

The background of the cover is a photograph of a modern, multi-level atrium. The space is characterized by curved walkways and railings with a vibrant orange wood-grain finish. A staircase with light-colored steps and a wooden handrail is visible on the right side. The ceiling features recessed lighting, and the overall atmosphere is bright and architectural.

OREGON STATE UNIVERSITY GREENHOUSE GAS INVENTORY FISCAL YEAR 2015

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Oregon State
UNIVERSITY



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Acknowledgements

OSU's Sustainability Office would not be able to complete the GHG Report without the support of the professionals throughout the campus and the state. We would like to thank the following for your dedication to getting it right and supporting the work we are doing.

Oregon State University

- Athletics: Jacque Bruns
- Facilities: Bill Caslow, Bill Callender, Jon Champney
- Agriculture Experiment Stations: Kathleen Dumont, Shelley Hughes, Sue Hansell, Carol Tollefson, Ilea Bouse, Debbie Burroughs, Willie Riggs, Jewel Haskins, Bob Moch, Chelle Boswell, Jan Jones, Maria Schramm, Peggy Carr, Arthel Ambrose, Kim McKague
- Animal and Rangeland Sciences: Otila Zuschlag, Seth Spencer, Mandy Seals
- OSU-Cascades: Kira Lueck
- Extension Service: Chris Bielenberg, Adam Stebbins, Rosemary Weidman, Roxie Applebee, Vicky Krenz, Samantha Clayton, Pam Wiederholt, Dana Martin, Darlene Belden, Evie Keeler, Sue Miller, Kjer Kizer, Ladene Hurd, Joanne Kiyokawa, Debbie Burroughs, Andrea Supuay, Tracy Brunner, Jeanine Hite, Dana Tessler, Liz Olsen, Rosemary Weidman, Bobbi Howell, Donita Roseboro, Tracy Fiske, Pat East, Madison Rosenbalm, Ashley Jones, Tami Rietmann, Jenny Chavez, Kay Jewett, Diana Leslie, Sandy Macnab, Lisa McKibben, Shevon Hatcher, Mary Corp, Brenda Dagget, Margie Vaughn, Kim McCullough, Vicki Campbell, Jan McFarland, Debra Zaveson
- Finance and Administration: Bezunesh Abebe, Justin Fleming, Andrea Norris, Karen Meador, Steve Nash, Stephanie Smith, Julie Stratton, Les Walton, Fritz Wilhelm. Alex Sims, Lissa Perrone, Charlotte Rooks, Eric Smith
- Hatfield Marine Science Center: Chelle Boswell, Bob Moch,
- Institutional Research: Terence Merritt
- Radiation Center: Shirley Campbell
- Ship Operations: Monita Cheeber
- Student Health Services: George Voss
- Research Animal Isolation Lab: Travis Feldsher

Businesses and Consultants

- Amerigas: Solveig Stormo
- Azumano Travel, Corvallis: Tony Fuerte
- Carson Oil: Amber Sams
- Enterprise Rent-A-Car: Michelle Barnes
- Teel's Travel, Corvallis: Wendy Woolsey
[Our condolences to Teel's Travel in the passing of Brad Teel]

Government Organizations

- Curry County Fairgrounds
- Marion County: Jodi Field
- Wheeler County: Judge Patrick C. Perry



Definitions of Key Terms

1. **“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.
2. **“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.
3. **“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.
4. **“Carbon dioxide” (CO₂)** means the chemical compound containing one atom of carbon and two atoms of oxygen.
5. **“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.
6. **“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.
7. **“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.
8. **“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.
9. **“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.



10. **“Metric ton, tonne, or metric tonne” (t)** means one metric tonne (1000 kilograms) or 2204.62 pounds.
11. **“Net emissions”** is the calculated sum of GHGs emitted minus renewable energy certificates, composting activities and carbon offsets.
12. **“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.
13. **“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.
14. **“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.
15. **“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.
16. **“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).
17. **“Total emissions”** is the calculated sum of GHGs emitted due to OSU-related activities.
18. **“World Business Council for Sustainable Development (WBCSD)”** is a global association of business representatives that deals exclusively with business and sustainable development.

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 amongst the top 25 for sustainability efforts. Our Fiscal Year 2015 (FY15) OSU Greenhouse Gas (GHG) Inventory Report tracks progress towards that goal. Since OSU President Ed Ray's April 2007 signing of the American College and University Presidents Climate Commitment (ACUPCC), OSU has been tracking its GHG Inventory as part of the university's Climate Action Plan.

This report provides the most current assessment of OSU GHG emissions and expands the GHG Inventory from FY07 to FY15. These inventories provide a continuous assessment based on an initial inventory completed for the Oregon University System (OUS) in CY04.

The FY15 report provides:

- A snapshot of OSU emissions: quantified greenhouse gas emissions resulting from OSU-related activities for the fiscal year ending June 30, 2015.
- Comparison with prior OSU GHG Inventories, providing a comparative analysis with FY07-FY14 emissions.
- Guidance for future inventories: changes in methodologies, successes, lessons learned, challenges and rationale of the expanded report provides a framework for future OSU reports.

Findings in Brief

- OSU's FY15 **gross emissions** were 128,656.0 metric tonnes of carbon dioxide equivalent (t CO₂e), a **3.1% decrease** relative to FY14. This decrease is likely mainly the result of:
 - Decreases in fertilizer application by the Statewide Public Services (Agricultural Experiment Stations, Extension Service and the Forest Research Laboratory)
 - Higher efficiency in steam production and a reduction in distillate oil #2 consumption at the OSU Energy Center
 - Full year run time on OSU's large ground mounted solar arrays
 - Moderate weather; particularly higher winter temperatures than during FY14.
- FY15 **net emissions** were 128,432.2 t CO₂e, a **3.1% decrease** below FY14 levels. Net emissions take into account offsets from the composting activities and electricity sold to the grid.
 - Likely causes for this decrease are the same as those noted above for gross emissions.
- Gross emissions per full time equivalent student were 5.07 t CO₂e, a **4.5% decrease** from FY14.
- Gross emissions per 1000 square feet of building space were 12.58 t CO₂e, an **11% decrease** since FY14.
 - This relatively substantial decrease is primarily due to the addition of new buildings in Corvallis as well as a more accurate square footage calculations relative to past GHG reports.

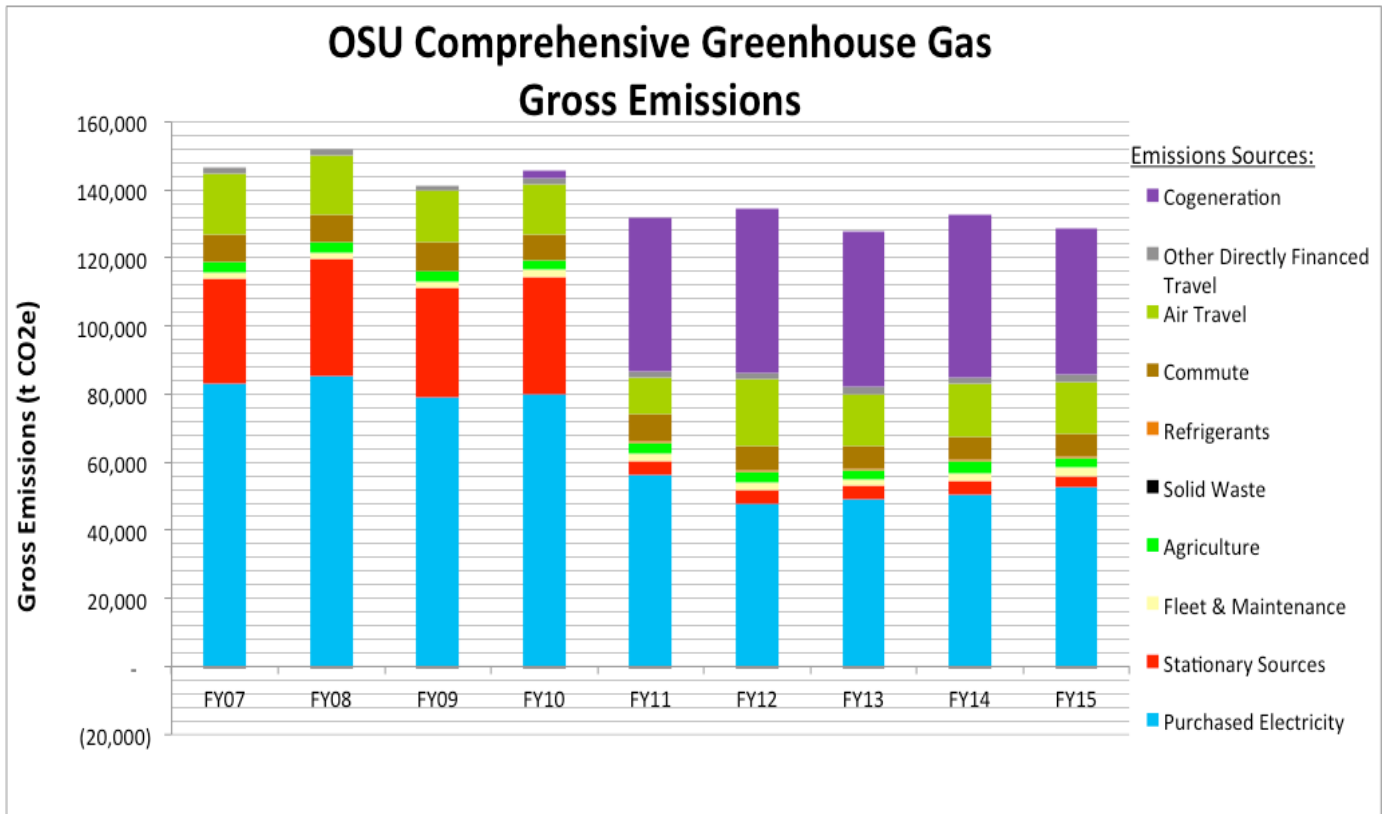


Figure 1. OSU Comprehensive Greenhouse Gas Gross Emissions

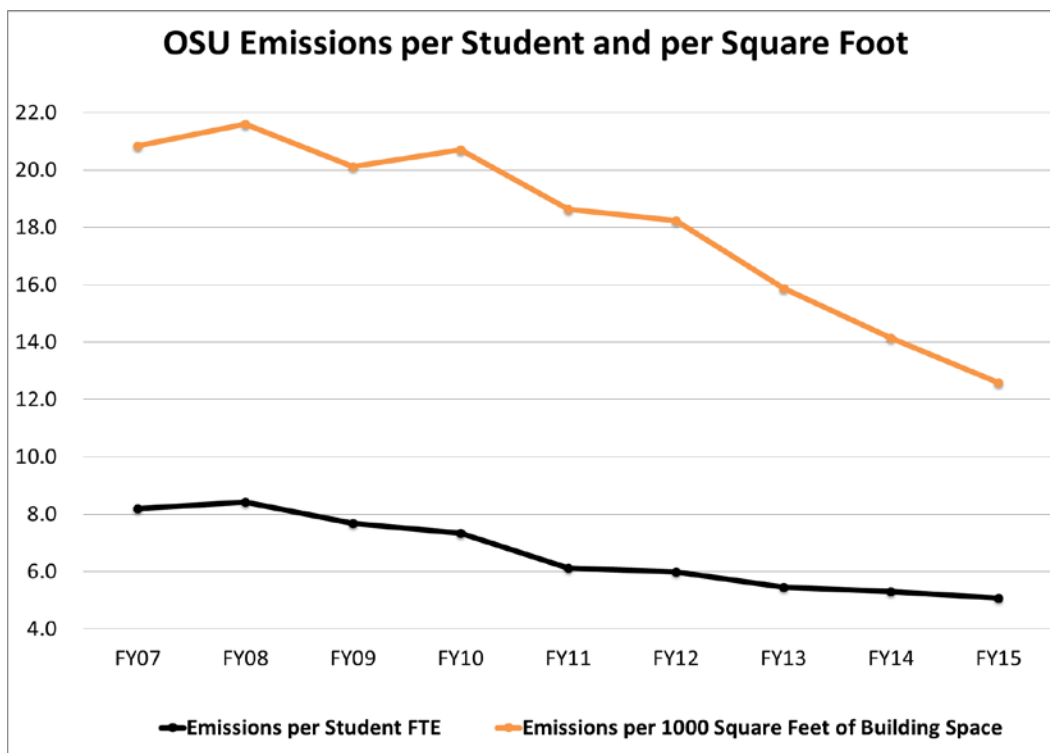


Figure 2. OSU Emissions per Student and per Square Foot

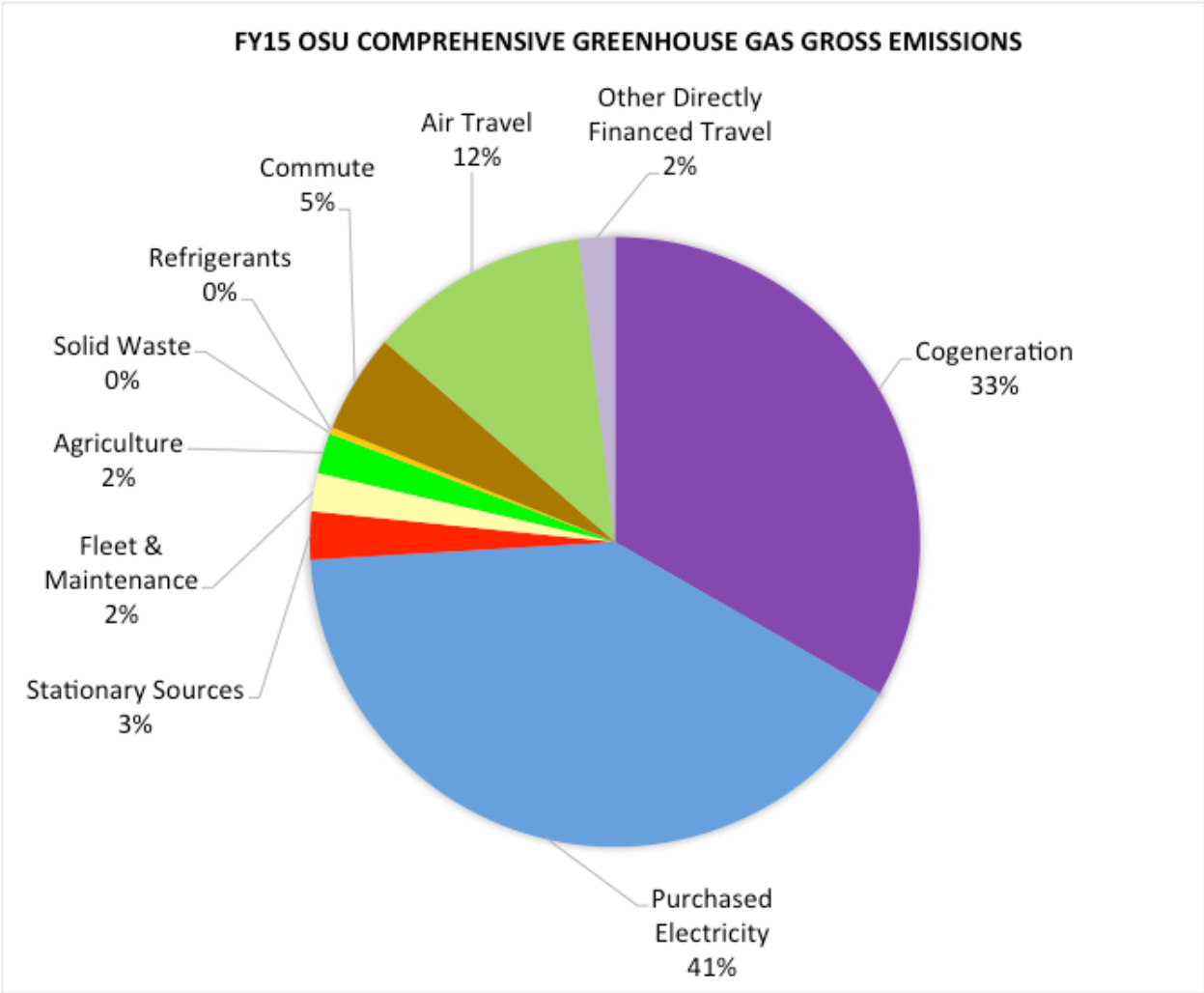


Figure 3. OSU Comprehensive Greenhouse Gas Gross Emissions by Source

Background

Oregon State University's ninth annual comprehensive greenhouse gas inventory reflects efforts from all sectors of the University to document resource use. Optimization of the Energy Center's co-generation output, the production from the 2.9 MW solar photovoltaic arrays and improved data collection methods and analyses affect our final totals. Contributors across the state have increased their accuracy in reporting data and OSU's Sustainability Office continues to apply best practices in maintaining an accurate greenhouse gas inventory.

GHG reporting has become the standard not just for universities across the US, but as an international standard for sustainability and climate action planning (www.ghgprotocol.org). OSU uses the [University of New Hampshire's Campus Carbon Calculator](#) (CCC) to track our GHG emissions and maintain an inventory over time. Feedback is appreciated on this document and the processes used to create it. Please visit our [Emissions Measurement and Reporting page](#) on the OSU Sustainability website for details and updates.

Methodology

Overview

With programs and operations as far-reaching as Oregon State University's, the largest task in creating this FY15 inventory is data collection. Extensive data were collected 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 [Scope and Boundaries](#) section of this report.

The CCC continues to be utilized for calculating university carbon emissions, as it has proven reliable and provides a solid analytical tool for managing OSU's GHG reporting requirements. This calculator has been utilized by universities nationwide and has the endorsement of the ACUPCC, of which OSU is a charter signatory. The calculator is consistent with international GHG inventory and reporting protocols and standards. CCC updates its analytics and publishes current versions the calculator for universities use; it will likely be maintained and continuously improved. The FY15 report has been calculated using CCC's version 8 calculator.

Scope and Boundaries

Identifying scope and boundaries issues is a critical step in emissions reporting. While some connections to emissions sources – like utility 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 activities, the boundaries were drawn to be fairly broad; any emissions from an entity over which OSU has financial and/or operational control were included, plus those of personal daily commuters to the Corvallis and Newport campuses.

FY15 essentially mirrors the methodology and reporting structure of FY14; 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 Sciences Center (HMSC), and the Statewide Public Services or "Statewides". All these locations are considered vital facets of the university. Below are outlined aspects of each location:

OSU Corvallis

The main Corvallis campus produces the vast majority of the university's GHG emissions. With over 570 developed acres and a total of 8,722,000 gross square feet of buildings, OSU Corvallis hosts over 24,000 students and nearly 6,000 faculty and staff.

OSU Cascades

Located in Bend, Oregon, the 56-acre campus specializes in degrees like Accountancy, Natural Resources, Tourism and Outdoor Leadership, Hospitality Management, Energy Sciences Engineering and many other programs. Ground was broken this fiscal year for the first of several new campus buildings.

Hatfield Marine Science Center (HMSC)

OSU's primary coastal operation and base for oceanographic research are located 50 miles west of Corvallis. 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 Services** connects Oregonians to research-based knowledge for economic development, healthy and productive life choices and sustainable ecosystems.
- The Oregon **Agricultural Experiment Stations** are 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 located throughout the state, requiring data from a large number of resources. Not all data are readily available nor verifiable. The need to balance timely reporting with collecting marginal data resulted in some intentional omissions. Other emission sources were omitted due to incomplete data and limits on reliable extrapolation. Additional rationale for data omissions is discussed in further detail in the [FY08 GHG Report](#).

Past Inventory Comparison

The CCC tool and this inventory function as tools to monitor emissions over time. The FY15 report captures changes in emissions in comparison to FY14 and to past years since FY07. While working to report the highest quality of data and analysis, past, current and future inventories may not be absolutely comparable for all sources. Comparative analysis will continue to be noted in these reports.

Boundaries

Overview

The scope and boundaries of this greenhouse gas inventory aims to be comprehensive, expanding beyond what is typically required of organizational inventories. Focusing on all aspects of emissions, OSU's inventory includes Scope 1 and 2 emissions and a Partial Scope 3 emissions as defined below. Scope 1 includes direct emissions from sources owned or directly controlled by the institution. Scope 2 includes emissions from consumption of purchased utilities: electricity, gas, steam and heated or chilled water. Scope 3 addresses indirect sources of GHG emissions resulting from the institution's activities not owned or controlled by the institution; such as air travel, electricity transmission and distribution losses, waste disposal and composting. 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 the signatories mitigate emissions 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. The 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 are not included in this analysis.

Omitted sources are listed 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
Additional biological sequestration	Significant
Lifecycle/embodied emissions*	Significant
Off-campus vehicle use	Negligible
Recycled materials (transportation and processing)	Unknown

Table 1. Omitted Emissions Sources for OSU

*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 CO ₂ e)					
	FY11	FY12	FY13	FY14	FY15
Scope 1					
Gross Emissions	54,573.9	58,069.4	54,188.9	58,250.2	51,912.5
Net Emissions	54,573.9	57,920.3	53,231.6	57,989.3	51,730.3
Scope 2					
Gross Emissions	52,924.4	44,746.8	46,409.5	47,208.6	49,195.8
Net Emissions	-20,582.0	36,973.4	46,046.0	47,201.3	49,154.2
Scope 3					
Gross Emissions	24,052.1	31,541.5	27,298.2	27,283.4	27,547.7
Net Emissions	23,522.3	31,541.5	27,298.2	27,283.4	27,547.7
Total					
Gross Emissions	131,844.2	134,734.9	127,896.7	132,742.2	128,656.0
Net Emissions	57,808.0	126,812.3	126,575.9	132,474.0	128,432.2

Table 2. OSU FY15 GHG Emissions by Scope

- Scope 1 emissions are 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.), commuting, solid waste, and losses due to transmission and distribution of electricity. Under the requirements of the ACUPCC, OSU is responsible for mitigation of emissions from Scope 1 and Scope 2, as well as Scope 3 emissions from commuting and air travel.
- OSU is required by the ACUPCC to mitigate *net* emissions of **125,355 tCO₂e** as of FY15.
- Gross emissions from operations in Corvallis represent 97.6% of total university emissions.
- As with past several versions of the Campus Carbon Calculator, FY15 carbon dioxide equivalent resulting from solid waste, -30 MT CO₂e, is a negative value because energy generation from solid waste results in fewer emissions than would have been emitted by standard utility generation.

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

Table 3. Emissions by Inventory (t CO₂e)					
	FY11	FY12	FY13	FY14	FY15
OSU Corvallis					
Gross Emissions	126,568.6	128,415.8	120,905.7	124,858.1	122,045.3
Net Emissions	52,876.7	121,012.4	119,584.9	124,589.9	121,821.5
Statewides					
Gross Emissions	4,298.9	5,043.8	5,547.5	5,602.4	4,557.6
Net Emissions	4,298.9	5,043.8	5,547.5	5,602.4	4,557.6
OSU Cascades					
Gross Emissions	540.5	800.0	968.2	1,191.9	1,159.3
Net Emissions	196.2	262.9	968.2	1,191.9	1,159.3
HMSC					
Gross Emissions	436.2	475.2	475.2	1,089.8	893.8
Net Emissions	436.2	475.2	475.2	1,089.8	893.8
OSU Comprehensive					
Gross Emissions	131,844.2	134,734.9	127,896.7	132,742.2	128,656.0
Net Emissions	57,808.0	126,794.3	126,575.9	132,474.0	128,432.2

Table 3. Total Emissions by Inventory FY10- FY15

Changes in gross and net emissions from the major emissions sources are shown in table 4:

Table 4. FY15 OSU Comprehensive Emissions by Emissions Source						
Emissions Sources	FY15 Gross Emissions (t CO2e)	% of Gross Emissions	% Change in Gross Emissions from FY14	FY15 Net Emissions (t CO2e)	% of Net Emissions	% Change in Net Emissions from FY14
Purchased Electricity	52,486	40.8%	4.2%	52,445	40.8%	4.1%
Stationary Sources	3,275	2.5%	-24.4%	3,275	2.5%	-24.4%
Fleet & Maintenance	2,603	2.0%	29.0%	2,603	2.0%	29.0%
Agriculture	2,749	2.1%	-26.4%	2,566	2.0%	-26.1%
Solid Waste	-30	0.0%	-45.0%	-30	0.0%	-45.0%
Refrigerants	433	0.3%	9.1%	433	0.3%	9.1%
Student and Faculty/Staff Commute	6,766	5.3%	0.8%	6,766	5.3%	0.8%
Air Travel	15,055	11.7%	-2.3%	15,055	11.7%	-2.3%
Other Directly Financed Travel	2,466	1.9%	19.7%	2,466	1.9%	19.7%
Cogeneration	42,853	33.3%	-10.3%	42,853	33.4%	-10.3%
Total	128,656	100.0%	-3.1%	128,432	100.0%	-3.1%

Table 4. FY15 Gross and Net Emissions by Emission Source

Net Emissions totals by emissions source are shown in table 5.

Table 5. FY15 OSU Comprehensive Net Emissions by Emissions Source			
Emissions Sources	FY15 Net Emissions (t CO2e)	% of Net Emissions	% Change in Net Emissions from FY14
Purchased Electricity	52,445	40.8%	4.1%
Stationary Sources	3,275	2.5%	-24.4%
Fleet & Maintenance	2,603	2.0%	29.0%
Agriculture	2,566	2.0%	-26.1%
Solid Waste	-30	0.0%	-45.0%
Refrigerants	433	0.3%	9.1%
Student and Faculty/Staff Commute	6,766	5.3%	0.8%
Air Travel	15,055	11.7%	-2.3%
Other Directly Financed Travel	2,466	1.9%	19.7%
Cogeneration	42,853	33.4%	-10.3%
Total Net	128,432	100.0%	-3.1%

Table 5. FY15 OSU Comprehensive Net Emissions by Emission Source

Scope 3 Emissions have a broad reach for institutional reporting. The lack of accurate data and the limitations of time and resources to report all the aspects of Scope 3 emissions results in some sources not being included in the OSU GHG Inventory. 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 some OSU locations
- Some stationary fuel purchase

Net emissions are calculated through deducting electricity sales to the grid from the co-generation plant and all other offsets. The total net emissions are displayed in Figure 3 and Figure 4.

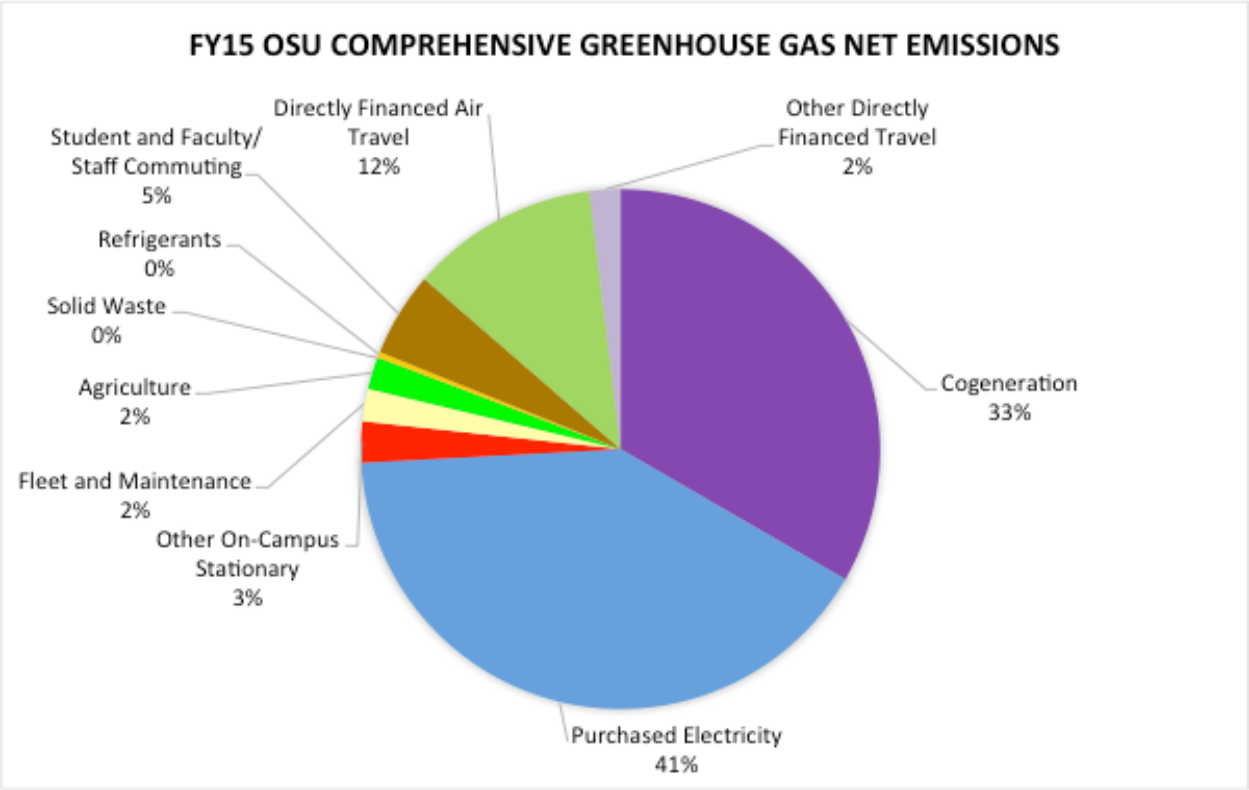


Figure 4. FY15 OSU Comprehensive Greenhouse Gas Net Emissions by Source

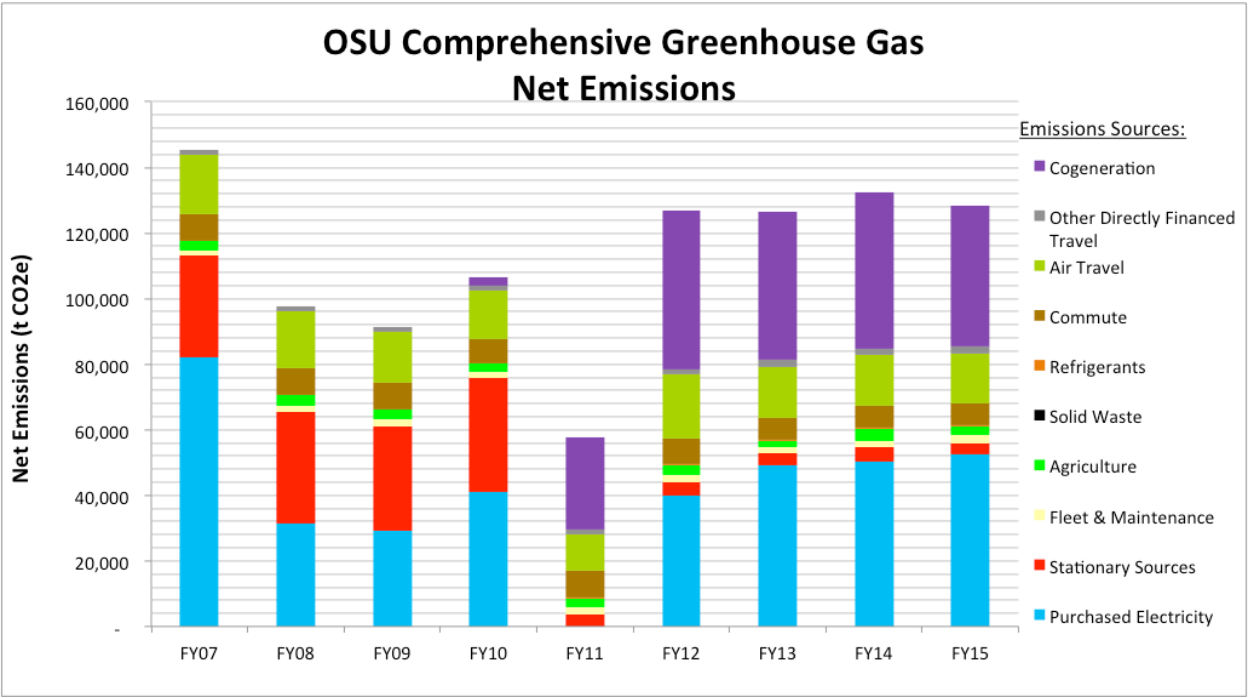


Figure 5. OSU Comprehensive Greenhouse Gas Net Emissions

Changes since the FY14 Inventory

- FY15 was the first total year of energy production from the 2.9 MW of solar photovoltaic arrays throughout the state. Total production for FY15 was 3,249,683.24 kWh.
- Refrigerant data was verified and reported. This Scope 1 emission has been under-reported in recent years.
- The Energy Center has reduced the consumption of distillate oil for generation due to a new contract for un-interruptible gas delivery. The distillate oil consumption for co-generation for FY15 was about 87% less than FY14. The Energy Center increased the efficiency of steam production to 86% efficiency from 80% in FY14. This was accomplished by the optimization of plant operations.

Additional details can be found in the [Analysis of Data Changes and Uncertainty](#) section of this report.

Offsets

Table 6 details offsets that are calculated for the past fiscal years from FY10-15. Currently, OSU's only offsets come from composting, as the university has not purchased a significant amount of renewable energy certificates (RECs) since FY12.

Table 6. OSU Offsets by Fiscal Year (t CO ₂ e)					
Offset Type	FY11	FY12	FY13	FY14	FY15
Composting	529.8	149.1	957.3	260.9	182.2
Renewable Energy Certificates (RECs)	73,506.4	7,709.7	3.5	2.2	2.2

Table 6. OSU Offsets FY10-FY15

Comparative Analysis

Figure 5 illustrates OSU's emissions per student FTE as well as OSU's emissions per 1000 ft² for fiscal years FY10-FY15. Since 2007, emissions per square foot have decreased by 33% and per student by just under the same amount.

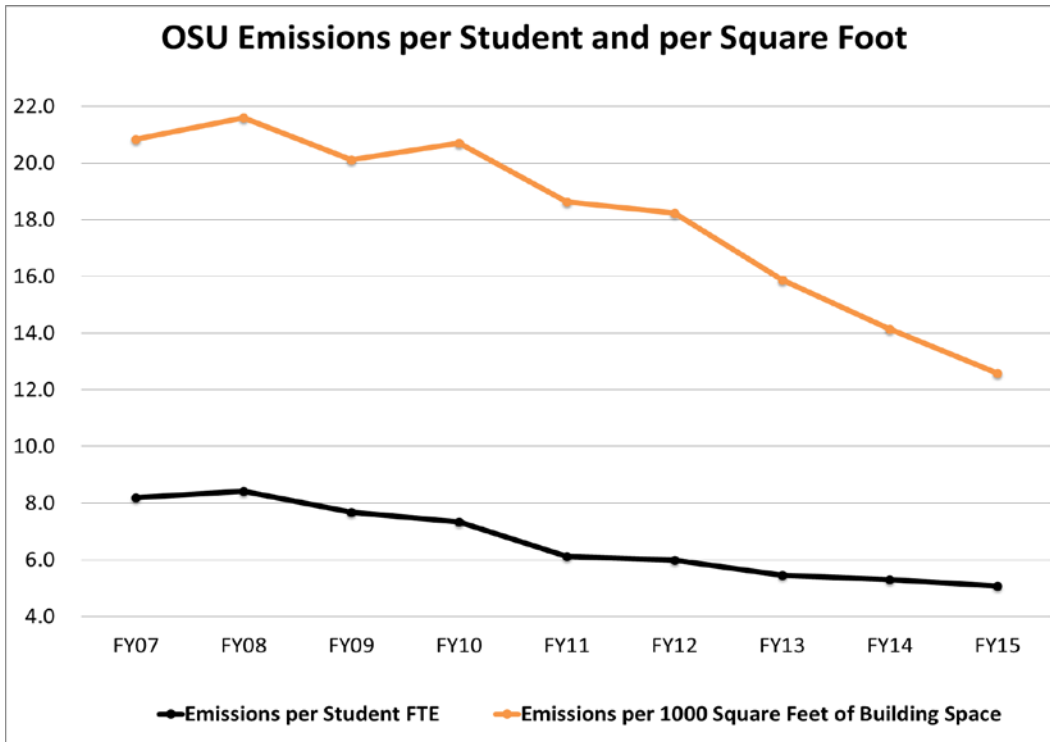


Figure 6. OSU Emissions per Student and per Square Foot

The following comparative data are drawn from the [ACUPCC Reporting System website](#). Several of the universities that are OSU's comparable institutions have not published their FY15 reports as of December 2015.

Table 7. Comparison of OSU Emissions Metrics with Peer Universities									
	'15 OSU Comprehensive	'14 OSU Comprehensive	'13 OSU Comprehensive	'12 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 CO ₂ e)	5.4	5.3	4.9	5.5	10.7	13.2	4.4	6.7	8.1
Net emissions per 1000 square feet (t CO ₂ e)	14.4	14.1	14.3	16.3	14.2	28.8	12.2	12.5	13.6

Table 7. Emissions Comparison with Peer Universities

Analysis of Data Changes and Uncertainty

Emissions Source	Analysis
Cogeneration	<p><u>Source data changes for FY15:</u> Distillate oil #2 is no longer used for generation, only routine testing. Natural gas consumption was reduced due to higher efficiency in steam production at the Energy Center.</p> <p><u>Methodology changes for FY15:</u> None</p>
Fertilizers	<p><u>Source data changes for FY15:</u> Fertilizer application reported in FY15 includes OSU athletic fields. Union Station reported zero fertilizer usage for FY15.</p> <p><u>Methodology changes for FY15:</u> None</p>
Commute-Faculty/Staff	<p><u>Source data changes for FY15:</u> Campus Travel Survey published in FY15 provided up-to-date metrics in commuting.</p> <p><u>Methodology changes for FY15:</u> Commute emissions for all previous years were based on headcount of faculty and staff. For FY15, commute emissions were based on FTE to match CCC.</p> <p><u>Uncertainty Analysis for FY15:</u> While the new survey provides current data from a significant % of participants, factors such as total commute day and mileage are estimated in the CCC. Additional factors are reported on at page 19 the FY09 report.</p>
Commute-Students	<p><u>Source data changes for FY15:</u> Campus Travel Survey published in FY15 provided up-to-date metrics in commuting.</p> <p><u>Methodology changes for FY15:</u> Commute emissions for all previous years were based on headcount of students. For FY15, commute emissions were based on FTE to match CCC.</p> <p><u>Uncertainty Analysis for FY15:</u> See above.</p>
Directly Financed Travel	<p><u>Source data changes for FY15:</u> Additional charter flights for Women’s Basketball.</p> <p><u>Methodology changes for FY15:</u> None.</p> <p><u>Uncertainty analysis:</u> Improved data collection has continued to provide more accurate data from vendors, some minor emissions may go unreported, with an estimated impact of less than 5% of the category total.</p>

Solid Waste	<p><u>Source data changes for FY15:</u> None.</p> <p><u>Methodology changes for FY15:</u> None.</p> <p><u>Uncertainty Analysis:</u> Data are not collected for off-campus sites. It is likely that solid waste emissions are 10-15% higher than reported.</p>
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Table 8. Analysis of Data Changes and Uncertainty

Analysis of Data Quality

Due to varied data quality and completeness, assumptions and extrapolations were used for the following areas: mission related travel, some metrics for student and faculty/staff commuting.

Areas requiring further investigation and improved recordkeeping include: long-distance student travel (to/from home and school); auto mileage and commute information that includes Extension, Agricultural Experiment Stations (AES), the FRL, OSU-Cascades and HMSC; total utility consumption at AES and Statewide Public Service offices, waste totals at statewide sites.

Future Action

OSU Climate Plan

As part of its commitment to climate action, OSU became a signatory of the American College and University Presidents Climate Commitment (ACUPCC) in 2007. That commitment requires each institution to develop a climate plan to address global climate change. The Sustainability Office worked with all entities at OSU to create its [first OSU Climate Plan](#) in September 2009. An updated version will be produced in 2016. University leadership, faculty, staff, students and those outside the campus community will be able to provide input to the revision.

The OSU Climate Plan developed goals, framework and strategic steps necessary for OSU to achieve net climate neutrality (no net emissions) by 2025. Reduction of net emissions are a central focus of the Climate Plan, as is the institutional focus on incorporating climate change awareness into education, engagement and research as required by the ACUPCC.

The Climate Plan builds upon 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 in a separate reporting system. This system and more information is available online at the [OSU 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 measurements 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 FY 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 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); and electricity usage. 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 co-generation 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% 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 gross emissions are estimated to be 110,977 t CO₂e from all major sources now included in recent GHG inventories, which is 7.4 t CO₂e per student versus 5.4 for 2015.

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 reduction goals.

Findings Table

Energy

<p>Purchased Electricity</p>	<p>OSU Corvallis purchased electricity usage was 63,890,888 kWh.</p> <p>The Agricultural Experiment Stations (AES) consumed 4,221,016 kWh.</p> <p>County Extension offices consumed 1,698,694 kWh.</p> <p>Hatfield Marine Science Center consumed 1,581,519 kWh.</p> <p>OSU-Cascades consumed 1,082,660 kWh.</p> <p>The CCC calculator allows for a grid mix specific to the electric utility. OSU Corvallis and OSU Cascades receive electricity from Pacific Power, HMSC receives electricity from Lincoln Co. PUD and the Statewide offices receive electricity from an assortment of smaller public utilities. Due to this assortment of providers for the Statewides, the utility grid mix was used from EPA eGrid data for the Northwest Power Pool (NWPP) utility grid mix and applied to the Statewides calculations.</p> <div style="display: flex; justify-content: space-around;"> <table border="1" data-bbox="532 1024 909 1371"> <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>62.97%</td> </tr> <tr> <td>Natural Gas</td> <td>14.72%</td> </tr> <tr> <td>Hydro</td> <td>8.30%</td> </tr> <tr> <td>Wind</td> <td>3.61%</td> </tr> <tr> <td>Geothermal</td> <td>0.35%</td> </tr> <tr> <td>Biomass</td> <td>1.10%</td> </tr> <tr> <td>Other</td> <td>9.40%</td> </tr> </tbody> </table> <table border="1" data-bbox="971 991 1369 1409"> <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> </div> <p>Central Lincoln PUD reported the following utility grid mix for HMSC.</p> <table border="1" data-bbox="784 1551 1138 1808"> <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>84.40%</td> </tr> <tr> <td>Nuclear</td> <td>10.40%</td> </tr> <tr> <td>Other</td> <td>5.10%</td> </tr> </tbody> </table>	Pacific Power Grid Mix		Fuel	% of total	Coal	62.97%	Natural Gas	14.72%	Hydro	8.30%	Wind	3.61%	Geothermal	0.35%	Biomass	1.10%	Other	9.40%	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	84.40%	Nuclear	10.40%	Other	5.10%
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On campus co-generation	<p>The Energy Center consumed 805,241 therms of natural gas and 3,773 gallons of diesel in FY 15.</p> <p>These fuels produced 523,141,690 lbs. of steam and 43,284,467 kWh of electricity.</p>
Natural Gas (Scope 1) (not including Energy Center)	<p>OSU Corvallis consumed 437,722 therms of natural gas in FY15 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>OSU-Cascades consumed 21,267 therms.</p> <p>The Agricultural Experiment Stations consumed 66,250 therms.</p> <p>The Extension Service county offices consumed 21,876 therms.</p> <p>Hatfield Marine Science Center consumed 3,399 therms.</p> <p>Total FY15 consumption of natural gas, excluding use at the Energy Center: 550,515 therms.</p>
Steam and Chilled water purchased	<p>N/A - No steam or chilled water is purchased from non-OSU sources.</p>
Residual oils (#5, #6) and distillate oils (#1,#2,#3,#4) (Scope 1)	<p>OSU Corvallis used 21,197 gallons of distillate oil #2 (diesel) primarily at the Energy Center when natural gas supply was curtailed. Backup generators accounted for 17,424 gallons of the total and the Energy Center accounted for 3,773 gallons, though this figure may be incomplete. Further recordkeeping is necessary.</p> <p>Agricultural Experiment Stations used 2,281 gallons of diesel #2 for heating.</p> <p>Extension Service consumed 3,498 gallons of diesel #2.</p> <p>Total FY15 consumption of distillate oil #2 (diesel) for non-transportation uses was: 26,976 gallons</p>
Propane (Scope 1&3)	<p>Total documented propane use at OSU Corvallis was 6,254 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 9,775 gallons of propane for heating, forklifts and backup generators.</p> <p>The Extension Service used 4,594 gallons.</p> <p>Total FY15 consumption of propane: 20,622 gallons.</p>
Incinerated Waste	<p>The Research Animal Isolation Lab (RAIL) reported 7,179 lbs. of incinerator waste for FY15.</p>

Coal	N/A – coal is not directly consumed by OSU.
Solar/Wind/ Biomass/Human Power	FY15 was the first total year of generation for the photovoltaic arrays installed on OSU properties across the state. OSU has a total of 2.9 MW installed that produced 3,249,683.24 kWh.
Data Sources: Les Walton, Energy Operations Supervisor; George Voss, Assoc. Dir. Admin. Services, Student Health Services; Facilities Services, Pacific Power, Portland General Electric, Carson Oil, Travis Feldsher, RAIL; Kira Billingsley, OSU-Cascades Faculty and Finance Specialist; Solveig Stormo, Amerigas; Chelle Boswell, HMSC Office Specialist; staff and office managers at County Extension offices and AES offices	

Table 9. Findings - Energy

Transportation

Fleet and Maintenance (Gasoline)	<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 FY15 was 260,600.8 gallons.</p> <p>OSU Corvallis total consumed 232,745.9 gallons of gasoline.</p> <p>Hatfield Marine Science Center used 27,854.9 gallons of gasoline for their fleet.</p> <p>Diesel 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 22,436.9 gallons.</p> <p>OSU Corvallis used 10,602.9 gallons of diesel in FY15.</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 FY15 diesel consumption for HMSC was 12,374 gallons.</p>
Data Sources: Justin Fleming, OSU Motor Pool Manager; Delwin Loucks, First Student; Monita Cheeber, Ship Ops; Amber Sams, Carson Oil	
Directly Financed Travel (Scope 3)	<p>In FY15, 3.35 million miles were reimbursed by Travel Reimbursement.</p> <p>Mileage reimbursed to accounts outside of TRES totaled 1,899,595 miles.</p> <p>OSU also contracts rental cars through Enterprise Rent-a-Car. Enterprise reported OSU accounts driving 1,008,253 miles in FY15.</p>

	<p>Mileage driven in non-contracted vendor rental vehicles totaled 184,198 miles in FY15. 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 charter 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 \$614,851. Assuming this rate of \$4.49/mi is representative of all chartered bus travel, Athletics' chartered buses drove 136,938 miles in FY15.</p> <p>In FY15, a reported 6,439,351 car miles were directly financed by OSU.</p> <p>Directly Financed Travel includes charter buses, rental vehicles and private vehicle reimbursements. OSU contracts with Enterprise Rentals for vehicles locally and charters buses for athletic travel.</p>
<p>Commute (Scope 3)</p>	<p>Commuting totals are collated for staff/faculty and students separately. Institutional Research reports 146 teaching days per year (excluding summer); that number was used to calculate commuting days for students. Staff and faculty commuting days were calculated using regular and overtime payroll hours for classified staff and faculty by the FTE for the respective classification. This calculation yielded 233 working days for staff and 245 for faculty.</p> <p>An average commute distance of 5 miles was used for personal vehicle travel and based jointly on the 2003 OSU commute survey, and a 2003 Portland State University GHG inventory estimated commute distance of 7.5 miles. While Corvallis is a much smaller community, many students commute from outside the area. More accurate information on commuting distances is needed to definitively determine commute emissions. This estimated distance was also applied to the OSU-Cascades. While the estimation is reasonable, further commuting studies should be performed to better model commute patterns there.</p> <p>An average commute distance of 3 miles was used for bus travel. This reflects the likelihood of bus commuters traveling shorter distances, as the majority of the transit system is based around Corvallis.</p> <p>Staff and faculty FTE provided by Institutional Research include OSU-Cascades, AES, Extension and the FRL. Commute distance and mode splits are most likely different from those of Corvallis Campus, yet no reliable commute data exists for these auxiliaries.</p>
<p>Data Sources: Sal Castillo, Institutional Research; Steve Nash, Payroll Manager; Rebecca Houghtaling, Senior Planner Campus Operations</p>	

Air Travel (Scope 3)

OSU used two travel agents in FY15: Teel’s Travel Planners and Azumano Travel. 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 costs. Teel’s Travel provided total number of trip segments booked by their firm for OSU groups. OSU Travel Reimbursement provided a similar list. All these reports included non-packaged, non-tour Athletics travel. Since Azumano had a complete report 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	14,735	66.12%
Teel's	4,597	20.63%
Travel Reimbursement	2,951	13.24%
Total	22,283	100.0%

Azumano booked 20,646,378 miles for OSU in FY15.

$$\begin{array}{rcl}
 \frac{20,646,378 \text{ miles}}{14,735 \text{ flight segments}} & = & \frac{x \text{ total miles}}{22,283 \text{ total flight segments}} \\
 & & x = 31,222,480 \text{ total miles}
 \end{array}$$

Approximately 5% of flights do not appear on travel agencies records due to airline’ ticket recording processes. That total is calculated below:

$$\text{Total OSU air mileage} = (1/0.95) * 31,222,480 = 32,783,604 \text{ miles}$$

In addition, non-Tres reimbursements accounted for 45,076 miles (based on reimbursement amounts). This brings total mileage to 32,828,680.

All air travel emissions were applied to the OSU Corvallis inventory as most travel for other campuses and research stations are funded through central business offices.

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

Athletic Travel: For each away game, the OSU Football team charters an Airbus 320 to take the team from Eugene, OR to the game destination. Using the fall 2014 football schedule at [osubeavers](#) and [webflyer](#), an airport distance calculator, the calculated distance flown by chartered football flights was 10,218.

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 of the CCC calculator, as it is not equipped to accurately calculate emissions resulting from a dedicated jet flight:</p> $\frac{11,608 \text{ kg. fuel}}{2,482 \text{ mi.}} \times \frac{1 \text{ gal jet fuel}^2}{3.06 \text{ kg Fuel}} \times \frac{21.095 \text{ lbs CO}_2^2}{1 \text{ gal jet fuel}} \times \frac{1 \text{ t}}{2205 \text{ lbs}} = 0.0146 \text{ t CO}_2\text{e}$ $\frac{0.0146 \text{ t CO}_2\text{e}}{\text{mi.}} \times 10,218 = 149.18 \text{ tCO}_2\text{e} \times 2.8 \text{ RFI} = 417.71 \text{ t CO}_2\text{e}$ $417.71 \text{ t CO}_2\text{e} \times 0.90718474 \text{ MT} = 378.94 \text{ MT CO}_2\text{e}$ <p>Emissions resulting from chartered football air travel are reported under the Directly Financed Travel category.</p>
<p>Data Sources: Teel’s Travel Planners; Julie Stratton, Business Affairs; Stephanie Smith, Business Affairs, Webflyers; European Environmental Agency Emissions Inventory Guidebook¹; Energy Information Agency. [Our condolences to Teel’s Travel Planners in the passing of Brad Teel.]</p>	

Table 10. Findings - Transportation

Other Major Sources

Solid Waste (Scope 3)	<p>Total weight of solid waste sent to coffin Butte Landfill in FY15: 1,714 short tons. (5.6 million lbs.). From the 1,714 short tons, 1,669 short tons were sent to the landfill for CH4 recovery and electric generation. The associated carbon dioxide equivalent resulting from solid waste, -29.6 MT CO₂e, is a negative value because energy generation from solid waste results in fewer emissions than would have been emitted by standard utility generation.</p> <p>Coffin Butte recovers methane and produces power, but it is unknown how much methane produced could be attributable to OSU waste. No solid waste information was available for the Statewides, HMSC or OSU-Cascades.</p>
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Data Source: Pete Lepre, Campus Recycling Manager; Republic Services

Animals and Agriculture	<p>Animals are raised and cared for at several OSU facilities. Their totals are displayed below:</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #f4a460;"> <th>Type</th> <th>Animal Science</th> <th>Union Station</th> <th>Burns Station</th> <th>Vet Med</th> <th>Soap Creek</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Dairy Cows</td> <td>118</td> <td>-</td> <td>-</td> <td>1</td> <td>-</td> <td>119</td> </tr> <tr> <td>Beef Cattle</td> <td>17</td> <td>241</td> <td>611</td> <td>1</td> <td>165</td> <td>1,035</td> </tr> <tr> <td>Horses</td> <td>16</td> <td>-</td> <td>2</td> <td>14</td> <td>3</td> <td>35</td> </tr> <tr> <td>Poultry</td> <td>350</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>350</td> </tr> <tr> <td>Sheep</td> <td>149</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>149</td> </tr> <tr> <td>Swine</td> <td>16</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>16</td> </tr> <tr> <td>Goats</td> <td>25</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>25</td> </tr> </tbody> </table>	Type	Animal Science	Union Station	Burns Station	Vet Med	Soap Creek	Total	Dairy Cows	118	-	-	1	-	119	Beef Cattle	17	241	611	1	165	1,035	Horses	16	-	2	14	3	35	Poultry	350	-	-	-	-	350	Sheep	149	-	-	-	-	149	Swine	16	-	-	-	-	16	Goats	25	-	-	-	-	25
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The College of Veterinary Medicine provided the number of treatment days for each type animal. The annual total was divided by 365, giving a yearly equivalent for each type. One type, “large animals’ was determined to be mostly llamas and alpacas. Because the Campus Carbon Calculator had no category or emissions factors for camelids, these animals were categorized as sheep because of their size and type of digestion system.

Emissions from animals kept at 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 Fertilizer application on OSU grounds is inadequately tracked, so totals may be incomplete. Emissions from fertilizer applied to Burns, Union and AES grounds were reported in the Statewides inventory. Emissions from the Dairy, OSU Corvallis grounds and Soap Creek and Berry Creek cattle ranches were reported in the OSU Corvallis inventory.

Location	Weight (lbs)	% Nitrogen
Burns	5,500	40%
Corvallis grounds	134,654	21%
Extension	204	27%
Ag. Exp. Stations	151,833	26%
Total	292,191	30.6%

Data Sources: Otila Zuschlag, Seth Spenser, Bill Coslow, Bill Callender, Tim DelCurto, Mandy Seals, Peter McPartland, Brian Lee Davis court, Jake Gibson

Refrigerants Refrigerants can be a powerful greenhouse gas and tracking their usage is required by EPA. Small amounts of gas can escape during typical equipment use or in cases of equipment failure. The following table outlines the type and amount of refrigerants used in FY15. Past years utilized data from FY11 due to a lack of refrigerant usage data.

Refrigerant	Weight (lbs)	GWP (100 year)
R-508b	3.25	13,396
R-12	18.5	2,400
R-22	258.6	1,700
R-134A	94.5	1,300
R-404A	64.1	3,260
R-409A	22.4	1,440

Data Source: Jon Champney, Facilities Stores

<p>Offsets (green tags, RECs, composting, etc)</p>	<p>OSU did not purchase RECs in FY15, but was provided a small amount for no cost by Pacific Power to offset energy use at the annual Corvallis Sustainability Coalition Town Hall, a community event hosted on campus.</p> <p>Composting totals for OSU were 2452.78 Tons composted off-site from diverse parts of the campus to include Vet Med Animal Bedding, Republic Services Organic Carts, Republic scrap wood composting. On-site composting totaling 620 tons, to include Wiegand Hall and the debris pile usage for mulch.</p> <p>Off-site composting is not included in offset totals, as this total reduces solid waste totals.</p>
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Table 11. Findings – Other Major Sources

Summary Tables and Figures

MODULE	Comprehensive FY15 Summary						
WORKSHEET	Overview of Annual Emissions						
UNIVERSITY	Oregon State University						
2015		Energy Consumption	CO2	CH4	N2O	eCO2	% change from FY14
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Co-gen Electricity	335,495.5	17,613,359.8	1,575.0	34.3	17,662.9	-6.7%
	Co-gen Steam	478,465.5	25,119,218.1	2,246.1	48.9	25,189.9	-12.6%
	Other On-Campus Stationary	71,453.5	3,264,573.6	307.9	8.0	3,274.7	-24.4%
	Direct Transportation	35,494.5	2,540,755.4	498.9	168.3	2,603.4	29.0%
	Refrigerants & Chemicals	-	-	-	-	433.1	9.1%
	Agriculture	-	-	87,213.1	1,906.5	2,748.5	-26.4%
Scope 2	Purchased Electricity	247,451.9	48,798,248.5	7,029.0	744.6	49,156.4	-2.3%
Scope 3	Faculty / Staff Commuting	44,152.7	3,152,321.3	655.0	219.4	3,234.1	4.6%
	Student Commuting	48,184.5	3,445,614.1	692.0	232.8	3,532.3	-2.5%
	Directly Financed Air Travel	74,775.0	14,583,365.5	144.6	166.2	15,054.8	-2.3%
	Other Directly Financed Travel	33,663.8	2,403,571.7	498.9	167.1	2,465.8	19.7%
	Solid Waste	-	-	-1,184.7	-	-29.6	-44.9%
	Scope 2 T&D Losses	16,251.0	3,258,753.9	469.4	49.8	3,285.3	4.0%
Offsets	Additional					-182.2	-30.2%
	Non-Additional					-2.2	0.0%
Totals	Scope 1	920,909.2	48,537,906.7	91,841.1	2,166.1	51,912.5	-10.9%
	Scope 2	247,451.9	48,798,248.5	7,029.0	744.6	49,156.4	4.1%
	Scope 3	217,382.1	26,848,548.3	1,275.4	835.3	27,547.6	1.0%
	All Scopes	58,454.4	124,184,703.5	100,145.5	3,746.0	128,616.5	-3.1%
	All Offsets					-184.4	-29.9%
Net Emissions:						128,432.2	-3.1%

Table 12. Comprehensive FY15 Summary

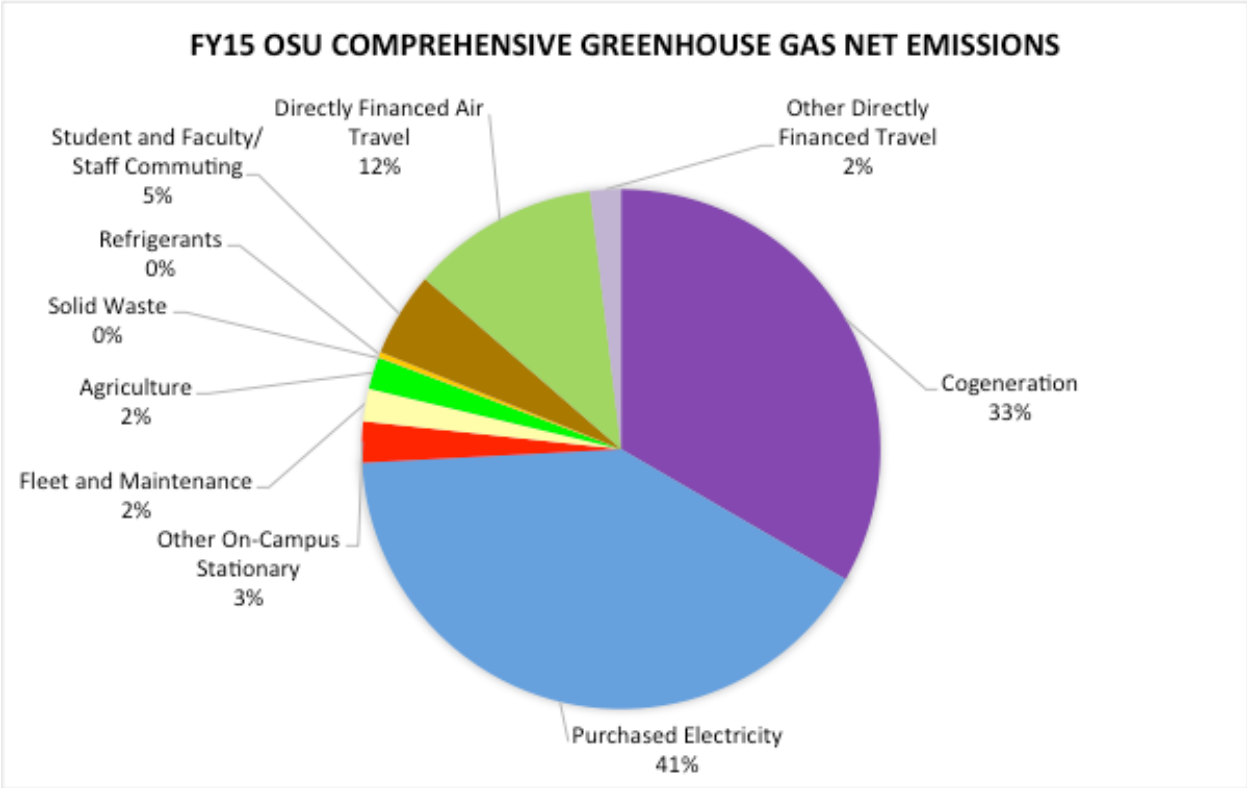


Figure 7. OSU Comprehensive Greenhouse Gas Net Emissions

MODULE	Corvallis FY15 Summary						
WORKSHEET	Overview of Annual Emissions						
UNIVERSITY	Oregon State University						
2015		Energy Consumption	CO2	CH4	N2O	eCO2	% change from FY14
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Co-gen Electricity	335,495.5	17,613,359.8	1,575.0	34.3	17,662.9	-6.7%
	Co-gen Steam	478,465.5	25,119,218.1	2,246.1	48.9	25,189.9	-12.6%
	Other On-Campus Stationary	55,243.6	2,532,193.4	235.4	5.8	2,539.8	-19.0%
	Direct Transportation	30,317.1	2,166,857.8	439.9	147.8	2,221.9	39.7%
	Refrigerants & Chemicals	-	-	-	-	433.1	1.4%
	Agriculture	-	-	37,719.8	1,019.6	1,246.8	-42.2%
Scope 2	Purchased Electricity	218,185.0	45,670,425.9	6,661.2	678.1	46,039.0	5.8%
Scope 3	Faculty / Staff Commuting	42,136.8	3,008,157.4	626.1	209.6	3,086.3	1.2%
	Student Commuting	46,041.8	3,292,246.0	661.8	222.6	3,375.1	2.7%
	Directly Financed Air Travel	73,213.7	14,278,872.5	141.5	162.7	14,749.2	0.7%
	Other Directly Financed Travel	33,663.8	2,403,571.7	498.9	167.1	2,465.8	19.7%
	Solid Waste	-	-	-1,184.7	-	-29.6	-44.9%
	Scope 2 T&D Losses	14,525.9	3,040,559.2	443.5	45.1	3,065.1	5.9%
Offsets	Additional					-182.2	-30.2%
	Non-Additional					-2.2	-1.9%
Totals	Scope 1	899,521.8	47,431,629.0	42,216.1	1,256.3	49,294.5	-10.5%
	Scope 2	218,185.0	45,670,425.9	6,661.2	678.1	45,999.6	5.7%
	Scope 3	209,582.0	26,023,406.7	1,187.2	807.2	26,711.9	1.6%
	All Scopes	1,327,288.8	119,125,461.6	50,064.5	2,741.6	122,006.0	-2.3%
	All Offsets					-184.4	-97.4%
Net Emissions:						121,821.6	-2.2%

Table 13. Corvallis FY15 Summary

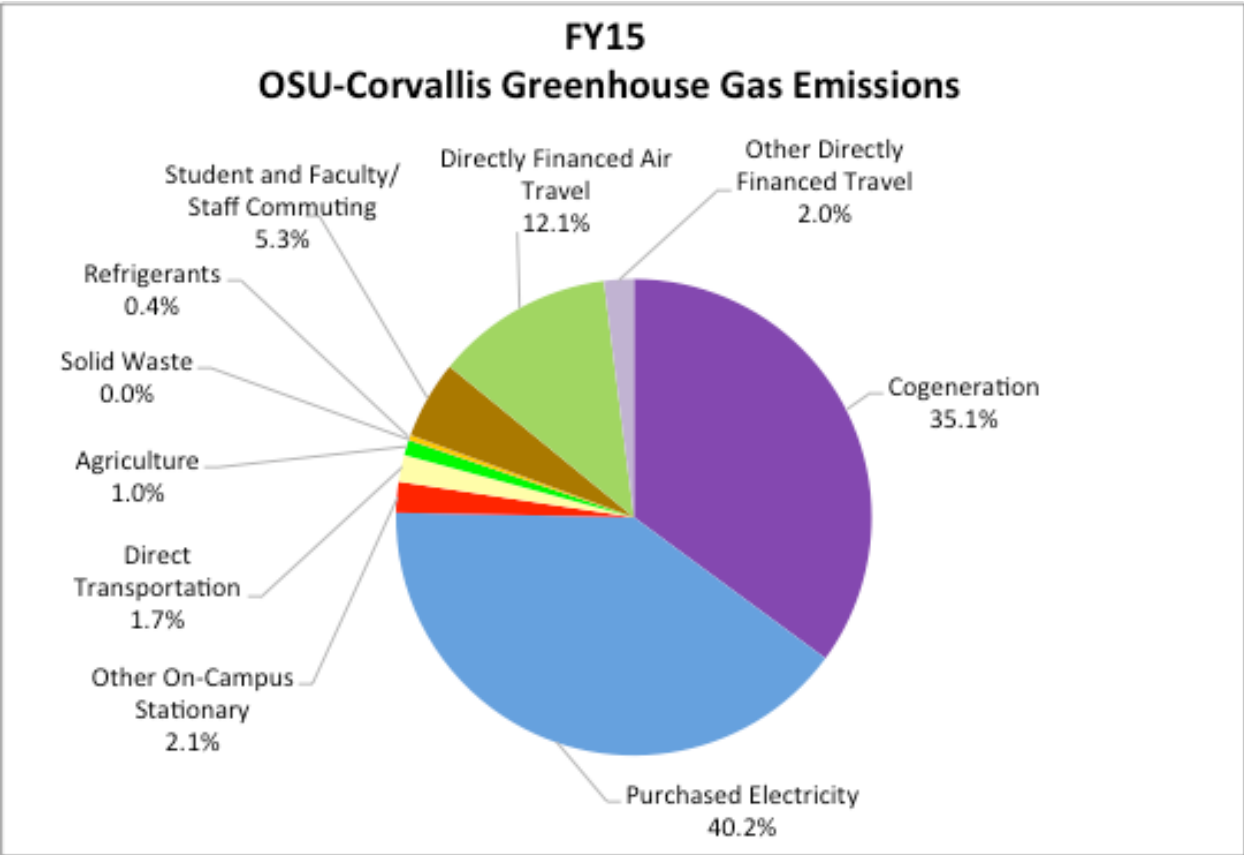


Figure 8. OSU Corvallis Greenhouse Gas Net Emissions

MODULE		OSU Cascades FY15 Summary					
WORKSHEET		Overview of Annual Emissions					
UNIVERSITY		Oregon State University					
2015		Energy Consumption	CO2	CH4	N2O	eCO2	% change from FY14
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	2,126.7	112,757.6	10.1	0.2	113.1	-23%
Scope 2	Purchased Electricity	3,691.3	790,662.9	112.7	11.5	796.9	0%
Scope 3	Faculty / Staff Commuting	539.9	38,642.4	7.6	2.6	39.6	12%
	Student Commuting	2,142.7	153,368.1	30.2	10.2	157.2	116%
	Scope 2 T&D Losses	243.2	52,081.6	7.4	0.8	52.5	0%
Totals	Scope 1	2,126.7	112,757.6	10.1	0.2	113.1	-23%
	Scope 2	3,691.3	790,662.9	112.7	11.5	796.9	0%
	Scope 3	2,925.7	244,092.2	45.2	13.5	249.2	-1%
	All Scopes	8,743.8	1,147,512.8	168.0	25.2	1,159.2	-3%
Net Emissions:						1,159.2	-2.7%

Table 14. Cascades FY15 Summary

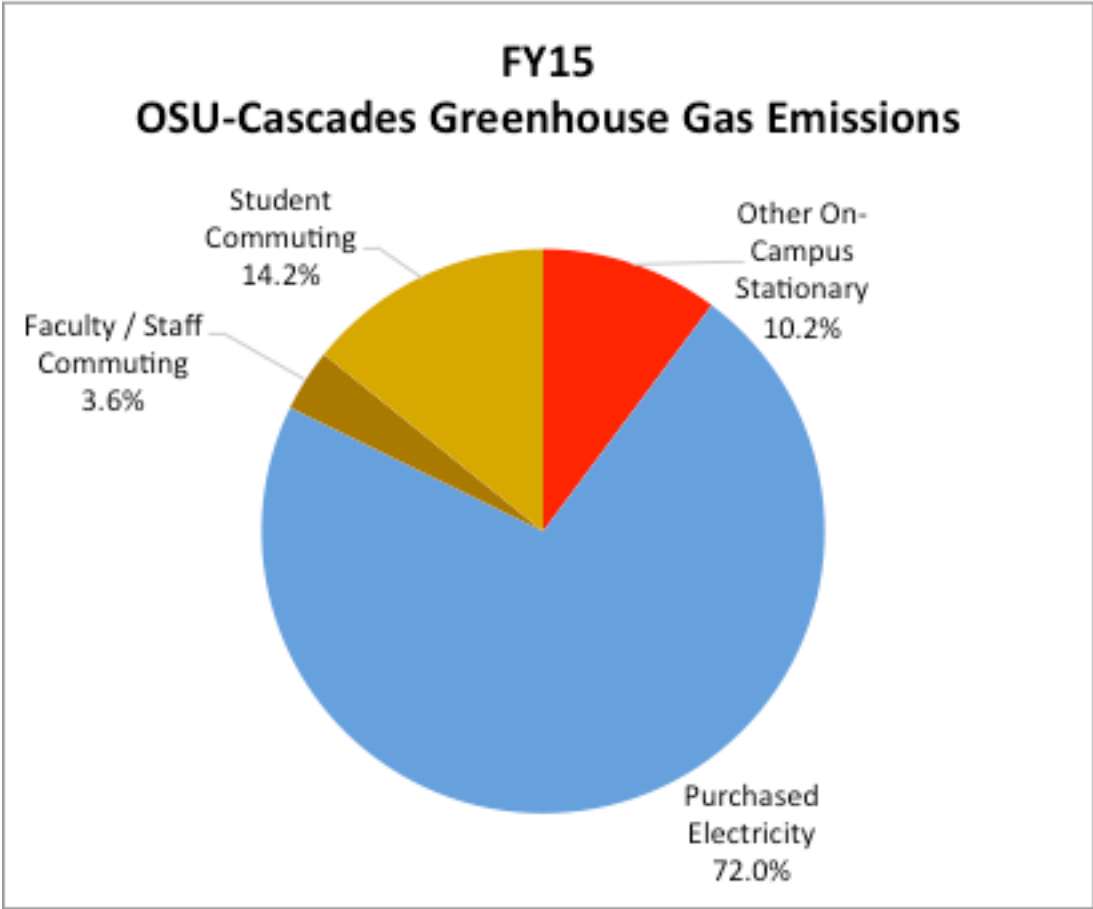


Figure 9. OSU Cascades Greenhouse Gas Net Emissions

MODULE		HMSC FY15 Summary					
WORKSHEET		Overview of Annual Emissions					
UNIVERSITY		Oregon State University					
2015		Energy Consumption	CO2	CH4	N2O	eCO2	% change from FY14
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	340.0	18,026.8	1.6	0.0	18.1	-38.5%
	Direct Transportation	5,177.5	373,897.6	59.0	20.6	381.5	-10.7%
Scope 2	Purchased Electricity	5,392.2	74,718.4	3.5	2.0	75.4	-17.4%
Scope 3	Faculty / Staff Commuting	1,476.1	105,521.5	21.3	7.2	108.2	-39.1%
	Directly Financed Air Travel	1,561.3	304,493.0	3.0	3.5	305.6	-14.8%
	Scope 2 T&D Losses	355.2	4,921.8	0.2	0.1	5.0	-17.2%
Totals	Scope 1	5,517.5	391,924.4	60.6	20.6	399.6	-12.5%
	Scope 2	5,392.2	74,718.4	3.5	2.0	75.4	-17.4%
	Scope 3	3,392.5	414,936.3	24.6	10.8	418.8	-22.8%
	All Scopes	14,302.2	881,579.0	88.7	33.4	893.7	-18.0%
Net Emissions:						893.7	-18.0%

Table 15. HMSC FY15 Summary

FY15 Hatfield Marine Science Center Greenhouse Gas Emissions

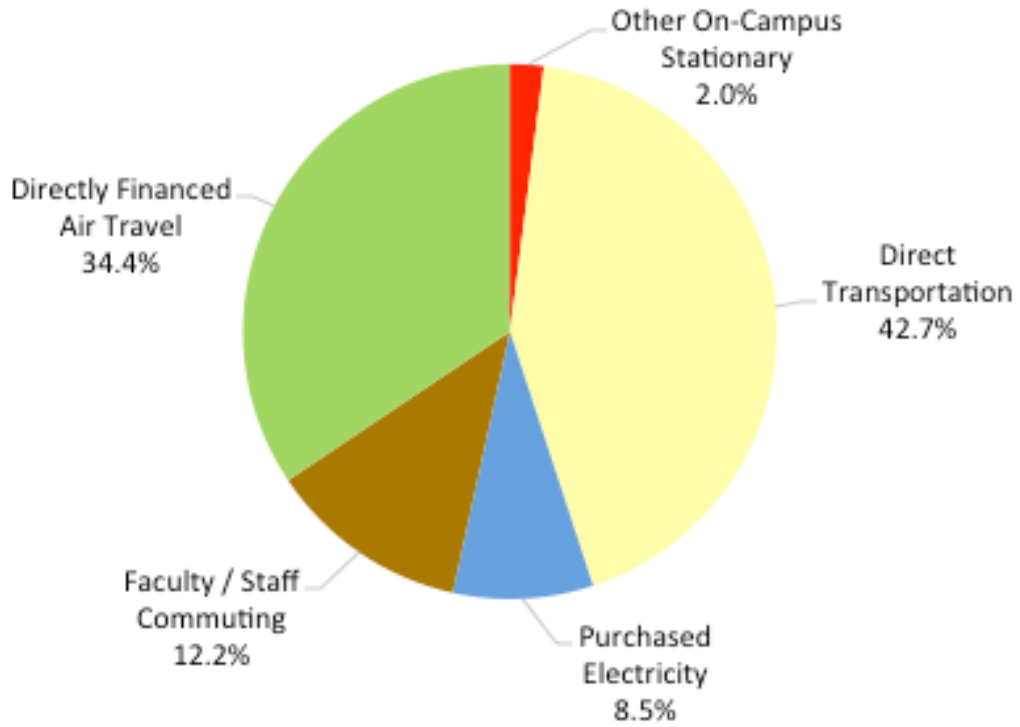


Figure 10. OSU HMSC Greenhouse Gas Net Emissions

MODULE		Statewides FY15 Summary					
WORKSHEET		Overview of Annual Emissions					
UNIVERSITY		Oregon State University					
2015		Energy Consumption	CO2	CH4	N2O	eCO2	% change from FY14
		MMBtu	kg	kg	kg	Metric Tonnes	
Scope 1	Other On-Campus Stationary	13,743.2	601,595.7	60.9	2.0	603.7	-40.7%
	Agriculture	-	-	49,493.4	887.0	1,501.7	-4.7%
Scope 2	Purchased Electricity	20,183.3	2,262,441.3	251.6	53.0	2,284.5	-18.5%
Scope 3	Scope 2 T&D Losses	1,481.9	166,113.1	18.5	3.9	167.7	-18.5%
Totals	Scope 1	13,743.2	601,595.7	49,554.3	889.0	2,105.4	-18.8%
	Scope 2	20,183.3	2,262,441.3	251.6	53.0	2,284.5	-18.5%
	Scope 3	1,481.9	166,113.1	18.5	3.9	167.7	-18.5%
	All Scopes	35,408.4	3,030,150.1	49,824.3	945.8	4,557.6	-18.6%
Net Emissions:						4,557.6	-18.6%

Table 16. Statewides FY15 Summary

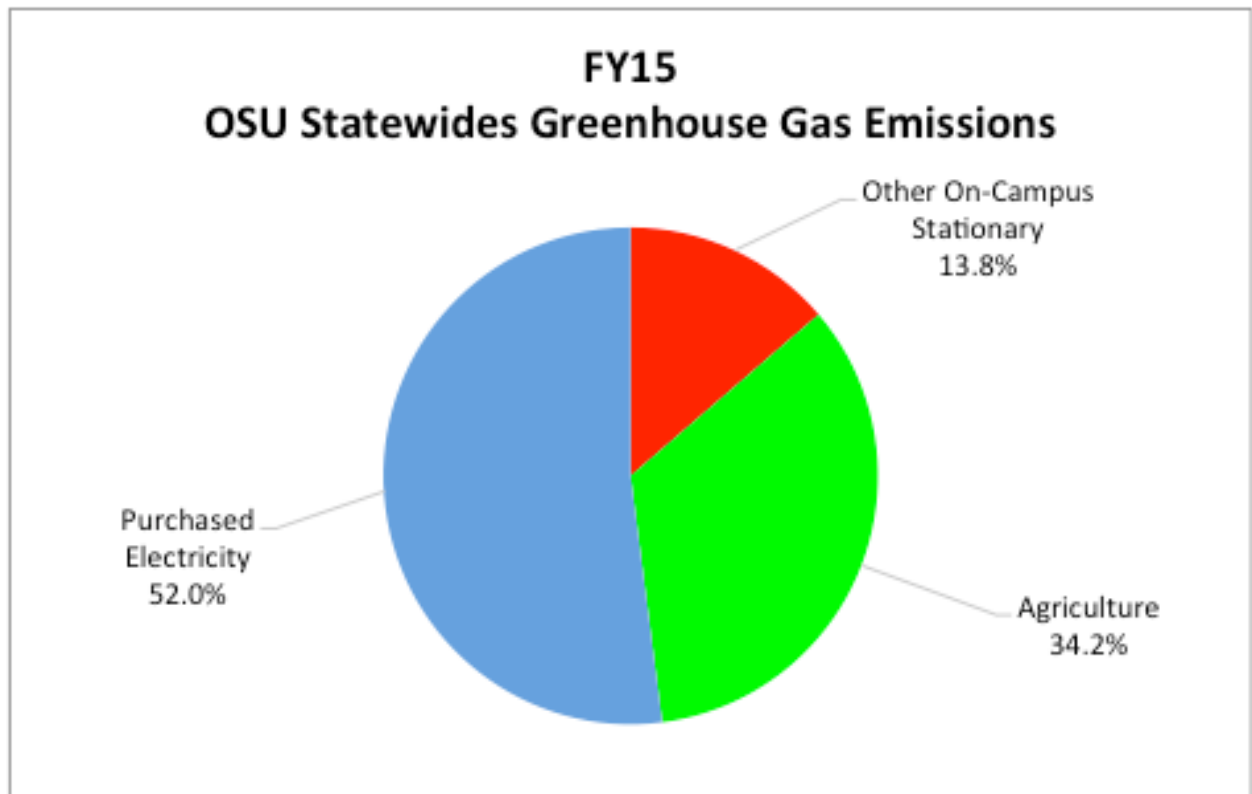


Figure 11. OSU Statewides Greenhouse Gas Net Emissions