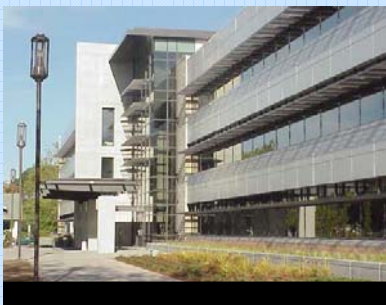


# *Greenhouse Gas Emissions of State Operations*

State of Oregon  
2009



Interagency Team Report  
Reporting Year Data 2008

Greenhouse Gas Emissions  
Interagency Team Report

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## Executive Summary

Governor Ted Kulongoski is Oregon's first governor to make the fight against global warming a priority, adding that state government would do its part to reduce greenhouse gas emissions from state buildings and associated activities. Knowing that a number of opportunities exist to improve the environmental performance of state government, the Governor signed Executive Order No. 06-02 directing the Department of Administrative Services (DAS) to coordinate an Interagency Team to establish a baseline for state government emissions and recommend best practices for reducing emissions.

The objective of the Interagency Team was to categorize those government activities most impacting greenhouse gas emissions. The team concluded that building energy consumption and transportation were the most significant contributors to greenhouse gas emissions; however, solid waste was also included due to its potentials for recycling and implementing best practices to reduce its generation. Together, with ongoing state energy and materials conservation practices, this report recommends areas where future inventory tools and best practices should be considered to continue to advance the goal of reducing greenhouse gas emissions of state government.

This report was prepared by DAS with significant input from the other members of the Interagency Team. The Interagency Team was comprised of staff from:

- Oregon University System (OUS)
- Oregon Department of Energy (ODOE)
- Oregon Department of Environmental Quality (ODEQ)
- Oregon Department of Transportation (ODOT)
- DAS Fleet
- DAS Facilities
- Governor's Sustainability Policy Advisor

The Interagency Team tracks electricity, solid waste, transportation, heating fuel and overall greenhouse gas emissions. For 2008 the Interagency Team reports the following:

### Electricity:

State government continued to see a downward trend in electricity use. The 2008 data showed an overall decrease of 1.57%, on top of 8.6% in 2007. Combined, the total reduction in electricity for state agencies exceeds 10% in two years. This is a phenomenal achievement considering that square footage of buildings continues to increase. This decrease represents the state's progress toward the goal of reducing building energy consumption by 20% over the year 2000 by 2015.

### Transportation:

Transportation increased by 9.5% for state government operations. The Department of Transportation continued to be the largest user of fuel and increased its consumption by 8%. It was followed closely by Department of Administrative Services with a 4% increase and State Police with 5.5%. This increase is primarily attributed to a colder winter that required extensive highway sanding by ODOT, more transportation needs by agencies using DAS fleet vehicles due to the recession, and more police officers patrolling the roads.

### Solid Waste:

Solid waste disposal decreased by 25% in state government operations in 2008. Nearly all medium to large state agencies decreased their disposal, while only a few saw significant increases. This reduction compliments the re-energized focus on recycling that launched in 2008.

#### Heating Fuel:

State government's decrease in heating fuel did not continue into 2008. Due to colder weather in 2008, state facilities required about 9% more heating than 2007. This amounted to an increase of 12% in the state's heating fuel use for 2008.

#### Overall Greenhouse Gas Emissions:

The total 2008 reporting year results for state government are 614,691 metric tons eCO<sub>2</sub>. This represents a 1.47% increase over emissions from the last report, representing the 2007 reporting year, and a 2.46% increase from the 2006 baseline year. This increase is primarily attributed to the state's increase in transportation and heating fuel.

## Introduction

For many years, the State of Oregon has looked for ways to diminish the impact on the environment from state government operations. One of the more significant indicators of success is reducing greenhouse gas emissions. In his first four years in office, Governor Ted Kulongoski established combating global warming as one of his priorities. To that end, he involved Oregon in a three-state west coast collaboration on regional strategies to reduce greenhouse emissions. He created the state's first comprehensive look at reducing greenhouse gas emissions through the creation of a Global Warming Advisory Group. Key recommendations from the advisory group that already have been implemented include having Oregon adopt cleaner automobile tailpipe emissions standards, increasing the use of renewable energy statewide in Oregon and in state government, and establishing greenhouse gas reduction goals for the state as follows:

- arrest increased emissions by 2010;
- reduce to 10% below 1990 levels by 2020;
- reduce to 75% below 1990 levels by 2050 to fully stabilize and eliminate the negative impacts of greenhouse gas emissions.

To further these efforts, in his Executive Order No. 06-02, the Governor directed the DAS to lead an Interagency Team and author a methodology for state agencies to develop greenhouse gas emission baseline assessments, a methodology for tracking and reporting emissions in the future, and to recommend best practices for reducing greenhouse gas emissions in order to ensure that state government shows leadership in addressing and ultimately complying with the state greenhouse gas reduction goals.

In developing this report, the Interagency Team was mindful of complementary goals begun by the Governor which impact greenhouse gas emissions. These include:

- the Governor's call for 100 percent renewable electricity to be used in state government by 2025;
- the Governor's directive to green the state vehicle fleet by transitioning to hybrid and alternative fuel vehicles and to use increasing amounts of alternative fuels; and
- the Governor's call for state government to reduce energy use by 20 percent by 2015 (from a 2000 baseline).

This report focuses on the owned facilities, vehicles and equipment within state government. Strategies for including state-leased buildings are included in the best practices section but full inclusion of leased space will need to occur in the future. Similarly, strategies for addressing emissions associated with materials use, emissions from third party entities working on state projects, and emissions from state employee commuting and airline travel, also will be addressed in future iterations.

## 2008 Reporting Year Results

The total 2008 reporting year results for state government are **614,691 metric tons eCO<sub>2</sub>**. This represents a 1.47% increase over emissions from the last report, representing the 2007 reporting year, and a 2.46% increase from the 2006 baseline year.

The 2008 reporting year emissions equate to:

- One hundred six thousand passenger cars on the road, or
- Electricity for 72,400 homes, or
- The carbon sequestered by over fourteen million trees for ten years.

This is about 0.1% of the total emissions for the United States, including all production from residential, commercial, industrial, and transportation sources.

A detailed listing of the data, reporting factors, and percentage changes by agency is included in the tables and graphs that follow.

**Table 1  
State Government Agency Profile  
2008 Reporting Year Emissions**

Agency	Facility Electricity (MMBTU)	Facility Heating Fuel (MMBTU)	Transportation (gallons)	Solid Waste (short tons)*	Total Metric Tons eCO <sub>2</sub> Emissions	% of State Government Total
Agriculture	166	643	166,287	3 <sup>4</sup>	1,554	0.25
Aviation	197	74	8,908	5 <sup>4</sup>	126	0.02
Corrections	229,235	572,372	309,670	18 <sup>5</sup>	83,614	13.60
DAS	169,827	59,002	63,465	1,212 <sup>4</sup>	39,417	6.41
Education	6,501	26,014	10,607	3 <sup>5</sup>	2,785	0.45
Employment	6,135	4,182	45,709	47 <sup>4</sup>	1,864	0.30
Energy	604	334	4,052	7 <sup>4</sup>	175	0.03
Environmental Quality	11,211 <sup>1</sup>	4,484 <sup>1</sup>	68,289	84 <sup>4 7</sup>	3,323	0.54
Fish & Wildlife	45,468	6,400	472,535	377 <sup>4</sup>	13,970	2.27
Forestry	16,469	12,456	510,425	279 <sup>4</sup>	8,832	1.44
Human Services, Other	100,488 <sup>1</sup>	40,195 <sup>1</sup>	690,554	757 <sup>4 7</sup>	30,490	4.96
Human Services, State Hospital	23,765	134,416	<sup>2</sup>	0.83 <sup>5</sup>	5,375	0.87
Judicial	1,602	1,421	6,231	19 <sup>4</sup>	452	0.07
Lands, State	3,990	3,128	16,296	30 <sup>4</sup>	1,114	0.18
Legislative	10,277	8,560	1,608	125 <sup>4</sup>	2,529	0.41
Liquor Commission	5,301	9,228	26,773	101 <sup>4</sup>	1,824	0.30
Lottery, State	6,851	3,211	384,488	37 <sup>4</sup>	4,985	0.81
Military	117,417	158,593	45,696	1,424 <sup>4</sup>	33,954	5.52
Parks & Recreation	52,391	17,478	235,009	1,063 <sup>5</sup>	14,758	2.40
PERS	4,608	102	4,407	23 <sup>4</sup>	981	0.16
Police, State	14,232 <sup>1</sup>	5,693 <sup>1</sup>	970,583	107 <sup>4 7</sup>	12,116	1.97
Public Safety, Standards & Training	9,561	11,119	40,102	121 <sup>5</sup>	2,862	0.47
Transportation	163,470	97,563	3,794,512	160 <sup>4 6</sup>	72,490	11.79
University System, Oregon	804,885	1,607,479	452,516	7,638 <sup>4</sup>	259,261	42.18
Veterans	10,233	13,067	4,776	74 <sup>4</sup>	2,793	0.45
Youth Authority	30,481	68,155	100,676	3 <sup>5</sup>	11,039	1.80
<b>TOTAL</b>	<b>1,849,706</b>	<b>2,817,567</b>	<b>8,434,174</b>	<b>13,718</b>	<b>614,691</b>	<b>100%</b>

*Note: This table does not represent all state agencies. This analysis only includes those agencies with statutory authority to own buildings, those who consume significant quantities of building or transportation fuel, or those whose missions are relevant to this report.*

<sup>1</sup> Electricity and heating fuel use for leased buildings are not actuals due to complications in the leasing structure, but based on DAS/sq ft usage.

<sup>2</sup> State Hospital transportation use reported in Dept of Human Services total.

<sup>3</sup> Human Services Building use reported in Dept of Administrative Services total and State Hospital reported separately.

<sup>4</sup> Offices and remote locations are based on DAS figure of 0.75lb/sq ft/year.

<sup>5</sup> 24/7 facilities solid waste tons are based on Corrections figure of 2.56 lbs/inmate. Parks are based on this same figure of 2.56 lbs/overnight guest.

<sup>6</sup> ODOT maintenance yards are excluded from the solid waste figures for this report, but will be included in future reports. ODOT office areas are based on the DAS solid waste figure.

<sup>7</sup> Square footage calculation used for garbage figures for DHS, OSP, ODOT and DEQ based on 2008 leased office space in the DAS database.

**Table 2  
State Government Agency Profile  
CO<sub>2</sub> Emission Comparison**

Agency	Total Metric Tons eCO <sub>2</sub> Emissions 2006	Total Metric Tons eCO <sub>2</sub> Emissions 2007	Total Metric Tons eCO <sub>2</sub> Emissions 2008	Percent Increase or Decrease in eCO <sub>2</sub> Emissions 2006-2007	Percent Increase or Decrease in eCO <sub>2</sub> Emissions 2007-2008	Percent Increase or Decrease in eCO <sub>2</sub> Emissions 2006-2008
Agriculture	1,675	1,468	1,554	-12.36	+5.86	-7.22
Aviation*	122	126	126	0	0	0
Corrections	80,507	88,134	83,614	+9.47	-5.13	+3.86
DAS*	35,639	36,602	39,417	+4.26	+7.69	+12.28
Education	3,017	2,898	2,785	-3.94	-3.90	-7.69
Employment	2,036	1,627	1,864	-20.09	+14.57	-8.45
Energy*	191	168	175	-20.00	+4.17	-16.67
Environmental Quality	4,157	3,163	3,323	-23.91	+5.06	-20.06
Fish & Wildlife	12,593	12,857	13,970	+2.10	+8.66	+10.93
Forestry*	10,298	8,747	8,832	+2.40	+1.47	+3.91
Human Services, Other	24,072	25,867	30,490	+7.46	+17.87	+26.66
Human Services, State Hospital	10,617	10,341	5,375	-2.60	-48.02	-49.37
Judicial	352	480	452	+36.36	-5.83	+28.41
Lands, State	957	1,025	1,114	+7.11	+8.68	+16.41
Legislative	2,581	2,789	2,529	+8.06	-9.32	-2.01
Liquor Commission	1,441	1,662	1,824	+15.34	+9.75	+26.58
Lottery, State	3,092	4,838	4,985	+56.47	+3.04	+61.22
Military	30,272	34,451	33,954	+14.10	-1.70	+12.16
Parks & Recreation	15,387	17,171	14,758	+11.59	-14.05	-4.09
PERS	952	1,000	981	+5.04	-1.90	+3.05
Police, State	9,843	10,694	12,116	+8.65	+13.30	+23.09
Public Safety, Standards & Training	1,476	2,931	2,865	+98.58	-2.35	+93.90
Transportation*	79,891	66,572	72,490	-24.04	+8.89	-17.28
University System, Oregon*	253,631	254,586	259,261	+0.38	+1.84	+2.22
Veterans	2,682	2,882	2,793	+7.46	-3.09	+4.14
Youth Authority	10,445	10,625	11,039	+1.72	+3.90	+5.69
<b>TOTAL</b>	<b>605,371</b>	<b>605,758</b>	<b>614,691</b>	<b>+0.98%</b>	<b>+1.47%</b>	<b>+2.46%</b>

**Table 3  
State Government Agency Profile  
Breakdown of Changes in Emissions  
Percent Change Compared to 2007**

Agency	Facility Electricity	Facility Heating Fuel	Transportation	Solid Waste	Change from 2007
Agriculture	-9.00	+66.29	+5.33	-14.19	+12.11
Aviation	-14.37	-15.32	+4.60	-42.05	-16.78
Corrections	-9.88	-11.12	+4.34	-42.05	-3.11
DAS	+6.49	+24.18	+4.62	-18.49	+4.20
Education	-5.59	-2.24	-5.47	-82.15	-33.86
Employment	+12.82	+15.54	+19.24	-5.03	+10.64
Energy	+6.50	-3.52	+0.97	-26.19	-5.56
Environmental Quality	-4.41	+44.94	+1.86	-30.79	+2.90
Fish & Wildlife	+11.06	+15.99	+8.25	0	+8.82
Forestry	-1.51	+51.61	+0.63	-29.4	+5.33
Human Services, Other	+7.52	+43.15	+17.11	-18.36	+12.36
Human Services, State Hospital	+5.30	+39.83	0	-16.80	+5.91
Judicial	-14.25	+1.89	+77.42	-23.54	+10.38
Lands, State	+3.87	+44.73	+4.97	-13.17	+10.10
Legislative	-14.45	+22.66	+17.12	-24.50	+0.20
Liquor Commission	+5.70	+28.31	+2.22	-24.97	+2.80
Lottery, State	+5.93	+8.47	+1.63	-24.52	-2.12
Military	+1.84	-6.57	+14.51	-24.68	-3.72
Parks & Recreation	-3.11	-11.27	+0.53	-64.84	-19.67
PERS	-2.12	-3.67	+10.76	-26.85	-5.47
Police, State	-26.75	-68.73	+5.52	-8.39	-24.68
Public Safety, Standards & Training	-5.90	+3.25	+3.54	-63.59	-15.67
Transportation	+10.22	+4.42	+8.42	0	+5.77
University System, Oregon	+1.78	+23.06	-0.63	-62.34	+1.84
Veterans	-4.07	-1.14	+11.93	-16.74	-2.51
Youth Authority	+6.19	-2.12	+17.98	-1.87	+5.05
<b>TOTAL</b>	<b>-1.57%</b>	<b>+12.02%</b>	<b>+9.50%</b>	<b>-25.43%</b>	<b>+1.47%</b>

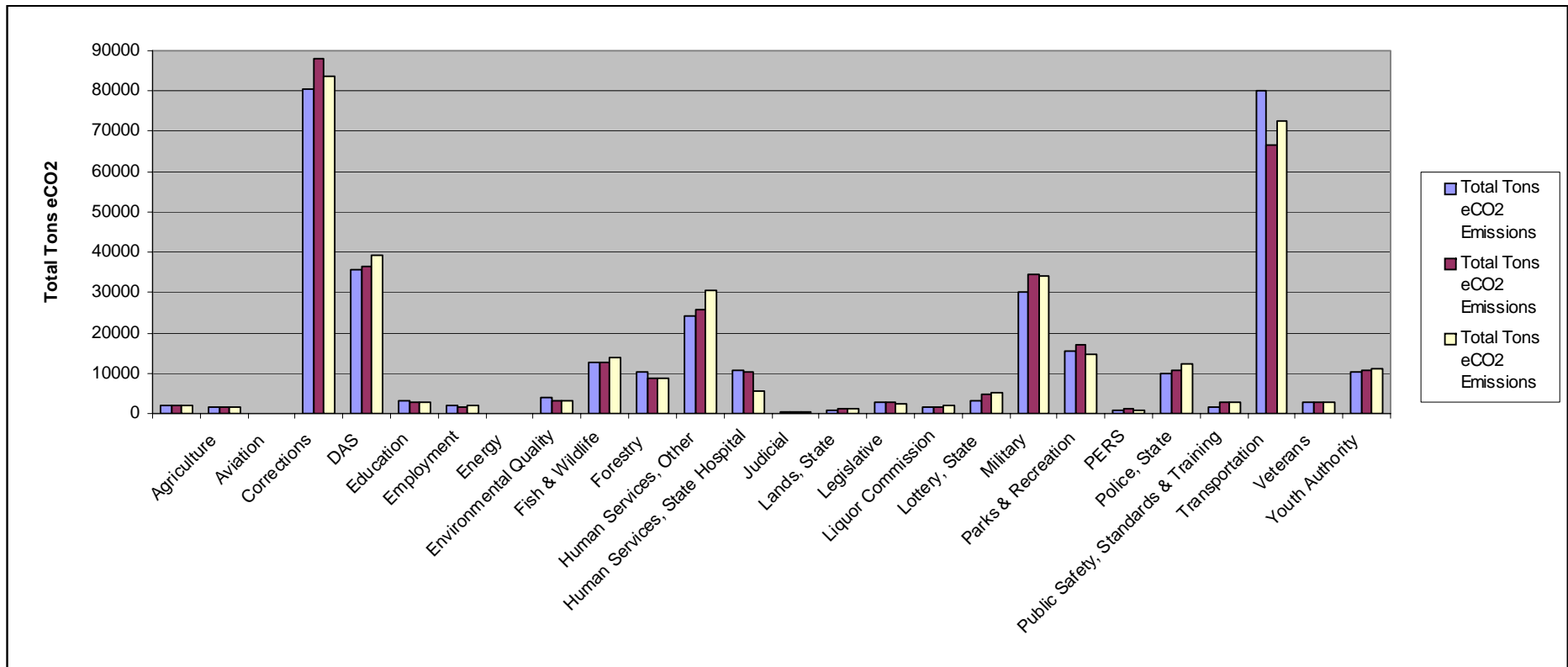
**Table 4  
1990\*  
State Government Emissions from Internal Operations**

Agency	Total Tons eCO <sub>2</sub> Emissions 1990	Total Tons eCO <sub>2</sub> Emissions 2008	Percent Increase or Decrease in eCO <sub>2</sub> Emissions
DAS	22,811	39,417	+72.78%
Transportation	25,318	72,490	+186.32%

\* The 1990 calculations are for broad comparison only and have not been determined as official baseline numbers. The numbers are based on the emissions from building square footage and fleet vehicles only.



**Chart 1  
State Government Agency Greenhouse Gas Emissions  
2006-2008**



Note: the above chart does not include the Oregon University System.

**Table 5**  
**2008 Oregon State Agencies' Facility Energy Use**  
 (provided by Oregon Department of Energy)

Agency	Electricity	Nat. Gas	#5 Oil	Diesel	Kerosene	Propane
	kWh	therms	gal	gal	gal	gal
Admin Services	49,758,722	590,022				
Agriculture	48,527	6,428				
Aviation	57,819		415	84		
Corrections	75,089,134	6,596,672				27,008
Education	1,904,808	260,139				
Employment	1,797,597	41,815				
Energy	177,040	3,344				
Fish & Wildlife	13,321,974	32,825			400	33,445
Forestry	4,825,330	118,592		2,986		1,984
Parks & Recreation	15,350,392	62,397				122,684
Transportation	47,896,280	695,153				306,203
Veterans	2,998,120	130,668				
State Lands	1,169,205	31,276				
Legislative Admin	3,011,045	85,599				
Liquor Control Comm.	1,553,111	92,276				
Military	34,402,788	1,556,618				31,995
Lottery	2,007,400	32,113				
Oregon Univ. System	235,829,110	16,074,793				
Oregon Youth Authority	8,930,851	681,546				66,340
PERS	1,350,200	1,024				
State Hospital	6,963,194	1,344,159			36,269	
Public Safety S&T	2,801,290	111,193				
<b>TOTAL</b>	<b>511,243,937</b>	<b>28,548,652</b>	<b>415</b>	<b>3,070</b>	<b>36,669</b>	<b>589,659</b>

## Best Practices for Mitigation Measures

The purpose of compiling this inventory is to identify and quantify the sources of greenhouse gas emission in Oregon state government operations. These data will be the basis for establishing greenhouse gas emission targets which, at the discretion of the Governor, can be set for individual agencies or for state government operations as a whole.

In addition to the Governor's goals for greenhouse gas reductions, the state intends to explore:

- Development of one or more state renewable energy facilities – or partnering with a private developer to purchase the output of renewable energy.
- Participate in utility renewable energy purchase programs.
- Expand the use of cost-effective solar energy in state buildings.

- Continue to promote legislation that authorizes state agencies to develop renewable energy on state forests, state lands, state campuses and other state property.

## Long-term Inventory Improvement Practices

During this process of developing the strategy to capture greenhouse gas emission data, the team identified areas where future improvements in data collection and analysis should be considered:

### Incorporate in the 2010 report

- Development of a system to capture the amounts of greenhouse gas emissions generated as it correlates to the amount of paper and other materials purchased, recycled, and composted by an agency
- Procurement practices (i.e. consider the embedded energy of items procured, how it relates to overall GHG consumption, and ways to mitigate these impacts)
- Implementation of educational programs for agency personnel staff
- Improved data collection of waste generation (trash and recycling)

### Incorporate in the 2011 report

- Business air travel
- Data on energy use and waste generated from agencies in leased locations
- Data on vehicle use from leased fleets (such as Flexcar in Portland)
- Reporting of emissions generated from construction of buildings (both materials and operations)
- Normalizing of data by employee, by facility, etc. to help identify trends and/or improvement strategies
- Increase Scope 2 reporting and add Scope 3 reporting (these emissions come from indirect sources, as opposed to Scope 1, which come from direct sources such as electrical production).

### Incorporate in the 2012 report or beyond

- Employee commuting data
- Development of systems to capture energy data, i.e. street lighting, fish hatcheries
- Emissions from third parties working on contract on state projects
- Emissions associated with water production and transportation

## Conclusion

While greenhouse gas emissions from state government operations increased during 2008, the Interagency Team is confident the state will reach its long-term goals. In 2008, many agencies increased their sustainability presence and began tracking these factors more closely. Some of these factors are Scope 2, but many are Scope 3, which are not yet represented in this report. The team plans to expand the reporting to include Scope 3 as the data is available. As that data is worked into the baseline and yearly updates, it will improve the state operations emission picture. Finally, agencies will see a major reduction when they move to 100% renewable electricity by 2025.

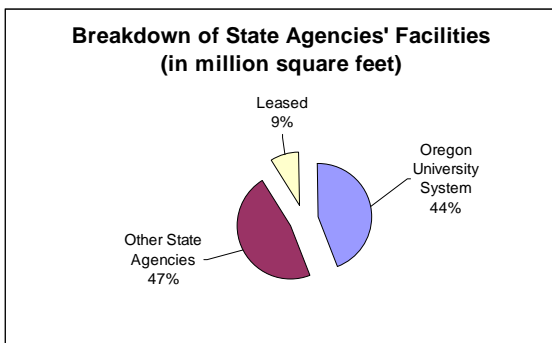
Report was compiled on February 19, 2010 by:

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Appendix A – Scope and Description of Oregon State Government

The State of Oregon is made up of a multitude of services and programs. There are over 70 state agencies, with approximately 37,000 full-time employees, occupying 4,685 buildings. Of these, 376 buildings have individual values of more than 1 million dollars. These facilities use significant amounts of energy to heat and cool buildings, power machinery and fish hatcheries and light workspaces. State agencies own and manage approximately 20 million square feet of facility assets and leases an additional 4 million feet of office and storage space. The Oregon University System, comprised of 7 campuses, includes 1,172 buildings totaling 21.5 million square feet. Together, the state manages about 42 million square feet of facility assets, consuming electricity, heating oil, natural gas, and other fuels that power equipment and provide light, heating and cooling, and hot water to building occupants.

**Graph 2**

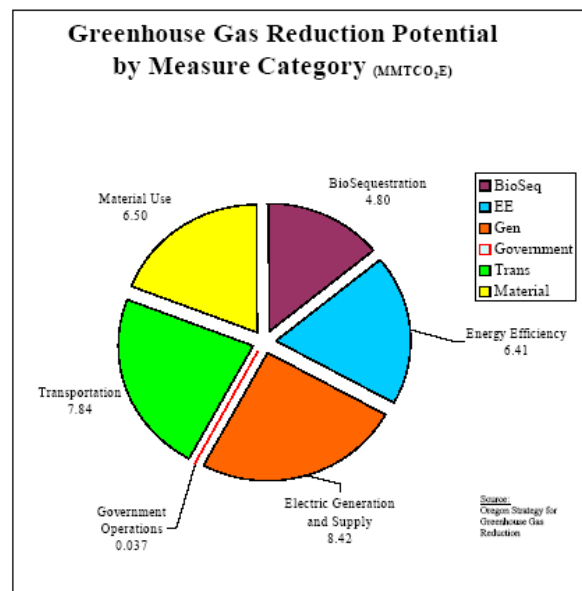
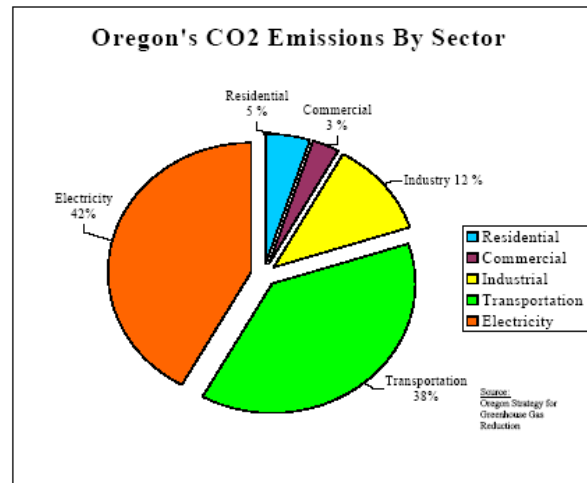


Significant amounts of fuel are also used by state agency fleets for transportation purposes. From gasoline used in state-owned light fleet vehicles to diesel fuel used in state trucks and heavy equipment, fuel is consumed to ensure the successful day-to-day operation of state business.

State government has an opportunity to lead in the reduction of greenhouse gas emissions by lowering energy consumption, increasing the use of renewable energy, and utilizing less polluting fuels for operating vehicles and equipment.

Reducing the amount of solid waste that results from state government operations leads to reduced greenhouse emissions. More importantly, by tracking solid waste, the emission reduction potential of important sustainability programs, such as recycling and reuse efforts, can be calculated and credited to state agencies.

**Graph 3  
State of Oregon General Emissions**



Appendix B – Inventory Scope, Methodology and Calculations Descriptions  
from 2006 Reporting Year Report

Inventory Scope and Methodology

In order to estimate and report on the amount of greenhouse gas emissions from state government operations, the Interagency Team used data from the following energy sources, initially:

Building Energy:

- Electricity
- Natural Gas
- Heating Fuels

Transportation:

- Fuel Consumption (state-owned and operated light-, medium-, and heavy-duty vehicles, on-road and off-road)

Solid Waste:

- Garbage tonnage

It is important to note that the emissions associated with producing the goods that the state purchases (some fraction of which are subsequently disposed of as waste) are not included due to insufficient procurement data. Similarly, credits associated with recycling and composting by state agencies are also not included. The magnitude of emissions (or credits) in both of these categories are much larger than the magnitude of disposal-related emissions. Users of the Inventory should be cautioned not to place undue emphasis on the relatively small contribution of solid waste disposal; agency decisions regarding recycling and procurement of materials are typically more significant than disposal-related impacts, but are not reflected in the current inventory.

In addition, the metric for establishing a baseline and continued monitoring varies among these sources (building energy, transportation, and solid waste). Some are based on dollar expenditures (e.g. garbage) while others are based on the quantity of fuel purchased (e.g. electricity, natural gas, and fuels). While these sources are not meant to be exhaustive of all the greenhouse gas emissions attributable to state government, the team has chosen them as priority areas because they collectively represent the majority of the state's greenhouse gas emissions. In addition, reduction strategies for these sources can be implemented relatively quickly.

The scope of the inventory was designed with the following assumptions:

- Electricity is used primarily to light, cool, and to power building systems and equipment;
- Heating oils and natural gas are used mainly to provide building heat;
- Diesel, gasoline, propane and ethanol are used primarily to fuel vehicles.
- The dollar amount expended on garbage collection can be used to calculate a corresponding amount of tonnage.

CO<sub>2</sub> emissions from other activities related to state operations, such as employee commuting and procurement of construction and other materials, will not be included in this initial assessment, despite their contribution to climate change. While such data would make this inventory more complete, data for such items are not currently available. The report includes recommendations on

how to develop better data in these areas with the expectation that it will be included in future iterations as the data become available.

### Selection of Inventory Tool

In earlier greenhouse gas inventory efforts, the Oregon University System chose to utilize the Clean Air Cool Planet (CCAT). Given that the OUS comprises 44% of the square footage of state buildings, and that their facilities and activities are expected to dominate the state agency inventory, the decision was made to utilize the same tool set for the remainder of the state agencies.

The CCAT is a Microsoft Excel-based spreadsheet tool to calculate greenhouse gas emissions. Once data are gathered and entered, the program calculates total emissions and generates charts and graphs in order to compare usage from year-to-year. This data can be broken out for analysis by type, sector (building versus transportation), agency, function (transportation versus human services, public safety, administration), and environmental impact.

Although the CCAT was not designed specifically for state government operations, it was felt by the Interagency Team that it was robust enough to handle the needs of the overall state agency inventory in addition to the OUS inventory. Because the OUS inventory was already substantially complete using the tool, the group believed that unless there were substantial reasons for not using the same inventory tool, for the sake of consistency, the same tool should be used by all state agencies.

### Oregon University System (OUS) Inventory

Since the Oregon University System inventory is completed on a parallel process to the state agency inventory, DAS will be able to combine the results of the inventories to create a combined inventory if desired. However, given some differences in scope between the two inventories, it is probably best to present the results of the two inventories separately if possible. The appendix includes a link to the full version of the University System 2007 inventory.

While state agencies are using the CCAT due to the connection with the OUS inventory, they are evaluating new technologies and tools that come into the marketplace. The Climate Registry has refined their tool and state agencies will determine if it is viable in the future to replace the CCAT for the state's inventory.

### Initial Reporting Year Establishment and Data Collection

The Interagency Team chose 2006 as the initial reporting (baseline) year for the measurement of greenhouse gas emissions. While many organizations have adopted 1990 as a base year, as stipulated by the Kyoto Protocol and the baseline year for the Governor's greenhouse gas reduction goals, the team judged that an agency's ability to assemble past data would prove difficult and that the accuracy of the data would be questionable.

However, a baseline for 1990 is needed to track adherence to the Governor's greenhouse gas goals. The Interagency Team concluded they would continue to use 2006 for the formal tracking baseline, but also extrapolate a rough 1990 figure as well. The 1990 figure would be based around a 1990 Department of Energy report, number of state employee, number of fleet vehicles, and any fleet gasoline use that could be found. While this figure won't be used for formal comparisons, it will be provided for a loose checkpoint against the Governor's goals.

Energy consumption for the different fuel types and other commodities was captured from several different sources. Data was collected, tracked and reported by each agency occupying a state-owned building, as well as other key agencies active in sustainability initiatives. Data was reported to the Department of Energy using a web-based data collection tool, which was analyzed and developed into a profile for state government (Table 2).

Agencies reported on annual building energy use, transportation fuel consumption and solid waste. In cases where electricity and natural gas consumption, fuel expenditure and waste data are not available, but accurate cost data are available from purchasing records and vendor reports, these procurement records were used to estimate consumption.

Based on this baseline inventory, the greenhouse gas emissions of these selected state agencies will be calculated annually and a report developed for the Sustainability Board. This report will determine whether state government is on track to meet the reduction goals established by the Governor.

### Building and Waste Calculations

Building energy data and solid waste data received from state agencies was compiled by the Department of Administrative Services and input into the CCAT inventory tool. The inventory tool is able to provide all necessary calculations to determine equivalent carbon dioxide values for all of these inputs. The building energy generation emissions do not include pre-combustion emissions, such as those generated by the production of electricity. In combination with the data derived from state vehicles, an agency-by-agency listing of greenhouse gas emissions was developed (Table 1).

### State Fleet Calculations

The Interagency Team, in collaboration with state agencies, DAS Fleet and the Fleet Management Advisory Council, chose a methodology for determining greenhouse gas emissions resulting from state fleet operations based upon fuel consumption by vehicles operated by state agencies. There are two other methods to determine greenhouse gas emissions (EPA vehicle ratings, and mileage by type of vehicle/engine). The fuel consumption model is currently used by other states (such as Massachusetts) and jurisdictions in similar measurement efforts and, uses the most readily-available type of data within the administrative records maintained by state agencies.

The calculation methodology is based upon fuel consumed times a fuel-specific emissions factor, which is the molecular weight of each fuel converted to pounds or grams for each gallon of fuel consumed. The emissions factor for standard gasoline (without any blended agents/fuels) is 19.564 pounds of CO<sub>2</sub>-equivalent (carbon dioxide, nitrogen oxide, and twelve other toxins/compounds) per gallon. While standard gasoline weighs only 6.17 pounds per gallon, it combines with over 22 pounds of oxygen to produce, by its combustion in vehicle engines, 19.564 pounds per gallon of CO<sub>2</sub>-equivalent (greenhouse gasses) and 8.89 pounds of H<sub>2</sub>O (water). The emissions factors used for blended fuels were proportionally allocated consistent with the values of each of the blends used. An emission factor of 13.59 pounds per gallon for Ethanol-85 Blended fuel represents the proportional value of standard gasoline (19.564 pounds per gallon) and of ethanol (12 pounds per gallon). These factors do not make an assumption that biofuels are biogenic ("carbon-neutral").

This estimate includes state-owned and operated light-, medium-, and heavy-duty vehicles, on-road and off-road. It does not include emissions from vehicles operated in the delivery of goods and services contracted by state for the benefit of state agencies, the general public, or related to other federal, tribal, or public agencies. It also does not include leased vehicle use, such as Flexcar

in Portland. DAS Fleet estimates that this baseline calculation represents 85% of the vehicle greenhouse gas emissions related to state fleet operations.

The default values in the CCAT inventory tool were modified as necessary to accommodate this calculation methodology for the state fleet. These fleet data were summed with the data from state buildings and waste operations to determine total agency-by-agency greenhouse gas emissions.

### Appendix C - References

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