or new renewable generation and storage.

An annual NO<sub>x</sub> mass total will not appropriately characterize the impact of SCCTs because they only run when called upon during periods of peak energy demand. This demand often correlates to weather which is, by nature, unpredictable. If totaled on an annual basis, these sources may show lower total emissions than other sources but when DEC evaluated the days when New York residents are impacted by high ozone levels, SCCTs tend to have the greatest emissions contributions of all electric generating units (EGUs) on a mass basis.

Ozone exceedances are a daily health concern. Nonattainment monitors typically show 10-20 ozone exceedance days per year in the NYMA, meaning that the ozone level is above what is considered protective of human health. SCCTs have historically run on these high ozone days. As other types of EGUs have been controlled through regulation, older SCCTs have emitted a much larger portion of NO<sub>x</sub> emissions on high ozone days. In fact, on these high ozone days old SCCTs contribute as much as 94 percent of NO<sub>x</sub> emissions while providing as little as 36 percent of the gross load.<sup>14</sup>

#### Electric Grid Reliability:

New York City contains the oldest electrical grid in the United States.<sup>15</sup> The age and the congestion of the grid combined with the population density in the largest city in the United States creates a system where electricity reliability is a serious concern.

The New York State Reliability Council, L.L.C. (NYSRC) is a not-for-profit entity whose mission is to promote and preserve the reliability of electric service on the New York State Power System by developing, maintaining, and, updating the Reliability Rules which shall be complied with by the New York Independent System Operator (NYISO) and all entities engaging in electric transmission, ancillary services, energy and power transactions on the New York State Power System. The NYSRC has set a reliability requirement for minimum capacity meeting a one day in ten years (0.1 day per year) Loss of Load Expectation (LOLE).<sup>16</sup>

LOLE estimates are included in the NYISO's Reliability Needs Assessment (RNA) that is conducted every two years. The 2018 RNA assessed the resource adequacy and transmission security of the New York area from year 2019 through 2028, the study period of that RNA. The final 2018 RNA concludes that there are no transmission security violations and no resource adequacy violations for the 2019-2028 period.<sup>17</sup> This assessment includes the shut-down of the Indian Point Energy Center and all other changes submitted to the NYISO. This demonstrates that under current conditions, there do not appear to be any reliability issues even with a large power producer (Indian Point) shutting down. This proposed rule was not considered during the 2018 RNA.

DEC worked with the NYISO, New York State Department of Public Service (DPS) and New York State Energy Research and Development Authority (NYSERDA) to develop a proposal that considers reliability of the electric grid. In addition, DEC reached out to impacted stakeholders with pre-proposal regulatory options and solicited feedback. The pre-proposal stakeholder effort resulted in a phased-in approach to allow impacted sources time to comply.

When an electricity generating unit plans to shut down, a notice is submitted to the NYISO which then conducts an analysis of the reliability impacts (if any) that could result. If such an analysis identifies a reliability need due to the shutdown of an SCCT, provisions in the proposed rule (Section 227-3.6 of Subpart 227-3) could be triggered to allow an SCCT to operate up to four additional years while a permanent solution to the reliability need is implemented.

To adequately assess future reliability needs associated with this rule making, DEC is proposing that affected facilities submit compliance plans by March 2, 2020 so that the NYISO may include the compliance solutions selected by facilities in its 2020 RNA. The results of the 2020 RNA will identify if there are reliability concerns and where new market based solutions may be required.

**Proposal:**

To address NO<sub>x</sub> emissions on high ozone days from SCCTs, DEC is proposing to develop a new regulation, Subpart 227-3, that will apply to SCCTs with a nameplate capacity of 15 megawatts or greater that bid into the NYISO wholesale market. This regulation will phase in lower emission limits for NO<sub>x</sub> during the ozone season and will limit the current averaging provision found in Subpart 227-2.<sup>18</sup> The sources subject to this proposal will continue to be subject to the requirements of Subpart 227-2 outside of the ozone season. This rulemaking proposes additional requirements for SCCTs during the ozone season allowing more flexibility outside of the ozone season. The requirements are expanded on in the following paragraphs.

**Control Requirements:**

The NO<sub>x</sub> emission limits for SCCTs will be phased in as shown in Tables 3 and 4 below. These limits may be met by averaging only SCCTs on a facility-wide basis.

**By May 1, 2023**

	NO <sub>x</sub> Emission Limit (ppmvd <sup>19</sup> )
All SCCTs	100

Table 3: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2023

**By May 1, 2025**

Fuel Type	NO <sub>x</sub> Emission Limit (ppmvd)
Gaseous fuels	25
Distillate oil or other liquid fuel	42

Table 4: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2025

Also beginning May 1, 2023, SCCTs will only be able to average emissions with other SCCTs at the facility or, if the facility opts to utilize one of the compliance options in Section 227-3.5 of Subpart 227-3, then those SCCTs may average NO<sub>x</sub> emissions with approved electricity storage or renewable energy resources during the ozone season. Currently, these sources may average NO<sub>x</sub> emissions with other electric generating sources such as boilers. This change to the averaging provision is expected to result in significantly lower emissions for this first phase of the proposal.

**Compliance Options:**

The proposed rule contains several compliance options that owners and operators may utilize in order to comply with the proposed requirements. The first is to meet the limits as proposed. Owners and operators may also opt to shut down or not run non-compliant SCCTs during the ozone season. If an owner or operator elects to not run an SCCT during the ozone season, it must be recorded in the operating permit. Another compliance option offered in this rule allows an owner or operator of an existing source to comply with applicable limits by meeting an average output-based emission limit (that includes renewables and storage) as a daily average emission rate. Under this option, the storage or renewable energy resource must be under common control with the SCCTs to be included in the averaging calculation. Furthermore, the electric storage or renewable energy resource must service the same community as the SCCTs with which it is averaging.

As noted above, information gathered during the stakeholder process led to the inclusion of an electric system reliability provision in this rulemaking. To address reliability issues identified, the proposal requires a compliance plan to be submitted to DEC by March 2, 2020. In addition, if an SCCT is identified as a reliability resource by the NYISO or transmission owner, that SCCT may be given a two-year extension to run while a permanent solution is developed and implemented. This extension may be renewed once for an additional two-year period if the permanent solution is in the process of being permitted or constructed and the SCCT is still considered a reliability needed resource.

## Costs

DEC is proposing to require that each source owner develop a compliance plan to demonstrate how it intends to comply with the proposed standards. The SCCTs installed prior to 1986 are typically not conducive to the addition of retrofit control technology. Furthermore, forty-eight of these sources are located on barges which may not offer the space necessary for controls. As a result, DEC expects that most impacted facilities will choose to replace or shutdown the older, non-compliant SCCTs. To estimate replacement costs DEC looked to information provided by the NYISO and Department of Energy's, Energy Information Administration (EIA).

The EIA describes overnight costs for electricity generating facilities as including<sup>20</sup>:

- Civil and structural costs: allowance for site preparation, drainage, installation of underground utilities, structural steel supply, and construction of buildings on the site;
- Mechanical equipment supply and installation: major equipment, including but not limited to, boilers, flue gas desulfurization scrubbers, cooling towers, steam turbine generators, condensers, photovoltaic modules, combustion turbines, and other auxiliary equipment;
- Electrical and instrumentation and control: electrical transformers, switchgear, motor control centers, switchyards, distributed control systems, and other electrical commodities;
- Project indirect costs: engineering, distributable labor and materials, craft labor overtime and incentives, scaffolding costs, construction management start up and commissioning, and contingency fees; and
- Owners costs: development costs, preliminary feasibility and engineering studies, environmental studies and permitting, legal fees, insurance costs, property taxes during construction, and the electrical interconnection costs, including a tie-in to a nearby electrical transmission system.<sup>21</sup>

Table 5 presents the full overnight costs developed by EIA and NYISO for full replacement of an SCCT.

Source	Overnight Cost (\$/kW)	Notes
EIA	\$1,054 - \$1,558 <sup>22</sup>	Range is specific for the Long Island and New York City area and includes conventional and advanced combustion turbines.
NYISO	\$1,314 - \$1,357 <sup>23</sup>	Range is specific for the Long Island and New York City area and represents replacement with a dual fuel peaking turbine.

Table 5: Estimated range of overnight costs for full replacement of an SCCT

DEC believes that the entire capacity of generation will likely not need to be replaced. Most SCCTs have a capacity factor of less than 5 percent, meaning that they are used less than 5 percent of the time on an annual basis. In addition, with the implementation of several New York State initiatives, including the State's recently announced energy efficiency and energy storage targets, Reforming the Energy Vision and the Clean Energy Standard, demand for these units should continue to decline. There are over 3,400 MW of SCCT capacity listed in the NYISO Gold Book<sup>24</sup> that are older, pre-1986 SCCTs.

Owners and operators may opt to install after-market emission control devices on sources that are unable to comply. Water injection technology is the after-market technology that a facility owner would likely consider for these older sources. The costs of adding after-market emission control devices varies widely depending on location, operation and land space availability. It has been reported to DEC, anecdotally, that the cost of adding after-market water injection to one of these older sources is approximately two million dollars. Other sources discuss a cost of \$10,000 - \$15,000 per megawatt,<sup>25</sup> and many of the sources that would be impacted are fifteen to twenty megawatts each. However, this data does not include installation and other associated costs.

#### Cost of Nonattainment:

This proposal is part of a suite of New York State efforts to bring the NYMA into attainment for ozone, in order to adequately protect human health. In the Regulatory Impact Analysis (RIA) for the 2015 ozone NAAQS, EPA projected a wide array of benefits that would be realized on a national level, excluding California, if ozone attainment is achieved. This includes co-benefits from reduced PM<sub>2.5</sub> which both EPA and DEC include because PM<sub>2.5</sub> is reduced automatically with NO<sub>x</sub> controls and there is no additional cost for these reductions. According to the U.S. Census Bureau, New York's nonattainment county population accounts for 14 percent of total United States population<sup>26</sup> excluding California. On a population basis, the benefits to New York State are the prevention of the following annually:

Attainment Provides Prevention of:	
Deaths from effects of ozone	13 - 22
Deaths from effects of PM <sub>2.5</sub>	31 - 70
Nonfatal heart attacks	4 - 36
Hospital admissions & emergency room visits	134
Acute bronchitis	48
Upper & lower respiratory symptoms	1,540
Exacerbated asthma	32,200
Missed work & school	26,320
Restricted activity days	86,800

Table 6: Summary of Total Number of Annual Ozone and PM-Related Premature Mortalities and Premature Morbidity: 2025 National Benefits (adapted from EPA, 2015 RIA, p. ES-16)

Table 6, which represents a simple population based conservative estimate, demonstrates that there is a serious cost of nonattainment to New York State residents. The NYMA experiences some of the highest ozone levels in the nation outside of California and will greatly benefit from lowered ozone levels.

#### Cost to the Department:

The authority and responsibility for implementing Subpart 227-3 lies solely with the Department. Each subject facility is required to have a Title V facility permit under 6 NYCRR Subpart 201-6. Permit revisions will be necessary to account for the requirements of Subpart 227-3 and the revised permit conditions will be incorporated into each relevant permit by DEC staff.

Each subject facility will need to submit emissions and possibly generation data. The Department must review and determine the sufficiency of all emissions testing protocols and results that will be submitted by the source owner. The review of the initial compliance testing protocols and compliance test results will require DEC staff time.

It is estimated that this rulemaking and ongoing support will require 1.0 full time equivalent (FTE) or \$158,333<sup>27</sup> during the first year and 0.5 FTE annually thereafter.

## Local Government Mandates

The proposed regulation does not contain a mandate on local governments. Local governments have no additional compliance obligations as compared to other subject entities.

There are two SCCTs that are owned by local governments that are listed in Table 7 below. While these sources will be subject to the requirements of this proposal, they already comply with the lower NO<sub>x</sub> rates and no changes will be required by the facilities.

Facility	Local Government
Freeport	Village of Freeport
SA Carlson	Town of Jamestown

Table 7: List of Local Government Facilities

## Paperwork

This proposal will require each affected facility to submit a compliance plan to DEC. The compliance plan will state how each facility plans to comply with the new requirements.

Those facilities required to meet new emission limits will be required to submit permit applications to modify their Title V permits to incorporate the newly applicable requirements by the May 1, 2023 compliance date. These changes can be incorporated into the renewal application for the facility's Title V permit (Title V permits must be renewed at five-year intervals). If there are no changes caused by the proposed Subpart 227-3 no permit action is required.

Subject facilities that do not use a continuous emissions monitoring system (CEMS) will be required to perform an emissions test to assure compliance with the applicable NO<sub>x</sub> emission limits. Every subject facility will be required to submit test protocols and test reports to the Department for approval.

## Duplication

The proposed Subpart 227-3 does not duplicate or conflict with any other state or federal requirements.

## Alternatives

### Alternative #1: No Action

Under this alternative, DEC may elect to not address emissions from this sector. Under this scenario, the State would fail to meet its obligations under the CAA to address its significant contribution to nonattainment in downwind areas. Furthermore, as demonstrated throughout this document, these sources have been shown to impact downwind monitors outside of New York. As such, other states can file CAA Section 126 petitions which, if acted upon by EPA, could require controls on these sources within three years. EPA imposed controls may not include the reliability considerations or flexibility options encompassed in this rulemaking.

### Alternative #2: Only lower emission rate limits

DEC may elect to only lower the emission rates on SCCTs without providing for alternative compliance mechanisms. Under this option, sources will have to replace or find another solution more quickly than what is

being proposed without regard for system reliability. The simple application of lower emission rates, absent the flexibility being proposed, would ignore the extensive feedback that DEC received during the stakeholder process for this rulemaking and may create electric grid reliability concerns.

## Federal Standards

The proposed rule does not exceed any minimum federal standards.

## Compliance Schedule

March 2, 2020: All impacted sources must submit a compliance plan that must, at minimum, contain:

- Nameplate capacity.
- Ownership.
- A list of each emission source that includes identifying numbers such as facility number, source number and name
- A schedule outlining how the owner or operator will comply with the requirements set forth in the rule.
- Which emission sources will install controls and what those controls will be.
- Which emission sources will be replaced or repowered.

May 1, 2023: The first phase of NO<sub>x</sub> emission limits will be implemented during the ozone season and SCCTs will be limited to averaging with other SCCTs, storage or renewable energy resources. The first phase of emission limits will be:

### By May 1, 2023

	NO <sub>x</sub> Emission Limit (ppmvd <sup>28</sup> )
All SCCTs	100

Table 8: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2023

May 1, 2025: The second and final phase of NO<sub>x</sub> emission limits will be implemented during the ozone season as follows:

### Beginning May 1, 2025

Fuel Type	NO <sub>x</sub> Emission Limit (ppmvd)
Gaseous fuels	25
Distillate oil or other liquid fuel	42

Table 9: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2025

<sup>1</sup> 73 FR 16436 (March 27, 2008), codified at 40 CFR section 50.15. Attainment of the 2008 ozone NAAQS is determined when the fourth highest daily maximum 8-hour average ambient air quality ozone concentration, averaged over three year, is less than or equal to 0.075 ppm.

<sup>2</sup> 80 FR 65292 (October 26, 2015).

<sup>3</sup> Code of Federal Regulations, Part 50 Appendix I.

<sup>4</sup> 83 FR 56781 (November 14, 2018).

<sup>5</sup> 83 FR 25776 (June 4, 2018).



<sup>6</sup> CMAQ is an active open-source development project of the U.S. EPA that consists of a suite of programs for conducting air quality model simulations. CMAQ combines current knowledge in atmospheric science and air quality modeling, multi-processor computing techniques, and an open-source framework to deliver fast, technically sound estimates of ozone, particulates, toxics and acid deposition.

<sup>7</sup> FR Vol 81. Number 207, October 26, 2016. Pages 74504-74649

<sup>8</sup> EPA-HQ-OAR-2009-0491, 2010, Technical Support Document (TSD) for the Transport Rule

<sup>9</sup> EPA Air Markets Program Data. <https://ampd.epa.gov/ampd/>.

<sup>10</sup> Percentages calculated from EPA Air Markets Program Data for days which exceeded the ozone NAAQS. <https://ampd.epa.gov/ampd/>.

<sup>11</sup> "Gas Turbines: A Handbook of Land, Sea and Air Applications" by Claire Soares, publisher Butterworth Heinemann, BH.

<sup>12</sup> EPA Air Markets Program Data. <https://ampd.epa.gov/ampd/>.

<sup>13</sup> "New York State implementation plan for the 2008 ozone national ambient air quality standards." <http://www.dec.ny.gov/chemical/110727.html>.

<sup>14</sup> Percentages calculated from EPA Air Markets Program Data for days that exceeded the ozone NAAQS. <https://ampd.epa.gov/ampd/>.

<sup>15</sup> <http://www.edisontechcenter.org/>.

<sup>16</sup> New York State Reliability Council Reliability Rule A-R1, available at [http://www.nysrc.org/pdf/Reliability%20Rules%20Manuals/RRC%20Manual%20V43%20Final\[4070\].pdf](http://www.nysrc.org/pdf/Reliability%20Rules%20Manuals/RRC%20Manual%20V43%20Final[4070].pdf).

<sup>17</sup> The draft 2018 RNA was posted for NYISO Operating Committee approval on September 12, 2018 which voted unanimously to concur in the draft RNA and to recommend that the Board of Directors approve the RNA.

<sup>18</sup> May 1 to October 31 of each year.

<sup>19</sup> Parts per million on a dry volume basis at fifteen percent oxygen.

<sup>20</sup> Overnight costs include the costs for the physical power plant assuming it can be built overnight. As a result, interest on loans are not factored into the cost estimates.

<sup>21</sup> EIA, Capital Cost Estimates for Utility Scale Electricity Generating Plants, November 2016.

<sup>22</sup> EIA, Capital Cost Estimates for Utility Scale Electricity Generating Plants, November 2016.

<sup>23</sup> NYISO, Demand Curve Model - 2019-2020.xlsm. Retrieved (1/3/2019) from: [https://www.nyiso.com/search?time=last-year&sortField=\\_score&resultsLayout=list&q=Demand%20Curve%20Model%202016](https://www.nyiso.com/search?time=last-year&sortField=_score&resultsLayout=list&q=Demand%20Curve%20Model%202016).

<sup>24</sup> NYISO, 2017 Load and Capacity Data.

<sup>25</sup> The data provided only includes capital cost. "Gas Turbine Combustion." Lefebvre & Ballal. CRC Press, April 26, 2010.

<sup>26</sup> U.S. Census Bureau, "State Population Totals and Components of Change: 2010-2017." <https://www.census.gov/data/tables/2017/demo/popest/state-total.html>.

<sup>27</sup> Assumptions: Grade 24 pay rate of \$97,448 per year and an overhead rate of 62.48 percent. Per: <https://www.osc.state.ny.us/agencies/guide/MyWebHelp/#VII/9/9.htm>.

<sup>28</sup> Parts per million on a dry volume basis at fifteen percent oxygen.



## **Proposed Part 227-3 Job Impact Statement**

The New York State Department of Environmental Conservation (DEC) is proposing new 6 NYCRR Part 227-3, "Ozone Season Oxides of Nitrogen (NO<sub>x</sub>) Emission Limits for Simple Cycle and Regenerative Combustion Turbines." The primary goal of this proposal is to lower allowable NO<sub>x</sub> emission rates from simple cycle and regenerative combustion turbines during the ozone season.

### **Nature of Impact**

DEC does not expect the requirements of this proposal to adversely impact employment opportunities at the affected sources. The affected sources generate electricity that is injected into the electrical grid and those facilities are required to maintain generation compliant with reliability rules at the federal and state level.

### **Categories and Numbers Affected**

This proposal will affect facilities that use older simple cycle and regenerative combustion turbines (SCCTs) to generate electricity for the electrical grid. Newer SCCTs are expected to already meet the requirements set forth in this proposal. At least 18 facilities utilizing older SCCTs will be affected by this proposal.

### **Regions of Adverse Impact**

This is a statewide proposal, so all SCCTs will be subject to the requirements of a final rule. However, most SCCTs are located in New York City and on Long Island.

### **Minimizing Adverse Impact**

The proposed rule contains several compliance options that owners and operators may utilize in order to comply with the proposed requirements. The first is to meet the limits as proposed. Owners and operators may also opt to shut down or not run non-compliant SCCTs during the ozone season. If an owner or operator elects to not run an SCCT during the ozone season, it must be recorded in the operating permit. Another compliance option offered in this proposal allows an owner or operator of an existing source to comply with applicable limits by meeting an average output-based emission limit (that includes renewables and storage) as a daily average emission rate. Under this option, the storage or renewable energy resource must be under common control with the SCCTs to be included in the averaging calculation.

These compliance options will allow existing SCCTs that cannot meet the proposed emission limits to operate for a few additional years while new SCCTs or other electricity generating resources are constructed. As a result, the Department does not anticipate adverse impacts to employment opportunities at a company subject to the rule.

### **Self Employment Opportunities**

It is not expected that the proposed Subpart 227-3 will have a measurable impact on opportunities for self-employment.

### **Initial Review**

The initial review of this rule shall occur no later than in the third calendar year after the year in which the rule is adopted.





## Proposed Part 227-3 Rural Area Flexibility Analysis

The New York State Department of Environmental Conservation (DEC) is proposing new 6 NYCRR Part 227-3, "Ozone Season Oxides of Nitrogen (NO<sub>x</sub>) Emission Limits for Simple Cycle and Regenerative Combustion Turbines." The primary goal of this proposal is to lower allowable NO<sub>x</sub> emission rates from simple cycle and regenerative combustion turbines (SCCTs) during the ozone season.

### Types and Estimated Numbers of Rural Areas Affected

Only one facility located in a rural area is affected by this regulation - the Samuel A. Carlson Generating Station located in Jamestown, Chautauqua County.

### Reporting, Recordkeeping and Other Compliance Requirements; and Professional Services

#### Reporting & Recordkeeping:

This proposal will require each affected facility to submit a compliance plan to DEC. The compliance plan will state how each facility plans to comply with the new requirements.

Those facilities required to meet new emission limits will be required to submit permit applications to modify their Title V permits to incorporate the newly applicable requirements by the May 1, 2023 compliance date. These changes can be incorporated into the renewal application for the facility's Title V permit (Title V permits must be renewed at five-year intervals). If there are no changes caused by the proposed Subpart 227-3 no permit action is required.

Subject facilities that do not use a continuous emissions monitoring system (CEMS) will be required to perform an emissions test to assure compliance with the applicable NO<sub>x</sub> emission limits. Every subject facility will be required to submit test protocols and test reports to DEC for approval.

An owner or operator that elects to use the Electric Storage and Renewable Energy Resources compliance option must submit annual electricity generation and NO<sub>x</sub> emissions data to DEC.

#### Compliance Requirements:

On or before March 2, 2020: All impacted sources must submit a compliance plan that must, at minimum, contain:

- Nameplate capacity.
- Ownership.
- A list of each emission source that includes identifying numbers such as facility number, source number and name.
- A schedule outlining how the owner or operator will comply with the requirements set forth in the rule.
- Which emission sources will install controls and what those controls will be.
- Which emission sources will be replaced or repowered.

Effective May 1, 2023: The first phase of NO<sub>x</sub> emission limits will be implemented during the ozone season and SCCTs will be limited to averaging with other SCCTs, storage or renewable energy resources. The first phase of emission limits will be:

**By May 1, 2023**

	NO <sub>x</sub> Emission Limit (ppmvd) <sup>1</sup>
All SCCTs	100

Table 1: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2023

Effective May 1, 2025: The second and final phase of NO<sub>x</sub> emission limits will be implemented during the ozone season as follows:

**Beginning May 1, 2025**

Fuel Type	NO <sub>x</sub> Emission Limit (ppmvd)
Gaseous fuels	25
Distillate oil or other liquid fuel	42

Table 2: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2025

Professional Services:

If an affected source currently utilizes professional services, such as consulting engineers, to comply with 6 NYCRR Subpart 227-2, they may continue to use those services to comply with the requirements of this proposal.

**Costs**

The Samuel A. Carlson Generating Station already complies with the NO<sub>x</sub> rates in the proposed rule. Therefore, no changes will be required by the facility. A compliance plan is still required by March 2, 2020. The costs of preparing the compliance plan should be minimal.

**Minimizing Adverse Impact**

Since the Samuel A. Carlson Generating Station already complies with the NO<sub>x</sub> rates in the proposed rule, there are no adverse impacts to that facility.

**Rural Area Participation**

DEC participated in several stakeholder meetings including those for impacted facilities and local environmental justice groups over a period of eighteen months. In addition, DEC posted a stakeholder outline on the DEC website to encourage stakeholder participation and comment.<sup>2</sup>

**Initial Review**

The initial review of this rule shall occur no later than in the third calendar year after the year in which the rule is adopted.

<sup>1</sup> Parts per million on a dry volume basis at fifteen percent oxygen.

<sup>2</sup> <https://www.dec.ny.gov/chemical/113887.html>.



# Proposed Part 227-3 Regulatory Flexibility Analysis for Small Businesses and Local Governments

The New York State Department of Environmental Conservation (DEC) is proposing new 6 NYCRR Part 227-3, "Ozone Season Oxides of Nitrogen (NO<sub>x</sub>) Emission Limits for Simple Cycle and Regenerative Combustion Turbines." The primary goal of this proposal is to lower allowable NO<sub>x</sub> emission rates from simple cycle and regenerative combustion turbines (SCCTs) during the ozone season.

## Effect of Rule

DEC does not expect the requirements of this proposal to adversely impact employment opportunities with small businesses. Businesses and local governments subject to this proposed rule generate electricity that is injected into the electrical grid and those facilities are required to maintain generation compliant with reliability rules at the federal and state level. The facilities subject to the proposed rule are large businesses and corporations.

The proposed regulation does not contain a mandate on local governments. Local governments have no additional compliance obligations. There are two SCCTs that are owned by local governments that are listed in the table below. While these sources will be subject to the requirements of this proposal, they already comply with the lower NO<sub>x</sub> rates and so no changes will be required by the facilities. While the two sources will be required to submit compliance plans, as outlined below, their plan requirements are simplified because they already comply with the emissions limits.

Facility	Local Government
Freeport	Village of Freeport
SA Carlson	Town of Jamestown

Table 1: Local Governments Subject to the Proposed Rule

## Compliance Requirements

On or before March 2, 2020: All impacted sources must submit a compliance plan that must, at minimum, contain:

- Nameplate capacity.
- Ownership.
- A list of each emission source that includes identifying numbers such as facility number, source number and name.
- A schedule outlining how the owner or operator will comply with the requirements set forth in the rule.
- Which emission sources will install controls and what those controls will be.
- Which emission sources will be replaced or repowered.

Effective May 1, 2023: The first phase of NO<sub>x</sub> emission limits will be implemented during the ozone season and SCCTs will be limited to averaging with other SCCTs, storage or renewable energy resources. The first phase of emission limits will be:

**By May 1, 2023**

--	--

	NO <sub>x</sub> Emission Limit (ppmvd <sup>1</sup> )
All simple cycle and regenerative combustion turbines	100

Table 2: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2023

Effective May 1, 2025: The second and final phase of NO<sub>x</sub> emission limits will be implemented during the ozone season as follows:

**Beginning May 1, 2025**

Fuel Type	NO <sub>x</sub> Emission Limit (ppmvd)
Gaseous fuels	25
Distillate oil or other liquid fuel	42

Table 3: NO<sub>x</sub> emission limits for SCCTs beginning 5/1/2025

## Professional Services

It is not expected that small businesses or local governments are likely to need professional services to comply with this rule. If an affected source currently utilizes professional services, such as consulting engineers, to comply with 6 NYCRR Subpart 227-2, they may continue to use those services to comply with the requirements of this proposal.

## Compliance Costs

Compliance costs discussed below are expected to impact larger power generation businesses, not small businesses or local governments. Discussion on the compliance costs to large generation businesses follows.

DEC is proposing to require each source owner to develop a compliance plan to demonstrate how they intend to comply with the proposed rule. The SCCTs installed prior to 1986 are typically not conducive to the addition of retrofit control technology. Furthermore, forty-eight of these sources are located on barges that may not offer the space necessary for controls. As a result, DEC expects that most impacted SCCT owners will choose to replace or shutdown the non-compliant SCCTs. To estimate replacement costs DEC looked to information provided by the NYISO and Department of Energy (DOE), Energy Information Administration (EIA).

The EIA describes overnight costs for electricity generating facilities as including<sup>2</sup>:

- Civil and structural costs: allowance for site preparation, drainage, installation of underground utilities, structural steel supply, and construction of buildings on the site;
- Mechanical equipment supply and installation: major equipment, including but not limited to, boilers, flue gas desulfurization scrubbers, cooling towers, steam turbine generators, condensers, photovoltaic modules, combustion turbines, and other auxiliary equipment;
- Electrical and instrumentation and control: electrical transformers, switchgear, motor control centers, switchyards, distributed control systems, and other electrical commodities;
- Project indirect costs: engineering, distributable labor and materials, craft labor overtime and incentives, scaffolding costs, construction management start up and commissioning, and contingency fees; and
- Owners costs: development costs, preliminary feasibility and engineering studies, environmental studies and permitting, legal fees, insurance costs, property taxes during construction, and the electrical interconnection costs, including a tie-in to a nearby electrical transmission system.<sup>3</sup>

Table 4 presents the full overnight costs developed by EIA and NYISO for full replacement of an SCCT.

Source	Overnight Cost (\$/kW)	Notes
EIA	\$1,054 - \$1,558 <sup>4</sup>	Range is specific for the Long Island and New York City area and includes conventional and advanced combustion turbines.
NYISO	\$1,314 - \$1,357 <sup>5</sup>	Range is specific for the Long Island and New York City area and represents replacement with a dual fuel peaking turbine.

Table 4: Estimated range of overnight costs for full replacement of an SCCT

DEC believes that the entire capacity of generation will likely not need to be replaced. Most SCCTs have a capacity factor of less than 5 percent, meaning that they are used less than 5 percent of the time on an annual basis. In addition, with the implementation of several New York State initiatives, including the State's recently announced energy efficiency and energy storage targets, Reforming the Energy Vision and the Clean Energy Standard, demand for these units should continue to decline. There are over 3,400 MW of SCCT capacity listed in the NYISO Gold Book<sup>6</sup> that are older, pre-1986 SCCTs.

Owners and operators may opt to install after-market emission control devices on sources that are unable to comply. Water injection technology is the after-market technology that a facility owner would likely consider for these older sources. The costs of adding after-market emission control devices varies widely depending on location, operation and land space availability. It has been reported to DEC, anecdotally, that the cost of adding after-market water injection to one of these older sources is approximately two million dollars. Other sources discuss a cost of \$10,000 - \$15,000 per megawatt,<sup>7</sup> and many of the sources that would be impacted are 15 to 20 megawatts each. However, this data does not include installation and other associated costs.

## Economic and Technological Feasibility

It is not expected that small businesses will need to comply with this proposed rule. As noted above, the two local governments subject to the emission limits already comply. This is not a mandate on small businesses or local government,

## Minimizing Adverse Impacts

To minimize any adverse impacts DEC is proposing a phase-in of requirements as well as a reliability provision. The phase-in of requirements allows for power companies, with affected sources, to plan over a longer term. In addition, DEC is proposing several compliance options to offer compliance flexibility:

- 1) Owners and operators may elect an ozone season stop where it is recorded in their operating permit that the source may not operate during the ozone season.
- 2) Owners and operators may elect to adhere to an output-based NO<sub>x</sub> daily emission rate that includes electric storage and renewable energy under common control with the SCCTs with which they are averaging.

## Small Business and Local Government Participation

DEC participated in several stakeholder meetings including those for impacted facilities and local environmental justice groups over a period of eighteen months. In addition, DEC posted a stakeholder outline on the DEC website to encourage stakeholder participation and comment.<sup>8</sup>

## Cure Period or Ameliorative Action

No additional cure period or other opportunity for ameliorative action is included in Subpart 227-3. This proposal will not result in immediate violations or impositions of penalties for existing facilities. To help reduce immediate impacts on affected sources, Subpart 227-3 requires a compliance plan due on March 2, 2020 followed by reduced NO<sub>x</sub> emission limits phased-in first on May 1, 2023 and later on May 1, 2025. This will allow owners and operators of affected sources time to comply with the proposed Subpart 227-3.

## Initial Review

The initial review of this rule shall occur no later than in the third calendar year after the year in which the rule is adopted.

---

<sup>1</sup> Parts per million on a dry volume basis at fifteen percent oxygen.

<sup>2</sup> Overnight costs include the costs for the physical power plant assuming it can be built overnight. As a result, interest on loans are not factored into the cost estimates.

<sup>3</sup> EIA, Capital Cost Estimates for Utility Scale Electricity Generating Plants, November 2016.

<sup>4</sup> EIA, Capital Cost Estimates for Utility Scale Electricity Generating Plants, November 2016.

<sup>5</sup> NYISO, The New York Installed Capacity (ICAP) market Working Group. Available here: [http://www.nyiso.com/public/markets\\_operations/market\\_data/icap/index.jsp](http://www.nyiso.com/public/markets_operations/market_data/icap/index.jsp).

<sup>6</sup> NYISO, 2017 Load and Capacity Data.

<sup>7</sup> The data provided only includes capital cost. "Gas Turbine Combustion." Lefebvre & Ballal. CRC Press, April 26, 2010.

<sup>8</sup> <https://www.dec.ny.gov/chemical/113887.html>.