



GREENHOUSE GAS INVENTORY Fiscal Year 2014

Kennesaw State University (KSU) has conducted its fourth environmental inventory of greenhouse gas emissions. 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 vastly different from the three that preceded it. On January 6, 2015, KSU united with its neighbor, 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.

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. Data for the FY 2014 (July 1, 2013 – June 30, 2014) were used for this inventory.

The Cool Air-Clean Planet (CA-CP) web-based calculator was used to generate the greenhouse gas emissions figures. The inventory includes GHG emissions associated with the University’s energy use, transportation (university-sponsored automobile, air and bus travel and commuting), solid waste, and energy used in general campus operations. Given the large increase in enrollment and physical plant size represented here, comparisons with previous inventories would be of limited value. However, there are some interesting similarities and differences to report in comparing the proportions of total emissions coming from various sources.

As in previous audits (for the Kennesaw campus alone), emissions resulting from transportation (commuting and air travel) make up the largest proportion of the overall total (Fig. 1). A notable difference can be seen in the scope 1 data (Fig. 2). In previous inventories, the largest portion of scope 1 emissions was due to heating with natural gas. In fiscal year 2014 scope 1 emissions are evenly distributed between burning natural gas and emissions from the campus fleets.

ACKNOWLEDGEMENTS

Personnel from the Kennesaw State University Foundation and from numerous KSU offices (Marietta and Kennesaw campuses) contributed data for this report. KSU contributors include:

Plant Operations
University Facilities & Planning
Business Services
Enterprise Information Management
University Card Services

Two Marietta campus students assisted in compiling data and calculating emission totals: Ms. Jestein Futrell and Ms. Marie Kitchen. Ms. Lori Meadows of KSU's Office of the Vice President for Operations was especially helpful in tracking down data sources.

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, buildings owned by the KSU Foundation and leased by KSU as well as the KSU Foundation's student housing buildings were included in the inventory.

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.

Solid waste tonnage data were unavailable for the Marietta campus. Estimates of landfill-bound and recycled waste tonnage for the Marietta campus were made using the assumption that the amounts generated would be proportionately smaller than that of the Kennesaw campus based on campus population size. The CA-CP tool generated emissions estimates based on GHGs emanating from solid waste placed in landfills equipped with methane flaring.

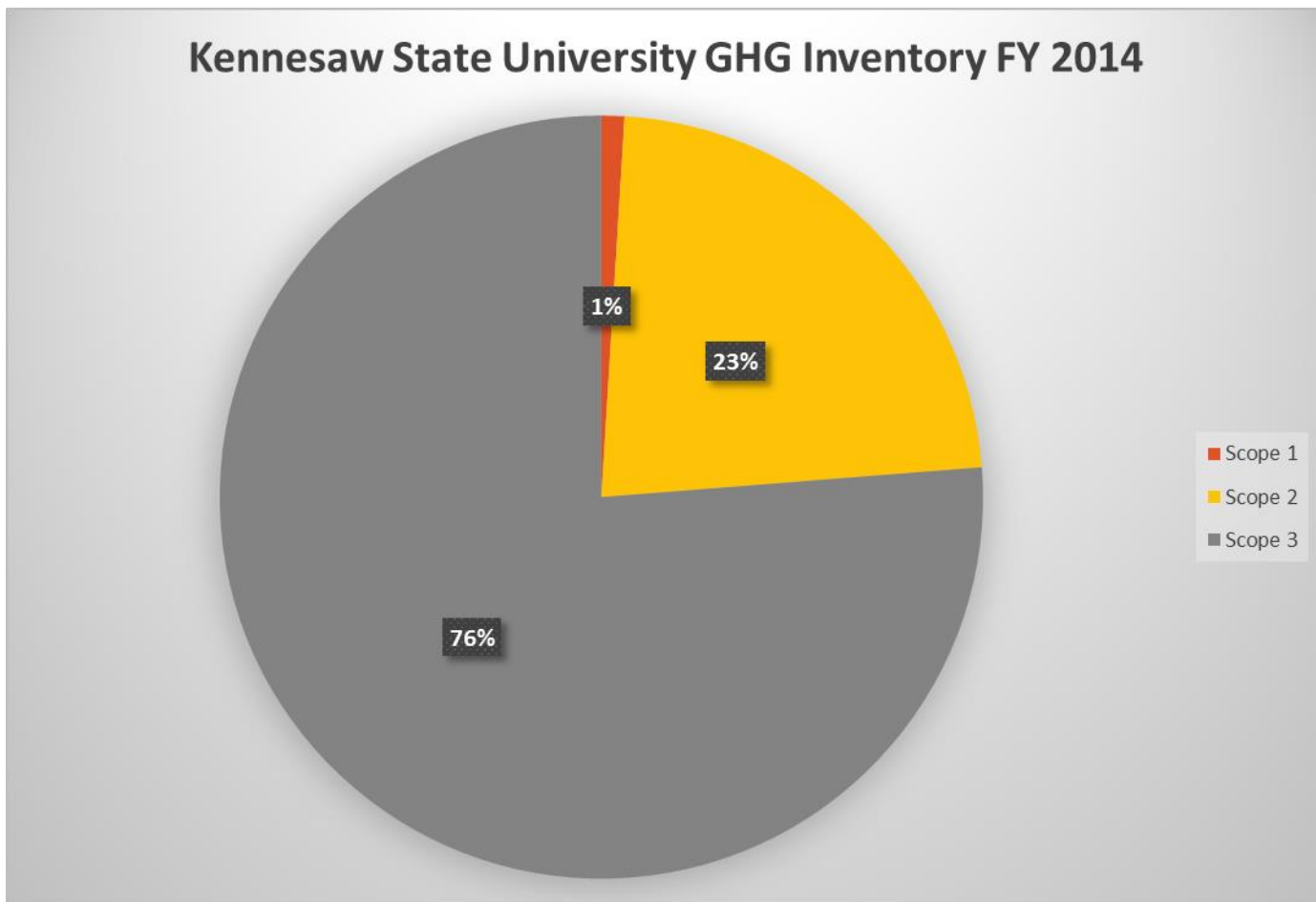
Unlike previous inventories, fiscal year 2014 university-sponsored automobile and air travel mileage were available. Study abroad mileage was estimated based on numbers of participants multiplied by round-trip miles to either the capitols or major airports of their destination countries.

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

GHG Data, FY 2014

Scope 1 emissions (natural gas, campus fleet, refrigerants, N-containing fertilizers)	2,217.3 MTeCO ₂
Scope 2 (purchased electricity)	52,198.65 MTeCO ₂
Scope 3 (commuting, air travel, solid waste)	94,310.13 MTeCO ₂
Total emissions	148, 725.91 MTeCO ₂
Emissions per full-time student	4.77 MTeCO ₂
Emissions per 1000 square feet of building space	27.6 MTeCO ₂

Figure 1: Total GHG (MT eCO₂) for FY 2014 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

Figure 2: Scope 1 GHG Components, FY 2014

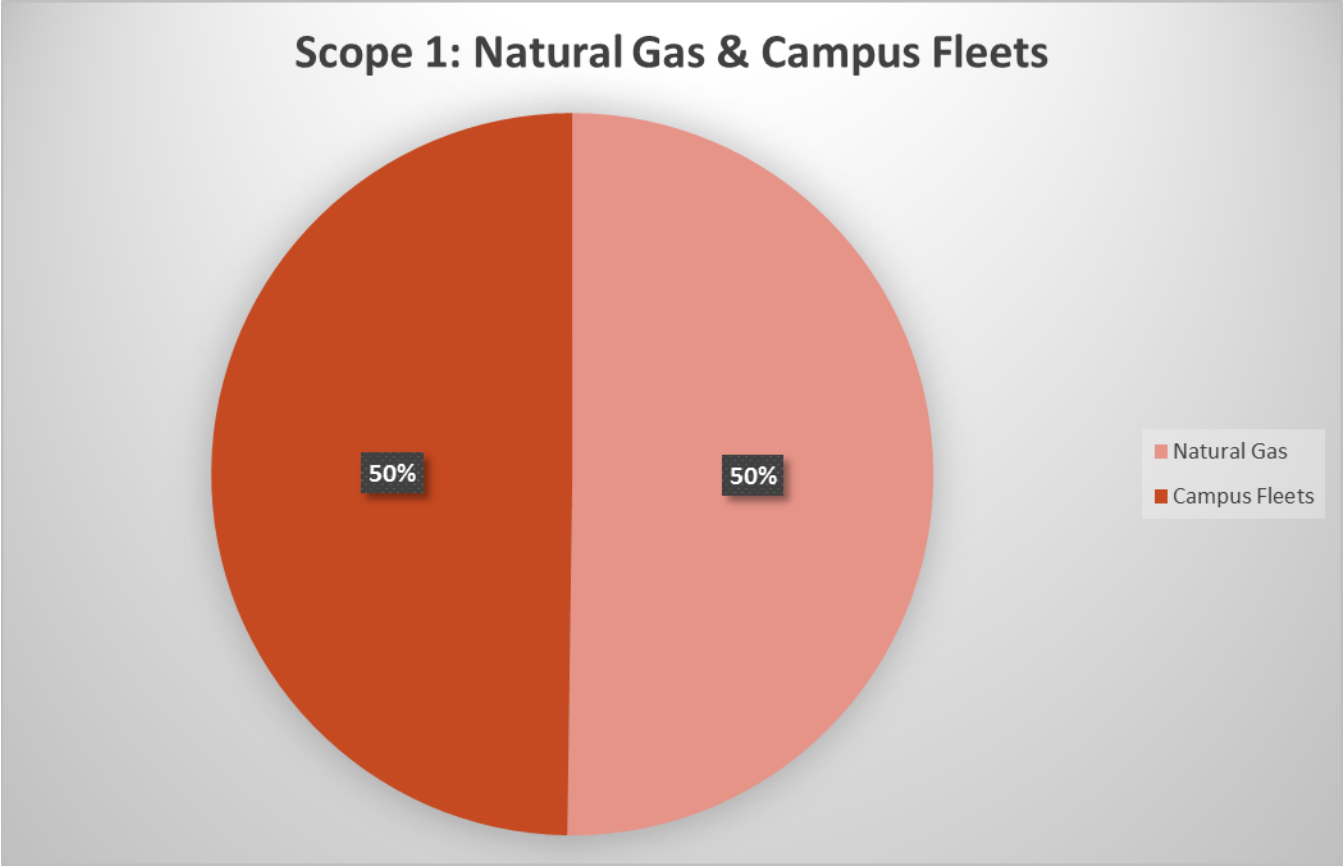
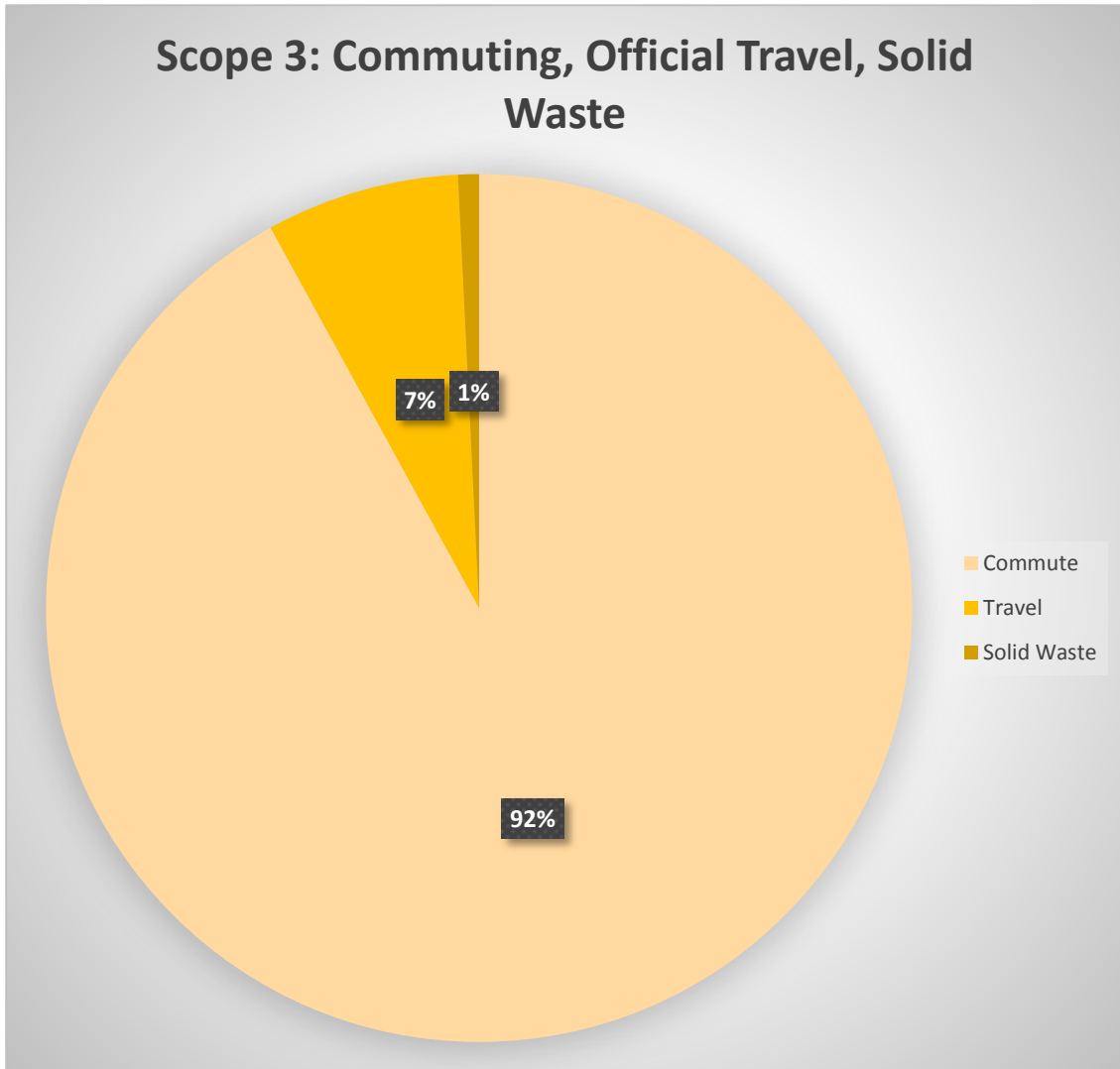


Figure 3: Scope 3 GHG Components, FY 2014



ANALYSIS

The newly configured KSU differs greatly from the institution assessed in previous inventories. The student population has grown by more than 25%; building space has increased by around 38%. This inventory provides a set of baseline data going forward.

The usefulness of this baseline inventory is limited by several factors. Previous inventories used versions of calculating software that differed in the formulae used and in some underlying assumptions. It will be helpful to have a consistent and perhaps standardized calculating tool available for future inventories. As in previous inventories, the least reliable numbers are in the area of commuting. We do 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; the inventory's commuting mileage estimates were based on distances to the counties of students' permanent (perhaps family) residences. The quality of some of the campus data collection is improving. For example, actual air travel miles were available for this inventory. In previous years, mileage was estimated based on air fare expenditures.

One area of improvement in the area of commuting was not captured in this audit because there is no mechanism for measuring excess GHG emissions produced by automotive idling. During FY 2012 KSU added remote parking lots with shuttle bus connections to campus. This alleviated some of the traffic gridlock and automotive idling due to limited entrance and exit routes. The shuttle system continues to expand and serves students living in nearby apartment complexes, reducing the number of vehicles coming to campus each day. While it is clear that the shuttles are providing a mechanism for reducing emissions, the inventory captures an increase in GHGs due to increased shuttle bus activity but 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 that are served by the shuttles.

FUTURE ACTION

Data Collection

KSU's methods of record keeping need to be improved, particularly in the area of commuting. 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 the addition of more metering and with enhanced electronic data monitoring by the University System of Georgia.

Energy Use

The Kennesaw campus of KSU has shown improvement in this area, but there is still much that can be done. 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. A strong grassroots educational program can be initiated to inform faculty and staff about ways to conserve energy and water. Resident students can become involved by participating in energy competitions.

Solid Waste and Recycling

While solid waste has not been a huge contributor to KSU's GHG emissions, recycling efforts can be enhanced and some improvements are already underway in the academic areas of both campuses. The residence halls have a lot more work to do in this area; there are only minimal, voluntary recycling programs in place at present.

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 waiting for prime parking spots to open up. The greatest reduction in emissions will come with improvements in regional public transportation. These improvements are a long way off, with planning at the local county-level just getting underway with the county's "Cobb Connect" program. In the meantime, transportation will continue to be the largest component of KSU's carbon footprint. Numerous members of the KSU community will need to travel the 9.1 mile distance between the Marietta and Kennesaw campuses, so it will become even more important to find alternatives to KSU's dependence on single-occupancy vehicle commuting.

This report has been submitted to the American College and University Presidents Climate Commitment web site:

<http://rs.acupcc.org/>