2018

FY18 Greenhouse Gas Inventory Executive Summary

Office of Sustainability
University of Nebraska at Omaha
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INTRODUCTION

A greenhouse gas (GHG) inventory is a comprehensive analysis of GHG emissions created, directly or indirectly, from the combustion of fossil fuels by an institution. The Earth's temperature depends on the balance of energy entering and leaving the planet. As the sun's energy reaches the Earth's surface, it can either be reflected back into space or be absorbed by the Earth. In the past, the concentration of GHGs in the atmosphere has remained relatively constant, with minor fluctuations occurring due to natural causes. Since the Industrial Revolution, however, human activities have contributed substantially to the increase of GHGs in the atmosphere. GHGs absorb energy, acting as a blanket slowing or preventing the loss of heat into space, thus increasing atmospheric temperatures. The thicker the blanket of GHGs, the more energy is being absorbed by the planet and the warmer the planet becomes. The most common and impactful GHGs are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).

Conducting a GHG inventory helps institutions identify sources of emissions and prioritize emission reduction strategies. Additionally, a GHG inventory helps create a personalized climate discussion by creating a direct link between an institution's behavior and climate change.

This GHG inventory report for FY18 marks the completion of the University of Nebraska at Omaha's third comprehensive GHG inventory.

METHODOLOGY

Previous GHG inventories utilized an excel-based campus carbon calculator (FY09–FY15) and the online tool CarbonMAP – Management and Analysis Platform (FY16). Starting for the FY17 GHG inventory, UNO utilized the online tool, SIMAP – Sustainability Indicator Management and Analysis Platform, which replaced CarbonMAP in January 2018. As a tool created specifically for colleges and universities to measure their GHG emissions, SIMAP provides an accessible platform to streamline data collection, entry, tracking, and reporting. This tool measures and reports UNO's emissions from three primary GHGs:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)

Once all data were entered in SIMAP, the tool normalized total GHG emissions to metric tons of carbon dioxide equivalent ($mtCO_2e$). Carbon dioxide is used as the normalizing factor because it is the GHG produced most during the burning of fossil fuels and it is the most widely known of all the GHGs.

GHG emissions are categorized by source into three categories: Scope 1, Scope 2, and Scope 3. Scope 1 emissions are from sources owned and operated by the university and/or are from sources that are combusted on-site. Scope 2 emissions are from sources that are purchased by the university that are combusted off-site. Scope 3 emissions are sources neither owned nor operated by the university, but are created a result of university activities.

RESULTS

In FY18, UNO's total GHG emissions (Scope 1, Scope 2, and Scope 3) totaled 68,130.41 mtCO2e. Based on EPA conversions, this is equivalent to the amount of GHG emissions created by 14,465 passenger vehicles driven for one year or the amount of CO2 emissions generated by the energy use of 8,158 homes for one year. To become carbon neutral, UNO's total GHG emissions could be sequestered by 80,184 acres of U.S. forests or could be offset by the installation of 14.4 wind turbines. Table 1 shows the total GHG emissions for FY18 along with the amount of emissions per weighted campus user, FTE student, and 1,000 square feet.

Table 1: GHG emissions FY18

FY18 Metrics	Total ($mtCO_2e$)	Per Weighted Campus User	Per FTE Student	Per 1,000 Sq. Ft.
Gross Emissions (Scope 1 + Scope 2)	52,839.74	4.74	4.15	11.12
Gross Emissions (Scope 1 + Scope 2 + Scope 3)	68,130.41	6.12	5.35	14.34

Figure 1 shows the emissions by category per scope. Some contributing categories account for less than one percent of total emissions. Table 2 shows the amount of each source category in $mtCO_2e$. The negative number associated with solid waste is due to the type of landfill our waste is taken. The Douglas County landfill (Pheasant Point), in which all of UNO's landfill waste is taken, is a CH_4 recovery/electricity generating landfill. The use of waste to generate electricity allows for a negative amount of emissions in this category. As the figures show, the largest source of GHG emissions for UNO is purchased electricity (50%) followed next by commuting by campus users (20%) and stationary combustion (17%). Knowing these sources are the biggest contributors to UNO's GHG emissions provides direction for the university in which source categories to focus on for emission reductions.

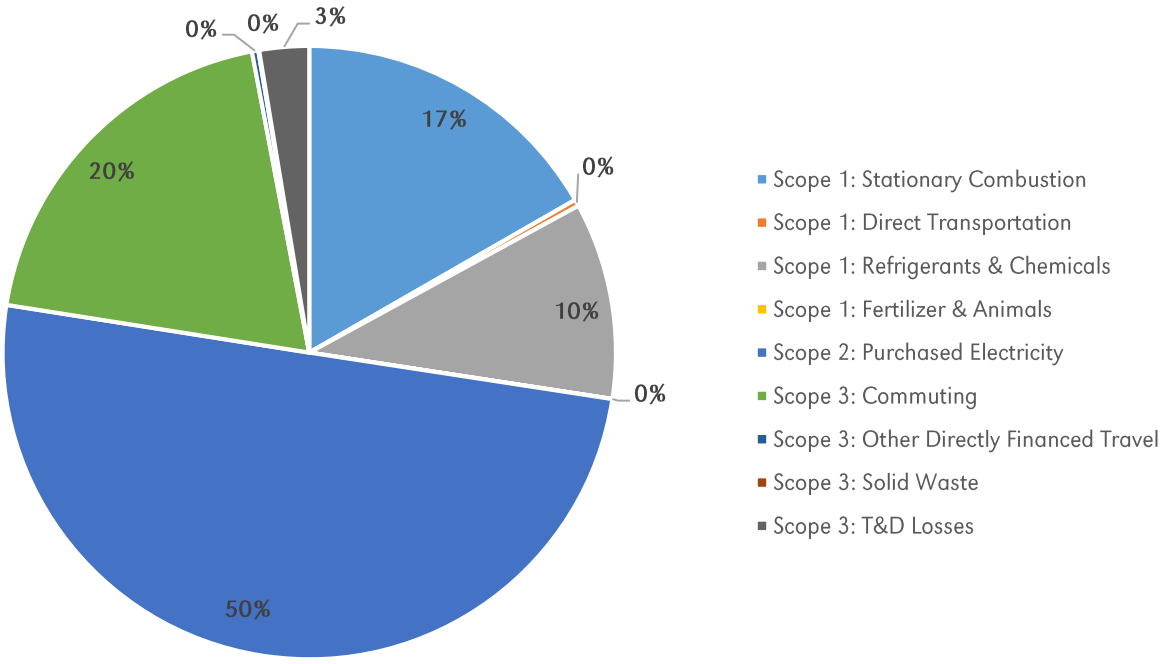

Figure 1: FY18 Gross GHG emissions by source category

Table 2: FY18 Gross GHG emission by source category – detailed

GHG Emissions Source Category	Total Emissions ($mtCO_2e$)
Scope 1: Stationary Combustion (natural gas, fuel oil)	11,386.82
Scope 1: Direct Transportation (fleet – gasoline, diesel, compressed natural gas)	237.98
Scope 1: Refrigerants & Chemicals	7,069.29
Scope 1: Fertilizer & Animals	5.15
Scope 2: Purchased Electricity	34,140.50
Scope 3: Commuting (to and from campus; faculty, staff, and students)	13,304.70
Scope 3: Other Directly Financed Travel (University funded travel by car – rental and mileage reimbursement, train)	230.11
Scope 3: Solid Waste (landfill, recycling, and composting)	-29.66
Scope 3: T&D Losses (electricity losses due transmission & distribution)	1,785.52

COMPARISON OVER THE YEARS

As mentioned earlier in this report, previous GHG inventories were calculated using an excel-based campus carbon calculator. In January 2017, all GHG data were transferred into the Carbon MAP program to simplify data entry and tracking for the future. In January 2018, Carbon MAP was replaced with SIMAP and all data were transferred into the new platform. Due to the new platform's updated algorithms and conversion factors, previous data became slightly adjusted. All data reported in this report is based on results from SIMAP to keep with consistency in reporting. Figure 2 shows the fiscal year comparisons of GHG emissions for Scope1 and 2 from FY09 to FY18. Scope 3 is not included in the comparisons due to full data collection on categories beginning in FY16.

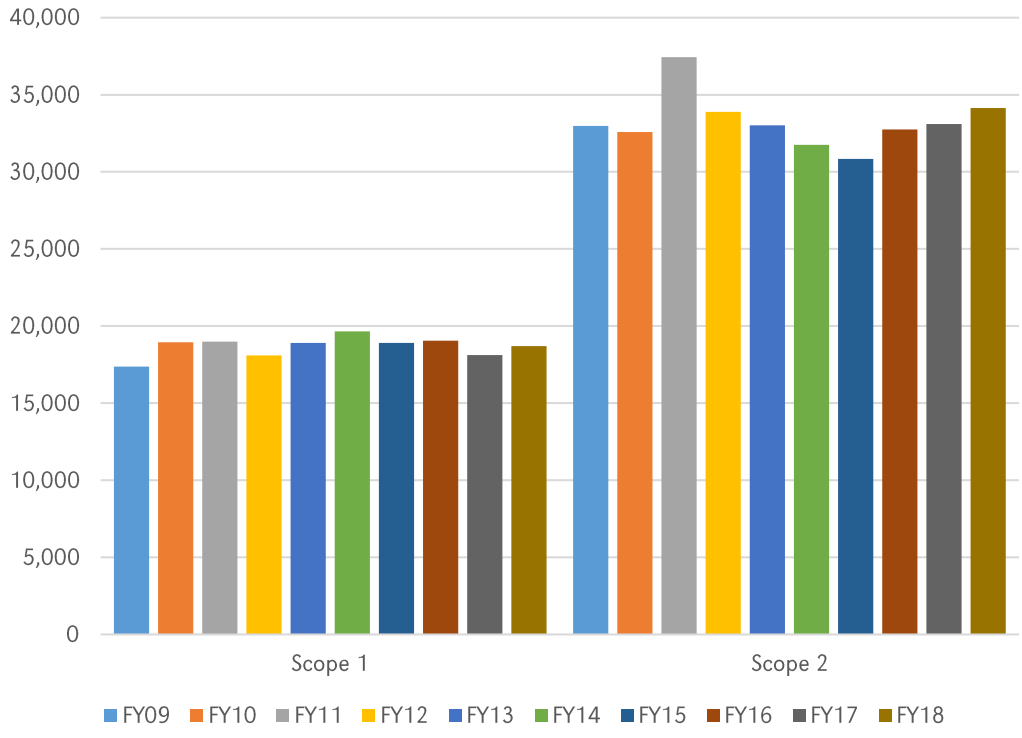

Figure 2: GHG emission by Scope 1 and 2 from FY09 - FY18

As you can see, in FY18, UNO's total Scope 1 emissions were slightly higher than FY17. This was due to an increase in stationary combustion sources (natural gas and fuel oil). Since FY10, the university has been consistent with its Scope 1 emissions with slightly fluctuations throughout the years. Additionally, there was an increase in Scope 2 emissions in

FY17 due to an increase in the amount of purchased electricity used as compared to FY17. Between FY11 and FY15, the university was able to reduce its Scope 2 emissions each year. However, starting in FY16, the amount of Scope 2 emissions has increased.