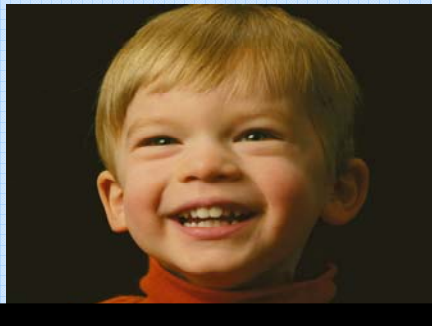
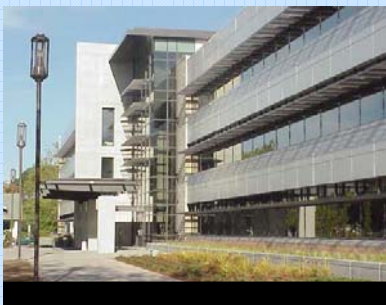


Greenhouse Gas Emissions of State Operations

State of Oregon
2008



Interagency Team Report
Reporting Year Data 2007

Greenhouse Gas Emissions
Interagency Team Report

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Executive Summary

Greenhouse gas emissions are a major indicator of Oregon state government's success at reducing the environmental impact from its operations. Governor Kulongoski has made combating global warming a priority. Executive Order No. 06-02 directed 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. Opportunities exist to improve environmental performance in state government. Agencies can engage in a wide range of sustainable activities that reduce greenhouse gas emissions.

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

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 total 2007 reporting year results for state government are **603,751 tons eCO₂**. This represents an 11% increase over emissions from the last report, representing the 2006 reporting year.

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 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 creation of his Global Warming Advisory Group, and he has begun implementing recommendations from that group, which were delivered to him in December 2004. Key recommendations 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 initiatives 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 2010;
- 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.

2007 Reporting Year Results

The total 2007 reporting year results for state government are **603,751 tons eCO₂**. This represents an 11% increase over emissions from the last report, representing the 2006 reporting year.

The 2007 reporting year emissions equate to:

- Twelve million cars on the road, or
- Electricity for 67,000 homes, or
- Three million trees

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

While some agencies saw an increase in electricity, state government had an overall decrease of 8.6%. This decrease represents agencies progress towards the state government goal of reducing building energy consumption by 20% over the year 2000 by 2015.

The decrease in heating fuel was smaller, at .006%. This is particularly significant considering the winter of 2007 was colder than 2006, and required 13% more heating. Agencies with office buildings and overnight facilities generally saw increases, but the impressive decrease for the University System offset those increases since they represent 50% of the building square footage in state government.

Transportation increased by 33% for state government operations. Many agencies with large transportation requirements had decreases, such as Department of Transportation and the Department of Administrative Services. However, other agency increases offset any gains from these efforts.

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
2007 Reporting Year Emissions**

Agency	Facility Electricity (MMBTU)	Facility Heating Fuel (MMBTU)	Transportation (gallons)	Solid Waste (tons)*	Total Tons eCO ₂ Emissions	% of State Government Total
Agriculture	182	387	157,867	3 ⁴	1,468	0.24%
Aviation	230	87	8,516	8 ⁴	126	0.02%
Corrections	254,359	644,009	296,795	17 ⁵	88,134	14.60%
DAS	163,766	49,203	60,665	1,487 ⁴	36,602	6.06%
Education	6,886	26,610	11,221	16 ⁵	2,898	0.48%
Employment	5,438	3,619	38,335	50 ⁴	1,627	0.27%
Energy	567	347	4,013	10 ⁴	168	0.03%
Environmental Quality	11,728 ¹	3,094 ¹	67,040	122 ^{4 7}	3,163	0.52%
Fish & Wildlife	40,941	5,517	436,540	377 ⁴	12,857	2.13%
Forestry	16,721	8,216	507,230	395 ⁴	8,704	1.44%
Human Services, Other	93,458 ^{1 3}	28,079 ^{1 3}	589,644	927 ^{4 7}	25,867	4.28%
Human Services, State Hospital	25,094 ⁵	99,605 ⁵	0 ²	1 ⁵	10,341	1.71%
Judicial	1,868	1,395	3,512	25 ⁴	480	0.08%
Lands, State	3,842	2,161	15,525	34 ⁴	1,025	0.17%
Legislative	12,013	6,979	1,373	166 ⁴	2,789	0.46%
Liquor Commission	5,015	7,192	26,191	135 ⁴	1,662	0.28%
Lottery, State	6,468	2,961	378,303	49 ⁴	4,838	0.80%
Military	115,292	169,746	39,904	1,891 ⁴	34,541	5.72%
Parks & Recreation	54,071	19,697	233,775	3,024 ⁵	17,171	2.84%
PERS	4,708	106	3,979	31 ⁴	1,000	0.17%
Police, State	11,229 ¹	3,374 ¹	919,779	117 ^{4 7}	10,694	1.77%
Public Safety, Standards & Training	10,160	10,769	38,730	333 ⁵	2,931	0.49%
Transportation	148,307	93,432	3,499,933	160 ^{4 6}	66,572	11.03%
University System, Oregon	790,827	1,306,310	455,395	20,283 ⁴	254,586	42.17%
Veterans	10,667	13,217	4,267	89 ⁴	2,882	0.48%
Youth Authority	28,703	75,836	85,330	3 ⁵	10,625	1.76%
TOTAL	1,822,540	2,581,948	7,883,862	29,753	603,751	100%

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.

- ¹ 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.
- ² State Hospital transportation use reported in Dept of Human Services total.
- ³ Human Services Building use reported in Dept of Administrative Services total and State Hospital reported separately.
- ⁴ Offices and remote locations are based on DAS figure of 1 lb/sq ft/year.
- ⁵ 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.
- ⁶ 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.
- ⁷ Square footage calculation used for garbage figures for DHS, OSP, ODOT and DEQ based on 2007 leased office space in the DAS database.

**Table 2
State Government Agency Profile
CO₂ Emission Comparison for 2007**

Agency	Total Tons eCO ₂ Emissions 2006	Total Tons eCO ₂ Emissions 2007	Total Change in eCO ₂ Emissions	Percent Increase or Decrease in eCO ₂ Emissions
Agriculture	1,675	1,468	-207	-12%
Aviation*	122	126	+4	+3%
Corrections	80,507	88,134	+7,627	+9%
DAS*	35,639	36,602	+963	+3%
Education	3,017	2,898	-119	-4%
Employment	2,036	1,637	-399	-20%
Energy*	191	168	-23	-12%
Environmental Quality	4,157	3,163	-994	-24%
Fish & Wildlife	12,593	12,857	+264	+2%
Forestry*	8,500	8,704	204	+2%
Human Services, Other	24,072	25,867	+1,795	+7%
Human Services, State Hospital	10,617	10,341	-276	+3%
Judicial	352	480	+128	+36%
Lands, State	957	1,025	+68	+7%
Legislative	2,581	2,789	+208	+8%
Liquor Commission	1,441	1,662	+221	+15%
Lottery, State	3,092	4,838	+1,746	+56%
Military	30,272	34,451	+4,159	+14%
Parks & Recreation	15,387	17,171	+1,784	+12%
PERS	952	1,000	+48	+5%
Police, State	9,843	10,694	+851	+9%
Public Safety, Standards & Training	1,476	2,931	+1,455	+99%
Transportation*	79,891	66,572	-13,319	-17%
University System, Oregon*	253,631	254,586	+955	+0.4%
Veterans	2,682	2,882	+200	+7%
Youth Authority	10,445	10,625	+180	+2%
TOTAL	544,821	603,751	+58,930	+11%

* The number in this chart reflects a corrected baseline figure. An error was detected and corrected.

**Table 3
State Government Agency Profile
Breakdown of Changes in Emissions**

Agency	Facility Electricity	Facility Heating Fuel	Transportation	Solid Waste	Total % Change
Agriculture	-17%	-30.1%	-11.9%	0%	-12.4%
Aviation	+2.2%	+26.1%	+1.7%	+160%	+3.3%
Corrections	+10%	+9.4%	+1.3%	-5.6%	+9.4%
DAS	+2.6%	+5.7%	-5.6%	+2.5%	+2.7%
Education	+0.3%	-8.6%	+11%	0%	-3.9%
Employment	+5.4%	-59.7%	-15.8%	0%	-19.6%
Energy	-15.9%	+11.6%	-5.7%	0%	-12.0%
Environmental Quality	-26.1%	-33.2%	-9.4%	-29.5%	-23.9%
Fish & Wildlife	+6.8%	-2.2%	-6.1%	0%	+2.1%
Forestry	+22.3%	-40.1%	+0.4%	+4.7%	+2.4%
Human Services, Other	+9.9%	+13.1%	-12.3%	0%	+7.5%
Human Services, State Hospital	-8.2%	+3.6%	N/A	0%	-2.6%
Judicial	+43.8%	+10.4%	+22.7%	0%	+36.4%
Lands, State	+3.7%	+44.5%	+4.5%	-2.9%	+7.1%
Legislative	+8.3%	+5.4%	+125%	-77.3%	+8.1%
Liquor Commission	+15.3%	+31.4%	-7.5%	+124%	+15.3%
Lottery, State	-4.2%	+0.2%	+114%	+11.4%	+56.5%
Military	+2.8%	+14.8%	+43%	+33.7%	+13.8%
Parks & Recreation	+4.4%	+4.6%	-1%	+75.5%	+12%
PERS	+5.8%	-8.6%	-6.5%	-13.9%	+5.0%
Police, State	+4.5%	+7.6%	+9.9%	0%	+8.9%
Public Safety, Standards & Training	+97.5%	+184%	+27.1%	0%	+98.5%
Transportation	-30.5%	+39.4%	-0.3%	-24.5%	-16.7%
University System, Oregon	-16.5%	-7.9%	+82.9%	-5.7%	+0.38%
Veterans	+6.3%	+13.1%	-17.8%	+10.1%	+7.5%
Youth Authority	+1.9%	+2.1%	-3.2%	0%	+1.7%
TOTAL	-8.6%	-0.006%	+33.9%	+3.1%	+10.8%

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

Agency	Total Tons eCO ₂ Emissions 1990	Total Tons eCO ₂ Emissions 2007	Percent Increase or Decrease in eCO ₂ Emissions
DAS	22,811	36,320	+59.2%
Transportation	25,318	35,626	+39.3%

* 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.

Graph 1
State Government Agency Percentages of Greenhouse Gas Emissions

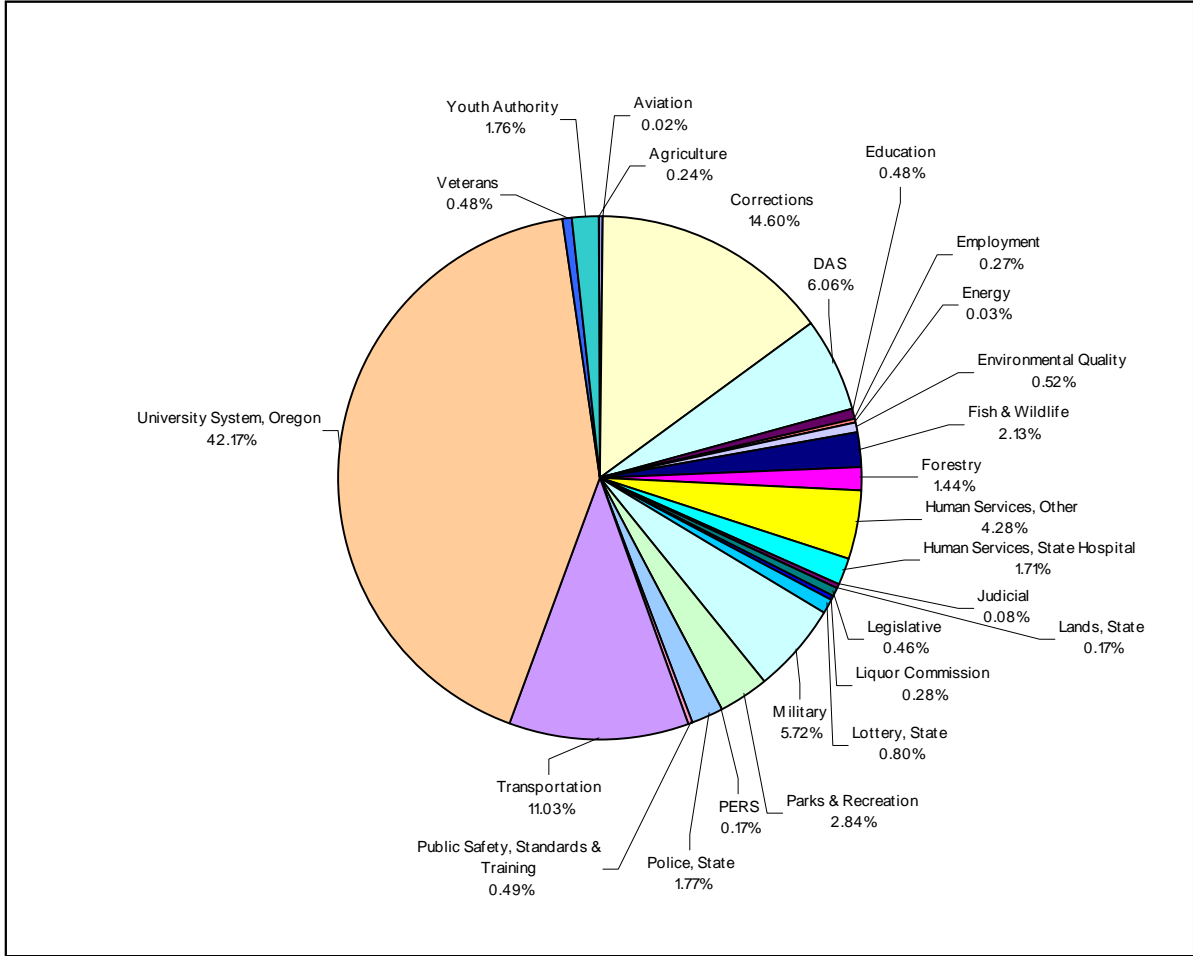


Table 5
2007 Oregon State Agencies' Facility Energy Use
 (provided by Oregon Department of Energy)

Agency	Electricity	Nat. Gas	#5 Oil	Diesel	Kerosene	Propane
	kWh	therms	gal	gal	gal	gal
Admin Services	47,983,149	492,028				
Agriculture	53,327	3,866				
Aviation	67,520		582			
Corrections	74,526,524	6,440,091				
Education	2,017,569	266,096				
Employment	1,593,325	36,190				
Energy	166,240	3,466				
Fish & Wildlife	11,995,748	28,896				28,686
Forestry	4,899,063	74,687		4,212	3	1,759
Parks & Recreation	15,842,684	55,802				154,117
Transportation	43,453,651	659,910				299,573
Veterans	3,125,360	132,173				
State Lands	1,125,667	21,610				
Legislative Admin	3,519,632	69,787				
Liquor Control Comm.	1,469,352	71,918				
Military	33,780,256	1,654,056			1,675	44,936
Lottery	1,895,000	29,606				
Oregon Univ. System	231,710,271	12,852,878		1,179	155,656	
Oregon Youth Authority	8,410,005	696,121				67,945
PERS	1,379,400	1,063				
State Hospital	7,352,525	996,049				
Public Safety S&T	2,976,789	107,694				
TOTAL	499,343,058	24,693,986	582	5,391	157,334	597,015

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 2009 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
- Implementation of educational programs for agency personnel staff
- Improved data collection of waste generation (trash and recycling)

Incorporate in the 2010 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

Incorporate in the 2011 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

Conclusion

While greenhouse gas emissions from state government operations appear to be going the wrong direction to meet the target, the Interagency Team is confident we can get there. 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 2010.

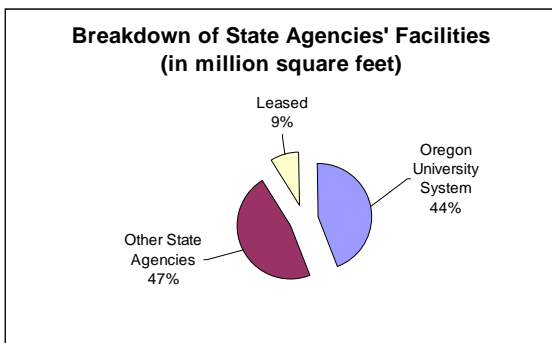
Report was compiled on January 15, 2009 by:

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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

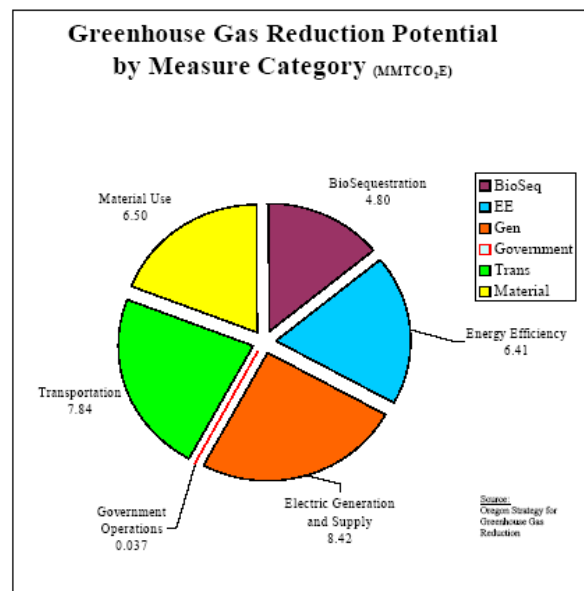
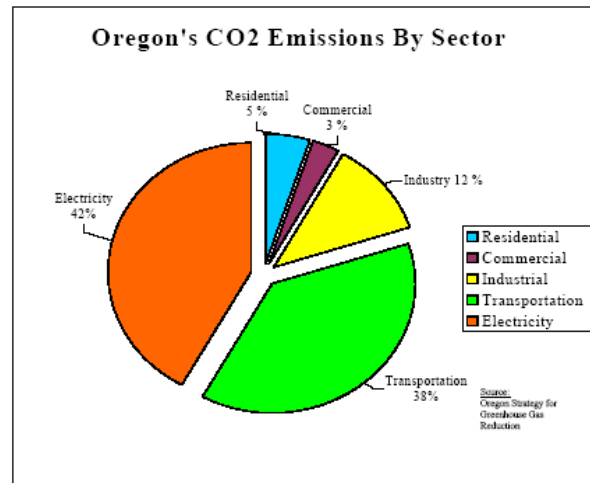


Significant amounts of fuel are also used by state agency fleets for transportation purposes. From gasoline used in state-owned light fleet vehicles to diesel fuel used in state trucks and heavy equipment, fuel is consumed to ensure the successful day-to-day operation of state business.

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. There is also no correlation between reduced consumption and/or waste prevention. 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.

CO₂ 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 CO₂-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 CO₂-equivalent (greenhouse gasses) and 8.89 pounds of H₂O (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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