

FY15-16

# University of Nebraska at Omaha Greenhouse Gas Inventory– Executive Summary



Office of Sustainability

University of Nebraska at Omaha

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Please contact [sustainability@unomaha.edu](mailto:sustainability@unomaha.edu)  
for any inquiries.

## 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 absorbed by the planet and the warmer the planet becomes. The most common and impactful GHGs are carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O).

Conducting a GHG inventory helps institutions identify sources of emissions and prioritize emissions reductions 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 FY15-16 marks the first time that the University of Nebraska at Omaha (UNO) utilized an online carbon accounting platform to calculate its GHG inventory. In previous years, UNO's GHG inventories were calculated using an excel-based campus carbon calculator. Data to calculate UNO's GHG inventory have been gathered since FY08-09, however, FY15-16 is the first year that a report has been written to summarize UNO's emissions.

## METHODOLOGY

UNO utilized the online tool, Carbon MAP – Management and Analysis Platform, to conduct its GHG inventory. As a tool created specifically for colleges and universities to measure their GHG emissions, Carbon MAP provides an accessible platform to streamline data collection, entry, tracking, and reporting. This tool measured UNO's emissions from six primary GHGs:

- Carbon dioxide (CO<sub>2</sub>)
- Methane (CH<sub>4</sub>)
- Nitrous oxide (N<sub>2</sub>O)
- Hydrofluorocarbons (HFC)
- Hydrochlorofluorocarbons (HCFC)
- Chlorofluorocarbons (CFC)

Once all data were entered in Carbon MAP, the tool normalized total GHG emissions to metric tons of carbon dioxide equivalent (mtCO<sub>2</sub>e). 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 as a result of University activities.

## RESULTS

IN FY15-16, UNO’s total GHG emissions (Scope 1, Scope 2, and Scope 3) totaled 59,755.82 mtCO<sub>2</sub>e. Based on EPA conversions, this is equivalent to the amount of GHG emissions created by about 12,622 vehicles driven for one year or the amount of CO<sub>2</sub> emissions generated by the energy use of 6,310 homes for one year. To become carbon neutral, UNO’s total GHG emissions could be sequestered by nearly 56,565 acres of U.S. forests or could be offset by the installation of 15 wind turbines. TABLE 1 shows the total GHG emissions for FY15-16 along with the amount of emissions per weighted campus user, FTE student, and 1,000 square feet.

Table 1: GHG Emissions FY15-16

FY15-16 Metrics	Total (mtCO <sub>2</sub> e)	Per Weighted Campus User	Per FTE Student	Per 1,000 Sq. Ft.
Gross Emissions (Scope 1 + Scope 2)	46,274.53	4.29	3.71	11.21
Gross Emissions (Scope 1 + Scope 2 + Scope 3)	59,755.82	5.54	4.79	14.48

Figure 1 shows the emissions by category per scope. Some contributing categories account for less than one percent of total emissions. Table 1 shows the amount of each source category in mtCO<sub>2</sub>e. 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<sub>4</sub> 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 (61%) followed next by stationary combustion (16%) and commuting by campus users (16%). 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 emissions reduction.

Figure 1: FY15-16 Gross GHG Emissions by Source Category

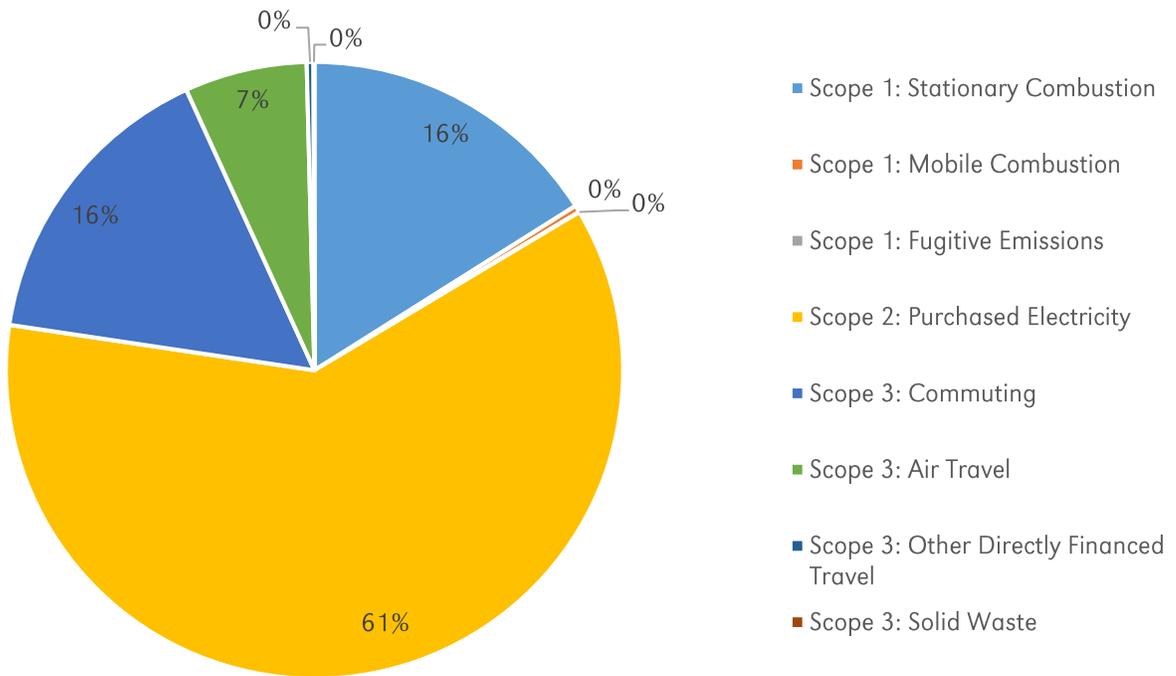


Table 2: FY15-16 Gross GHG Emission by Source Category – Detailed

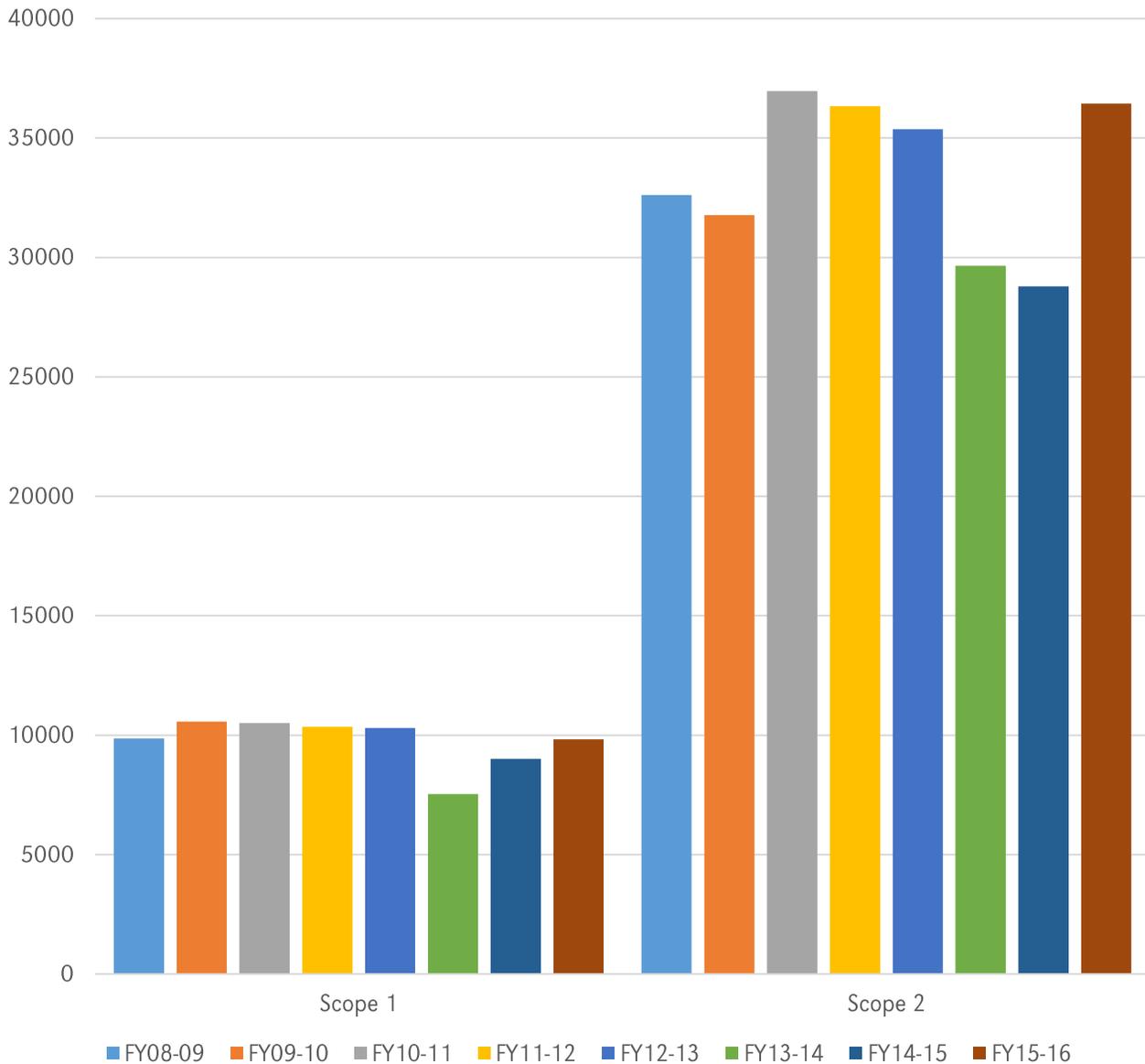
GHG Emissions Source Category	Total Emissions (mtCO <sub>2</sub> e)
Scope 1: Stationary Combustion (natural gas, fuel oil)	9,596.46
Scope 1: Mobile Combustion (fleet – gasoline, diesel, compressed natural gas)	221.03
Scope 1: Fugitive Emissions (fertilizers, refrigerants/chemicals)	4.88
Scope 2: Purchased Electricity	36,443.84
Scope 3: Commuting (to and from campus)	9,463.94
Scope 3: Air Travel (University funded travel)	3,835.80
Scope 3: Other Directly Financed Travel (University funded travel by car – rental and mileage reimbursement)	211.49
Scope 3: Solid Waste (landfill, recycling, and composting)	-29.95

## 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. Figure 2 shows the fiscal year comparisons of GHG emissions for Scope 1 and 2 from FY09 to FY16. Scope 3 is not included in the comparisons due to full data collection on categories beginning in FY15-16. Data for FY13-14 and FY14-15 did not include housing, thus the decrease in Scope 1 and 2 for those two years.

Figure 2: GHG Emission by Scope 1 and 2 from FY09 - FY16



As you can see, in FY15-16, UNO's total Scope 1 emissions were lower than FY12-13. This was due to a reduction in stationary combustion sources (natural gas and fuel oil) and mobile combustion



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(fleet vehicle gasoline, diesel, and compress natural gas consumption). There was a slight increase in Scope 2 emissions due to an increase in the amount of purchased electricity. This may be due to Baxter Arena coming online in FY15-16.

Since FY09-10 (excluding FY13-14 and FY14-15), the University has been able to decrease its Scope 1 emissions each year. While not a dramatic decrease in emissions, the trend for Scope 1 emissions reduction is positive. Scope 2 emissions have been different. Between FY10-11 and FY12-13, the University was able to reduce its Scope 2 emissions each year. In FY15-16, however, the University saw an increase in emissions that was similar to the emissions in FY11-12. This increase in the Scope 2 emissions is most likely due to Baxter Arena coming online.