

**Northeastern University-
Greenhouse Gas Inventory (2019)**

EXECUTIVE SUMMARY

In accordance with American College and University Presidents Climate Commitment, the following report documents Northeastern's six greenhouse gases (GHG's) covered under the Kyoto Protocol. Specifically reported are:

- Northeastern's Scope 1 emissions from the following sources; on-campus stationary combustion of fossil fuels, mobile combustion of fossil fuels by institution owned vehicles, stationary combustion of fuel in emergency/standby generators and fugitive emissions from accidental releases of hydroflourocarbons (HFC's) in air conditioning equipment.
- Scope 2 indirect emissions from the following source; emissions generated by our consumption of electricity.
- Scope 3 indirect emissions from the following sources; air travel paid by Northeastern, indirect emissions associated with automobile business travel, electric grid transmission losses and natural gas pipeline losses from source to Boston City Gate. Scope 3 emissions are reported but are not included in total emission calculations. CRIS states "it is possible that the same Scope 3 emissions may be reported as Scope 1 or 2 emissions by more than one Reporter (..for this reason, Scope 3 emissions should never be summed across Reporters or mixed with Scope 1 and Scope 2 emissions. The Registry does not add Scope 3 emissions together or mix Scope 3 with Scope 1 or 2 emissions").

Total Scope 1 and 2 CO₂e emissions for 2019 were 57,286.7 MTCe (metric tons carbon equivalent).
Total estimated Scope 3 CO₂ emissions for 2019 were 2,960.2 MTCe (metric tons carbon equivalent).

This document is meant to provide an overview of GHG emission sources and GHG collection processes and provides the foundation for future development of the University's climate action plan. Future modifications and annual updates will be made to source and data collection process descriptions as our inventory methodology advances and improves.

Organization and Geographic Boundary of Northeastern's GHG Inventory

Northeastern University, founded in 1898, is a private research University located in the heart of Boston, and a leader in interdisciplinary research, urban engagement, and the integration of classroom learning with real-world experience. Northeastern offers a comprehensive range of undergraduate and graduate programs leading to degrees through the doctorate in six undergraduate colleges, eight graduate schools and two part-time divisions.

For this inventory, the boundaries of emissions reported are for those facilities that are wholly

owned or leased, and under Northeastern University operational control.

GHG's REPORTED

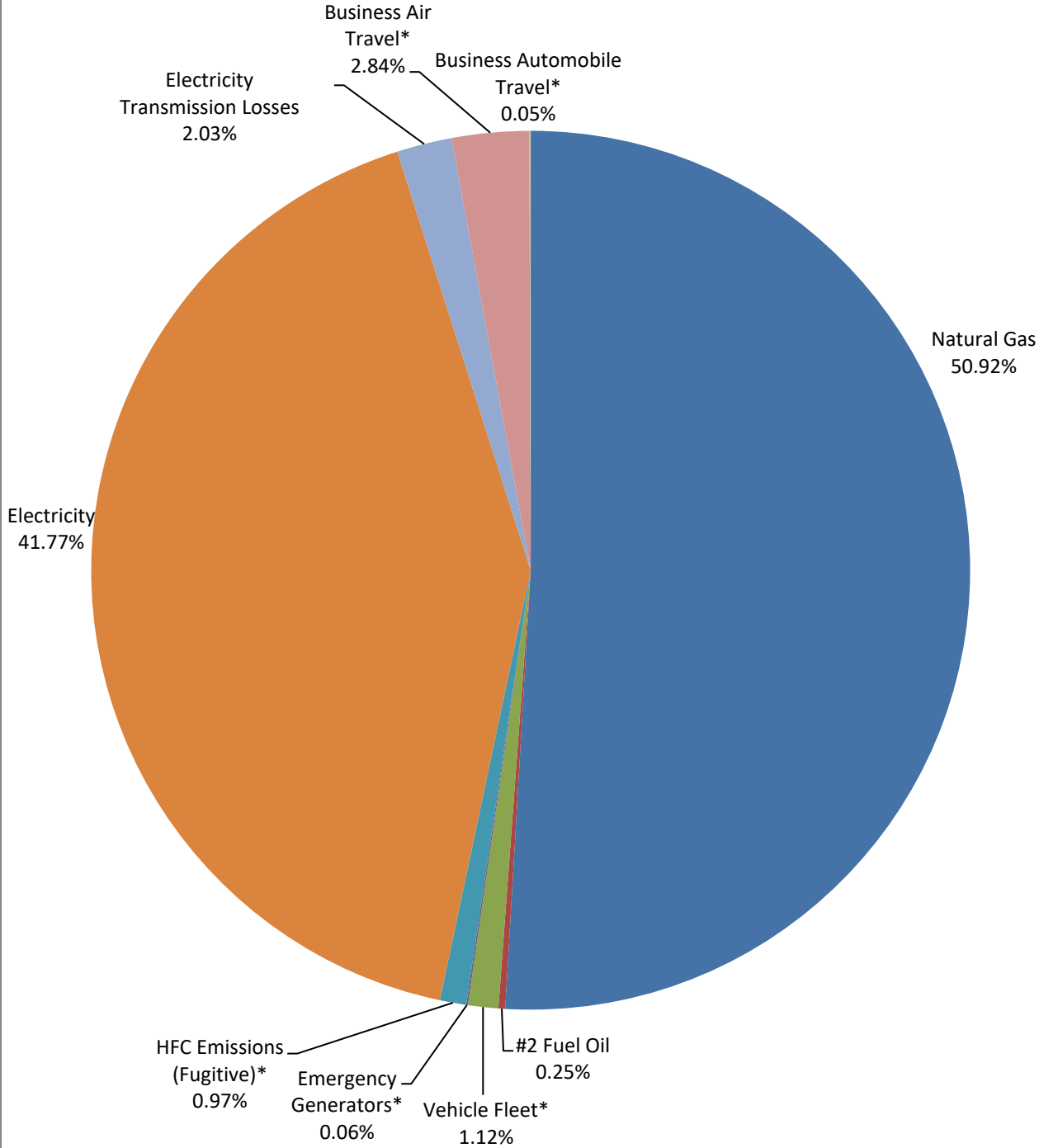
Greenhouse gases to be reported include all six internationally-recognized gases regulated under the Kyoto Protocol. These gases include: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydroflourocarbons (HFC's), perflourocabons (PFC's) and sulfur hexafluoride (SF₆). For the purpose of this inventory PFC's and SF₆ are excluded since these types of emissions are not likely to originate on Northeastern's Campuses.

METHODOLOGY

The University has adopted "best practices" accounting principles as defined by The Climate Registry's General Reporting Protocol, version 1.1. These principles are the same as those published by the World Resource Institute (WRI)/ World Business Council for Sustainable Development (WBCSD) *GHG Protocol Corporate Accounting Standard*. This standard encourages: relevance, completeness, consistency, transparency and accuracy. In addition, the University has followed existing GHG programs and protocols documented by the Registry from the International Organization for Standardization (ISO) 14064-1, The California Climate Action Registry, and the U.S. Environmental Protection Agency.

Northeastern University Carbon Footprint Components

MTCE (2019)



SOURCE NAME: Northeastern University 2019 Natural Gas Use

SOURCE TYPE: Stationary

SCOPE: Scope 1: Direct GHG Emissions

DESCRIPTION: 574,451 MMBtu of natural gas was combusted in 2019. The majority of gas was consumed by 6 firetube boilers in the University's dual fueled Central Steam Plant facility. The facility accounts for approximately 80% of all natural gas consumed at Northeastern and provides steam for heating, absorption cooling, domestic hot water, cooking and a variety of process loads. In 1998 Northeastern added linkageless micro-modulating combustion technology to its plant and increased combustion efficiencies by 7.5%. The remaining 20% of natural gas was used by smaller primary combustion units for heating, domestic hot water and cooking purposes.

EASE OF COLLECTION: Difficult

NOTES: Usage information for over 70 accounts was obtained from the Facilities Energy Division. This took considerable time and effort.

DATA QUALITY TIER FOR DIRECT CO₂ EMISSIONS: Tier C

METHOD FOR DETERMINING DIRECT CO₂ EMISSIONS: Calculation Based on Fuel Use

EMISSION FACTOR FOR DETERMINING DIRECT CO₂ EMISSIONS: Default Emission Factor by Sector and Fuel Type

DATA QUALITY TIER FOR DIRECT CH₄ and N₂O EMISSIONS: Tier C

METHOD FOR DETERMINING DIRECT CH₄ and N₂O EMISSIONS: Calculation Based on Fuel Use

EMISSION FACTORS FOR DETERMINING DIRECT CH₄ and N₂O EMISSIONS: Default Emission Factors by Sector and Fuel Type

Emissions:

	MTCe
CO ₂	30,480.4
CH ₄	12.6
N ₂ O	186.0
Total MTCe	30,679.0

SOURCE NAME: Northeastern University 2019 Oil Use

SOURCE TYPE: Stationary

SCOPE: Scope 1: Direct GHG Emissions

DESCRIPTION: 14,647 gallons of oil was combusted in 2019. The oil was used for heating and domestic hot water.

EASE OF COLLECTION: Easy

NOTES: Fuel oil is used in a relatively small number of locations on campus making it easy to track through existing utility bills.

DATA QUALITY TIER FOR DIRECT CO₂ EMISSIONS: Tier C

METHOD FOR DETERMINING DIRECT CO₂ EMISSIONS: Calculation Based on Fuel Use

EMISSION FACTOR FOR DETERMINING DIRECT CO₂ EMISSIONS: Default Emission Factor by Sector and Fuel Type

DATA QUALITY TIER FOR DIRECT CH₄ and N₂O EMISSIONS: Tier C

METHOD FOR DETERMINING DIRECT CH₄ and N₂O EMISSIONS: Calculation Based on Fuel Use

EMISSION FACTORS FOR DETERMINING DIRECT CH₄ and N₂O EMISSIONS: Default Emission Factors by Sector and Fuel Type

Emissions:

	MTCe
CO ₂	149.4
CH ₄	0.0
N ₂ O	0.3
Total MTCe	149.7

SOURCE NAME: Northeastern University 2019 Vehicle Fleet

SOURCE TYPE: Mobile

SCOPE: Scope 1: Direct GHG Emissions from Mobile Combustion

DESCRIPTION: Northeastern University's vehicle fleet consists of approximately **120** vehicles including vans, trucks, cars and electric vehicles, and in 2019 consumed 67,674 gallons of gasoline fuel and 7,620 gallons of diesel fuel.

EASE OF COLLECTION: Easy

NOTES: MTCE emissions for the University fleet were calculated in 2019 using the Climate Registry Information System protocol. The resulting emissions were at a level low enough to be deemed "de minimis".

DATA QUALITY TIER FOR DIRECT CO₂ EMISSIONS: Tier C

METHOD FOR DETERMINING DIRECT CO₂ EMISSIONS: Calculation Based on Fuel Use

EMISSION FACTOR FOR DETERMINING DIRECT CO₂ EMISSIONS: Default Emission Factor by Sector and Fuel Type

DATA QUALITY TIER FOR DIRECT CH₄ and N₂O EMISSIONS: Tier C

METHOD FOR DETERMINING DIRECT CH₄ and N₂O EMISSIONS: Calculation Based on Fuel Use

EMISSION FACTORS FOR DETERMINING DIRECT CH₄ and N₂O EMISSIONS: Default Emission Factors by Sector and Fuel Type

Emissions:

2019	
	MTCE
CO ₂	671.9
CH ₄	1.43
N ₂ O	21.67
Total MTCE	695.0

SOURCE NAME: Northeastern University 2019 Emergency/Standby Generators

SOURCE TYPE: Stationary

SCOPE: Scope 1: Direct GHG Emissions from Stationary Combustion

DESCRIPTION: 3,557.4 gallons of ultra-low sulfur diesel were combusted in University generators in 2019. The resulting emissions were at a level low enough to be considered “de minimus”.

EASE OF COLLECTION: Difficult

NOTES: Northeastern University has approximately 45 diesel powered generators that operate in the emergency/standby mode. These generators average 250 KW in size and are run monthly as required by code and were used for emergencies or as needed for maintenance activities.

DATA QUALITY TIER FOR DIRECT CO₂ EMISSIONS: Tier C

METHOD FOR DETERMINING DIRECT CO₂ EMISSIONS: Calculation Based on Fuel Use

EMISSION FACTOR FOR DETERMINING DIRECT CO₂ EMISSIONS: Default Emission Factor by Sector and Fuel Type

DATA QUALITY TIER FOR DIRECT CH₄ and N₂O EMISSIONS: Tier C

METHOD FOR DETERMINING DIRECT CH₄ and N₂O EMISSIONS: Calculation Based on Fuel Use

EMISSION FACTORS FOR DETERMINING DIRECT CH₄ and N₂O EMISSIONS: Default Emission Factors by Sector and Fuel Type

Emissions:

Ultra Low Sulfur Diesel	MTCe
CO ₂	36.108
CH ₄	0.043
N ₂ O	0.287
Total MTCe	36.4

SOURCE NAME: Northeastern University 2019 Fugitive Emissions

SOURCE TYPE: Stationary

SCOPE: Scope 1: Direct GHG Fugitive Emissions

DESCRIPTION: Northeastern University purchases refrigerants to replace refrigerant lost through equipment malfunctions and leakage.

EASE OF COLLECTION: Difficult

NOTES: The University's MTCE fugitive Greenhouse Gas emissions were calculated for 2019, based on HVAC technician refrigerant documentation. The resulting emissions were at a low enough level to be deemed "de minimis."

DATA QUALITY TIER FOR DIRECT CO₂ EMISSIONS: Tier C

METHOD FOR DETERMINING DIRECT CO₂ EMISSIONS: Calculation Based on Refrigerant

EMISSION FACTOR FOR DETERMINING DIRECT CO₂ EMISSIONS: Default Emission Factor by Sector and Fuel Type

Emissions:

	MTCe
All Refrigerants	583.2

SOURCE NAME: Northeastern University 2019 Electricity Use

SOURCE TYPE: Stationary

SCOPE: Scope 2: Indirect GHG Emissions from Electricity Consumption

DESCRIPTION: The University consumed 105,227 MWh in 2019. The majority of this electricity was by metered by the University's two primary fed electric substations. These two substations account for approximately 86% of all electricity used at Northeastern. The remaining electricity is metered by approximately 100 separate electric accounts.

EASE OF COLLECTION: Difficult

NOTES: Electricity consumption data from approximately 100 electricity accounts was used to calculate emissions from electricity use.

DATA QUALITY TIER FOR INDIRECT CO₂ EMISSIONS: Tier C

METHOD FOR DETERMINING INDIRECT CO₂ EMISSIONS: Calculation Based on Electricity Use

EMISSION FACTOR FOR DETERMINING INDIRECT CO₂ EMISSIONS: Default Emission Factor by Geographic Region

DATA QUALITY TIER FOR INDIRECT CH₄ and N₂O EMISSIONS: Tier C

METHOD FOR DETERMINING INDIRECT CH₄ and N₂O EMISSIONS: Calculation Based on Electricity Use

EMISSION FACTORS FOR DETERMINING INDIRECT CH₄ and N₂O EMISSIONS: Default Emission Factors by Geographic Region (EPA EGRID 2018, published February, 2020).

Emissions:

	MTCe
CO ₂	24,929.5
CH ₄	81.9
N ₂ O	155.0
Total MTCe	25,166.4

SOURCE NAME: Northeastern University 2019 Business Air Travel

SOURCE TYPE: Mobile

SCOPE: Scope 3: Indirect GHG Emissions from Business Air Travel

DESCRIPTION: Business Air Travel by University Personnel

EASE OF COLLECTION: Extremely Difficult

NOTES: MTCE emissions for the University business air travel was calculated in 2008 for the initial campus carbon footprint. The resulting emissions were at a level low enough to be deemed “de minimis” and estimated using the 2008 values.

DATA QUALITY TIER FOR INDIRECT CO₂ EMISSIONS: Tier C

METHOD FOR DETERMINING INDIRECT CO₂ EMISSIONS: Calculation Based on Miles Traveled

EMISSION FACTOR FOR DETERMINING INDIRECT CO₂ EMISSIONS: Default Emission Factor Based on Flight Distance and World Resource Institute’s Emission Factors

DATA QUALITY TIER FOR INDIRECT CH₄ and N₂O EMISSIONS: Tier C

Emissions:

Flight Type	MTCE
Short Haul	26.0
Medium Haul	231.0
Long Haul	1,452.5
Total MTCE	1,709.5

SOURCE NAME: Northeastern University 2019 Business Automobile Travel

SOURCE TYPE: Mobile

SCOPE: Scope 3: Indirect GHG Emissions from Business Automobile Travel

DESCRIPTION: Business Automobile Travel by University Personnel

EASE OF COLLECTION: Extremely Difficult

NOTES: MTCE emissions for the University business automobile travel was calculated in 2008 for the initial campus carbon footprint. The resulting emissions were at a level low enough to be deemed “de minimis” and estimated using the 2008 values.

DATA QUALITY TIER FOR INDIRECT CO₂ EMISSIONS: Tier C

METHOD FOR DETERMINING INDIRECT CO₂ EMISSIONS: Calculation Based on Miles Traveled

EMISSION FACTOR FOR DETERMINING INDIRECT CO₂ EMISSIONS: Default Emission Factors Based on Miles Traveled and Default Emission

DATA QUALITY TIER FOR INDIRECT CH₄ and N₂O EMISSIONS: Tier C

METHOD FOR DETERMINING INDIRECT CH₄ and N₂O EMISSIONS: Calculation Based on Estimated Fuel Efficiency and Actual Miles Traveled

EMISSION FACTORS FOR DETERMINING INDIRECT CH₄ and N₂O EMISSIONS: Default Emission Factors by Sector and Fuel Type

Emissions:

Business Travel	
Gas	MTCE
CO ₂	29.7
CH ₄	0.01
N ₂ O	0.2
Total MTCE	29.9

SOURCE NAME: Northeastern University 2019 Electric Grid Transmission losses

SOURCE TYPE: Stationary

SCOPE: Scope 3: Indirect GHG Emissions from Electric Grid Transmission losses

DESCRIPTION: Indirect GHG Emissions from Electric Grid Transmission losses

EASE OF COLLECTION: Easy

NOTES: 1,220.8 MTCE for electric grid transmission losses was calculated by using EGRID 2018 the published transmission line loss factor of 4.88% for ISO New England.

DATA QUALITY TIER FOR INDIRECT CO₂ EMISSIONS: Tier C

METHOD FOR DETERMINING INDIRECT CO₂ EMISSIONS: Calculation Based on EGRID 2018

EMISSION FACTOR FOR DETERMINING INDIRECT CO₂ EMISSIONS: Default Emission Factors Based on EGRID 2018

DATA QUALITY TIER FOR INDIRECT CH₄ and N₂O EMISSIONS: Tier C

METHOD FOR DETERMINING INDIRECT CH₄ and N₂O EMISSIONS: Calculation Based on EGRID 2018 transmission line loss factor for ISO New England.

EMISSION FACTORS FOR DETERMINING INDIRECT CH₄ and N₂O EMISSIONS: CH₄ and N₂O Emission Factors included as CO₂e.

Emissions:

	MTCE
CO ₂	1,216.6
CH ₄	4.2
N ₂ O	0.0
Total MTCE	1,220.8