## Appendix I: Contacts

<table>
<thead>
<tr>
<th>Data</th>
<th>Source</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population &amp; Physical Size</td>
<td>Common Data Set of College’s website <a href="http://www.wm.edu/offices/iae/institutional_research_reporting/cds/index.php">http://www.wm.edu/offices/iae/institutional_research_reporting/cds/index.php</a></td>
<td></td>
</tr>
<tr>
<td>Budget-Operating &amp; Research</td>
<td>Glenda White, Director of Budget</td>
<td><a href="mailto:gewhit@wm.edu">gewhit@wm.edu</a> 757-221-2566</td>
</tr>
<tr>
<td>Budget-Energy; Custom Fuel Mix</td>
<td>Dan Patterson, Energy Manager</td>
<td><a href="mailto:dppatt@wm.edu">dppatt@wm.edu</a> 757-221-1754</td>
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<tr>
<td>University Fleet</td>
<td>Diana Tennis, Business Manager</td>
<td><a href="mailto:drtenn@wm.edu">drtenn@wm.edu</a> 757-221-2500</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>Paul Morie, Turf Supervisor, Facilities Management</td>
<td><a href="mailto:pamori@wm.edu">pamori@wm.edu</a> 757-221-1381</td>
</tr>
<tr>
<td>Study Abroad</td>
<td>Emily Hogge, Study Abroad/ISSP Programs and Services Assistant, Reve’s Center for International Studies</td>
<td><a href="mailto:echogge@wm.edu">echogge@wm.edu</a> 757-221-3567</td>
</tr>
<tr>
<td>Outsourced Travel</td>
<td>Survey created by Andre Pike ('09)</td>
<td>Dr. John Swaddle, <a href="mailto:jpswad@wm.edu">jpswad@wm.edu</a>, was the advisor for the survey</td>
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</tbody>
</table>
Fig. 5: Emissions per person, 2002 to 2011
This decrease in emissions per square foot may be attributed to the completion of many of the large construction projects. The Mason School of Business, the School of Education, and the Cohen Career Center have been given LEED Gold certifications from the U.S Green Building Council. In addition, the College has begun projects to increase the efficiency of existing buildings on campus.
carbon offset program in May 2011. Once the project receives enough money from donors, energy-reduction projects will be implemented. Future audits should consider the program in their analysis.

IV. Total Emissions

Fig. 2: Total emissions of metric tons eCO2, 2002 to 2011

Overall, the College of William and Mary emitted 78,210 metric tons of eCO2 in fiscal year 2011. This is a decrease from last year. In 2011, the total building space of the campus grew to reach a total of 3,767,700 square feet and the entire campus population of students, faculty, and staff increased. Therefore, emissions per square foot and per person have decreased since 2010.
programs will become increasingly important to reducing greenhouse gas emissions, particularly as many of the technical changes are completed.

The College should also continue to explore options for clean energy generation on campus. Pilot projects have included the Committee on Sustainability funded solar panels that can be used to generate electricity. Increasing research into options for clean energy generation on campus will be an important piece of the plan to reduce greenhouse gas emissions.

Purchasing clean energy from Dominion Power could be another method of reducing the College’s greenhouse gas emissions. This method is currently out of William and Mary’s reach, however; the existing program to purchase clean power from Dominion is prohibitively expensive. If Dominion Power increases its use of clean power in the future, this would be a significant contribution to the reduction of William and Mary’s greenhouse gas emissions.

V. Scope 3 Changes, Emissions

All emissions not directly controlled by the College are considered Scope 3 emissions. In this report, personal commuting, college-related business travel, travel to study abroad programs, solid waste, and purchased emissions compose Scope 3.

The data from 2009’s survey on commuter habits, created by Andrew Pike ’09, was applied to the population data of 2011 to estimate the emissions due to commuting. It was assumed that any changes in commuter habits would have been negligible due to the absence of any concentrated campaign to alter commuter choices. Changes may be seen in future years, as the carpooling and Zipcar programs that were started in Fall 2010 continue to expand. For students, faculty, and staff to commute to campus an estimated 5,871.5 metric tons of eCO2 were emitted. This figure was taken from the 2010 report. This report also uses the 2009 estimate for business travel of 7,821.7 metric tons of eCO2. Future audits should conduct another study for updated transportation data. Study abroad travel by students caused the emission of 5,216 metric tons of eCO2. This was an increase from the 4,596.1 metric tons of eCO2 emitted in 2010 for study abroad travel.

Solid waste emissions were 90 metric tons of eCO2, a significant decrease from the emission of 380.9 metric tons of eCO2 in 2009. This decrease can be attributed to the Dining Service’s recent composting program.

In total, Scope 3 encompasses 18,909.2 metric tons of eCO2 emitted by the College in 2011. The greatest impact on reducing the College’s greenhouse gas emissions from Scope 3 sources would come from addressing transportation related emissions. Reducing the emissions caused by daily commuting to campus could come from increasing the use of public transportation and carpooling. The campus implemented a carpooling and Zipcar program in the fall of 2010, which may have decreased emissions for the 2011 fiscal year. Future years should conduct another commuter survey to analyze the specific impact of these programs. Business travel for the College will be more difficult to address. Using mass transit when possible would reduce emissions; carbon offsets are another solution for consideration. The College began an internal
III. Scope 1 Changes, Emissions

The emissions included in Scope 1 are from the campus power plant, the university fleet, and fertilizer applications.

In 2011, the campus power plant burned the following fuels: 5,802 gallons of #2 fuel oil, 245,810 MMBtu of natural gas, and 379 gallons of propane.

The automobiles owned by William and Mary used 39,769.3 gallons of gasoline and an estimated 1,505.14 gallons of diesel fuel. This data was gathered by working with Diana Tennis, the Business Manager in Auxiliary Services, to go through fuel purchasing records for the 2011 fiscal year. There was an 11.5% decrease in gallons of gasoline used since 2010.

Paul Morie, the Turf Supervisor for the College, provided the information on fertilizer applications. William and Mary used fertilizer comprised of 25% nitrogen in 2011, the same nitrogen content as was applied in 2010. 3.4 metric tons of eCO2 were released from fertilizer application in 2011.

Overall, Scope 1 sources were responsible for 14,135.8 metric tons of eCO2 in 2011. This is an increase from the 13,398.2 metric tons of eCO2 emitted in 2010.

IV. Scope 2 Changes, Emissions

The College’s purchased electricity is the only source of Scope 2 emissions. All the electricity is purchased from Dominion Power, the only electricity provider available. Dominion Power’s fuel mix has changed since the last greenhouse gas inventory. 40 percent comes from coal-fired power plants (a decrease from 44 percent last year), 22 percent from natural gas (an increase from 20 percent), 37 percent from nuclear energy (a slight increase from 36 percent), and 1 percent from oil (an increase from 0 percent).

In 2011, William and Mary purchased 77,006,216 kilowatt hours of electricity. This is a 0.8% decrease from the electricity purchased in 2010. Scope 2 emissions totaled 45,165 metric tons of eCO2 for 2011, a decrease from 47,024.8 metric tons in 2010.

Confronting Scope 2 emissions would be the most effective way for the College to reduce its greenhouse gas emissions. Reducing purchased energy takes two forms: reducing the energy consumed on campus altogether and reducing the energy purchased from Dominion Power.

Increasing the efficiency of campus buildings and equipment would reduce the electricity needed to operate them. The College has already begun taking steps to retrofit many of its systems and continuing this work is crucial to reducing its future emissions. Encouraging behavioral changes to reduce energy use is also important. In the past, less attention has been given to these efforts, rather than technical changes, but William and Mary has programs to begin promoting behavioral changes such as reducing energy use in dorms. Supporting and expanding these
considered as well; either by purchasing clean electricity from Dominion Power or creating it on campus.

The other important sector for William and Mary to consider for emissions reductions is transportation. Carpooling and Zipcar programs were implemented in Fall 2010. Supporting and expanding such programs should be an important priority for the College.

Fig 1: Total emissions of metric tons eCO2 in 2011, by Input

II. Methodology

The same methodology used in the 2008, 2009, and 2010 greenhouse gas inventories was used to complete this year’s report. A full explanation of that methodology can be seen in the “Greenhouse Gas Inventory for the College of William and Mary” conducted in spring 2009. In this report, only emissions from fiscal year 2011 were considered. The Clean Air-Cool Planet Campus Carbon Calculator was again used to compile the data and identify the associated emissions; the updated version (6.75) was used.

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I. Executive Summary

In the spring of 2009, the College of William and Mary completed the first greenhouse gas emissions inventory for the campus. The inventory quantified emissions from 2002 to 2008, and updated reports quantified emissions for 2009 and 2010. This report is a continuation of that work, updating the report with the greenhouse gas emissions from 2011.

The College emitted 78,210 metric tons of eCO2 in 2011. The emissions per developed area of campus have continued to decrease, falling to 20.76 kilograms of eCO2 per square foot of building space in 2011. This is a 10% decrease in emissions per square foot since 2010.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total emissions, MT eCO2</th>
<th>Emissions per square foot, kg eCO2/sq. ft</th>
<th>Emissions per undergraduate MT eCO2/undergraduate</th>
<th>Emissions per person, MT eCO2/person</th>
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<td>2002</td>
<td>73399.39</td>
<td>29.63</td>
<td>13.28</td>
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<td>2003</td>
<td>74701.26</td>
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<td>2004</td>
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<td>23</td>
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<td>2011</td>
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<td>20.76</td>
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Purchased energy is the greatest contribution to William and Mary’s greenhouse gas emissions. In 2011, emissions from purchased energy totaled 45,165 metric tons of eCO2. The campus experienced a decrease in energy use from previous years.

As purchased energy is the largest contributor to greenhouse gas emissions, any actions intended to reduce emissions must target reducing the use of purchased energy. This includes efforts to increase the efficiency of campus energy use, continuing efficiency upgrades and emphasizing the use of energy efficient technology in any new construction. Clean energy sources must be

¹ The 2010 report has purchased propane, #2 fuel oil, and natural gas data from 2009 only. It should be corrected to include 2010 data.
Greenhouse Gas Inventory Update (2011) for the College of William and Mary
Spring 2012

Caitlin Verdu and Zander Pellegrino
On behalf of the Science and Technical Advisory Subcommittee
Of the President’s Committee on Sustainability

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