



OREGON STATE UNIVERSITY

# Greenhouse Gas Inventory

## Fiscal Year 2013

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## Definitions of Key Terms

(1) “**Carbon dioxide**” (CO<sub>2</sub>) means the chemical compound containing one atom of carbon and two atoms of oxygen.

(2) “**Carbon dioxide equivalent**” (CO<sub>2</sub>e) represents the quantity of a greenhouse gas multiplied by a Global Warming Potential (GWP) factor, relative to CO<sub>2</sub>. This is the “standard unit” used to quantify various greenhouse gasses.

(3) “**Global Warming Potential factor**” (GWP) means the radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of carbon dioxide over a given period of time. For instance, methane (CH<sub>4</sub>) has a GWP of 23, meaning that every gram of methane will trap 23 times as much solar radiation as a gram of CO<sub>2</sub>.

(4) “**Radiative Forcing Index**” (RFI) is a multiplier designed to account for the effects on climate an emission source will cause in addition to the release of fossil carbon. The RFI is most commonly used for aviation emissions, where it accounts for the effects of releasing greenhouse gases at altitude. The Intergovernmental Panel on Climate Change (IPCC) has [estimated the RFI](#) multiplier for aviation at 2.0-4.0.

(5) “**Greenhouse gas**” (GHG) is any gas that contributes to anthropogenic global warming including, but not limited to, carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

(6) “**Metric ton, tonne, or metric tonne**” (t) means one metric tonne (1000 kilograms) or 2204.62 pounds.

(7) “**Total emissions**” is the calculated sum of GHGs emitted due to OSU-related activities.

(8) “**Net emissions**” is the calculated sum of GHGs emitted minus renewable energy certificates, composting activities and carbon offsets.

(9) “**Renewable energy source**” means any source of energy that is replenished rapidly by natural processes. Renewable sources may include, but are not limited to, wind, solar, hydroelectric, biomass, geothermal, tidal or sea currents etc.

(10) “**Statewides**” refers to the inventory that analyzes emissions from statewide, legislatively-mandated OSU entities, specifically the Agricultural Experiment Stations (AES), Extension Service and the Forest Research Laboratory (FRL).

(11) “**Renewable Energy Certificate**” (REC) is a tradable certificate that represents a unit of energy produced by renewable energy sources. The owner of a REC can claim that they are using renewable energy equal to the amount of RECs owned.

(12) “**Bonneville Environmental Foundation (BEF)**” is a Portland-based non-profit that specializes in carbon offsets, mainly renewable energy certificates (RECs). These credits increase the volume of clean, renewable energy that enters the electrical grid. OSU purchases RECs from BEF as part of the student renewable energy fee.

(13) “**Renewable energy fee**” refers to the student-approved initiative that directs \$8.50 per term per student towards the purchase of RECs. These RECs offset a large percent of OSU’s electrical consumption with additions of clean, renewable energy to the electrical grid.

(14) “**World Business Council for Sustainable Development (WBCSD)**” is a global association of business representatives that deals exclusively with business and sustainable development.

(15) “**Greenhouse Gas Protocol (GHGP)**” is an internationally-used accounting tool that allows business and governmental leaders to understand, quantify and manage greenhouse gas emissions. It provides a framework for nearly every greenhouse gas standard and program in the world. The WBCSD was an original partner in drafting and creating the GHGP.

(16) “**Intergovernmental Panel on Climate Change (IPCC)**” is a scientific body established to provide policymakers with an objective source of information on climate change. The IPCC performs no research nor does it monitor climate data; it instead offers analysis of research and climate data as an objective body with a broad range of views, expertise and wide geographical coverage.

(17) “**Clean Air-Cool Planet**” (CA-CP) is a non-partisan, non-profit organization that aims to find and promote solutions to global climate change. Their carbon calculator is used by many campuses for calculating emissions.

(18) “**American College and University Presidents Climate Commitment**” (ACUPCC) is an effort to encourage commitments from institutions of higher learning to neutralize greenhouse gas emissions and prioritize the research and education efforts aimed at stabilizing earth’s climate.

### Definition Sources

Oregon Department of Environmental Quality: [www.deq.state.or.us](http://www.deq.state.or.us)

Bonneville Environmental Foundation: [www.greentagsusa.org](http://www.greentagsusa.org)

World Business Council for Sustainable Development: [www.wbcسد.org](http://www.wbcسد.org)

Greenhouse Gas Protocol: [www.ghgprotocol.org](http://www.ghgprotocol.org)

Intergovernmental Panel on Climate Change: [www.ipcc.ch](http://www.ipcc.ch)

Clean Air-Cool Planet: <http://www.cleanair-coolplanet.org/>

American College and University Presidents’ Climate Commitment:

<http://www.presidentsclimatecommitment.org/>

## Executive Summary

Oregon State University (OSU) aspires to be among the top 10 colleges and universities in the United States recognized for excellence in sustainability. OSU consistently places among the top 25 for sustainability efforts and this Fiscal Year 2013 (FY13) OSU Greenhouse Gas (GHG) Inventory Report demonstrates progress toward that goal. Since OSU President Ed Ray's April 2007 signing of the American College and University Presidents Climate Commitment (ACUPCC), OSU has made progress toward an ambitious goal of becoming climate neutral by 2025. This report is an update and expansion of the [FY07-FY12](#) OSU GHG inventories, which themselves are expansions of a [CY04 inventory](#) commissioned by the Oregon University System (OUS).

The FY13 inventory provides:

1. A snapshot of OSU emissions: quantified greenhouse gas emissions resulting from OSU-related activities for the fiscal year ending June 30, 2013.
2. Comparison with prior OSU inventories: a comparative analysis with FY07-FY12 emissions.
3. Guidance for future inventories: the methodology, successes, challenges and rationale of this expanded report provides a framework for future OSU reports.

### *Findings in Brief*

- OSU's gross emissions were 115,691.2 metric tonnes (t) carbon dioxide equivalent (CO<sub>2</sub>e), a **15.2% decrease** from FY12
  - This decrease was mainly due to operational refinements at the OSU Energy Center, which improved efficiency
  - Decreased air travel emissions mostly due to decreased air miles, but also a slight change in the methodology.
- Net emissions were 115,088.3 t CO<sub>2</sub>e, a **10.8% decrease** from FY12.
  - Sources for this decrease are noted above for total gross emissions.
- Gross emissions per full-time equivalent (FTE) student were 3.5 t CO<sub>2</sub>e, a **41.9% decrease** from FY12.
  - This decrease, exceeding the 15.43% decrease in gross emissions, was mainly due to increasing enrollment and better accounting methods for counting FTE, which has always included full-time and part-time students, but now also includes summer school students.
- Gross emissions per 1000 square foot of 14.7 t CO<sub>2</sub>e, a **19.7% decrease** from FY12
  - This decrease exceeds the 15.43% gross emissions decrease because of square footage added on campus during FY13

	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>
<b>Scope 1</b>							
Gross Emissions	36,511.4	39,419.0	37,920.3	42,475.5	54,847.8	57,228.1	40,959.9
Net Emissions	36,511.4	39,419.0	37,920.3	42,475.5	54,847.8	57,190.8	40,720.6
<b>Scope 2</b>							
Gross Emissions	76,378.9	78,919.0	72,865.3	75,816.0	56,727.2	45,426.5	46,370.0
Net Emissions	75,354.5	25,050.4	23,066.9	37,047.2	(20,715.2)	37,720.4	46,006.4
<b>Scope 3</b>							
Gross Emissions	35,242.4	34,847.8	32,258.4	31,421.5	31,290.5	33,768.6	28,361.3
Net Emissions	35,240.5	34,842.0	32,252.6	31,289.1	31,158.1	33,768.6	28,361.3
<b>Total</b>							
Gross Emissions	148,132.7	153,424.1	143,285.9	149,973.5	143,159.3	136,800.4	115,691.2
Net Emissions	147,106.4	99,549.7	93,481.7	111,072.3	65,584.5	129,057.0	115,088.3

Table 1 lists total gross and total net emissions by scope for the FY07-FY13 inventories.

- Scope 1 emissions are mainly from fossil fuel combustion, refrigerants and agriculture; Scope 2 emissions are from purchased electricity; Scope 3 emissions include air travel, other university financed travel (personal mileage reimbursement, Athletics bus travel, etc.), commute, solid waste, and losses due to transmission and generation of electricity. Under the requirements of the ACUPCC, OSU is responsible for mitigation of emissions from Scope 1 and Scope 2, as well as emissions from commute and air travel.
- OSU is required by the ACUPCC to mitigate *net* emissions of 108,079.4 tCO2e.
- Gross emissions from operations in Corvallis represent 94.03% of total university emissions.

Changes in *net* emissions from the major emissions sources are shown in Table 2 below.

<b>Emissions Sources</b>	<b>FY12 Net Emissions (t CO2e)</b>	<b>% of Net Emissions</b>	<b>% Change in Net Emissions from FY12</b>
<b>Purchased Electricity</b>	50,592	44.0%	19.8%
<b>Stationary Sources</b>	4,229	3.7%	-3.4%
<b>Fleet &amp; Maintenance</b>	1,927	1.7%	-14.2%
<b>Agriculture</b>	2,498	2.2%	-20.2%
<b>Solid Waste</b>	(53)	0.0%	-45.8%
<b>Refrigerants</b>	328	0.3%	0.0%
<b>Commute</b>	5,331	4.6%	-30.4%
<b>Air Travel</b>	16,307	14.2%	-20.3%
<b>Other Directly Financed Travel</b>	2,190	1.9%	42.6%
<b>Cogeneration</b>	31,739	27.6%	-32.6%
<b>Total Net</b>	115,088	100.0%	-10.8%



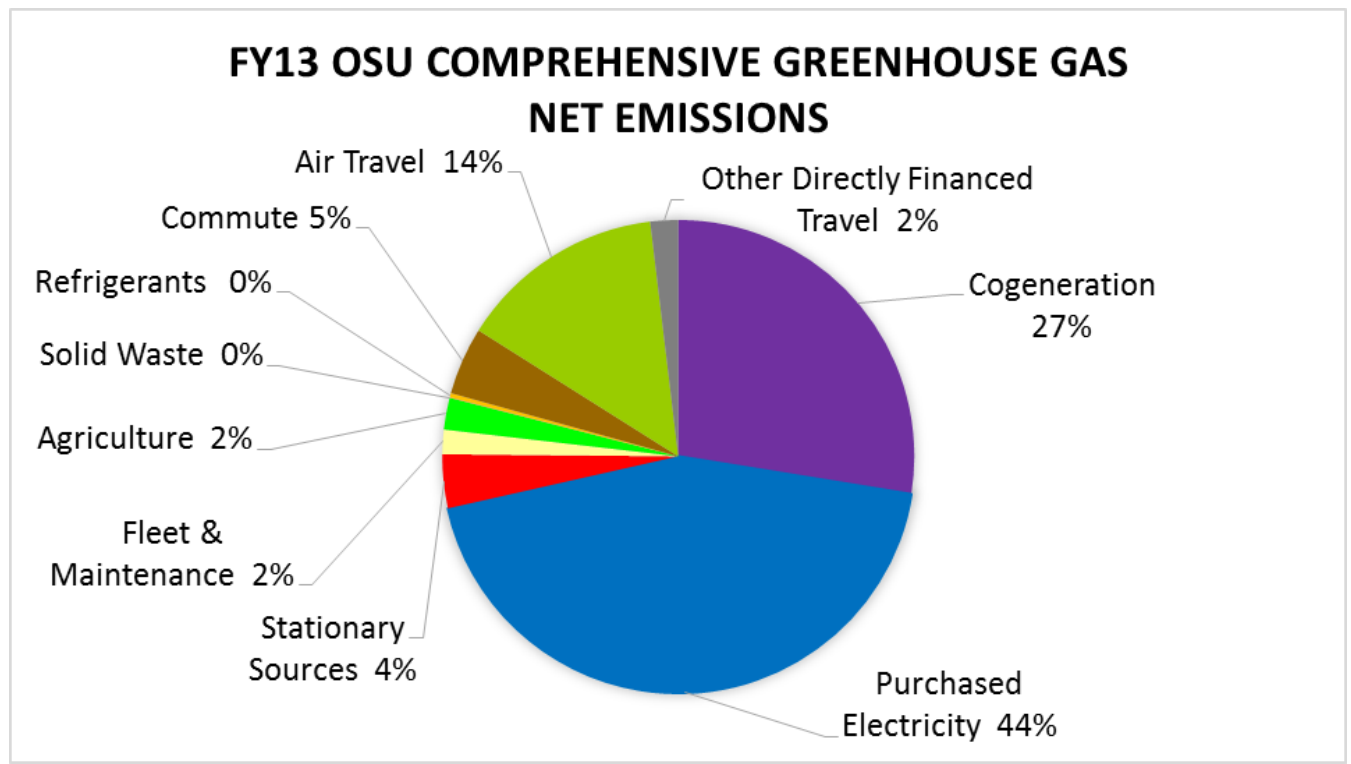
Potentially significant emissions sources not included:

- Lifecycle/embodied emissions of purchased goods and materials
- Long-distance student travel, including study abroad travel
- Transportation and processing of materials to be recycled
- Water treatment and distribution
- Solid waste, commuting and fleet emissions for Statewides, HMSC and OSU-Cascades
- Some OSU Athletics team travel
- Emissions from fertilizer from all OSU locations
- Some stationary fuel purchases

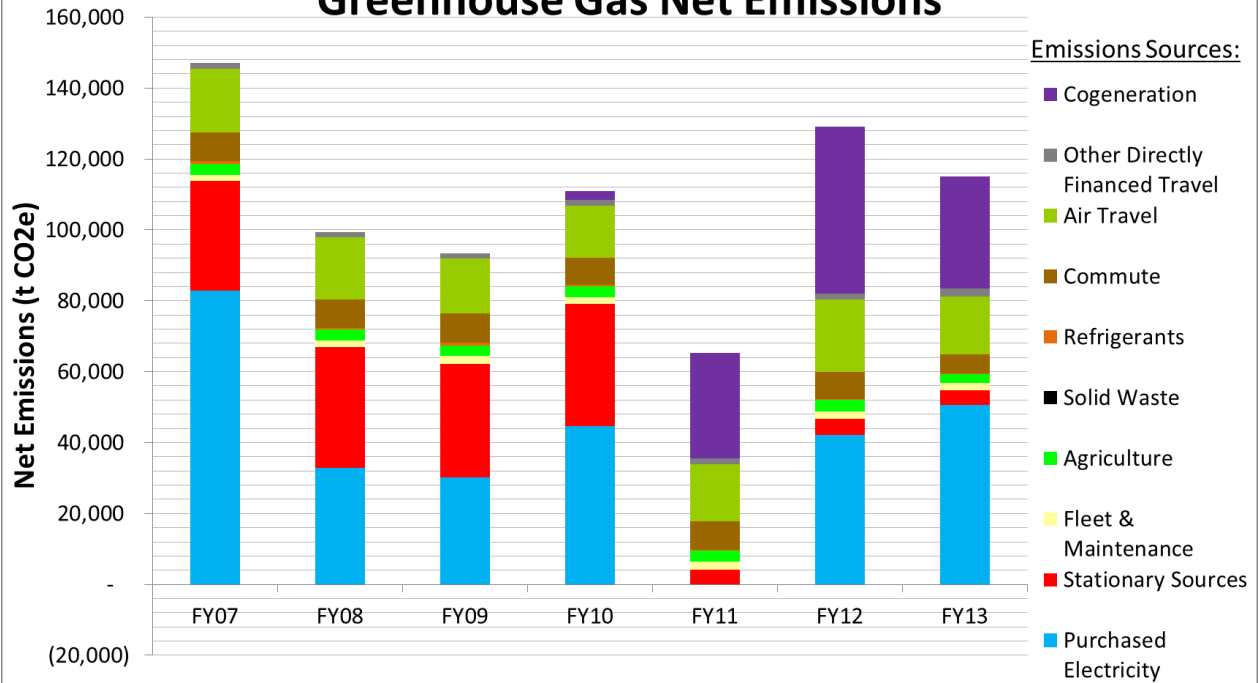
### **Changes since the FY12 Inventory**

- There are no new emissions sources for FY13
- Sources with a significant change in emissions calculation methodology include:
  - None

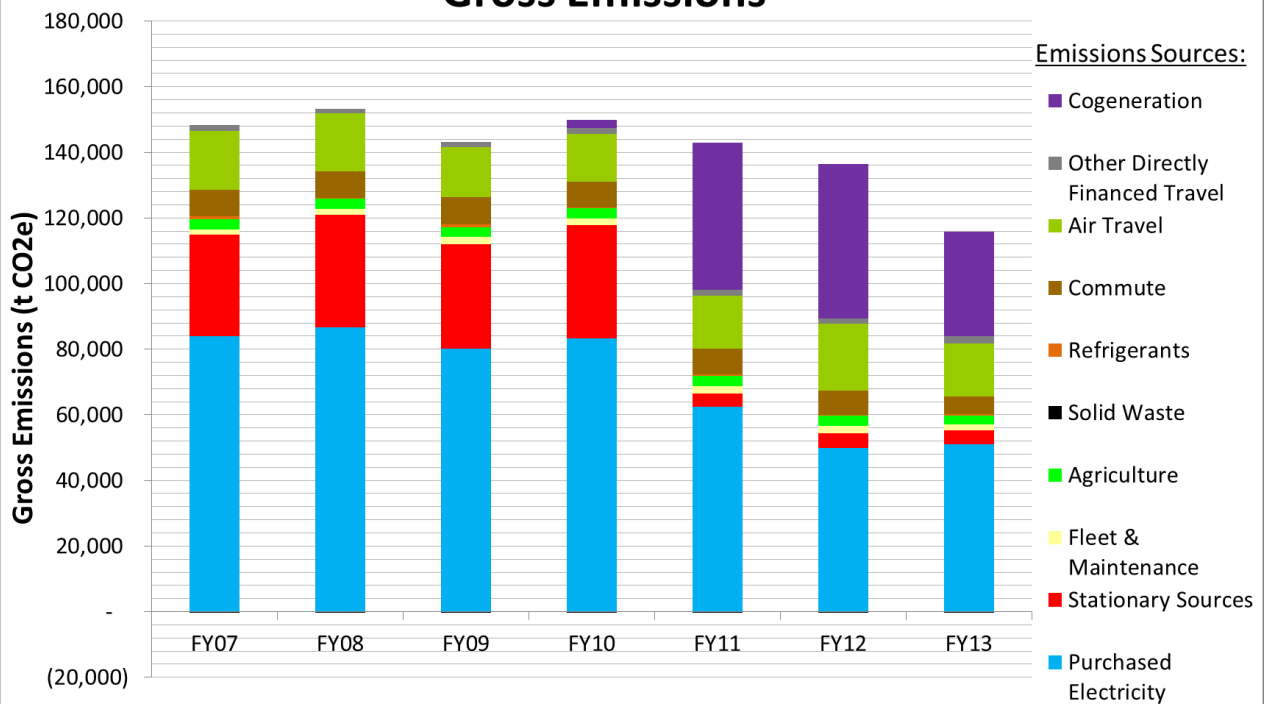
Please see the Analysis of Data and Results section for more details regarding these changes.



## Comparison of Annual OSU Comprehensive Greenhouse Gas Net Emissions



## OSU Comprehensive Greenhouse Gas Gross Emissions



## **Background**

Oregon State University's seventh annual comprehensive greenhouse gas inventory again reflects a continual improvement of data collection methods and analyses. This report contains a few changes since the previous annual report issued for Fiscal Year 2012. Although not reflected in this shorter report, constructing an inventory with this level of detail is now, more than ever, a monumental task.

In an effort to streamline the report format, the OSU Sustainability Office has moved to a reporting structure that highlights changes in methods from year to year. Rather than include text that largely remains static, the authors will, when appropriate, direct readers to past reports for specific details and references.

As was the case for the FY12 report, the science and methods behind best-practice inventory work is ever-evolving, making year-to-year comparisons complex. Greenhouse gas measurement is an increasingly important global issue. OSU's inventory processes exceeds (with a comfortable margin) the strictest regulatory requirements. Feedback is appreciated on this document and the processes used to create it. Please visit <http://oregonstate.edu/sustainability/climate> for details and updates.

## **Methodology**

### ***Overview***

With operations as broad and far-reaching as Oregon State University's, the largest task in creating this FY13 inventory was data collection. Extensive data were gathered from central sources and from OSU entities across the state. Most large sources of GHG emissions are accounted for in their entirety. Omissions are described in the Boundaries section. This is the most complete inventory of OSU's GHG emissions performed to date.

The CA-CP calculator was chosen again for FY13 due to its focus on university and college campuses, ease of comparison with past inventories and its endorsement by the ACUPCC, of which OSU is a charter signatory. Other reasons for selecting this tool can be found on page 12 of the [FY08 report](#).

### ***Scope and Boundaries***

Identifying scope and boundaries issues is a critical step in emissions reporting. While some connections to emissions sources – like electrical consumption – are direct, others, such as employee commuting or student air travel to and from the university, are not. In an effort to measure all emissions resulting from OSU activity, the boundaries were drawn to be fairly broad: any emissions from an entity over which OSU has financial and/or operational control were included.

FY13 essentially mirrors the methodology and reporting structure of FY12; a brief history of past reporting structures and the rationale for changes can be found on page 13 of the [FY09 report](#).

Unless otherwise noted, data comparing fiscal years and university-wide totals are drawn from the OSU Comprehensive inventory. Emissions sources like air travel and rental cars were attributed to OSU Corvallis unless otherwise noted.

### ***Data Gathering and Management***

As Oregon's land, sea, space and sun grant institution, OSU facilities are spread throughout the state, requiring data from a large number of sources. Not all data were readily available or in a useable format. The need to balance timeliness with attaining trivial data resulted in some intentional omissions. Other emissions sources were omitted because of incomplete data and a limited ability to reliably extrapolate. Rationale for these omissions is discussed in further detail in the [FY08 report](#).

### ***Past Inventory Comparison***

An important function of this FY13 inventory is to monitor emissions trends over time. Data presented in this report reflect changes in emissions between FY12 and FY13 using the highest quality data and best calculation practices available. In an effort to present the best data using the latest calculation methods, past, current and future inventories may not be absolutely comparable for all sources. Issues of comparison over time will continue to be noted in these reports.

## **Boundaries**

### ***Overview***

In order to create the most realistic, accurate greenhouse gas inventory possible, this report's scope and boundaries expand beyond what is typically included in organizational inventories. Using terminology common to greenhouse gas reporting, most inventories examine a "Scope 1," which includes all direct emissions from sources owned or directly controlled by the subject organization. "Scope 2" sources, which cover GHG emissions that result from importing or buying electricity, steam, heated or chilled water, are also often included. "Scope 3" includes all other indirect sources of GHG emissions that result from organization activities from sources not owned or controlled by the organization. These scopes are defined by the World Business Council for Sustainable Development (WBCSD) and are used to ensure consistency and prevent double-counting or double-crediting. The ACUPCC requires that signatories mitigate emissions only from Scope 1 and 2 sources, as well as commute and air travel from Scope 3. Most OSU peer institutions focus on these boundaries. Our inventory aims to document all OSU emissions for which data exist, regardless of our mitigation responsibilities. Total emissions that OSU is required to mitigate by the ACUPCC will be specifically identified throughout the report.

## Omitted Emissions Sources and Credits

It was not possible to precisely inventory every emissions source or credit due to diverse university operations across the state and existing business practices and accounting methods not well suited for reporting the types of data needed. Those intentional omissions are discussed below. If emissions from a source are expected to contribute more than 1% to total emissions the source is considered significant; those that are expected to contribute less than 1% are considered negligible and not included in this analysis.

The list of omitted sources is shown in Table 3:

<b>Omitted Source</b>	<b>Expected Impact</b>
Water treatment and distribution	Significant
Long-distance student travel (travel abroad, to/from home)	Significant
<u>Additional</u> biological sequestration	Significant
Lifecycle/embodied emissions*	Significant
Off-campus vehicle use	Negligible
Incinerated waste – non-energy producing	Negligible
Recycled materials (transport and processing)	Unknown

\*A [lifecycle greenhouse gas analysis](#) was performed for the Oregon University System by [Good Company](#) in August 2009 based on the Carnegie Mellon *Economic Input-Output Life-Cycle Assessment (EIO-LCA)* model. Quantifying emissions using FY08 expenditures for food, construction, retail goods, computers, paper, lab equipment and much more, **Good Company found that OSU's emissions from the procurement of goods and services were estimated at nearly 85,000 t CO<sub>2</sub>e, or more than 73% of gross FY13 emissions.**

## Findings and Analysis

### *Findings*

Total gross and net emissions for each inventory are shown in the Table 4 below.

	FY07	FY08	FY09	FY10	FY11	FY12	FY13
<b>OSU Corvallis</b>							
Gross Emissions	143,343	146,107	136,594	143,598	136,574	129,153	108,786
Net Emissions	142,317	92,232	86,790	105,000	59,362	121,924	108,183
<b>Statewides</b>							
Gross Emissions	4,789	6,337	5,693	5,491	5,578	6,331	5,387
Net Emissions	4,789	6,337	5,693	5,491	5,578	6,331	5,387
<b>OSU Cascades</b>							
Gross Emissions	N/A	526	557	569	570	813	1,006
Net Emissions	N/A	526	557	266	207	280	1,006
<b>HMSC</b>							
Gross Emissions	-	454	441	316	438	504	512
Net Emissions	-	454	441	316	438	504	512
<b>OSU Comprehensive</b>							
Gross Emissions	<b>148,133</b>	<b>153,424</b>	<b>143,286</b>	<b>149,974</b>	<b>143,159</b>	<b>136,800</b>	<b>115,691</b>
Net Emissions	<b>147,106</b>	<b>99,550</b>	<b>93,482</b>	<b>111,072</b>	<b>65,585</b>	<b>129,039</b>	<b>115,088</b>

Total FY13 gross and net emissions are displayed in Table 5.

Emissions Sources	FY13 Gross Emissions (t CO2e)	% of Gross Emissions	% Change in Gross Emissions from FY12	FY13 Net Emissions (t CO2e)	% of Net Emissions	% Change in Net Emissions from FY12
Purchased Electricity	50,956	44.0%	2.1%	50,592	44.0%	19.8%
Stationary Sources	4,229	3.7%	-3.4%	4,229	3.7%	-3.4%
Fleet & Maintenance	1,927	1.7%	-14.2%	1,927	1.7%	-14.2%
Agriculture	2,737	2.4%	-13.5%	2,498	2.2%	-20.2%
Solid Waste	(53)	0.0%	-45.8%	(53)	0.0%	-45.8%
Refrigerants	328	0.3%	0.0%	328	0.3%	0.0%
Commute	5,331	4.6%	-27.6%	5,331	4.6%	-30.4%
Air Travel	16,307	14.1%	-20.3%	16,307	14.2%	-20.3%
Other Directly Financed Travel	2,190	1.9%	42.6%	2,190	1.9%	42.6%
Cogeneration	31,739	27.4%	-32.6%	31,739	27.6%	-32.6%
<b>Total</b>	<b>115,691</b>	<b>100.0%</b>	<b>-15.2%</b>	<b>115,088</b>	<b>100.0%</b>	<b>-10.8%</b>

Table 6 details offsets related to composting activities and purchase of renewable energy certificates (RECs). Wind power represents the majority of the source of RECs, which also include some biogas and biomass.

Offset Type	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Composting	1.9	5.8	5.8	132.4	132.4	37.3	239.3
Renewable Energy Certificates (RECs)	1,024.4	53,868.6	49,798.4	38,768.8	77,442.4	7,642.4	3.6

The following comparative data are drawn from reports submitted by the institutions to the [ACUPCC Reporting System website](#).

Table 7. Comparison of OSU Emissions Metrics with Peer Universities											
	'13 OSU Comprehensive	'12 OSU Comprehensive	'11 OSU Comprehensive	'10 OSU Comprehensive	'12 Cornell University	'13 The Ohio State University	'13 Utah State	'13 UC Davis	'12 Washington State - Pullman		
Net emissions per FTE enrolled (t CO2e)	4.9	5.5	3.0	5.9	10.5	4.6	4.4	6.7	8.3		
Net emissions per 1000 square feet (t CO2e)	14.3	16.3	10.2	16.5	13.2	11.1	12.2	12.5	14.0		

### Analysis of Data and Results

#### Commute - Faculty/Staff:

Source data changes for FY13: Some OSU-Cascades commuting data were based on assumptions from the Corvallis commuting reports.

Methodology changes for FY13: Faculty/staff commute emissions reported in the FY13 Corvallis inventory estimated emissions using a 5-mile-per-round-trip distance estimate. In the [CY04 inventory](#) commissioned by the OUS, a value of 3 miles per trip was chosen based on demographic information gathered by the consultant.

Uncertainty Analysis: For an in-depth analysis on the uncertainty relating to faculty/staff commuting, please see page 22 of the [FY09 report](#).

#### Directly Financed Travel (excluding Air Travel):

Source data changes for FY13: None.

Methodology changes for FY13: None.

Uncertainty analysis: Uncertainty in this category is still an improvement compared to previous years. Some minor emissions sources still go unreported, but their impact is estimated to be less than 5% of the category total.

#### Stationary Sources:

Source data changes for FY13: None

Methodology changes for FY13: Emission values for stationary sources are slightly higher than the past fiscal year.

## **Solid Waste:**

Source data changes for FY13: In past years, only data for dumpster waste was calculated. Refinements in data collection from OSU Recycling and Surplus now provides data for multiple locations on campus including compactor weights.

Methodology changes for FY13: None.

Uncertainty Analysis: Since no solid waste information was collected for any other entity besides OSU Corvallis, mainly due to data availability issues, this emissions source will undoubtedly increase as information becomes available. It is likely actual emissions from solid waste are 10-15% higher than reported here.

## ***Analysis of Data Quality***

Due to varied data quality and completeness, assumptions and extrapolations were used for the following areas: mission-related air travel, student and faculty/staff commuting for the Corvallis campus, gasoline and diesel fleet and Enterprise rental car mileage.

Areas requiring further investigation and enhanced recordkeeping include: long-distance student travel (to/from home and school); auto mileage and commute information that includes Extension, Ag. Experiment Stations, the FRL, OSU-Cascades and HMSC; backup generator fuel consumption; propane use; fertilizer use; solid waste and composting.

## **Future Action**

### ***OSU Climate Plan***

As awareness and demand for action around global climate change continues to grow, requests and requirements have come from the campus community, the community at-large, and local, state and federal governments. To respond to this increasing attention and to meet the requirements of the American College and University Presidents Climate Commitment, the OSU Sustainability Office created the [OSU Climate Plan](#) in September 2009.

The Plan develops goals, frameworks and strategic steps necessary for OSU to achieve climate neutrality (no net emissions) by 2025. While reducing actual emissions are a central focus of the Climate Plan, outlining steps to further incorporate climate change awareness into education, engagement and research is also required by the ACUPCC and included in the Plan.



The Climate Plan is based on three primary mitigation strategies:

- conservation and efficiency projects
- on-site renewable energy installations
- carbon offsets, renewable energy certificate purchases, and other off-site measures.

These strategies and progress toward neutrality goals are not included in this report, but are covered by a separate reporting system. This system and more information is available online at <http://oregonstate.edu/sustainability/climateplan>

### ***Creating a 1990 Baseline***

Creating an organizational baseline, or reference emissions level, is critical to goal setting and tracking progress over time and across organizations. Although detailed measurement like the kind illustrated in this report didn't begin at OSU until 2007, it is still possible to create a rough baseline for years past.

Determining an appropriate baseline year is both critical and challenging. OSU selected Fiscal Year 1990 as its baseline year due to the prevalence of 1990 as a baseline for many state, federal and international climate initiatives.

However, using 1990 as a baseline year imposes considerable challenges, including low data quality and availability. Much of the data central to emissions calculations are simply not available for this time period. When data are available, quality and scope are often questionable. IPCC emissions from sources like electricity and air travel from that time period are difficult to calculate. The combination of these factors makes estimating a 1990 baseline difficult.

OSU's 1990 baseline was calculated after analyzing a number of factors that correlate with emissions. They were: student enrollment FTE; faculty/staff FTE; gross square footage (GSF); natural gas use; and electricity use. Using a blend of historical data and estimations, FY90 emissions levels were calculated based on the rates of change of these factors.

Upon analysis of these factors, it was determined that emissions from electricity were best suited to use as a proxy for 1990 emissions. This is due to a number of reasons:

- Emissions from electricity represent a significant portion of OSU's gross emissions
- Prior to the cogeneration capability at the OSU Energy Center, the rate of consumption of natural gas and other heating fuels has closely mirrored the increase in electricity consumption; also, together, these sources accounted for nearly 75% of OSU's gross emissions
- The calculated emissions for 1990 based on electricity were "middle of the road" when compared with the other analyzed factors as well as other baseline estimations.

**OSU's FY90 emissions are estimated to be 110,977 t CO<sub>2</sub>e** from all major sources now included in recent GHG inventories.

In the summer of 2009, OUS contracted with [Good Company](#) to provide an estimate of 1990 emissions from buildings (essentially all Scope 1 & 2 emissions) for the seven public university campuses in Oregon. Using campus square footage, estimated emissions coefficients for the electrical grid in 1990, and energy intensity of buildings (based on a multi-year report for the Western United States), OSU's 1990 emissions from buildings were estimated at 49,855 t CO<sub>2</sub>e.

Due to its limited scope, the Good Company estimate could not stand alone as the 1990 emissions baseline; no Scope 3 emissions (air travel, waste, commute, etc.) were included, and some Scope 1 and 2 sources (refrigerants, fleet, etc.) were also missing. However, it does provide some assurance that the 1990 baseline calculated by the OSU Sustainability Office is reasonable.

While a relatively sound estimate for 1990 emissions is important, an exact value for 1990 emissions cannot be calculated. The value of the 1990 baseline is to set a reference point for institutional emissions reductions goals.

## Findings Table

### Energy

<p><b>Purchased Electricity (Scope 2)</b></p>	<p>OSU Corvallis purchased electricity usage for FY13 was 60,376,881 kWh.</p> <p>The 14 Agricultural Experiment Stations (AES) consumed 4,577,137 kWh.</p> <p>County Extension offices used 2,490,194 kWh.</p> <p>Hatfield Marine Science Center used 2,003,049 kWh.</p> <p>OSU-Cascades consumed 1,022,920 kWh.</p> <p>Four Extension offices (in Aurora, Hood River, Hermiston and Central Point) are covered in the AES data, as they are combined units of both Extension and AES and share facility space.</p> <p>The CA-CP calculator allowed for a grid mix specific to the electric utility. Using information from Pacific Power the following utility grid mix was used for the OSU Corvallis and OSU-Cascades. Since Statewides use a more diverse electricity resources, the utility grid mix for Statewides was determined from <a href="#">EPA eGrid</a> data for the Northwest Power Pool (NWPP) utility grid mix.</p> <table border="1" data-bbox="511 924 885 1270"> <thead> <tr> <th colspan="2">Pacific Power Grid Mix</th> </tr> <tr> <th>Fuel</th> <th>% of total</th> </tr> </thead> <tbody> <tr> <td>Coal</td> <td>61.3%</td> </tr> <tr> <td>Natural Gas</td> <td>12.5%</td> </tr> <tr> <td>Hydro</td> <td>7.1%</td> </tr> <tr> <td>Wind</td> <td>7.6%</td> </tr> <tr> <td>Geothermal</td> <td>0.4%</td> </tr> <tr> <td>Biomass</td> <td>0.3%</td> </tr> <tr> <td>Other</td> <td>10.8%</td> </tr> </tbody> </table> <table border="1" data-bbox="925 913 1307 1333"> <thead> <tr> <th colspan="2">NWPP Subregional Grid Mix</th> </tr> <tr> <th>Fuel</th> <th>% of total</th> </tr> </thead> <tbody> <tr> <td>Coal</td> <td>31.3%</td> </tr> <tr> <td>Natural Gas</td> <td>14.3%</td> </tr> <tr> <td>Hydro</td> <td>43.6%</td> </tr> <tr> <td>Wind</td> <td>4.8%</td> </tr> <tr> <td>Geothermal</td> <td>0.7%</td> </tr> <tr> <td>Biomass</td> <td>1.2%</td> </tr> <tr> <td>Nuclear</td> <td>3.4%</td> </tr> <tr> <td>Oil</td> <td>0.3%</td> </tr> <tr> <td>Other</td> <td>0.1%</td> </tr> </tbody> </table> <p>Central Lincoln PUD reported the following utility grid mix for HMSC.</p> <table border="1" data-bbox="771 1417 1079 1680"> <thead> <tr> <th colspan="2">Central Lincoln PUD Grid Mix</th> </tr> <tr> <th>Fuel</th> <th>% of total</th> </tr> </thead> <tbody> <tr> <td>Hydro</td> <td>86.0%</td> </tr> <tr> <td>Nuclear</td> <td>9.0%</td> </tr> <tr> <td>Other</td> <td>5.0%</td> </tr> </tbody> </table> <p>Total FY13 purchased electricity usage for OSU: 70,470,181 kWh.</p>	Pacific Power Grid Mix		Fuel	% of total	Coal	61.3%	Natural Gas	12.5%	Hydro	7.1%	Wind	7.6%	Geothermal	0.4%	Biomass	0.3%	Other	10.8%	NWPP Subregional Grid Mix		Fuel	% of total	Coal	31.3%	Natural Gas	14.3%	Hydro	43.6%	Wind	4.8%	Geothermal	0.7%	Biomass	1.2%	Nuclear	3.4%	Oil	0.3%	Other	0.1%	Central Lincoln PUD Grid Mix		Fuel	% of total	Hydro	86.0%	Nuclear	9.0%	Other	5.0%
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<p><b>On-campus Cogeneration</b></p>	<p>In July 2009, the \$40 million Energy Center, a cogeneration facility, began producing steam from its two boilers. In June 2010, it began producing electricity under non-test conditions.</p> <p>As a cogeneration facility, the Energy Center consumed 5,902,395 therms of natural gas and 74,538 gallons of diesel in FY13. It produced 543,127,618 pounds of steam and 41,082,606.9 kWh of electricity.</p>
<p><b>Natural Gas (Scope 1)</b></p>	<p>OSU Corvallis consumed 517,558 therms of natural gas in FY13 not including use at the OSU Energy Center. Most of this was used for space and water heating in buildings not served by steam from the Energy Center.</p> <p>The Agricultural Experiment Stations used a combined 61,720 therms.</p> <p>The Extension Service county offices used a total of 56,648 therms.</p> <p>Hatfield Marine Science Center consumed 4,729 therms.</p> <p>Cascade campus used 17,592 therms.</p> <p>Total FY13 consumption of natural gas, excluding use at the Energy Center: 658,245 therms or 65,825 MMBtu</p>
<p><b>Steam and Chilled water purchased</b></p>	<p>N/A – no steam or chilled water is purchased from non-OSU sources.</p>
<p><b>Residual oils (#5, #6) and Distillate oils (#1, #2, #3, #4) (Scope 1)</b></p>	<p>OSU Corvallis used 80,563 gallons of distillate oil #2 (diesel) primarily at the Energy Center when natural gas supply was curtailed. Backup generators accounted for 6,026 gallons of the total and the Energy Center accounted for 74,538 gallons, though this figure may be incomplete. Further recordkeeping is necessary.</p> <p>Agricultural Experiment Stations used 3,456 gallons of diesel #2 for heating.</p> <p>Extension Service consumed 6,431 gallons of diesel #2.</p> <p>Total FY13 consumption of distillate oil #2 (diesel) for non-transportation uses was: 90,451 gallons</p>
<p><b>Propane (Scope 1 &amp; 3)</b></p>	<p>Total documented propane use at OSU Corvallis was 8,241 gallons, used mainly for heating, backup generator priming and forklifts. Purchasers of propane are scattered throughout campus and there is no centralized recordkeeping.</p> <p>Agricultural Experiment Stations used 12,821 gallons of propane for heating, forklifts and backup generators.</p> <p>The Extension Service used 6,122 gallons.</p> <p>Total FY13 consumption of propane: 27,185 gallons.</p>
<p><b>Incinerated Waste</b></p>	<p>The Research Animal Isolation Lab (RAIL) reported 5,583 pounds of incinerator waste for FY13. This number represents half of the fiscal year since half of the data was lost during staffing changes. Even so, the CA-CP calculator is only set up to calculate emissions for incinerators producing electricity.</p>
<p><b>Coal</b></p>	<p>N/A – no coal is directly consumed by OSU.</p>

<b>Solar / Wind / Biomass / Human Power</b>	<p>During FY13, two new ground mounted photovoltaic (PV) systems were installed in Corvallis. These systems are in addition to Kelley Engineering Center and the OSU Solar Trailer. HMSC has a PV system as well. In 2009, Dixon Recreation Center installed 22 ReRev elliptical exercise machines which produce electricity while being utilized for exercise. The estimated FY13 output from all sites was 444,092.6 kWh. This amount was not applied to this inventory because the energy produced reduced the buildings' electricity use.</p>
	<p><b>Data sources:</b> Les Walton, Energy Operations Supervisor; George Voss, Associate Director of Admin Services for Student Health Services; Facilities Services; Carson Oil; Travis Feldsher, RAIL; Kira Billingsley, OSU-Cascades Faculty and Finance Specialist; Solveig Stormo, Amerigas; Chelle Boswell, HMSC Office Specialist; numerous staff contacts at Extension county offices and Ag. Experiment Stations.</p>

## Transportation

<b>Fleet and Maintenance (Scope 1)</b>	<p><b>Gasoline</b></p> <p>Fossil fuels used in transportation are reported separately from fuels used in stationary sources. OSU has a fuel pump located at the Motor Pool that fills maintenance and fleet vehicles. There is also a credit card system that allows individuals on business trips to fill fleet vehicles wherever needed. Total volume from these sources in FY13 was 169,204 gallons.</p> <p>OSU also received deliveries of 240 gallons of gasoline from Carson Oil. This fuel was primarily used in landscape equipment and vehicles.</p> <p>Hyslop farms received 1,157 gallons of gasoline in FY13. The fuel was primarily used in farm vehicles.</p> <p>Hatfield Marine Science Center used 7,529.3 gallons of gasoline for their fleet.</p> <p><b>Diesel</b></p> <p>In Corvallis, diesel is primarily used in the small diesel fleet run by the Motor Pool as well as in the Campus shuttles. The shuttles are fueled off-campus by First Student, a contracted service provider.</p> <p>Reported diesel use at the campus Motor Pool filling station and the Motor Pool credit card system was 9,324 gallons.</p> <p>The shuttles used 4,537 gallons of diesel in FY13.</p> <p>HMSC also uses diesel for their research vessels and fleet vehicles. The only ship fuel information available was for the R/V Pacific Storm. Total FY13 diesel consumption for HMSC was 9,935 gallons.</p> <p>Total gasoline in FY13: 178,130.3 gallons</p> <p>Total diesel used in mobile sources: 29,642.0 gallons.</p>
	<p><b>Data sources:</b> Justin Fleming, Motor Pool Manager; Delwin Loucks, First Student; Chelle Boswell, HSMC Office Specialist; Amber Sams, Credit Dept. Carson Oil;</p>

<p><b>Directly Financed Travel (Scope 3)</b></p>	<p>In FY13, 3.3 million miles were reimbursed by Travel Reimbursement.</p> <p>Mileage reimbursed to accounts outside of TRES totaled 107,946 miles.</p> <p>OSU also contracts rental cars through Enterprise Rent-a-Car. Enterprise reported OSU accounts driving 1,679,656 miles in FY13.</p> <p>Mileage driven in non-contracted vendor rental vehicles totaled 519,909 miles in FY13. These values were based on charges and reimbursements, and used data given by Enterprise to extrapolate a mileage total. Travel on non-contracted vendor rental vehicles is assumed to be the same as Enterprise.</p> <p>OSU Athletics charters buses to provide short- and long-distance transportation to its teams. Using a medium-length route with a known distance and typical cost, an extrapolation was made using bus charter payment information.</p> <p>A one-way trip to Portland Airport from the Corvallis Campus is 98 miles. The standard one-way rate to the airport is \$440 per bus. Total bus expenditures were calculated to be \$1,246,733.86. Assuming this rate of \$4.49/mi is representative of all chartered bus travel, Athletics' chartered buses drove 277,669 miles in FY13.</p> <p>In FY13, a reported 5,579,598 car miles were directly financed by OSU.</p> <p>A total of 277,669 bus miles were financed by OSU.</p> <p><b>Data sources:</b> Justin Fleming, Motor Pool Manager; Julie Stratton, Auxiliaries &amp; Activities Business Center; Stephanie Smith, Fiscal Coordinator Business Affairs; Margaret Taylor, Business Affairs; Davion Reese, Enterprise Rent-a-Car; Jacque Bruns, OSU Athletics; Brad Teel, Teel's Travel; Stephen Matusik, Account Manager Azumano Travel.</p>
<p><b>Commute (Scope 3)</b></p>	<p>It is assumed each person made one trip to campus per day. Students and staff/faculty were counted separately in the calculator. Institutional Research reports 146 teaching days per year (excluding summer) and that number was used for commuting days for students. Staff and faculty commuting days were determined by dividing the number of regular and overtime payroll hours for classified staff and faculty by the FTE of the respective classification. This method yielded 233 working days for classified staff and 245 for faculty.</p> <p>An average commute distance of 5 miles was used for personal vehicle travel and based jointly on the 2003 OSU commute survey, and a 2003 Portland State University GHG inventory estimated commute distance of 7.5 miles. While Corvallis is a much smaller community, many students commute from outside the area. More accurate information on commuting distances is needed to definitively determine commute emissions. This estimated distance was also applied to the OSU-Cascades. While the estimation is reasonable, further commuting studies should be performed to better model commute patterns there.</p> <p>An average commute distance of 3 miles was used for bus travel. This reflects the likelihood of bus commuters traveling shorter distances, as the majority of the transit system is based around Corvallis.</p> <p>Staff and faculty FTE provided by Institutional Research include OSU-Cascades, AES, Extension and the FRL. Commute distance and mode splits are most likely different from those of Corvallis Campus, yet no reliable commute data exists for these auxiliaries.</p> <p>Summer students were included in commute calculations for the first time in FY13.</p>

**Data sources:** Sal Castillo, Institutional Research; Steve Nash, Payroll Manager; Rebecca Houghtaling, Senior Planner Campus Operations.

**Air Travel  
(Scope 3)**

OSU used two travel agents in FY13: Teel's Travel Planners and Azumano Travel. Travel Solutions was a third travel agent used by OSU in previous years. All provided significant amounts of information, as well as advice and guidance. Air travel is also reimbursed by OSU's Travel Reimbursement office.

Azumano Travel provided a report detailing all OSU activity booked through their firm and included mileage, number of trip segments and cost. Teel's Travel provided total number of trip segments booked by their firm for OSU groups. OSU Travel Reimbursement provided a similar list. All of these reports included non-packaged, non-tour Athletics travel.

Since Azumano had a complete report of mileage and number of segments, and both Teel's and Travel Reimbursement provided number of segments, we can extrapolate using Azumano's mileage information.

The extrapolation and calculation are:

Company	flights/seg	% of total
Azumano	2,591	19.4%
Teel's	7,664	57.3%
Travel Reimbursement	3,130	23.4%
Total	13,385	100.0%

Azumano booked 6,279,124 miles for OSU.

$$\frac{6,279,124 \text{ Azumano miles}}{2,591 \text{ Azumano flights}} = \frac{x \text{ total miles}}{13,385 \text{ total flights}}$$

$$x = 32,437,698 \text{ total miles}$$

Both Teel's and Azumano stated that approximately 5% of flights will not appear in their records due to the way a couple of airlines (notably JetBlue and Southwest) ticket. One final extrapolation is needed:

$$\text{Total OSU air mileage} = (1/.95) * 32,437,698 = 30,815,813 \text{ miles}$$

In addition, non-TRES reimbursements accounted for 19,775 miles (based on reimbursement amounts). This brings total mileage to 30,835,588 miles.

All air travel emissions were applied to the OSU Corvallis inventory due to lack of specific data for non-Corvallis sites.

**Assumptions:** Travel booked through Azumano is representative of all OSU travel.

For each away game, the OSU Football team charts an Airbus 320 to take the team from Eugene, OR to the game destination. Using the fall 2012 football schedule at <http://www.osubeavers.com/> and Webflyer.com, an airport distance calculator, the calculated distance flown by chartered football jets was 9,822 miles.

	<p>The European Environmental Agency<sup>1</sup> has fuel burn rates for numerous jetliners. It is estimated that for a 2,482 mile flight, an A320 will burn 11,608 kg of jet fuel.</p> <p>The following calculations were made separate from the CA-CP calculator, as it is not equipped to accurately calculate emissions resulting from a dedicated jet flight:</p> $\frac{11,608 \text{ kg fuel}}{2482 \text{ mi}} \times \frac{1 \text{ gal jet fuel}^2}{3.06 \text{ kg fuel}} \times \frac{21.095 \text{ lb CO}_2^2}{1 \text{ gal jet fuel}} \times \frac{1 \text{ t}}{2205 \text{ lbs}} = \frac{0.0146 \text{ t CO}_2}{\text{mi}}$ $\frac{0.0146 \text{ t CO}_2}{\text{mi}} \times 6,578 \text{ miles} = 96.03 \text{ t CO}_2 \times 2.8 \text{ RFI} = 269.3 \text{ t CO}_2\text{e}$ $269.3 \text{ t CO}_2\text{e} \times 0.90718474 \text{ MT} = 244.3 \text{ MT CO}_2\text{e}$ <p>Emissions resulting from chartered football air travel are reported under the Directly Financed Travel category.</p> <p><b>Data sources:</b> Brad Teel, President, Teel's Travel Planners; Julie Stratton, Business Affairs; Margaret Taylor, Business Affairs. Webflyer.com; <sup>1</sup> - European Environmental Agency Emission Inventory Guidebook <a href="http://www.eea.europa.eu/publications/EMEP/CORINAIR4">http://www.eea.europa.eu/publications/EMEP/CORINAIR4</a>; <sup>2</sup>- Energy Information Agency <a href="http://www.eia.doe.gov/oiaf/1605/coefficients.html">http://www.eia.doe.gov/oiaf/1605/coefficients.html</a></p>
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## Other Major Sources

<p><b>Solid Waste (Scope 3)</b></p>	<p>Total weight of solid waste sent to Coffin Butte Landfill in FY13: 1.3 million lbs. (629.73 tons).</p> <p>Coffin Butte recovers methane and produces power, but it is unknown how much methane produced could be attributed to OSU waste.</p> <p>No solid waste information was available for the Statewides, HMSC or OSU-Cascades.</p> <p><b>Data source:</b> Pete Lepre, Campus Recycling Manager</p>
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**Animals and Agriculture (Scope 1)**

**Animals**

Animals are raised and cared for at several OSU facilities. Their totals are displayed in the table below.

Type	Animal Science	Union Station	Burns Station	Vet Med	Soap Creek	Total
Dairy Cows	90	-	-	1.0	-	91
Beef Cattle	15	310	538	1.0	267.0	1,131
Horses	15	2	3	115.0	3.0	138
Poultry	648	-	-	-	-	648
Sheep	139	-	-	1.0	-	140
Swine	24	-	-	1.0	-	25
Goats	-	-	-	1.0	-	1

The College of Veterinary Medicine provided the number of treatment days for each type of animal. This annual total was divided by 365, giving a yearly equivalent for each type. One category, 'large animals' was determined to be mostly llamas and alpacas. Because the Clean Air-Cool Planet calculator had no category or emissions factor for camelids, these animals were categorized as sheep because of their size and type of digestion system.

Emissions from animals kept at the Burns and Union stations were reported under the Statewides inventory. Emissions from Animal Science and Vet Med were reported under the OSU Corvallis Campus inventory.

**Fertilizer**

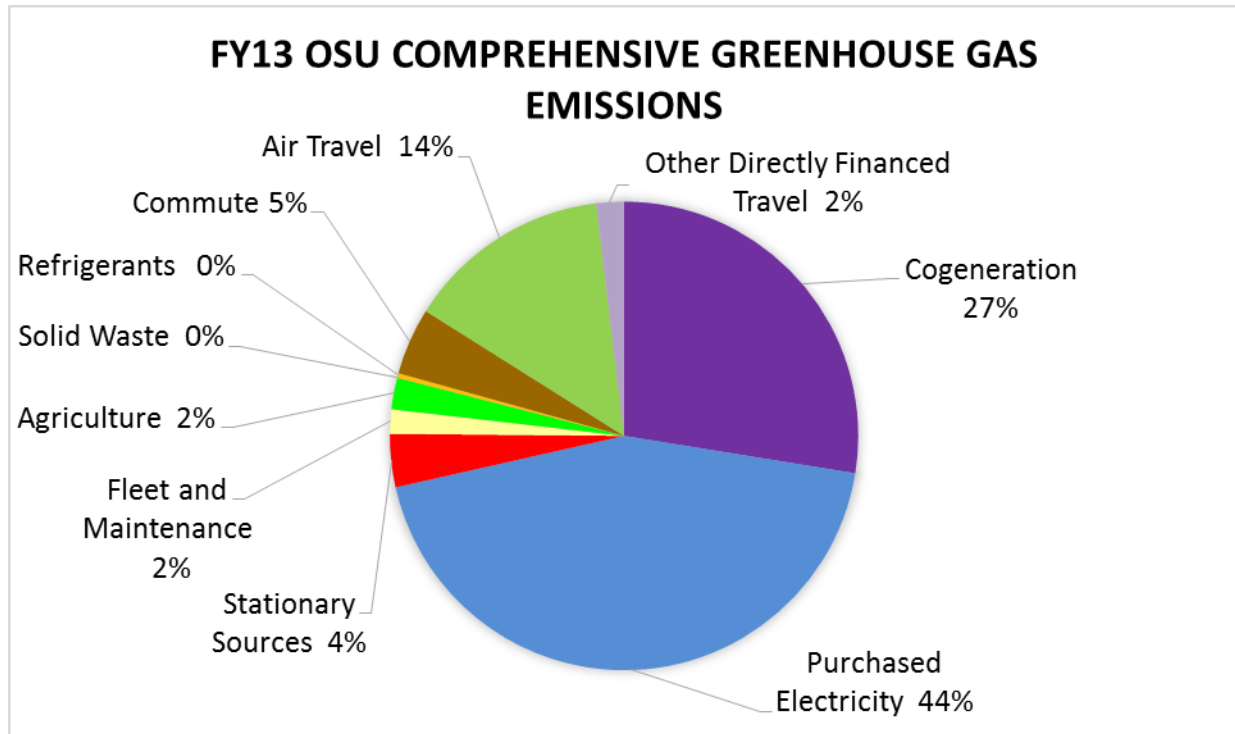
Location	Weight (lbs)	% Nitrogen
Burns	0	0%
Union	21,000	0%
Corvallis grounds	0	0%
Soap and Berry Creek	3,550	70%
Ag. Exp. Stations	266,638	26%
Total	291,188	28%

Fertilizer application on OSU grounds is inadequately tracked. Even so, this emissions source is likely small. Emissions from fertilizer applied to Burns, Union and AES grounds were reported in the Statewides inventory. Emissions from the Dairy, OSU Corvallis grounds and the Soap Creek and Berry Creek cattle ranches were reported in the OSU Corvallis inventory.

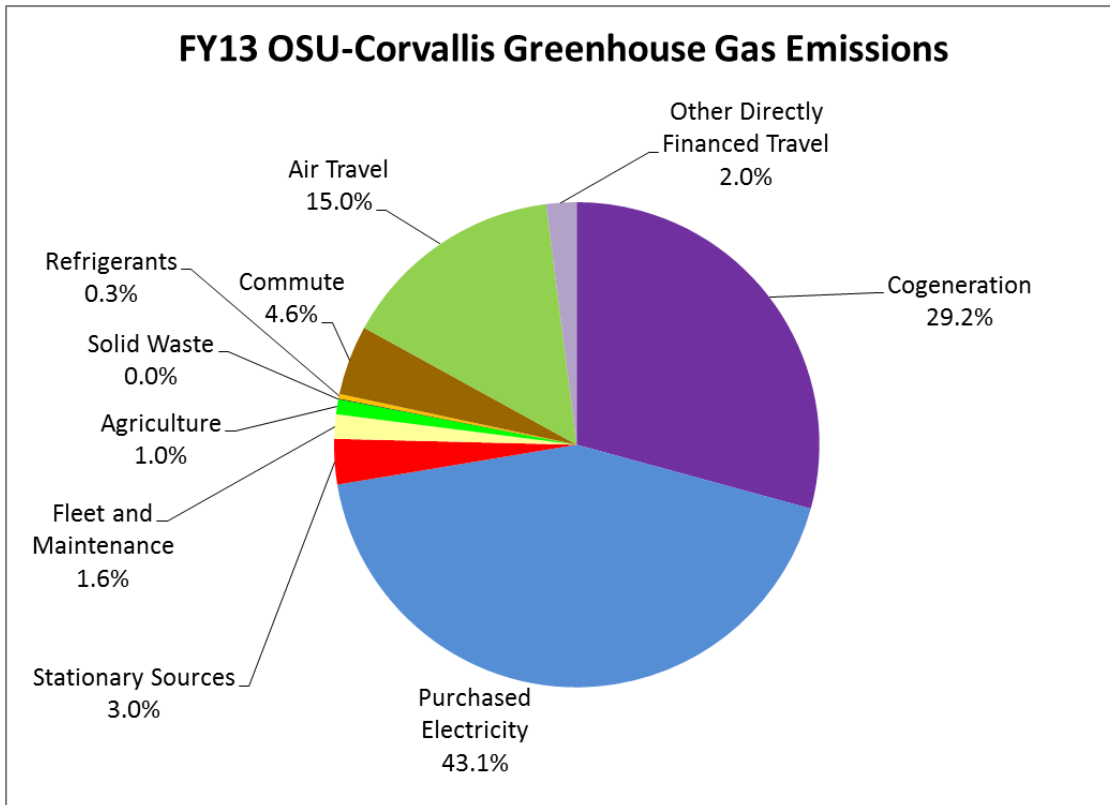
**Data sources:** Nora Ross, Asst. to the Chair, Animal Science Dept.; Tim DeCurto, Superintendent, Union Station; Norm Brown, OSU Landscape; Mandy Seals, Coordinator Client Service Vet Med.

<p><b>Refrigerants (Scope 1)</b></p>	<p>Refrigerants can be powerful greenhouse gases and their tracking is required by the EPA. Small amounts can escape during typical equipment use or in cases of equipment failure. The following table outlines the type and amount of refrigerants used in FY11 and their 100-year global warming potential (GWP). OSU is currently in the planning stages for creating a system to become more compliant with legal requirements for tracking refrigerants. Until that system is in place FY11 data is the most recent data available.</p> <table border="1" data-bbox="698 430 1161 745"> <thead> <tr> <th>Refrigerant</th> <th>Weight (lbs)</th> <th>GWP (100 year)</th> </tr> </thead> <tbody> <tr> <td>R-11</td> <td>2</td> <td>4,000</td> </tr> <tr> <td>R-12</td> <td>105</td> <td>2,400</td> </tr> <tr> <td>R-22</td> <td>278</td> <td>1,780</td> </tr> <tr> <td>R-134A</td> <td>3</td> <td>1,300</td> </tr> <tr> <td>R-404A</td> <td>21</td> <td>3,260</td> </tr> <tr> <td>R-409A</td> <td>29</td> <td>1,440</td> </tr> </tbody> </table>	Refrigerant	Weight (lbs)	GWP (100 year)	R-11	2	4,000	R-12	105	2,400	R-22	278	1,780	R-134A	3	1,300	R-404A	21	3,260	R-409A	29	1,440
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	<p><b>Data source:</b> Greg Riutzel, Refrigeration Mechanic, Facilities Services</p>																					
<p><b>Offsets (green tags, RECs, composting etc.)</b></p>	<p><b>Renewable Energy Certificates (RECs)</b>  Total REC purchases for the OSU Corvallis campus were 5 MWh.</p> <p>Total offsets for FY13: 5 MWh.</p> <p><b>Offsets with Additionality</b>  Approximately 621.64 tons of waste is composted by various campus entities. The Republic Services wood drop box, Organic Growers Club, Crop and Soil Sciences Department and the Student Sustainability Initiative compost dairy solids, pre- and post-consumer food waste from campus dining centers and landscape debris. OSU-based waste composted offsite by a third party, such as Republic Services, will not be counted as an offset by OSU. The benefit of this type of composting is instead realized in the reduced reported weight of landfill solid waste.</p>																					

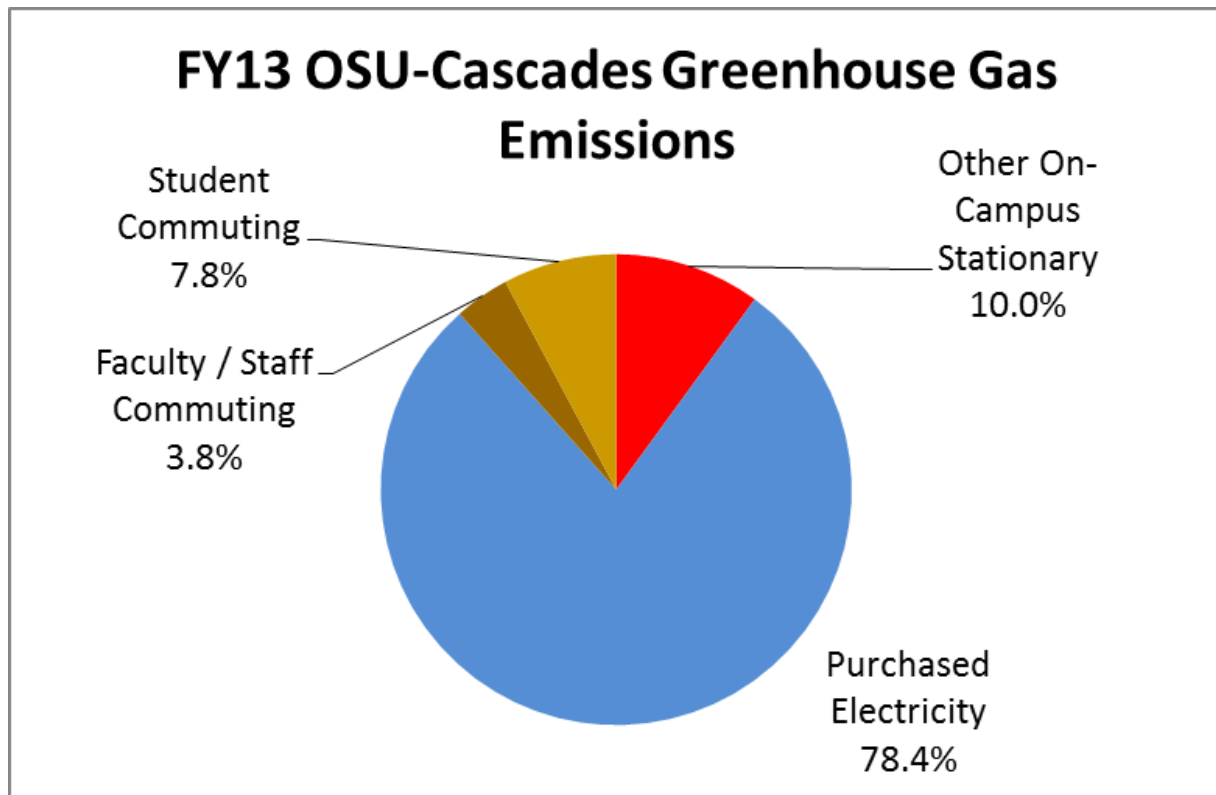
MODULE	Comprehensive FY13 Summary						
WORKSHEET	Overview of Annual Emissions						
UNIVERSITY	Oregon State University						
Select Year -->	2013	Energy Consumption	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	eCO <sub>2</sub>	% change from FY12
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Co-gen Electricity	243,028.7	12,925,426.6	1,292.1	26.6	12,965.7	10885.5%
	Co-gen Steam	351,893.0	18,715,350.9	1,870.8	38.6	18,773.6	-61.0%
	Other On-Campus Stationary	75,990.4	4,213,637.7	454.5	13.4	4,229.0	-3.4%
	Fleet and Maintenance	26,241.6	1,883,130.4	349.0	118.7	1,927.2	-14.2%
	Refrigerants & Chemicals	-	-	-	-	327.6	0.0%
	Agriculture	-	-	89,398.6	1,684.3	2,736.9	-13.5%
Scope 2	Purchased Electricity	622,800.7	46,137,461.4	959.7	699.4	46,009.9	-7.8%
Scope 3	Faculty / Staff Commuting	26,598.3	1,898,946.1	394.7	132.2	2,125.8	-29.0%
	Student Commuting	43,725.7	3,126,700.8	628.1	211.3	3,205.4	-49.1%
	Directly Financed Air Travel	81,933.6	15,979,501.5	158.4	182.1	16,307.0	-20.3%
	Other Directly Financed Travel	29,885.9	2,135,600.3	435.4	146.2	2,190.1	42.6%
	Solid Waste	-	-	(2,116.4)	-	(52.9)	-45.8%
	Scope 2 T&D Losses	61,595.7	4,563,045.6	94.9	69.2	4,586.0	4.7%
Offsets	Additional					(239.3)	-86.2%
	Non-Additional					(3.6)	-99.9%
Totals	Scope 1	697,153.7	37,737,545.6	93,364.9	1,881.6	40,960.0	-28.4%
	Scope 2	622,800.7	46,137,461.4	959.7	699.4	46,009.9	1.3%
	Scope 3	243,739.1	27,703,794.4	(404.8)	741.0	28,361.4	-16.0%
	All Scopes	1,563,693.5	111,578,801.3	93,919.8	3,322.0	115,331.2	-15.5%
	All Offsets					(242.9)	-103.2%
						<b>Net Emissions:</b> 115,088.4	-10.8%



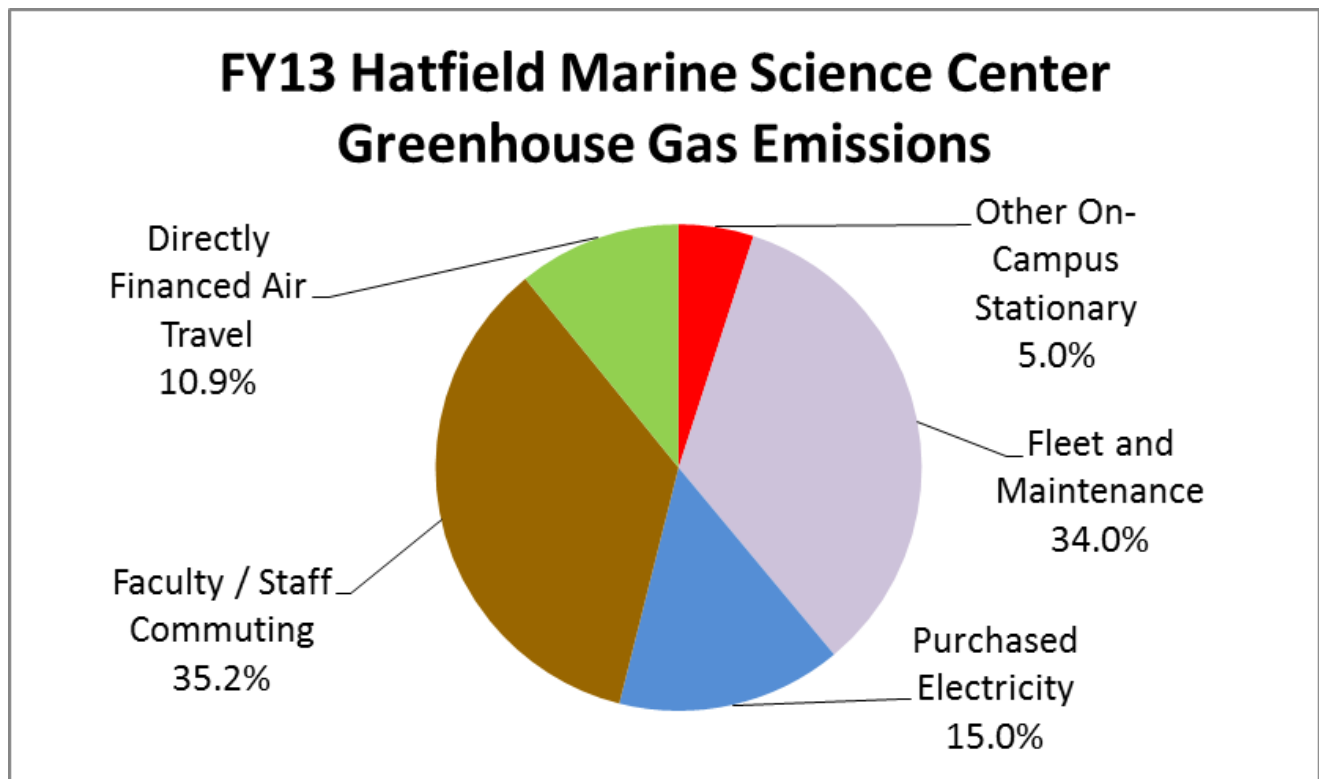
MODULE	Corvallis FY13 Summary						
WORKSHEET	Overview of Annual Emissions						
UNIVERSITY	Oregon State University						
Select Year -->	2013	Energy Consumption	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	eCO <sub>2</sub>	% change from FY12
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Co-gen Electricity	243,028.7	12,925,426.6	1,292.1	26.6	12,965.7	11154.9%
	Co-gen Steam	351,893.0	18,715,350.9	1,870.8	38.6	18,773.6	-60.1%
	Other On-Campus Stationary	58,945.2	3,267,246.8	348.9	10.0	3,279.0	-3.1%
	Fleet and Maintenance	23,928.3	1,714,480.5	329.3	111.5	1,755.9	-16.6%
	Refrigerants & Chemicals	-	-	-	-	327.6	0.0%
	Agriculture	-	-	40,066.3	285.5	1,086.7	-43.1%
Scope 2	Purchased Electricity	562,194.4	42,713,458.8	874.6	613.0	42,558.0	3.7%
Scope 3	Faculty / Staff Commuting	26,117.3	1,864,517.8	388.0	129.9	1,912.9	-26.2%
	Student Commuting	42,732.6	3,055,617.8	614.1	206.6	3,132.5	-41.6%
	Directly Financed Air Travel	81,653.6	15,924,899.2	157.9	181.5	16,252.2	-16.4%
	Other Directly Financed Travel	29,885.9	2,135,600.3	435.4	146.2	2,190.1	42.6%
	Solid Waste	-	-	(2,116.4)	-	(52.9)	-45.8%
	Scope 2 T&D Losses	55,601.6	4,224,408.0	86.5	60.6	4,244.6	4.5%
Offsets	Additional					(239.3)	541.6%
	Non-Additional					(3.6)	-100.0%
Totals	Scope 1	677,795.2	36,622,504.8	43,907.4	472.2	38,188.5	-30.4%
	Scope 2	562,194.4	42,713,458.8	874.6	613.0	42,558.0	3.7%
	Scope 3	235,991.0	27,205,043.0	(434.5)	724.8	27,679.5	-16.8%
	All Scopes	1,475,980.6	106,541,006.6	44,347.5	1,810.0	108,426.0	-16.0%
	All Offsets					(242.9)	-96.6%
	Net Emissions:						108,183.1



MODULE	OSU Cascades FY13 Summary						
WORKSHEET	Overview of Annual Emissions						
UNIVERSITY	Oregon State University						
Select Year -->	2013	Energy Consumption	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	eCO <sub>2</sub>	% change from FY12
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	1,759.2	93,272.8	9.3	0.2	93.6	-14.6%
Scope 2	Purchased Electricity	9,524.8	723,662.8	14.8	27.3	732.2	37.5%
Scope 3	Faculty / Staff Commuting	481.0	34,428.3	6.8	2.3	35.3	15.7%
	Student Commuting	993.1	71,083.1	14.0	4.7	72.8	-16.7%
	Scope 2 T&D Losses	942.0	71,571.0	1.5	2.7	72.4	37.4%
Totals	Scope 1	1,759.2	93,272.8	9.3	0.2	93.6	-14.6%
	Scope 2	9,524.8	723,662.8	14.8	27.3	732.2	37.5%
	Scope 3	2,416.1	177,082.5	22.2	9.7	180.5	5.8%
	All Scopes	13,700.2	994,018.0	46.3	37.2	1,006.3	23.8%
<b>Net Emissions:</b>						<b>1,006.3</b>	<b>259.3%</b>



MODULE	HMSC FY13 Summary						
WORKSHEET	Overview of Annual Emissions						
UNIVERSITY	Oregon State University						
Select Year -->	2013	Energy Consumption	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	eCO <sub>2</sub>	% change
		MMBtu	kg	kg	kg	Metric Tonnes	from FY12
Scope 1	Other On-Campus Stationary	472.9	25,072.6	2.5	0.0	25.1	2.9%
	Fleet and Maintenance	2,313.3	168,649.9	19.7	7.2	171.3	20.1%
Scope 2	Purchased Electricity	19,257.6	75,329.9	1.4	0.7	75.6	-7.1%
Scope 3	Faculty / Staff Commuting	-	-	-	-	177.6	0.0%
	Directly Financed Air Travel	280.0	54,602.4	0.5	0.6	54.8	-32.6%
	Scope 2 T&D Losses	1,904.6	7,450.2	0.1	0.1	7.5	-6.6%
Totals	Scope 1	2,786.2	193,722.5	22.2	7.3	196.5	17.6%
	Scope 2	19,257.6	75,329.9	1.4	0.7	75.6	-7.1%
	Scope 3	2,184.6	62,052.6	0.7	0.7	239.9	208.3%
	All Scopes	24,228.4	331,105.0	24.2	8.6	511.9	57.0%
<b>Net Emissions:</b>						511.9	57.0%



<b>MODULE</b>	Statewides FY13 Summary						
<b>WORKSHEET</b>	Overview of Annual Emissions						
<b>UNIVERSITY</b>	Oregon State University						
<b>Select Year --&gt;</b>	2013	<b>Energy Consumption</b>	<b>CO<sub>2</sub></b>	<b>CH<sub>4</sub></b>	<b>N<sub>2</sub>O</b>	<b>eCO<sub>2</sub></b>	<b>% change from FY12</b>
		MMBtu	kg	kg	kg	Metric Tonnes	
<b>Scope 1</b>	Other On-Campus Stationary	14,813.1	828,045.5	93.8	3.1	831.3	-3.3%
	Agriculture	-	-	49,332.2	1,398.7	1,650.1	31.3%
<b>Scope 2</b>	Purchased Electricity	31,823.8	2,625,009.8	69.0	58.5	2,644.2	-31.1%
<b>Scope 3</b>	Scope 2 T&D Losses	3,147.4	259,616.4	6.8	5.8	261.5	-31.1%
<b>Totals</b>	<b>Scope 1</b>	14,813.1	828,045.5	49,426.1	1,401.9	2,481.5	17.2%
	<b>Scope 2</b>	31,823.8	2,625,009.8	69.0	58.5	2,644.2	-31.1%
	<b>Scope 3</b>	3,147.4	259,616.4	6.8	5.8	261.5	-95.9%
	<b>All Scopes</b>	49,784.3	3,712,671.7	49,501.9	1,466.1	5,387.1	-14.9%
	<b>Net Emissions:</b>					5,387.1	-14.9%

## FY13 OSU Statewides Greenhouse Gas Emissions

