

# Radford University's 2019 Greenhouse Gas Inventory

July 1, 2018- June 30, 2019

## Summary

Radford University conducts an annual inventory of its greenhouse gas emissions. The process

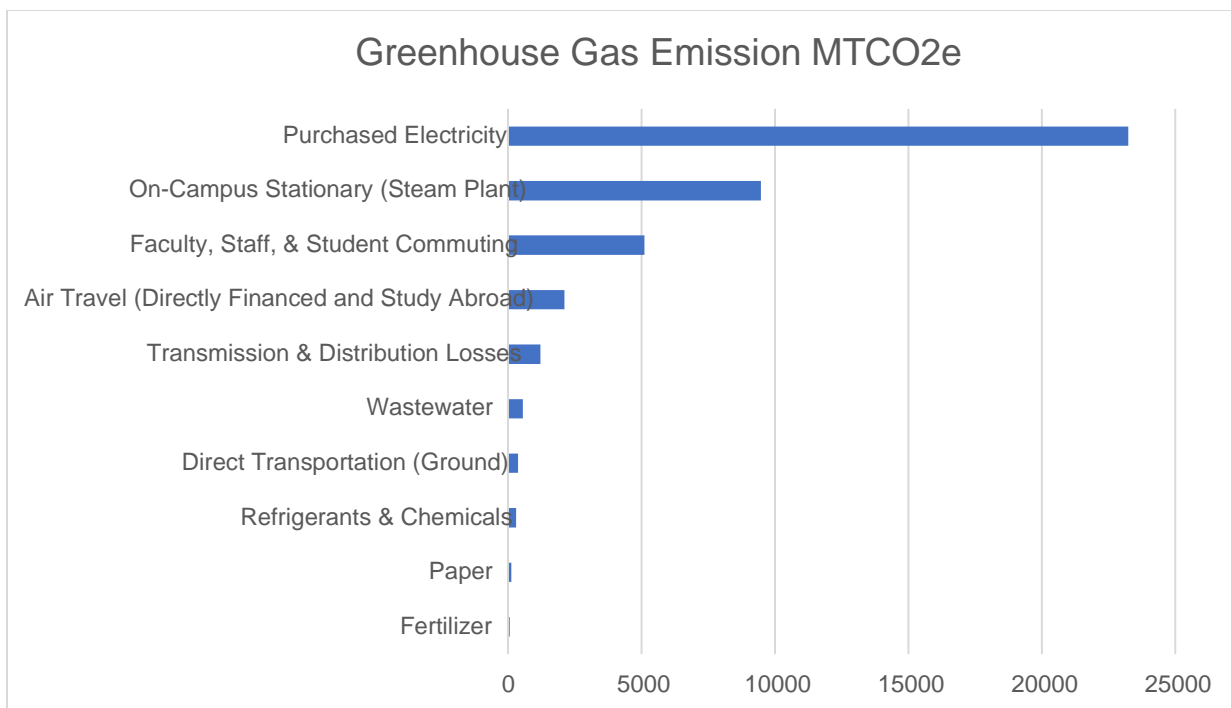


During the data collection phase, the Sustainability Manager entered the raw data into SIMAP where appropriate and processed other data into units that are compatible with the tool. When the data collection was complete, the Sustainability Manager and other university employees began analyzing the results for any omissions or unusual discrepancies.

## Results

SIMAP processes all data with emissions conversion factors that translate different emissions sources to greenhouse gas equivalents. This tool calculates energy consumption, amounts of three greenhouse gases, level of emissions from each source and Scope 1 and 2, and electric tons of carbon dioxide equivalent (MTCO<sub>2</sub>e).

Top 10 Sources	Greenhouse Gas Emission MTCO <sub>2</sub> e
Purchased Electricity	23,245.07
On-Campus Stationary (Steam Plant)	9,478.32
Faculty, Staff, & Student Commuting	5,117.48
Air Travel (Directly Financed and Study Abroad)	2,110.78
Transmission & Distribution Losses	1,215.70
Wastewater	559.57
Direct Transportation (Ground)	375.03
Refrigerants & Chemicals	310.95
Paper	122.62
Fertilizer	63.21
<b>TOTAL EMISSIONS</b>	<b>42,554.39</b>



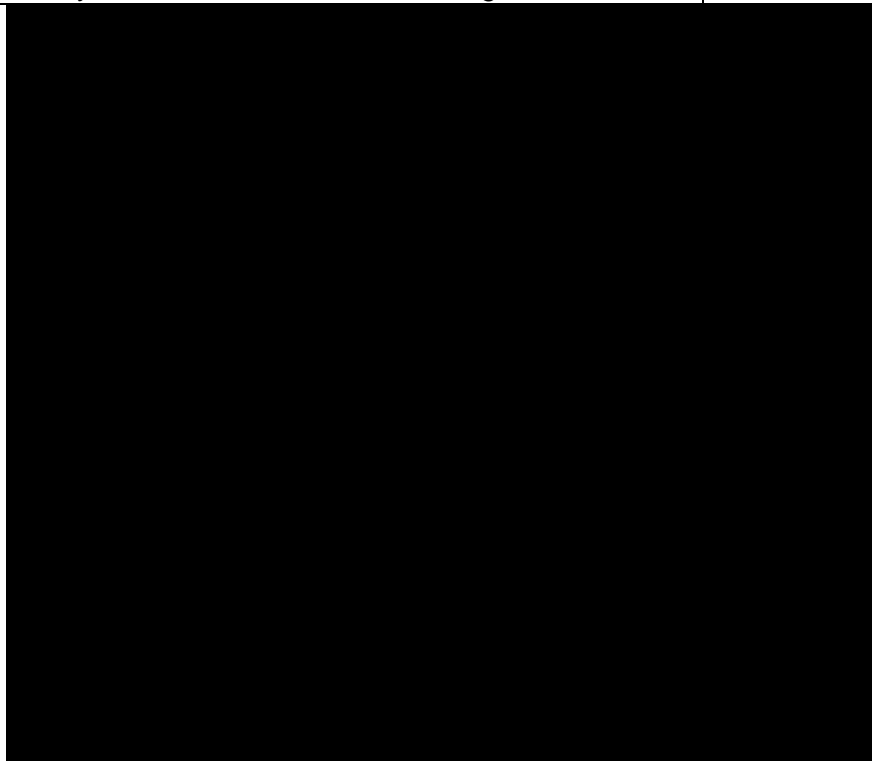
## Discussion

### Emissions by Scope

Emissions sources are categorized based on their origin; these categories are referred to as Scopes 1, 2, and 3. Scope 1 emissions are direct sources from campus and include on-campus energy generation and steam production, on-campus mobile fuel use, refrigerants, and fertilizers. Scope 2 refers to direct, off-campus emissions sources that are directly linked to campus operations, primarily purchased electricity. Indirect emissions linked to university activities are categorized as Scope 3. These emissions include university-financed travel, solid waste disposal, water treatment, and faculty, staff, and student commuting.

Approximately 54.6% (23,245.51 MTCO<sub>2</sub>e) of Radford University's total emissions are Scope 2 emissions. Scope 1 (10,227.51 MTCO<sub>2</sub>e) emissions sources account for 42% of total emissions, produced primarily by burning Propane and Natural Gas on-campus, along with on-campus vehicles. The remaining emissions are considered Scope 3, and account for 3% (9,081.81 MTCO<sub>2</sub>e) of total emissions.

2019 Greenhouse Gas Emissions by Scope	Greenhouse Gas Emissions MTCO <sub>2</sub> e
Scope 1: Direct emissions sources from campus. Includes steam, natural gas, fuel use, fertilizers, etc.	10,227.51
Scope 2: Direct, off-campus emissions. Includes purchased electricity	23,245.07
Scope 3: Indirect emissions linked to university activities. Includes business travel, study abroad, solid waste, commuting, wastewater, etc.	9,081.81



## Top 5 Emissions by Source

1. Purchased Electricity 54.6% of Total Emissions Purchased electricity, a Scope 2 emission source, continues to be the university's largest emissions source. During FY2016, Radford University purchased 40,581,010 watt hours (kWh) of electricity from the City of Radford's Utility. The approximate fuel mixture for producing electricity in the university's eGrid Subregion, RFC West, is used to calculate these emissions.

Purchased electricity produced 23,245.07 MTCO<sub>2</sub>e FY2019.

2. On-Campus Stationary Sources 22.3% of Total Emissions These emissions sources are Scope 1 emissions and represent stationary (non-mobile) fuel sources consumed on the Radford University campus. In FY2016, the university used 5,405 gallons of propane (LPG), and 177,643.78 MMBtu of natural gas. Natural gas is the primary fuel source burned in Radford University's Steam Plant to generate steam for heating campus buildings. Propane provides heating for the Student Center, the Student Center Annex, the Student Center East, the Student Center West, the Student Center North, the Student Center South, the Student Center East Annex, the Student Center West Annex, the Student Center North Annex, and the Student Center South Annex.

user. The U.S. Energy Information Administration (EIA) estimates that T&D losses average about 5% of the electricity that is transmitted and distributed annually in the United States<sup>1</sup>. T&D Losses will increase or decrease based on the amount of electricity that the University purchases and/or the sources from which it is produced, and is currently 2.85% of total emissions. This emissions source is considered Scope 3.

T&D Losses produced 1,215 MTCO<sub>2</sub>e in FY2019

## Normalization and Trends

1. Since 2016, Radford University's total greenhouse gas emissions (MTCO<sub>2</sub>e) have increased each year.

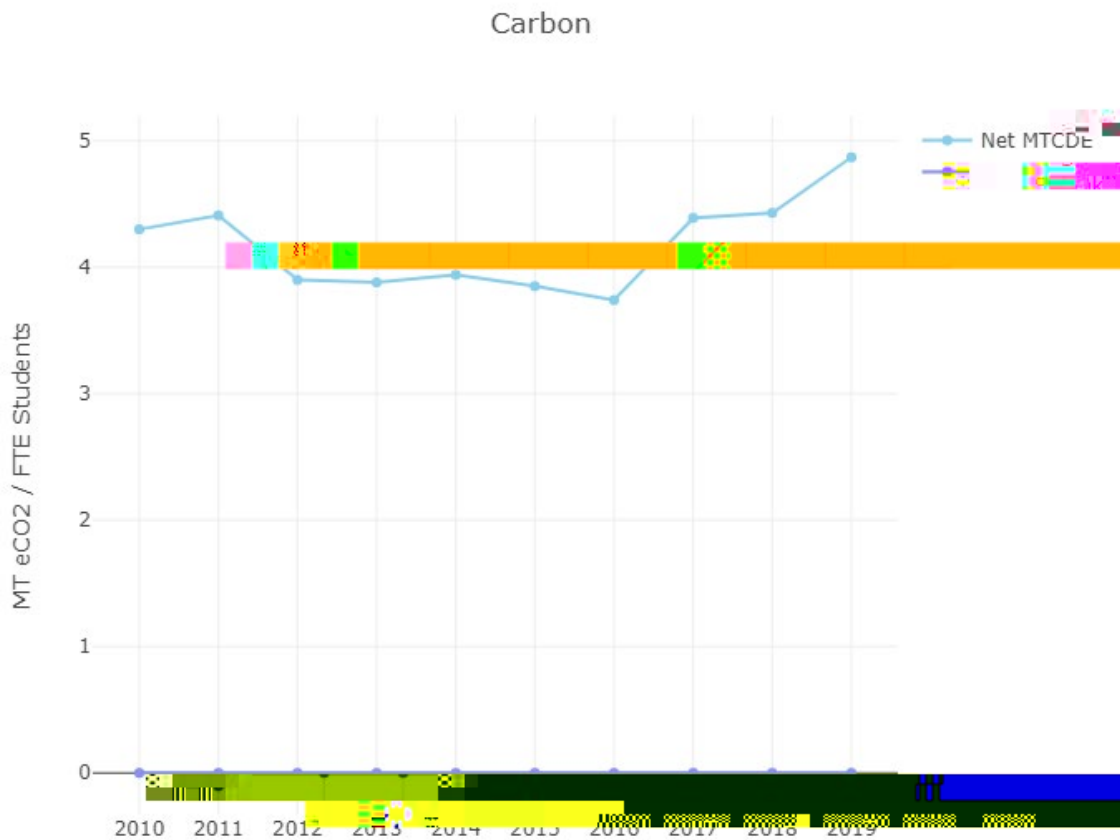
Total Emissions during FY2019 are much less than the 2010 Greenhouse Gas Inventory "Business As Usual" projection for total emissions in 2019.

- o Total emissions increased from 37,749.6 MTCO<sub>2</sub>e in 2010 to 42,554.3 MTCO<sub>2</sub>e in 2019; a total increase of 4,804.8 MTCO<sub>2</sub>e or approximately 12.7%.
- o The "Business as Usual" projection for total emissions in 2019 is 819.38 MTCO<sub>2</sub>e, which is significantly higher than the actual emissions of 42,554.3 MTCO<sub>2</sub>e.

2.



3. Emissions per student (FTE Enrollment) are increasing.



In 2010, FTE Student Enrollment was 8,558, as compared to 8,746 in 2019, an increase of 2.2%. During this same period of time, gross square footage increased 10.5% and net greenhouse gas emissions increased 12.7%.

As such, emissions per student (FTE Enrollment) increased from 4.3 MTCDe in 2010 to 4.87 MTCDe in 2019, an increase of 13.3%.

## Appendix

### A. Benchmarking with Other Virginia Institutions of Higher Education

Making meaningful comparisons between higher education institutions is challenging as each institution is unique, not all emissions inventories are identical, building square footage and FTE Enrollment fluctuate. For this comparison, all data is publicly available on Second Nature's online reporting dashboard and on STARS reports. Only institutions that have reported since 2016 are included. Second Nature is the organization managing the implementation of Carbon and Climate Commitment (formerly ACUPCC) and there are currently 15 higher education institutions in Virginia that are Second Nature reporting signatories. Radford University is one of only three public higher education institutions in this group (George Mason University and Virginia Commonwealth University). The University of Virginia and Virginia Tech are public universities and are not signatories, but recently reported their emissions in STARS reports



\*Not a Carbon Commitment signatory. Emissions and building space data from most recent STARS reports.

\*Not a Carbon Commitment signatory. Emissions and Enrollment FTE data from most recent STARS reports.

## B. Links to Other Reports & Resources

American College and University President's Climate Commitment:

<https://www.radford.edu/content/dam/departments/administrative/Sustainability/Documents/SignedACUPCC.pdf>