Greenhouse Gas Background

A GHG is a gas that is transparent to solar radiation but opaque to infrared (or heat) radiation. That is, a GHG permits the sun's rays to reach the earth, but prevents infrared radiation from escaping back into space. Excess GHG's in the atmosphere interfere with the mechanism by which the planetary temperature is regulated.

The most abundant and naturally occurring GHG in the atmosphere is water vapor, followed by carbon dioxide (CO2). There are naturally occurring (biogenic) sources of GHG's and human-generated (anthropogenic) sources of GHG's.

Various GHG's react in different ways in the atmosphere. The IPCC has quantified these characteristics by determining the global warming potential (GWP) of various gases. The GWP is a metric for how much a given mass of a GHG will contribute to global warming. CO2 was given a value of 1 by atmospheric scientists, and all other GWP are based on this metric. For example,

Greenhouse Gas Emission Inventory Background

A GHG emission inventory is a report that documents the total GHG footprint, in metric tonne carbon dioxide equivalents (MTCDE), for which the College is either directly or indirectly responsible.

GHG emissions arise from the consumption or use of carbon-

Fugitive Refrigerants	Includes refrigerants that escape into the atmosphere	Vendor from whom we buy refrigerants. Refrigerants bought for	
	via links in equipment	replacement is approximately equal to fugitive refrigerants	

but also commuting and travel habits. Since we had a 15% participation rate, the carbon emission equivalent data were extrapolated to a MTCDE average for Faculty/Staff commuting, train travel, individually booked air travel, and student travel to and from home. The extrapolated data were then "back checked" using a zip code analysis for commuting; however, the extrapolated survey data were the data used for the final report. The travel data reported for travel agency-booked air, athletic air, chartered bus and study-abroad air were used directly to calculate emissions and were not extrapolated.

Results

During fiscal year 2013, Skidmore emitted approximately 16,972 MTCDE with 6,167 MTCDE in Scope 1, 5,719 MTCDE in Scope 2 and approximately 5,086 in Scope 3 (Figure 1).

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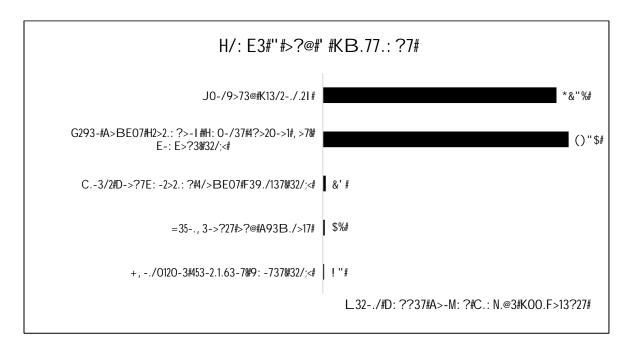


Figure 2. This graph depicts the Scope 1 and 2 emissions by source. It is clear that Skidmore's use of electricity and other campus stationary sources produce the largest quantities of greenhouse gas emissions of the Scope 1 and 2 sources.

Discussion

This GHG inventory reveals a relatively even spilt between the College's Scope 1, 2 and 3 emissions: 36, 34, and 30 percent, respectively. However, it is important to note the distinct difference in data confidence and data types among the three Scopes. Scope 1 and 2 data came primarily from utility bills, so we can be relatively confident about their accuracy.

For Scope 3 emissions, some of the data came directly from sources: study abroad air travel, travel agency- booked faculty/staff academic/business air travel, chartered bus travel and athletic air travel so, as with scope 1 and 2, we can have confidence in the accuracy of these data. The scope 3 emissions calculated for faculty/staff commuting, non-travel agency-booked air travel, faculty/staff train travel and student travel to and from home were collected from the survey and then extrapolated to the community. Although this methodology is well within the boundary of compliance with the Greenhouse Gas Protocol and Clean Air Cool Planet Campus Carbon Calculator, the results should be treated as a grosser approximation than those from Scope 1 and 2. Additionally, the College has less control over scope 3 emissions and in some cases there are fewer mitigation strategies (for example, for air travel). Lastly, as more and more entities begin to account for their carbon emissions, Scope 3 emissions have the potential of being "double counted". For example, if an administrator takes the train to New York City for a business meeting, the emissions of the trip could potentially be counted within Skidmore's GHG inventory as well as the train company's. As a result of the decrease in data confidence and the possibility of "double counting", Scope 3 emissions are treated differently than Scope 1 and 2.

The completion of the GHG inventory begs the question, "how does Skidmore's GHG inventory compare to other Colleges'?" One of the added complexities of GHG accounting in higher education is the lack of consistency in the methods institutions employ to arrive at their GHG baseline such as the

gathering and presenting of the data, the various different dates of the reports, particularly for Scope 3 emissions. These differences in methodologies (such as estimating faculty and staff commuting, student travel to and from home) does not allow for productive institutional comparisons at this time. It is our hope that over time GHG accounting methodology will become more rigorous and standardized to allow for productive comparisons.

As the College looks forward at carbon reduction strategies, it is important to honor the good work the College has already done, and, indeed, we have seen a 48% reduction in GHG emissions (Scope 1 and 2) between our baseline year of 2000 and this inventory. A few examples of GHG reduction projects include the College's geothermal heating and cooling systems, the residence hall electricity metering project, occupancy sensor installations, light efficiency projects, re-insulation projects, motor upgrades, increased fuel efficiency in our fleet, the reduction of fertilizer use, the installation of independent boilers, etc. Please note that in 2014 Skidmore installed a large solar field, several solar thermal projects, and entered an agreement for

Definitions:

Greenhouse Gas / Gases (GHG) – Atmospheric gases, such as carbon dioxide and methane, that affect the Earth's average temperature by trapping infrared radiation (heat) in the atmosphere.

Carbon Dioxide Equivalent (CDE) -All greenhouse gases (six including carbon dioxide) have a scientific equivalency to carbon dioxide; this unit is also expressed as equivalent carbon dioxide (ECO2)

Tonnes -Metric tons (2,205 pounds), the standard for reporting GHG emissions, shorthanded as MTCDE (metric tonnes of CDE) and MMTCDE (million tonnes CDE) for larger entities.

Tons -