CONSOLIDATED EDISON COMPANY OF NEW YORK, INC

CON EDISON - ASTORIA FACILITY

TITLE V PERMIT MODIFICATION

31-01 20TH AVENUE
ASTORIA, NEW YORK 1105

CLCPA GREENHOUSE GAS ASSESSMENT

Prepared by AKRF, Inc.

Henry Kearney

Kevin Edwards

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Consolidated Edison Company of New York, Inc.
Astoria Facility Title V Permit Modification
Climate Leadership and Community Protection Act
Greenhouse Gas Assessment

A. INTRODUCTION

In July 2019, New York State enacted the Climate Leadership and Community Protection Act (CLCPA) establishing statewide greenhouse gas (GHG) emission limits that represent a 40 percent reduction from 1990 levels by 2030, and an 85 percent reduction from 1990 levels by 2050. Among other requirements to meet the state's emission reduction goals, the CLCPA directs state agencies to determine if their decisions are consistent with the statewide GHG emission limits established by the CLCPA in the Environmental Conservation Law (ECL) Article 75[1] as well as ensure that decisions shall not disproportionately burden disadvantaged communities.[2] Under the program policy enacted by the New York State Department of Environmental Conservation (NYSDEC) (DAR-21, *The Climate Leadership and Community Protection Act and Air Permit Applications*), a CLCPA consistency determination is required for applications for new state facility permits, new Title V permits, certain air facility registrations and certain modifications to state facility permits and Title V permits.

Consolidated Edison Company of New York, Inc. (Con Edison) is seeking a modification of its Title V Permit its Astoria Facility (Facility), which includes Con Edison's Liquefied Natural Gas (LNG) Plant (Plant). Under the permit modification application, Con Edison would install a new combustion turbine as an in-kind replacement of the existing combustion turbine used to power the Plant's nitrogen refrigeration cycle (the proposed project), for conversion of natural gas to LNG, which is then stored on site. The existing combustion turbine has been in operation since the 1970s and is in need of replacement due to its age and condition. The proposed modification to the existing Title V Permit would also restrict usage of the proposed turbine to 4,380 hours of operation per year. The proposed turbine would be installed at the same site as the current Plant. Other equipment regulated under the Title V permit would not be affected by the proposed project.

Per NYSDEC policy, a CLCPA consistency assessment was performed for the proposed combustion turbine at the Plant, as discussed in more detail below. This assessment demonstrates that the proposed project would result in decreased energy consumption associated with the Plant's liquefaction process. Therefore, the proposed modification to the Title V Permit would result in a significant net reduction of GHG emissions and is not expected to interfere with achieving the statewide GHG emission reduction targets for 2030 and 2050, consistent with the GHG reduction goals of the CLCPA.

Co-pollutant emissions from the proposed project have also been quantified and there is a demonstrated reduction at the Facility resulting from the proposed project. Additionally, as a result, any localized effects of co-pollutants beyond the Facility at nearby disadvantaged communities would decrease with the use of more efficient equipment. Therefore, the proposed modification to the Title V permit would

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[1] CLCPA Section 7(2)

[2] CLCPA Section 7(3)

also be consistent with the goals of avoiding disproportionate impacts on disadvantaged communities, consistent with the environmental justice goals under the CLCPA.

B. PROJECT DESCRIPTION

PROCESS DESCRIPTION

The LNG Plant at the Con Edison Astoria Facility provides a backup supply of natural gas that enables Con Edison to maintain service to utility customers -- including hospitals, schools, businesses and homes -- during unplanned gas supply contingencies and extreme winter weather. The Plant's combustion turbine powers the nitrogen refrigeration cycle that liquefies natural gas for storage at the Facility. The LNG is stored in an existing storage tank with a capacity of approximately 1 billion standard cubic feet of natural gas (SCF). The Plant stores only pipeline gas and does not receive natural gas delivered via surface transportation (truck or rail).

PROPOSED PROJECT

Con Edison operates the Plant on an approximately 25-acre site within Con Edison's larger approximately 200-acre complex in Astoria, Queens (NY). The proposed project entails the in-kind replacement of the existing 82 MMBtu/hr combustion turbine, which powers the nitrogen refrigeration cycle, with a new, more efficient 54 MMBTU/hr combustion turbine on the same site. The existing 82 MMBtu/hr combustion turbine would be decommissioned and removed. As mentioned above, there is a present operational need to replace this existing turbine, since it is obsolete and the original equipment manufacturer no longer manufactures turbines and, thus, cannot provide replacement parts. As a result, Con Edison has had difficulty sourcing spare parts needed to maintain the turbine, a situation that threatens the continued availability and reliability of the Plant to store backup gas and supply public utility customers during system contingencies.

The proposed modification to the Title V Permit would include the installation of the new combustion turbine to replace the existing combustion turbine. Additionally, the Title V Permit would restrict the proposed turbine's operating hours to 4,380 hours per year, compared to the existing combustion turbine, which has no restrictions on operating hours.

With the combustion turbine replacement, the Plant would be able to meet the design intent of the LNG tank to be filled at approximately 6 million SCF per day. The proposed project would not, however, change the Plant's LNG storage capacity or the amount of LNG vaporized.

C. METHODOLOGY FOR ESTIMATING GHG EMISSIONS

POLLUTANTS OF CONCERN

GREENHOUSE GASES

GHGs are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. The general warming of the Earth's atmosphere caused by this phenomenon is known as the "greenhouse effect." The United States Environmental Protection Agency (EPA) identifies seven types of GHGs that are relevant for GHG inventory purposes: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), nitrogen trifluoride (NF_3), and sulfur hexafluoride (SF_6). There are no significant direct or indirect sources of HFCs, PFCs, NF_3, or SF_6 associated with the proposed project; therefore, the GHG assessment focuses on CO_2, N_2O, and methane.

To present a complete inventory of all GHGs, component emissions are added together and presented as carbon dioxide equivalent (CO_2e) emissions—a unit representing the quantity of each GHG weighted by its effectiveness using CO_2 as a reference. This is achieved by multiplying the quantity of each GHG emitted by a factor called global warming potential (GWP). GWPs account for the lifetime and the radiative forcing[3] of each chemical over a period of 20 years (e.g., CO_2 has a much shorter atmospheric lifetime than N_2O and therefore has a much lower GWP). The GWPs for the main GHGs discussed here are presented in **Table 1**.

Table 1
Global Warming Potential (GWP) for Major GHGs

Greenhouse Gas	20-Year Horizon GWP
Carbon Dioxide (CO_2)	1
Methane (CH_4)	84
Nitrous Oxide (N_2O)	264
Source: 6 NYCRR 496.5	

CO-POLLUTANTS

Co-pollutants represent air contaminants with the potential to affect human health within the local community nearby an emission source. This would include major air pollutants carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and particulate matter (PM), and volatile organic compounds (VOCs). Ambient concentrations of CO, PM, NO_2, SO_2, ozone, and lead are regulated by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act (CAA) and are referred to as criteria pollutants; emissions of VOCs, NO_x, and other precursors to criteria pollutants from certain source categories are also regulated by EPA.

In addition to the criteria pollutants, non-criteria air pollutants, also called hazardous air pollutants (HAPs), may be of concern. HAPs are those pollutants that are known or suspected to cause serious health effects in small doses. HAPs are emitted by a wide range of human-made and naturally occurring sources.

STATEWIDE GHG INVENTORY AND EMISSION LIMITS

As part of the regulations adopted at 6 NYCRR Part 496 in 2020, the New York State Energy Research and Development Authority (NYSERDA) developed the 1990 baseline GHG emissions for New York State consistent with the calculation requirements specified under the CLCPA. The statewide inventory is separated into four sectors—Energy Sector, Industrial Processes and Product Use, Agriculture Forestry and Other Land Use, and Waste. The GHG emissions associated with the LNG Plant would fall within the following sectors:

1. Energy Sector—This sector includes direct fuel combustion within the state (associated with building fuel usage, vehicle travel, and electricity generation), fugitive emissions within the state (associated with emissions released during production and transportation of fuels), electricity transmission (associated with the leakage of GHGs during the manufacture, use, and disposal of equipment used in the transmission and distribution of electricity), fuels imported into the state (associated with emissions from out of state industrial production and transportation), and electricity

[3] *Radiative forcing* is a measure of the influence a gas has in altering the balance of incoming and outgoing energy in the Earth-atmosphere system and is an index of the importance of the gas as a GHG.

imported into the state (associated with emissions from out of state generation and transmission). The energy sector also includes GHG emissions from fuel consumption at the LNG Plant.

2. Industrial Processes and Product Use—This sector includes emissions from the manufacturing process or from a manufactured product and are separate from the combustion of fossil fuels by industries, which is accounted for in the Energy sector. However, since natural gas would not come from any one origin, the upstream component for fuel extraction within the state would be accounted for within the Industrial Processes and Product Use Sector.

The GHG inventory performed by NYSERDA determined a statewide 1990 annual baseline emission total of 409.78 million metric tons (MMT) of CO_2e. Subsequently, this established the statewide annual CO_2e emission limits for 2030 and 2050 as 245.87 MMT and 61.47 MMT, respectively.

GHG EMISSIONS

The GHG emission estimates associated with the combustion turbine replacement were performed consistent with NYSDEC guidelines (as specified in DAR-21). Emissions were estimated for both the maximum operations as allowed by the permit (Potential to Emit, or "PTE") and the actual anticipated emissions from the GHG emissions sources. In addition, emissions associated with natural gas that is liquefied to produce LNG that is stored at the Facility and later vaporized were estimated.

The proposed modifications to the Title V Permit would not impact consumption of electricity or changes in fuel type that could result in changes in emissions in future years. Therefore, GHG emission estimates would represent the Plant's GHG emissions in the future years of 2030 and 2050 when New York State is required to meet the statewide emission limits.

COMBUSTION TURBINES

Fuel Usage

As discussed above, the proposed turbine would both: (1) operate with a higher energy efficiency compared to the existing unit; and (2) be restricted to 4,380 hours of operation per year. The PTE for the combustion turbines were based on the maximum allowable hours of operation—8,760 hours per year for the existing turbine (since there is no hours limit in the permit currently) and 4,380 hours per year for the proposed turbine (Con Edison's proposed hourly permit limit). Consequently, the turbine replacement would result in a decrease of the maximum potential natural gas consumed from 718,320 MMBtu per year using the existing turbine compared to 236,520 MMBtu per year using the proposed turbine—a 67.1 percent reduction.

Consistent with DAR-21, actual emissions are reflective of the highest 24-month average GHG emissions during the latest five years. Therefore, actual emissions for the combustion turbines were based on the maximum 24-month average number of hours the turbines would operate observed within five years of records (2017-2021)—2,929 hours per year as observed over the 2017-2018 time period. While the higher efficiency of the proposed turbine is anticipated to significantly reduce the number of hours of operation needed to produce LNG for storage at the Plant compared to the existing turbine, it was conservatively assumed that the new combustion turbine would operate for the same number of hours as the existing combustion turbine in the calculation of actual anticipated emissions associated with the future condition.[4] Consequently, the turbine replacement would result in a decrease of the

[4] As noted in the analysis, the comparison is reasonable given that the project will not change the LNG storage capacity, or the amount of LNG vaporized at the Facility.

anticipated amount of natural gas consumed from 221,242 MMBtu per year using the existing turbine compared to 158,166 MMBtu per year using the proposed turbine—a 28.5 percent reduction.

Furthermore, in the calculation of actual anticipated emissions, the proposed turbine was assumed to operate at full load during the actual hours of operation, while the existing turbine operated at less than full load. Therefore, GHG emissions associated with the proposed turbine would be less than the conservative estimates of actual GHG emissions presented, and the proposed project would in actuality result in a larger reduction of GHG emissions.

Direct Emissions

GHG emissions from the existing and proposed turbines were calculated based on estimated fuel consumption over a single year. The quantity of fuel was then multiplied by unit-specific emission factors of 117 lb CO_2 per MMBtu and 153 lb CO_2 per MMBtu for the existing and proposed turbines, respectively, obtained from a published emission factor (U.S. Energy Information Administration [EIA]) and manufacturer's specifications. In order to develop CO_2e emission factors, emission factors of N_2O and CH_4 for natural gas combustion (1.36 g/MMBtu and 3.90 g/MMBtu, respectively) were taken from EPA's Compilation of Air Pollutant Emissions Factors (AP-42) for stationary natural gas combustion turbines.[5] These emissions would correlate to direct fuel combustion under the Energy Sector of the 1990 baseline GHG Inventory.

Upstream Emissions

Upstream emissions were projected for the annual fuel consumed by the existing and proposed combustion turbine under the PTE and anticipated actual operations. Upstream emission factors for natural gas have been specified by NYSDEC for upstream and out-of-state emissions.[6] Fuel may originate from either in-state or out-of-state sources; therefore, portions of the Plant's upstream emissions would correlate to the Industrial Processes and Product Use Sector as fuel production emissions. The remaining portion would correlate to the Energy Sector as either direct fuel combustion associated with in-state vehicle travel, fugitive emissions occurring within the state, as well out-of-state emissions associated with the production and transport of imported fuel.

LNG THROUGHPUT

As discussed above, the proposed project would not change the Plant's LNG storage capacity, the amount of LNG vaporized, or increase transmission of natural gas to the site for liquefaction. Therefore, the working capacity of the LNG storage tank would remain as 1,000,000,000 standard cubic feet. The assessment of GHG emissions associated with the amount of LNG liquefied per year during actual operations were estimated based on the 24-month average annual amount of LNG as recorded over the 2018-2019 time period—267,576,696 standard cubic feet of natural gas.

The emissions associated with the operation of the LNG process included the upstream emissions associated with the natural gas delivered to the site for LNG storage, the downstream emissions associated with the distribution of natural gas from the site after vaporization, and the combustion of this natural gas at the end user. GHG emissions for end user natural gas combustion were taken from EPA's Emission Factors for Greenhouse Gas Inventories for stationary combustion.[7] In this situation, the quantity of fuels to be produced, stored at the Plant as LNG, and distributed to end-users would be

[5] EPA. AP-42, Fifth Edition Compilation of Air Pollutant Emissions Factors, Volume 1: Stationary Point and Area Sources, Chapter 3: Stationary Internal Combustion Sources. April 2000.

[6] NYSDEC. Appendix A of the *2022 Statewide GHG Emission Report*. January 2023.

[7] EPA. Emission Factors for Greenhouse Gas Inventories. 1 April 2023.

the same before and after the proposed project. This is because the amount of natural gas stored at LNG is limited by the existing capacity of the LNG storage tank, which is not changing as part of the proposed project.

D. GREENHOUSE GAS EMISSIONS

POTENTIAL TO EMIT

The maximum potential fuel consumption, usage, emission factors, and resulting GHG PTE emissions for the combustion turbine and LNG usage for the existing Plant and in the future with the proposed project are presented in **Tables 2** and **3**, respectively.

Table 2
Annual GHG PTE Emissions from Combustion Turbine and LNG Usage
Existing LNG Plant

Type	Annual Usage	Category	Emission Factors			Emissions (metric tons CO_2e/year)
			CO_2	CH_4	N_2O	
Natural Gas for Combustion Turbine	704,235,294 scf	Direct[1] [2]	53,107 g/MMBtu	3.90 g/MMBtu	1.36 g/MMBtu	38,641
		Upstream[3]	12,206 g/MMBtu	350 g/MMBtu	0.140 g/MMBtu	29,913
					Natural Gas Total	**68,554**
Natural Gas for LNG Liquefaction and Storage	1,000,000,000 scf	Direct [2]	53,060 g/MMBtu	3.90 g/MMBtu	1.36 g/MMBtu	0 [6]
		Upstream[3]	12,206 g/MMBtu	350 g/MMBtu	0.140 g/MMBtu	42,476
		Downstream [4] (Transmission)	2.17 g/MMBtu	73 g/MMBtu	N/A	6,257
		Downstream [5] (End Use)	53,060 g/MMBtu	1.00 g/MMBtu	0.10 g/MMBtu	54,234
					LNG Total	**102,966**
					Plant Total	**171,520**

Notes:
Totals may not sum due to rounding. See detailed calculations in Appendix A.
scf—standard cubic feet
g—grams
MMBtu—million British thermal units

(1) A direct CO_2 emission factor of 117 lb/MMBtu for natural gas consumption within the existing units taken from a published emission factor (EIA).
(2) Direct emission factors for natural gas consumption within the existing units were taken from EPA AP-42 Table 3.1-2a.
(3) Upstream emission factors for natural gas and diesel fuel specified by NYSDEC, Appendix A of the *2022 Statewide GHG Emission Report*. January 2023.
(4) Downstream CH_4 and CO_2 emission factors for transmission of natural gas specified by NYSDEC, Appendix A of the *2022 Statewide GHG Emission Report*. January 2023.
(5) Direct emission factors for end use combustion of the vaporized LNG were taken from EPA Emission Factors for Greenhouse Gas Inventories for stationary combustion (https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf).
(6) No direct emissions are associated with the natural gas for LNG storage at the Facility. However, the assessment includes the upstream emissions associated with the extraction and transport of natural gas to the Plant for liquefaction and vaporization, downstream emissions associated with transmission of the vaporized LNG from the Plant, and combustion of the vaporized LNG at the end user.

Table 3
Annual GHG PTE Emissions from Combustion Turbine and LNG Usage
Future LNG Plant

Type	Annual Usage	Category	Emission Factors			Emissions (metric tons CO_2e/year)
			CO_2	CH_4	N_2O	
Natural Gas for Combustion Turbine	231,882,353 scf	Direct[1] [2]	69,350 g/MMBtu	3.90 g/MMBtu	1.36 g/MMBtu	16,565
		Upstream[3]	12,206 g/MMBtu	350 g/MMBtu	0.140 g/MMBtu	9,849
					Natural Gas Total	**26,414**
Natural Gas for LNG Liquefaction and Storage	1,000,000,000 scf	Direct [2]	53,060 g/MMBtu	3.90 g/MMBtu	1.36 g/MMBtu	0 [6]
		Upstream[3]	12,206 g/MMBtu	350 g/MMBtu	0.140 g/MMBtu	42,476
		Downstream [4] (Transmission)	2.17 g/MMBtu	73 g/MMBtu	N/A	6,257
		Downstream [5] (End Use)	53,060 g/MMBtu	1.00 g/MMBtu	0.10 g/MMBtu	54,234
					LNG Total	**102,966**
					Plant Total	**129,381**

Notes:
Totals may not sum due to rounding. See detailed calculations in Appendix A.
scf—standard cubic feet
g—grams
MMBtu—million British thermal units

(1) A direct CO_2 emission factor of 153 lb/MMBtu for natural gas consumption within the proposed combustion turbine taken from manufacturer's data.
(2) Direct emission factors for natural gas consumption within the proposed combustion turbine were taken from EPA AP-42, Table 3.1-2a.
(3) Upstream emission factors for natural gas and diesel fuel specified by NYSDEC, Appendix A of the *2022 Statewide GHG Emission Report*. January 2023.
(4) Downstream CH_4 and CO_2 emission factors for transmission of natural gas specified by NYSDEC, Appendix A of the *2022 Statewide GHG Emission Report*. January 2023.
(5) Direct emission factors for end use combustion of the vaporized LNG were taken from EPA Emission Factors for Greenhouse Gas Inventories for stationary combustion (https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf).
(6) No direct emissions are associated with the natural gas for LNG storage at the Facility. However, the assessment includes the upstream emissions associated with the extraction and transport of natural gas to the Plant for liquefaction and vaporization, downstream emissions associated with transmission of the vaporized LNG from the Plant, and combustion of the vaporized LNG at the end user.

Due to the reduced potential on-site natural gas consumption, the Plant's GHG emissions associated with the combustion turbine are estimated to decrease by approximately 42,140 metric tons of CO_2e per year on a PTE basis. Total GHG emissions when combined with the emissions associated with the liquefaction and storage are estimated to be 171,520 metric tons when using the existing combustion turbine and 129,381 metric tons when fully utilizing the proposed combustion turbine.[8]

[8] Totals may not sum due to rounding. See detailed calculations in Appendix A.

ACTUAL GHG EMISSIONS

The anticipated actual fuel consumption, usage, emission factors, and resulting GHG emissions for the combustion turbine and LNG usage for the existing Plant and in the future with the project are presented in **Tables 4** and **5**, respectively.

Table 4
Annual Actual GHG Emissions from Combustion Turbine and LNG Usage
Existing LNG Plant

Type	Annual Usage	Category	Emission Factors			Emissions (metric tons CO_2e/year)
			CO_2	CH_4	N_2O	
Natural Gas for Combustion Turbine	216,903,669 scf	Direct(1) (2)	53,107 g/MMBtu	3.90 g/MMBtu	1.36 g/MMBtu	11,901
		Upstream(3)	12,206 g/MMBtu	350 g/MMBtu	0.140 g/MMBtu	9,213
					Natural Gas Total	**21,115**
Natural Gas for LNG Liquefaction and Storage	267,576,696 scf	Direct (2)	53,060 g/MMBtu	3.90 g/MMBtu	1.36 g/MMBtu	0 (6)
		Upstream(3)	12,206 g/MMBtu	350 g/MMBtu	0.140 g/MMBtu	11,366
		Downstream (4) (Transmission)	2.17 g/MMBtu	73 g/MMBtu	N/A	1,674
		Downstream (5) (End Use)	53,060 g/MMBtu	1.00 g/MMBtu	0.10 g/MMBtu	14,512
					LNG Total	**27,551**
					Plant Total	**48,666**

Notes:
Totals may not sum due to rounding. See detailed calculations in Appendix A.
scf—standard cubic feet
g—grams
MMBtu—million British thermal units

(1) A direct CO_2 emission factor of 117 lb/MMBtu for natural gas consumption within the existing units taken from a published emission factor (EIA).
(2) Direct emission factors for natural gas consumption within the existing units were taken from EPA AP-42, Table 3.1-2a.
(3) Upstream emission factors for natural gas and diesel fuel specified by NYSDEC, Appendix A of the *2022 Statewide GHG Emission Report*. January 2023.
(4) Downstream CH_4 and CO_2 emission factors for transmission of natural gas specified by NYSDEC, Appendix A of the *2022 Statewide GHG Emission Report*. January 2023.
(5) Direct emission factors for end use combustion of the vaporized LNG were taken from EPA Emission Factors for Greenhouse Gas Inventories for stationary combustion (https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf).
(6) No direct emissions are associated with the natural gas for LNG storage at the Facility. However, the assessment includes the upstream emissions associated with the extraction and transport of natural gas to the Plant for liquefaction and vaporization, downstream emissions associated with transmission of the vaporized LNG from the Plant, and combustion of the vaporized LNG at the end user.

Table 5
Annual Actual GHG Emissions from Combustion Turbine and LNG Usage
Future LNG Plant

Type	Annual Usage	Category	Emission Factors			Emissions (metric tons CO_2e/year)
			CO_2	CH_4	N_2O	
Natural Gas for Combustion Turbine	155,064,706 scf	Direct(1) (2)	69,350 g/MMBtu	3.90 g/MMBtu	1.36 g/MMBtu	11,077
		Upstream(3)	12,206 g/MMBtu	350 g/MMBtu	0.140 g/MMBtu	6,587
					Natural Gas Total	**17,664**
Natural Gas for LNG Liquefaction and Storage	267,576,696 scf	Direct (2)	53,060 g/MMBtu	3.90 g/MMBtu	1.36 g/MMBtu	0 (6)
		Upstream(3)	12,206 g/MMBtu	350 g/MMBtu	0.140 g/MMBtu	11,366
		Downstream (4) (Transmission)	2.17 g/MMBtu	73 g/MMBtu	N/A	1,674
		Downstream (5) (End Use)	53,060 g/MMBtu	1.00 g/MMBtu	0.10 g/MMBtu	14,512
					LNG Total	**27,551**
					Plant Total	**42,215**

Notes:
Totals may not sum due to rounding. See detailed calculations in Appendix A.
scf—standard cubic feet
g—grams
MMBtu—million British thermal units

(1) A direct CO_2 emission factor of 153 lb/MMBtu for natural gas consumption within the proposed combustion turbines taken from manufacturer's data.
(2) Direct emission factors for natural gas consumption within the proposed combustion turbines taken from EPA AP-42, Table 3.1-2a.
(3) Upstream emission factors for natural gas and diesel fuel specified by NYSDEC, Appendix A of the *2022 Statewide GHG Emission Report*. January 2023.
(4) Downstream CH_4 and CO_2 emission factors for transmission of natural gas specified by NYSDEC, Appendix A of the *2022 Statewide GHG Emission Report*. January 2023.
(5) Direct emission factors for end use combustion of the vaporized LNG were taken from EPA Emission Factors for Greenhouse Gas Inventories for stationary combustion (https://www.epa.gov/system/files/documents/2023-03/ghg_emission_factors_hub.pdf).
(6) No direct emissions are associated with the natural gas for LNG storage at the Facility. However, the assessment includes the upstream emissions associated with the extraction and transport of natural gas to the Plant for liquefaction and vaporization, downstream emissions associated with transmission of the vaporized LNG from the Plant, and combustion of the vaporized LNG at the end user.

Due to the reduced on-site natural gas consumption from the proposed project, the GHG emissions from on-site fuel usage are estimated to decrease by approximately 3,451 metric tons of CO_2e per year. Total emissions when combined with the emissions associated with LNG liquefaction, storage and vaporization are estimated to be 48,666 metric tons when using the existing turbine and 45,215 metric tons when utilizing the proposed turbine.[9]

[9] Totals may not sum due to rounding. See detailed calculations in Appendix A.

E. CO-POLLUTANT EMISSIONS

Similar to GHG emissions, co-pollutant emissions from the proposed project were estimated based on the number of hours of operation for the combustion turbines as well as the maximum potential to emit. The fuel consumption, emission factors, and resulting co-pollutant emissions for the existing turbine and the proposed project are presented in **Tables 6 and 7**, along with the net change in co-pollutants. The decrease in fuel consumption would result in a reduction in annual co-pollutant emissions from the combustion turbines. The co-pollutant emissions calculations are attached to this assessment.

Table 6
Annual Co-Pollutant PTE Emissions

Pollutant [1]	Emission Factor [2]	Existing Turbine		Future Turbine		Net Emissions (tons/year)
		Usage	Emissions (tons/year)	Usage	Emissions (tons/year)	
Criteria Pollutants						
Nitrogen Dioxide [3]	272 lb/mmcf	704,235,294 scf	95.64	231,882,353 scf	---	(83.50)
	105 lb/mmcf		---		12.15	
Carbon Monoxide	84 lb/mmcf		29.58		9.74	(19.84)
Volatile Organic Compounds	5.5 lb/mmcf		1.94		0.64	(1.30)
Particulate Matter (PM_{10})	7.6 lb/mmcf		2.68		0.88	(1.79)
Particulate Matter ($PM_{2.5}$)	7.6 lb/mmcf		2.68		0.88	(1.79)
Sulfur Dioxide	0.6 lb/mmcf		0.21		0.07	(0.14)
Hazardous Air Pollutants						
Benzene	0.0021 lb/mmcf	704,235,294 scf	7.39E-04	231,882,353 scf	2.43E-04	(4.96E-04)
Toluene	0.0034 lb/mmcf		1.20E-03		3.94E-04	(8.03E-04)
Formaldehyde	0.0750 lb/mmcf		2.64E-02		8.70E-03	(1.77E-02)
Naphthalene	0.0006 lb/mmcf		2.15E-04		7.07E-05	(1.44E-04)
Hexane	1.8000 lb/mmcf		6.34E-01		2.09E-01	(4.25E-01)
		Total HAPs	**0.66**	**Total HAPs**	**0.22**	**(0.44)**

Notes:
Totals may not sum due to rounding. See detailed calculations in Appendix A.
Mmcf—million cubic feet
scf—standard cubic feet

MMBtu—million British thermal units
(1) Note that co-pollutant emissions from other existing sources at the Facility are not included since they would not be affected by the proposed project.
(2) Emission factors for all pollutants other than NO_x taken from AP-42 Tables 1.4-1 through 1.4-3.
(3) NO_x emissions factors for the existing turbine and proposed turbine taken from emission testing data and manufacturer's data, respectively. Emissions of NO_2 were then estimated assuming all NO_x emissions would undergo full conversion to NO_2

Table 7
Annual Actual Co-Pollutant Emissions

Pollutant [1]	Emission Factor [2]	Existing Turbine		Future Turbine		Net Emissions (tons/year)
		Usage	Emissions (tons/year)	Usage	Emissions (tons/year)	
Criteria Pollutants						
Nitrogen Dioxide [3]	272 lb/mmcf	216,903,669 scf	29.46	155,064,706 scf	---	(21.34)
	105 lb/mmcf		---		8.12	
Carbon Monoxide	84 lb/mmcf		9.11		6.51	(2.60)
Volatile Organic Compounds	5.5 lb/mmcf		0.60		0.43	(0.17)
Particulate Matter (PM_{10})	7.6 lb/mmcf		0.82		0.59	(0.23)
Particulate Matter ($PM_{2.5}$)	7.6 lb/mmcf		0.82		0.59	(0.23)
Sulfur Dioxide	0.6 lb/mmcf		0.07		0.05	(0.02)
Hazardous Air Pollutants						
Benzene	0.0021 lb/mmcf	216,903,669 scf	2.28E-04	155,064,706 scf	1.63E-04	(6.49E-05)
Toluene	0.0034 lb/mmcf		3.69E-04		2.64E-04	(1.05E-04)
Formaldehyde	0.0750 lb/mmcf		8.13E-03		5.81E-03	(2.32E-03)
Naphthalene	0.0006 lb/mmcf		6.62E-05		4.73E-05	(1.89E-05)
Hexane	1.8000 lb/mmcf		1.95E-01		1.40E-01	(5.57E-02)
		Total HAPs	**0.20**	**Total HAPs**	**0.15**	**(0.06)**

Notes:
Totals may not sum due to rounding. See detailed calculations in Appendix A.
Mmcf—million cubic feet
scf—standard cubic feet

MMBtu—million British thermal units
(1) Note that co-pollutant emissions from other existing sources at the Facility are not included since they would not be affected by the proposed project.
(2) Emission factors for all pollutants other than NO_x taken from AP-42 Tables 1.4-1 through 1.4-3.
(3) NO_x emissions factors for the existing turbine and proposed turbine taken from emission testing data and manufacturer's data, respectively. Emissions of NO_2 were then estimated assuming all NO_x emissions would undergo full conversion to NO_2

F. CONCLUSIONS

As explained above, the proposed project would result in a net decrease of both PTE and projected actual emissions from the Plant of approximately 42,139 and 3,451 metric tons of CO_2e per year, respectively. The proposed modifications to the Title V Permit would not change the Plant's LNG storage capacity, the amount of LNG vaporized, the consumption of electricity, or changes in fuel type that could result in changes in emissions in future years. Therefore, the Plant's actual and PTE GHG emissions in future years of 2030 and 2050 are assumed to remain at the projected levels of 45,215 and 129,381 metric tons of CO_2e per year, respectively.

These reductions are representative of Con Edison's commitment to reduce its direct carbon emissions. The significant reductions in GHG emissions demonstrate that the proposed modification to the Title V Permit would support the State in achieving its emission reduction goals. Furthermore, since the proposed modification would not expand the capacity of the existing natural gas system, the proposed combustion turbine would only represent an investment to reduce GHG emissions within the State's existing fossil fuel infrastructure. In the future, with increased electrification, it is also anticipated that the new combustion turbine would also run less frequently than what is projected in this CLCPA analysis. Consequently, it is consistent with and will not interfere with the attainment of the statewide greenhouse gas emissions limits in 6 NYCRR Part 496 and is therefore in compliance with Section 7(2) of the CLCPA.

In addition, the proposed project benefits disadvantaged communities through reducing local emissions of co-pollutants and by providing reliable gas service to socioeconomically vulnerable communities, consistent with Section 7(3) of the CLCPA.

Therefore, the proposed project complies with the requirements of the CLCPA.