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Report to the Legislature on Reducing Greenhouse Gas Emissions in Washington State Government

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For more information, contact:

Air Quality Program
P.O. Box 47600
Olympia, WA 98504-7600
(360) 407-6800

Washington State Department of Ecology - www.ecology.wa.gov

- Headquarters, Olympia 360-407-6000
- Northwest Regional Office, Bellevue 425-649-7000
- Southwest Regional Office, Olympia 360-407-6300
- Central Regional Office, Yakima 509-575-2490
- Eastern Regional Office, Spokane 509-329-3400

To request ADA accommodation, call (360) 407-6800, 711 (relay service), or (877) 833-6341 (TTY).

Report to the Legislature on Reducing Greenhouse Gas Emissions in Washington State Government

by
Gail Sandlin

Air Quality Program
Washington State Department of Ecology
Olympia, Washington

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Executive Summary

The Washington State Legislature recognized the need to address the threat climate change poses to our state and, in 2008, established statewide limits on greenhouse gases. As part of the response to climate change, the Legislature also required state agencies to reduce their greenhouse emissions.

This report summarizes the total greenhouse gas emissions from state agencies for 2005 (the baseline year) and 2014 – 2015. The report focuses on the top greenhouse gas emitters among state agencies and actions taken since 2014 to meet the reduction targets.

These reporting requirements are in RCW 70.235.060(3):

By December 31st 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.

Reduction targets

State agencies are required under RCW 70.235.050 to reduce their greenhouse gas emissions. Agencies are working toward the following reduction targets:

- By 2020, reduce greenhouse gas emissions 15 percent below 2005 levels
- By 2035, reduce greenhouse gas emissions 36 percent below 2005 levels
- By 2050, reduce greenhouse gas emissions 57.5 percent below 2005 levels

Conclusion

Greenhouse gas emissions from Washington state government are on track to meet the 2020 target goal. Twenty-seven state agencies each emit more than 5,000 metric tons of carbon dioxide equivalent (CO₂e) yearly and collectively contribute over 90 percent of Washington state agency emissions.

Findings also included:

- Most of the greenhouse gas emissions from state agencies come from buildings (i.e., electricity and natural gas used to power and heat), and transportation from state vehicles and the Washington State ferry system.
- Other sources of greenhouse gases, such as employee commuting and business travel, are difficult to quantify, but may be significant sources.
- We need to continue following our mitigation strategies because this has allowed us to stay on track to meet the 2020 greenhouse gas reduction goal as suggested by the trend line in Figure 1.

Background

Greenhouse gases (GHGs) are substances that contribute to climate change by trapping heat in the atmosphere. For state agencies, greenhouse gases are released during:

- Stationary combustion, from equipment such as boilers or emergency generators to produce heat or power
- Mobile combustion, from transportation fuel (such as in cars, trucks, boats, and planes)
- Electricity or steam consumption, which occurs when electricity or steam is purchased for building operations

Washington's state agency greenhouse gas reporting legislation

The State Agency Climate Leadership Act, which passed in 2009, requires state agencies to reduce greenhouse gas (GHG) emissions:

- By 2020, reduce greenhouse gas emissions 15 percent below 2005 levels
- By 2035, reduce greenhouse gas emissions 36 percent below 2005 levels
- By 2050, reduce greenhouse gas emissions 57.5 percent below 2005 levels

These reporting requirements are in RCW 70.235.060(3):

By December 31st 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 requires state agencies to report their emissions to Ecology yearly and to report actions taken to meet the reduction targets every two years. Starting in 2010, Ecology is required to compile a biennial report to the governor and the Legislature on the total state agencies' greenhouse gas emissions for the preceding two years and compare them to the 2005 baseline. The report must also describe actions taken to meet the reduction targets.¹

This is the fourth report issued that states the need to continue implementing existing and potentially new policies to meet emission reductions goals.² The delay of this fourth summary report reinforces the need for improved efficiencies in data reporting, collection, and analysis as proposed by an interagency workgroup (see "Next Steps").

The requirements in the Act apply to all state agencies. This includes all:

¹ RCW 70.235.060

² <http://www.ecy.wa.gov/climatechange/WAleadership.htm>

- Administrative, legislative and judicial agencies, and elected offices
- Boards and commissions
- Community and technical colleges, universities, and The Evergreen State College

The 2005 baseline for greenhouse gas emissions shows that 27 state agencies each generate more than 5000 metric tons (MT) of greenhouse gas emissions yearly. Collectively, these state agencies contribute over 90 percent of the greenhouse gas emissions from state agencies.

This report summarizes the total greenhouse gas emitters from state agencies for 2005 (the baseline year) and 2014 – 2015. The report focuses on the top greenhouse gas emitters among state agencies and actions taken since 2014 to meet the reduction targets.

State agency greenhouse gas emission inventory

Greenhouse gas emissions from Washington state agencies represent about 1 percent of total state agency greenhouse gas emissions. The data indicates that 27 state agencies generate over 90 percent of state agency greenhouse gas emissions. Collectively, the other 89 state agencies generate less than 10 percent of state agency greenhouse gas emissions. Based on this information, this report will focus on the 27 agencies that generate the most greenhouse gas emissions.

State agencies used a greenhouse gas calculator developed by Ecology to meet a set of generally-accepted greenhouse gas accounting principles and guidelines. Several higher education institutions that participate in the American College and University Presidents' Climate Commitment used a comprehensive greenhouse gas calculator tailored specifically to higher education institutions. The greenhouse gas emissions information contained in this report was compiled from yearly greenhouse gas inventory reports submitted by each individual state agency.

Sources of greenhouse gas emissions

State agencies reported on sources of greenhouse gas emissions directly under their operational control or that result from activities directly controlled by the state agency, including:

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

In addition, most state agencies reported greenhouse gas emissions from:

- Business travel in vehicles owned by employees
- Air travel
- Employee commuting

A few state agencies reported fugitive emissions (emission leaks) of refrigerants or other potent high global warming potential greenhouse gases.

Greenhouse gases included

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

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Hydrofluorocarbons (HFCs) (primarily air conditioners)

State agencies use a common metric, the carbon dioxide equivalent (CO₂e), to report their greenhouse gas emissions. CO₂e is a term that describes different greenhouse gases with a common unit. For any quantity and type of greenhouse gas, CO₂e signifies the amount of carbon dioxide which would have the same global warming impact. This is called the Global Warming Potential (GWP). Table 1 below describes the global warming potential related to each type of greenhouse gas.

Table 1. Global Warming Potentials ³

Greenhouse Gas	GWP (100-year)
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	25
Nitrous Oxide (N ₂ O)	298
Hydrofluorocarbons (HFCs)	124 - 14,800

³ Table A-274: IPCC AR4 Global Warming Potentials...
<https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2015-Annex-6-Additional-Information.pdf>

Findings: State Agency Greenhouse Gas Emissions

In 2015, several state agencies did not report their greenhouse gas emissions. Therefore, we used annual greenhouse gas inventory data from previous reports submitted by these state agencies to estimate total 2015 state agency greenhouse gas emissions. Using this conservative approach, 2015 building and fleet greenhouse gas emissions from all state agencies is estimated at 1.08 million metric tons (MMT) of carbon dioxide equivalent (CO₂e). This is equivalent to about a 10.2 percent reduction from the 2005 baseline of 1.20 million metric tons (MMT) of greenhouse gas emissions for all state agencies. See Figure 1.

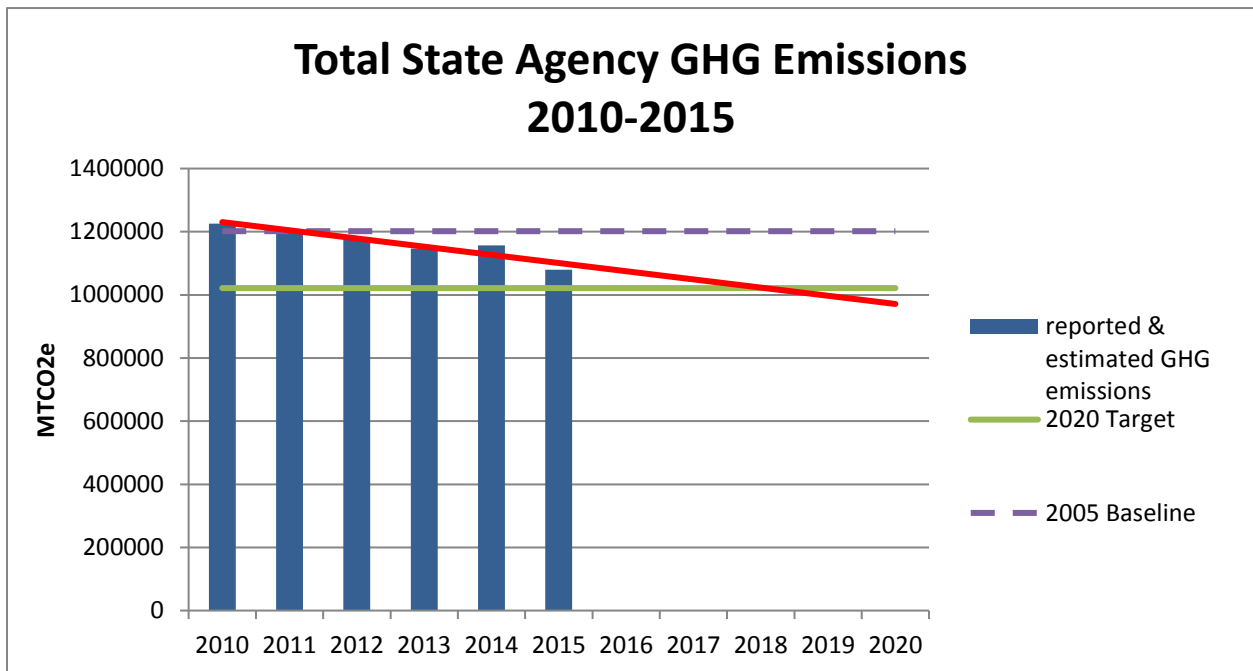


Figure 1: Total State Agency Greenhouse Gas Emissions, 2010 – 2015

The red trend line in Figure 1 suggests that collectively state agencies should meet their 2020 emissions target of 15 percent below the 2005 baseline. This reduction trend in greenhouse gas emissions is likely because state agencies continued to implement policies to reduce building energy use. This includes green power purchase agreements where carbon neutral electricity sources may significantly reduce an agency's greenhouse gas emissions. State agency fleets are also becoming more energy efficient.

Greenhouse gas emissions by state agency

For the 2005 baseline for greenhouse gas emissions, 27 state agencies reported more than 5000 metric tons of carbon dioxide equivalent (CO₂e) from energy used to heat and power state-owned or leased buildings and from the state vehicle fleet. In 2015, these state agencies (listed in Table 2 still account for about 90 percent of total state agency greenhouse gas emissions. These emissions are mainly from buildings and transportation.

Table 2. State Agency Greenhouse Gas Emissions

State Agency	2005 Baseline	2015	2020 Goal
Department of Transportation	261,122	248,814	221,954
University of Washington main campus	207,445	192,213	176,328
Washington State University - Pullman	[137,363]	144,087	[116,759]
Department of Corrections	115,479	84,489	98,157
Department of Social and Health Services	72,959	47,583	62,015
Department of Enterprise Services	[36,524]	24,827	[31,045]
Central Washington University	27,538	24,962	23,407
Eastern Washington University	27,280	[15,080]	23,188
Western Washington University	23,120	23,925	19,652
Washington State Patrol	21,455	23,572	18,237
Department of Fish and Wildlife	21,136	[13,146]	17,966
Seattle Community College - District 6 ⁴	3,955	3,026	3,362
State Parks and Recreation Commission	13,573	8,560	11,537
Spokane Community College - District 17	13,034	[13,215]	11,079
The Evergreen State College	12,977	8,748	11,030
Department of Natural Resources	11,790	10,597	10,022
Department of Health	9,590	7,264	8,152
Liquor Control Board ⁵	7,323	1,081	6,225
Department of Labor and Industries	7,205	5,489	6,124
Department of Veterans' Affairs	6,452	[7,150]	5,484
Highline Community College	6,286	[6,881]	5,343
Department of Ecology	6,246	4,146	5,309
Bates Technical College	6,161	[5,903]	5,237
Edmonds Community College	5,877	3,068	4,996
Green River Community College	[5,543]	[4,655]	[4,712]
Lake Washington Technical College	5,217	2,632	4,434
Bellevue Community College	5,212	6,554	4,430
Total: Metric Tons CO₂e	1,077,862	941,667	916,184

Data in brackets reflect estimates based on previous reports.

⁴ Seattle Community College applied a modified electricity emission factor developed by Seattle City Light.

⁵ Liquor Control Board has significantly changed organization structure.

Greenhouse gas emissions by source

When considering state agency building and transportation emissions, the largest single source of emissions in 2015 is from electricity and steam consumed in state-owned or leased buildings and other fixed equipment, such as traffic lights and streetlights. The second largest source is 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 27 percent of state agency greenhouse gas emissions.

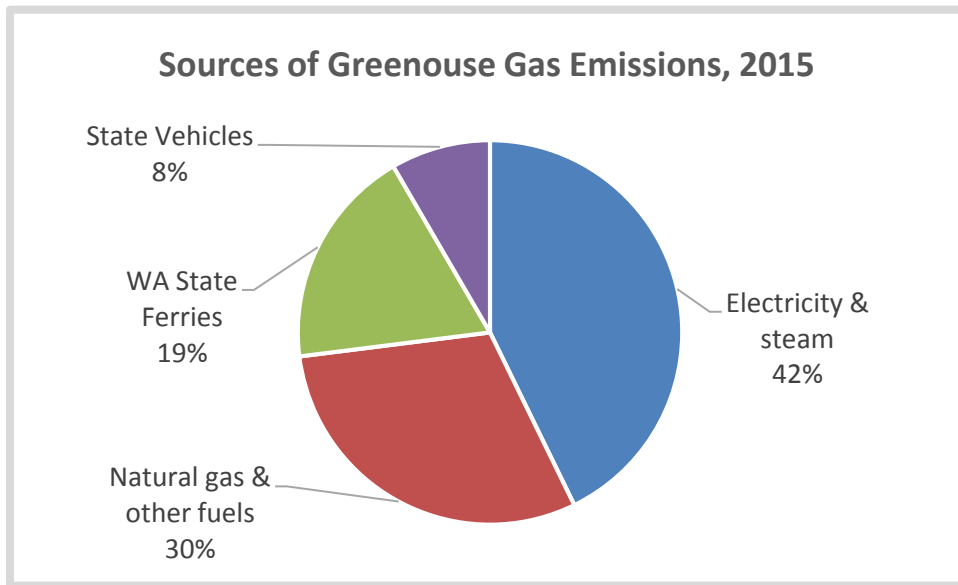


Figure 2. Sources of Greenhouse Gas Emissions from State Agencies, 2015

Electricity greenhouse gas emissions

Electricity emissions were determined using the regional Northwest Power Pool (NWPP) emission factor. In the future, the regional emission factor will be more Washington-specific since it will be based on the fuel mix data from the Washington Department of Commerce. The market-based method quantifies greenhouse gas emissions from electricity directly purchased through energy contracts (such as green energy purchases). This method includes carbon neutral electricity, which may help significantly reduce greenhouse gas emissions from buildings. For example, the data from Seattle Community College reflects electricity emissions using this market-based method.

For the 2017 state agency greenhouse gas inventory, the *Corporate Standards Greenhouse Gas Protocol Scope 2 Guidance* and the 2016 Climate Registry’s *General Reporting Protocol* require us to use both location-based and market-based methodologies. This will allow us to review regional emission factors (that have a generalized default value) compared to market-based emission factors (that have specific emission factors, often carbon neutral).

Energy use in buildings and state vehicles

Buildings use energy for heating, cooling, lighting, and to power equipment. In 2015, the top 27 state agencies released 0.68 million metric tons of carbon dioxide equivalent (CO₂e); however, 60 percent of those emissions were from the University of Washington, Washington State University, and the Washington Department of Corrections.

Table 3. State Agency Greenhouse Gas Emissions: Buildings and Transportation

State Agency	2015	Buildings MT CO ₂ e	Transportation MT CO ₂ e
Department of Transportation	248,814	46,603	202,135
University of Washington main campus	192,213	189,753	2,460
Washington State University - Pullman	144,087	139,616	4,090
Department of Corrections	84,489	76,669	7,820
Department of Social and Health Services	47,583	43,708	3,875
Department of Enterprise Services	24,827	24,474	353
Central Washington University	24,962	23,967	995
Eastern Washington University	[15,080]	[14,710]	[370]
Western Washington University	23,925	23,413	511
Washington State Patrol	23,572	7,373	16,204
Department of Fish and Wildlife	[13,146]	[8,302]	[4,844]
Seattle Community College - District 6 ⁶	3,026	2,922	[104]
State Parks and Recreation Commission	8,560	5,737	2,823
Spokane Community College - District 17	[13,215]	[12,961]	[254]
The Evergreen State College	8,748	8,467	281
Department of Natural Resources	10,597	2,453	8,143
Department of Health	7,264	6,778	483
Liquor Control Board	1,081	529	552
Department of Labor and Industries	5,489	3,279	2,210
Department of Veterans' Affairs	[7,150]	[4,299]	[2,851]
Highline Community College	[6,881]	[6,784]	97
Department of Ecology	4,146	2,510	1,636
Bates Technical College	[5,903]	[5,669]	[235]
Edmonds Community College	3,068	2,964	104
Green River Community College	4,655	4,581	76
Lake Washington Technical College	2,632	2,624	8
Bellevue Community College	6,554	6,331	51
TOTAL: metric tons of CO ₂ e	941,667	677,476	263,565

Data in brackets reflect estimates based on previous reports.

⁶ Seattle Community College applied a modified electricity emission factor developed by Seattle City Light.

In 2015, greenhouse gas emissions from state-owned transportation sources from the top 27 state agencies totaled 0.26 million metric tons (MMT) of carbon dioxide equivalent (CO₂e). The Washington State Ferry system, operated by the Washington Department of Transportation, generated more than 75 percent of these emissions.

Other sources of greenhouse gas emissions

Most state agencies reported greenhouse gas emissions from several sources where there is indirect control, including:

- Business travel in vehicles owned by employees
- Air travel
- Employee commuting

These are not included in the total state agency greenhouse gas emissions because quality data was not available for 2005, the baseline year. Many state agencies have taken steps to improve tracking this data, but significant challenges remain. State agencies have less control over emission reduction decisions from these sources. Nevertheless, state agencies continue to pursue emission reductions by supporting teleconferencing and alternative commuting such as car pools, transit, walking, or biking.

A few state agencies also reported fugitive emissions which are emissions that leak from air conditioners, refrigeration units, and other types of equipment. These emissions are not included in the total state agency greenhouse gas emissions since tracking these emissions is difficult and inconsistent. Improved air conditioning and refrigerant systems that use hydrofluorocarbons with lower global warming potentials may offer significant reductions from this source.

Actions taken since 2014 to reduce greenhouse gas emissions

The Act requires state agencies to report every two years on actions they have taken to reduce greenhouse gas emissions in the past two years. Ecology developed a web survey for state agencies to report. Sixty-five state agencies responded using Ecology's survey.

Building energy use actions

Sixty-five state agencies provided responses about building energy use. Forty-six percent reported that energy use in buildings had decreased since 2014 by using energy efficiency measures. Thirteen percent reported an increase in building greenhouse gas emissions due to more state agency staff. The remaining state agencies reported that building emissions had remained the same, especially for small rental spaces where building energy estimates were estimated on square footage.

State agencies took the following actions since 2014 to increase energy efficiency:

- Renovated buildings to meet green building standards
- Included performance contracting to conserve energy
- Installed meters to track energy use
- Retrofitted HVAC systems
- Installed energy efficient indoor and outdoor lighting
- Installed occupancy sensors to turn lights on or off
- Installed energy efficient appliances
- Encouraged employees to reduce their energy use (turn off lights and computers at night)
- Partnered with utilities on energy conservation incentives
- Changed gym hall and residential cottage lights

Transportation energy use actions

Of the 65 state agencies that completed the survey, 13 percent stated that transportation greenhouse gas emissions had decreased. Nineteen percent stated transportation emissions had increased. Thirty-three percent indicated that transportation emissions had either stayed the same or were not applicable.

2020 greenhouse gas emissions target

When asked if they would meet their 2020 target of 15 percent below the 2005 baseline for greenhouse gas emissions, the 65 agencies reported:

- 48 percent would meet their target
- 46 percent did not know if they would meet their target

Tables 4 and 5 show that 41 percent of state agencies representing the majority of state government greenhouse gas emissions have already met the 2020 target. Table 4 shows that 56 percent of state agencies that release more than 5,000 metric tons of carbon dioxide equivalent (CO_{2e}) yearly have already met the 2020 target. Table 5 shows that 28 percent of the agencies that release more than 1000 but less than 5000 metric tons of carbon dioxide equivalent (CO_{2e}) yearly have met the 2020 target. Previously-reported data was used if the state agency did not complete their 2015 greenhouse gas inventory.

Table 4. Reporters with 2005 Baseline for Greenhouse Gas Emissions greater than 5000 metric tons of CO₂e

Total Annual Greenhouse Gas Emissions from Buildings (Owned and Leased) and State-Owned Vehicles	2005	2014	2015	2020 Target	Percent above or below target
Department of Transportation	261,122	259,601	248,814	221,954	10.8
University of Washington	207,445	217,083	192,213	176,328	8.3
Washington State University - Pullman	[137,363]	158,647	144,087	[116,759]	19.0
Department of Corrections	115,479	1,257,887	84,489	98,157	-16.2
Department of Social and Health Services	72,959	63,181	47,583	62,015	-30.3
Department of Enterprise Services	[36,524]	30,473	24,827	[31,046]	-25.0
Central Washington University	27,538	29,324	24,960	23,407	6.2
Eastern Washington University	27,280	15,080	[15,080]	23,188	-53.8
Western Washington University	23,120	25,146	23,925	19,652	17.9
Washington State Patrol	21,455	24,157	23,572	18,237	22.6
Department of Fish and Wildlife	21,136	13,146	[13,146]	17,966	-36.7
Seattle Community College - District 6 ⁷	3,955	3,385	3,026	3,362	-11.1
State Parks and Recreation Commission	13,573	9,862	8,560	11,537	-34.8
Spokane Community College - District 17	13,034	12,215	[13,215]	11,079	16.2
The Evergreen State College	12,977	[10,753]	8,748	11,030	-26.1
Department of Natural Resources	11,790	11,238	10,597	10,022	5.4
Department of Health	9,590	4,297	7,261	8,152	-12.3
Liquor Control Board	7,323	950	1,081	6,225	-475.8 ⁸
Department of Labor and Industries	7,205	6,477	5,489	6,124	-11.6
Department of Veterans' Affairs	6,452	[7,150]	[7,150]	5,484	23.3
Highline Community College	6,286	6,881	6,881	5,343	22.3
Department of Ecology	6,246	4,687	4,146	5,309	-28.1
Bates Technical College	6,161	[5,903]	[5,903]	5,237	11.3
Edmonds Community College	5,877	6,919	3,068	4,996	-62.8
Green River Community College	[5,543]	[4,480]	4,655	[4,712]	-1.2
Lake Washington Technical College	5,217	3,046	2,632	4,434	-68.5
Bellevue Community College	5,212	5,939	6,554	4,430	32.4

Data in brackets reflect estimates based on previous reports.

⁷ Seattle Community College applied a modified electricity emission factor developed by Seattle City Light.

⁸ Agency reorganization caused a significant change in greenhouse gas emissions.

Table 5. Reporters with 2005 Baseline for Greenhouse Emissions greater than 1000 but less than 5000 metric tons of CO₂e

Total Annual Greenhouse Gas Emissions from Buildings (Owned and Leased) and State-Owned Vehicles	2005	2014	2015	2020	Percent above or below target
Clover Park Technical College	4,975	NA	[4,964]	4,229	14.8
Big Bend Community College	4,884	4,787	3,804	4,151	-9.1
Shoreline Community College	4,812	5,043	4,490	4,090	8.9
Columbia Basin Community College	4,696	5,572	4,832	3,991	17.4
Department of Employment Security	4,681	NA	[2,934]	3,979	-35.6
Pierce College	4,334	4,846	3,638	3,684	-1.3
Clark College	NA	4,335	3,581	NA	NA
Yakima Valley College	NA	NA	3,984	NA	NA
Tacoma Community College	3,944	NA	[3,869]	3,352	13.4
Everett Community College	3,924	3,081	2,912	3,335	-14.5
Skagit Valley College	3,809	NA	[4,401]	3,238	26.4
Walla Walla Community College	3,715	NA	[3,726]	3,157	15.3
Wenatchee Valley College	3,381	NA	[4,118]	2,874	30.2
South Puget Sound Community College	2,933	3,359	3,008	2,493	17.1
Department of Licensing	2,896	2,409	[2,409]	2,462	2.2
Military Department	2,838	2,816	6,091	2,412	60.4
Department of Revenue	2,711	2,409	1,978	2,305	-16.5
Lower Columbia College	2,577	3,180	3,094	2,190	29.2
Renton Technical College	2,472	NA	[2,749]	2,101	23.6
Whatcom Community College	2,357	2,095	1,426	2,003	-40.5
Bellingham Technical College	2,192	NA	[1,930]	1,863	3.5
WA State Center for Childhood Deafness	2,115	1,055	794	1,798	-126.4
Department of Agriculture	2,093	2,300	2,323	1,779	23.4
Centralia College	1,865	1,815	1,836	1,585	13.6
Office of the Attorney General	1,632	1,185	1,089	1,387	-27.3
Cascadia Community College	1,476	NA	1,665	1,254	24.7
Peninsula College	1,265	1,828	1,751	1,076	38.6
Grays Harbor College	[1,010]	NA	1,802	[859]	52.4
WA Health Care Facilities Authority	874	NA	1,320	743	43.7

Data in brackets reflect estimates based on previous reports.

NA = Data not available

Recommendations

Several state agencies responded that they were not aware of their targets or would like more information about emission reduction actions. They recommended periodic staff training about data collection and emission reduction options. Most state agencies also need funding to help implement reduction strategies.

We recommend establishing an interagency working group to improve the state agency greenhouse gas emissions reporting program. Based on eight years of collecting greenhouse gas emissions data from state agencies, we think there are opportunities to improve reporting efficiency and data quality.

Next Steps

An interagency group has met several times over the last six months to develop the recommendations below. We will let reporters know about these changes and will post the revised calculator in time for state agency reporting by July 2017.

- Establish a reporting threshold that would only require significant greenhouse gas emitters to report, reducing the reporting burden on smaller agencies.
- Replace mitigation strategies with agency-specific a list of mitigation strategies with an estimate of expected emission reductions (qualitative project description and quantitative data reporting).
- Develop an electronic data management system. This will improve data quality and allow the public to see the data.
- Reassess the 2035 and 2050 targets. Given currently-available reduction options, 2035 and 2050 targets may not be achievable.
- Train state agencies yearly about their reporting requirements.
- Evaluate the role of renewable energy credits to offset greenhouse gas emissions. Ecology and state agencies should assess whether to include these credits and, if so, how to account for reductions from them.
- Require both location-based and market-based methods for determining emissions from electricity. The current greenhouse gas emissions calculator conservatively estimates electricity emissions based on the regional Northwest Power Pool emission factor.

Conclusion

This is the fourth report on “Reducing Greenhouse Gas Emissions in Washington State Government.” This report complements previous reports continuing to observe that:

- Ninety percent of Washington state government emissions are from 27 state agencies.
- Most of the greenhouse gas emissions from state agencies come from buildings (i.e., electricity and natural gas used to power and heat), and transportation from state vehicles and the Washington State ferry system.
- Other sources of greenhouse gases, such as employee commuting and business travel, are difficult to quantify, but may be significant sources that agencies should continue to mitigate where feasible.
- Continue following our mitigation strategies since this has allowed us to stay on track to meet the 2020 greenhouse gas reduction goal.
- Collectively, greenhouse gas emissions from Washington state government are on track to meet the 2020 target goal, primarily due to building energy efficiencies. Furthermore, market-based accounting quantifies greenhouse gas emissions from electricity directly purchased through energy contracts (such as green energy purchases). This method includes carbon neutral electricity, which may significantly reduce greenhouse gas emissions from buildings.
- Establishing a baseline threshold of 5000 metric tons or greater of carbon dioxide equivalent (CO₂e) would capture the top state agency emitters and would relieve reporting burden for smaller agencies.