

## **Con Edison – 59<sup>th</sup> Street Station Climate Leadership and Community Protection Act (CLCPA) Analysis**

Consolidated Edison Company of New York, Inc. (“Con Edison” or the “company”) submits this analysis in response to the July 27, 2022 request of the New York State Department of Environmental Conservation (Department) to demonstrate that the continued operation of the 59th Street Station (the “Station”) within Con Edison’s utility district steam system is consistent with Section 7(2) and 7(3) of the Climate Leadership and Community Protection Act (CLCPA).<sup>1</sup>

As explained below, the continued operation of the Station over the next five year permit term is consistent with the CLCPA because: (1) the Station is a component of Con Edison’s public utility steam system and plays a critical role in reducing greenhouse gas (GHG) emissions from customer buildings; (2) Con Edison has taken actions to reduce GHG emissions across its steam system and has committed resources to complete additional GHG and other emission reduction measures in the near future; and (3) Con Edison has adopted a long-range plan to completely decarbonize the steam system, through the retirement of fossil fuel fired assets and other measures, by 2050.

### **The Steam System’s Critical Role in Reducing GHG Emissions from Buildings**

Con Edison distributes district steam to nearly 1,600 large buildings in Manhattan with over 500 million square feet of space. District steam is used by those buildings for heating, cooling, domestic hot water and other purposes. The residential buildings the company serves include buildings owned by the New York City Housing Authority (NYCHA) that are home to some of the City’s most economically vulnerable individuals and families.

Operation of the Con Edison steam system, including the 59th Street Station, helps New York City building owners reduce their GHG emissions consistent with the building emission limits imposed by Local Law 97 starting in 2024. Con Edison district steam is recognized under the law as having a lower carbon intensity than building heating systems that rely on oil, natural gas or grid electric.<sup>2</sup> Continued operation of the Con Edison steam system will afford building owners the option to reduce their GHG emissions by switching from oil or natural gas boilers to district steam as Con Edison continuously reduces its own GHG emissions and transitions toward a completely decarbonized steam system by 2050. “This transformation will provide a cost-effective clean energy solution for hard-to-electrify Manhattan buildings seeking to comply with city and state emissions limits.”<sup>3</sup>

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<sup>1</sup> Con Edison applied for renewal of the 59th Street Station’s Title V permit in 2018. The company has also requested a modification of the station’s Title V permit to allow the company to replace No. 4 backup fuel with cleaner-burning No. 2 oil.

<sup>2</sup> See NYC Administrative Code § 28-320.3.1.1.

<sup>3</sup> See “Con Edison Steam System – NYC Hottest Clean Energy Solution,” The New York CaribNews (April 2, 2022) <https://www.nycaribnews.com/articles/con-edison-steam-system-nyc-hottest-clean-energy-solution/> (last visited November 14, 2022).

Switching to steam also provides immediate, localized air quality benefits by reducing the emissions from trucks to deliver fuel oil. Finally, steam production in Con Edison's central plants -- rather than in-building heating boilers -- offers improved dispersion of emissions through stacks that are typically much taller than those used for individual building fossil fuel fired heating systems.

### **Upcoming and Completed Actions on GHG and Other Emissions Across the Steam System**

Over two decades, Con Edison has reduced air emissions from its steam boilers, including those located at the 59th Street Station. During this period, Con Edison has partnered with industry groups, including the Electric Power Research Institute (EPRI), on joint projects to test state-of-the-art low NO<sub>x</sub> burners, ultra-low NO<sub>x</sub> burners, flue gas recirculation, over fire air, and selective catalytic reduction (SCR) design. These partnerships have led to project designs implemented in the Con Edison steam system that reduce NO<sub>x</sub> and improve heat rate.

Work with EPRI and other industry partners has also led to emissions reductions by aiding in the design criteria for the two combined heat power (CHP) units installed in the system that have both SCR and carbon monoxide reduction technologies. This CHP installation, along with the addition of natural gas at all of our steam plants, have resulted in significant emissions reductions from 2005 levels.

The company is committed to retiring less efficient steam assets and making the investments needed to upgrade existing equipment to meet new, stringent emissions reduction requirements. Con Edison has already retired turbine GT4 at its Hudson Avenue Steam Station, and we will not be operating the remaining turbines (GT3 and GT5) as of November 1, 2022. The company is also committed to retiring the fossil-fuel steam boilers at the Ravenswood Steam Plant before 2030. Con Edison is exploring options identified in the long-range plan (discussed below) to continue providing carbon-free steam at this location before 2030 and beyond.

Over the past five years, Con Edison has been completing retrofits across its steam plants to accommodate the use of cleaner burning liquid backup fuels. We expect these retrofits to be completed by 2025. Finally, the company is undertaking significant investments to further reduce potential NO<sub>x</sub> emissions from its steam plants before 2030. NO<sub>x</sub> emissions contribute to ground level ozone, which may have localized impacts, including in areas within or near company plants that may be identified as disadvantaged communities.

### **Con Edison's Long-Term Plan to Decarbonize the Steam System**

Con Edison has made a Clean Energy Commitment to reduce the carbon footprint of its district steam system (currently about 85% of the Scope 1 greenhouse gas emissions of Con Edison and its affiliates) through energy efficiency improvements, the electrification of boilers and other methods.<sup>4</sup> Con Edison anticipates investing approximately \$1.5 billion over the next 10 years to deliver on this commitment. Beyond 10 years, the company will need to continue investing across

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<sup>4</sup> See <https://www.coned.com/en/our-energy-future/our-energy-vision/our-energy-future-commitment> (last visited on November 14, 2022).

its steam system to help New York State achieve economy-wide net-zero GHG emissions by 2050.

Building on its Clean Energy Commitment, Con Edison earlier this year published its long-range plan for the steam system that outlines the company's initiatives to build a low-to-zero carbon gaseous fuels portfolio and support its customers' transition of buildings currently heated using oil and gas onto the district steam system.<sup>5</sup> In carrying out these initiatives, the plan also calls on the Company to manage rate impacts on disadvantaged communities by selecting the lowest cost decarbonization solutions and implementing them over time.

The long-range plan identifies several potential decarbonization pathways, such as:

- Development of low-carbon fuels like hydrogen, with a special focus on green hydrogen as a lower-carbon alternative fuel to natural gas.
- Use of geothermal extraction systems to preheat feedwater to reduce required heat input, fuel demand and subsequent GHG emissions.
- Use of carbon capture and sequestration.
- Electrification of boilers to use clean energy.
- Use of industrial-scale heat pumps that would help create steam, including pairing heat pumps with energy storage to help balance the electric grid when renewables produce excess electricity.

### **GHG Potential To Emit Analysis and Upstream Out-of-State GHG Emissions**

The potential to emit (PTE) for each GHG identified in Table 1 below have been calculated based on operating restrictions that limit the boilers' heat input for oil firing as an area source under the Industrial, Commercial and Institutional Maximum Achievable Control Technology (ICI MACT) Rule. The PTE for each GHG is calculated for the two very large boilers (Boilers 114 and 115), three large boilers (Boilers 116, 117 and 118) and one simple cycle combustion turbine (GT1) at the 59<sup>th</sup> Street Station. The CO<sub>2</sub>e emissions have been calculated using the global warming potential (GWP) stated in 6 NYCRR § 496.5.

"Upstream" out-of-state GHG emissions associated with the use of fossil fuels (residual fuel oil and natural gas) are presented in Table 2 below. The annual average of the highest 24-month fuel consumption within the past 5 normal operating years was used for the GHG emissions calculations. The upstream emissions were calculated using emission factors provided by the Department in Appendix A "Emission Factors 2021 NYS Statewide GHG Emissions Report".

The Department requested that Con Edison also include calculations showing the Station's projected GHG and CO<sub>2</sub>e emissions in the years 2030 and 2050 "if possible." At this time, it is not possible for Con Edison to provide definitive calculations of GHG or CO<sub>2</sub>e this far into the future; however, projected GHGs during the permit term through 2026 are presented below.

### **Co-Pollutants – Hazardous Air Pollutants (HAPs) PTE and NOx Emissions**

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<sup>5</sup> See <https://cdne-dcxprod-sitecore.azureedge.net/-/media/files/coned/documents/our-energy-future/our-energy-projects/steam-long-range-plan.pdf?rev=75b9e45ae4544ad4a1f39bc321608abd&hash=0EC9E41B509DC6C8A05F1290A49D83C3> (last visited November 14, 2022).

In Table 3, emissions of co-pollutants from GHG sources are presented for the purpose of evaluation under CLCPA Section 7(3). The calculations of HAP emissions were performed using available EPA AP-42 emission factors with the restricted maximum heat input allowed under ICI MACT area source compliance. As shown in Table 3a, the emissions are below the major source threshold for each single HAP and for aggregated HAPs of 10 tons per year and 25 tons per year respectively for the facility restricted PTE.

While the location of 59th Street Station is identified in preliminary maps as being located within or close to disadvantaged communities, based on the AP-42 emission factors, Con Edison's conversion of backup fuels to No. 2 fuel oil, which are expected to be completed by 2025, will result in reduced HAPs emissions potential from the 59<sup>th</sup> Street Station and the steam system as a whole by 2030. Projected HAPs emissions are presented in Table 3b. In addition, continued operations of the Station, as part of Con Edison's public utility steam system, is expected to benefit disadvantaged communities by providing lower emissions from heating to residents of NYCHA buildings served by the steam system, and by lowering localized emissions due to reduced fuel truck deliveries as buildings switch from liquid heating fuels to Con Edison steam.

## **Conclusion**

As explained above, continued operation of the 59th Street Station as part of the Con Edison district steam system 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.

Continued operation of the Con Edison steam system, including the 59th Street Station, also benefits disadvantaged communities, and fully comports with Section 7(3) of the CLCPA, by providing reliable steam service to socioeconomically vulnerable communities, providing a pathway for building owners to reduce the carbon intensity associated with building heating, and reducing the adverse impacts individual gas and oil heating systems have on local communities in terms of air quality, noise and traffic.

**Table 1: Section 7(2) Analysis of the Climate Leadership and Community Protection Act**

The Station's potential to emit GHGs associated with its continued operation were calculated using the emission factors below with the CO<sub>2</sub> equivalent (CO<sub>2</sub>e) calculated using the respective carbon dioxide equivalent value below.

Pollutant	Emission Factor <sup>NG</sup>	Emission Factor <sup>Residual Fuel Oil</sup>
	[lb/MMBtu]	
CO <sub>2</sub>	117.08	173.060
CH <sub>4</sub>	0.0023	0.00187
N <sub>2</sub> O	0.0022	0.00353

Greenhouse Gas	Carbon dioxide equivalent value
Carbon dioxide	1
Methane	84
Nitrous oxide	264

6 NYCRR § 496.5

### Potential Heat Input based on Design Capacity

	<b>[MMBtu]</b>
Maximum Heat Input (MHI), Design Capacity	19,470,560
Boilers 114 & 115	14,103,600
Boilers 116, 117 & 118	5,045,760
GT1	321,200
Maximum Heat Input Oil Firing MHI_RO (< HAPs Threshold, ICI MACT)	8,400,000
Boilers 114 & 115	6,084,583
Boilers 116, 117 & 118	2,315,417
GT1	0
Maximum NG firing	11,070,560
Boilers 114 & 115	8,019,017
Boilers 116, 117 & 118	3,051,543
GT1	321,200

### Project's Potential to Emit GHGs

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115	995,932	14.73	19.39	1,002,288
Boilers 116, 117 and 118	378,990	5.61	7.38	381,409
GT1	18,803	0.36	0.35	18,925
Facility Total	1,374,923	20.34	26.76	1,402,622

## **Projected Station's Actual GHGs Emissions through 2026**

### **Projected Heat Input (through 2026)**

		[MMBtu]
Projected Heat Input (PHI)	(Total)	4,288,472
	Boilers 114 & 115	3,258,134
	Boilers 116, 117 & 118	1,028,300
	GT1	2,038
Projected Heat Input Oil Firing, PHI_RO/DO		
	Boilers 114 & 115	124,329
	Boilers 116, 117 & 118	35,400
	GT1	0
Projected Heat Input Natural Gas, PHI_NG		
	Boilers 114 & 115	3,133,805
	Boilers 116, 117 & 118	992,900
	GT1	2,038

### **Projected Actual GHGs Emissions through 2026**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115	194,211	3.65	3.60	195,468
Boilers 116, 117 and 118	61,188	1.15	1.13	61,584
GT1	119	0.0023	0.0022	120
Facility Total	255,399	4.80	4.73	257,171

### **Project's Projected GHGs Emissions in 2030**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115		No Projection		
Boilers 116, 117 and 118		No Projection		
GT1		No Projection		
Facility Total		No Projection		

## **Project's Projected GHGs Emissions in 2050**

<b>Emission Unit</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub>e</b>
	<b>[tons per year]</b>			
Boilers 114 and 115		No Projection		
Boilers 116, 117 and 118		No Projection		
GT1		No Projection		
<b>Facility Total</b>		No Projection		



**Table 2: Upstream Out-of-State GHGs Emissions**

The upstream out-of-state GHGs emissions are based on the baseline heat input for 2 calendar years (24-months) (annual average).

**Baseline Heat Input**

		<b>[MMBtu]</b>
Baseline Heat Input (BHI)	(Total)	4,456,404
	Boilers 114 & 115	3,451,818
	Boilers 116, 117 & 118	994,532
	GT1	10,054
Baseline Heat Input Oil Firing, BHI_RO/DO		
	Boilers 114 & 115	205,309
	Boilers 116, 117 & 118	27,435
	GT1	0
Baseline Heat Input Natural Gas, BHI_NG		
	Boilers 114 & 115	3,246,509
	Boilers 116, 117 & 118	967,097
	GT1	10,054

**Table A1: 2019 Emission Rates for Upstream Out-of-State Sources (g/MMBtu)**

	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>Total CO<sub>2</sub>e</b>
Natural Gas	12,131	357	0.14	42,147
Diesel/Distillate Fuel	15,164	121	0.26	25,375
Coal	3,300	364	0.10	33,891
Kerosene/Jet Fuel	10,071	109	0.17	19,270
Gasoline (E85)	5,097	33	0.08	7,905
Gasoline	19,604	128	0.33	30,405
LPG	17,295	121	0.27	27,553
Petroleum Coke	11,612	112	0.20	21,096
Residual Fuel	11,799	111	0.19	21,184

**Upstream Out-of-State GHGs Emissions**

Emission Unit	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub>e</b>
	<b>[tons per year]</b>			
Boilers 114 and 115	46,083	1,302.70	0.54	155,654
Boilers 116, 117 and 118	13,289	383.93	0.15	45,580
GT1	134	3.96	0.00	467
Facility Total	59,506	1690.59	0.70	201,701

### **Projected Upstream GHGs Emissions through 2026**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115	43,523	1,237.56	0.51	147,612
Boilers 116, 117 and 118	13,738	395.06	0.16	46,965
GT1	27	0.80	0.00	95
Facility Total	57,260	1632.62	0.67	194,672

### **Projected Upstream GHGs Emissions in 2030**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115		No projection		
Boilers 116, 117 and 118		No Projection		
GT1		No Projection		
Facility Total		No Projection		

### **Projected Upstream GHGs Emissions in 2050**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115		No Projection		
Boilers 116, 117 and 118		No Projection		
GT1		No Projection		
Facility Total		No Projection		

**Table 3a: Current Station 's Hazardous Air Pollutants' Emissions (PTE)**

The emissions of hazardous air pollutants (HAPs), otherwise known as co-pollutants for the purpose of the CLCPA analysis, were calculated using the restricted potential to emit in Table 1 above using the US EPA – AP42 emission factors as listed in the table below.

HAP	Emission Factors		Blrs. 114 & 115 HAP Emissions	Blrs 116, 117&118 HAP Emissions	GT1	Total HAP Emissions
	Emission Factor <sup>NG</sup>	Emission Factor <sup>Residual Fuel Oil</sup>				
	[lb/MMBtu]		[tons per year]			
Antimony		3.50E-05	0.106	0.041	0.000	0.147
Arsenic	1.96E-07	8.80E-06	0.028	0.010	0.000	0.038
Benzene	2.06E-06	1.43E-06	0.013	0.005	0.000	0.018
Beryllium	1.18E-08	1.85E-07	0.001	0.000	0.000	0.001
Cadmium	1.08E-06	2.65E-06	0.012	0.005	0.000	0.017
Chromium	1.37E-06	5.63E-06	0.023	0.009	0.000	0.031
Cobalt	8.24E-08	4.01E-05	0.122	0.047	0.000	0.169
Ethylbenzene		4.24E-07	0.001	0.000	0.000	0.002
Formaldehyde	7.35E-05	2.20E-04	0.964	0.367	0.012	1.343
Fluoride		2.49E-04	0.757	0.288	0.000	1.044
Hydrochloric Acid		1.12E-03	3.407	1.297	0.000	4.704
Manganese	3.73E-07	2.00E-05	0.062	0.024	0.000	0.086
Mercury	2.55E-07	7.53E-07	0.003	0.001	0.000	0.005
Naphthalene	5.98E-07	7.53E-06	0.025	0.010	0.000	0.035
Nickel	2.06E-06	5.63E-04	1.722	0.655	0.000	2.378
Phosphorus		6.31E-05	0.192	0.073	0.000	0.265
Selenium	2.35E-08	4.55E-06	0.014	0.005	0.000	0.019
Toluene	3.36E-06	4.13E-05	0.139	0.053	0.001	0.193
0-Xylene		7.27E-07	0.002	0.001	0.000	0.003
<b>TOTAL HAPS</b>			<b>7.59</b>	<b>2.89</b>	<b>0.01</b>	<b>10.48</b>

**Table 3b: Projected Station's Hazardous Air Pollutants' Emissions through 2026**

The projected hazardous air pollutants were calculated using the projected heat input through 2026 as indicated in the previous section above.

HAP	Emission Factors		Blrs 114 & 115	Blrs 116, 117 & 118	GT1	Total
	Emission Factor <sup>NG</sup>	Emission Factor <sup>Residual Fuel Oil</sup>	HAP Emissions	HAP Emissions		HAP Emissions
	[lb/MMBtu]		[tons per year]			
Antimony		3.50E-05	0.002	0.001	0.000	0.003
Arsenic	1.96E-07	8.80E-06	0.001	0.000	0.000	0.001
Benzene	2.06E-06	1.43E-06	0.003	0.001	0.000	0.004
Beryllium	1.18E-08	1.85E-07	0.000	0.000	0.000	0.000
Cadmium	1.08E-06	2.65E-06	0.002	0.001	0.000	0.002
Chromium	1.37E-06	5.63E-06	0.003	0.001	0.000	0.003
Cobalt	8.24E-08	4.01E-05	0.003	0.001	0.000	0.003
Ethylbenzene		4.24E-07	0.000	0.000	0.000	0.000
Formaldehyde	7.35E-05	2.20E-04	0.129	0.040	0.000	0.169
Fluoride		2.49E-04	0.015	0.004	0.000	0.020
Hydrochloric Acid		1.12E-03	0.070	0.020	0.000	0.089
Manganese	3.73E-07	2.00E-05	0.002	0.001	0.000	0.002
Mercury	2.55E-07	7.53E-07	0.000	0.000	0.000	0.001
Naphthalene	5.98E-07	7.53E-06	0.001	0.000	0.000	0.002
Nickel	2.06E-06	5.63E-04	0.038	0.011	0.000	0.049
Phosphorus		6.31E-05	0.004	0.001	0.000	0.005
Selenium	2.35E-08	4.55E-06	0.000	0.000	0.000	0.000
Toluene	3.36E-06	4.13E-05	0.008	0.002	0.000	0.010
0-Xylene		7.27E-07	0.000	0.000	0.000	0.000
<b>TOTAL HAPS</b>			<b>0.28</b>	<b>0.08</b>	<b>0.00</b>	<b>0.37</b>

**Response to NYSDEC CLCPA Questions re**  
**59<sup>th</sup> Street Station and Ravenswood Steam Plant**

Con Edison provides the information below in response to DEC's questions (received via email on 11/30/22) on the draft CLCPA Analyses for the 59<sup>th</sup> Street Steam Station and the Ravenswood Steam Plant (both dated 11/14/22).

The Analyses are presented in connection with Con Edison's applications to renew the facilities' Title V permits to authorize their continued operation and to modify these Title V permits to authorize the use of cleaner burning No. 2 fuel oil as a backup fuel. Under DAR-21, permit renewals like these that do not include significant modifications and would not lead to an increase in potential or actual greenhouse gas emissions, are presumptively considered to be consistent with the CLCPA.<sup>1</sup> Notwithstanding this presumption, the Analyses and the supplemental information provided in response to DEC's questions demonstrate clearly that the renewal and modification of the permits are directionally consistent with achieving the CLCPA's statewide greenhouse gas emissions limits.<sup>2</sup>

The CLCPA requires DEC to establish statewide greenhouse gas emissions limits that are 60% of 1990 levels in 2030 and 15% of 1990 emissions levels by 2050. To be consistent with the law, statewide greenhouse gas emissions are therefore required to decrease by 40% from 1990 levels by 2030 and decrease by 85% by 2050. Since 2005, when Con Edison began tracking greenhouse gas emissions, emissions from the 59<sup>th</sup> Street Station have decreased by approximately 47%, and emissions from the Ravenswood Steam Plant have declined almost 100%. In other words, the facilities have surpassed the 40% greenhouse gas emission reduction goal that the CLCPA established for statewide emissions.

- 1. The analyses give somewhat of a general overview of the actions Con Ed may have taken system-wide; however, the analyses do not mention actions taken at these specific facilities. The analyses should include actions taken to reduce emissions at these specific facilities.**

Con Edison has taken the following actions to reduce emissions at the 59<sup>th</sup> Street Station (approximate year of completion in parentheses): eliminated soot-blowing (2000); installed low NOx burners (2013); installed induced Flue Gas Recirculation (IFGR) equipment (2013); installed overfire air (2013); transitioned from liquid fuel to natural gas with liquid backup fuel (2013); installed a distributive control system with excess oxygen control (2013); limited gas turbine operating hours (2013); and transitioned the Station's liquid backup fuel from No. 6 oil to No. 4 oil (2018). At the Ravenswood Plant, Con Edison increased gas ignition capabilities to reduce oil firing at low loads (2013) and transitioned the Plant's liquid backup fuel from No. 6 oil to No. 4 oil (2019).

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<sup>1</sup> See DAR-21, p. 3.

<sup>2</sup> Even if the continued operation of the facilities over the next permit term were incorrectly deemed to be *inconsistent* with the emission limits, their continued operation is justified because their operation is needed to maintain the safety and reliability of Con Edison's existing steam utility system. See DAR-21, p. 6. Con Edison has a statutory obligation to provide safe and adequate service to its steam customers. Public Service Law § 79(1).

- 2. Similar to the comment above, the analyses include a somewhat general section discussing ‘possible decarbonization pathways’. While this information is useful to include, Con Ed should consider and discuss actions they will take at these specific locations. Furthermore, if any of those actions can and/or will be implemented prior to 2030 this should be noted in the analyses as well.**

Con Edison is developing a carbon capture pilot project that includes the 59th Street Station in collaboration with the Low Carbon Resource Initiative (LCRI) and U.S. Department of Energy (DOE) in response to their request for proposals. Carbon capture technology absorbs carbon from sources such as steam boilers or directly from the air to offset carbon emissions from other activities. Con Edison’s proposal, if selected, will install a carbon capture system at the 59th Street Station that will withdraw a portion of the flue gas generated by package boilers and liquify the carbon dioxide using a refrigeration process. Preliminary design of the carbon capture system is currently underway and is expected to be sufficient to support a request for proposals to the DOE later in 2023.

For the Ravenswood Plant, Con Edison is committed to surrendering and relinquishing the Title V permit for the Plant by 2030. Retirement of the facility’s boilers and relinquishment of the permit contributes to Con Edison’s long-range plan to decarbonize New York’s public utility steam system by retiring less efficient fossil-fuel fired steam assets.

- 3. The GHG calculations appear to show potential to emit for direct emissions and past actual emissions for their upstream emissions. Please also provide upstream emissions on a potential to emit basis for both facilities. However, draft DAR-21 policy indicates that projected actual direct emissions should be provided as well.**

Supplemental GHG emissions calculations accompany this document.

For the Ravenswood Steam Plant, potential to emit and projected actual direct emissions will be zero in 2030 and 2050.

For the 59<sup>th</sup> Street Station, it is not possible to predict the Station’s potential to emit or its projected actual emissions in 2030 or 2050. For the sole purpose of advancing discussion with the Department and the completion of the analyses:

- Con Edison assumes that the Station’s potential to emit in 2030 will remain the same as the current PTE.
- Con Edison assumes hypothetically that actual direct emissions in 2030 will be the same as the emissions projected for 2026, except for a reduction in greenhouse gas emissions from successful implementation of the carbon capture pilot project. If successful, that project is preliminarily estimated to result in an approximate reduction in greenhouse gas emissions of 3,000 tCO<sub>2</sub>e per year from the Station by 2030.
- Con Edison is also providing additional calculations showing hypothetical actual direct emissions from the Station compared to baseline actual emissions in 2030.

Please note that projected actual direct emissions are estimated using the same methodology employed to evaluate changes to steam plants in compliance with the Department's New Source Review program. Among other things, the NSR methodology reflects that the Station may be called on to operate in place of steam plants at other locations that are temporarily taken out of service for preventive maintenance. Retirement of the Ravenswood Steam Plant emissions units will not materially increase operations of or emissions from other steam plants.

**4. The analyses should include additional details as to why the switch to #2 fuel oil for backup is not proposed to occur until 2025.**

Section 24-168(d) of the New York City Administrative Code requires the conversion to No. 2 oil by January 1, 2025. Con Edison is expecting to complete the switch to No. 2 fuel oil at the 59<sup>th</sup> Street Station in 2023. The Analyses generically indicated that these conversions would be completed by 2025. Con Edison is prepared to move forward with the fuel conversion at the 59<sup>th</sup> Street Station earlier than what is legally required, resulting in an acceleration of the air quality benefits that can be realized through the conversion. Con Edison submitted an addendum to the Station's Title V renewal application on January 15, 2020 to authorize the conversion. The same addendum was submitted for the Ravenswood Plant on April 16, 2020. We are waiting on DEC's approval to move forward with permitting these environmentally beneficial fuel conversions.

**5. For Ravenswood, the analyses include some general references to the plant's fossil fuel fired boilers being retired by 2030; however, these references are not substantiated or explained. If Con Ed has entered into some sort of agreement to retire these units, please describe that in detail and provide any documentation if possible.**

See response to Question 2 above. Con Edison is not contractually required to retire these units but is committing to do so.

**6. For 59th St, there are no projected emissions in 2030 or 2050, and there's also no discussion of a planned shutdown as with Ravenswood. It is believed that Con Ed is seeking approval to rebuild the boiler at 59th St, which appears to be a significant investment and also a significant extension of the life of the boiler. On page 3 of the analysis it is stated that ConEd cannot predict past 2026, it is not clear if this is why these emissions are shown to be zero or does Con Ed plan to take some future action that would eliminate the emissions from this facility? If ConEd does not plan to operate this facility past 2026, please provide projections for 2030 and 2050 even if it's just the PTE of the facility.**

Con Edison has no plans to expand operations of the 59<sup>th</sup> Street Station or to increase the Station's potential to emit greenhouse gases. Con Edison is not proposing to "rebuild the boiler at 59<sup>th</sup> St." This comment presumably relates to a tube replacement project, of which we separately notified DEC pursuant to 6 NYCRR § 231-3.5(c) as being unrelated to any projected increase in the Station's NOx emissions. The tube replacement project was needed for the safety and reliability of Con Edison's public utility steam system, and was essentially preventative maintenance.

Since 2005, when Con Edison began tracking the Station's greenhouse gas emissions, its emissions have decreased approximately 47%. Accordingly, the Station is already consistent with – and even ahead of – the CLCPA's 40% emissions reduction goal for New York State. Con Edison currently plans to operate the Station after 2026 but does not anticipate that actual emissions from the Station will materially change between now and 2030. Con Edison expects that steam sales will continue to decline because of energy efficiency, demand response, targeted electrification, and other measures implemented to achieve CLCPA and Local Law 97 requirements, although we anticipate that sales to new customers may partially offset this decline.

It is not possible to predict actual or potential emissions from the Station twenty-seven years into the future.

With respect to Ravenswood, as stated above, greenhouse gas emissions have declined by almost 100% from 2005 to *de minimis* levels over the past two years. Con Edison has no plans that would increase the Plant's potential to emit. Instead, Con Edison plans to relinquish and surrender its Title V permit for this facility by 2030. For this reason, it *is* possible to project GHG emissions as being zero in 2030 and 2050.



## **59<sup>th</sup> Street Station**

### **Section 7.2 Analysis of the Climate Leadership and Community Protection Act**

#### **Facility's Potential to Emit GHGs**

<b>Emission Unit</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub>e</b>
	<b>[tons per year]</b>			
Boilers 114 and 115	995,932	14.73	19.39	1,002,288
Boilers 116, 117 and 118	378,990	5.61	7.38	381,409
GT1	18,803	0.36	0.35	18,925
<b>Facility Total</b>	<b>1,374,923</b>	<b>20.34</b>	<b>26.76</b>	<b>1,402,622</b>

#### **Facility's Past Actual Direct GHG Emissions**

<b>Emission Unit</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub>e</b>
	<b>[tons per year]</b>			
Boilers 114 and 115	207,816	3.85	3.86	209,160
Boilers 116, 117 and 118	58,988	1.12	1.09	59,370
GT1	589	0.0113	0.0108	592
<b>Facility Total</b>	<b>266,804</b>	<b>4.97</b>	<b>4.95</b>	<b>269,122</b>

(Note: Past Actual GHGs emissions are calculated using the highest annual heat input for 2 calendar years 2018 and 2019 in the past 5-year baseline period.)

#### **Facility's Projected Actual GHG Emissions through 2026**

<b>Emission Unit</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub>e</b>
	<b>[tons per year]</b>			
Boilers 114 and 115	194,211	3.65	3.60	195,468
Boilers 116, 117 and 118	61,188	1.15	1.13	61,584
GT1	119	0.0023	0.0022	120
<b>Facility Total</b>	<b>255,399</b>	<b>4.80</b>	<b>4.73</b>	<b>257,171</b>

**Facility's Projected Actual Minus Past Actual GHGs Emissions through 2026**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
Boilers 114 and 115	-13,605	-0.20	-0.26	-13,692
Boilers 116, 117 and 118	2,200	0.04	0.04	2,214
GT1	-469	-0.0090	-0.0086	-472
Facility Total	-11,405	-0.17	-0.22	-11,950

**Facility's Hypothetical Potential to Emit GHGs in 2030**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
Boilers 114 and 115	995,932	14.73	19.39	1,002,288
Boilers 116, 117 and 118	378,990	5.61	7.38	381,409
GT1	18,803	0.36	0.35	18,925
Facility Total	1,374,923	20.34	26.76	1,402,622

**Facility's Hypothetical GHGs Emissions in 2030**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
Boilers 114 and 115	194,211	3.65	3.60	195,468
Boilers 116, 117 and 118	58,188	1.15	1.13	58,584
GT1	119	0.0023	0.0022	120
Facility Total	252,399	4.80	4.73	254,172

(Note: The facility's hypothetical GHGs emissions in 2030 include CO<sub>2</sub> emission reduction of about 3,000 tons through carbon capture technology project on flue gas generated by the Package Boilers 116, 117 and 118.)

**Table A1: 2019 Emission Rates for Upstream Out-of-State Sources (g/MMBtu)**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Total CO <sub>2</sub> e
Natural Gas	12,131	357	0.14	42,147
Diesel/Distillate Fuel	15,164	121	0.26	25,375
Coal	3,300	364	0.10	33,891
Kerosene/Jet Fuel	10,071	109	0.17	19,270
Gasoline (E85)	5,097	33	0.08	7,905
Gasoline	19,604	128	0.33	30,405
LPG	17,295	121	0.27	27,553
Petroleum Coke	11,612	112	0.20	21,096
Residual Fuel	11,799	111	0.19	21,184

**Facility's Upstream Potential to Emit GHGs**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	<b>[tons per year]</b>			
Boilers 114 and 115	186,368	3,900.17	2.51	514,646
Boilers 116, 117 and 118	70,920	1,484.16	0.96	195,842
GT1	4,295	126.40	0.05	14,926
Facility Total	261,584	5510.73	3.52	725,414

**Facility's Upstream Past Actual GHGs Emissions**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	<b>[tons per year]</b>			
Boilers 114 and 115	46,083	1,302.70	0.54	155,654
Boilers 116, 117 and 118	13,289	383.93	0.15	45,580
GT1	134	3.96	0.00	467
Facility Total	59,506	1690.59	0.70	201,701

(Note: The upstream past actual GHGs emissions are based on the highest 2 calendar years 2018 and 2019 for the past 5-year baseline period.)

## **Facility's Projected Upstream GHGs Emissions through 2026**

<b>Emission Unit</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub>e</b>
	<b>[tons per year]</b>			
Boilers 114 and 115	43,523	1,237.56	0.51	147,612
Boilers 116, 117 and 118	13,738	395.06	0.16	46,965
GT1	27	0.80	0.00	95
<b>Facility Total</b>	<b>57,260</b>	<b>1632.62</b>	<b>0.67</b>	<b>194,672</b>

## **Facility's Projected Minus Past Actual Upstream GHGs Emissions through 2026**

<b>Emission Unit</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub>e</b>
	<b>[tons per year]</b>			
Boilers 114 and 115	-2,560	-65.14	-0.03	-8,041
Boilers 116, 117 and 118	449	11.13	0.01	1,385
GT1	-107	-3.15	0.00	-372
<b>Facility Total</b>	<b>-2,112</b>	<b>-54.01</b>	<b>-0.03</b>	<b>-7,029</b>

## **Ravenswood Steam Plant**

### **Section 7.2 Analysis of the Climate Leadership and Community Protection Act**

#### **Facility's Potential to Emit GHGs**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	452,175	5.70	7.51	454,637
U-BLR24	452,175	5.70	7.51	454,637
Facility Total	904,350	11.40	15.03	909,275

#### **Facility's Past Actual Direct GHG Emissions**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	7,482	0.10	0.12	7,520
U-BLR24	3,821	0.05	0.06	3,841
Facility Total	11,303	0.15	0.17	11,362

(Note: Past Actual GHGs emissions are calculated using the highest annual heat input for 2 calendar years 2018 and 2019 in the past 5-year baseline period.)

#### **Facility's Projected Actual GHG Emissions through 2026**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	235	0.00	0.00	236
U-BLR24	235	0.00	0.00	236
Facility Total	470	0.01	0.01	473

#### **Facility's Projected Actual Minus Past Actual GHGs Emissions through 2026**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	-7,246	-0.10	-0.11	-7,284
U-BLR24	-3,586	-0.05	-0.06	-3,605
Facility Total	-10,833	-0.14	-0.17	-10,889

### **Facility's Potential to Emit GHGs Emissions in 2030**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	0	0.00	0.00	0
U-BLR24	0	0.00	0.00	0
Facility Total	0	0.00	0.00	0

### **Facility's Projected GHGs Emissions in 2030 (Including Upstream GHGs Emissions)**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	0	0.00	0.00	0
U-BLR24	0	0.00	0.00	0
Facility Total	0	0.00	0.00	0

### **Facility's Potential to Emit GHGs Emissions in 2050**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	0	0.00	0.00	0
U-BLR24	0	0.00	0.00	0
Facility Total	0	0.00	0.00	0

### **Facility's Projected GHGs Emissions in 2050**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	0	0.00	0.00	0
U-BLR24	0	0.00	0.00	0
Facility Total	0	0.00	0.00	0

**Table A1: 2019 Emission Rates for Upstream Out-of-State Sources (g/MMBtu)**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Total CO <sub>2</sub> e
Natural Gas	12,131	357	0.14	42,147
Diesel/Distillate Fuel	15,164	121	0.26	25,375
Coal	3,300	364	0.10	33,891
Kerosene/Jet Fuel	10,071	109	0.17	19,270
Gasoline (E85)	5,097	33	0.08	7,905
Gasoline	19,604	128	0.33	30,405
LPG	17,295	121	0.27	27,553
Petroleum Coke	11,612	112	0.20	21,096
Residual Fuel	11,799	111	0.19	21,184

**Facility's Upstream Potential to Emit GHGs**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	74,493	1,098.55	1.11	167,064
U-BLR24	74,493	1,098.55	1.11	167,064
Facility Total	148,986	2197.11	2.22	334,128

**Facility's Upstream Past Actual GHGs Emissions**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	1,270	20.73	0.02	3,017
U-BLR24	648	10.51	0.01	1,533
Facility Total	1,918	31.25	0.03	4,550

**Facility's Projected Upstream GHGs Emissions through 2026**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
U-BLR13	0	0.00	0.00	0
U-BLR24	0	0.00	0.00	0
Facility Total	0	0.00	0.00	0

**Facility 's Projected Minus Past Actual Upstream GHG Emissions through 2026**

<b>Emission Unit</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>CO<sub>2</sub>e</b>
	<b>[tons per year]</b>			
U-BLR13	-1,270	-20.73	-0.02	-3,017
U-BLR24	-648	-10.51	-0.01	-1,533
Facility Total	-1,918	-31.25	-0.03	-4,550



## 59<sup>th</sup> Street Station

### Section 7.2 Analysis of the Climate Leadership and Community Protection Act

#### Emission Factors for Greenhouse Gases and their references

Pollutant	Emission Factor <sup>NG</sup>	Emission Factor <sup>RO</sup>	Emission Factor <sup>DO</sup>	Ref.
	[lb/MMBtu]			
CO <sub>2</sub>	117.08	173.06	159.54	EIA
CH <sub>4</sub>	0.0023	0.00187	0.0023	EPA AP-42
N <sub>2</sub> O	0.0022	0.00353	0.0022	EPA AP-42

Note: NG = Natural Gas; RO = Residual Fuel Oil; and DO = Distillate Fuel Oil

#### Facility's Potential to Emit GHGs

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115	995,932	14.73	19.39	1,002,288
Boilers 116, 117 and 118	378,990	5.61	7.38	381,409
GT1	18,803	0.36	0.35	18,925
Facility Total	1,374,923	20.34	26.76	1,402,622

#### Facility's Past Actual GHGs Emissions

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115	207,816	3.85	3.86	209,160
Boilers 116, 117 and 118	58,988	1.12	1.09	59,370
GT1	589	0.0113	0.0108	592
Facility Total	266,804	4.97	4.95	269,122

(Note: Past Actual GHGs emissions are calculated using the highest annual heat input for 2 calendar years 2018 and 2019 in the past 5-year baseline period.)

### **Facility's Projected Actual GHGs Emissions**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115	193,370	3.68	3.52	194,607
Boilers 116, 117 and 118	60,948	1.16	1.11	61,339
GT1	119	0.0023	0.0022	120
Facility Total	254,318	4.80	4.73	256,066

### **Facility's Projected Actual Minus Past Actual GHGs Emissions**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115	-14,446	-0.18	-0.35	-14,552
Boilers 116, 117 and 118	1,960	0.04	0.02	1,969
GT1	-469	-0.0090	-0.0086	-472
Facility Total	-11,405	-0.17	-0.22	-13,056

### **Facility's Assumed Potential to Emit GHGs Emissions in 2030 and 2050**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
[tons per year]				
Boilers 114 and 115	995,932	14.73	19.39	1,002,288
Boilers 116, 117 and 118	378,990	5.61	7.38	381,409
GT1	18,803	0.36	0.35	18,925
Facility Total	1,374,923	20.34	26.76	1,402,622

**Facility's Assumed GHGs Emissions in 2030 and 2050  
(without carbon capture pilot project)**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
<b>[tons per year]</b>				
Boilers 114 and 115	193,370	3.68	3.52	194,607
Boilers 116, 117 and 118	60,948	1.16	1.11	61,339
GT1	119	0.0023	0.0022	120
Facility Total	254,318	4.84	4.63	256,066

**Facility's Assumed GHGs Emissions in 2030 and 2050  
(with carbon capture pilot project)**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
<b>[tons per year]</b>				
Boilers 114 and 115	193,370	3.68	3.52	194,607
Boilers 116, 117 and 118	57,948	1.16	1.11	58,339
GT1	119	0.0023	0.0022	120
Facility Total	251,318	4.84	4.63	253,066

(Note: The facility's assumed GHGs emissions in 2030 include CO<sub>2</sub> emission reduction of about 3,000 tons through carbon capture technology project on flue gas generated by the Package Boilers 116, 117 and 118.)

**Table A1: 2020 Emission Rates for Upstream Out-of-State Sources (g/MMBtu)**

	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Total CO <sub>2</sub> e
Natural Gas	12,206	350	0.14	41,671
Diesel/Distillate Fuel	14,599	119	0.25	24,638
Coal	3,297	401	0.10	37,029
Kerosene/Jet Fuel	9,449	106	0.16	18,413
Gasoline (E85)	4,915	33	0.08	7,671
Gasoline	18,902	125	0.32	29,504
LPG	16,582	119	0.26	26,648
Petroleum Coke	11,030	110	0.20	20,342
Residual Fuel	11,183	109	0.19	20,423

Note: Total CO<sub>2</sub>e conversion uses GWP20 per 6 NYCRR Part 496

### **Facility's Upstream Potential to Emit GHGs Emissions**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
Boilers 114 and 115	182,900	3,824.88	2.51	504,853
Boilers 116, 117 and 118	69,600	1,455.51	0.96	192,116
GT1	4,322	123.92	0.05	14,744
Facility Total	256,822	5,404.31	3.52	711,713

### **Facility's Upstream Past Actual GHGs Emissions**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
Boilers 114 and 115	46,212	1,277.20	0.54	153,640
Boilers 116, 117 and 118	13,350	376.41	0.15	45,010
GT1	135	3.88	0.00	462
Facility Total	59,698	1657.49	0.70	199,112

(Note: The upstream past actual GHGs emissions are based on the highest 2 calendar years 2018 and 2019 for the past 5-year baseline period.)

### **Facility's Projected Upstream GHGs Emissions**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
Boilers 114 and 115	43,697	1,213.30	0.51	145,749
Boilers 116, 117 and 118	13,796	387.32	0.16	46,373
GT1	27	0.79	0.00	94
Facility Total	57,493	1600.62	0.67	192,216

### **Facility's Projected Minus Past Actual Upstream GHGs Emissions**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
Boilers 114 and 115	-2,515	-63.90	-0.03	-7,891
Boilers 116, 117 and 118	445	10.91	0.01	1,363
GT1	-108	-3.09	0.00	-368
Facility Total	-2,069	-52.98	-0.03	-6,896

### **Facility's Assumed Upstream Potential to Emit GHGs Emissions in 2030 and 2050**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
Boilers 114 and 115	182,900	3,824.88	2.51	504,853
Boilers 116, 117 and 118	69,600	1,455.51	0.96	192,116
GT1	4,322	123.92	0.05	14,744
Facility Total	256,822	5,404.31	3.52	711,713

### **Facility's Assumed Upstream GHGs Emissions in 2030 and 2050**

Emission Unit	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
	[tons per year]			
Boilers 114 and 115	43,697	1,213.30	0.51	145,749
Boilers 116, 117 and 118	13,796	387.32	0.16	46,373
GT1	27	0.79	0.00	94
Facility Total	57,493	1600.62	0.67	192,216