Executive Summary

The overarching goal of Elon University’s Sustainability Master Plan completed in the spring of 2007 is “to minimize our impact on the global environment by establishing a carbon neutral university.” Calculating the university’s greenhouse gas (GHG) emissions or carbon footprint is one of the essential first steps in establishing a carbon neutral university. This initial GHG inventory is Elon’s baseline year from which to measure reductions and will serve as a guide to and inform the creation of Elon’s Climate Action Plan.

A GHG inventory includes four main components: three different emission sources classified as Scope 1, Scope 2 and Scope 3 and offsets.

- Scope 1 is direct emissions such as production of electricity on campus and university vehicles.
- Scope 2 emissions come from imported sources of energy, i.e., purchased electricity or steam.
- Scope 3 is all other indirect sources of emissions including business travel, commuter travel and solid waste generation.
- An offset is a reduction of carbon dioxide or removal of carbon dioxide equivalent (eCO₂) GHG emissions that is used to counterbalance or compensate for (“offset”) emissions from other activities.

The initial goal was to obtain data back to fiscal year (FY) 1990. After contacting several departments to explain the project and ask for the relevant information from the department, it became apparent that it would not be possible to collect data back to FY 1990 due to lack of records. Given this, information was collected back to FY 2000 or for as many years as possible. Once collected, the information was converted as necessary and inputted into the Clean Air-Cool Plant (CA-CP) Campus Carbon Calculator Version 5.

The baseline year for Elon’s GHG inventory is 2008 since that is the year for which the most complete set of data is available. Elon’s overarching goal is to become carbon neutral, which does not require knowing the GHG emissions of numerous previous years. Elon’s total GHG emissions for 2008 were 40,533 metric tons of carbon dioxide equivalents (MTCDE) (Figure 1). The net GHG emissions for 2008 were 40,516 MTCDE due to an offset of 17 MTCDE for yard waste composting. Elon’s net GHG emissions per full-time equivalent (FTE) student were 7.6 MTCDE/student and per building square foot (ft²) were 0.02 MTCDE/ft² or 21.5 kg of carbon dioxide equivalents (eCO₂) per ft².

To put Elon’s amount of GHG emissions into perspective it helps to know the emissions of other higher education institutions. Furman University’s reported net emissions for 2007 were 27,856 MTCDE. The University of Richmond reported 36,247 MTCDE for its 2008 net emissions, while Oberlin College reported 40,442 MTCDE for 2007 net emissions. While these emissions amounts do provide context to
Elon’s GHG emissions total, they cannot be used for straight comparisons due to the unique qualities of each institution and the varying methods used to calculate their emissions totals.

Figure 1: Emissions Percentage by Category

As illustrated in Figure 1, Purchased Electricity is the largest category followed by Winter Abroad and Natural Gas/Propane. Campus energy consumption accounts for 58% of the GHG emissions, which is expected given the primary source of Elon’s purchased electricity is coal. Continued energy conservation, efficiency and upgrade projects as well as renewable energy projects such as photovoltaic, solar thermal and geothermal will need to be considered, among other strategies, to reduce GHG emissions from energy consumption.
Elon is ranked number one in the nation among masters – level universities for study abroad programs by the Institute of International Education. The majority of students study abroad during Winter Term, which explains why Winter Abroad travel is one of the larger categories of Elon’s GHG emissions. However, reducing the number of students who study abroad is not an option given the prestige of this program. What could be explored are options for offsetting study abroad travel to reduce the net GHG emissions from this essential program.

Commuting and faculty and staff travel account for a combined 16% of the GHG emissions. Strategies to consider that would reduce these emissions include additional alternative transportation methods such as walking, biking, carpooling, using the bio-buses and taking the Amtrak train when appropriate as well as web conferencing and travel offsets.

In addition to projects and programs that can be implemented to affect campus operations and behavior, other strategies, mainly offsets, will also need to be considered to reach climate neutrality. An offset is a reduction of carbon dioxide or removal of carbon dioxide equivalent (eCO₂) GHG emissions that is used to counterbalance or compensate for (“offset”) emissions from other activities. In selecting offsets, it is essential to ensure they are high quality. Renewable Energy Credits (RECs) are not the same as offsets but can still be utilized as a way to account for Scope 2 emissions (indirect emissions from purchased electricity).

If Elon made no changes to campus operations and programs, i.e., no reduction in energy consumption, no renewable energy, no additional alternative transportation and fuels, etc., and bought retail offset credits for all of its 2008 net GHG emissions, the cost would vary widely depending upon the provider and offset project chosen. Using current pricing of four providers, the cost range is $500,000 to $892,000, with the average being about $689,000. To maintain this level of offset, a similar purchase would need to be made for each year’s net GHG emissions. The intention is to utilize offsets only after reducing emissions on campus as much as possible. Purchasing retail offset credits for all of Elon’s net GHG emissions would not be an effective use of financial resources.

Conducting this initial GHG emissions inventory was a valuable first step toward climate neutrality. The process and results will be utilized to develop Elon’s Climate Action Plan, which will include interim emissions reduction targets and serve as a roadmap for carrying out projects designed to reduce net GHG emissions. Elon’s interim emissions reduction targets will likely be a percentage reduction from 2008 net emissions each year or at specified milestone years. Either method will utilize the Sustainability Master Plan’s recommended timeframe of within 30 years (from 2007) to reach climate neutrality and account for growth and the inclusion of additional categories in subsequent GHG inventories. The appropriate method will be selected after investigating strategies for reducing emissions and identifying the impact of each strategy, including the environmental, social and economic costs and benefits. The projects and programs mentioned here, as well as others, will be assessed to identify the optimal strategies for reducing Elon’s GHG emissions and to develop Elon’s Climate Action Plan. A GHG inventory will be conducted yearly to monitor progress toward Elon’s interim reduction goals and the ultimate goal of climate neutrality.