

OREGON STATE UNIVERSITY
Greenhouse Gas Inventory
Fiscal Year 2014

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Definitions of Key Terms



1. **“Carbon dioxide” (CO₂)** means the chemical compound containing one atom of carbon and two atoms of oxygen.
2. **“Carbon dioxide equivalent” (CO₂e)** represents the quantity of a greenhouse gas multiplied by a Global Warming Potential (GWP) factor, relative to CO₂. 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 (CH₄) has a GWP of 23, meaning that every gram of methane will trap 23 times as much solar radiation as a gram of CO₂.
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, Oregon 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. **“Campus Carbon Calculator” (CCC)** is a carbon calculator used by many campuses for calculating greenhouse gas emissions. Originally developed by the former non-profit Clean Air – Cool Planet and the Sustainability Institute at University of New Hampshire (UNH), it is now owned and managed by the Sustainability Institute at UNH.
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

Bonneville Environmental Foundation: www.greentagsusa.org

World Business Council for Sustainable Development: www.wbcsd.org

Greenhouse Gas Protocol: www.ghgprotocol.org

Intergovernmental Panel on Climate Change: 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 2014 (FY14) OSU Greenhouse Gas (GHG) Inventory Report tracks 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 generally made progress toward an ambitious goal of becoming climate neutral by 2025, although campus enrollment and square footage growth in recent years have made continued GHG reductions challenging.

This report is an update and expansion of the [FY07-FY13](#) OSU GHG inventories, which themselves are expansions of a [CY04 inventory](#) commissioned by the Oregon University System (OUS).

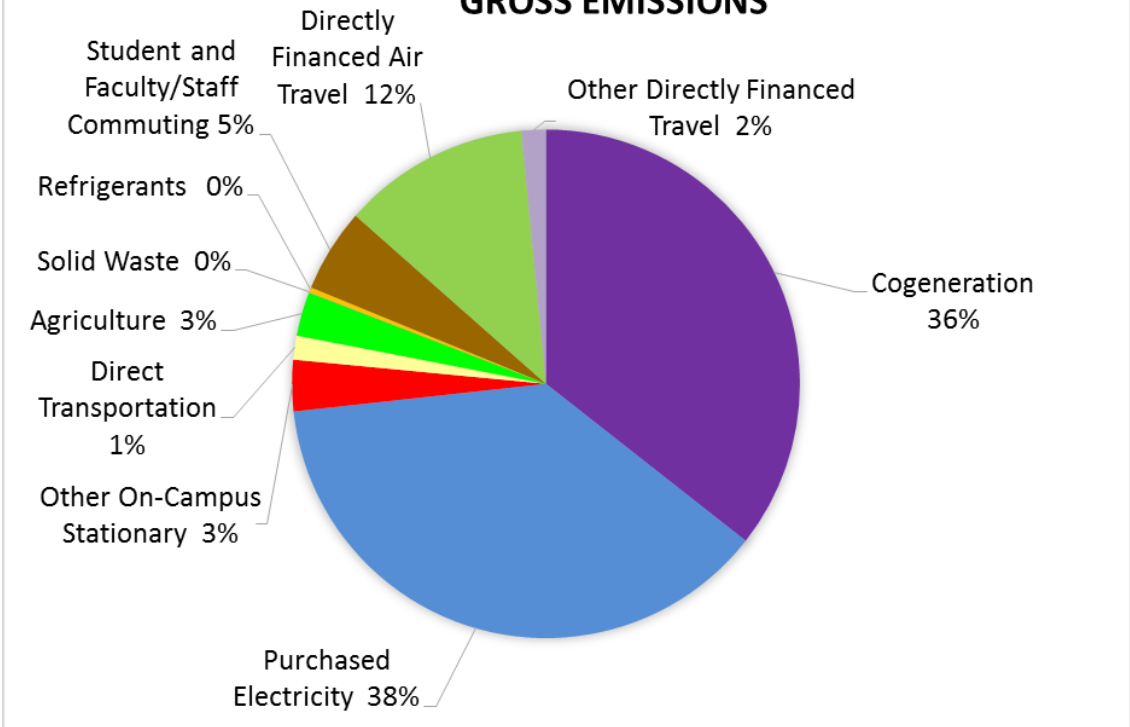
The FY14 report provides:

1. A snapshot of OSU emissions: quantified greenhouse gas emissions resulting from OSU-related activities for the fiscal year ending June 30, 2014.
2. Comparison with prior OSU inventories: a comparative analysis with FY07-FY13 emissions.
3. Guidance for future inventories: the methodology, successes, challenges and rationale of this expanded report provides a framework for future OSU reports.

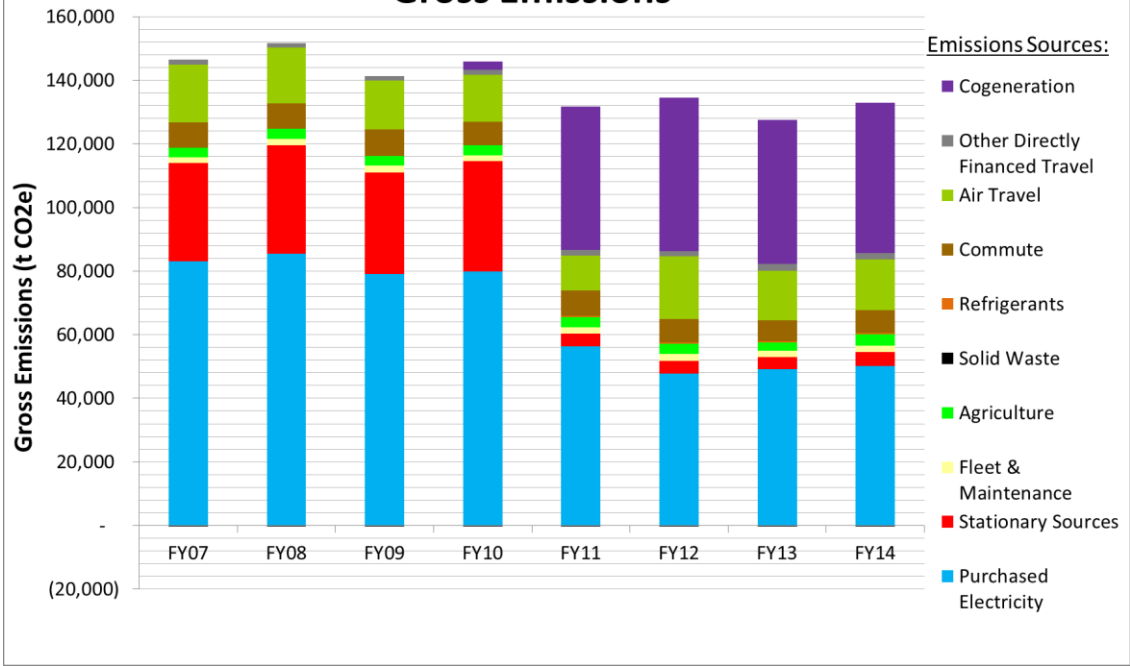
Findings in Brief

- OSU's FY14 **gross emissions** were 132,932.33 metric tonnes (t) carbon dioxide equivalent (CO₂e), a **3.8% increase** from FY13. This increase was mainly due to:
 - Increased student enrollment and total building and research square footage.
 - Higher reported fertilizer use due to more accurate information from nine sites.
 - Increased commuting emissions due to higher enrollment and a change in commute calculating methodology.
 - Increased Scope 1 emissions due to Incineration as a new emission source.
- **Net emissions** were 131,965.9 t CO₂e, a **4.1% increase** from FY13.
 - Sources for this increase are the same as those noted above for gross emissions.
 - Energy Center sales to the electrical grid decreased significantly between FY13 and FY14.
- Gross emissions per full-time equivalent (FTE) student were 5.32 t CO₂e, a **2.5% decrease** from FY13.
 - Increased student enrollment resulted in a per student decrease in emissions, in spite of higher overall university emissions levels.
- Gross emissions per 1000 square foot of 14.16 t CO₂e, a **10.8% decrease** from FY13
 - This relatively substantial decrease is primarily due to more accurate square footage calculations and accounting, relative to past GHG reports.

FY14 OSU COMPREHENSIVE GREENHOUSE GAS GROSS EMISSIONS



OSU Comprehensive Greenhouse Gas Gross Emissions



Background

Oregon State University's eighth annual comprehensive greenhouse gas inventory again reflects a continual improvement of data collection methods and analyses. This report includes several changes since the previous annual report issued for Fiscal Year 2013. 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 FY13 report, the science and methods behind best-practice greenhouse gas inventory work is ever-evolving, making year-to-year comparisons complex. GHG 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 our [Emissions Measurement and Reporting Website](#) for details and updates.

Methodology

Overview

With operations as broad and far-reaching as Oregon State University's, the largest task in creating this FY14 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 CCC calculator was chosen again for FY14 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.

FY14 essentially mirrors the methodology and reporting structure of FY13; 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.

Inventories

In order to account for and differentiate between all emissions of [OSU's operations across the state](#), this report is comprised of four different inventories: Corvallis Campus, OSU-Cascades, Hatfield Marine Science Center (HMSC), and The Statewide Public Services, or "Statewides." All these locations are considered vital facets of the university. Below are outlined the different key aspects of each location:

OSU Corvallis

The main Corvallis campus produces the vast majority of the university's GHG emissions. At over 400-acres, OSU Corvallis hosts 27,925 students and 5,639 faculty and staff.

OSU Cascades

Cascades is the only branch campus of OSU. Located in Bend, Oregon, this 56-acre campus specializes in degrees like Accountancy, Natural Resources, Tourism and Outdoor Leadership, Hospitality Management, and many others.

Hatfield Marine Science Center (HMSC)

OSU's primary coastal operation and a base for oceanographic research. Originally established as a marine laboratory for Oregon State University, HMSC currently hosts collaborative research and education programs from seven OSU colleges and six state and federal agencies on its 49-acre campus.

Statewides

As part of OSU's designation as the state's land, sea, space and sun grant institution, OSU's Statewide Public Service Programs identify emerging community issues, discover new research-based solutions, and apply new discoveries through engaged learning. The Statewides consist of three divisions, with operations in all 36 Oregon counties:

- The **OSU Extension Service** connects Oregonians to research-based knowledge for economic development, healthy and productive life choices, and sustainable ecosystems.
- The Oregon **Agricultural Experiment Station** is Oregon's principal research engine related to food, agriculture, and natural resources.
- The **Forest Research Laboratory** is a dynamic source of knowledge about the science and management of forests, the connections of people to forests, and the use of renewable materials to benefit businesses, communities, and quality of life in Oregon.

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 FY14 inventory is to monitor emissions trends over time. Data presented in this report reflect changes in emissions between FY13 and FY14 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 required of organizational inventories. Using terminology common to greenhouse gas reporting, most inventories at minimum 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.

Omitted sources are shown in Table 1:

Table 1. Omitted Sources	
Omitted Source	Expected Impact
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
Recycled materials (transportation 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 CO₂e, or more than 73% of gross FY13 emissions.**

Findings and Analysis

Findings

Total gross and net emissions for each scope are shown in Table 2 below.

Table 2. OSU Comprehensive Emissions by Scope (t CO2e)					
	FY10	FY11	FY12	FY13	FY14
Scope 1					
Gross Emissions	42,058.8	54,573.9	58,069.4	54,188.9	57,834.7
Net Emissions	42,058.8	54,573.9	57,920.3	53,231.6	56,878.0
Scope 2					
Gross Emissions	74,963.6	52,924.4	44,746.8	46,409.5	46,977.2
Net Emissions	36,101.0	(20,582.0)	36,973.4	46,045.9	46,967.5
Scope 3					
Gross Emissions	28,678.9	24,052.1	31,541.5	27,298.2	28,120.4
Net Emissions	28,149.1	23,522.3	31,541.5	27,298.2	28,120.4
Total					
Gross Emissions	145,961.7	131,844.2	134,734.9	127,896.7	132,932.3
Net Emissions	106,569.3	57,808.0	126,812.3	126,575.8	131,965.9

- 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 127,577.1 tCO2e.
- Gross emissions from operations in Corvallis represent 96.9% of total university emissions.

Total gross and net emissions for each inventory are shown in the Table 3 below.

Table 3. Emissions by Inventory (t CO2e)					
	FY10	FY11	FY12	FY13	FY14
OSU Corvallis					
Gross Emissions	140,786	126,569	128,416	120,906	125,315
Net Emissions	101,698	52,877	121,012	119,585	124,349
Statewides					
Gross Emissions	4,302	4,299	5,044	5,548	5,594
Net Emissions	4,302	4,299	5,044	5,548	5,594
OSU Cascades					
Gross Emissions	559	541	800	968	1,295
Net Emissions	255	196	263	968	1,295
HMSC					
Gross Emissions	315	436	475	475	728
Net Emissions	315	436	475	475	728
OSU Comprehensive					
Gross Emissions	145,962	131,844	134,735	127,897	132,932
Net Emissions	106,569	57,808	126,794	126,576	131,966

Total FY14 gross and net emissions by source category are displayed in Table 4.

Table 4. FY14 OSU Comprehensive Emissions by Emissions Source						
Emissions Sources	FY14 Gross Emissions (t CO2e)	% of Gross Emissions	% Change in Gross Emissions from FY13	FY14 Net Emissions (t CO2e)	% of Net Emissions	% Change in Net Emissions from FY13
Purchased Electricity	50,112	37.7%	2.0%	50,110	38.0%	2.0%
Stationary Sources	4,331	3.3%	13.3%	4,331	3.3%	13.3%
Fleet & Maintenance	2,018	1.5%	4.7%	2,018	1.5%	4.7%
Agriculture	3,733	2.8%	36.4%	2,776	2.1%	56.0%
Solid Waste	(54)	0.0%	-2.2%	(54)	0.0%	-2.2%
Refrigerants	401	0.3%	0.0%	401	0.3%	0.0%
Student and Faculty/Staff Commute	7,081	5.3%	8.1%	7,081	5.4%	8.1%
Air Travel	15,888	12.0%	2.3%	15,888	12.0%	2.3%
Other Directly Financed Travel	2,063	1.6%	-5.8%	2,063	1.6%	-5.8%
Cogeneration	47,352	35.6%	4.5%	47,352	35.9%	4.5%
Total	132,925	100.0%	4.2%	131,966	100.0%	7.3%

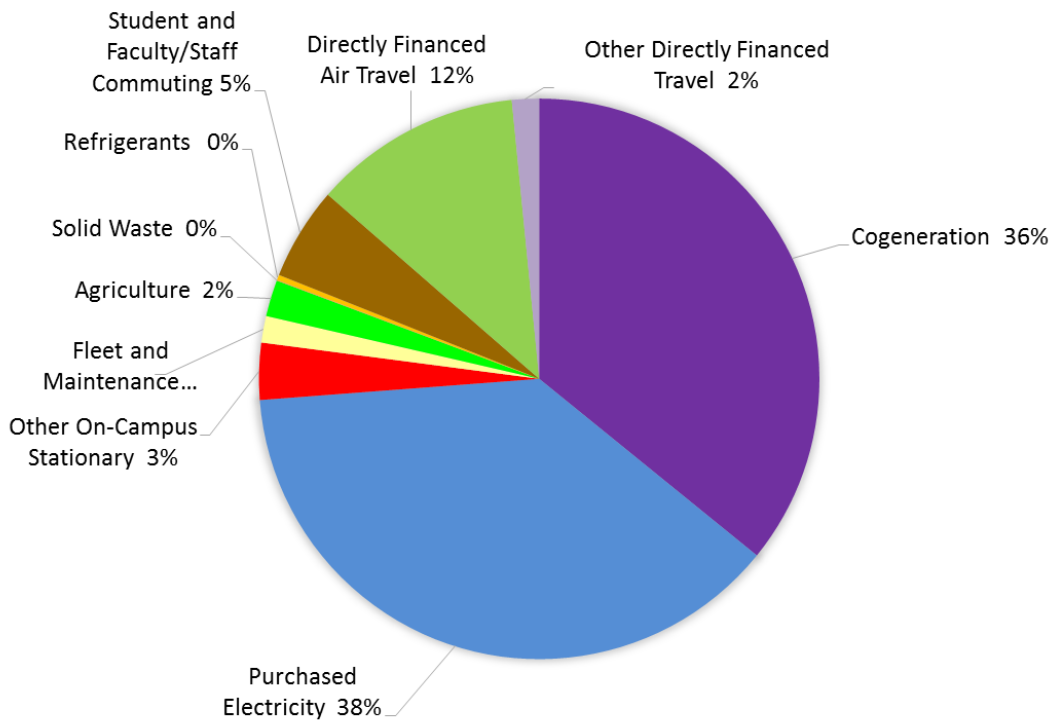
Changes in *net* emissions from the major emissions sources are shown in Table 5 below.

Table 5. FY14 OSU Comprehensive Net Emissions by Emissions Source			
Emissions Sources	FY14 Net Emissions (t CO2e)	% of Net Emissions	% Change in Net Emissions from FY13
Purchased Electricity	50,110	38.0%	25.4%
Stationary Sources	4,331	3.3%	13.3%
Fleet & Maintenance	2,018	1.5%	4.7%
Agriculture	2,776	2.0%	56.0%
Solid Waste	(54)	0.0%	-2.2%
Refrigerants	401	0.3%	0.0%
Student and Faculty/Staff Commute	7,081	5.4%	8.1%
Air Travel	15,888	12.0%	2.3%
Other Directly Financed Travel	2,063	1.6%	-5.8%
Cogeneration	47,352	35.9%	4.5%
Total Net	131,966	100.0%	4.1%

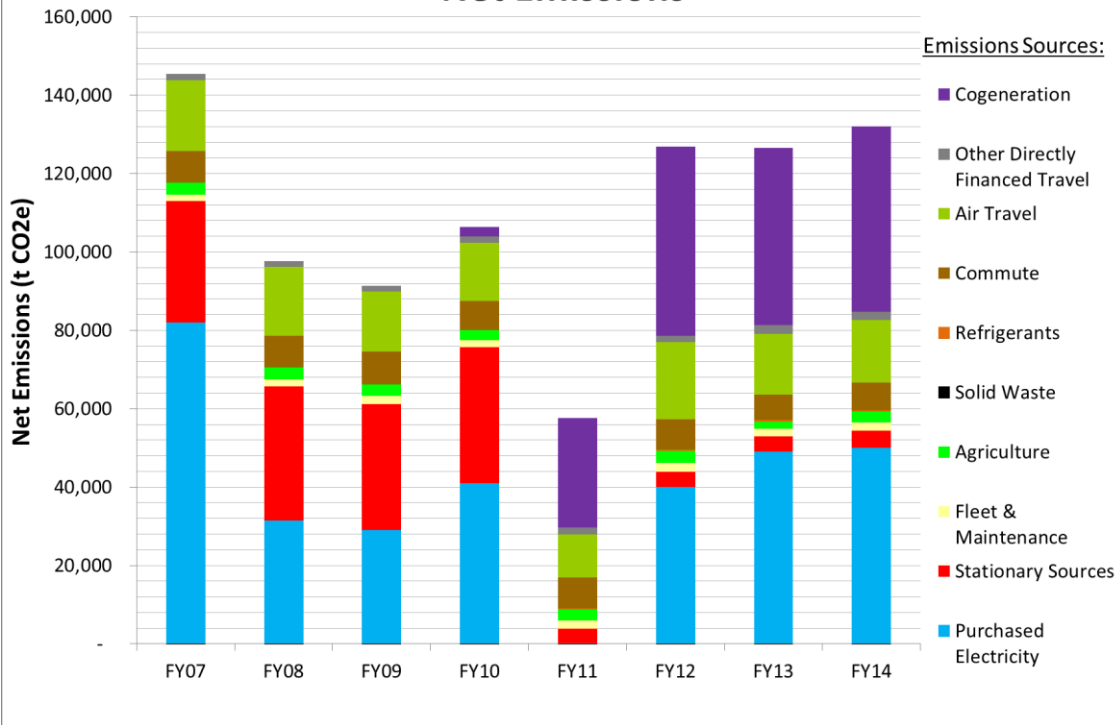
Potentially significant emissions sources not included:

- 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

FY14 OSU COMPREHENSIVE GREENHOUSE GAS NET EMISSIONS



OSU Comprehensive Greenhouse Gas Net Emissions



Changes since the FY13 Inventory

- Incineration of animal waste was added as a new emission source in FY14 for the Corvallis campus.
- 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.

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.

Table 6. OSU Offsets by Fiscal Year (t CO2e)					
Offset Type	FY10	FY11	FY12	FY13	FY14
Composting	529.8	529.8	149.1	957.3	956.7
Renewable Energy Certificates (RECs)	38,862.6	73,506.4	7,709.7	3.6	2.2

The following comparative data are drawn from the [ACUPCC Reporting System website](#).

Table 7. Comparison of OSU Emissions Metrics with Peer Universities									
	'14 OSU Comprehensive	'13 OSU Comprehensive	'12 OSU Comprehensive	'11 OSU Comprehensive	'14 Cornell University	'14 The Ohio State University	'13 Utah State	'13 UC Davis	'13 Washington State - Pullman
Net emissions per FTE enrolled (t CO2e)	5.3	4.9	5.5	3.0	10.7	13.2	4.4	6.7	8.1
Net emissions per 1000 square feet (t CO2e)	14.1	14.3	16.3	10.2	14.2	28.8	12.2	12.5	13.6

Analysis of Data and Results

Cogeneration:

Source data changes for FY14: Distillate oil is no longer used in cogeneration, except for tests.

Methodology changes for FY14: Natural gas consumption at the Energy Center was misreported in the FY13 Corvallis inventory. Total natural gas consumption not reported was 255,236 MMBtu, equivalent to 13,570.1 t CO2e.

Incineration:

Source data changes for FY14: Sources of emissions not included in past inventories include 5,475 lbs. of animal waste incinerated at the Research Animal Isolation Laboratory, equivalent to 1.5 t CO₂e.

Methodology changes for FY14: None.

Purchased Electricity:

Source data changes for FY14: Sources of emissions from electricity not included in past inventories were emissions from Oldfield Animal Teaching Facility and the new OSU Beaver Store. Additional to these buildings, they were eight construction projects that included: Asian & Pacific Cultural Center, Black Cultural Center, Learning Innovation Center, Samaritan Sports Medicine Institute, Washington Way Realignment, Student Experience Center, Strand Ag Remodel, and Goss Stadium.

Methodology changes for FY14: None.

Fleet and Maintenance:

Source data changes for FY14: None.

Methodology changes for FY14: None.

Uncertainty Analysis: Uncertainty in Fleet and Maintenance has been reduced from previous years. Some emissions sources may be double counted for the Corvallis campus and Corvallis area farm operations.

Fertilizers:

Source data changes for FY14: Fertilizer application reported in the FY13 Corvallis inventory only included Soap Creek and Berry Creek. It did **not** include fertilizer applied to Dairy Center, Horse Center, Poultry Center, Sheep Center, OSU Grounds, Recreational Sports Fields, and Peavy Field. For FY14, there was information available for these seven sites totaling 20,670 lbs. of 28% N synthetic fertilizer, equivalent to 24.3 t CO₂e.

Fertilizer application reported in the FY13 Statewides inventory only included Agricultural Experiment Station fields and Union Station and **not** fertilizer applied to Extension and Burns Station. For FY14, there was information available for these two sites totaling 190 lbs. of 61% N synthetic fertilizer, equivalent to 0.5 t CO₂e.

Methodology changes for FY14: None.

Refrigerants:

Source data changes for FY14: None. Due to data collection and tracking issues within Facilities Services, there have not been new refrigerant data since FY11.

Methodology changes for FY14: None.

Commute - Faculty/Staff:

Source data changes for FY14: None.

Methodology changes for FY14: Faculty/staff commute emissions reported in the FY14 Corvallis inventory, the FY14 HMSC inventory, and the FY14 OSU-Cascades inventory estimate emissions using FTE rather than headcount. This is consistent with new guidelines from the CCC calculator.

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

Commute - Students:

Source data changes for FY14: None.

Methodology changes for FY14: Student commute emissions reported in the FY14 Corvallis inventory and the FY14 OSU-Cascades inventory estimated emissions using FTE rather than headcount. This is consistent with the new guidelines from the CCC calculator.

Directly Financed Travel:

Source data changes for FY14: The Azumano Travel Agency miles flown was misreported in the FY13 Corvallis inventory. Total miles flown not reported in FY13 was 11,361,145 miles, equivalent to 5,774.5 t CO_{2e}.

Travel Reimbursement mileage was misreported in the FY13 Corvallis inventory. Total miles not included were 29,356, equivalent to 11.1 t CO_{2e}.

Methodology changes for FY14: None.

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

Solid Waste:

Source data changes for FY14: 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, salvage yard dropbox and incineration.

Methodology changes for FY14: 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 net 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 our [Climate Plan webpage](#).

Creating a 1990 Baseline

Creating an organizational baseline, or reference emissions level, is critical to goal-setting and tracking progress over time. Although detailed measurement like those 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 CO₂e 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 CO₂e.

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>Purchased Electricity (Scope 2)</p>	<p>OSU Corvallis purchased electricity usage for FY14 was 60,197,695 kWh.</p> <p>The 14 Agricultural Experiment Stations (AES) consumed 4,479,323 kWh.</p> <p>County Extension offices used 2,783,954 kWh.</p> <p>Hatfield Marine Science Center used 2,019,526 kWh.</p> <p>OSU-Cascades consumed 1,075,880 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 CCC 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 EPA eGrid data for the Northwest Power Pool (NWPP) utility grid mix.</p> <table border="1" data-bbox="483 932 854 1283"> <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>63.5%</td> </tr> <tr> <td>Natural Gas</td> <td>14.1%</td> </tr> <tr> <td>Hydro</td> <td>5.5%</td> </tr> <tr> <td>Wind</td> <td>7.8%</td> </tr> <tr> <td>Geothermal</td> <td>0.4%</td> </tr> <tr> <td>Biomass</td> <td>0.4%</td> </tr> <tr> <td>Other</td> <td>8.3%</td> </tr> </tbody> </table> <table border="1" data-bbox="898 919 1276 1339"> <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="756 1461 1107 1719"> <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>85.0%</td> </tr> <tr> <td>Nuclear</td> <td>10.0%</td> </tr> <tr> <td>Other</td> <td>5.0%</td> </tr> </tbody> </table> <p>Total FY14 purchased electricity usage for OSU: 70,556,377.98 kWh.</p>	Pacific Power Grid Mix		Fuel	% of total	Coal	63.5%	Natural Gas	14.1%	Hydro	5.5%	Wind	7.8%	Geothermal	0.4%	Biomass	0.4%	Other	8.3%	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	85.0%	Nuclear	10.0%	Other	5.0%
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<p>On-campus Cogeneration</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>																																																		

	As a cogeneration facility, the Energy Center consumed 8,905,970 therms of natural gas and 40,690 gallons of diesel in FY14. It produced 543,127,618 pounds of steam and 43,954,584.0 kWh of electricity.
Natural Gas (Scope 1)	<p>OSU Corvallis consumed 562,929 therms of natural gas in FY14 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 62,006 therms.</p> <p>The Extension Service county offices used a total of 68,056 therms.</p> <p>Hatfield Marine Science Center consumed 5,532.8 therms.</p> <p>Cascade campus used 27,662 therms.</p> <p>Total FY14 consumption of natural gas, excluding use at the Energy Center: 726,185.6 therms or 72,618.56 MMBtu</p>
Steam and Chilled water purchased	N/A – no steam or chilled water is purchased from non-OSU sources.
Residual oils (#5, #6) and Distillate oils (#1, #2, #3, #4) (Scope 1)	<p>OSU Corvallis used 48,221 gallons of distillate oil #2 (diesel) primarily at the Energy Center when natural gas supply was curtailed. Backup generators accounted for 7,531 gallons of the total and the Energy Center accounted for 40,690 gallons, though this figure may be incomplete. Further recordkeeping is necessary.</p> <p>Agricultural Experiment Stations used 4,540 gallons of diesel #2 for heating.</p> <p>Extension Service consumed 16,652 gallons of diesel #2.</p> <p>Total FY14 consumption of distillate oil #2 (diesel) for non-transportation uses was: 69,413 gallons</p>
Propane (Scope 1 & 3)	<p>Total documented propane use at OSU Corvallis was 12,574 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 14,437 gallons of propane for heating, forklifts and backup generators.</p> <p>The Extension Service used 6,046 gallons.</p> <p>Total FY14 consumption of propane: 33,057 gallons.</p>
Incinerated Waste	The Research Animal Isolation Lab (RAIL) reported 5,475 pounds of incinerator waste for FY14.
Coal	N/A – no coal is directly consumed by OSU.

<p>Solar / Wind / Biomass / Human Power</p>	<p>During FY14, three new ground mounted photovoltaic (PV) systems were installed on OSU properties around the state. These systems are in addition to Kelley Engineering Center, Salmon Disease Lab, Research Animal Isolation Lab, 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 from human power. The estimated FY14 output from all sites was 1,867,882 kWh. This amount was not applied to this inventory because the energy produced reduced the buildings' electricity use.</p>
<p>Data sources: 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

<p>Fleet and Maintenance (Scope 1)</p>	<p>Gasoline</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 FY14 was 158,912.8 gallons.</p> <p>OSU also received deliveries of 147.1 gallons of gasoline from Carson Oil. This fuel was primarily used in landscape equipment and vehicles.</p> <p>Hyslop farms received 3,095 gallons of gasoline in FY14. The fuel was primarily used in farm vehicles.</p> <p>Hatfield Marine Science Center used 28,850.5 gallons of gasoline for their fleet.</p> <p>Diesel</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 5,145 gallons.</p> <p>The shuttles used 4,537 gallons of diesel in FY13. Emissions for FY14 were reported based on 1,093 gallons although we suspect this number to be incorrect and are clarifying with the data source.</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 FY14 diesel consumption for HMSC was 15,896.5 gallons.</p> <p>Total gasoline in FY14: 192,250.4 gallons</p>
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	Total diesel used in mobile sources: 25,959.3 gallons.
Data sources: Justin Fleming, Motor Pool Manager; Delwin Loucks, First Student; Chelle Boswell, HSMC Office Specialist; Amber Sams, Credit Dept. Carson Oil	
Directly Financed Travel (Scope 3)	<p>In FY14, 3.1 million miles were reimbursed by Travel Reimbursement.</p> <p>Mileage reimbursed to accounts outside of TRES totaled 122,818 miles.</p> <p>OSU also contracts rental cars through Enterprise Rent-a-Car. Enterprise reported OSU accounts driving 1,641,797 miles in FY14.</p> <p>Mileage driven in non-contracted vendor rental vehicles totaled 348,689.13 miles in FY14. 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 \$1,460,913.79. Assuming this rate of \$4.49/mi is representative of all chartered bus travel, Athletics' chartered buses drove 325,371 miles in FY14.</p> <p>In FY14, a reported 5,199,444 car miles were directly financed by OSU.</p> <p>A total of 325,371 bus miles were financed by OSU.</p>
Data sources: Justin Fleming, Motor Pool Manager; Julie Stratton, Auxiliaries & 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.	
Commute (Scope 3)	<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>

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.

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.

Summer students were included in commute calculations for the first time in FY13.

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 FY14: 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	# of flight segments	% of total
Azumano	14,562	61.5%
Teel's	3,567	15.1%
Travel Reimbursement	5,548	23.4%
Total	23,677	100.0%

Azumano booked 19,787,831 miles for OSU.

$$\begin{array}{rcl}
 19,787,831 \text{ Azumano miles} & & \text{x total miles} \\
 14,562 \text{ Azumano flight segments} & = & 23,667 \text{ total flights segments} \\
 & & \\
 & \text{x} & = \text{32,160,321 total miles}
 \end{array}$$

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:

$$\text{Total OSU air mileage} = (1/0.95) * 32,160,321 = 33,852,970 \text{ miles}$$

	<p>In addition, non-TRES reimbursements accounted for 204,982 miles (based on reimbursement amounts). This brings total mileage to 34,057,952 miles.</p> <p>All air travel emissions were applied to the OSU Corvallis inventory due to lack of specific data for non-Corvallis sites.</p> <p>Assumptions: Travel booked through Azumano is representative of all OSU travel.</p> <p>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 2013 football schedule at http://www.osubeavers.com/ and Webflyer.com, an airport distance calculator, the calculated distance flown by chartered football jets was 4,974 miles.</p> <p>The European Environmental Agency¹ 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 CCC calculator, as it is not equipped to accurately calculate emissions resulting from a dedicated jet flight:</p> $\frac{11,608 \text{ kg fuel}}{2482 \text{ mi}} \times \frac{1 \text{ gal jet fuel}^2}{3.06 \text{ kg fuel}} \times \frac{21.095 \text{ lb CO}_2^2}{1 \text{ gal jet fuel}} \times \frac{1 \text{ t}}{2205 \text{ lbs}} = \frac{0.0146 \text{ t CO}_2}{\text{mi}}$ $\frac{0.0146 \text{ t CO}_2}{\text{mi}} \times 4,974 \text{ miles} = 72.62 \text{ t CO}_2 \times 2.8 \text{ RFI} = 203.34 \text{ t CO}_2\text{e}$ $203.34 \text{ t CO}_2\text{e} \times 0.90718474 \text{ MT} = 184.46 \text{ MT CO}_2\text{e}$ <p>Emissions resulting from chartered football air travel are reported under the Directly Financed Travel category.</p>
<p>Data sources: Brad Teel, President, Teel’s Travel Planners; Julie Stratton, Business Affairs; Margaret Taylor, Business Affairs. Webflyer.com; ¹ - European Environmental Agency Emission Inventory Guidebook http://www.eea.europa.eu/publications/EMEP/CORINAIR4; ² - Energy Information Agency http://www.eia.doe.gov/oiaf/1605/coefficients.html</p>	

Other Major Sources

<p>Solid Waste (Scope 3)</p>	<p>Total weight of solid waste sent to Coffin Butte Landfill in FY14: 5.1 million lbs. (2547.45 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>Data source: Pete Lepre, Campus Recycling Manager</p>	
<p>Animals and Agriculture</p>	<p>Animals</p>

(Scope 1)

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	250	-	-	1	-	251
Beef Cattle	15	265	553	1	360	1,149
Horses	17	-	2	15	3	37
Poultry	620	-	-	-	-	620
Sheep	110	-	-	-	-	110
Swine	10	-	-	-	-	10
Goats	19	-	-	-	-	19

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	150	100%
Union	8,400	46%
Corvallis grounds	1,850	21%
Soap and Berry Creek	44,000	43%
Ag. Exp. Stations	266,638	26%
Total	321,038	28%

Fertilizer application on OSU grounds 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.

Refrigerants (Scope 1)

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.

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

Data source: Greg Riutzel, Refrigeration Mechanic, Facilities Services

Offsets (green tags, RECs, composting etc.)

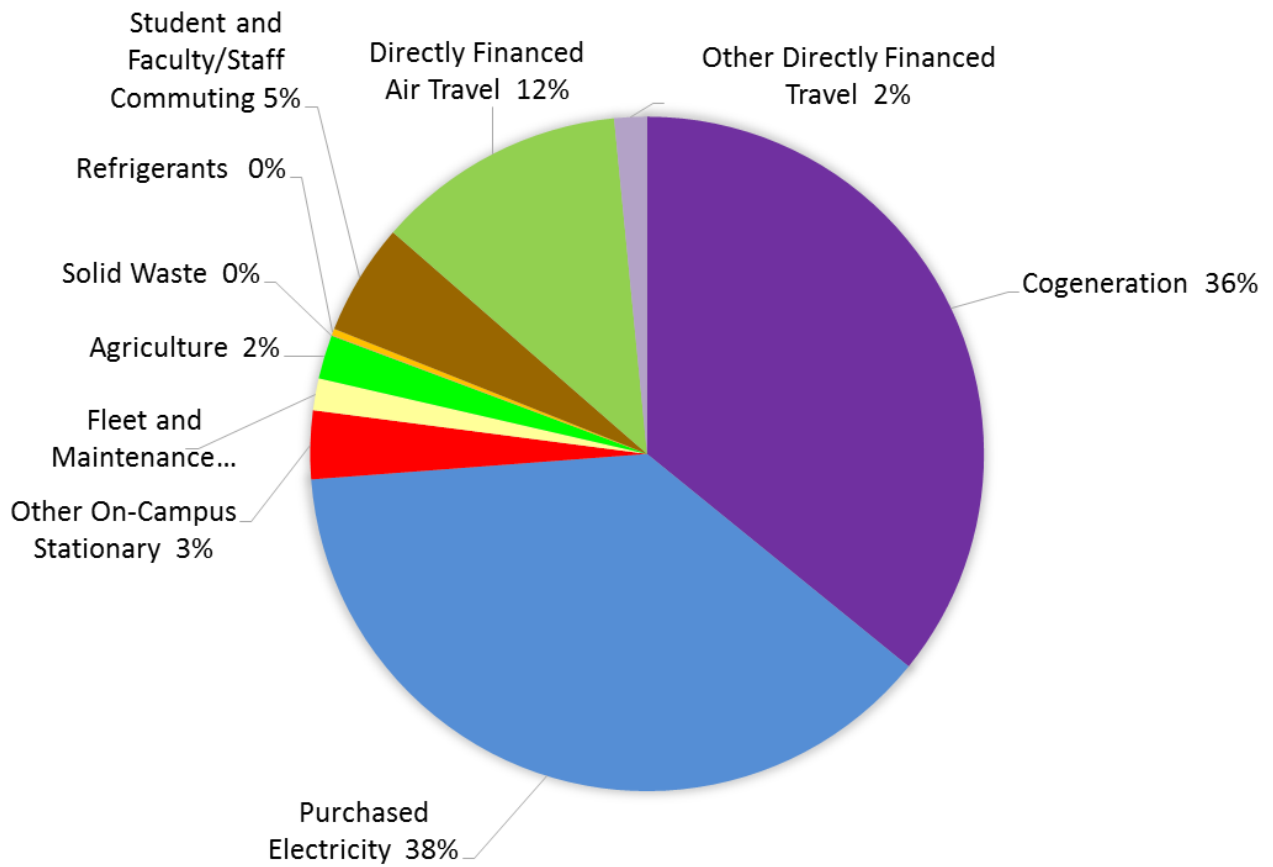
Renewable Energy Certificates (RECs)
 Total REC purchases for the OSU Corvallis campus were 3 MWh.

Total offsets for FY14: 3 MWh. Offsets with Additionality

Approximately 621.24 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.

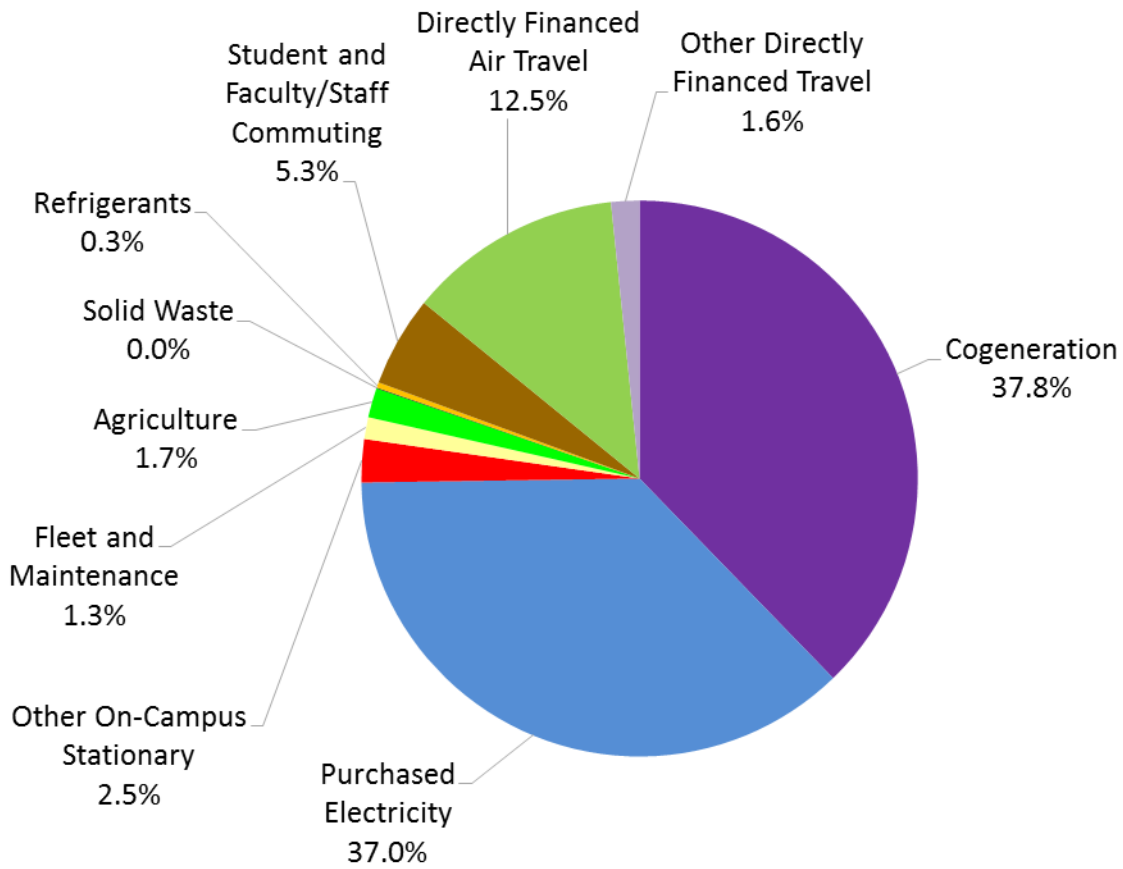
MODULE		Comprehensive FY14 Summary					
WORKSHEET		Overview of Annual Emissions					
UNIVERSITY		Oregon State University					
2014		Energy Consumption	CO ₂	CH ₄	N ₂ O	eCO ₂	% change from FY13
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Co-gen Electricity	353,065.4	18,718,643.5	1,673.1	35.4	18,771.0	1.4%
	Co-gen Steam	537,573.7	28,500,809.4	2,547.5	54.0	28,580.6	6.7%
	Other On-Campus Stationary	79,400.2	4,317,517.0	408.4	10.7	4,330.9	13.3%
	Direct Transportation	27,489.6	1,970,850.8	373.5	126.6	2,017.9	4.7%
	Refrigerants & Chemicals	-	-	-	-	401.1	0.0%
	Agriculture	-	-	123,260.9	1,197.6	3,733.2	36.4%
Scope 2	Purchased Electricity	612,299.6	46,639,695.9	5,162.9	699.5	46,969.7	-4.4%
Scope 3	Faculty / Staff Commuting	36,728.3	2,622,132.4	545.5	182.6	2,867.8	11.5%
	Student Commuting	57,470.7	4,109,735.0	825.2	277.6	4,213.1	10.9%
	Directly Financed Air Travel	80,127.6	15,627,279.0	154.9	178.1	15,887.8	2.3%
	Other Directly Financed Travel	28,144.2	2,011,860.8	407.2	136.8	2,062.8	-5.8%
	Solid Waste	-	-	(2,152.7)	-	(53.8)	-2.2%
	Scope 2 T&D Losses	40,943.4	3,120,018.8	343.7	46.9	3,142.6	2.1%
Offsets	Additional					(956.7)	-0.1%
						(2.2)	-37.1%
Totals	Scope 1	997,528.9	53,507,820.7	128,263.4	1,424.4	57,834.8	6.7%
	Scope 2	612,630.5	46,639,695.9	5,162.9	699.5	46,969.7	1.2%
	Scope 3	243,414.2	27,491,026.0	123.8	822.0	28,120.3	3.0%
	All Scopes	1,853,573.6	127,638,542.6	133,550.1	2,945.9	132,924.8	3.9%
	All Offsets					(958.9)	-0.2%
Net Emissions:						131,965.9	4.3%

FY14 OSU COMPREHENSIVE GREENHOUSE GAS EMISSIONS

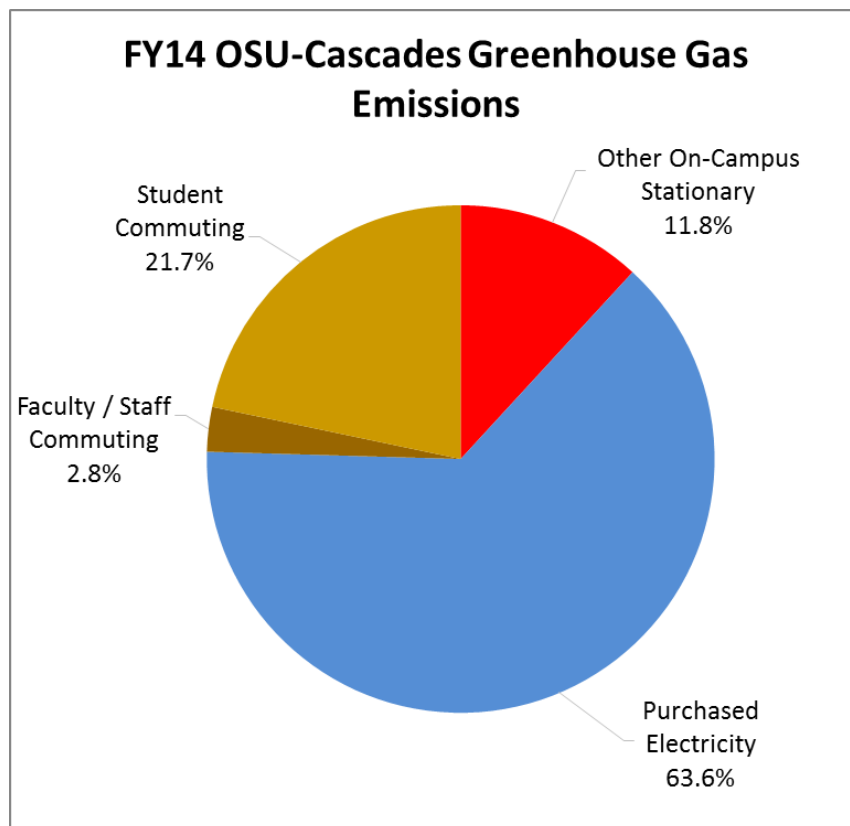


MODULE		Corvallis FY14 Summary					
WORKSHEET		Overview of Annual Emissions					
UNIVERSITY		Oregon State University					
2014		Energy Consumption	CO2	CH4	N2O	eCO2	% change
		MMBtu	kg	kg	kg	Metric Tonnes	from FY13
Scope 1	Co-gen Electricity	353,065.4	18,718,643.5	1,673.1	35.4	18,771.0	1.4%
	Co-gen Steam	537,573.7	28,500,809.4	2,547.5	54.0	28,580.6	6.7%
	Other On-Campus Stationary	58,401.7	3,127,571.1	286.8	6.5	3,136.7	9.8%
	Direct Transportation	21,699.9	1,551,996.9	310.6	104.5	1,590.9	-9.4%
	Refrigerants & Chemicals	-	-	-	-	401.1	134.2%
	Agriculture	-	-	75,740.7	885.4	2,157.4	98.5%
Scope 2	Purchased Electricity	547,604.3	43,033,828.4	5,001.7	626.3	43,338.0	1.3%
Scope 3	Faculty / Staff Commuting	36,247.2	2,587,698.0	538.7	180.4	2,654.9	4.7%
	Student Commuting	53,793.8	3,846,553.8	773.5	260.1	3,943.4	5.8%
	Directly Financed Air Travel	79,897.3	15,582,365.8	154.5	177.5	15,842.7	5.8%
	Other Directly Financed Travel	28,144.2	2,011,860.8	407.2	136.8	2,062.8	-5.8%
	Solid Waste	-	-	(2,152.7)	-	(53.8)	-2.2%
	Scope 2 T&D Losses	36,413.0	2,861,535.6	332.6	41.6	2,882.3	2.2%
Offsets	Additional					(956.7)	-0.1%
	Non-Additional					(2.2)	-38.3%
Totals	Scope 1	970,740.7	51,899,020.9	80,558.7	1,085.8	54,637.7	6.3%
	Scope 2	547,604.3	43,033,828.4	5,001.7	626.3	43,338.0	1.3%
	Scope 3	234,495.5	26,890,014.0	53.7	796.5	27,332.3	2.4%
	All Scopes	1,752,840.5	121,822,863.3	85,614.1	2,508.6	125,308.8	3.6%
	All Offsets					(958.9)	-86.6%
Net Emissions:						124,349.1	4.0%

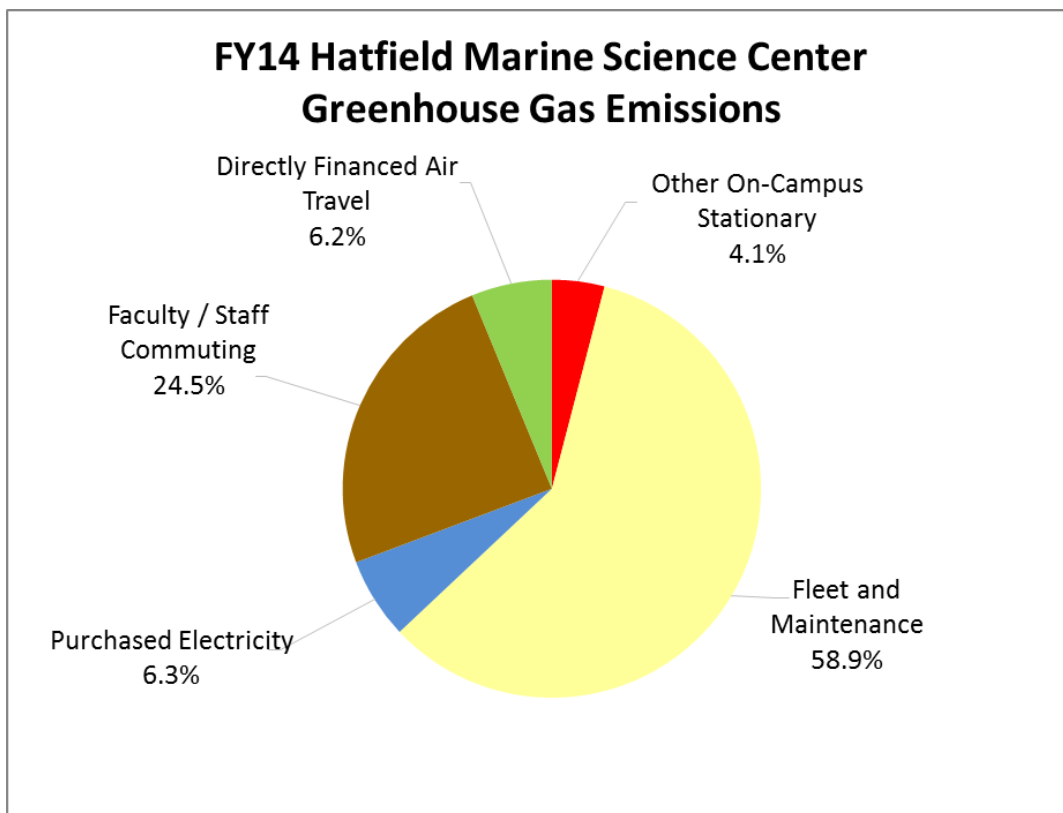
FY14 OSU-Corvallis Greenhouse Gas Emissions



MODULE		OSU Cascades FY14 Summary					
WORKSHEET		Overview of Annual Emissions					
UNIVERSITY		Oregon State University					
2014		Energy Consumption	CO2	CH4	N2O	eCO2	% change from FY13
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	2,766.2	146,663.9	13.1	0.3	147.1	57%
Scope 2	Purchased Electricity	10,020.1	784,775.9	89.5	11.9	790.5	10%
Scope 3	Faculty / Staff Commuting	481.1	34,434.4	6.8	2.3	35.3	0%
	Student Commuting	3,676.9	263,181.2	51.8	17.5	269.7	270%
	Scope 2 T&D Losses	660.0	51,693.8	5.9	0.8	52.1	10%
Totals	Scope 1	2,766.2	146,663.9	13.1	0.3	147.1	57%
	Scope 2	10,020.1	784,775.9	89.5	11.9	790.5	10%
	Scope 3	4,818.0	349,309.4	64.4	20.5	357.0	130%
	All Scopes	17,604.3	1,280,749.2	167.0	32.7	1,294.7	34%
Net Emissions:						1,294.7	33.7%



MODULE		HMSC FY14 Summary					
WORKSHEET		Overview of Annual Emissions					
UNIVERSITY		Oregon State University					
2014		Energy Consumption	CO2	CH4	N2O	eCO2	% change from FY13
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	553.3	29,334.9	2.6	0.1	29.4	17.2%
	Direct Transportation	5,789.7	418,853.9	62.8	22.1	427.0	149.3%
Scope 2	Purchased Electricity	22,286.0	45,155.4	0.9	1.3	45.6	0.6%
Scope 3	Faculty / Staff Commuting	-	-	-	-	177.6	0.0%
	Directly Financed Air Travel	230.3	44,913.2	0.4	0.5	45.1	-73.7%
	Scope 2 T&D Losses	1,468.0	2,974.4	0.1	0.1	3.0	0.0%
Totals	Scope 1	6,343.0	448,188.8	65.5	22.1	456.4	132.4%
	Scope 2	22,286.0	45,155.4	0.9	1.3	45.6	0.6%
	Scope 3	1,698.3	47,887.6	0.5	0.6	225.7	-3.3%
	All Scopes	30,327.3	541,231.8	66.8	24.0	727.7	53.1%
Net Emissions:						727.7	53.1%



MODULE		Statewides FY14 Summary					
WORKSHEET		Overview of Annual Emissions					
UNIVERSITY		Oregon State University					
2014		Energy Consumption	CO2	CH4	N2O	eCO2	% change from FY13
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	17,679.0	1,013,947.1	105.9	3.9	1,017.8	20.0%
	Agriculture	-	-	47,520.2	312.3	1,575.8	-4.5%
Scope 2	Purchased Electricity	32,720.1	2,775,936.3	70.9	60.1	2,795.6	-1.6%
Scope 3	Scope 2 T&D Losses	2,402.4	203,815.0	5.2	4.4	205.3	-1.6%
Totals	Scope 1	17,679.0	1,013,947.1	47,626.1	316.2	2,593.6	3.8%
	Scope 2	32,720.1	2,775,936.3	70.9	60.1	2,795.6	-1.6%
	Scope 3	2,402.4	203,815.0	5.2	4.4	205.3	-1.6%
	All Scopes	52,801.5	3,993,698.4	47,702.2	380.7	5,594.5	0.8%
Net Emissions:						5,594.5	0.8%

