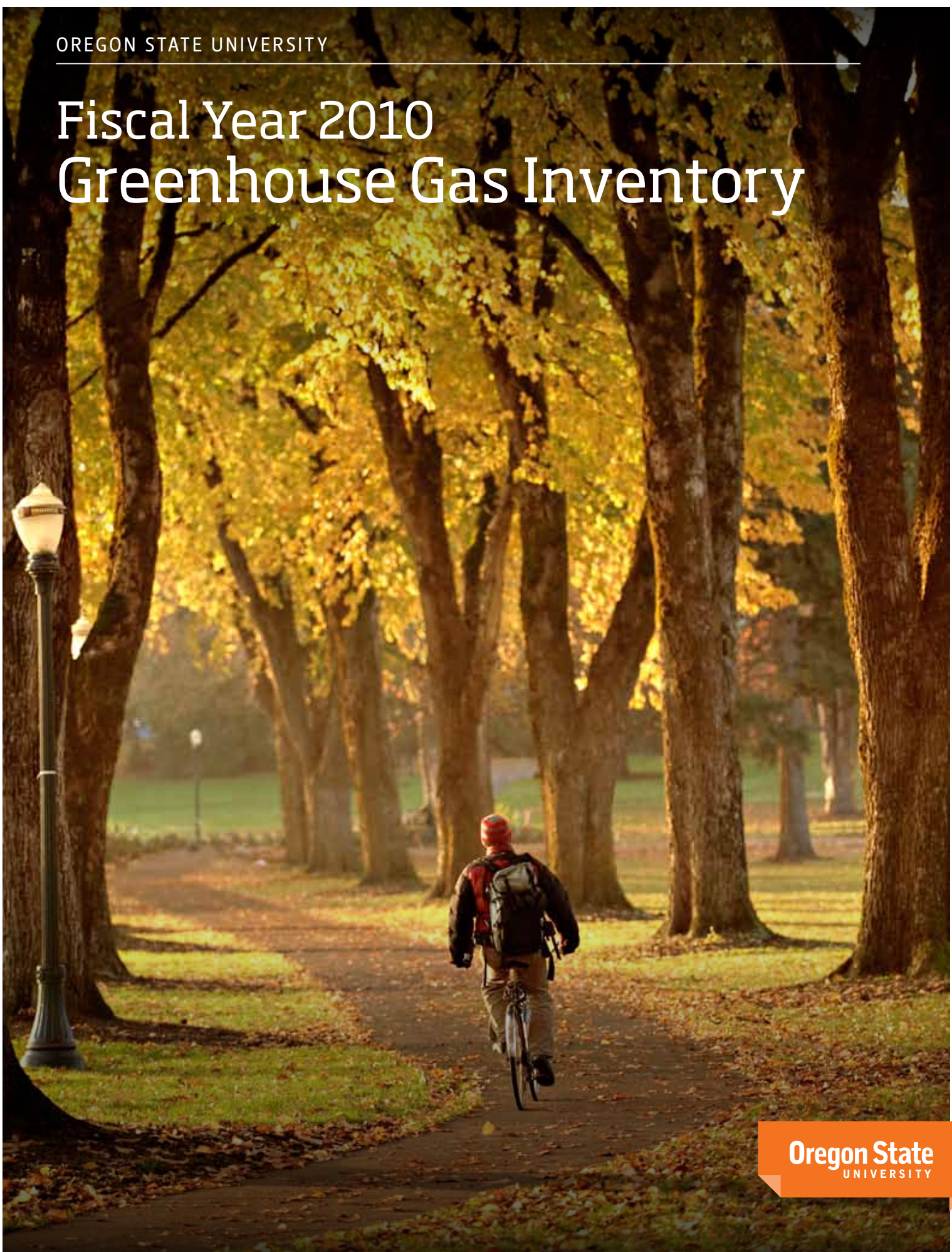


OREGON STATE UNIVERSITY

Fiscal Year 2010 Greenhouse Gas Inventory



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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 the 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 (1,000 kilograms) or 2,204.62 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 statewides, 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 nonprofit which 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. Instead, it 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, nonprofit 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: deq.state.or.us

Bonneville Environmental Foundation: greentagsusa.org

World Business Council for Sustainable Development: wbcsd.org

Greenhouse Gas Protocol: ghgprotocol.org

Intergovernmental Panel on Climate Change: ipcc.ch

Clean Air-Cool Planet: cleanair-coolplanet.org

American College and University Presidents Climate Commitment:

presidentsclimatecommitment.org

Executive Summary

Oregon State University (OSU) continues to demonstrate regional leadership and receive national attention for sustainability-related activities and initiatives. Part of the basis for this recognition is OSU President Ed Ray’s April 2007 signing of the American College and University Presidents Climate Commitment (ACUPCC). In part, the Climate Commitment requires inventorying greenhouse gasses every two years (OSU performs them annually). For Fiscal Year 2010 (FY10), the OSU Greenhouse Gas (GHG) Inventory Report is an update and expansion of the **FY09, FY08** and **FY07** OSU GHG inventories, which themselves are expansions of a **CY04 inventory** commissioned by the Oregon University System.

The FY10 inventory provides:

1. A snapshot of OSU emissions: quantified greenhouse gas emissions resulting from OSU-related activities for the fiscal year ending June 30, 2010.
2. Comparison with prior OSU inventories: a comparative analysis with FY07, FY08 and FY09 emissions.
3. Guidance for future inventories: the methodology, successes, challenges and rationale of this expanded report provide a framework for future OSU reports.

Findings in Brief

- Total **gross** emissions of 151,599 metric tonnes (t) of carbon dioxide equivalent (CO₂e), a **2.2 percent increase** from FY09.
 - » This increase was mainly due to increases in electricity and natural gas consumption.
- Net emissions per full-time equivalent (FTE) student of 5.7 t CO₂e, a **6.0 percent increase** from FY09.
- Net emissions per 1,000 square foot of 16.1 t CO₂e, a **14.1 percent increase** from FY09.
- Net emissions of 113,336 t CO₂e, a **14.4 percent increase** from FY09.
 - » This increase was largely due to a reduction in renewable energy certificates purchased with student fees, after direction from students to move toward developing local renewable energy sources.

Table 1. OSU Comprehensive Emissions by Scope (t CO ₂ e)				
	FY07	FY08	FY09	FY10
Scope 1				
Gross emissions	37,143	39,131	37,572	38,507
Net emissions	37,143	39,131	37,572	38,507
Scope 2				
Gross emissions	74,173	76,439	70,711	73,696
Net emissions	73,167	23,514	21,526	35,566
Scope 3				
Gross emissions	34,305	34,455	33,176	32,284
Net emissions	34,303	34,449	33,170	32,152
Total				
Gross emissions	152,957	157,408	148,274	151,599
Net emissions	151,949	104,477	99,084	113,336

Table 1 shows the total gross and net emissions by scope for the FY07, FY08, FY09 and FY10 inventories.

- Scope 1 emissions are mainly from fossil fuel combustion, refrigerants and agriculture; Scope 2 emissions are from purchased electricity; Scope 3 emissions includes air travel, other university-financed travel (personal mileage reimbursement, athletics bus travel, etc.), commute, solid waste and line losses due to the transmission and generation of electricity.
 - » OSU is only responsible for mitigation of emissions from scope 1 and 2, as well as emissions from commute and air travel.
- Net emissions of 100,876 t CO₂e that OSU is required to mitigate by the ACUPCC.
- Gross emissions from operations in Corvallis represent 96.5 percent of total university emissions.

Table 2. FY10 OSU Comprehensive Net Emissions by Emissions Source			
Emissions Source	FY10 Net Emissions (t CO ₂ e)	% of Net Emissions	% Change in Net Emissions from FY09
Purchased Electricity	42,854	37.8%	50.3%
Stationary Sources	31,088	27.4%	-3.8%
Fleet & Maintenance	1,830	1.6%	-11.9%
Agriculture	2,299	2.0%	-4.4%
Solid Waste	623	0.5%	-0.7%
Refrigerants	689	0.6%	-8.8%
Commute	8,154	7.2%	-7.8%
Air Travel	21,250	18.7%	-1.9%
Other Directly Financed Travel	2,079	1.8%	10.8%
Cogeneration	2,470	2.2%	N/A
Total	113,336	100%	14.4%

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

Potentially significant emissions sources not included are:

- Long-distance student travel, including study abroad travel
- Lifecycle/embodied emissions
- Transportation and processing of materials to be recycled
- Water treatment and distribution
- Solid waste and fleet emissions for Statewides, HMSC and OSU-Cascades
- Some OSU Athletics team travel

Changes since the FY09 Inventory

Emissions sources included for the first time in FY10 are:

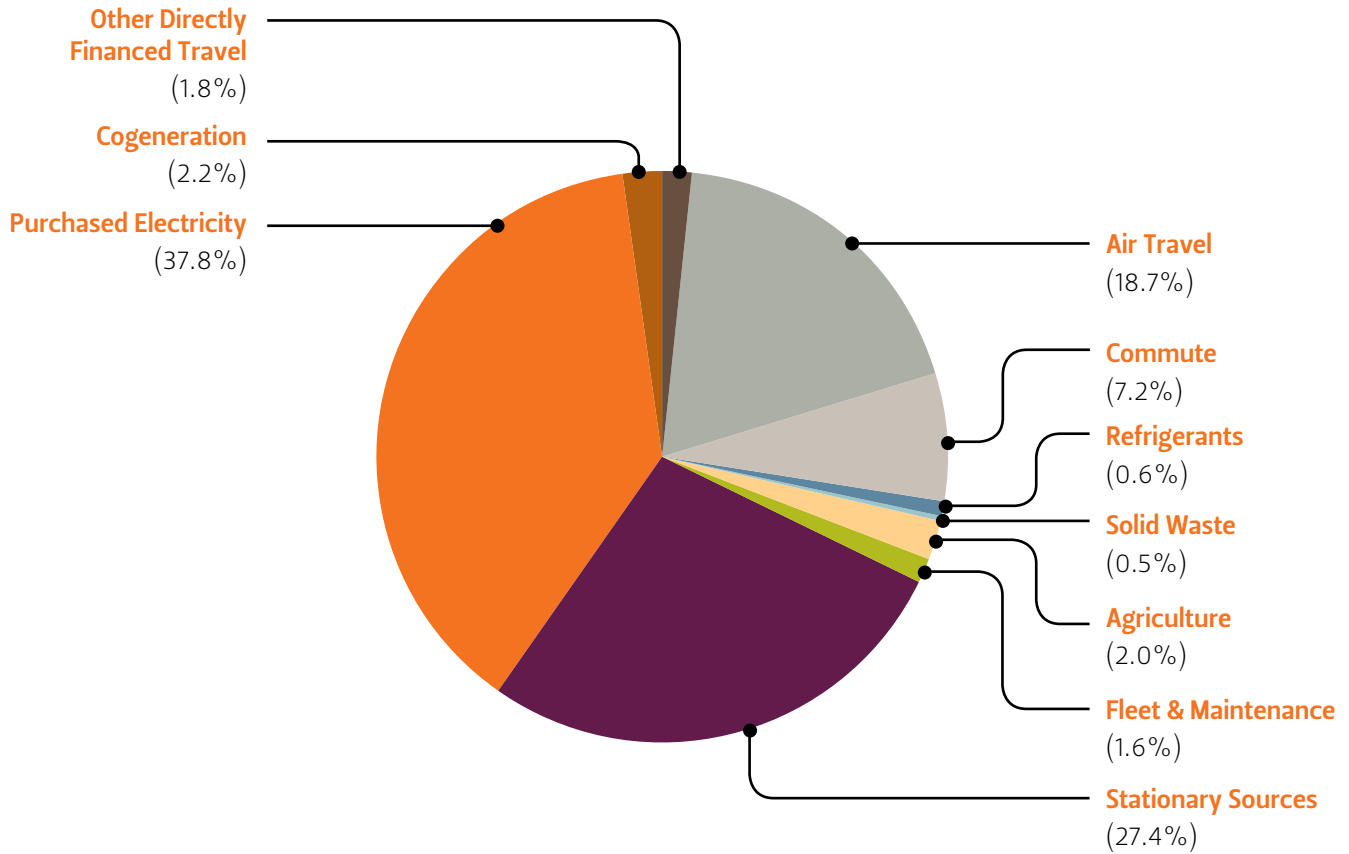
- OSU Energy Center
- Non-contract car rental
- Non- Travel Reimbursement Entry System (TRES) reimbursed travel
- Diesel purchased on OSU Voyager card
- Electricity and natural gas consumption in Newberry Hall at OSU-Cascades

Calculations/methodology changes since FY09:

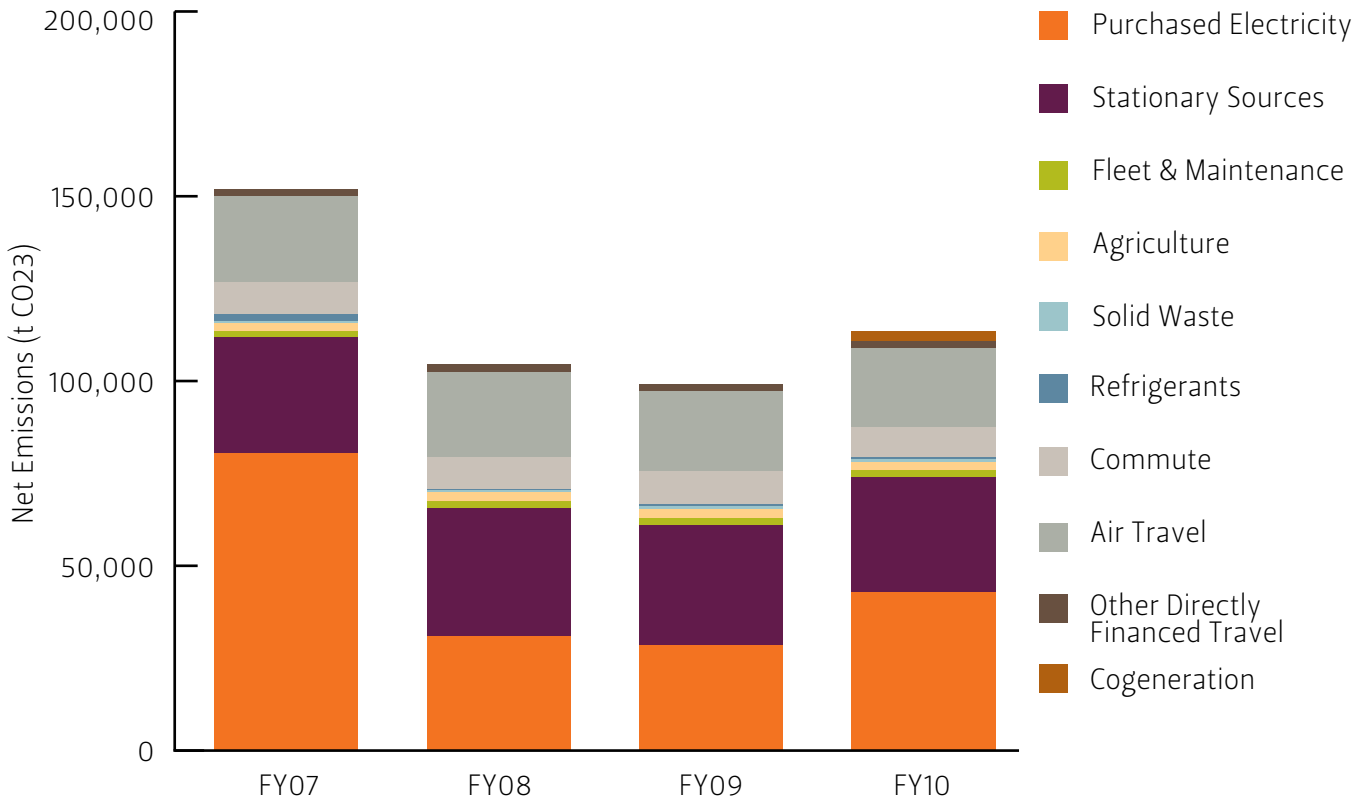
- Revision of air mileage calculations.

See the [Analysis of Data and Results](#) section for more details regarding these sources and improvements.

FY10 OSU Comprehensive Greenhouse Gas Emissions



Comparison of Annual OSU Comprehensive Greenhouse Gas Net Emissions



Introduction

Oregon State University's fourth-annual comprehensive greenhouse gas inventory again reflects a continual improvement of data collection methods and analyses. This report contains fewer changes relative to the previous annual report issued for Fiscal Year 2009. Although not reflected in this shorter report, more than ever, constructing an inventory with this level of detail is 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 FY09 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 state and national issue. OSU's inventory processes exceeds with a comfortable margin the strictest reporting requirements. Feedback is appreciated on this document and the processes used to create it. Please visit 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 FY10 inventory was data collection. Extensive data was 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 FY10 due to its focus on university and college campuses, ease of comparison with the FY07, FY08 and FY09 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 — such as 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.

FY10 essentially mirrors the methodology and reporting structure of FY09; 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 FY10 inventory is the ability to compare with previous inventories. Data presented in this report reflect changes in emissions between FY09 and FY10 using the highest quality data and best calculation practices available. In an effort to present the highest-quality data using the latest calculation methods, past, current and future inventories may not be absolutely comparable for all source categories. 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 Presidents' Climate Commitment 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 percent to total emissions, the source is considered significant; those that are expected to contribute less than 1 percent are considered negligible and not included in this analysis.

The list of omitted sources is shown in Table 3:

Table 3. Omitted Sources	
Omitted Source	Expected Impact
Water treatment and distribution	Significant
Long-distance student travel (travel abroad, to/from home)	Significant
Additional biological sequestration	Significant
Lifecycle/embodyed emissions*	Significant
Off-campus vehicle use and solid waste	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 OSU's emissions from the purchase of goods and services were estimated at nearly 85,000 t CO₂e, or more than 56 percent of gross FY09 emissions.

Findings and Analysis

Findings in Brief

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

Table 4. Emissions by Inventory (t CO2e)					
		FY07	FY08	FY09	FY10
OSU Corvallis	Gross emissions	149,367	151,515	142,660	146,313
	Net emissions	148,359	98,761	93,789	108,313
Statewides	Gross emissions	3,590	4,862	4,532	4,349
	Net emissions	3,590	4,862	4,532	4,349
OSU Cascades	Gross emissions	N/A	583	646	623
	Net emissions	N/A	583	326	291
HMSC	Gross emissions	N/A	449	436	314
	Net emissions	N/A	449	436	314
OSU Comprehensive	Gross emissions	152,957	157,408	148,274	151,599
	Net emissions	151,949	104,477	99,084	113,336

Total FY10 gross and net emissions are displayed in Table 5.

Table 5. FY10 OSU Comprehensive Emissions by Emissions Source						
Emissions Source	FY10 Gross Emissions (t CO2e)	% of Gross Emissions	% Change in Gross Emissions from FY09	FY10 Net Emissions (t CO2e)	% of Net Emissions	% Change in Net Emissions from FY09
Purchased Electricity	80,985	53.4%	4.2%	42,854	37.8%	50.3%
Stationary Sources	31,088	20.5%	-3.8%	31,088	27.4%	-3.8%
Fleet & Maintenance	1,830	1.2%	-11.9%	1,830	1.6%	-11.9%
Agriculture	2,431	1.6%	0.9%	2,299	2.0%	-4.4%
Solid Waste	623	0.4%	-0.7%	623	0.5%	-0.7%
Refrigerants	689	0.5%	-8.8%	689	0.6%	-8.8%
Commute	8,154	5.4%	-7.8%	8,154	7.2%	-7.8%
Air Travel	21,250	14.0%	-1.9%	21,250	18.7%	-1.9%
Other Directly Financed Travel	2,079	1.4%	10.8%	2,079	1.8%	10.8%
Cogeneration	2,470	1.6%	N/A	2,470	2.2%	N/A
Total	151,599	100.0%	2.2%	113,336	100.0%	14.4%

Table 6 details offsets related to composting activities and student-fee funded purchase of renewable energy certificates (RECs). The approximate composition of these RECs was 40 percent wind, 40 percent biogas and 20 percent biomass; these averages fluctuate because of weather, market forces and varying load conditions.

Table 6. OSU Offsets by Fiscal Year (t CO2e)				
Offset Type	FY07	FY08	FY09	FY10
Composting	1.9	5.8	5.8	132.4
Renewable energy certificates (RECs)	1,006.2	52,925.3	49,184.9	38,130.5

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		
	Net emissions per FTE enrolled (t CO2e)	Net emissions per 1000 square feet (t CO2e)
'10 OSU Comprehensive	5.7	16.1
'09 OSU Comprehensive	5.4	14
'08 OSU Comprehensive	5.8	14.9
'07 OSU Expanded	8.5	21.6
'10 Cornell University	10.9	15
'08 Cornell University	15.6	20.7
'09 The Ohio State University	12.3	29.3
'08 The Ohio State University	12.2	29.2
'09 Utah State	6.8	18.5
'08 Utah State	7	19.1
'09 UC Davis	9.4	17.6
'07 UC Davis	9.7	19.4
'07 Washington	5.9	12.3

Analysis of Data and Results

Air Travel:

New sources for FY10: None.

Methodology changes since FY09: It was determined that the methodology used to calculate reimbursed air segments drastically undercounted these segments. For FY09, total segments were actually 2,374 instead of the reported 1,434. Actual emissions for FY09 were 884.4 t CO2e higher than reported in the FY09 inventory.

Uncertainty Analysis: In addition to data issues highlighted above, there is significant uncertainty for the calculation of emissions from air travel, due mostly to the unknown effects of emissions at altitude (represented by the Radiative Forcing Index). The RFI of 2.8 used by the CA-CP calculator is **supported by an IPCC report on Aviation and Global Atmosphere**. Compared to other air emissions calculators, CA-CP estimates are at the high end of the range. Depending on future refinement of calculation methodology, it is possible that OSU emissions from air travel will show modest additional decreases.

Commute – Student:

New sources for FY10: None.

Methodology changes since FY09: As a result of a fall 2010 campus-wide transportation survey, transportation mode split data was updated for the FY10 inventory, replacing data from 2003. Mode split describes the percentage of commuters using various transportation methods and includes carpool/vanpool, public transit (bus), bike, pedestrian and single-occupancy vehicle. The new mode split data show increases in bicycle and transit use, and decreases in walking, carpooling and driving a single-occupancy vehicle.

Uncertainty Analysis: For an in-depth analysis on the uncertainty relating to student commuting, see page 21 of the **FY09 report**.

Commute – Faculty/Staff:

New sources for FY10: None.

Methodology changes since FY09: As a result of the fall 2010 campus-wide transportation survey mentioned above in the **Commute – Student** section, mode split data were also updated for faculty and staff.

The methodology used to determine the number of days that faculty and staff commute to campus was changed for the FY10 inventory, reflecting a desire to more accurately account for fluctuations in staffing levels and other variables such as employee furlough days. In past inventories, a static number of 235 commuting days was used. For the FY10 inventory, the number of commuting days was 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 230 working days for classified staff and 237 for faculty.

In the FY09 inventory, faculty and staff commuters from the OSU-Cascades Campus were accidentally double counted. Institutional Research provides FTE data for faculty and staff, but it was not understood that these data included the OSU-Cascades and HMSC campuses. The FTE data from Institutional Research is used to calculate commute emissions for the Corvallis campus, while OSU-Cascades- and HMSC-specific commute emissions are calculated using commute data from those campuses. To prevent double counting in this inventory, the OSU-Cascades faculty and staff numbers provided by OSU-Cascades staff will be subtracted from the Institutional Research faculty & staff total, allowing for both sites' commuting data to be correct.

Uncertainty Analysis: For an in-depth analysis on the uncertainty relating to faculty/staff commuting, see page 22 of the **FY09 report**.

Directly Financed Travel (excluding Air Travel):

New sources for FY10: Sources of emissions from ground travel financed by the institution not included in past inventories were:

- Personal mileage reimbursements and car rentals external to TRES.
- Car rentals from companies other than the contracted car rental vendor (Enterprise Rent-A-Car).

These sources added a total of 259,880 miles. Emissions from these new sources are estimated at 120 t of CO₂e, or approximately 0.08 percent of total OSU emissions. Total mileage and the associated emissions from rental cars were calculated using a miles driven per dollar spent metric provided by Enterprise Rent-A-Car and expenditures from Business Affairs.

Methodology changes since FY09: None.

Uncertainty analysis: By including these new sources, uncertainty in this category has been significantly reduced. Some minor emissions sources still go unreported, but their impact is estimated to be less than 5 percent of the category total.

Electricity:

New sources for FY10: Sources of emissions from electricity not included in past inventories were emissions from Newberry Hall, a leased space occupied by OSU-Cascades. Total electricity use for this new source for FY10 was 38,022 kwh. Emissions are estimated at 31 t CO₂e.

Methodology changes since FY09: Electricity consumption at Ship Operations at Hatfield Marine Science Center was not properly included in the FY09 inventory. Total electricity consumption not reported was 277,248 kWh. As a result, reported emissions for FY09 were 204 t CO₂e lower than actual.

For the FY09 inventory, emissions resulting from electricity generation for Hatfield Marine Science Center were based on a grid mix (the percent of electricity derived from coal, natural gas, nuclear, renewables, etc.) for Pacific Power. Upon further investigation, it was determined that the grid mix for Central Lincoln People's Utility District (the utility that serves HMSC) was significantly different than the grid mix of Pacific Power. Reported emissions from electricity generation for HMSC in FY09 were 1,606 t CO₂e. Using the corrected grid mix values, emissions for HMSC in FY09 are 51 t CO₂e.

Uncertainty Analysis: For an in-depth analysis on the uncertainty relating to electricity, see page 23 of the **FY09 report**.

Fertilizer:

New sources for FY10: None.

Methodology changes since FY09: Fertilizer application reported in the FY09 Statewides inventory only included fertilizer applied to Agricultural Experiment Station fields and not fertilizer applied to Burns and Union stations' land. Total fertilizer applied, but not reported was 26,000 lbs of 45 percent N synthetic fertilizer. As a result, reported emissions for FY09 were 87 t CO₂e lower than actual.

Uncertainty analysis: There are still a number of known fertilizer sources that were not included in the FY10 inventory. Together with unknown sources, emissions resulting from fertilizer application could increase by up to 20 percent.

Fleet:

New sources for FY10: Sources of fleet emissions not counted in past inventories were diesel fuel purchased on Motor Pool issued Voyager Cards. Total purchases equaled 3,036 gallons of diesel. Emissions from this new source are estimated at 31 t of CO₂e, or approximately 0.02 percent of total OSU emissions.

Methodology changes since FY09: None.

Uncertainty Analysis: A number of sources of Fleet emissions, mostly from the Statewides, are uncounted. Emissions from these sources could increase emissions from the OSU fleet by 10 to 15 percent.

Stationary Sources:

New sources for FY10: Sources of emissions from stationary sources not included in past inventories were:

- The Energy Center, a cogeneration (electricity and steam) facility brought online in July 2009.
- Newberry Hall, a leased space occupied by OSU-Cascades.

These sources added a total of 470,185 therms of natural gas. Emissions from these new sources are estimated at 2,488 t of CO₂e, or approximately 1.6 percent of total OSU emissions.

Methodology changes since FY09: None.

Uncertainty Analysis: For an in-depth analysis on the uncertainty relating to propane, see page 24 of the **FY09 report**.

Solid Waste:

New sources for FY10: None.

Methodology changes since FY09: Due to data unavailability, solid waste data from FY09 was used for the FY10 inventory.

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 to 15 percent higher than reported here.

Offsets – Additional:

New sources for FY10: Sources of additional offsets not included in past inventories were:

- Dining center food waste.
- Woody debris collected from OSU grounds by Facilities Services.
- Animal bedding from the College of Veterinary Medicine.
- Scrap wood composted by Allied Waste.

These sources added a total of 342 tons of material that was composted and not sent to the landfill. Offsets from these new sources are estimated at 132 t of CO₂e.

Methodology changes since FY09: None

Uncertainty Analysis: Since no solid waste information was collected for any other entity besides OSU Corvallis, mainly due to data availability issues, this offset source could increase as information becomes available. It is likely that actual offsets from additional sources are 10 to 15 percent higher than reported here.

Offsets – Non-Additional:

New sources for FY10: None.

Methodology changes since FY09: Renewable energy purchases reported in the FY09 inventory attributed the 403,100 kWh of renewable energy certificates purchased by OSU-Cascades to the Corvallis campus inventory. Actual emissions from OSU-Cascades were 326 t CO₂e for FY09. This error did not affect the comprehensive emissions total for OSU.

Uncertainty Analysis: It is not known if other campus units have made purchases of renewable energy, though it is thought that most purchases would be insignificant relative to OSU's total electricity consumption. It is possible that actual offsets from non-additional sources are no more than 1 percent 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 and OSU-Cascades campuses; gasoline and diesel fleet; Enterprise rental car mileage; and animal information for Veterinary Medicine.

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, Agricultural Experiment Stations, the Forest Research Laboratory, OSU-Cascades and Hatfield Marine Science Center; backup generator fuel consumption; propane use; fertilizer use; and solid waste.

Future Action

OSU Climate Plan

As awareness and demand for action around global climate change continues to grow, requests and requirements will 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. Intermediate goals consist of halting the growth of emissions by FY10, reducing FY12 net emissions to 10 percent below 1990 levels, and reducing FY20 net emissions to 75 percent below 1990 levels. 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 speaks to applying a combination of 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 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. Emissions coefficients for 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 comprised nearly 50 percent of OSU's gross emissions during the past three inventories.
- The rate of consumption of natural gas and other heating fuels has closely mirrored the increase in electricity consumption. Also, together these sources account for nearly 75 percent 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 campuses. 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</p> <p>(Scope 2)</p>	<p>Corvallis campus electricity usage for FY 2010 was 95,345,688 kWh.</p> <p>The 14 Agricultural Experiment Stations (AES) consumed 4,369,017 kWh.</p> <p>County Extension offices used 1,621,280 kWh.</p> <p>The Forest Research Lab at Peavy Arboretum used 75,007 kWh.</p> <p>Hatfield Marine Science Center used 1,971,623 kWh.</p> <p>OSU-Cascades used 446,662 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 grid mix was entered and used for the Corvallis campus and OSU-Cascades:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="background-color: #f4a460;">Pacific Power Grid Mix</th> </tr> <tr> <th style="text-align: center;">Fuel</th> <th style="text-align: center;">% of total</th> </tr> </thead> <tbody> <tr> <td>Coal</td> <td style="text-align: center;">67.5%</td> </tr> <tr> <td>Natural Gas</td> <td style="text-align: center;">17.6%</td> </tr> <tr> <td>Hydro</td> <td style="text-align: center;">10.0%</td> </tr> <tr> <td>Wind</td> <td style="text-align: center;">2.9%</td> </tr> <tr> <td>Biomass</td> <td style="text-align: center;">1.3%</td> </tr> <tr> <td>Other</td> <td style="text-align: center;">0.8%</td> </tr> </tbody> </table>	Pacific Power Grid Mix		Fuel	% of total	Coal	67.5%	Natural Gas	17.6%	Hydro	10.0%	Wind	2.9%	Biomass	1.3%	Other	0.8%
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The Statewides inventory used the Pacific Northwest regional grid mix; the Statewides use a number of different utilities, each with a different grid mix. The regional mix is the best way to account for this diversity. Using data provided by the Bonneville Power Administration and the EPA eGRID, the following grid mix for the Central Lincoln People's Utility District, the electricity utility for HMSC, was determined:

Central Lincoln PUD Grid Mix	
Fuel	% of total
Coal	2.0%
Natural Gas	0.9%
Hydro	86.3%
Wind	0.9%
Nuclear	9.9%

Total FY10 electricity usage for OSU: 104,232,975 kWh.

<p>On-campus Cogeneration</p>	<p>In July 2009, the new \$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. Until June, the Energy Center was not a cogeneration facility, so data until this time can be found in the Natural Gas section.</p> <p>As a cogeneration facility, the Energy Center consumed 466,700 therms of natural gas in FY10. It produced 34.9 million pounds of steam and 855,911 kWh of electricity.</p>
<p>Natural Gas (Scope 1)</p>	<p>The Corvallis campus consumed 5,813,986 therms of natural gas in FY10. Most of this was used at the Energy Center when it was not cogenerating.</p> <p>The Agricultural Experiment Stations used a combined 66,159 therms.</p> <p>The Extension Service county offices used a total of 32,244 therms.</p> <p>Hatfield Marine Science Center used 3,798 therms.</p> <p>OSU-Cascade used 21,972 therms.</p> <p>Total FY10 consumption of natural gas: 5,938,159 therms or 593,816 MMBtu.</p>
<p>Steam and Chilled water purchased</p>	<p>N/A – No steam or chilled water is purchased from outside sources.</p>
<p>Residual oils (#5, #6) and Distillate oils (#1, #2, #3, #4) (Scope 1)</p>	<p>The Corvallis campus used 188,123 gallons of distillate oil #2 (diesel) primarily at the central steam plant when the natural gas supply was curtailed. Backup generators accounted for 9,658 gallons of the total, although this figure may be incomplete. Further recordkeeping is necessary.</p> <p>Agricultural Experiment Stations used 5,309 gallons of diesel #2 for heating.</p> <p>The Extension Service used 2,466 gallons of diesel #2.</p> <p>Total FY10 consumption of distillate oil #2 (diesel) for non-transportation uses was: 205,556 gallons.</p>

<p>Propane</p> <p>(Scope 1 & 3)</p>	<p>Total documented propane use at the Corvallis campus was 11,089 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 13,420 gallons of propane for heating, forklifts and backup generators.</p> <p>The Extension Service used 5,829 gallons.</p> <p>Total FY10 consumption of propane: 30,338 gallons.</p>
<p>Incinerated Waste</p>	<p>The Veterinary Medicine Animal Isolation Lab (VMAIL) facility on the Corvallis campus incinerated 23,594 lbs of waste in FY10. VMAIL was not included because the CA-CP calculator is set up only for incinerators producing electricity.</p>
<p>Coal</p>	<p>N/A – No coal is directly consumed by OSU.</p>
<p>Solar / Wind / Biomass</p>	<p>The Kelley Engineering Center and the OSU Solar Trailer are the only locations on the Corvallis campus with photovoltaic (PV) solar generation. HMSC has a PV system as well. The estimated FY10 output from all sites was 4,347 kWh. This amount was not applied to this inventory as the energy produced reduced the buildings' electricity use.</p>
<p>Data sources: Roger Admiral, Director of Forestry Operations; Mac McGuire, Landscape Machinery Maintenance, Facilities Services; Carson Oil; Lisa Plagmann, VMAIL; Maryann Bozza, Project Manager, HMSC; numerous staff contacts at Extension county offices and Agricultural Experiment Stations</p>	

Transportation

<p>Fleet and Maintenance</p> <p>(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. Total volume dispensed from the tank in FY10 was 96,917 gallons.</p> <p>There is also a credit card system that allows faculty and staff on business trips to fill fleet vehicles wherever they wish. The credit card system recognized 85,715 gallons in purchases.</p> <p>OSU also received deliveries of 795 gallons of gasoline from Carson Oil. This fuel was primarily used in landscape equipment and vehicles.</p> <p>Hyslop farms received 1,265 gallons of gasoline in FY10. The fuel was primarily used in farm vehicles.</p> <p>Hatfield Marine Science Center used 3,868 gallons of gasoline for its fleet.</p> <p>Diesel</p> <p>On the Corvallis Campus, 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, the contracted service provider.</p> <p>Reported diesel use at the Campus Motor Pool filling station was 1,711 gallons.</p> <p>The Motor Pool credit card system recognized 3,036 gallons of diesel purchases at locations other than the campus filling station.</p> <p>The shuttles used 4,718 gallons of diesel in FY10.</p> <p>HMSC also uses diesel for its research vessels and fleet vehicles. The only ship fuel information available was for the R/V Pacific Storm. Total FY10 diesel consumption for HMSC was 3,284 gallons.</p> <p>Total gasoline in FY10: 188,560 gallons</p> <p>Total diesel used in mobile sources: 15,123 gallons.</p>
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Data sources: Justin Fleming, Motor Pool Manager; Brian Maxwell, First Student; Carson Oil; Maryann Bozza, HSMC; Amber Sans, Carson Oil

Directly Financed Travel

(Scope 3)

In FY10, 2.9 million miles were reimbursed by Travel Reimbursement. Mileage reimbursed to accounts outside of TRES totaled 69,436 miles. OSU also contracts rental cars through Enterprise Rent-a-Car. Enterprise reported OSU accounts driving 1,061,001 miles in FY10. Mileage driven in non-contracted vendor rental vehicles totaled 190,444 miles in FY10. 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. 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. A one-way trip to Portland International 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 \$254,988. Assuming this rate of \$4.50/mi is representative of all chartered bus travel, Athletics' chartered busses drove 56,790 miles in FY10. In FY10, a reported 4,312,095 car miles were directly financed by OSU. A total of 56,790 bus miles were financed by OSU.

Data sources: Justin Fleming, Motor Pool Manager; Julie Stratton, Auxiliaries & Activities Business Center; Margaret Taylor, Business Affairs; Davion Reese, Enterprise Rent-a-Car; Jacque Bruns, OSU Athletics

Commute

(Scope 3)

This inventory relied on a 2010 commute survey commissioned by OSU.

Mode Split	% of total
Bike	23%
Walk	17%
Bus	9%
Single occupancy vehicle (SOV)	47%
Carpool	3%
OSU shuttle	1%

It is assumed each person made one trip to campus per day. Students and staff/faculty were counted separately in the calculator. The registrar’s office indicated there are 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 230 working days for classified staff and 237 for faculty.

An average commute distance of 5 miles was used 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 OSU-Cascades. While the estimation is reasonable, further commuting studies should be performed to better model commute patterns there.

Staff and faculty FTE provided by Institutional Research include OSU-Cascades, Agricultural Experiment Stations, Extension and the Forest Research Laboratory. Commute distance and mode splits are most likely different from those of the Corvallis campus, yet no reliable commute data exists for these auxiliaries.

Summer students were not included in commute calculations.

Data sources: Patty McIntosh, Planning Manager, Facilities Services; Steve Edwards, Institutional Research; Steve Nash, Payroll Manager

Air Travel

(Scope 3)

OSU primarily uses two travel agents: Teel's Travel Planners and Azumano Travel. Both provided significant amounts of information, as well as advice and guidance. Air travel is reimbursed by OSU's Travel Reimbursement office.

Azumano Travel provided a report detailing all OSU activity booked through the agency and included mileage, number of trip segments and cost. Teel's Travel provided total number of trip segments booked by the agency 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 could extrapolate using Azumano's mileage information.

The extrapolation and calculation are as follows:

Company	# of flights	% of total
Azumano	12,550	55.4%
Teel's Travel	7,642	33.8%
Travel Reimbursement	2,450	10.8%
Total	22,642	100.0%

Azumano booked 14,412,928 miles for OSU.

$$\frac{12,550 \text{ Azumano flights}}{14,412,928 \text{ Azumano miles}} = \frac{22,642 \text{ total flights}}{x \text{ total miles}}$$

$$x = 26,002,990 \text{ total miles}$$

Both Teel's and Azumano reported approximately 5 percent 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:

$$\text{Total OSU air mileage} = (1/.95) * 26,002,990 = 27,371,568 \text{ miles}$$

All air travel emissions were applied to the Corvallis campus 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 A320 to take the team from Eugene, Ore. to the game destination. Using the 2009 schedule and Webflyer.com, an airport distance calculator, the calculated distance flown by chartered football jets was 7,870 miles.

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>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> $\frac{11,608 \text{ kg fuel}}{2482 \text{ mi}} \times \frac{1 \text{ gal jet fuel}^2}{3.06 \text{ kg fuel}} \times \frac{21.095 \text{ lb CO}_2^2}{1 \text{ gal jet fuel}} \times \frac{1 \text{ t}}{2205 \text{ lbs}} = \underline{0.0146 \text{ t CO}_2}$ $\underline{0.0146 \text{ t CO}_2} \times 7,870 \text{ miles} = 114.9 \text{ t CO}_2 \times 2.8 \text{ RFI} = 322.2 \text{ t CO}_2\text{e}$ <p>mi</p> <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; Tony Fuerte, Corporate Accounts Manager, Azumano Travel; Julie Stratton, Business Affairs; Margaret Taylor, Business Affairs. Webflyer.com; ¹ - European Environmental Agency Emission Inventory Guidebook eea.europa.eu/publications/EMEPCORINAIR4 ; ²- Energy Information Agency eia.doe.gov/oiaf/1605/coefficients.html</p>	

Other Major Sources

<p>Solid Waste</p> <p>(Scope 3)</p>	<p>Total weight of solid waste sent to Coffin Butte Landfill in FY10: 7.1 million lbs. (3,594 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>	

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	Total
Dairy Cows	258	-	-	0.3	258
Beef Cattle	157	280	311	-	748
Horses	30	2	5	4.3	41
Poultry	1,210	-	-	-	1,210
Sheep	695	-	-	1.1	696
Swine	14	-	-	0.1	14
Goats	-	-	-	-	-

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	800	45%
Union	18,000	45%
Corvallis Grounds	3,200	20%
Soap and Berry Creek	52,125	40%
Ag. Exp. Stations	106,917	31%
Total	181,042	34%

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

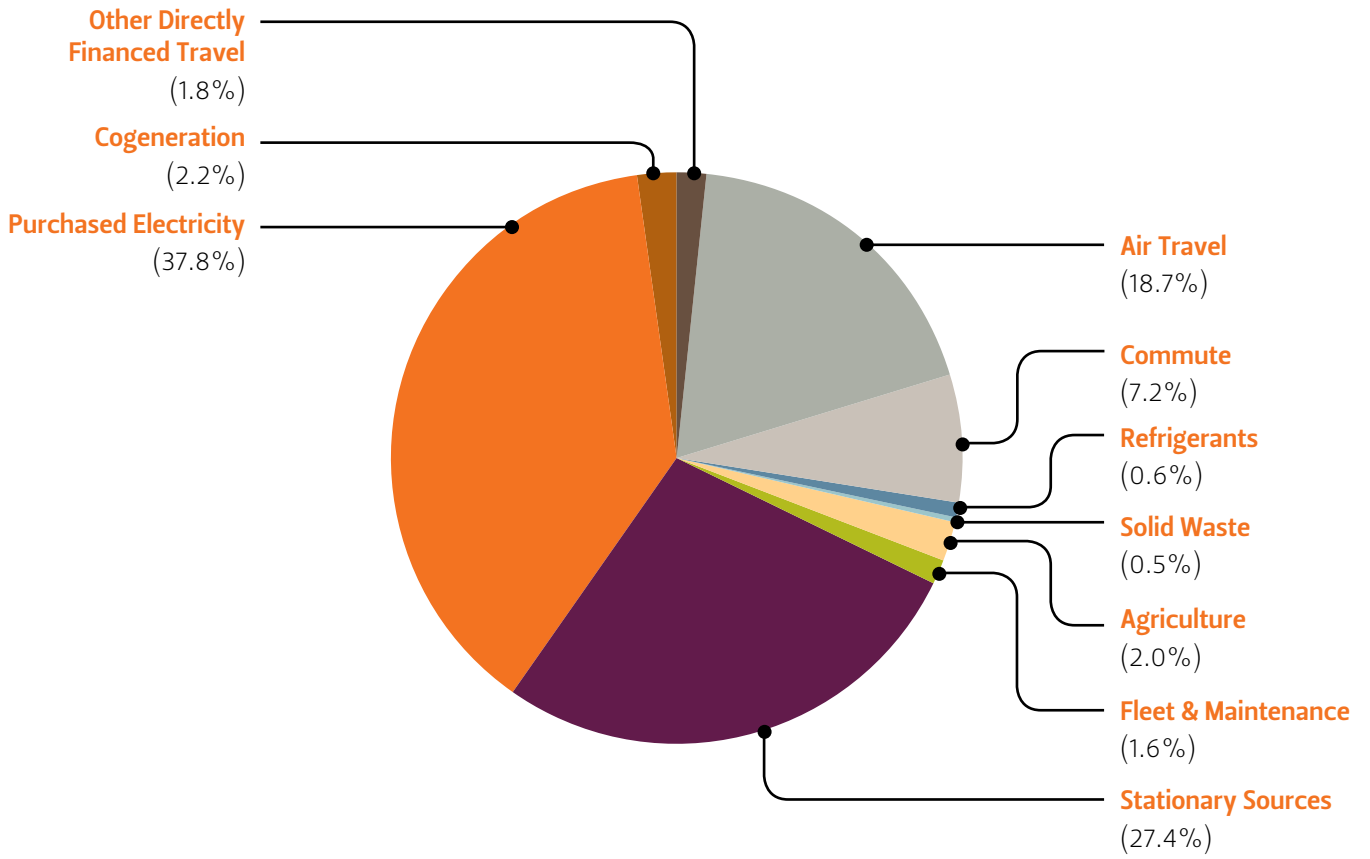
Data sources: Nora Ross, Assistant to the Chair, Animal Science Department; Debrah Rarick, Assistant to the Dean, College of Veterinary Medicine; Tim DelCurto, Superintendent, Union Station; Norm Brown, OSU Landscape

<p>Refrigerants</p> <p>(Scope 1)</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 FY10 and their 100-year global warming potential (GWP):</p> <table border="1" data-bbox="626 312 1269 686"> <thead> <tr> <th>Refrigerant</th> <th>Weight (lbs)</th> <th>GWP (100 year)</th> </tr> </thead> <tbody> <tr> <td>HFC-134</td> <td>14</td> <td>1,100</td> </tr> <tr> <td>HFC-404a</td> <td>13.75</td> <td>3,260</td> </tr> <tr> <td>HCFC-22</td> <td>383.5</td> <td>1,700</td> </tr> <tr> <td>CFC-12</td> <td>64</td> <td>10,600</td> </tr> <tr> <td>Hp-80</td> <td>50</td> <td>2,250</td> </tr> <tr> <td>R-508B</td> <td>1</td> <td>12,000</td> </tr> </tbody> </table>	Refrigerant	Weight (lbs)	GWP (100 year)	HFC-134	14	1,100	HFC-404a	13.75	3,260	HCFC-22	383.5	1,700	CFC-12	64	10,600	Hp-80	50	2,250	R-508B	1	12,000
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<p>Data source: Greg Riutzel, Refrigeration Mechanic, Facilities Services</p>																						

<p>Offsets</p> <p>(green tags, RECs, composting, etc.)</p>	<p>Renewable energy certificates (RECs) Total REC purchases for the OSU Corvallis campus were 51,146 MWh.</p> <p>Total REC purchases for the OSU Cascades campus were 449 MWh.</p> <p>Total offsets for FY10: 51,595 MWh.</p> <p>Offsets with Additionality</p> <p>Approximately 15 tons of waste is composted by various campus entities. The Organic Growers Club, Crop and Soil Sciences Department and the Student Sustainability Initiative compost dairy solids, pre-consumer food waste from campus dining centers and landscape debris. OSU’s waste hauler, Allied Waste, has indicated intent to accept greater amounts of food waste from the dining centers. OSU-based waste composted offsite by a third party such as Allied Waste 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>
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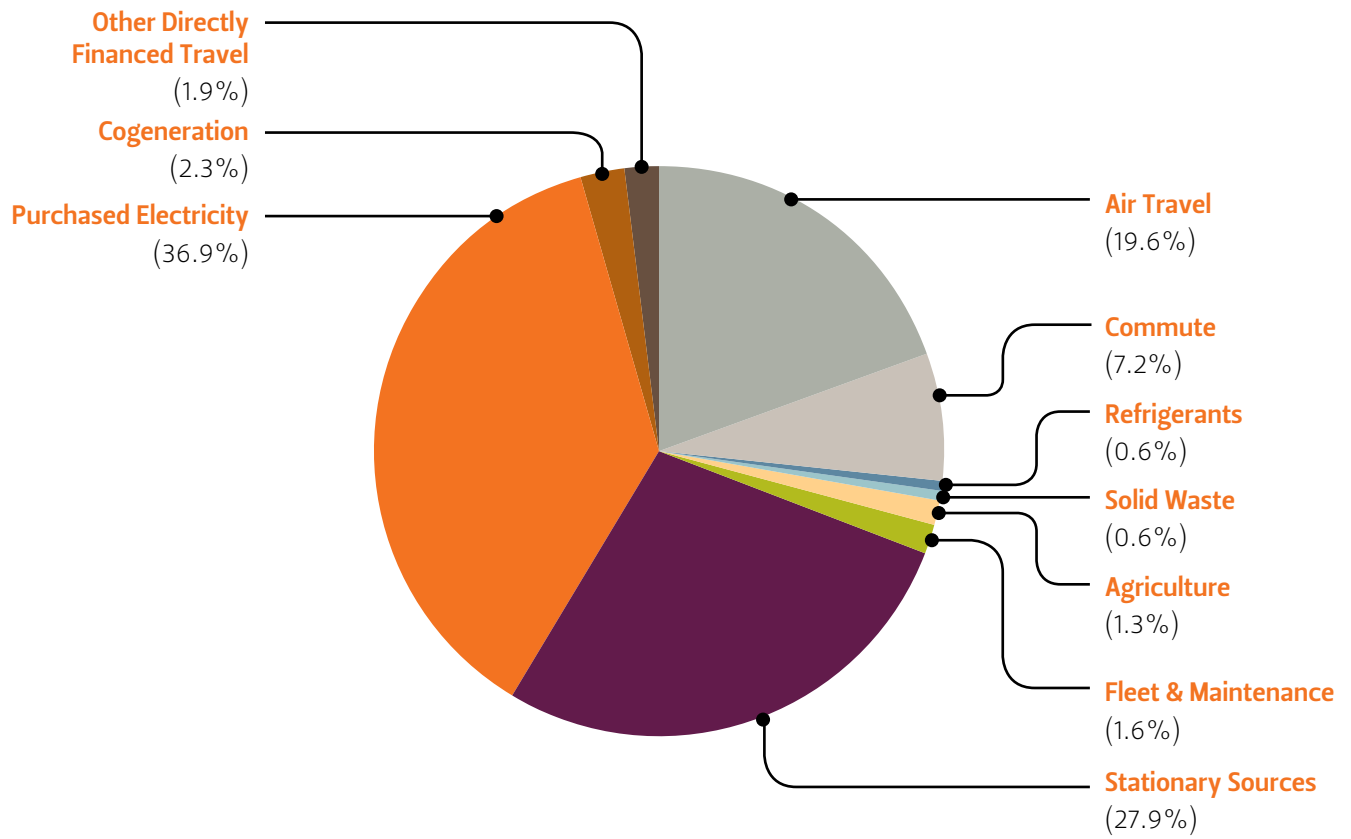
Module	FY10 OSU Comprehensive						
Worksheet	Emissions Summary						
University	Oregon State University						
	2010	Energy Consumption	CO2	CH4	N2O	CO2e	% change from FY09
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Co-gen Electricity	6.1	323.7	0.0	0.0	0.3	-
	Co-gen Steam	46,663.9	2,461,786.7	246.2	4.9	2,469.4	-
	Other On-Campus Stationary	576,794.8	30,985,408.2	3,199.0	76.5	31,088.2	-3.8%
	Fleet & Maintenance	25,418.1	1,786,843.8	336.6	116.8	1,830.1	-11.9%
	Refrigerants & Chemicals	-	-	-	-	688.5	-8.8%
	Agriculture	-	-	81,349.7	1,332.8	2,430.9	0.9%
Scope 2	Purchased Electricity	1,015,514.3	73,294,757.2	1,523.4	1,219.9	73,696.4	4.2%
Scope 3	Faculty / Staff Commuting	31,333.1	2,201,977.9	417.9	144.8	1,934.0	-13.9%
	Student Commuting	86,415.9	6,072,062.1	1,156.8	400.7	6,220.4	-5.7%
	Directly Financed Air Travel	107,844.0	21,173,814.0	208.5	239.7	21,250.4	-1.9%
	Other Directly Financed Travel	24,424.6	1,713,112.3	340.6	117.3	2,078.8	10.8%
	Solid Waste	-	-	24,927.5	-	623.2	-0.7%
	Scope 2 T&D Losses	100,435.5	7,248,932.0	150.7	120.7	7,288.7	4.2%
Offsets	Additional					(132.4)	2,193.3%
	Non-Additional					(38,130.5)	-22.5%
Totals	Scope 1	648,882.9	35,234,362.4	85,131.5	1,531.0	38,507.4	2.5%
	Scope 2	1,015,514.3	73,294,757.2	1,523.4	1,219.9	73,696.4	4.2%
	Scope 3	350,453.0	38,409,898.4	27,202.0	1,023.1	39,395.4	-1.5%
	All Scopes	2,014,850.3	146,939,017.9	113,856.9	3,774.0	151,599.2	2.2%
	All Offsets					(38,262.9)	-22.2%
Net Emissions:						113,336.3	14.4%

FY10 OSU Comprehensive Greenhouse Gas Emissions



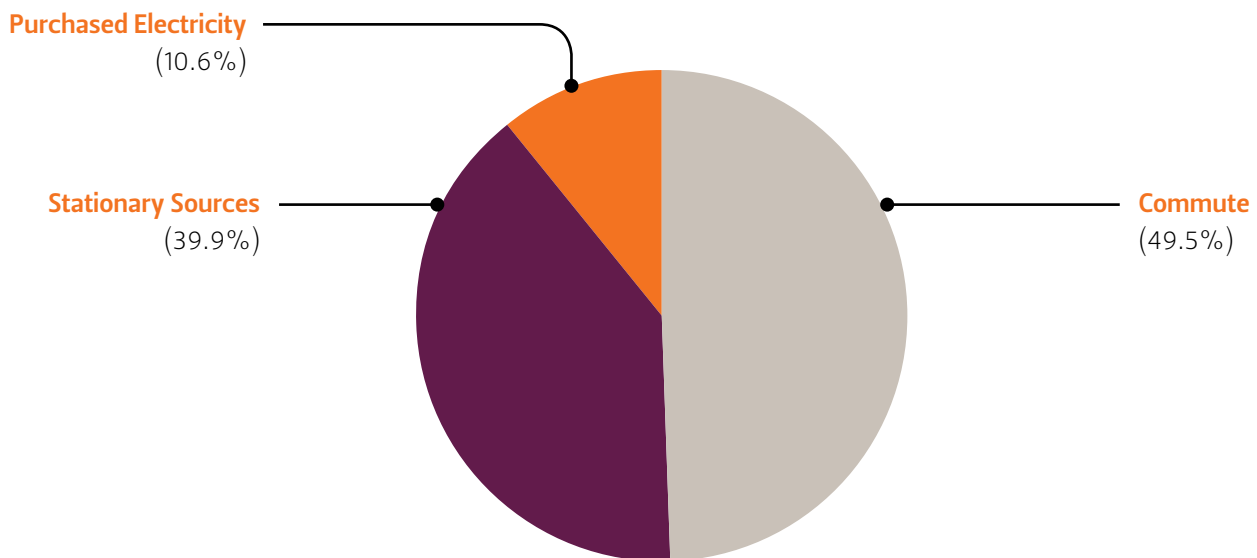
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	Student Commuting	86,415.9	6,072,062.1	1,156.8	400.7	6,220.4	-5.7%
	Directly Financed Air Travel	107,844.0	21,173,814.0	208.5	239.7	21,250.4	-1.9%
	Other Directly Financed Travel	24,424.6	1,713,112.3	340.6	117.3	2,078.8	10.8%
	Solid Waste	-	-	24,927.5	-	623.2	-0.7%
	Scope 2 T&D Losses	95,183.0	6,966,595.0	146.9	114.9	7,004.5	4.5%
Offsets	Additional					(132.4)	2,193.3%
	Non-Additional					(37,798.7)	-22.6%
Totals	Scope 1	632,800.3	34,331,182.7	57,573.6	808.7	36,700.0	3.4%
	Scope 2	962,405.8	70,440,015.9	1,485.4	1,161.0	70,823.1	4.5%
	Scope 3	340,730.1	37,813,800.0	27,136.8	996.1	38,789.7	-1.5%
	All Scopes	1,935,936.1	142,584,998.7	86,195.8	2,965.9	146,312.8	2.6%
	All Offsets					(37,931.0)	-22.4%
Net Emissions:						108,381.8	15.6%

FY10 OSU Corvallis Greenhouse Gas Emissions



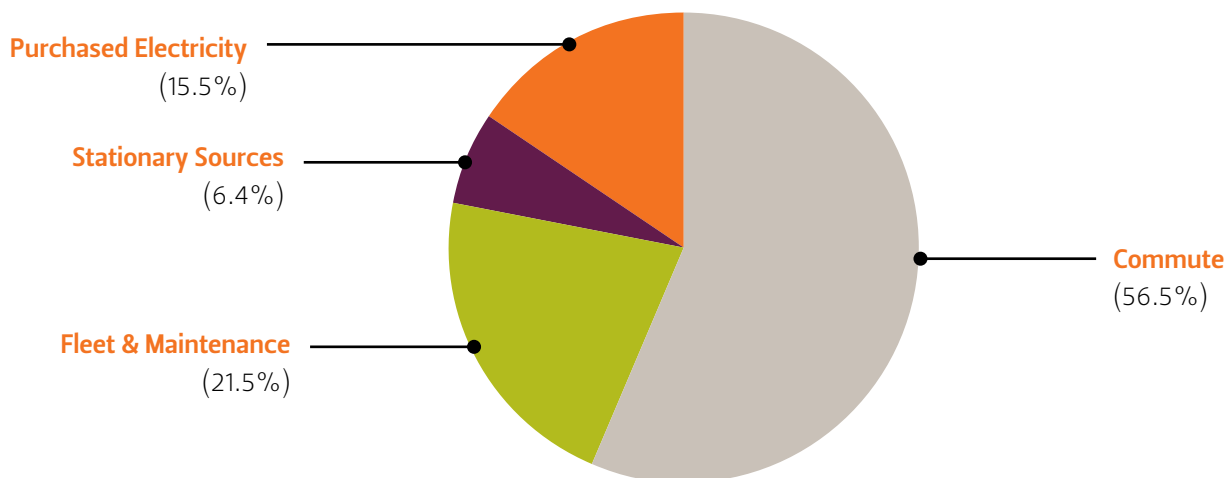
Module	FY10 OSU-Cascades						
Worksheet	Emissions Summary						
University	Oregon State University						
	2010	Energy Consumption	CO2	CH4	N2O	CO2e	% change from FY09
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	2,197.2	115,917.0	11.6	0.2	116.3	-5.9%
Scope 2	Purchased Electricity	4,485.6	328,311.8	6.9	5.4	330.1	-7.3%
Scope 3	Faculty / Staff Commuting	276.1	19,402.5	3.7	1.3	19.9	-7.6%
	Student Commuting	1,724.4	121,169.3	23.1	8.0	124.1	13.1%
	Scope 2 T&D Losses	443.6	32,470.4	0.7	0.5	32.6	-7.3%
Offsets	Non-Additional					(331.8)	3.7%
Totals	Scope 1	2,197.2	115,917.0	11.6	0.2	116.6	-5.9%
	Scope 2	4,485.6	328,311.8	6.9	5.4	330.1	-7.3%
	Scope 3	2,444.2	173,042.2	27.5	9.8	176.7	6.1%
	All Scopes	9,127.1	617,271.0	46.0	15.5	623.0	-3.6%
	All Offsets					(331.8)	3.7%
Net Emissions:						291.2	-10.8

FY10 OSU-Cascades Greenhouse Gas Emissions



Module		FY10 OSU HMSC					
Worksheet		Emissions Summary					
University		Oregon State University					
	2010	Energy Consumption	CO2	CH4	N2O	CO2e	% change from FY09
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	379.8	20,036.6	2.0	0.0	20.1	-19.95
	Direct Transportation	933.6	66,481.8	8.6	3.2	67.6	-62.8%
Scope 2	Purchased Electricity	18,908.5	44,208.4	0.6	0.6	44.4	-4.2%
Scope 3	Faculty / Staff Commuting	2,469.9	173,189.5	34.6	11.9	177.6	0.0%
	Scope 2 T&D Losses	1,870.1	4,372.3	0.1	0.1	4.4	-4.2%
Totals	Scope 1	1,313.4	86,518.5	10.6	3.2	87.7	-57.6%
	Scope 2	18,908.5	44,208.4	0.6	0.6	44.4	-4.2%
	Scope 3	4,340.0	177,561.7	34.7	12.0	182.0	-0.1%
	All Scopes	24,561.8	308,288.6	45.9	15.8	314.2	-27.9%
Net Emissions:						314.2	-27.9%

FY10 Hatfield Marine Science Center Greenhouse Gas Emissions



Module		FY10 OSU Statewides					
Worksheet		Overview of Annual Emissions					
University		Oregon State University					
	2010	Energy Consumption	CO2	CH4	N2O	CO2e	% change from FY09
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	12,572.0	700,744.2	80.7	2.8	703.6	-11.9%
	Agriculture	-	-	27,455.0	716.0	899.8	-3.8%
Scope 2	Purchased Electricity	29,714.4	2,482,221.1	30.5	52.8	2,498.7	-1.9%
Scope 3	Scope 2 T&D Losses	2,938.8	245,494.4	3.0	5.2	247.1	-1.9%
Totals	Scope 1	12,572.0	700,744.2	27,535.7	718.8	1,603.3	-7.6%
	Scope 2	29,714.4	2,482,221.1	30.5	52.8	2,498.7	-1.9%
	Scope 3	2,938.8	245,494.4	3.0	5.2	247.1	-1.9%
	All Scopes	45,225.3	3,428,459.7	27,569.3	776.8	4,349.2	-4.0%
Net Emissions:						4,349.2	-4.0%

FY10 OSU Statewides Greenhouse Gas Emissions

