



GREENHOUSE GAS INVENTORY

Fiscal Year 2016

Kennesaw State University (KSU) has conducted its fifth greenhouse gas (GHG) inventory. The inventory includes a carbon footprint analysis of buildings owned or operated by the University or the Kennesaw State University Foundation, and quantitative data for a variety of campus operations.

This inventory is significantly different from those that preceded it. On January 6, 2015, KSU united with its neighboring institution, Southern Polytechnic State University (SPSU). This consolidation resulted in an enrollment growth of over 25%. The “New KSU” consists of two main campuses: the Kennesaw campus and the Marietta campus where SPSU was located. Our GHG inventory for fiscal year (FY) 2014 incorporated data from what is now the Kennesaw campus, and from SPSU, which is now KSU’s Marietta campus. Since this is the first post-consolidation inventory, comparisons with previous inventories, particularly those for the original KSU alone, are of limited value.

The goal of this study is to compile current greenhouse gas (GHG) emissions data to serve as a baseline and to identify methods for improved data collection in future inventories of emissions for the post-consolidation KSU. Data for FY 2016 (July 1, 2015 – June 30, 2016) were used for this inventory.

METHODS

Emission sources include purchased electricity, stationary production of heat by natural gas, transportation, solid waste disposal, nitrogen-containing fertilizers, and refrigerants. In addition to buildings owned by KSU, the inventory included buildings leased by KSU and buildings owned or leased by the KSU Foundation.

Greenhouse gas emissions figures were generated using the Cool Air-Clean Planet (CA-CP) web-based calculator. The inventory includes GHG emissions associated with the University’s energy use for general campus operations, transportation (university-sponsored automobile, air and bus travel and commuting), and solid waste.

Commuter emissions were determined by estimating the percentages of students, staff, and faculty residing in neighboring counties and calculating the average commute distances based on the distances from either the Marietta or Kennesaw campus to each of the county seats. The CA-CP tool then generated emissions estimates. For many commuter students (i.e., those not living in campus housing), KSU only has a record of a permanent (perhaps family) residence although it is clear that many live in surrounding apartment complexes or other rental quarters. For this reason, the numbers of those students on record as living in distant counties (i.e., greater than 75 miles) were included with those living locally in Cobb County.

The CA-CP tool generated emissions estimates for KSU’s solid waste stream based on GHGs emanating from solid waste placed in landfills equipped with methane flaring.

University-sponsored air travel mileage was available. Study abroad mileage was estimated based on numbers of participants multiplied by round-trip miles to either the capitols or major airports in their destination countries. Much of the reporting of university-sponsored automobile and van travel included only rental dollar amounts, so mileage was estimated based on mileage reported by faculty and staff who used personal vehicles for similar travel.

DATA

GHG emissions are reported in units of metric ton equivalents of carbon dioxide (MTeCO₂).

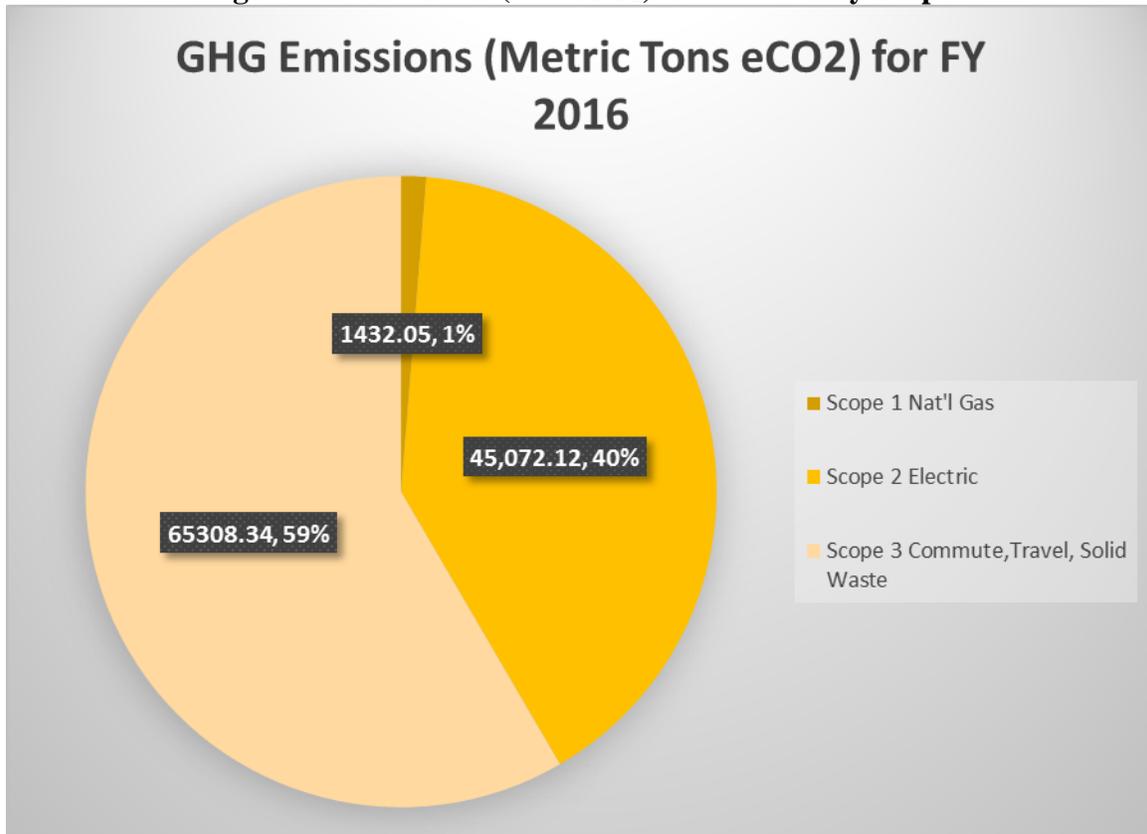
As in previous inventories, emissions resulting from transportation (commuting and air travel) make up the largest proportion of the overall total (Table 1, Fig. 1).

Table 1: GHG Data for FY 2014 and FY 2016

All data in units of MTeCO ₂	FY 2014	FY 2016
Scope 1 emissions (natural gas, campus fleet, refrigerants, N-containing fertilizers)	1,130.35	1,432.05
Scope 2 (purchased electricity)	52,198.65	45,072.12
Scope 3 (commuting, air travel, solid waste)	85,746.62	65,308.34
Gross emissions	139,075.62	111,812.51
Emissions per full-time student	4.77	4.67
Emissions per 1000 square feet of building space	27.6	20.04

FY 2014 data includes emissions from KSU and SPSU; FY 2016 data are for the post-consolidation KSU.

Figure 1: Total GHG (MT eCO₂) for FY 2016 by Scope



Scope 1 = On-campus GHG production

(natural gas, fuel for the fleet, refrigerants & fertilizers)

Scope 2 = Purchased Electricity

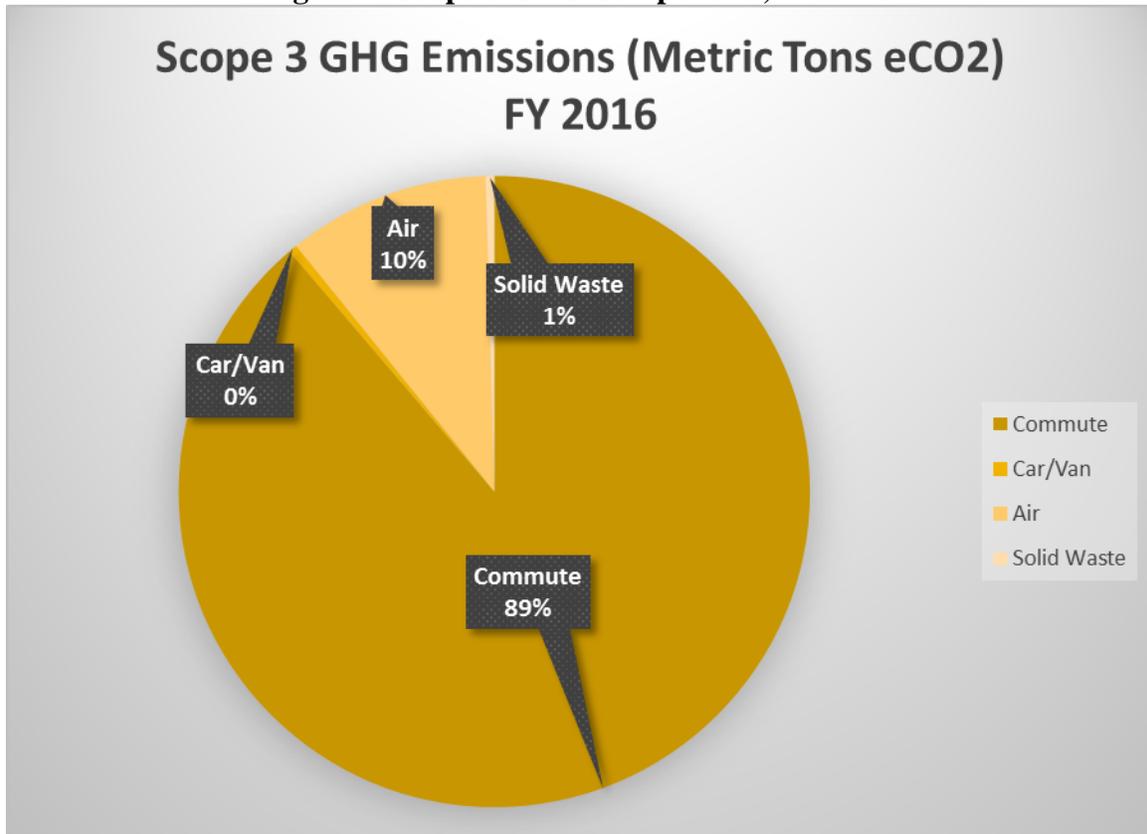
Scope 3 = GHG produced by University Commuting, Air Travel, and Solid Waste

Table 2: % Commuting Students “opting out” of KSU Parking Fees

	Total Commuters	Total opting out	% opting out
FY 2014	27193	1891	7
FY 2016	30336	11039	36

FY 2014 figures are for KSU and SPSU combined; FY 2016 figures are for post-consolidation KSU, Marietta and Kennesaw campuses

Figure 2: Scope 3 GHG Components, FY 2016



ANALYSIS

Post-consolidation KSU differs greatly from the institution assessed in inventories prior to 2014. The student population has grown by more than 25%; building space has increased by around 40%. This inventory provides a set of baseline data for comparison with future inventories.

Scope 3 emissions are the greatest by far (Table 1, Fig. 1) and commuting makes up the major portion of scope 3 emissions (Fig. 2). Air travel makes up 10% of the scope 3 emissions, and this is the result of KSU's strong study abroad program. Comparisons of the FY 14 and FY 16 inventories show an increase in scope 1 and decreases in scopes 2 and 3 (Table 1). A portion of the differences is due to increased ridership on campus shuttle buses. Table 2 shows a major increase in the number of commuting students who opted out of purchasing on-campus parking stickers. A small number of these may be taking on-line courses exclusively; most are using commuting options other than personal automobiles: walking, bicycling, and (primarily) shuttle buses.

The usefulness of this baseline inventory is limited by several factors. As in previous inventories, the least reliable numbers are in the area of commuting. KSU does not have reliable information on the commuting habits of students, faculty, and staff. It is estimated, for example, that up to one-third of students at the Kennesaw campus live in

campus residences or in apartment complexes within a five mile radius; most of the inventory's commuting mileage estimates were based on distances to the counties of students' permanent (perhaps family) residences. University-sponsored travel using automobiles or vans is reported by dollar amount rather than mileage, calling for additional assumptions and estimates. Reliable data are also lacking for the number of times per week students, faculty, or staff make the commute to and from campus.

One area of improvement in the area of commuting was not captured in this inventory because there is no mechanism for measuring excess GHG emissions produced by automotive idling. In 2011, KSU instituted remote parking lots with shuttle bus connections to the Kennesaw campus. This alleviated some of the traffic gridlock and automotive idling due to bottlenecks in entrance and exit routes. The shuttle system has continued to expand, serving students living in nearby apartment complexes and reducing the number of vehicles coming to campus each day. Buses also connect the Marietta and Kennesaw campuses that are about 9 miles apart. While it is clear that the shuttles are providing a mechanism for reducing emissions the inventory is unable to account for reduced emissions brought about by reductions in traffic congestion and automotive idling as well as the reduction in the number of students commuting from nearby apartments served by the shuttles. At the same time, the inventory captures an increase in scope 1 emissions due to increased shuttle bus activity (Table 1).

FUTURE ACTION

Data Collection

KSU's methods of data collection and record keeping can be improved, particularly in the area of commuting as noted above. A single, centralized location for information on chemicals, including those that are relevant for a GHG audit (refrigerants, nitrogen-containing fertilizers) would be helpful as well. Data collection in the area of utilities is improving with additional metering and with enhanced electronic data monitoring by the University System of Georgia.

Energy Use

The Kennesaw campus of KSU has shown reductions in campus energy use, but there is still much room for improvement. Enhanced metering will help identify buildings requiring immediate attention. The Marietta campus has a greater proportion of older buildings so a continuing program of retro-commissioning older buildings is needed to improve efficiency. Strong grassroots educational programs can be designed to inform faculty, staff, and students about ways to conserve energy and water. Programs are underway for resident students to participate in energy competitions.

Solid Waste and Recycling

While solid waste has not been a huge contributor to KSU's GHG emissions, recycling education efforts should be enhanced. Some improvements have been initiated in the academic areas and in the campus housing on both campuses. For example, KSU's Residence Life department began a move-in day collection program for cardboard boxes in 2016.

Transportation

Remote parking areas with shuttle bus connections are reducing emissions, though this is currently difficult to quantify. Emissions can be further reduced by mounting an educational program encouraging students, faculty and staff to participate in carpool programs and to avoid idling while waiting for prime parking spots to open up. Greater reductions in emissions will require improvements in regional public transportation. These improvements are a long way off, with planning at the local county's "Cobb Connect" program just getting underway. In the meantime, transportation continues to be the largest component of KSU's carbon footprint. Numerous members of the KSU community need to travel the 9.1-mile distance between the Marietta and Kennesaw campuses, making it even more important to strengthen alternatives to KSU's dependence on single-occupancy vehicle commuting.

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This report has been submitted to Second Nature's Climate Leadership web site:

<http://reporting.secondnature.org/>