



## **Reducing Greenhouse Gas Emissions in Washington State Government**

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*A look at the progress of Washington State agencies working to reduce their greenhouse gas emissions.*

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# **Reducing Greenhouse Gas Emissions in Washington State Government**

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# I. Executive Summary

In 2009, the Legislature and Governor adopted the State Agency Climate Leadership Act. The Act committed state agencies, including universities, colleges, and community and technical colleges to lead by example in reducing their greenhouse gas (GHG) emissions to:

- 15 percent below 2005 levels by 2020.
- 36 percent below 2005 by 2035.
- 57.5 percent below 2005 by 2050.

By June 30, 2010, state agencies were required to:

- Measure and report GHG emissions for 2005, 2008, and 2009.
- Project future emissions through 2035.
- Report on actions already taken since 2005 to reduce GHG emissions.

By June 2011, state agencies are required to develop strategies to reduce their GHG emissions to achieve the reduction targets.

This report is required by state law RCW 70.235.060 section (3):

*“By December 31<sup>st</sup> of each even-numbered year beginning in 2010, the department shall report to the governor and to the appropriate committees of the senate and house of representatives the total state agencies’ emissions of greenhouse gases for 2005 and the preceding two years and actions taken to meet the emissions reduction targets.”*

This report summarizes the total GHG emission from all state agencies for 2005, 2008, and 2009. It examines actions already taken by agencies to reduce emissions and outlines key next steps for agencies to take to develop emission reduction strategies.

## Key findings

- State agencies emitted about 1.24 million metric tons of carbon dioxide equivalent (MMTCO<sub>2</sub>e) in 2008. This is about 1.2 percent of the total statewide GHG emissions.
- Total reported GHG emissions increased 3.8 percent from 2005 to 2009. This increase would have been higher if agencies did not take any action to conserve energy, increase energy efficiency, and invest in clean energy technologies.
- Of the total GHG emissions from state agencies in 2009, 50 percent came from electricity and steam, 28 percent from natural gas and other fuel used in buildings, 14 percent from Washington State Ferries, and 8 percent from state vehicles and mobile equipment.
- Seventy-eight percent of the total reported GHG emissions are produced by nine of the state agencies that emit over 25,000 MTCO<sub>2</sub>e.

## **Actions taken to reduce GHG emissions**

Agencies have taken action to conserve energy, improve energy efficiency, and deploy clean energy technologies, leading to significant savings in utility and fuel costs. Here are a few examples:

- Twenty state projects have achieved Leadership in Energy and Environmental Design (LEED) certification from the U.S. Green Building Council since July 2005, when the High-Performance Green Building Act came into effect. Seventy-three state projects are pursuing LEED certification.
- Several agencies retrofitted their facilities to increase energy efficiency. For example:
  - 54 agencies installed more efficient indoor lighting.
  - 41 installed occupancy sensors.
  - 42 retrofitted HVAC systems in their existing buildings.
  - 23 agencies used Energy Savings Performance Contracting to identify, implement, and finance energy efficiency projects in their facilities, leading to significant savings in energy and utility costs.
- The Department of General Administration's motor pool is ranked #3 nationally among all public sector fleets for the number of hybrid vehicles in their fleet. About fifty-four percent of the Motor Pool vehicles are hybrids, or 958 out of 1,760 vehicles.
- State agencies reduced business travel through investments in video-conferencing, tele-conferencing, and web conferencing.
- State agencies are making progress in reducing drive-alone commute trips and vehicle miles traveled. From 2007 to 2009, the drive alone rate declined 3.1 percent and vehicle miles traveled per employee dropped 3.3 percent at state agency worksites that participate in the Commute Trip Reduction program.
- Several agencies generate renewable energy onsite or purchase green power or renewable energy credits through their utility or a third-party provider.
- State agencies have taken action to reduce their environmental impact through recycling, composting, resource conservation, and environmentally preferred purchasing. Agencies have also taken action to conserve water, implement stormwater best management practices, and reduce GHG emissions from wastewater treatment.

## **Path forward**

Starting in early 2011, each agency will develop a strategy to meet the reduction targets. Agencies will also measure their yearly GHG emissions and develop performance measures to track their progress in reducing emissions.

Meeting the reduction targets will require a transformation of state government. Specifically in how we operate and organize the locations of our buildings, how we manage vehicle fleets, and how we do our day-to-day business. The reduction strategy will provide state agencies an opportunity to identify costs savings and eliminate inefficiencies.

Washington State agencies are in the position to lead the way in taking actions to reduce energy use and create a more sustainable state government. With continued implementation of best management practices, energy efficiency retrofits, and increased use of alternative fuels, most of the state agencies emitting less than 25,000 MTCO<sub>2</sub>e will meet or come close to meeting the 2020 reduction target. Universities, community and technical colleges, and departments of Corrections and Transportation will face more challenges in meeting their 2020 reduction targets and will require significant dedication and investment.



## II. Background

### The State Agency Climate Leadership Act - Legislative requirements

In 2009, the Legislature recognized state government activities and operations contribute to GHG emissions and state agencies should lead by example in reducing their GHG emissions. The State Agency Climate Leadership Act (Engrossed Second Substitute Senate Bill 5560 – Chapter 519, Laws of 2009) was enacted by the Legislature and signed into law by Governor Gregoire. The Act is codified in RCW [70.235.050](#)<sup>1</sup> and RCW [70.235.060](#)<sup>2</sup>.

The State Agency Climate Leadership Act (The Act) established GHG reduction targets for state agencies to reduce greenhouse gas emissions from their operations by:

- 15 percent below 2005 levels by 2020.
- 36 percent below 2005 by 2035.
- 57.5 percent below 2005 by 2050.

To see the full text of The Act, see [Appendix 1 – State Agency Climate Leadership Act](#)<sup>3</sup>.

These GHG emission reduction targets correspond to the reduction targets established for Washington State by Governor Gregoire in Executive Order 07-02 and enacted by the Legislature in 2008 in RCW 70.235.020<sup>4</sup>.

The Act requires state agencies to measure and report GHG emissions for 2005, 2008 and 2009 and to project future emissions through 2035. Agencies are also required to:

- Report on actions already taken since 2005 to reduce GHG emissions.
- Develop and implement strategies and actions to meet the mandatory reduction targets.

Starting in 2011, agencies will report their GHG emissions on an annual basis and will report their progress towards meeting the reduction targets on a bi-annual basis. By December 31, 2010 and every two years after, Ecology will report to the Governor and the Legislature the total GHG emissions from state agencies and actions taken to meet the emissions reduction targets.

This 2010 report is required by state law RCW 70.235.060 section (3):

*“By December 31<sup>st</sup> of each even-numbered year beginning in 2010, the department shall report to the governor and to the appropriate committees of the senate and house of representatives the total state agencies’ emissions of greenhouse gases for 2005 and the preceding two years and actions taken to meet the emissions reduction targets.”*

The Act complements and builds on several existing state agency efforts that promote sustainability in state government operations. Washington State has adopted several policies that will help state government meet the GHG reductions. For example, state agencies are required to:

- Include energy conservation practices and renewable energy systems when designing major publicly owned or lease facilities.
- Achieve an average fuel economy of 40 miles per gallon for light duty passenger vehicles, when purchasing new petroleum-based fuel vehicles.

These policies are described in [Appendix 2 – Statutory Requirements Applicable to State Agency GHG Emissions Reduction.](#)<sup>5</sup>

# III. Process, Scope and Methods

## Reporting state agencies

The State Agency Climate Leadership Act applies to 140 state agencies including all administrative, legislative, judicial and elected offices, boards and commissions, community and technical colleges, and universities. The 120 state agencies that reported their GHG emissions, for this report, manage about 85 million square feet of owned space, 9 million square feet of private leased space, and employ over 123,000 employees. These agencies include:

- All 7 universities<sup>6</sup> and The Evergreen State College
- 27 out of 30 community and technical college districts
- All 10 of the largest state agencies - (based on vehicle miles traveled and occupied space) - excluding universities
- All 28 medium size agencies
- 47 out of 64 small agencies with 100 employees or less

Three community and technical colleges and 17 small agencies chose not to report their emissions.<sup>7</sup> Ecology estimates their emissions to be less than 1.5 percent of the total reported state agency emissions.

## Sources of greenhouse gas emissions

For 2005, 2008, and 2009, the agencies focused on quantifying and reporting on sources of GHG emissions directly under their operational control or that result from activities directly controlled by the agency, including:

- Natural gas, electricity, and other fuels used in buildings and stationary equipment owned or operated by the agency.
- Diesel, gas, and other fuels used in vehicles and equipment owned and operated by the agency, including light and heavy duty on-road vehicles, non-road or off-road vehicles, ferries, boats, and aircraft.

State agencies reported on the four main GHGs emitted from state agency activities, including:

1. Carbon dioxide (CO<sub>2</sub>)
2. Methane (CH<sub>4</sub>)
3. Nitrous oxide (N<sub>2</sub>O)
4. Hydrofluorocarbons (HFCs)

Agencies use a common metric, the carbon dioxide equivalent (CO<sub>2</sub>e) to report their GHG emissions. The CO<sub>2</sub>e metric takes into account the different potential each of the gases has to heat and warm the planet compared to CO<sub>2</sub>, or the Global Warming Potential (GWP). The table below describes the GWP related to each type of GHG.

Table 1: Global Warming Potential for Each Greenhouse Gas

Greenhouse Gas	GWP
Carbon dioxide (CO <sub>2</sub> )	1
Methane (CH <sub>4</sub> )	21
Nitrous Oxide (N <sub>2</sub> O)	310
Hydrofluorocarbons (HFCs)	12-11,700
Perfluorocarbons (PFCs)	6,500-9,200
Sulphur hexafluoride (SF <sub>6</sub> )	23,900

Agencies leasing space from the Department of General Administration (GA) or from other state agencies were not required to quantify and report on emissions from those leased spaces (GA or the building owner reported those GHG emissions). Each agency did report on their own GHG emissions from long and short-term leases of vehicles from the state motor pool managed by GA.

To get a complete picture of agency GHG emissions, agencies reported on GHG emissions from private leased facilities using utility information, where available, or estimates. Most agencies also reported on GHG emissions from business travel and employee commuting for 2009 only, due to incomplete data for 2005 and 2008. A few agencies reported on GHG emissions from refrigerants and compressed gases for 2009 only, due to lack of inventory information and data on equipment. Agencies did not quantify offsets, green power purchases, or carbon stocks (or sinks) that they may control, such as Department of Natural Resources (DNR) forest lands.

For more information, see [Appendix 3 - Main Sources of GHG Emissions from State Agency Operations](#).<sup>8</sup>

## Quantifying greenhouse gas emissions

All state agencies are required to report their GHG emissions. The Act does not set any thresholds for reporting. Some agencies are required to estimate their emissions based on actual and projected agency operations, including:

- The top ten agencies occupying the most building space and driving the most miles.
- Agencies that meet the thresholds for reporting established in the state mandatory reporting law in RCW [70.94.151](#).<sup>9</sup> This includes agencies with a facility that emits at least 10,000 metric tons of GHG emissions per year.

Several agencies with facilities with large boilers or other stationary GHG emission sources may be required to report under the Washington State mandatory reporting rule, the EPA rule, and the state agency reporting law.

In 2010, the Legislature and Governor approved legislation to align Washington’s state mandatory GHG reporting requirements<sup>10</sup> with EPA mandatory reporting rules. Ecology will continue to work with these agencies to minimize any duplicative reporting requirements.

Other agencies are required to develop emissions estimates using an emissions calculator provided by Ecology. Ecology provided two excel-based emission calculators to help agencies develop emissions estimates. One calculator used methods based on actual and projected

operations, and one calculator used simplified estimation methods. The calculators were developed using methods and default emissions factors from The Climate Registry's (TCR) General Reporting Protocol.<sup>11</sup> Both calculators use the same methods and emissions factors.

The calculators provided methods for calculating GHG emissions using actual data on energy consumption from utility or fleet records. The calculator also provided several methods for agencies to estimate their emissions where actual data is not available. Many agencies had difficulty finding actual data, especially for 2005. Ecology expects state agencies to better measure and track their energy usage in the future, which may result in an apparent rise in reported GHG emissions.

Several universities and community and technical colleges used the Clean Air Cool Planet calculator (CACP), an emissions calculator used nationwide by colleges and universities that participate in the American College and University President's Climate Commitment.<sup>12</sup> The CACP calculator provides complete and accurate information on GHG emissions.

Agencies reported total GHG emissions for the agency as a whole. Some agencies also tracked GHG emission by facility or campus. Most agencies reported on a calendar year basis.

For more information, see [Appendix 4 - GHG Emissions Calculators](#).<sup>13</sup>

## Projecting future greenhouse gas emissions

Ecology also developed a projection tool to estimate the path GHG emissions would take from 2005 to 2035 in a "business as usual" approach, where no actions are taken to reduce GHG emissions. The purpose of the projection is to:

- Anticipate future changes in agency operations, energy consumption, and GHG emissions.
- Better understand the magnitude and scope of future GHG reductions needed to meet the targets.

The tool provided agencies with three different methods for projecting future emissions. The methods were developed based on an analysis of historical agency trends.

- **Method One:** Assumed the number of agency employees will grow at the same rate as the state population, and GHG emissions per employee will stay constant over time.
- **Method Two:** Used the historical rate of change in GHG emissions from 2005 to 2009 as reported by the agency and assumed GHG emissions would change at the same rate in the future.
- **Method Three:** Agencies could enter their own growth rates based on their own internal estimates.

For more information, see [Appendix 4 – GHG Emissions Calculators](#).<sup>14</sup>

## **Reporting on actions already taken to reduce greenhouse gas emissions**

Washington State agencies have taken many actions to conserve energy, improve energy efficiency, and reduce GHG emissions. Several of these reduction actions were established in Executive Orders or state law. The purpose of reporting actions already taken is to help agencies identify future actions they can take to reduce GHG emissions. It also allows agencies to compare various actions and share best practices.

To help state agencies identify and, where appropriate, quantify actions already taken from 2005 to 2009 or 2010, Ecology asked agencies to respond to a web survey. About 100 agencies responded. The majority of agencies that didn't respond are small agencies that contribute a small fraction of GHG emissions. Both large and small agencies have taken actions to reduce GHG emissions.

## IV. Total State Agency Greenhouse Gas Emissions

In 2009, state agencies emitted about 1.24 million metric tons of carbon dioxide equivalent (MMT<sub>CO<sub>2</sub>e</sub>). This represents about 1.2 percent of total state GHG emissions, which in 2008 were estimated at 100 MMT<sub>CO<sub>2</sub>e</sub>.

### Greenhouse gas emissions by type of agency

In 2009, the nine largest state agencies (Transportation, Corrections, DSHS, GA, UW, WSU, WWU, EWU, and CWU) emitting over 25,000 MTCO<sub>2</sub>e accounted for 77.5 percent of total state agency GHG emissions. Sixty-six agencies emitted less than 1,000 MTCO<sub>2</sub>e and accounted for 1.2 percent of total state agency GHG emissions.

Table 2: 2009 Agency Size and Percentage of Total GHG Emissions

AGENCY CATEGORY	TOTAL GHG EMISSIONS BY CATEGORY	PERCENT OF TOTAL GHG EMISSIONS	NUMBER OF AGENCIES
Over 25,000 MTCO <sub>2</sub> e	960,030	77.5 %	9
10,000 to 25,000 MTCO <sub>2</sub> e	116,130	9.4 %	8
1,000 to 10,000 MTCO <sub>2</sub> e	147,500	11.9 %	36
Less than 1,000 MTCO <sub>2</sub> e	14,600	1.2 %	66
<b>TOTAL</b>	<b>1,238,260</b>	<b>100%</b>	<b>119</b>

For more information, see [Appendix 6 - State Agency GHG Emissions](#).<sup>15</sup>

### Trends in greenhouse gas emissions

Figure 1 below shows the trend in state agencies emissions from 2005 to 2009. Overall, total GHG emissions increased 3.8 percent from 2005 to 2009. This increase in GHG emissions would have been higher if agencies had not taken action to reduce emissions. Agencies are required to report their GHG emissions every year. This year-to-year trend will provide a good indication for how well agencies are doing to meet the reduction targets.

Between 2005 to 2009, electricity and natural gas used in buildings increased. This follows a national trend of increased electricity use from new technology. In addition, some agencies increased in size between 2005 and 2009. The largest increase seen was in universities, community and technical colleges and the Department of Corrections, as result of increases in student enrollment and inmate population. GHG emissions from motor vehicles declined during this period, likely as a result of:

- Travel restrictions.
- Using alternative ways to conduct business.
- Higher gas prices in 2008.

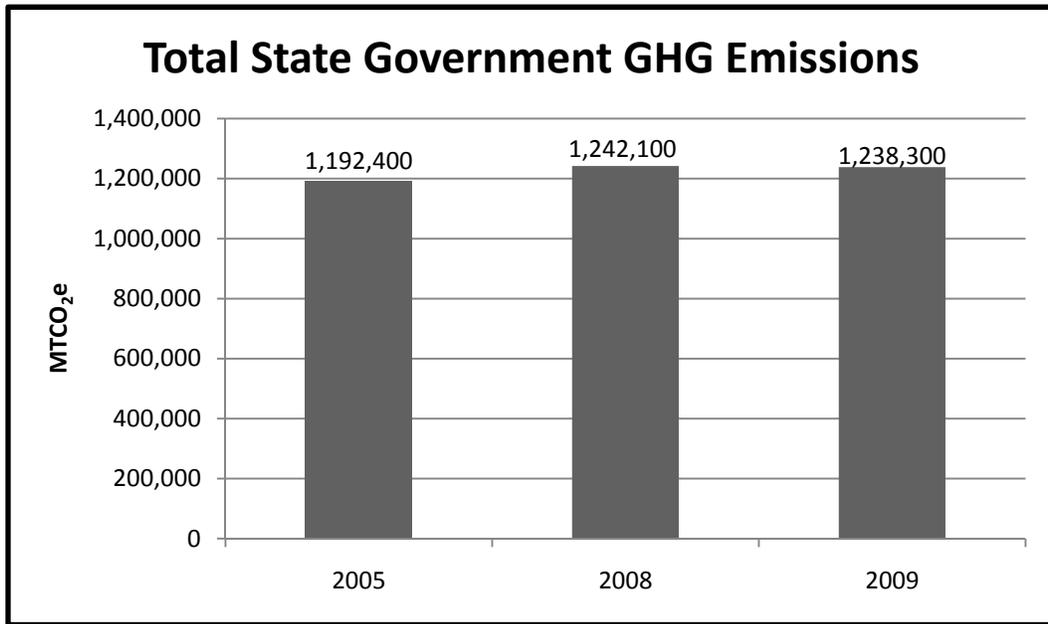


Figure 1: Total State Government GHG Emissions 2005-2009

State law requires state agencies to reduce their emissions by 15 percent below 2005 emission levels by 2020 (top dashed line), or by about 225,000 MTCO<sub>2</sub>e below 2009 levels. Figure 2 below illustrates the reduction pathway for the state government as a whole. Each agency will develop its own reduction pathway.

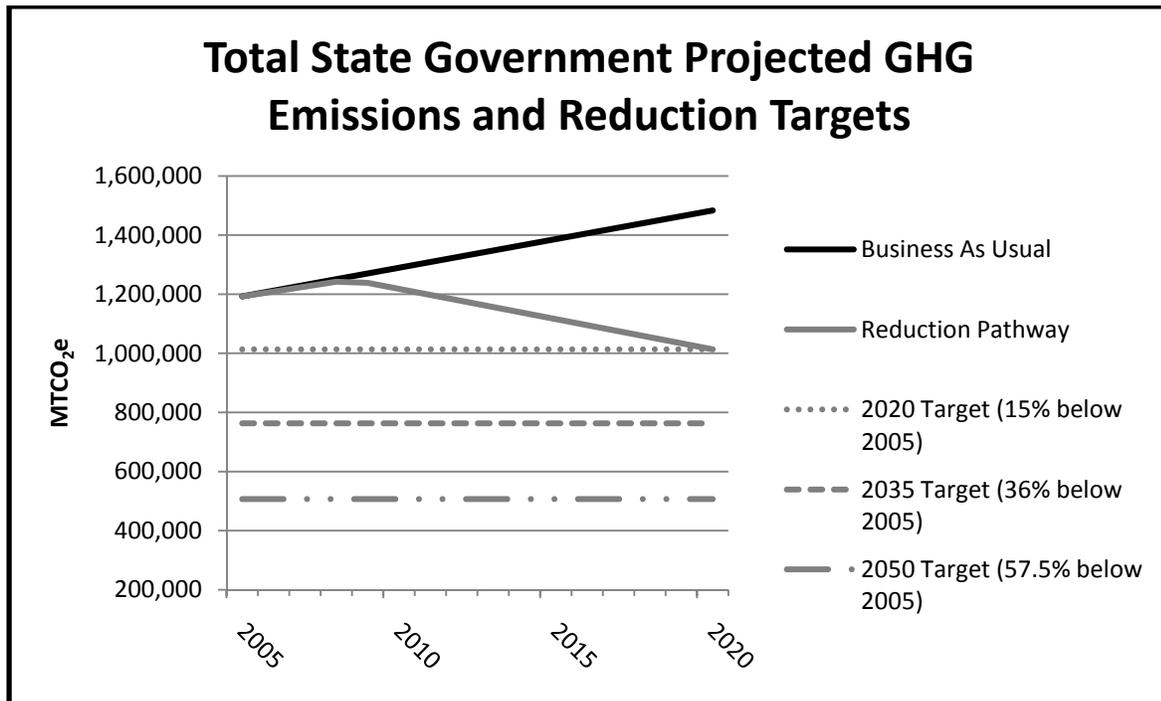


Figure 2: Total State Government Projected GHG Emissions and Reduction Targets

Since 2005, most agencies have already taken action to conserve energy, improve energy efficiency, and reduce GHG emissions. With continued implementation of best management practices, energy efficiency retrofits, and increased use of alternative fuels, many agencies will meet or come close to meeting the 2020 reduction target. However, several agencies experiencing growth pressure (i.e., departments of Corrections and Transportation, large universities, community and technical colleges) will more likely see their emissions continue to grow on a path that fits closely with the business-as-usual scenario, illustrated in figure 2. These agencies will need to pursue more aggressive emissions reductions to reach the 2020 reduction targets. In addition, achieving the 2035 target of 36 percent below 2005 levels will be a significant challenge requiring drastic changes to government operations and major investments in capital improvements.

## Sources of greenhouse gas emissions

Figure 3 to the right shows the sources of GHG emissions for state government. Using the 2009 reported emissions, the largest single source of emissions is from electricity and steam consumed in state owned and leased buildings and other fixed equipment, such as traffic lights and streetlights.

The second largest source is from natural gas and other fuels consumed to heat and power buildings (stationary sources).

Diesel used in the Washington State Ferry system and gasoline and diesel consumed in the state fleet together account for 22 percent of state government emissions. Business travel in private vehicles and employee commuting were reported only for 2009 and are not included in the total.

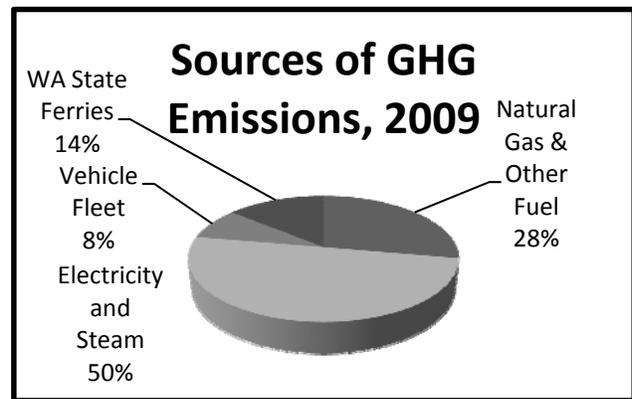


Figure 3: Sources of GHG Emissions, 2009



# V. Greenhouse Gas Emissions by Source

## Energy use in buildings and fixed equipment

Washington State has an estimated 85 million square feet of agency owned space and 9 million square feet of leased space. In 2009, agencies consumed about 1.5 billion-kilowatt hours (kwh) of electricity and close to 60 million therms of natural gas. The total state agency costs for electricity and natural gas are estimated at \$175 million for 2009.

In 2009, state agencies emitted about 962,480 metric tons (MT) carbon dioxide equivalents (CO<sub>2</sub>e) from energy used to power and heat state-owned and leased buildings and fixed equipment. Of the total emissions from buildings and fixed equipment, 64 percent is from electricity and steam, used to power and heat buildings and other fixed equipment, such as street and traffic lights along the state highway system. About 34 percent is from natural gas and other fuels used in buildings and stationary equipment, such as diesel used in generators, propane, and fuel oil.

GHG emissions from buildings and fixed equipment increased from 2005 to 2009, likely due to increased energy consumption for IT equipment and technology as well as increases in enrollment for universities and community and technical colleges. On average, GHG emissions from buildings and fixed equipment are 7.8 MTCO<sub>2</sub>e per employee or 10.2 MTCO<sub>2</sub>e per 1,000 square feet.<sup>16</sup> About 9 agencies account for 76 percent of GHG emissions from buildings and fixed equipment.

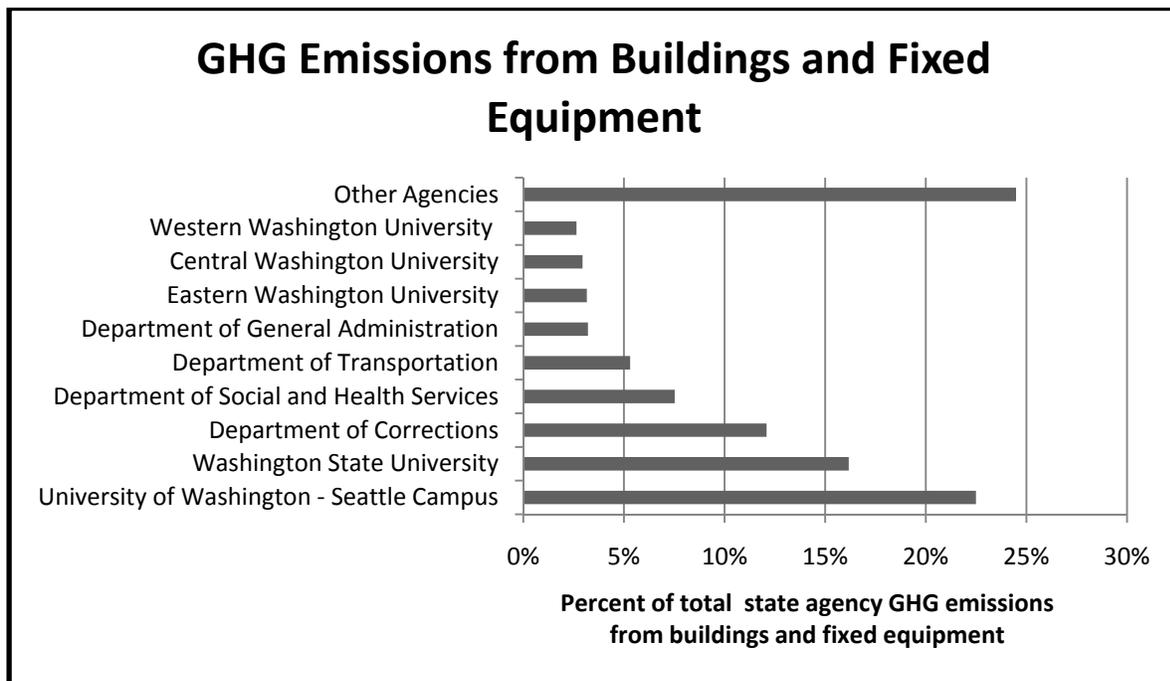


Figure 4: 2009 GHG Emissions from Buildings and Fixed Equipment

## **Quantifying greenhouse gas emissions from buildings and fixed equipment**

GHG emissions were calculated for all facilities owned and operated by the state as well as fixed equipment such as generators and streetlights. The Department of General Administration (GA) calculated GHG emissions from energy used in all GA owned buildings, including the capitol campus and off-campus. Each agency reported for energy consumed in agency-owned buildings and privately leased space.

Where possible, emissions were calculated using data from utility records on energy consumption. Agencies were encouraged to enter their energy consumption into the Environmental Protection Agency (EPA) tool [Portfolio Manager](#)<sup>17</sup>. Many agencies did not have utility records going back to 2005 for all of their facilities. Several of the large agencies had difficulty retrieving utility records because of decentralized record keeping or the large number of facilities and structures located throughout the state with separate utility accounts.

For privately leased space and space where utility records were not available, agencies estimated their energy consumption using simplified methods. Many agencies quantified energy consumption using national estimates of average energy intensity from the US Energy Information Administration (EIA) Commercial Buildings Energy Consumption Survey (CBECS). Agencies also estimated their energy consumption using information on utility payments and average utility costs.

### **Agencies used the e-GRID emissions factor for electricity**

All state agencies used a consistent emissions factor, the EPA Emission and Generation Resource Integrated Database (eGRID) for the Northwest Power Pool (NWPP) sub-region, to quantify GHG emissions from electricity consumption. This factor reflects the GHG emissions associated with the fuel mix used to generate electricity in the NWPP sub-region. The sub-region includes all of Washington, Oregon, Idaho, and Utah, major portions of Nevada, Montana, and Wyoming, and a portion of Northern California.

The emissions factor of the NWPP sub-region was chosen because of the interconnected nature of the electricity grid system. In addition, the emissions factor provides a consistent metric for all state agencies to use reflecting the amount of electricity consumed rather than differences in the fuel mix used by specific utilities. It is also more practical than using utility specific emissions factors. Some agencies have hundreds or thousands of utility accounts from facilities and structures that consume electricity in all regions of Washington State, making a utility specific emissions factor impractical. In addition, this is the emissions factor used by businesses required to report their emissions to EPA and Ecology.

About 49 percent of the electricity within the NWPP sub-region is from hydropower, 34 percent is from coal, 13 percent is from other fossil fuel sources, 3 percent from nuclear, and 1 percent from non-hydro renewable resources.

## State fleet

State agencies reported vehicle emissions from several sources: state fleet, business travel in private vehicles and employee commuting.

State agencies emitted about 275,800 MTCO<sub>2</sub>e from state-owned motor vehicles in 2009. About 63 percent of the total is from the Washington State Ferry (WSF) system, the nation's largest ferry system run by Washington State Department of Transportation (WSDOT).

Thirty-seven percent or 102,300 MTCO<sub>2</sub>e are from other state fleet vehicles, which includes:

- On-road light duty and heavy-duty vehicles
- Off-road vehicles
- Non-WSF ferries
- Boats
- Aircraft



*Photo 1: WSDOT operates the nation's largest ferry system – the Spokane carries up to 188 vehicles and 2000 passengers in the Puget Sound and San Juan Islands.*

As shown in Figure 5, five state agencies account for 89 percent of total GHG emissions from the state fleet.

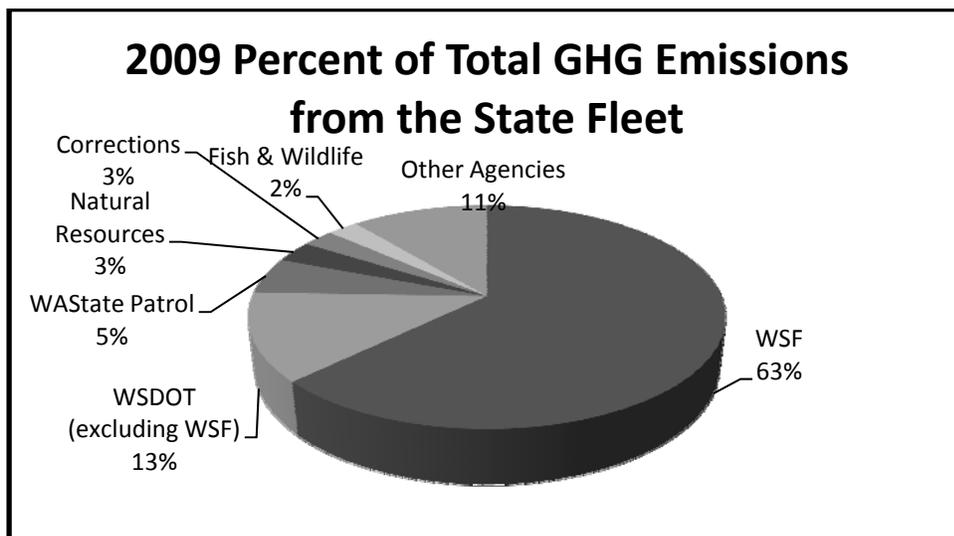


Figure 5: 2009 State Fleet GHG Emissions

State government consumed about 20 million gallons of diesel in 2009, including 17 million gallons of diesel used by WSF and 3 million gallons used in other vehicles and mobile equipment. About 8 million gallons of gasoline were consumed in the vehicle fleet in 2009.

WSF used about 102,000 gallons of biodiesel (B100) in 2009. Other state agencies excluding WSF used about 170,000 gallons of biodiesel (B100) in 2009.<sup>18</sup>

The total gas and diesel purchases are estimated at \$72 million dollars for 2009. State workers traveled about 103 million miles in 2009 in state owned vehicles, 23 percent of miles were traveled in the state motor pool run by GA.

Each agency reported GHG emissions from agency owned fleet and from use of the motor pool. Carbon dioxide (CO<sub>2</sub>) emissions were calculated using data on fuel consumption by fuel and type of vehicle. Nitrous oxide (N<sub>2</sub>O) and methane (CH<sub>4</sub>) emissions were calculated based on miles traveled or hours of operation based on the type of vehicle. Hydrofluorocarbon (HFC) emissions were calculated based on the number of vehicles by vehicle type with air conditioning units. Biofuel emissions are not included in the total but were calculated separately for each agency.

Overall, in 2009, agencies had accurate data on agency owned vehicles; the same cannot be said about 2005 data.

## **Business travel in private vehicles**

State agencies estimated GHG emissions from business travel in private vehicles for 2009. Agencies conduct business travel using the state fleet as well, and these GHG emissions are included in the state fleet emissions. GHG emissions from business travel in private vehicles are estimated separately from business travel in the state fleet because agencies have less control over these vehicles and generally have less data on the operation of these vehicles.

State agencies emitted about 64,300 MTCO<sub>2</sub>e from business travel in 2009. GHG emissions from business travel in private vehicles are limited to emissions from air travel and business travel in vehicles owned by employees. The estimated GHG emissions are not included in the total state agency GHG figures above, mainly because agencies were only required to estimate emissions for 2009 due to data limitations. GHG emissions from employee travel by taxi, car rentals, rail, ferry, or bus are not included in this estimate.

GHG emissions from business travel in employee-owned vehicles were calculated based on total miles traveled (calculated by dividing total employee reimbursements by the reimbursement rate per mile) and average fuel efficiency.

Air travel emissions were quantified using data on passenger miles traveled in long, medium, and short flights and emissions factors from the [EPA Climate Leaders](#) guidance.<sup>19</sup> Agencies used actual data where possible, estimated based on the number flights, or estimated based on airfare expenditures.

## **Employee commuting**

State agencies also emitted 146,000 MTCO<sub>2</sub>e from employee commuting for 2009. GHG emissions from employee commuting are limited to worksites included in the Commute Trip Reduction (CTR) program run by WSDOT. This includes worksites with over 100 employees in the nine most populous counties in the state. In 2009, the Legislature added requirements for all state agencies located in Thurston County to participate in a Joint Comprehensive CTR Plan.

WSDOT began to quantify GHG emissions for CTR worksites in 2009. Agencies will rely on the information on GHG emissions provided by WSDOT. WSDOT estimated emissions from commuting based on vehicle emission factors from the EPA and vehicle miles traveled for commuters driving alone, carpooling, vanpooling, or motorcycling as determined by commute trip survey data. Commuting emissions do not include rail, transit, ferry sources, or students generated commuting emissions.

## **Fugitive emissions**

An additional source of emissions is “fugitive” emissions or gas leaks from:

- Commercial refrigeration
- Commercial air conditioning equipment and heat pumps
- Fire suppression equipment
- Other types of equipment

Fugitive emissions are not included in the total state agency GHG emissions figures 1, 2, and 3 above. Agencies were not required to quantify fugitive emissions for 2009 or earlier. Seven agencies provided estimates totaling 49,000 MTCO<sub>2</sub>e for 2009 using a template developed by Ecology.

Ecology and agencies will evaluate quantifying these emissions starting in 2010. Many refrigerants and compressed gases are high global warming potential (GWP) gases that have GWPs that are 140 to 11,700 times that of carbon dioxide.



## VI. Actions Taken To Reduce Greenhouse Gas Emissions

The Act complements and builds on several existing efforts to lead by example and promote sustainability in state government operations. Washington State has adopted several policies that will help state government meet the GHG reductions, including requirements to:

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Lottery retrofitted fluorescent lighting with more efficient fixtures at a cost to the agency of \$7,925, annual savings of \$7,466, and annual reduction in 84,838 Kwh.

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- Achieve building energy performance standards for state-owned buildings and for new public buildings to achieve green building Leadership in Energy & Environmental Design (LEED) certification.
- Reduce fuel consumption, increase fuel economy, and increase the use of biofuels in the state fleet.
- Promote electrification in the state fleet.
- Develop plans to:
  - Reduce employee commuting in single occupancy vehicles.
  - Implement paper conservation and recycling programs.
  - Purchase environmentally preferred products.

A comprehensive crosswalk of policies related to state government leadership in sustainability is included in [Appendix 2 – Statutory Requirements Applicable to State Agency GHG Emissions Reduction](#).<sup>20</sup>

The Act required agencies to report actions they have taken to reduce GHG emissions. Ecology developed a web survey using Survey Monkey for agencies to use for reporting.

For more information, see [Appendix 7 - Summary of Responses to GHG Actions Taken Survey](#).<sup>21</sup>

### Actions taken to reduce greenhouse gas emissions from buildings and fixed equipment

Agencies have already taken many actions to reduce GHG emissions, conserve energy, and increase energy efficiency in buildings. For example:

- Since the High-Performance Green Buildings Act came into effect in July 2005, twenty state projects<sup>22</sup> have achieved Leadership in Energy & Environmental Design (LEED) certification, including 1 Platinum, 12 Gold, and 7 Silver. An additional 78 projects are pursuing LEED certification. For more information, see [GA's High Performance Building report](#).<sup>23</sup>

- The Lake Washington Technical College (LWTC) constructed the first LEED silver buildings in the Washington State Community and Technical College systems. A Post Occupancy Evaluation report issued in 2009 found that LWTC Redmond Campus building has an energy use intensity (measure of energy consumed in buildings) of 72 while the national average is 120.
- Many agencies upgraded and renovated their buildings to add energy saving measures such as retrofitted HVAC, efficient indoor lightings, and weatherization and occupancy sensors. For example, Yakima Valley Community College (YVCC) replaced nine HVAC units in six buildings at an estimate cost of \$650,000 resulting in an estimated energy savings of 25 percent to 30 percent. YVCC also replaced its interior and exterior lighting with Light emitting diodes (LED) lighting at an estimated cost of \$40,000 resulting in 70 percent in energy savings and 80 percent in labor savings
- Agencies using resource conservation managers track their energy use closely and have implemented best practices for energy use.
- Agencies purchased energy star rated refrigerators, washer and dryer and other appliances, available on contract from GA.
- Many agencies leasing private space negotiated with the building owners to incorporate energy efficiency measures into a new or renewed lease. Measures included upgrade HVAC systems, and lighting, and continual maintenance of the leased facilities. Some agencies, such as Department of Commerce moved to a new building in part because of concerns about energy efficiency, and worked closely with GA to incorporate cost-effective sustainability features into the renovated space.
- A large number of agencies, including community and technical colleges, used the Energy Savings Performance Contracting<sup>24</sup> to identify and implement energy efficiency projects. For example, LWTC invested over \$1million in grants and loans on a project developed by an energy services company (ESCO). The estimated electricity savings from the project are about 2 MKwh per year.
- Many agencies disabled unwanted or unneeded indoor overhead lights.



*Photo 2: Skagit Valley College was awarded LEED Platinum certification for the new Laura Angst Hall in June 2010*



*Photo 3: Stafford Creek Correctional Center replaced all perimeter lighting, resulting in an estimated power savings of 27 percent over the old system.*



*Photo 4: A Solar thermal water heating system installed by staff at Yakima Valley College.*

## Actions taken to reduce energy use from office equipment and information technology

Most agencies have adopted policies and implemented strategies to increase energy efficiency and reduce energy consumption from office equipment and information technology. For example:

- About 72 agencies reported using energy star computers, monitors, printers, and copiers.
- Over 75 agencies installed software on desktop and laptop computers that automatically puts the computer into a lower power setting or hibernation mode when not in use.
- About 30 agencies have deployed software to track and reduce printer usage and reduce the cost of printing.
- About 56 agencies are moving toward paperless systems and using electronic documents, and communications instead of printed materials.
- About ten agencies are implementing or plan to implement server virtualization to make use existing servers more efficiently and/or eliminate servers.
- Agencies, such as Ecology are seeing an increase in dual monitor usage, but the monitors have been changed to low-energy use, flat monitors and the use of dual monitors cut down the number of printing jobs.
- The legislature is currently evaluating the use of Software as a Service (SaaS), also referred to as "software on demand".
- Over 10 agencies have implemented an e-mail vaulting system operated by DIS to reduce the printing of e-mail records.

## Actions taken to reduce greenhouse gas emissions from the state fleet

Fuel economy has increased in the state fleet and vehicle miles traveled have decreased for several reasons:

- Travel restrictions instituted by the Governor, legislature, and agencies management. Most agencies have implemented more stringent polices than those required by OFM to reduce business trips.
- Biodiesel usage among state agencies has increased from 2005 to 2009. The availability of biofuels has been a limiting factor in increasing usage to date. Several agencies are working to increase the availability of biofuels throughout the state and to address other concerns or barriers to increasing biofuel usage. For more information, see GA's report [Biodiesel Use by Washington State Agencies](#).<sup>25</sup>



*Photo 5: Electric truck in use at Lake Wenatchee since 2005.*

- State agencies and higher education have purchased 1,510 hybrid models from GA contracts since January 2005 (this includes the GA Motor Pool). The GA Motor Pool has the largest state hybrid fleet in the nation according to a survey by [Automotive Fleet magazine September 2010 issue](#)<sup>26</sup>

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The GA Motor Pool ranks #1 nationally of state fleets for the largest number of hybrids – 958. It is also #1 in terms of percent of hybrids to total fleet, 54 percent.

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- Agencies are giving priority, when purchasing and using vehicles, to hybrid gas and electric vehicles and other fuel-efficient and low emission vehicles.
- Several agencies have constructed electric car charging stations and more are planned.
- Most agencies with large fleets instituted preventive maintenance and fleet management practices.
- Off-road ground maintenance vehicles have been converted to or replaced with plug-in electric vehicles at South Seattle Community College, GA, Parks and several community and technical colleges.
- The Military Department installed more than one mile of sidewalks on the Camp Murray campus to encourage walking instead of driving to the various buildings. State Parks provides free bikes to students to get around Fort Warden state park instead of driving.
- The Attorney General Office (AGO) developed and deployed a program to coordinate carpools to common destinations. The program consists of travel calendars for most frequently traveled routes that are posted to a shared AGO website. Employees list future trips and are able to contact and coordinate with each other using the listings.
- The Transportation Improvement Board has reduced the need to review roads in person by documenting roadway segments and using aerial photos to review segments when possible.

## **Actions to reduce greenhouse gas emissions from business travel in private vehicles and commuting**

Most agencies have significantly cut air travel from 2005 to 2009 due to travel restrictions. They have also reduced their vehicle miles traveled (VMT). For example:

- The number of agencies investing in video conferencing equipments has increased significantly since 2005. Ecology has video conferencing capability at eight worksites across the state.
- Several boards and commissions are allowing their board members to attend meetings via teleconferencing and webinars. Staff in most agencies are encouraged or required to carpool to meetings, and to use state hybrid vehicles in lieu of their personal vehicles.
- The use of e-learning (online classes) at universities and community and technical colleges is on the rise. E-learning is also used by the Department of Personnel. The Washington State eLearning Network (ELN) has a library of over 1,200 quality classes ranging from personal development to technical skills to improving leadership and managerial skills.

## VII. Additional Actions Taken

Many state agencies are committed to reducing their impact on the environment through:

- Generating renewable energy and purchasing green power or renewable energy credits (RECs)
- Reducing waste and purchasing environmentally preferable products
- Conserving water, implementing best management practices for reducing stormwater runoff, and reducing GHG emissions from wastewater treatment

The GHG emissions from these activities were not calculated because of a lack of established methods and a lack of data. All of these actions have a direct effect on Washington's environment and help reduce GHG emissions state-wide.

### Renewable energy, green power, and RECs

Many agencies have already taken the first steps toward offsetting their energy consumption by purchasing green power or Renewable Energy Credits (RECs) or installing their own renewable energy sources. For example:

- 12 agencies have installed solar photovoltaics<sup>27</sup> since 2005, and 10 more are planning to install them in the future.
- 4 have installed geothermal energy in their facilities, and an additional 10 plan to install this technology in the future.
- 15 agencies have been purchasing green power through their utility, 3 more through a third party vendor, and 4 plan to begin purchasing RECs in the future.



*Photo 6: In the past year, Skagit Valley College has generated nearly 36,000 kwh from a Solar photovoltaic array on top of LEED Platinum Laura Angst Hall.*

Widespread commitment to alternative energy sources is necessary to reduce the overall state government's emissions.

### Waste reduction and environmentally preferable purchasing

Reducing the amount of waste produced through careful recycling, composting, resource conservation and mindful purchasing has a big effect on the environment. Producing items out of raw material uses more energy than recycling already existing items.

State Agencies have taken many steps toward reducing their environmental impact through recycling. All of the agencies who completed the survey stated they are implementing the Paper

Conservation Act, enacted in 2009. They are using high recycled-content paper, all have reduced their paper use, and 85 percent have established recycling or resource conservation programs.

The Department of Printing uses plant-based inks, the highest recycled content paper available, and when-possible environmentally certified and wind-power generated paper products. The Department of Printing has eliminated the use of chemicals and heavy metals in their processes where possible. They also use electronic document drafts to conserve paper.

The Department of Licensing (DOL) worked with the Department of Printing and GA's Consolidated Mail Services (CMS) to redesign a number of recurring printing projects (including vehicle titles and renewals) to reduce costs (about \$360,000 per year) and sustain local jobs.

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"The economic and environmental benefits coming out of our new partnership with the Department of Printing are fantastic," DOL Director Liz Luce said. "We are saving taxpayer dollars, using paper made in our state, and Washingtonians are doing the job."

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Two-third of the agencies replied that they follow Environmentally Preferable Purchasing (EPP) reference guide developed by GA and Ecology in 2008, and 52 agencies state they started composting organic materials since 2005.

## Water conservation, stormwater management, and wastewater treatment

While not directly tied to GHG emissions, water conservation reduces energy use and therefore lowers GHG emissions associated with the energy used. Many state agencies are already taking action to reduce their water use. Most state agencies have installed low-flow fixtures and water efficient equipment, and are using low-maintenance landscapes. Fewer are reclaiming non-potable water for irrigation, controlling irrigation remotely or metering their water.

The Department of Correction's Coyote Ridge LEED Gold Certified campus renovation replaced water-intensive lawns with native plants and pea gravel, installed water efficient restroom, laundry, and shower fixtures, and saved about 20 million gallons of water per year and a substantial reduction in electricity used.

The School for the Blind Ogden Resource Center's green roof absorbs rainwater, reducing stormwater runoff. All other stormwater on-site is filtered through bio-swales and native plantings into wetlands and drywells; none is directed to the sewer system. These actions eliminate the need for fuel associated with construction of stormwater detention ponds

Several agencies installed high-efficiency equipment for treating wastewater and a couple are planning to install anaerobic digesters to treat wastewater, produce energy, and reduce emissions of methane gas.



Photo 7: Washington State School for the Blind's Ogden's Resource Center Green Roof

## VIII. State Agencies with Emissions over 25,000 MTCO<sub>2</sub>e

This section describes the GHG emissions and actions taken by agencies falling into three categories:

- State agencies that emit over 25,000 MTCO<sub>2</sub>e per year.
- State agencies that emit between 10,000 and 25,000 MTCO<sub>2</sub>e per year.
- State agencies that emit less than 10,000 MTCO<sub>2</sub>e per year.

These categories were selected for illustration purposes only and do not have significance in terms of the reporting and reduction requirements established in the Act or for any other regulatory purposes.

Nine state agencies emit over 25,000 MTCO<sub>2</sub>e. Table 3 summarizes the agencies' 2009 emissions.

Table 3: State Agencies with Emissions over 25,000 MTCO<sub>2</sub>e

AGENCY	NATURAL GAS & OTHER FUELS	ELECTRICITY AND STEAM	FLEET	TOTAL 2009	% CHANGE IN EMISSIONS 2005 -2009	% REDUCTION FROM 2009 TO MEET 2020 TARGET
Department of Transportation	4,471	46,465	207,890 <sup>28</sup>	258,826	-1	14
University of Washington Seattle Campus	89,067	126,935	2,501	218,503	5	19
Washington State University	68,470	86,761	3,834	159,065	6	20
Department of Corrections	52,386	63,643	7,016	123,045	7	20
Department of Social and Health Services	30,355	41,889	6,004	78,248	7	21
Department of General Administration	5,588	25,202	667	31,457	-14	1
Western Washington University <sup>29</sup>	13,043	12,302	540	31,295	10	23
Eastern Washington University	13,269	16,981	403	30,652	12	24
Central Washington University	13,213	15,048	680	28,941	5	19

# Department of Transportation

The Department of Transportation (WSDOT) has the largest GHG emissions among Washington State agencies and accounts for 21 percent of the emissions produced by all state agencies in 2009.

Table 4: WSDOT Emission by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> E) CREATED FROM USAGE
Purchased electricity and steam	112,564,464 (KWh)	46,465
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	697,650 (Therms)	4,471
Fleet: Ferries	16,935,633 (gallons)	172,879
Fleet: On-road light duty	756,831 (gallons)	6,650
Fleet: On-road heavy duty	2,692,460 (gallons)	25,404
Fleet: Off-road	290,659 (gallons)	2,957
Number of employees	8,052	NA
Occupied space square feet	3,493,837	NA

Table 5: WSDOT Emissions Reductions Needed to Meet 2020 Target

	2005	2008	2009
Total emissions ( MTCO <sub>2</sub> e )	261,122	262,350	258,826
2020 emissions target (15% below 2005)			221,954
Emissions reductions from 2009 needed to meet 2020 target ( MTCO <sub>2</sub> e )			36,872

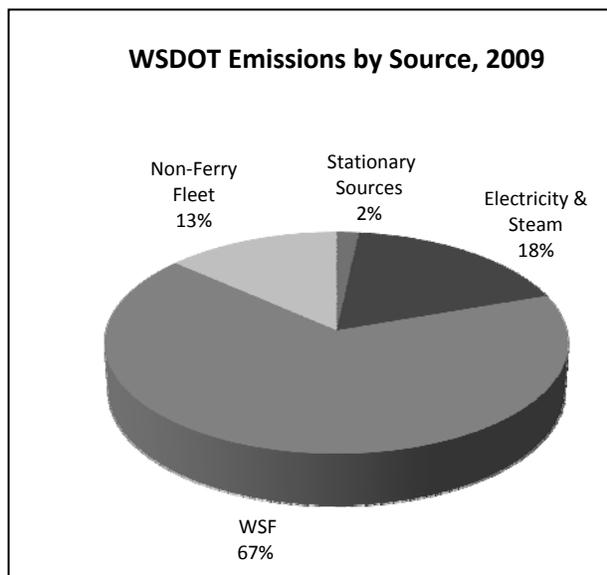
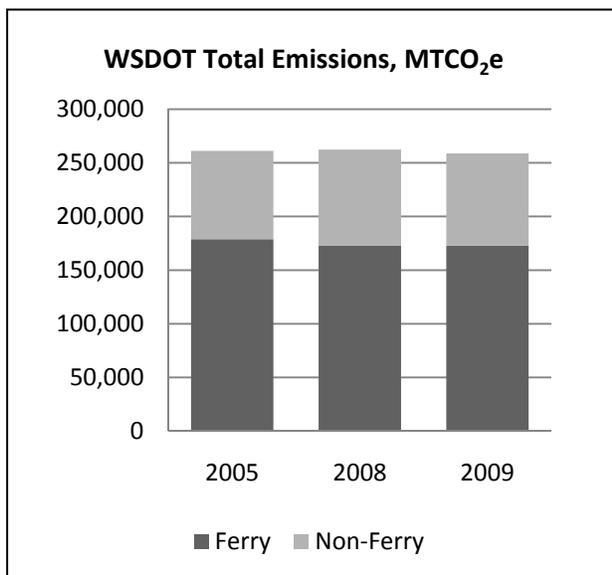


Figure 6: WSDOT Total Emissions

Figure 7: WSDOT Emissions by Source, 2009

The agency's emissions have decreased by almost 1 percent since 2005 levels, largely due to reductions in fleet emissions.

## Washington State Ferry System

Washington State Ferry (WSF) produced about 67 percent of WSDOT 2009 total emissions and 14 percent of total state emissions. Emissions levels from the ferries have dropped by 3 percent since 2005.

### Vehicle fleet

The nature of WSDOT's work requires a large number of heavy-duty vehicles and equipment. The fuel (mostly diesel) consumed from vehicles and equipment is dependent on the work required to construct and maintain the state's highway system. Emissions from the fleet and equipment vary annually based on the:

- Severity of weather conditions.
- Magnitude of roadway maintenance required.
- Number of construction projects.



*Photo 8: WSDOT staff prepares to plow snow on the Snoqualmie pass, keeping traffic moving during a winter storm.*

### Facilities energy use

At 18 percent, purchased electricity and steam used in WSDOT facilities are the next largest source of GHG emissions. WSDOT is responsible for powering their own facilities but also for traffic signals, highway lights, rest areas and other roadside energy use.

### Actions taken

WSDOT has taken actions to reduce the emissions from its ferries. They are in the process of phasing in high fuel efficiency ferries. One new ferry is operating and WSDOT has plans for two more fuel efficient ferries in 2011. WSDOT also reduced ferry service by two runs and ran some vessels on two engines instead of four engines saving 45,000 gallons of fuel a month. About 20 years ago, WSDOT installed shore power infrastructure to plug in ferries during lay-ups. They have also used biofuels in ferries since 2005.



*Photo 9: Variable message sign on I-5 provides driver information such as travel times and warnings of incidents ahead.*

WSDOT has a Fuel Conservation Committee for the state ferry system that looks at a variety of fuel reduction options, such as:

- Buying new vessels
- Changing fuel type
- Reducing service
- Slowing ferries and using fewer engines

Realistically unless WSDOT buys new vessels and changes the type of fuel used, the quickest way to reduce GHG emissions is to reduce service levels, i.e. number of runs. However, WSDOT is required by law to provide a specific level of service.

WSDOT has taken several actions since 2005 to cut costs, reduce fuel use and lower GHG emissions from its on-road fleet. For example, WSDOT:

- Installed shift lights in heavy trucks, alerting the driver of the optimum time to shift gears; increased their use of biodiesel; and replaced incandescent warning lights with LED lights to reduce idling, and limited idling for on-road vehicles.
- Purchased about 390 low emission and high mileage vehicles including 74 hybrids; discouraged purchase of SUVs.
- Adjusted its preventative maintenance schedule, starting July 1, 2009. WSDOT estimates a reduction of more than 14,500 gallons of petroleum products (engine oil) consumed per year.
- Considers alternative engine configurations regarding fuel economy and job specifications when making vehicle-purchasing decisions.
- Implemented a fuel conservation policy directing employees to conserve fuel and seek alternatives to single occupied vehicles on WSDOT business travel whenever practical and prudent.

Actions taken by WSDOT have reduced its overall fleet fuel use by 10 percent since 2008.

Steps taken to reduce electricity use include:

- Installing occupancy detectors.
- Retrofitting traffic signals to use high efficiency LEDs.
- Ensuring all new construction is built to a LEED Silver standard or better.

For more information on WSDOT's commitment to emissions reduction, see:

- [WSDOT's 2003 Sustainability Plan](#)<sup>30</sup>
- [2009 Sustainability Plan Progress Report](#)<sup>31</sup>.

# University of Washington Seattle Campus

The University of Washington (UW) Seattle campus is the second largest source of GHG emissions among state agencies. In 2009, the Seattle campus produced 18 percent of the state agency total emissions, a result of its large student body and number of employees, the large campus, central utility plant, and leading research facilities.

Table 6: UW Seattle Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	308,447,826 (KWh)	126,935
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	16,441,317 (Therms)	89,067
Vehicle fleet fuel	287,218 (gallons)	2,501
Number of students	40,852	NA
Number of employees	27,330	NA
Occupied space square feet	17,067,397	NA

Table 7: UW Seattle Emission Reductions

	2005	2008	2009
Total Emissions ( MTCO <sub>2</sub> e )	207,445	219,974	218,503
2020 emissions target (15% below 2005)			176,328
Emissions reductions needed to meet 2020 target ( MTCO <sub>2</sub> e )			42,175

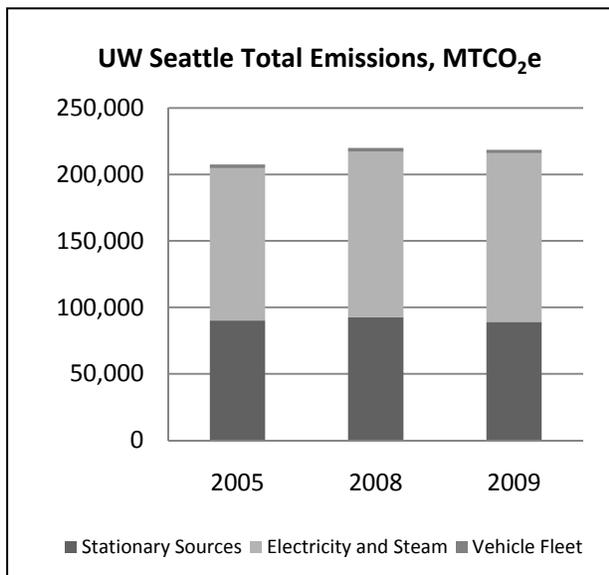


Figure 8: UW Seattle Total Emissions

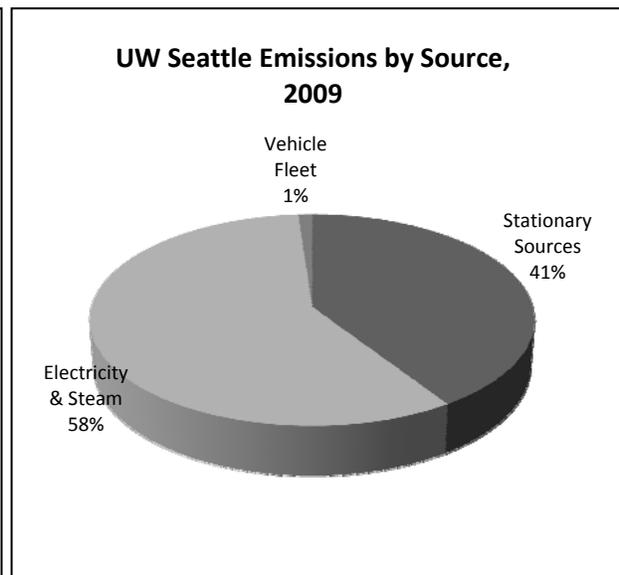


Figure 9: UW Seattle Emissions by Source, 2009

UW emissions have increased by 5 percent since 2005 and the campus square footage increased by 8 percent from 2005 to 2009. Student population and number of employees also grew. The change in emissions is mostly due to increased consumption of electricity by the UW Seattle campus.

The second largest source of emissions from the Seattle campus is stationary combustion from its power plant. This natural gas powered plant produces steam and chilled water to heat and cool campus buildings. It also produces a small amount of electricity to supplement the power purchased from Seattle City Light. The emissions from the plants are about 84,000 MTCO<sub>2</sub>e.

UW emissions in 2009 were 20 percent above the 2020 target emissions level.

## **Actions Taken**

UW is committed to having an energy efficient campus. Energy audits revealed areas of significant energy and utility savings. The university:

- Constructed and renovated several campus buildings that have been awarded the LEED Gold rating.
- Replaced air compressors and inefficient chillers.
- Replaced incandescent light bulbs.
- Lowered heating and water heating thermostats.
- Raised cooling thermostats.
- Implemented widespread lighting control systems and occupancy sensors.
- Participates in Seattle City Light's Green Up program, purchasing the largest amount of green power of any Seattle organization - about 5 percent of their own power consumption.

For more information about UW's commitment to reducing emissions, see:

- [University of Washington Climate Action Plan](#)<sup>32</sup>
- [University of Washington Climate Action Plan 2010 Update](#)<sup>33</sup>
- [2005 Inventory of Greenhouse Gases Ascribable to the University of Washington](#)<sup>34</sup>

# Washington State University

Washington State University (WSU) is the third largest emitter of GHG among state agencies. WSU's four campuses— Pullman, Spokane, Tri-cities and Vancouver—produced about 13 percent of the total GHG emitted by all state agencies.

Table 8: WSU Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	210,826,742 (kWh)	86,761
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	12,662,248 (Therms)	68,470
Vehicle fleet fuel	403,640 (gallons)	3,834
Number of students	25,352	NA
Number of employees	23,316	NA
Occupied space square feet	12,618,190	NA

Table 9: WSU Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	149,960	152,196	159,065
2020 emissions target (15% below 2005)			127,466
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			31,599

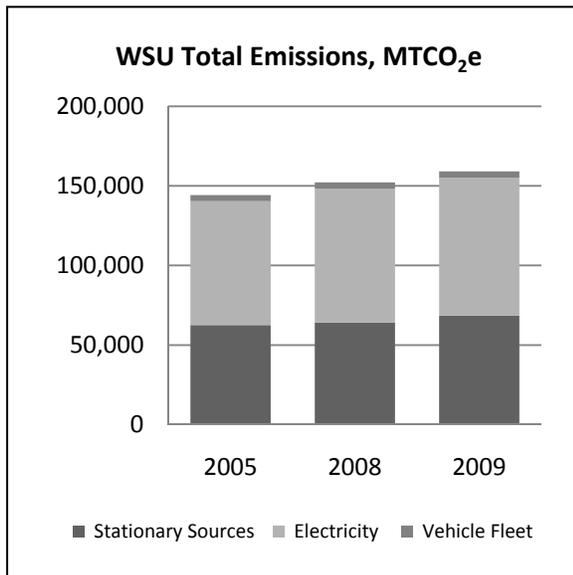


Figure 10: WSU Total Emissions

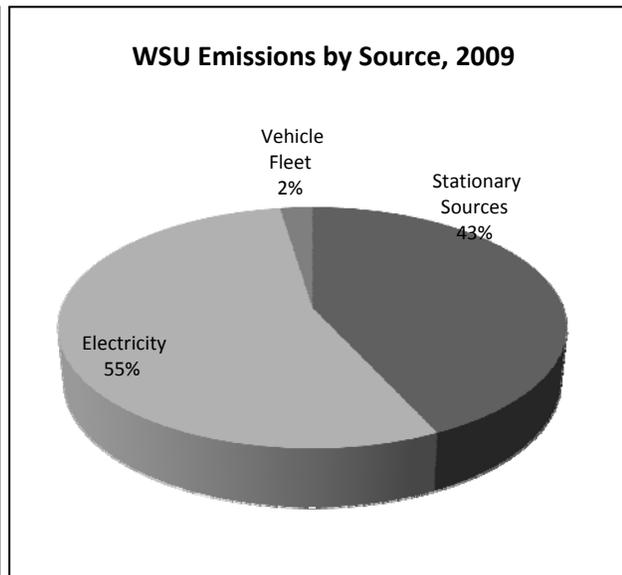


Figure 11: WSU Emissions by Source, 2009

The majority of WSU's emissions result from heating and powering of their campuses. WSU's largest source of emissions is purchased electricity and stationary combustion is the next largest source. In 2004, WSU replaced their coal burning steam plant with a natural gas powered system.

Emissions have increased 6 percent since 2005 levels due to increases in purchased electricity and natural gas. During this time WSU's square footage grew by 5 percent, student population grew by 8 percent and the number of employees grew by 9 percent.

WSU's 2009 emissions level grew by 6 percent from 2005. This is 20 percent above their 2020 target. Some of the growth is a result of significant increase in WSU research activities. WSU is among the nation's top public research universities.

## **Actions Taken**

WSU officials have taken many steps to reduce their GHG emissions. For example, WSU has:

- About half of its new facilities are LEED Silver certified or anticipating LEED Silver certification.
- Conducted energy audits since 2001 and acted on the results by:
  - Replacing appliances and electronics with energy efficient models;
  - Installing lighting that is more efficient.
  - Retrofitting HVAC systems.
  - Updating their chilled water facilities.

Currently, the university is considering options for future energy savings. For more information, see:

- [WSU Regional Campuses Climate Action Plan](#)<sup>35</sup>
- [WSU Pullman Campus Climate Action Plan](#)<sup>36</sup>

# Department of Corrections

The Department of Corrections (DOC) emitted 10 percent of the total GHGs produced by all state agencies in 2009.

Table 10: DOC Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	154,651,960 (KWh)	63,643
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	7,862,510 (Therms)	52,386
Vehicle fleet fuel	738,524 (gallons)	7,016
Number of inmates	43,317	NA
Number of employees	8,963	NA
Occupied space square feet	8,747,165	NA

Table 11: DOC Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	115,479	121,767	123,045
2020 emissions target (15% below 2005)			98,157
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			24,888

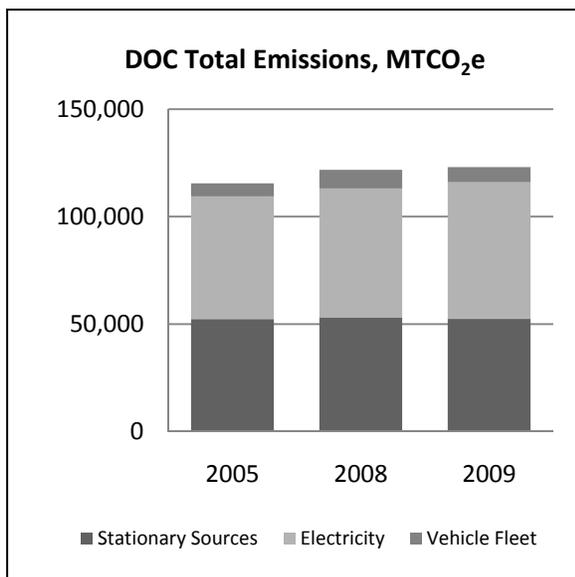


Figure 13: DOC Total Emissions

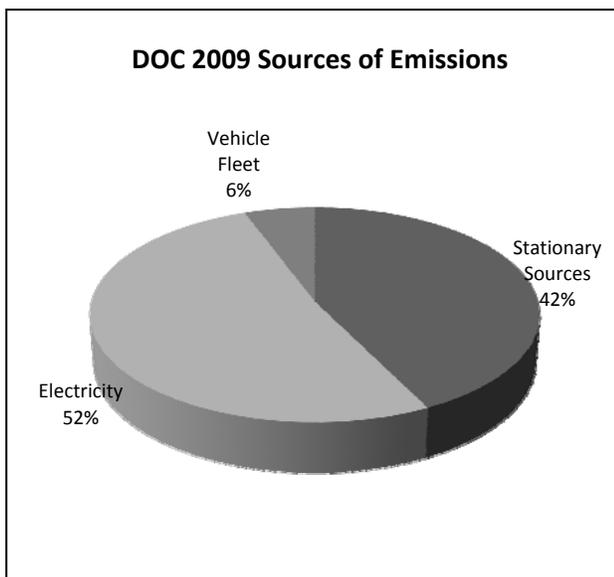


Figure 12: DOC 2009 Sources of Emissions

About 95 percent of DOC's emissions come from the energy needs of its 15 prisons, work release facilities, and community field offices. Electricity is DOC's largest source of emissions. The second largest source of emissions is stationary combustion, mostly from natural gas.

The DOC's emissions have increased by 7 percent since 2005 levels, largely due to an increase in purchased electricity. The DOC's occupied 8,747,165 square feet in 2009, an 8 percent increase from 2005. However, its emissions per square foot in 2009 are lower than 2005, due to implementation of energy efficiency measures.

The DOC's emissions in 2009 are 20% above their 2020 reduction target.

## Actions Taken

The DOC has implemented many sustainability measures. For example:

- Currently DOC occupies 38 LEED certified structures, including the newly expanded LEED Gold certified Coyote Ridge Corrections Center Campus.
- Alternative funding strategies have allowed DOC to implement energy efficiency projects.
- Energy Performance Audits were used to quantify the monetary savings from resource conservation projects. The Energy Services Company (ESCO) guarantees these savings, refunding the cost of implementation if they are not realized. With this guarantee, DOC has been able to fund a large number of projects including upgrades of multiple HVAC systems and widespread light replacement.



*Photo 10: DOC Inmate using a push mower to trim lawn.*

For more information see, [DOC 2009 Sustainability Plan](#).<sup>37</sup>

# Department of Social and Health Services

The Department of Social and Health Services (DSHS) has the 5<sup>th</sup> largest GHG emissions among all state agencies.

Table 12: DSHS Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity and steam	101,788,053 (KWh)	41,889
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	5,710,630 (Therms)	30,355
Vehicle fleet fuel	669,543 (gallons)	6,004
Number of patients housed	3,017	NA
Number of employees	FTEs: 18,582	NA
Occupied space square feet	8,460,903	NA

Table 13: DSHS Emission Reductions Needed

	2005	2008	2009
Total emissions ( MTCO <sub>2</sub> e )	72,959	79,140	78,248
2020 emissions target (15% below 2005)			62,015
Emissions reductions needed to meet 2020 target ( MTCO <sub>2</sub> e )			16,233

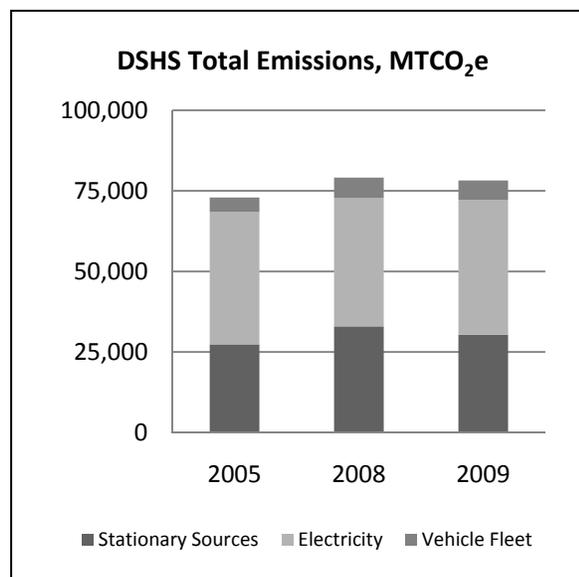


Figure 14: DSHS Total Emissions

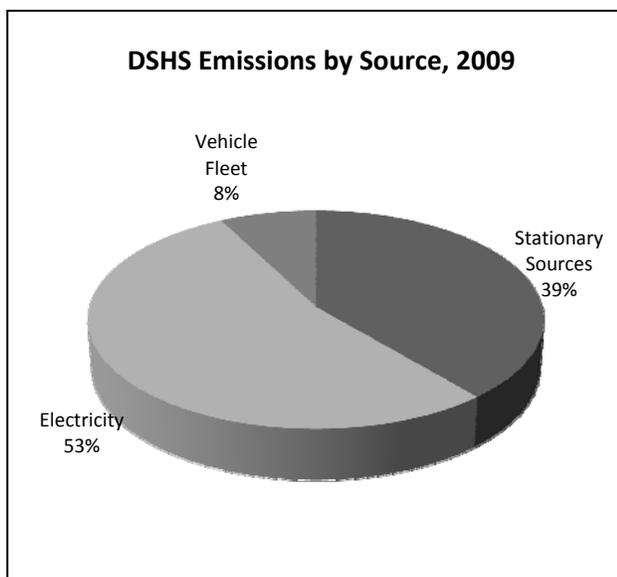


Figure 15: DSHS Emissions by Source, 2009

DSHS currently owns about 55 percent of its occupied space and houses 3,017 residents. Buildings produced about 92 percent of total GHG emissions in 2009.

Overall DSHS emissions in 2009 increased by 7 percent from the 2005 level. The increase is largely due to increased use of natural gas to heat and cool buildings. Between 2005 and 2009,

DSHS decreased total square feet by consolidating offices. DSHS expects that further reductions due to budget cuts and organizational changes will significantly reduce FTEs, occupied state-owned space, and total leased space.

## **Actions Taken**

DSHS has taken several actions to reduce its energy and fuel use. For example since 2005 DSHS has:

- Completed a natural gas energy conservation project at their largest institution in 2007.
- Began a resource conservation management program using a grant from Puget Sound Energy (PSE). Also, at the beginning of FY2009, the agency added a contracted resource conservation manager for seven institutions in the PSE service territory. These actions showed an immediate return and resulted in a decline of natural gas usage from 2008 through 2010 and a reduction in total energy usage to below the 2005 level. The PSE supported program runs through FY2011.
- Purchased or leased Energy Star compliant computers, monitors, and printers.
- Initiated PC Power Management Software.
- Purchased vehicles that are more efficient.
- In FY2010 reduced fuel use by 8.5 percent of FY2009.

For more information see:

- [DSHS Sustainability Plan 2006](#)<sup>38</sup>
- [DSHS Sustainability Plan Progress Report 2009](#)<sup>39</sup>

# Department of General Administration

The Department of General Administration (GA) makes up 3 percent of all state agencies' emissions.

Table 14: GA Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity and steam	61,239,560 (KWh)	25,202
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	1,002,715 (Therms)	5,588
Vehicle fleet fuel	77,88 (gallons)	667
Number of employees	625	NA
Occupied space square feet	5,725,157	NA

Table 15: GA Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions ( MTCO <sub>2</sub> e )	36,524	32,306	31,457
2020 emissions target (15% below 2005)			31,045
Emissions reductions needed to meet 2020 target ( MTCO <sub>2</sub> e )			412

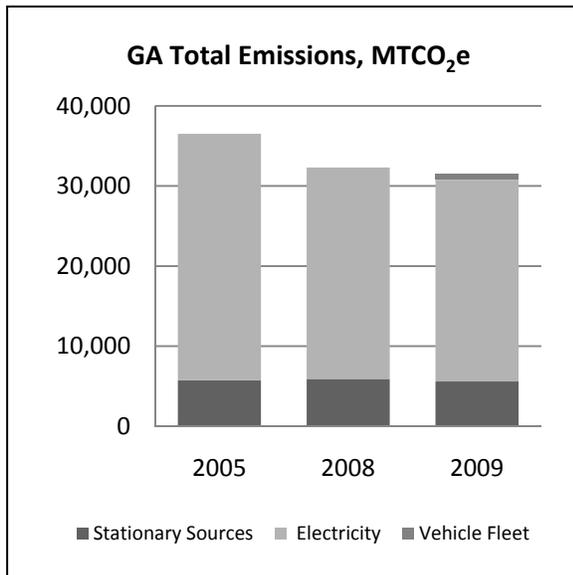


Figure 16: GA Total Emissions

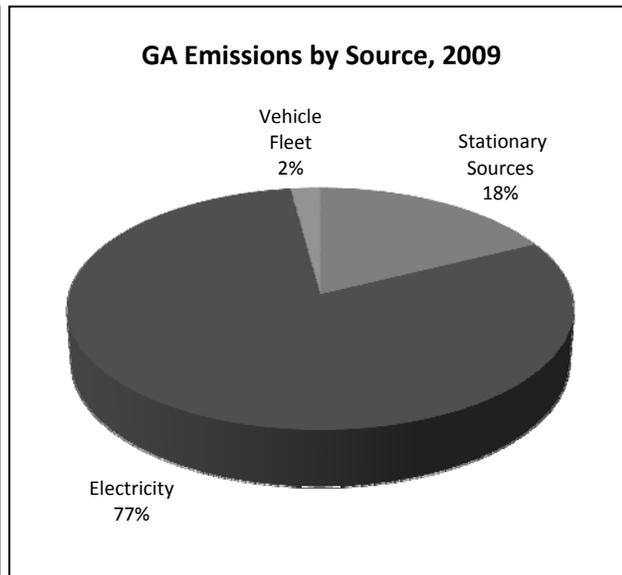


Figure 17: GA Emissions by Source, 2009

GA owns 5,725,157 square feet and leases much of that space to other state agencies. Purchased electricity is the highest source of GHG emissions compared to any other agency. GA's stationary combustion reflects the emissions from its steam plant. Together, building needs produce about 98 percent of GA's emissions.

GA calculated GHG emissions for buildings on capital campus and off-campus. To avoid double accounting of GHG emissions from buildings, all agencies occupying space in GA's buildings were asked by Ecology not to calculate their share of the emissions from the space they occupy. This affected mostly small agencies.

In 2009, GA reduced their GHG emissions by 14 percent by through their efforts to reduce energy consumption in all of its facilities and by focusing the work of the Resource Conservation Manager and facility staff.

## **Actions Taken**

GA is committed to sustainability and has implemented several efficiencies in their buildings (Capitol Campus and other facilities throughout the state). For example, GA has:

- Improved the operational profile of their buildings by matching the buildings energy systems to the occupancy of the buildings. Adjusting the heating and cooling settings and improving maintenance has contributed to GA's significant reduction in energy use and associated GHG emissions.
- Installed sub meters to collect energy use data in their buildings. GA uses the data to identify more ways to reduce energy use.
- Installed more energy efficient equipment.
- Employs a Resource Conservation Manager (RCM) whose job is to identify energy saving opportunities and implement energy efficiency best practices. Cost savings from utility reductions are being used to fund future energy-saving projects.
- Constructed new LEED certified facilities for agencies all over the state.

For more information see:

- [2009 GA Sustainability Report](#)<sup>40</sup>
- [2010 State Green Building Report](#)<sup>41</sup>

# Western Washington University

Western Washington University's (WWU) emissions have increased by 9.7 percent since 2005, largely due to increases in its use of natural gas. WWU's steam plant uses natural gas to heat its facilities and produce hot water. The campus has grown in size by 3 percent since 2005, increasing the demand on the plant.

Table 16: WWU Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity and steam	37,116,000 (kWh)	12,302
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	246,351 (Therms)	13,043
Vehicle fleet fuel	58,883 (gallons)	540
Number of students	14,035	NA
Number of employees	1,054	NA
Occupied space square feet	3,142,727	NA

Table 17: WWU Emission Reductions Needed

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e) <sup>42</sup>	28,530	31,226	31,295
2020 emissions target (15% below 2005)			24,251
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			7,045

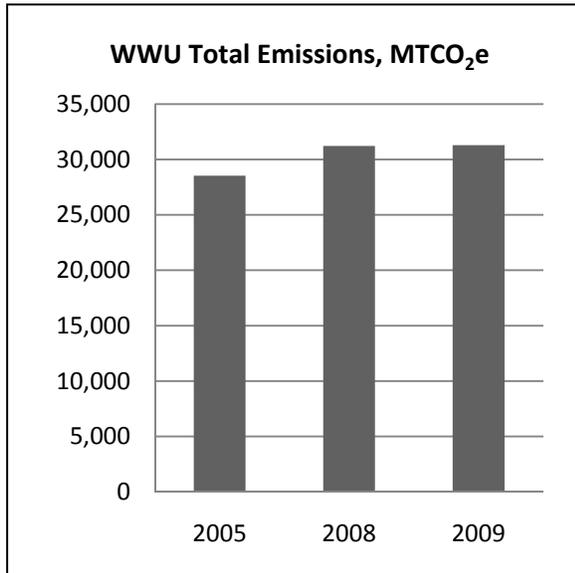


Figure 18: WWU Total Emissions

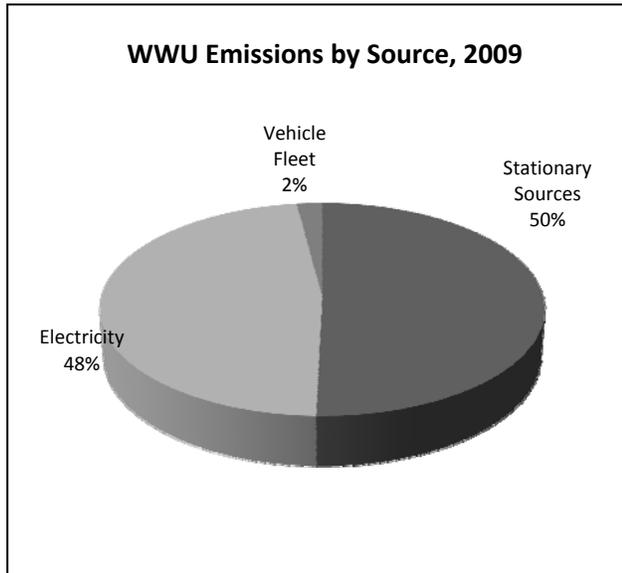


Figure 19: WWU Emissions by Source, 2009

## **Actions Taken**

WWU has taken actions to reduce its energy and GHG emissions. For example, WWU has:

- Purchased Renewable Energy Credits (RECs) through Puget Sound Power, offsetting all of its purchased electricity. Funded through student fees, WWU is the 4<sup>th</sup> largest purchaser of green energy among academic institutions nationwide.
- Implemented a campus-wide “10x12” campaign, combining sustainability education and improved building performance to conserve energy. Facility-specific utility monitoring allows the university to reward departments that reduce their energy consumption.
- “Eco Reps” in student housing facilities to educate and model behavior for their peers and have helped to achieve a 10 percent to 20 percent reduction in energy consumption as a result of behavior change alone.

For more information, see [WWU Climate Action Plan](#).<sup>43</sup>

# Eastern Washington University

Eastern Washington University (EWU) is the 8<sup>th</sup> largest producer of emissions among all state agencies.

Table 18: EWU Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	41,263,724 (KWh)	16,981
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	2,479,467 (Therms)	13,269
Vehicle fleet fuel	41,769 (gallons)	403
Number of students	11,161	NA
Number of employees	1,297	NA
Occupied space square feet	2,750,530	NA

Table 19: EWU Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions ( MTCO <sub>2</sub> e )	27,280	30,304	30,652
2020 emissions target (15% below 2005)			<b>23,188</b>
Emissions reductions needed to meet 2020 target ( MTCO <sub>2</sub> e )			<b>7,464</b>

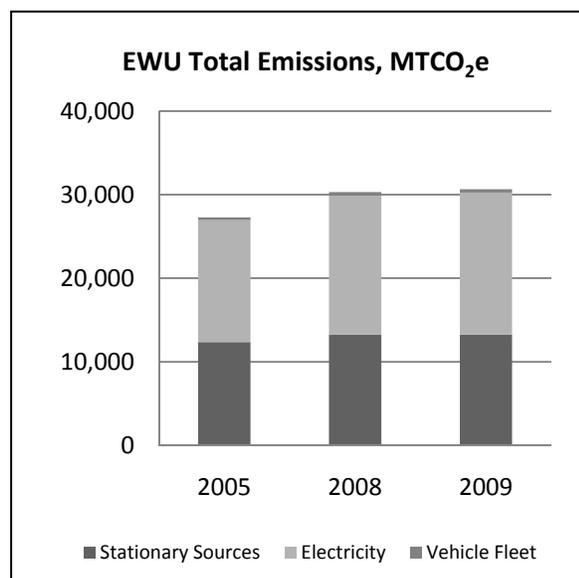


Figure 20: EWU Total Emissions

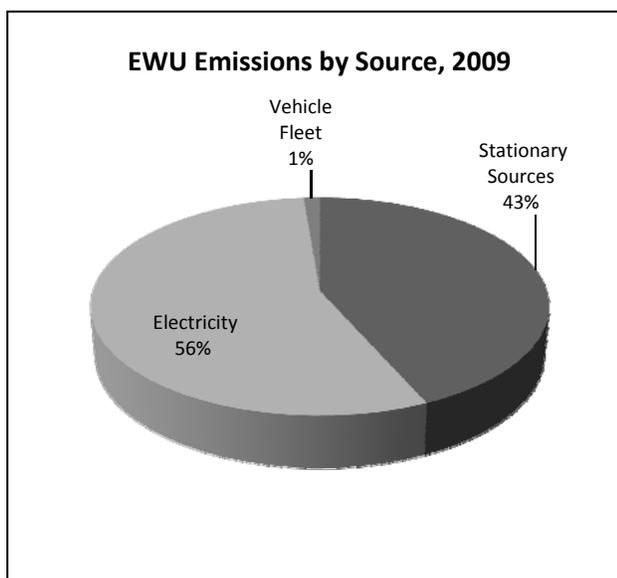


Figure 21: EWU Emissions by Source, 2009

Their carbon footprint is largely the result of their large campus. Purchased electricity is the largest source of emissions, with stationary combustion a close second. EWU's steam plant currently burns natural gas to heat campus buildings and produce hot water.

## **Actions Taken**

EWU has already taken action to make their campus more energy efficient. For example, EWU has:

- Retrofitted its HVAC systems.
- Upgraded its lighting and improved system controls.
- Committed to pursuing LEED certification for all new construction and renovation; five projects are currently pursuing LEED Silver certification.
- Planned energy audits for all campus buildings; this information will help the university create a strategic plan to implement energy and cost saving measures.
- Planned to conduct a feasibility study about the use of alternative fuel sources such as biomass or bio-diesel.

For more information, see [EWU 2010 Climate Action Plan](#)<sup>44</sup>.

# Central Washington University

Central Washington University (CWU) is the 9<sup>th</sup> largest GHG producer among state agencies.

Table 20: CWU Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity and dteam	36,565,682 (KWh)	15,048
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	2,485,740 (Therms)	13,213
Vehicle fleet fuel	72,154 (gallons)	680
Number of students	10,688	NA
Number of employees	631	NA
Occupied space square feet	3,134,673	NA

Table 21: CWU Emission Reductions Needed to

	2005	2008	2009
Total emissions ( MTCO <sub>2</sub> e )	27,538	28,612	28,941
2020 emissions target (15% below 2005)			23,407
Emissions reductions needed to meet 2020 target ( MTCO <sub>2</sub> e )			5,534

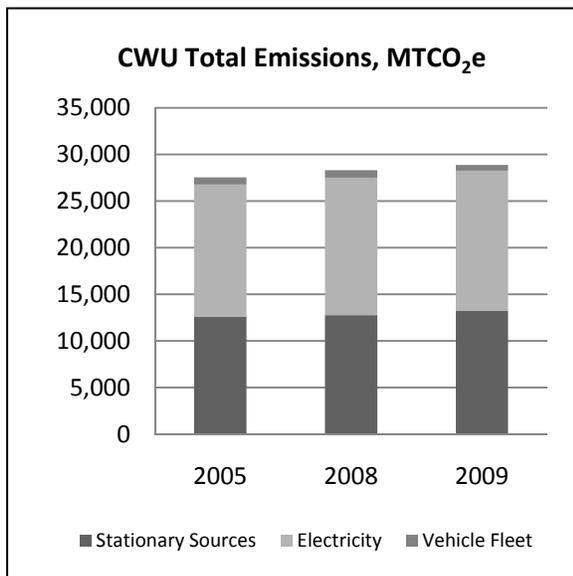


Figure 22: CWU Total Emissions

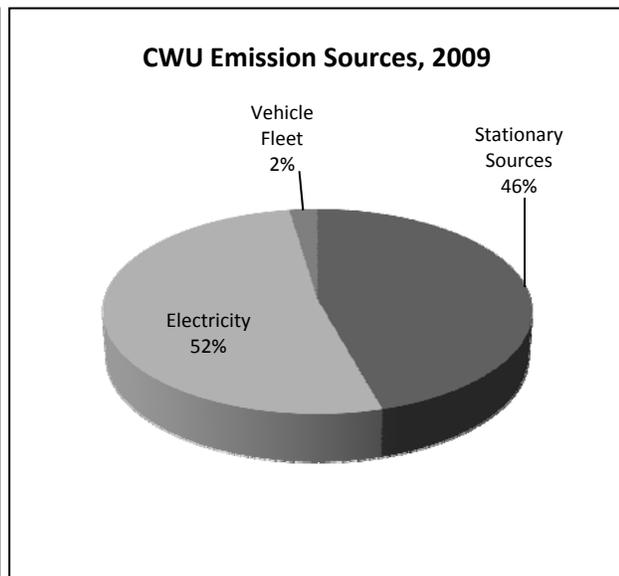


Figure 23: CWU Emission Sources, 2009

CWU's emissions are largely due to its natural gas-burning steam plant. Emissions have grown 5 percent since 2005 due to higher electricity and natural gas usage, most likely related to increases in square footage and student enrollment since 2005.

## **Actions Taken**

CWU has taken steps toward energy efficiency. It has:

- Analyzed campus options to reduce natural gas and electricity usage.
- Replaced outdated, inefficient boilers and analyzed the possibility of switching to bio-diesel are planned for the steam plant.
- Committed to green building, the Dean Hall Renovation, currently in the accreditation process, is expected to achieve LEED Gold certification, and the Hogue Technology addition, currently under construction, is expected to achieve LEED GOLD.

For more information, see [CWU 2010 Climate Commitment Action Plan](#)<sup>45</sup>

## IX. State Agencies with Emissions Between 10,000 and 25,000 MTCO<sub>2</sub>e

Table 22: State Agencies with Emissions between 10,000 and 25,000 MTCO<sub>2</sub>e in 2009

AGENCY	NATURAL GAS & OTHER FUELS	ELECTRICITY AND STEAM	FLEET	TOTAL 2009	% CHANGE IN EMISSIONS 2005 -2009	% REDUCTION FROM 2009 TO MEET 2020 TARGET
Washington State Patrol	697	7,640	14,463	22,800	6	20
Dept. of Fish and Wildlife	377	10,156	6,814	17,348	-18	0
Spokane Community College, District 17	5,753	8,453	271	14,478	11	23
Seattle Community College, District 6	1,920	11,381	192	13,493	15	26
Dept. of Health	103	12,395	555	13,053	36	38
State Parks and Recreation Commission	1,872	7,883	2,579	12,335	-9	6
Dept. of Natural Resources	713	2,704	8,528	11,945	1	16
The Evergreen State College	4,542	6,863	251	11,656	-18	5

# Washington State Patrol

As the 10<sup>th</sup> largest source of GHG emissions within state agencies, the Washington State Patrol’s (WSP) carbon footprint is largely due to its duty to enforce traffic safety. WSP’s fleet traveled almost 4 million miles in 2009. These miles account for 63 percent of the agency’s emissions.

Table 23: WSP Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity and steam	18,564,938 (KWh)	7,640
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	49,384 (Therms)	697
Vehicle fleet fuel	1,700,953 (gallons)	14,463
Number of employees	2,257	NA
Occupied space square feet	1,042,754	NA

Table 24: WSP Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	21,455	22,202	22,826
2020 emissions target (15% below 2005)			18,237
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			4,589

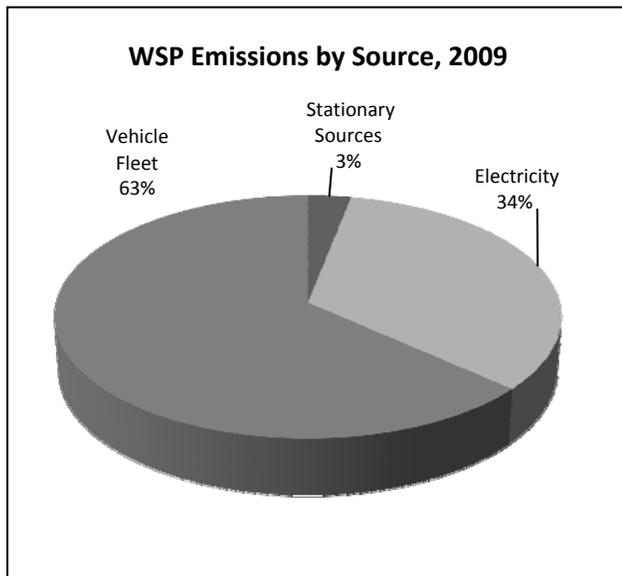
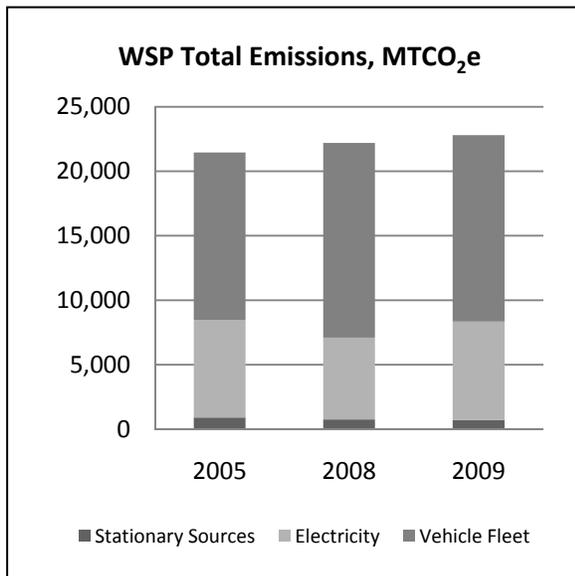


Figure 24: WSP Total Emissions

Figure 25: WSP Emissions by Source, 2009

Emissions have increased since 2005, largely due to increases in fleet fuel and purchased electricity. The WSP’s 2009 emissions are 20 percent above the target emission levels for 2020.

## **Actions Taken**

WSP has taken several steps to hybridize its non-pursuit fleet, but does not currently have plans to adjust pursuit vehicles.

For more information see:

- [WSP 2003 Sustainability Plan](#)<sup>46</sup>
- [WSP 2009 Sustainability Plan Update](#)<sup>47</sup>

# Department of Fish and Wildlife

The Washington Department of Fish and Wildlife (WDFW) is the 11<sup>th</sup> largest emitter among state agencies and made up 1.4 percent of 2009 Washington State agency emissions.

Table 25: WDFW Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity and steam	24,679,741 (kWh)	10,156
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	71,000 (Therms)	377
Vehicle fleet fuel	784,936 (gallons)	6,814
Number of employees	1,758	NA
Occupied space square feet	1,445,815	NA

Table 26: WDFW Emission Reductions Needed

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	21,136	18,129	17,348
2020 emissions target (15% below 2005)			17,966
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			0

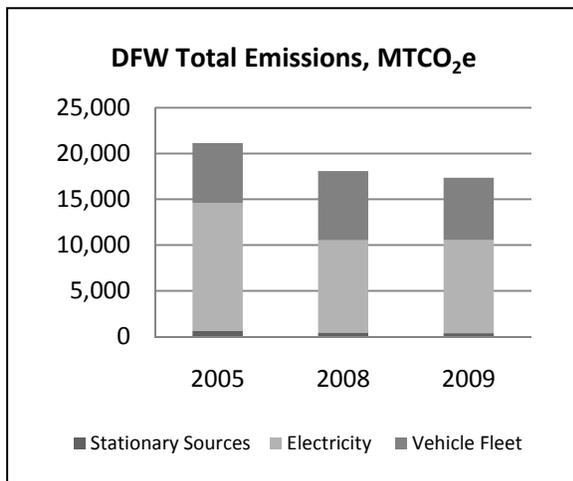


Figure 26: DFW Total Emissions

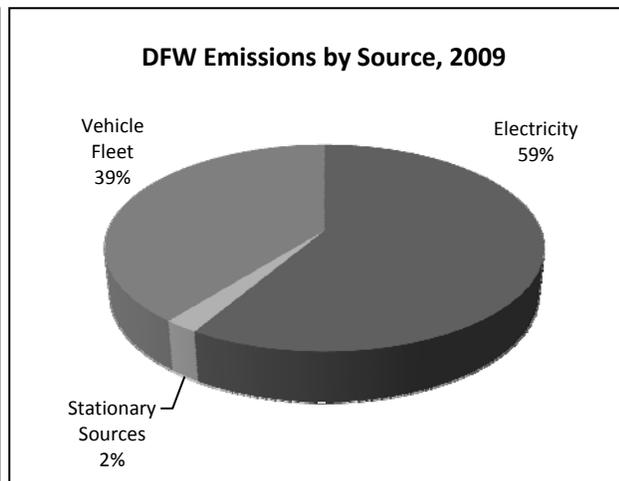


Figure 27: DFW Emissions by Source, 2009

WDFW's workforce and occupied square footage reduced significantly from 2005 to 2009. WDFW's emissions levels dropped significantly as a result. WDFW's 2009 emissions are now below the 2020 target.

## **Actions Taken**

The Department of Fish and Wildlife has taken several actions. For example, WDFW has:

- Retrofitted lighting
- Weatherized buildings
- Replaced inefficient office equipment
- Installed solar panels in some of their facilities
- Upgraded its fleet with higher efficiency vehicles

# Spokane Community College- District 17

As the 12<sup>th</sup> largest emitter among state agencies, Spokane Community College - District 17 (SCC-D-17) was responsible for 1 percent of the total state government emissions.

Table 27: SCC – District 17 Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	20,541,212 (KWh)	8,453
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	1,076,862 (Therms)	5,753
Vehicle fleet fuel	28,636 (gallons)	271
Number of students	41,436	NA
Number of employees	1,242	NA
Occupied space square feet	1,932,031	NA

Table 28: SCC - District 17 Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	13,034	15,000	14,478
2020 emissions target (15% below 2005)			11,079
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			3,399

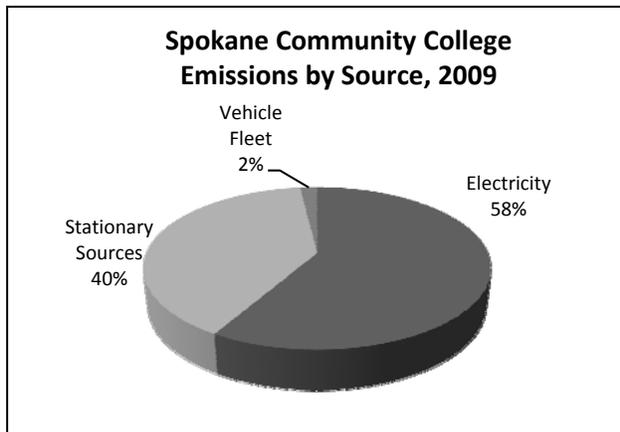


Figure 28: Spokane Community College

About 98 percent of SCC emissions are a result of the natural gas and electricity required by campuses. Emissions have increased significantly since 2005, due to the growth in student enrollment. A 23 percent reduction from 2009 levels is required to meet the 2020 target.

## **Actions Taken**

SCC has:

- Retrofitted HVAC systems
- Upgraded lighting
- Replaced appliances
- Installed occupancy sensors
- Purchased Energy Star Computers
- Reduced use of dual monitors
- Used video conferencing equipment.
- Installed solar hot water and photovoltaic solar panels to reduce their overall building energy consumption

# Seattle Community Colleges- District 6

As the 13<sup>th</sup> largest emitter among state agencies, Seattle Community Colleges- District 6 (SCC – D-16) was responsible for 1 percent of 2009 emissions from state government. This district is made up of 4 community colleges located throughout Seattle.

Table 29: SCC - District 6 Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	26,647,109 (KWh)	11,381
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	361,169 (Therms)	1,920
Vehicle fleet fuel	18,774 (gallons)	192
Number of students	53,305	NA
Number of employees	1,441	NA
Occupied space square feet	1,841,739	NA

Table 30: SCC - District 8 Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	11,780	13,902	13,493
2020 emissions target (15% below 2005)			10,013
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			3,481

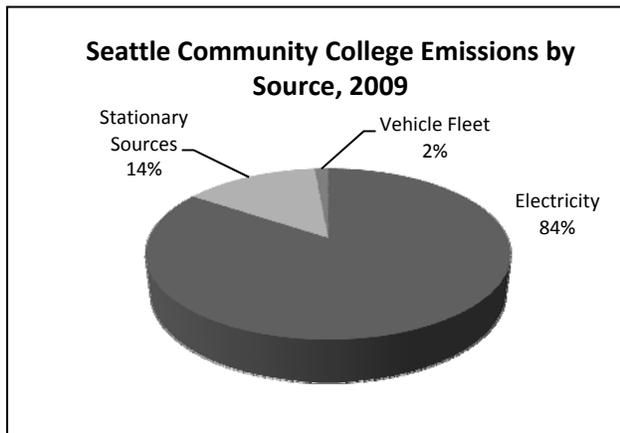


Figure 29: SCC Emissions by Source, 2009

Emissions have increased 13 percent since 2005. This means the colleges must reduce their emissions by 28 percent to reach the 2020 target emissions levels.

## **Actions Taken**

Seattle Community Colleges have:

- Constructed LEED rated buildings.
- Retrofitted their HVAC systems.
- Retrofitted lighting, installed occupancy sensors, and weatherized their buildings.
- Reduced gasoline consumption and replaced aging vehicles with hybrids.

Seattle Central Community College has found funding to upgrade lighting, pipe insulation, and HVAC controls starting in January 2011 and the projects is expected to significantly reduce their energy consumption and greenhouse gas emissions.

# Department of Health

The Department of Health (DOH) produced 1 percent of the state government total emissions.

Table 31: DOH Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	14,913,507 (KWh)	12,395
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	19,319 (Therms)	103
Vehicle fleet fuel	63,193 (gallons)	555
Number of employees	1,470	NA
Occupied space square feet	523,621	NA

Table 32: DOH Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	9,590	12,167	13,052
2020 emissions target (15% below 2005)			8,152
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			4,901

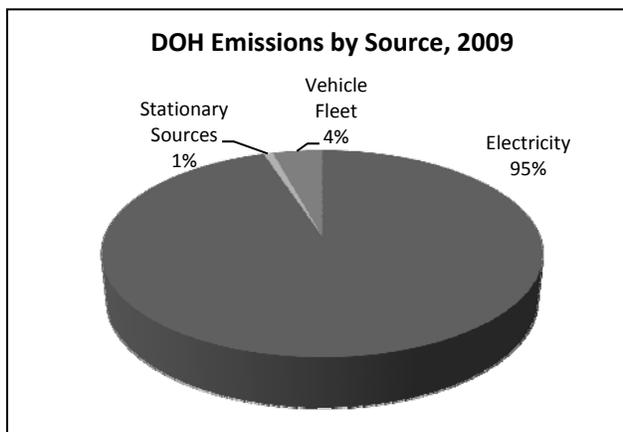


Figure 30: DOH Emissions by Source, 2009

DOH's emissions have increased dramatically since 2005. DOH will need to reduce its emissions by 38 percent to reach the 2020 target emissions levels. Increased emissions may have been caused by increases in employees and occupied square footage from 2005 to 2009. DOH leases a large majority of its occupied space, and has limited control over building energy consumption.

## Actions Taken

DOH has:

- Installed higher efficiency lighting, and occupancy sensors
- Reduced outdated electronic equipment with higher efficiency models.

# State Parks and Recreation Commission

The Washington State Parks and Recreation Commission (State Parks) was responsible for 1 percent of the 2009 total emissions from state government.

Table 33: State Parks Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	19,155,149 (kWh)	7,883
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	70,422 (Therms)	1,872
Vehicle fleet fuel	259,071 (gallons)	2,579
Number of employees	886	NA
Occupied space square feet	2,398,221	NA

Table 34: State Parks Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	13,573	13,053	12,335
2020 emissions target (15% below 2005)			11,537
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			798

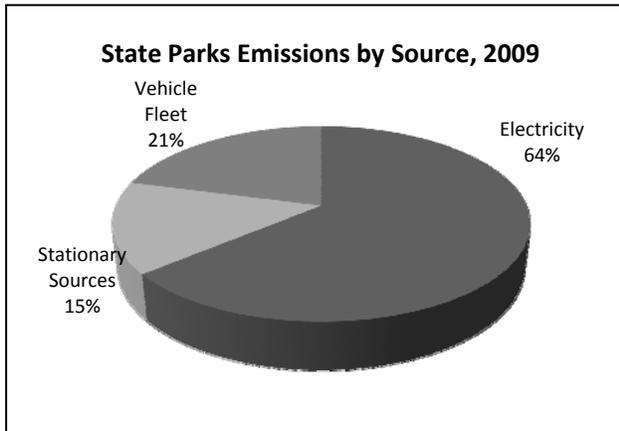


Figure 31: State Parks Emissions by Source, 2009

State Parks emissions have fallen slightly since 2005 despite small increases in employees and occupied space. A further 6 percent reduction in 2009 emission levels is required to meet the 2020 target.

## **Actions Taken**

State Parks has taken action statewide to conserve energy and reduce emissions in their facilities. Many facilities have:

- Recognized the importance of green building in new construction. For example:
  - State Parks Headquarters is certified LEED Gold
  - Lake Sammamish State Park Beach House won the 2008 “Green” AIA Award
  - Fort Casey State Park has a comfort station with a green roof
- Installed sub-meters to help them more accurately understand their energy use.
- Weatherized or replaced windows.
- Installed higher efficiency lighting.
- Installed large geothermal heat pumps to increase their heating energy efficiency.
- Equipped their heating systems with heat reclamation equipment.
- Conducted lighting audits at 30 locations and upgraded to energy efficient lighting at 14 locations between 2005 and 2010. This was done in partnership with Puget Sound Energy (PSE) and Avista.
- Received some rebates for weatherization from Avista and received PSE rebates for over 95 percent of the costs.

State Parks has greatly improved the fuel efficiency of their fleet. They have replaced the majority of their pre-1996 vehicles and all trucks purchased after 2007 are biodiesel-ready. State Parks fleet now includes:

- 100 hybrids
- 30 electric plug-in vehicles
- 100 vehicles equipped to run on biodiesel

# Department of Natural Resources

The Department of Natural Resources is responsible for less than 1 percent of the 2009 total emissions from state government and is the 16<sup>th</sup> in terms of GHG emissions among state agencies.

Table 35: DNR Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	6,571,158(kWh)	7,883
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	122,736 (Therms)	1,872
Vehicle fleet fuel	850,252 (gallons)	2,579
Number of employees	1,290	NA
Occupied space square feet	928,699	NA

Table 36: DNR Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	11,790	12,110	11,946
2020 emissions target (15% below 2005)			10,022
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			1,924

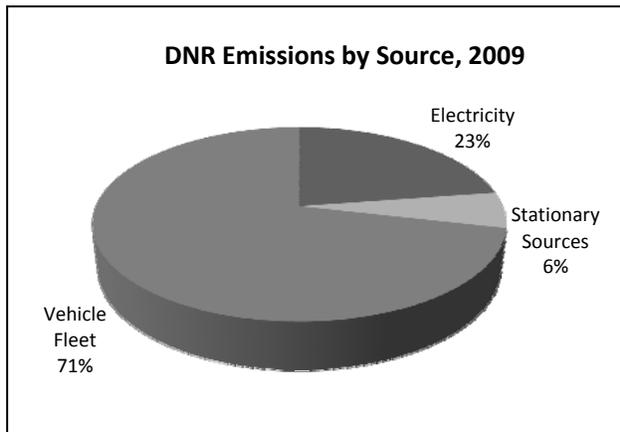


Figure 32: DNR Emissions by Source, 2009

## **Actions Taken**

DNR has taken steps to improve the efficiency of its existing buildings and fleet. For example, DNR has:

- Upgraded its HVAC systems.
- Improved its lighting efficiency and installed occupancy sensors.
- Weatherized and insulated its building and upgraded windows, widely improving the efficiency of the facilities.
- Installed solar panels.
- Purchased Renewable Energy Credits to further green their energy consumption.
- Purchased hybrids and reduced the total size of their vehicle fleet.
- Reduced its vehicle miles traveled by 1.7 million miles in 2009, thanks to telecommuting, ride sharing, and a relatively small wildfire season.

# The Evergreen State College

The Evergreen State College (TESC) is the 17<sup>th</sup> largest GHG emitter among Washington state agencies.

Table 37: TESC Emissions by Source, 2009

EMISSION SOURCE	USAGE	EMISSIONS (MTCO <sub>2</sub> e) CREATED FROM USAGE
Purchased electricity	13,823,632 (KWh)	6,863
Natural gas and other fuels used in buildings and fixed equipment (stationary sources)	85,695 (Therms)	4,542
Vehicle fleet fuel	27,314 (gallons)	251
Number of students	4,891	NA
Occupied space square Feet	756	NA

Table 38: TESC Emission Reductions Needed to Meet 2020 Target.

	2005	2008	2009
Total emissions (MTCO <sub>2</sub> e)	12,977	13,161	11,656
2020 emissions target (15% below 2005)			11,030
Emissions reductions needed to meet 2020 target (MTCO <sub>2</sub> e)			626

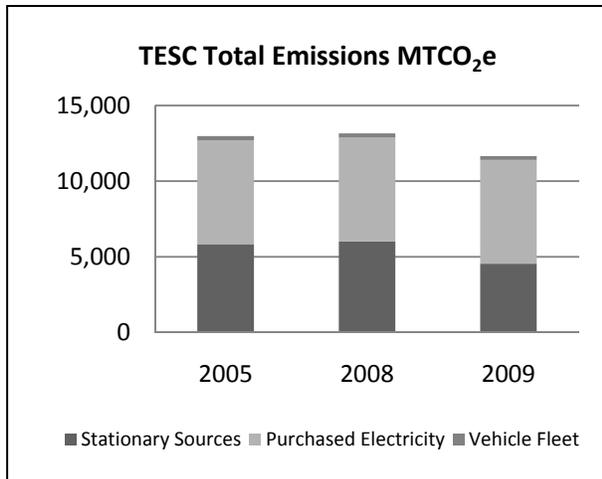


Figure 33: TESC Total Emissions

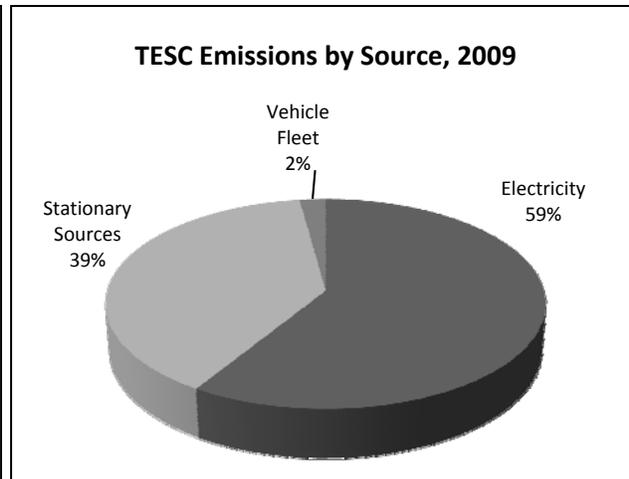


Figure 34: TESC Emissions by Source, 2009

## Actions Taken

TESC's commitment to reduce their emissions and become carbon neutral in 2020 has pushed the college to reduce its 2009 emissions by 18 percent from 2005.

TESC has long been a leader in sustainable building construction and energy efficiency. For example:

- The Seminar II building was the first publicly funded LEED Gold certified building in Washington State.

- The Lab II building is expected to receive LEED Silver.
- The Campus Activities building is expected to receive LEED Gold.

In additions, TESC has:

- Installed Occupancy sensors.
- Installed energy efficient lighting and appliances.
- Upgraded its heating and cooling systems to variable speed drive chillers and high efficiency motor with variable frequency drives.
- Installed reflective roofs and green roofs.
- Improved their steam infrastructure and installed solar panels on the roof of the Dan Evans Library during the first phase of an ESCO contract, which has been measured and verified to save 8,100 kW and over 100,000 therms. The college is proceeding with a second phase of the ESCO as well as pursuing aggressive energy management practices for further reductions.
- Initiated feasibility studies (almost completed) on the installation of a biomass gasification plant. This plant could significantly reduce TESC's dependence on the natural gas used for space heating.
- Purchased several electric vehicles and is committed to reducing their gasoline-powered fleet.

Students voted to institute a “clean energy” fee in 2005. This fee purchases RECs from Puget Sound Energy, ensuring that 100 percent of TESC's purchased electricity comes from green sources.

For more information, see [TESC 2009 Climate Action Plan](#).

## X. State Agencies with Emissions Less Than 10,000 MTCO<sub>2</sub>e

The majority of state agencies emit less than 10,000 MTCO<sub>2</sub>e. Out of the 119 agencies, that reported their GHG emissions, 102 agencies fall into this category and account for 13.1 percent of total state government GHG emissions for 2009.

Table 39: State Agencies with Emissions Less Than 10,000 MTCO<sub>2</sub>e

2009 GHG EMISSIONS RANGE (MTCO <sub>2</sub> E)	NUMBER OF AGENCIES IN RANGE	TOTAL 2009 GHG EMISSIONS FROM AGENCIES IN RANGE (MTCO <sub>2</sub> E)	% OF TOTAL STATE AGENCY GHG EMISSIONS
10,000 to 1,000	36	147,500	11.9 %
1,000 to 100	28	13,760	1.1 %
Less than 100	38	840	0.07 %
<b>TOTAL</b>	<b>102</b>	<b>162,100</b>	<b>13.1 %</b>

### Agencies emitting 10,000 to 1,000 MTCO<sub>2</sub>e

Thirty-six agencies emitted between 10,000 and 1,000 MTCO<sub>2</sub>e in 2009 and accounted for about 12 percent of the total GHG emission from state agencies. The majority of community and technical colleges (23 out of 26 that reported) fit into this category, as well as the Tacoma and Bothell campuses of the University of Washington and 11 more medium-size agencies.

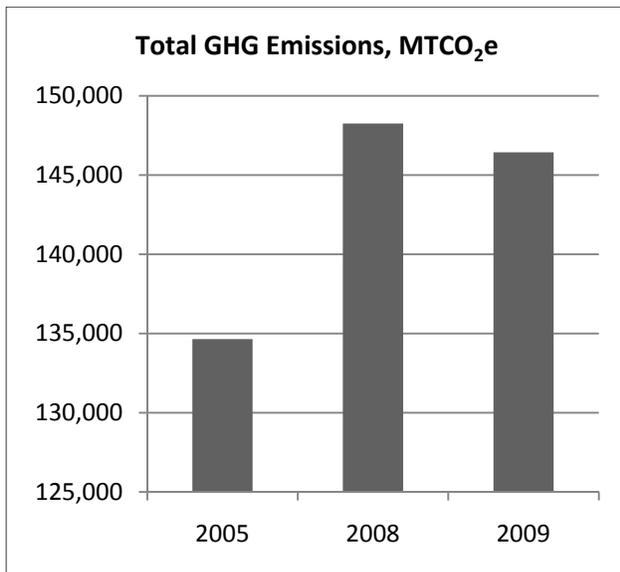


Figure 35: Total GHG Emissions for agencies emitting 10,000 to 1,000 MTCO<sub>2</sub>e.

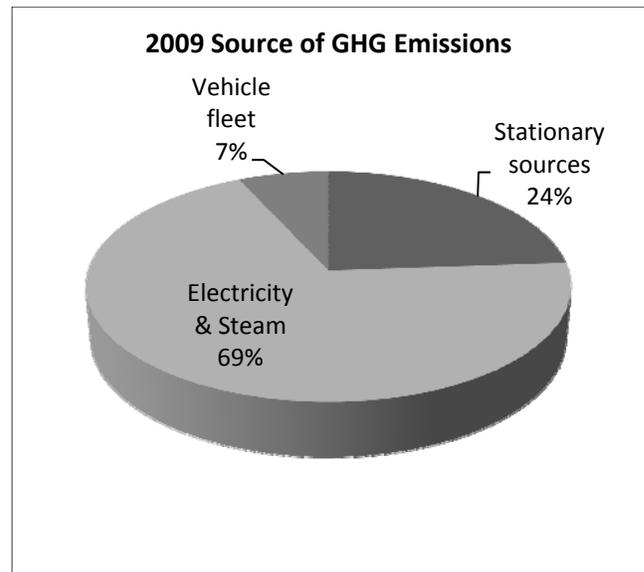


Figure 36: 2009 Source of GHG Emissions for agencies emitting 10,000 to 1,000 MTCO<sub>2</sub>e.

GHG emissions increased from 2005 to 2009. This is partly due to incomplete data for 2005 reporting and a steady increase in enrollment in community and technical colleges throughout the period.

The primary source of GHG emissions is from electricity and natural gas used to light, power, and condition agency facilities. Vehicle fleet emissions are relatively small for this category of agencies. Community and technical colleges typically have small fleets whereas some of the medium-size agencies have larger fleets.

## Agencies emitting between 1,000 and 100 MTCO<sub>2</sub>e

Twenty-eight agencies emitted between 1,000 and 100 MTCO<sub>2</sub>e in 2009 and accounted for 1.1 percent of the total state agency GHG emissions. This category includes:

- Several medium and small size agencies
- One community college
- Several large boards and commissions

Total GHG emissions from state agencies in this category increased by 8 percent from 2005 to 2009. This is partly a result of underestimated emissions for 2005 due to limited data and partly due to increases in energy consumption

The main source of emissions is from electricity and steam, followed by natural gas and other fuels used in buildings, and the vehicle fleet. Several of these agencies lease space from General Administration and GHG emissions from this space is not included in the totals here. Overall, these agencies rely more on employee vehicles for business travel compared to larger agencies.

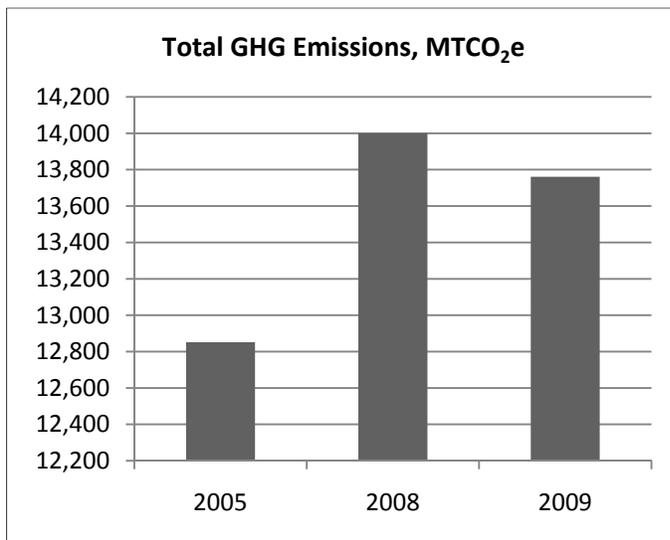


Figure 36: Total GHG Emissions, MTCO<sub>2</sub>e for Agencies emitting between 1,000 and 100 MTCO<sub>2</sub>e.

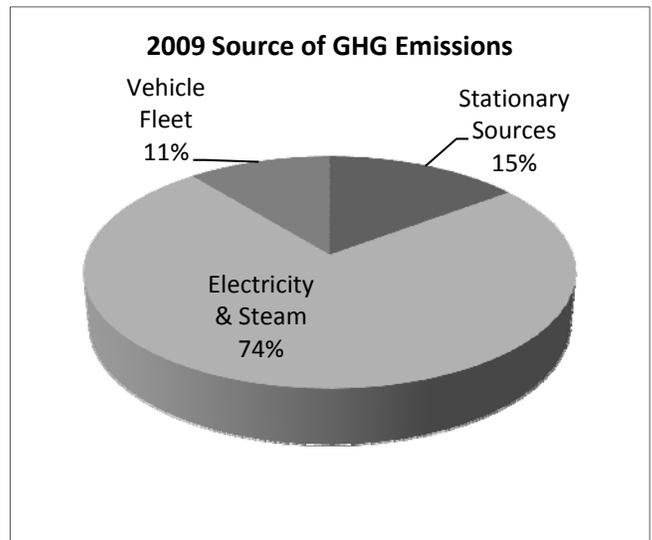


Figure 37: 2009 Source of GHG Emissions for Agencies emitting between 1,000 and 100 MTCO<sub>2</sub>e

GHG emissions from travel in employee owned vehicles are not included in the totals. The totals also do not include emissions from travel and other activities from board members and commissioners and only include emissions associated with staff.

## Agencies emitting less than 100 MTCO<sub>2</sub>e

Thirty-eight state agencies emitted less than 100 MTCO<sub>2</sub>e in 2009 and accounted for less than 0.1 percent of the total GHG emissions from state agencies. This category includes:

- Several small boards and commissions
- Small agencies that primarily lease space from GA and do not own vehicles or lease vehicles from GA.

GHG emissions increased by 33 percent from 2005 to 2008 and declined by 5.4 percent from 2008 to 2009. This is partly a result of underestimated emissions for 2005 due to limited data and partly due to increases in energy consumption. The main source of emissions is from electricity and steam, followed by natural gas and other fuels used in buildings, and the vehicle fleet.

For some agencies these totals are low because they do not include emissions from facilities leased from GA, including all facilities located on the Capitol Campus. GA reported GHG emissions from all facilities it owns and leases to other agencies.

In addition, some other sources of emissions were reported by other agencies. For example, Washington State Patrol owns and operates the Governor's vehicles and reported emissions from those vehicles. Many agencies use primarily employee-owned vehicles for business travel. These GHG emissions are not included in the totals here because the agency does not specifically own or operate these vehicles. The totals also do not include emissions from travel and other activities from board members and commissioners and only include emissions associated with staff.

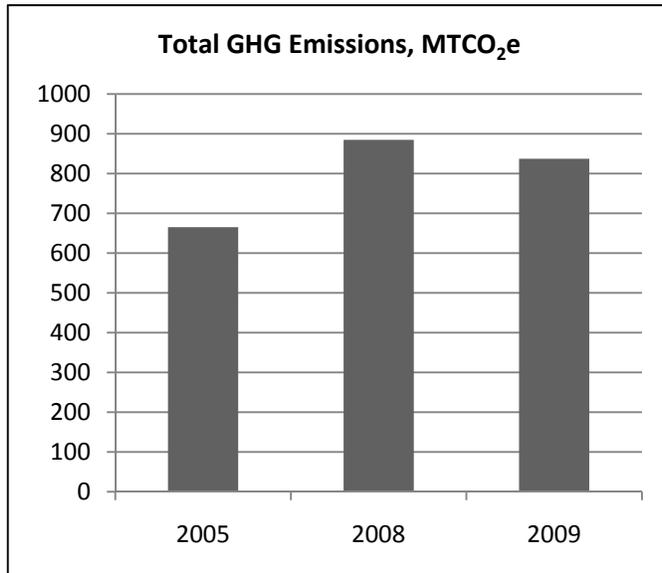


Figure 36: Total GHG Emissions for agencies emitting less than 100 MTCO<sub>2</sub>e.

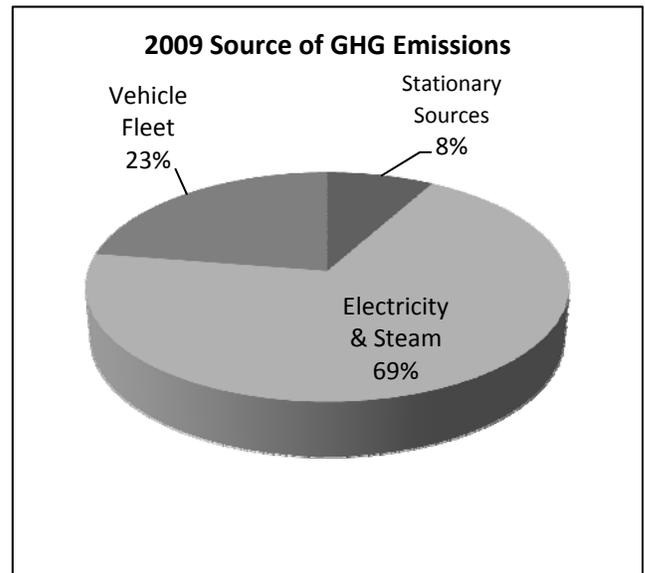


Figure 37: 2009 Source of GHG Emissions for Agencies emitting less than 100 MTCO<sub>2</sub>e.

# Summary of actions taken from agencies emitting less than 10,000 MTCO<sub>2</sub>e

Many agencies emitting less than 10,000 MTCO<sub>2</sub>e have taken action to decrease their carbon footprint. Several of the smaller agencies that primarily lease space from private entities and do not own or lease cars have more limited opportunities to reduce GHG emissions.

## Buildings

Common actions taken to reduce energy consumption in buildings include:

- Green building, retrofitting existing buildings, and weatherizing buildings
- Installing more efficient indoor and outdoor light and installing occupancy sensors
- Switching to energy efficient appliances
- Upgrading HVAC systems
- Installing solar panels and green roofs
- Conducting energy audits and negotiating energy issues in leases

Several agencies have been awarded LEED certification for the construction of green buildings.

- In June 2010, Skagit Valley College was awarded LEED Platinum certification for the new Laura Angst Hall. It is the first higher education building in Washington to achieve LEED Platinum certification.
- Five community colleges and one agency have buildings that have achieved LEED Gold certification.
- One community college and one agency have LEED silver buildings.

There are many other green buildings in the design and construction phase. For more information visit GA's web site [Green building & LEED](#)<sup>48</sup>.

GA estimates energy savings from green buildings to range from 14 percent to 46 percent.

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### Washington State School for the Blind

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The Ogden Resource Center's green building contains one of the Northwest's largest photovoltaic arrays for its size, uses passive and active solar design and has a green roof filled with wild strawberry plants. All storm water runoff is filtered into bio-swales or drywells and not into the centralized sewer system.

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### Washington State Criminal Justice Training Commission

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The Commission has done widespread lighting replacement and installed occupancy sensors. Features such as automated sinks and waterless urinals have conserved water and automated paper towels have reduced janitorial paper use. The commission has purchased hybrids to replace aging vehicles and implemented a recycling plan.

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### Cascadia Community College

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Sustainability has always been a core value at Cascadia Community College and is part of Cascadia's strategic plan. Cascadia's newest building is registered for LEED platinum and is expected to receive certification soon. The community college has green roofs and a rainwater collection system to flush the toilets. Cascadia is implementing a series of ESCO projects, including installing solar powered electric car charging stations. These projects and others will be tied into Cascadia's Environmental Technologies and Sustainable Practices Program, which includes courses in solar design and installation.

## Office Equipment and Information Technology

Most agencies in this category have taken actions to reduce energy use in office and IT equipment.

- Between 73 and 85 percent of community and technical colleges, medium, and small agencies report purchasing energy star computers, monitors, printers, and copiers.
- Over 90 percent of agencies set equipment to idle when not in use.
- Over 40 percent have converted their forms, records and reports to electronic documents (i.e. Departments of Revenue, Ecology, and Licensing).
- Over half are reducing the number of printers and copiers and are using software to monitor and reduce printer use.
- Ten agencies are reducing the use of dual monitors.
- 39 have installed video conferencing systems, and many are increasing use of web conferencing.
- Few are implementing or are considering server virtualization to reduce energy use from servers.

## Fleet Efficiency Actions

About 45 of agencies in this category own or lease at least one light-duty vehicle.

- Two-thirds of agencies (30) in this category have been replacing older, larger, and less fuel-efficient vehicles with hybrids and electric vehicles and are using biodiesel.
- Several have installed electric vehicle charging stations onsite.
- Most are instituting preventative maintenance and employ fleet management practices such as limiting idling.

## Business Travel Reduction

Most of the agencies in this category have taken steps to reduce business travel, including:

- Implementing business travel reduction policies and encouraging carpooling to meetings and conferences.
- Thirty-eight of the sixty-five agencies that responded to this question have installed video conferencing equipment, and fifty-eight have increased the use of web meetings.

## Employee Commuting

Most of the agencies in this category participate in the commute trip reduction program or have implemented policies and programs to reduce single occupancy vehicle commuting by employees. Out of the 60 agencies in this category:

- 54 implemented flexible work policies.
- 52 increased ride sharing, vanpooling, and bus rider ship.
- 50 increased telecommuting opportunities.
- 42 provided incentives for alternative commuting and telework.

- 32 implemented commute trip reduction policies.
- 29 provided emergency ride home programs.
- And 15 enacted parking fees and/or shared parking incentives.

## Renewable Energy

Twenty agencies in this category reported taking action to use, generate, or support renewable energy, including:

- 8 purchased renewable energy credits (RECs) (also called “green power purchases”) through their utility.
- 2 purchased RECs or offsets through a third-party vendor.
- 5 installed solar voltaic panels and four installed solar hot water heaters.
- 2 installed capacity to use geothermal energy.
- 6 used low carbon fuels.
- 1 installed wood-waste co-generation units.



*Photo 11: GA installed solar panels with the help of Puget Sound Energy. GA uses the panels to power the lights at the top of the dome of the*

## **XI. Next Steps**

Agencies have taken several actions over the past several years to:

- Reduce energy use.
- Lower energy costs.
- Deploy cleaner, more efficient energy technologies.

Some agencies are likely to see reductions in GHG emissions by continuing to pursue conservation, energy efficiency, and clean energy technologies. Ecology expects other agencies to expand in the future. Meeting the reduction targets will be challenging and will require significant dedication and investment. At the same time, it provides an opportunity to identify costs savings and eliminate inefficiencies.

### **Developing strategies to reduce greenhouse gas emissions**

Starting in early 2011, each agency will begin working on developing a strategy to meet the reduction targets. The strategies are due to Ecology by June 30, 2011. The strategy must address:

- Employee travel activities
- Teleconferencing alternatives
- Existing and proposed actions
- A timeline for reductions
- Recommendations for budgetary and other incentives to reduce emissions

Agencies will consider the cost-effectiveness of various actions to reduce GHG emissions and the payback period of the actions. No or low cost actions will be given priority for implementation. Agencies will also examine actions with short payback periods and actions that will require major public investments.

# Reporting greenhouse gas emissions and actions taken

Agencies are required to quantify their emissions each year. Moving forward agencies will need to identify data gaps and options for improving data tracking. Many agencies have multiple buildings metered by a single meter, which limits the information available to strategically manage utilities by building. Many agencies also have decentralized records of utility consumption and have difficulty totaling energy information for the agency as a whole. Also, many agencies have incomplete or decentralized data on air travel. Agencies GHG emissions may fluctuate over the next few years as agencies improve data management and tracking.

Agencies will report to Ecology their progress in implementing the reduction strategy and the actions taken to reduce GHG emissions by October 1, 2012 and every two years after. By December 31, 2012 and every two years after Ecology will report to the Governor and the Legislature the total state agencies' emissions of GHGs and actions taken to reduce emissions in the last two years.

Table 40: Reporting Requirements and Key Dates

DUE DATE	REPORTING REQUIREMENT
June 30, 2010	<b>Agencies submit to Ecology</b> <ul style="list-style-type: none"> <li>Estimates of 2005, 2008, and 2009 GHG emissions</li> <li>Projected GHG emissions to 2035</li> </ul>
October 1, 2010 and bi-annually	<b>Agencies submit to Ecology:</b> <ul style="list-style-type: none"> <li>Survey of actions taken to reduce GHG emissions</li> </ul>
December 31, 2010 and bi-annually	<b>Ecology reports to Governor and Legislature:</b> <ul style="list-style-type: none"> <li>Total state agencies' emissions for 2005 and the preceding two years and actions taken to meet the emissions reduction targets</li> </ul>
June 30, 2011	<b>Agencies submit to Ecology:</b> <ul style="list-style-type: none"> <li>A strategy to meet the emissions reduction targets.</li> </ul>
June 30, 2011 and annually	<b>Agencies submit to Ecology:</b> <ul style="list-style-type: none"> <li>Estimates of emissions for the prior year.</li> </ul>

## Leverage complementary efforts and improve data

Ecology will continue to coordinate with other agencies and the Governor's office to leverage complementary efforts that will result in emissions reductions and improve data coordination. Here are a few examples of current and ongoing work:

- WSDOT is currently developing a comprehensive commute trip reduction plan for all worksites in Thurston County that will provide more comprehensive data for reporting GHG emissions from employee commuting. Ecology will continue to work with WSDOT to promote reduction in single occupancy vehicle trips and to improve data on GHG emissions from commuting.
- General Administration (GA) is working with agencies to track electricity and natural gas usage in portfolio manager and to promote continued improvement in the energy performance of buildings. This will improve the data available for agencies to quantify

GHG emissions. GA is also taking several actions to increase the efficiency of the motor pool and realize efficiencies through fleet consolidation.

- GA, Dept. of Commerce, Dept. of Agriculture, WSDOT, and others are also pursuing opportunities to increase access to biodiesel for the state fleet, improve data tracking of biofuel usage, and promote vehicle electrification.
- Ecology will also work with the Interagency Sustainability Committee to leverage actions to move towards a more sustainable state government and to coordinate on data tracking and reporting requirements.

For more information on other complimentary efforts see, [Appendix 2 - Statutory Requirements Applicable to State Agency GHG Emissions Reduction](#).<sup>49</sup>

## Measure progress and account for changes in operations

State agencies carry out a variety of activities to achieve their mission and deliver services to constituents. Because the type of buildings and fleets each agency has are different, the agencies GHG emissions Ecology cannot directly compare them to one another. When reviewing the agencies' GHG emissions, it is important to acknowledge and consider this variation and the resulting differences in GHG emissions levels and strategies needed to achieve the mandatory reduction targets.

Ecology explored ways to compare state agencies GHG emissions with external benchmarks. However, with the relatively small number of public sector entities calculating GHG emissions and the lack of common standards on benchmarking, understanding how the State of Washington emissions compare with others is difficult.

To track progress over time, it is important for agencies to institutionalize the process and to establish internal performance measures that tie to their specific activities, operations, and energy needs. Complementary efforts by agencies to establish energy benchmarking scores for buildings in Portfolio Manager and to track fleet fuel efficiency will assist agencies in tracking their progress in improving efficiency and reducing GHG emissions. Agencies can work to institutionalize sustainability and to consider energy consumption and emissions in Government Management Accountability and Performance (GMAP), strategic plans, policies, budgets, and mission statements.

Ecology will examine options for taking into account agency reorganizations and significant changes in agency operations that result in significant increases or decreases in emissions from the baseline level. Some agencies could meet the targets without taking significant action because of organizational changes and through reductions in staffing and services. Other agencies will continue to grow and expand programs and services, making it more difficult to meet the targets.

## Carbon neutral government

In a [December 2009 news release](#)<sup>50</sup>, following her trip to the United Nations climate summit in Copenhagen, Governor Gregoire challenged Ecology to lead state government to achieve carbon neutrality by 2020. Carbon neutrality means that we reduce our emissions as much as possible. All remaining emissions must be offset by implementing projects outside of state government operations that will reduce emissions by an equal amount.

Ecology developed the [Carbon Smart project](#)<sup>51</sup> to examine options to reduce Ecology's emissions and to look at business practices and strategies to help all state agencies and the public reduce emissions. Ecology has taken several actions to reduce emissions and plans to communicate the results and share best practices with other agencies.

## XII. Glossary of Terms and Acronyms

**Base year** – 2005, the year that agencies use to track their emissions over time.

**CH<sub>4</sub>** – Methane

**CO<sub>2</sub>** – Carbon dioxide

**CO<sub>2</sub>e** – Carbon dioxide equivalent, the universal unit for comparing emissions of different GHGs expressed in terms of the GWP of one unit of carbon dioxide.

**CTR** – Commute trip reduction is a program to reduce vehicle miles traveled and drive alone vehicles trips.

**eGRID** - Emission and Generation Resource Integrated Database, an EPA database with comprehensive information on U.S. electricity generation and emissions.

**Emissions factor** – The emissions from a unit of activity, such as the emissions from the consumption of one kwh of electricity.

**ESCO** – Energy services company, a company that conducts an energy audit of a facility, designs installs, commissions, and finances energy efficiency projects selected by the facility owner, and guarantees both the maximum project cost and the projected energy savings.  
**Fugitive emissions** – Emissions of gases leaked from commercial refrigeration, commercial air conditioning equipment, heat pumps, fire suppression equipment, and other types of equipment. Many refrigerants and compressed gases are high global warming potential (high GWP) gases that have GWPs which are 140 to 11,700 times that of carbon dioxide.

**GHG** – Greenhouse gas - there are six main GHGs recognized internationally in the Kyoto Protocol: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>).

**Green power** – Several utilities have green power programs that allow customers to support renewable energy projects, such as wind and solar.

**GWP** – Global warming potential, the degree of warming to the atmosphere that would result from the emission of one unit of a given GHG compared to one unit of carbon dioxide.

**HFC** – Hydrofluorocarbon, highly potent greenhouse gases used for refrigeration and other commercial purposes.

**Kwh** – Kilowatt hour

**LEED** – Leadership in Energy and Environmental Design, a third party certification system and benchmark developed by the U.S. Green Building Council for the design, construction, and operation of high performance green buildings.

**N<sub>2</sub>O** – Nitrous oxide

**MT CO<sub>2</sub>e** – Metric ton carbon dioxide equivalent. One metric ton equals 2,204.62 pounds.

**Portfolio Manager** – An EPA Energy Star tool to benchmark the energy performance of buildings and track energy and water consumption in buildings.

**RECs** – Renewable energy credits, a credit for the generation or purchase of one megawatt hour of renewable power. Also known as green tags.

**RCM** – Resource Conservation Manager, a staff position dedicated to creating and managing an agencies' resource conservation program. The position focuses on managing agency resources, (including electricity, natural gas, water, solid waste, recycling, and others) to reduce operating costs, increase efficiency, and promote sustainable operations.

**Stationary combustion emissions** – Emissions from the combustion of fossil fuels to produce electricity or heat using boilers, furnaces, or other equipment in a fixed location.

## XIII. Appendices

The following appendices to this report are available online at [www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm).

- Appendix 1. *State Agency Climate Leadership Act*
- Appendix 2. *Statutory Requirements Applicable to State Agency GHG Emissions Reduction*
- Appendix 3. *Main Sources of GHG Emissions from State Agency Operations*
- Appendix 4. *GHG Emissions Calculators*
  - *State Agency GHG Calculator*
  - *State Agency GHG Calculator Instructions*
  - *Simplified State Agency GHG Calculator*
  - *Simplified State Agency GHG Calculator Instructions*
  - *Fugitive Emissions Calculator*
- Appendix 5. *GHG Projection Tool*
- Appendix 6. *State Agency GHG Emissions*
- Appendix 7. *Summary of Responses to GHG Actions Taken Survey*



## XIV. Endnotes

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<sup>1</sup> **State law RCW 70.235.050**

<http://apps.leg.wa.gov/RCW/default.aspx?cite=70.235.050>

<sup>2</sup> **State law RCW 70.235.060**

<http://apps.leg.wa.gov/RCW/default.aspx?cite=70.235.060>

<sup>3</sup> **Appendix 1 – State Agency Climate Leadership Act**

[www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm)

<sup>4</sup> **State law RCW 70.235.020**

<http://apps.leg.wa.gov/RCW/default.aspx?cite=70.235.020>

<sup>5</sup> **Appendix 2 – Statutory Requirements Applicable to State Agency GHG Emissions Reduction**

[www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm).

<sup>6</sup> The Seattle, Bothell, and Tacoma campuses of the University of Washington reported separately and are counted separately in this figure.

<sup>7</sup> Ecology received the Yakima Valley Community College report in Dec. 2010 which is not included in this report.

<sup>8</sup> **Appendix 3 - Main Sources of GHG Emissions from State Agency Operations**

[www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm)

<sup>9</sup> **State law RCW 70.94.151**

<http://apps.leg.wa.gov/RCW/default.aspx?cite=70.94.151>

<sup>10</sup> **Washington State’s Greenhouse Gas Reporting Rule**

[www.ecy.wa.gov/programs/air/globalwarm\\_RegHaze/GreenHouseGasreporting\\_rule.html](http://www.ecy.wa.gov/programs/air/globalwarm_RegHaze/GreenHouseGasreporting_rule.html)

<sup>11</sup> **TCR** is a nonprofit collaboration among North American states, provinces, territories and Native American nations that sets consistent and transparent standards for calculating and reporting sources of GHG emissions.

<sup>12</sup> **American College and University President’s Climate Commitment**

[www.presidentsclimatecommitment.org/](http://www.presidentsclimatecommitment.org/)

<sup>13</sup> **Appendix 4 - GHG Emissions Calculators**

[www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm)

<sup>14</sup> **Appendix 4 – GHG Emissions Calculators**

[www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm)

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<sup>15</sup> **Appendix 6 - State Agency GHG Emissions.**

[www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm)

<sup>16</sup> These metrics should not be compared to other institutions or between agencies because the GHG emissions include some non-building energy uses, such as electricity used to power street lights, highways lights, and other uses.

<sup>17</sup> **Environmental Protection Agency (EPA) tool [Portfolio Manager](#)**

[www.ga.wa.gov/energy/EnergyStar.htm](http://www.ga.wa.gov/energy/EnergyStar.htm)

<sup>18</sup> **Biodiesel Used by Washington State Agencies (2009)**

[www.ga.wa.gov/News/2009-07-BiodieselReport.pdf](http://www.ga.wa.gov/News/2009-07-BiodieselReport.pdf)

<sup>19</sup> **Optional Emissions from Commuting, Business Travel and Product Transport**

[/www.epa.gov/climateleaders/documents/resources/commute\\_travel\\_product.pdf](http://www.epa.gov/climateleaders/documents/resources/commute_travel_product.pdf)

<sup>20</sup> **Appendix 2 – Statutory Requirements Applicable to State Agency GHG Emissions Reduction**

[www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm).

<sup>21</sup> **Appendix 7 - Summary of Responses to GHG Actions Taken Survey.**

[www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm)

<sup>22</sup> The number of LEED certified buildings is higher. Some projects are campuses with multiple LEED certified buildings. For example, Corrections has 38 LEED buildings.

<sup>23</sup> **GA Implementation of RCW 39.35D, High-Performance Green Building**

[www.ga.wa.gov/EAS/green/StateGreenBuildingReport-2010.pdf](http://www.ga.wa.gov/EAS/green/StateGreenBuildingReport-2010.pdf)

<sup>24</sup> **GA Energy Savings Performance Contracting – Guidelines for Public Agencies in Washington State**

[www.ga.wa.gov/EAS/epc/ESPCGuidelines.pdf?I2.X=9&I2.Y=9#Page=15](http://www.ga.wa.gov/EAS/epc/ESPCGuidelines.pdf?I2.X=9&I2.Y=9#Page=15)

<sup>25</sup> **GA Biodiesel Use by Washington State Agencies (2010)**

[www.ga.wa.gov/News/2010-01-BiodieselReport.pdf](http://www.ga.wa.gov/News/2010-01-BiodieselReport.pdf)

<sup>26</sup> **Top 50 Commercial, Private Utility and Public Sector Hybrid Fleets**

[www.automotive-fleet.com/fc\\_resources/AF0910-30-top50.pdf](http://www.automotive-fleet.com/fc_resources/AF0910-30-top50.pdf)

<sup>27</sup> **Photovoltaics** is a method of generating electrical power by converting solar radiation into direct current electricity using semiconductors that exhibit the photovoltaic effect.

<sup>28</sup> GHG emissions from WSDOT's fleet includes 172,880 MTCO<sub>2</sub>e from Washington State Ferries and 35,010 MTCO<sub>2</sub>e from the non-ferry fleet.

<sup>29</sup> WWU used the CACP calculator to quantify emissions and the total emissions includes additional sources not included in the total of other agencies.

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- <sup>30</sup> **WSDOT Interim Sustainability Plan**  
[www.ofm.wa.gov/sustainability/plans/plans\\_03/wsdot.pdf](http://www.ofm.wa.gov/sustainability/plans/plans_03/wsdot.pdf)
- <sup>31</sup> **WSDOT FY09 Annual Sustainability Data Report**  
[www.ofm.wa.gov/sustainability/plans/progress\\_09/wsdot.pdf](http://www.ofm.wa.gov/sustainability/plans/progress_09/wsdot.pdf)
- <sup>32</sup> **UW Climate Action Plan**  
[http://f2.washington.edu/oess/sites/default/files/file/UW%20Climate%20Action%20Plan%2010\\_9.pdf](http://f2.washington.edu/oess/sites/default/files/file/UW%20Climate%20Action%20Plan%2010_9.pdf)
- <sup>33</sup> **UW Climate Action Plan – 2010 Update**  
<http://f2.washington.edu/oess/sites/default/files/UW%20CAP%202010%20Update%20final.pdf>
- <sup>34</sup> **UW 2005 Inventory of Greenhouse Gas Emissions Ascribable to the University of Washington**  
[www.washington.edu/facilities/files/documents/UW\\_GHG\\_Inventory\\_2005\\_Final\\_PDF.pdf](http://www.washington.edu/facilities/files/documents/UW_GHG_Inventory_2005_Final_PDF.pdf)
- <sup>35</sup> **WSU Regional Campuses Climate Action Plan**  
<http://sustainability.wsu.edu/utills/File.aspx?fileid=6173>
- <sup>36</sup> **WSU Pullman Climate Action Plan**  
<http://sustainability.wsu.edu/utills/File.aspx?fileid=6172>
- <sup>37</sup> **DOC 2009 Sustainability Progress Report**  
[www.doc.wa.gov/goals/sustainability/docs/2009SustainabilityReport.pdf](http://www.doc.wa.gov/goals/sustainability/docs/2009SustainabilityReport.pdf)
- <sup>38</sup> **DSHS 2006 Sustainability Plan Update**  
[www.ofm.wa.gov/sustainability/plans/plans\\_06/dshs.pdf](http://www.ofm.wa.gov/sustainability/plans/plans_06/dshs.pdf)
- <sup>39</sup> **DSHS FY09 Annual Progress Report**  
[www.ofm.wa.gov/sustainability/plans/progress\\_09/dshs.pdf](http://www.ofm.wa.gov/sustainability/plans/progress_09/dshs.pdf)
- <sup>40</sup> **GA Sustainability Progress Report 2009**  
[www.ga.wa.gov/sustainability/2009SustainabilityReport.pdf](http://www.ga.wa.gov/sustainability/2009SustainabilityReport.pdf)
- <sup>41</sup> **GA Implementation of RCW 39.35D, High-Performance Green Building**  
[www.ga.wa.gov/EAS/green/StateGreenBuildingReport-2010.pdf](http://www.ga.wa.gov/EAS/green/StateGreenBuildingReport-2010.pdf)
- <sup>42</sup> The total emissions reported for WWU includes additional sources not included by other agencies.
- <sup>43</sup> **WWU Climate Action Plan**  
[www.wvu.edu/sustain/climateneutralwestern/](http://www.wvu.edu/sustain/climateneutralwestern/)
- <sup>44</sup> **EWU Campus Wide Energy Efficiency and Sustainability Plan**  
[http://acupcc.aashe.org/site\\_media/uploads/cap/569-cap.pdf](http://acupcc.aashe.org/site_media/uploads/cap/569-cap.pdf)
- <sup>45</sup> **CWU Climate Commitment Action Plan**  
[www.cwu.edu/~facility/sustainability/docs/Carbon%20Reduction%20Report.pdf](http://www.cwu.edu/~facility/sustainability/docs/Carbon%20Reduction%20Report.pdf)

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<sup>46</sup> **WSP Sustainability Plan**

[www.ofm.wa.gov/sustainability/plans/plans\\_03/patrol.pdf](http://www.ofm.wa.gov/sustainability/plans/plans_03/patrol.pdf)

<sup>47</sup> **WSP FY09 Annual Sustainability Data Report**

[www.ofm.wa.gov/sustainability/plans/progress\\_09/patrol.pdf](http://www.ofm.wa.gov/sustainability/plans/progress_09/patrol.pdf)

<sup>48</sup> **GA Green building & LEED**

[www.ga.wa.gov/EAS/green/index.html](http://www.ga.wa.gov/EAS/green/index.html)

<sup>49</sup> **Appendix 2 - Statutory Requirements Applicable to State Agency GHG Emissions Reduction.**

[www.ecy.wa.gov/climatechange/index.htm](http://www.ecy.wa.gov/climatechange/index.htm)

<sup>50</sup> **Governor Gregoire 12/23/09 News Release**

[www.governor.wa.gov/news/news-view.asp?pressRelease=1401&newsType=1](http://www.governor.wa.gov/news/news-view.asp?pressRelease=1401&newsType=1)

<sup>51</sup> **Carbon Smart Project**

[www.ecy.wa.gov/carbonsmart/index.html](http://www.ecy.wa.gov/carbonsmart/index.html)