



DEPARTMENT OF
ECOLOGY
State of Washington

Reducing Greenhouse Gas Emissions in Washington State Government

Report to the Legislature

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For more information contact:

Air Quality Program
P.O. Box 47600
Olympia, WA 98504-7600
Phone: 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, Union Gap 509-575-2490
- Eastern Regional Office, Spokane 509-329-3400

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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 required state agencies to reduce their greenhouse emissions (GHG) and report on their progress every two years.

RCW 70.235.060(3) establishes the reporting requirements:

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.

Greenhouse gas emissions from Washington State agencies represent approximately 1 percent of total state greenhouse gas emissions. However, state government is in a unique position to demonstrate leadership in reducing greenhouse gas emissions and combating climate change.

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

This report incorporates several key changes in the State Agency Greenhouse Gas reporting program relative to prior versions. These changes are described in more detail in the Introduction section.

- 1) A reporting threshold was established that eliminates reporting for smaller state agencies,
- 2) The annual reporting deadline for state agencies was moved to July 1st,
- 3) The Northwest regional electricity default emission factor was replaced with the Washington state specific fuel mix disclosure emission factor generated by the Department of Commerce,
- 4) The greenhouse gas calculator eliminated scope 3 (business and employee travel) emissions,
- 5) Agencies can now report electricity purchased by 'green energy' contracts,
- 6) Each agency was given the opportunity to summarize their mitigation efforts.

Washington state government is on track to meet the 2020 greenhouse gas emissions goal; however, continued reductions will be needed to meet future goals.

Findings also included:

- Twenty-two state agencies contribute 93 percent of Washington state government emissions in this reporting period.
- Most of the greenhouse gas emissions from state agencies come from buildings (i.e., electricity and natural gas used to power and heat), transportation from state vehicles and the Washington State ferry system.
- To ensure the 2020 greenhouse gas reduction goal is met, Washington state agencies must continue to implement their existing mitigation strategies.

Introduction

The state agency greenhouse gas reporting program requires that every two years a status report is issued to the “*governor and to the appropriate committees of the senate and house of representatives*”. Compared to previous reports, this document includes several reporting changes introduced in 2016. These are:

- 1) establishment of reporting thresholds,
- 2) annual GHG inventory reporting date changed to July 1,
- 3) streamlining of GHG calculator,
- 4) electricity emission factor changed from eGrid Northwest power pool to the Fuel Mix Disclosure emission factor developed by the Department of Commerce,
- 5) inclusion of green ‘market-based’ electricity and,
- 6) inclusion of a brief narrative provided by each agency describing the greenhouse gas mitigation strategies undertaken in the previous two years.

Reporting Thresholds:

Early in 2016, Ecology initiated an interagency working group to reexamine the state agency greenhouse gas reporting requirements with the objective of improving reporting efficiency and data quality. The analysis of previously reported data suggested that the greenhouse gas emissions of only a small portion of agencies collectively accounted for the majority of greenhouse gas emissions of all state agencies. To minimize the reporting burden to small agencies, state commissions, and higher education community colleges, while still providing a realistic assessment of state agency emissions, the interagency working group established reporting thresholds based on the 2005 baseline data.

The newly established reporting thresholds captures 22 agencies that account for approximately 93% of state agency 2005 baseline greenhouse gas emissions. Ecology projects that emissions for the non-reporting state agencies will continue to match past trends. The 22 agencies continuing to report fall into three categories:

- All state agencies with estimated 2005 baseline greater than 5,000 MT CO₂e (13 reporters)
- State higher education institutions with estimated 2005 baseline greater than 10,000 MT CO₂e (8 reporters)
- Agencies not already captured but who must report under Alternative Fuel and Vehicle Extent Practicable rule¹ (1 reporter)

Greenhouse Gas Emissions Annual Reporting date:

State agencies’ annual deadline for reporting of greenhouse gas emissions was moved up to July 1 of each year. This is an earlier date than previously required and allows adequate time to reconcile any data issues and complete data analysis in a timely manner.

¹ Chapter 194-29 WAC Practicable Use of Electricity and Biofuels to Fuel Local Government Vehicles, Vessels and Construction Equipment

Streamlined GHG calculator:

The Department of Ecology provides reporters with a calculator to estimate greenhouse gas emissions from their operations. In the past, agencies were required to report emissions in three categories: Scope 1 - direct emissions, Scope 2 - indirect emissions and Scope 3 emissions (from business and employee travel). Historically agency 2005 greenhouse gas emissions baselines and the 2020 reduction goal, did not include scope 3 emissions. This was because scope 3 emissions data is limited in availability and quality. Based on discussions with the interagency working group, Ecology eliminated scope 3 emissions from the calculator and agencies are no longer required to report them. Reporters can continue to track scope 3 emissions at their operations level and Ecology is available for assistance if needed.

In another streamlining initiative, Ecology updated transportation fuels reporting to only include those fuels commonly used by state agencies. This simplified the calculator inputs. Methane and nitrous oxide transportation greenhouse gas emissions are typically less than 1.0 percent of the greenhouse gas emissions and the estimation is dependent on the emission control technology used in each vehicle. Eliminating these emissions simplifies reporting while still maintaining sufficient data to meet the objectives of this report.

Electricity Emission Factor:

Ecology updated the data source for electricity emissions factor, improving the accuracy and timeliness of the data. The greenhouse gas calculator previously estimated electricity emissions using the default Northwest Power Pool (NWPP) eGrid emission factor which is based on a multi-state regional average of the mix of energy generation. The Department of Commerce generates a Washington State specific electricity emission factor based on actual fuel mix generated and consumed in Washington. This delivers a more accurate estimate. Using Commerce's factor, known as the fuel mix disclosure (FMD) emission factor allows for direct comparison of state agency greenhouse gas data to the Washington State greenhouse gas emissions inventory.

For this report, Ecology re-estimated all inventory data from the 22 reporters from 2010 to present, including the 2005 baseline, using the FMD factor specific for each reporting year.

Green Power:

Finally, due to recent changes in scope 2 greenhouse gas accounting, 'green' power electricity purchases are now tracked separately from regular electricity consumption. Generally 'green' power contracts suggests that the energy source for electricity production is carbon neutral.

The Department of Commerce provides this guidance on what is considered 'green' power in market contracts:

1. Electricity generated and consumed by the agency using a renewable energy source, such as a solar photovoltaic or wind generating system or a biomass-fired boiler.

2. Electricity purchased by the agency directly from the operator of a renewable energy generating facility, if the purchase includes RECs (renewable energy certificates).
3. Purchases of renewable energy through a utility green power program. Examples:
 - a. PSE Green Power (Schedule 136)
 - b. PSE Green Direct (Schedule 139)
 - c. Avista Renewable Power (Schedule 95)
 - d. Avista Solar Select
 - e. PacifiCorp Blue Sky
 - f. Seattle City Light GreenUp
4. Purchases of renewable energy certificates. Examples:
 - a. Bonneville Environmental Foundation
 - b. 3degrees
5. “Green electricity” does not include electricity, even if generated using renewable energy, if the RECs (renewable energy certificates) are sold or used for another purpose. This includes electricity generated by the agency if the agency sells the RECs.
6. “Green electricity” may include electricity purchased through a community solar program, but only if the agency receives the environmental attributes or RECs. In some community solar programs offered by utilities, the utility retains the environmental attributes. This is specified in a participation agreement or other contract. Examples:
 - a. Tacoma Power community solar – Not eligible to report as green electricity.
 - b. Mason PUD 3 shared solar – Eligible to report as green electricity.

Agencies that have purchased or currently have contracts for ‘green’ power include: Western Washington University, University of Washington, Seattle City Colleges, The Evergreen State College, Department of Ecology, Department of Health, Department of Enterprise Services and State and Parks Recreation Commission. In addition, in late October 2018, Governor Jay Inslee announced that eight state agencies will purchase over one hundred million kWh of electricity by 2021 from wind and solar projects built in Washington State.

In 2017, 33% of electricity consumed by state agencies was sourced from green power. It is anticipated that state agencies will continue to investigate green power opportunities. In addition, state agencies are also evaluating energy self-generation initiatives such as solar power.

Greenhouse Gas Profile and Mitigation Narrative:

This report includes an appendix that provides a greenhouse gas profile for each agency. Agencies may also choose to report how they mitigate their greenhouse gas emissions through activities such as building energy efficiency projects or use of electric fleet vehicles. This profile includes a greenhouse gas mitigation narrative where agencies describe *in their own words* greenhouse gas mitigation activities implemented during the previous two years. This narrative replaces a cumbersome survey that lacked open ended questions and provided less information on agency actions.

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.

Greenhouse gases included

State agencies reported on the three main greenhouse gases emitted from state agency activities:

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)

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 Potentials²

Greenhouse Gas	GWP
Carbon dioxide (CO ₂)	1
Methane (CH ₄)	25
Nitrous Oxide (N ₂ O)	298

² Table A-267: IPCC AR4 Global Warming Potentials...
https://www.epa.gov/sites/production/files/2018-01/documents/2018_annex_6.pdf

Total State Agency GHG Emissions

Greenhouse gas emissions from Washington State agencies represent approximately 1.0 percent of total state greenhouse gas emissions. The 22 state agency reporters listed in Table 2, generate 93 percent of state agency greenhouse gas emissions.

Table 2: State Agency Reporters

Agencies & Higher Education with estimated 2005 baseline >10,000 MT
Department of Transportation
University of Washington
Washington State University
Department of Corrections
Department of Social and Health Services
Washington State Patrol
Department of Enterprise Services
Central Washington University
Eastern Washington University
Western Washington University
Department of Fish and Wildlife
Seattle Community College
State Parks and Recreation Commission
Spokane Community College
The Evergreen State College
Department of Natural Resources
Agencies with estimated 2005 baseline > 5000 MT
Department of Health
Liquor and Cannabis Board
Labor and Industries
Department of Veteran Affairs
Department of Ecology
Agencies not already captured but which must report under <i>Alternative Fuel and Vehicle Extent Practicable</i> rule
Department of Agriculture

Figure 1 indicates that, by 2017, state agencies collectively reduced greenhouse gas emissions by 14.1 percent from the 2005 baseline. As of the drafting of this report, two state agencies have not reported their 2017 greenhouse gas emissions so their last reported data was used as a

placeholder. In 2017 the collective state agency greenhouse gas emissions were within 1.0 percent of the 2020 target emissions; however, a number of individual agencies have already met their 2020 target (see Appendix).

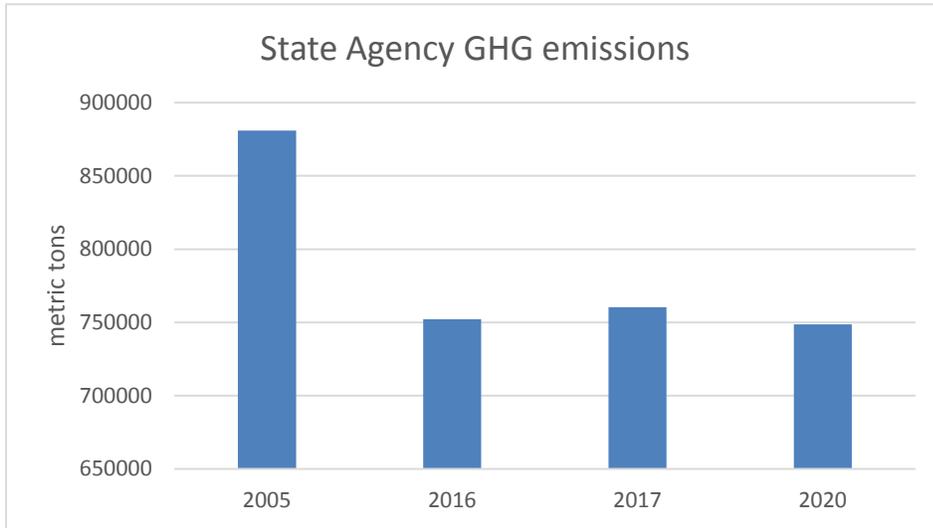


Figure 1: Total GHG emissions from Buildings and Transportation recalculated with Fuel Mix Disclosure Emission Factor

As figure 2 indicates, stationary sources are the primary source of greenhouse gas emissions for state agencies. Stationary sources are typically emissions from buildings and include both scope 1 (natural gas) and scope 2 (electricity) emissions. For a few state agencies, scope 1 mobile sources (transportation fuels) are significant, especially Washington State Department of Transportation, which includes emissions from the state ferry system.

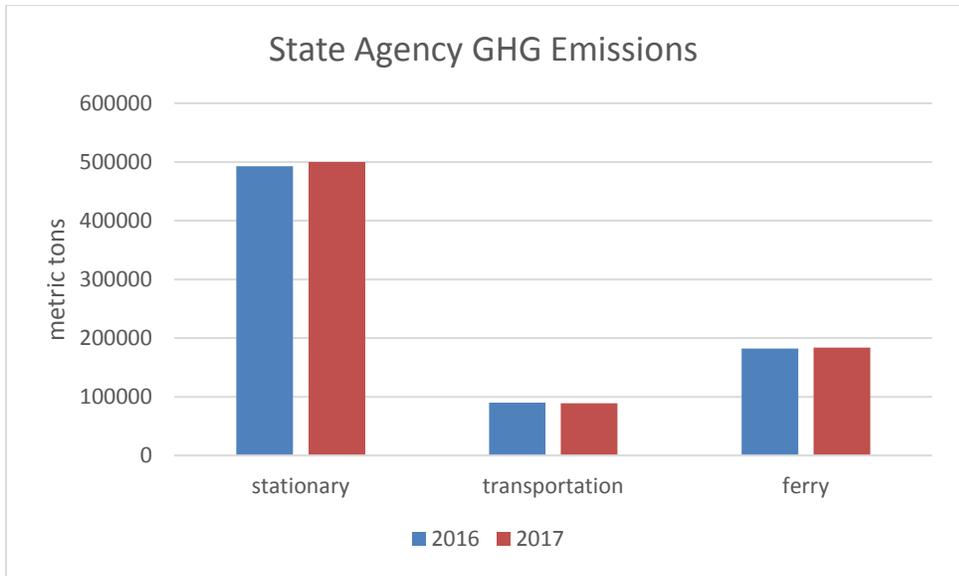


Figure 2: State Agency GHG emissions by source

Figure 3 indicates that in 2017 building energy such as natural gas and electricity are the predominant sources of greenhouse gas emissions for state agencies. A significant opportunity for emissions reductions exists with ‘green’ market electricity contracts.

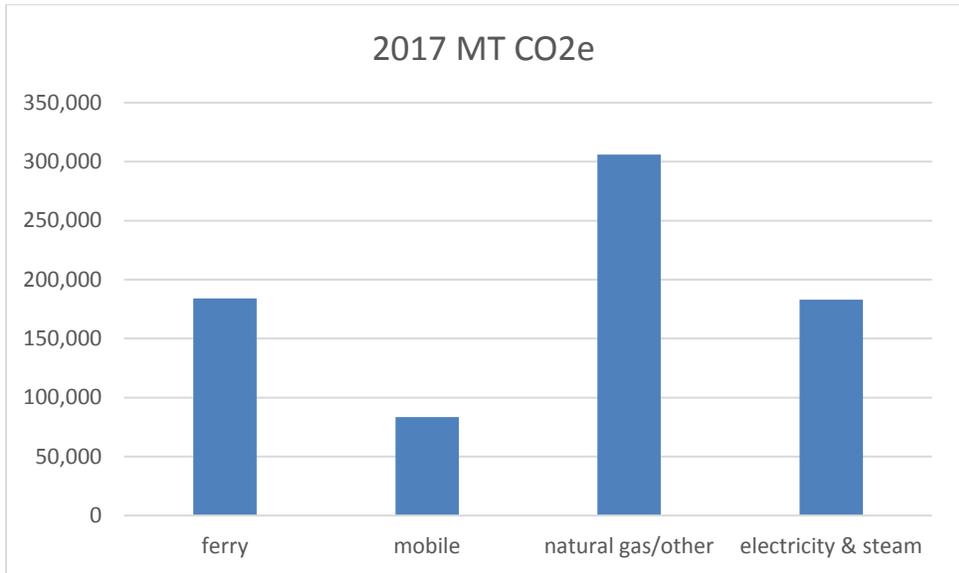


Figure 3: State Agency 2017 GHG emissions by source

Specific agency greenhouse gas profiles are available in the Appendix.

Recommendations

Most state agencies are doing an excellent job of tracking their greenhouse gas emissions and are on target for meeting their 2020 reduction targets. To meet their targets, a few reporting agencies may need additional support either from management or the newly formed State Efficiency and Environmental Performance (SEEP) program at the Department of Commerce where agency annual greenhouse gas inventory data is reviewed and discussed for improvement opportunities.

Within the SEEP program there is an emphasis on establishing green energy contracts that would significantly reduce the agency's carbon footprint. Carbon neutral electricity would also be important in supporting fleet electrification. In addition, several agencies have started to introduce solar power at their facilities which would also mitigate their greenhouse gas emissions. Financial support for expansion of these types of initiatives should be encouraged.

The Liquor and Cannabis Board no longer operates state owned liquor stores and its greenhouse gas emissions have changed significantly since the 2005 baseline data. The agency's total annual greenhouse gas emissions for the last several years is below 1000 MT so the agency currently operates under the greenhouse gas reporting threshold. The Liquor and Cannabis Board participates in the SEEP program therefore it should continue to report its greenhouse gas inventory.

Conclusion

The state agency greenhouse gas emissions reporting program emphasizes annual tracking and reporting of an agency's greenhouse gas emissions. Even though emissions from Washington State agencies represent approximately 1.0 percent of total state greenhouse gas emissions, state government is in a unique position to demonstrate leadership in reducing greenhouse gas emissions and responding to climate change.

The data analysis suggests nearly all state agencies are making continued improvement in reducing their greenhouse gas emissions. The 2020 target is achievable as long as agencies continue to implement existing strategies. However, all state agencies must continue to prioritize further emissions reductions to meet the 2035 target of 36 percent below 2005 levels.

Appendix: GHG Inventory Reporters

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. Each report was adjusted using the fuel mix disclosure emission factor for electricity.

The greenhouse gas profile for each of the 22 reporters is provided in the appendix, along with a brief narrative from the agency describing their greenhouse gas mitigation actions during the last two years. As of the drafting of this biennial report, several agencies have failed to submit their GHG inventory and their mitigation narrative. In such cases, the last reported annual inventory data may be used as a placeholder and no mitigation narrative has been provided.

Fourteen agency reporters have already met or are likely to meet their 2020 targets:

- Department of Corrections
- Department of Ecology
- Department of Enterprise Services
- Department of Fish and Wildlife
- Department of Health
- Department of Labor and Industries
- Liquor and Cannabis Board
- Seattle Colleges
- Department of Social and Health Services
- State Parks and Recreation Commission
- Washington State Patrol
- The Evergreen State College
- University of Washington
- Western Washington University

Agriculture, Department of

The Department of Agriculture is a reporter since it is captured by the new threshold reporting requirement,

“Agencies not already captured but who must report under Alternative Fuel and Vehicle Extent Practicable rule”

Figure 1 indicates that the Department of Agriculture’s GHG emissions have decreased in 2017.

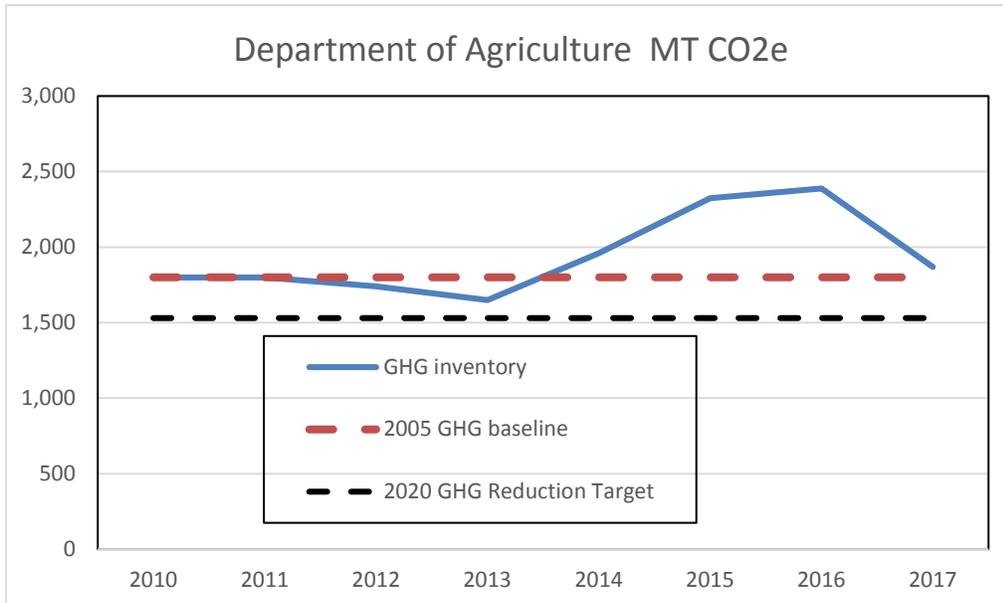


Figure 1: Greenhouse Gas Emissions profile

The data in figure 2 suggests a decrease in transportation greenhouse gas emissions.

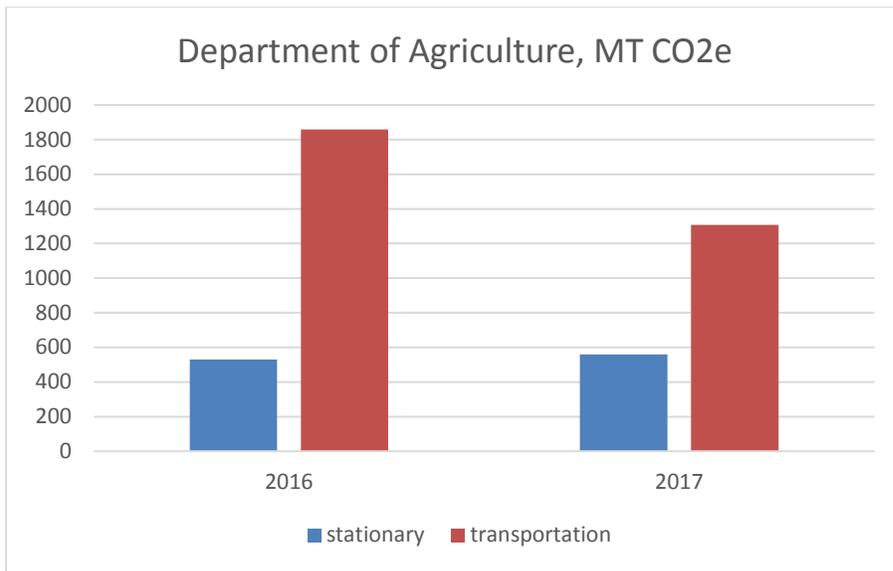


Figure 2 GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

The Department of Agriculture relies on the Department of Enterprise Services to determine where any energy consumption reduction can be implemented when building leases are renewed. In addition, Agriculture relies on DES' Fleet Operations for their vehicles and uses hybrids or all-electric vehicles where practicable.

Central Washington University

Central Washington University did not provide updated data, so placeholder data for 2016 and 2017 has been used for the greenhouse gas profile in Figure 1.

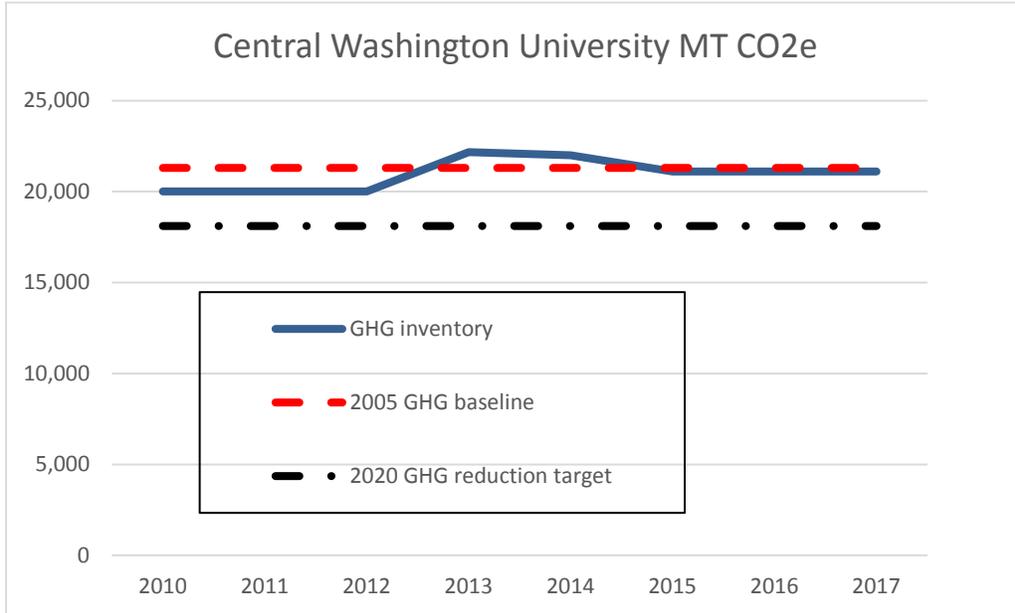


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions.

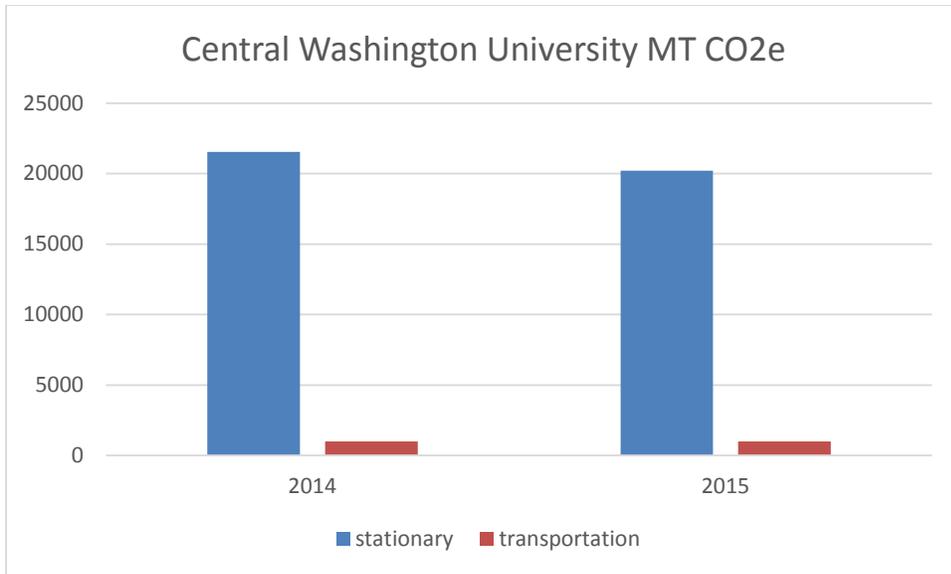


Figure 2 GHG Sources: Stationary and Transportation

Agency GHG Mitigation Actions.

No mitigation narrative provided.

Community Colleges of Spokane

Figure 1 indicates that greenhouse gas emissions are decreasing at the Community Colleges of Spokane.

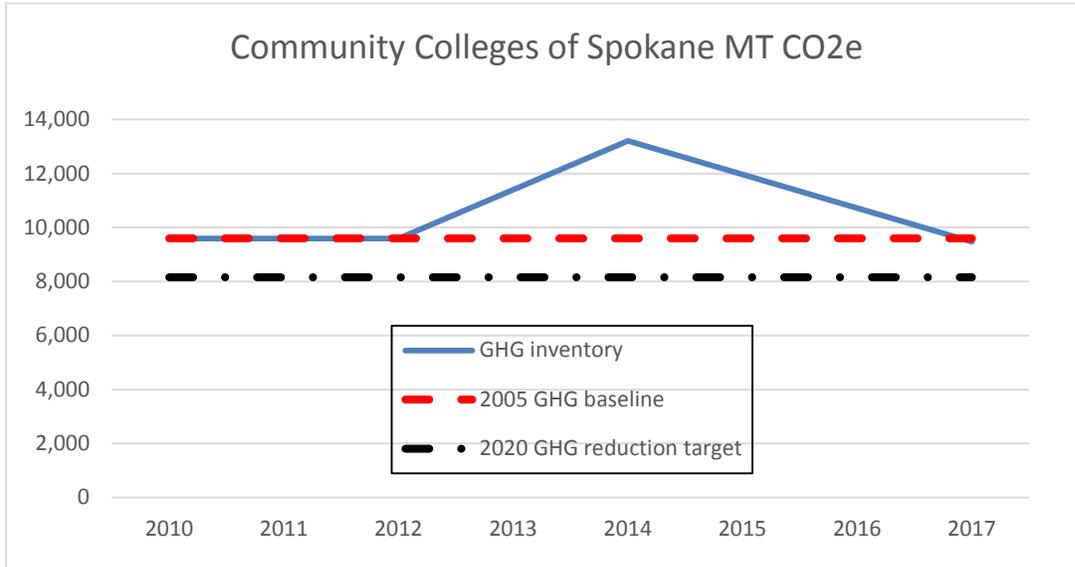


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions.

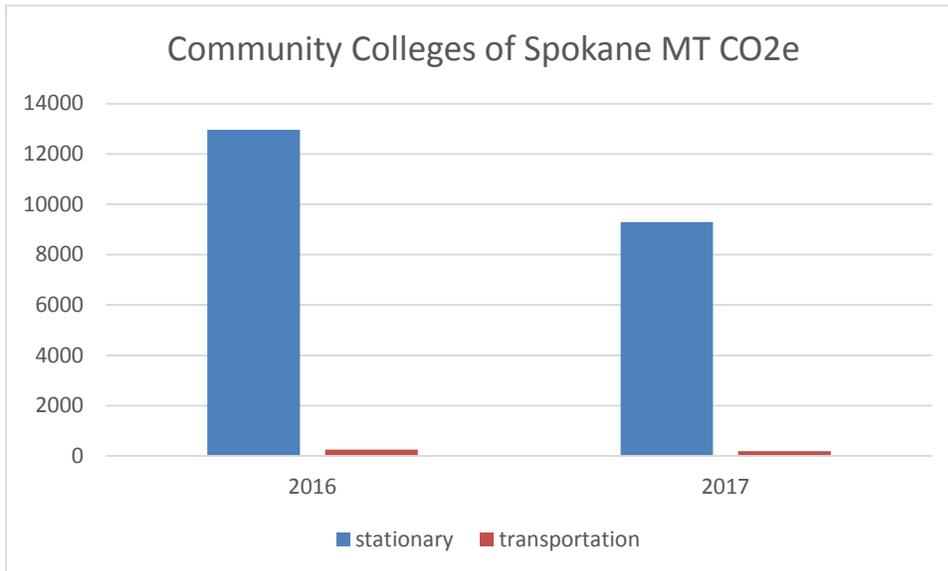


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

Community Colleges of Spokane (CCS) is proud of their efforts to reduce greenhouse gas emissions during calendar year 2017. CCS continues to design all new construction utilizing sustainable/LEED standards. Our most recent design incorporated geothermal cooling from the Rathdrum Aquifer and eliminated the need for an electric powered chiller. This type of innovative design will reduce greenhouse gas emissions for decades to come.

CCS has focused almost exclusively on reducing our electricity consumption in 2017. Nearly all high wattage parking lot lights have been replaced with high efficiency LED lamp and targeted high use interior lamps have been replaced with LEDs as well. We continue to install variable frequency drives and stagger building start times to reduce demand loads during peak energy consumption times. Last year, we upgraded the Heating Ventilation and Air Conditioning (HVAC) controls system on a 68,000 square foot classroom/lab building that is estimated to reduce electricity use another 611K kWh per year. CCS also refined the HVAC controls system runtime schedule, resulting in a 25 percent reduction in run time.

CCS reorganized trades staff geographically to reduce vehicle fuel use. By decentralizing the trades staff, we estimate that CCS we will reduce fuel consumption by 10,000 gallons per year. We also downsized our fleet size by 10 vehicles. Additionally, in cooperation with Avista, our local utility provider, CCS installed six electric vehicle charging ports for visitors, staff, and students. Although there is not a big demand for electric vehicle charging stations at this time, CCS is looking to the future by providing the infrastructure.

Many of our efficiency measures would not be possible without the support of Avista, our local utility provider. Their rebate program has made it possible for us to undertake most of the efficiencies noted above

Corrections, Department of

Figure 1 indicates that the Department of Corrections greenhouse gas emissions are below its 2020 target.

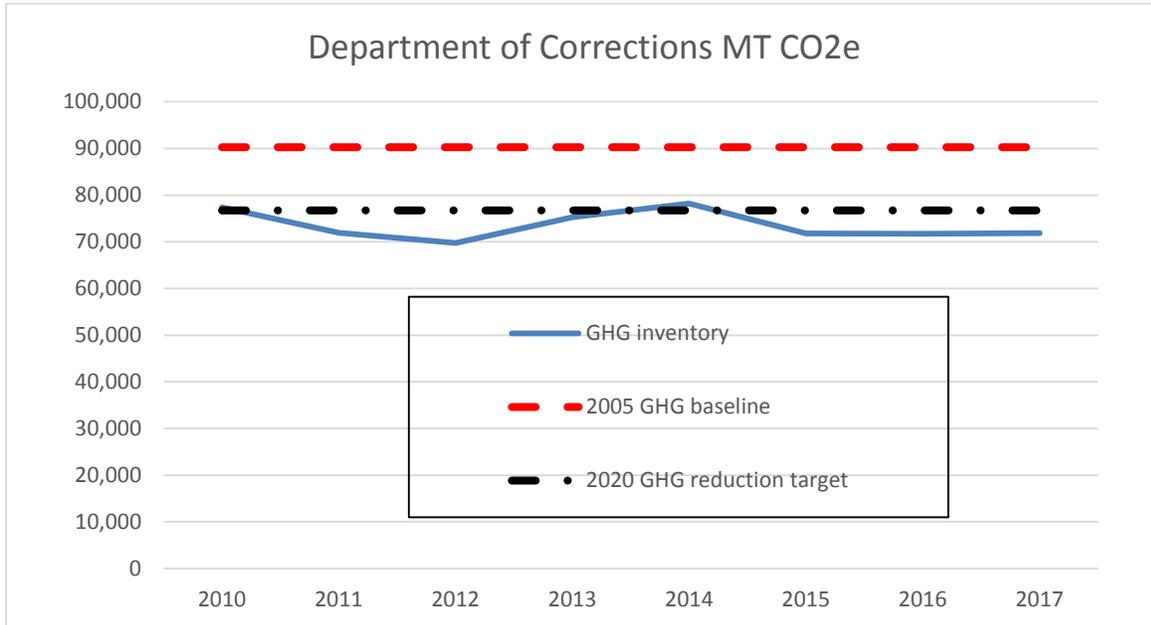


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions; however, the Department of Corrections has reduced its overall emission below the 2020 target.

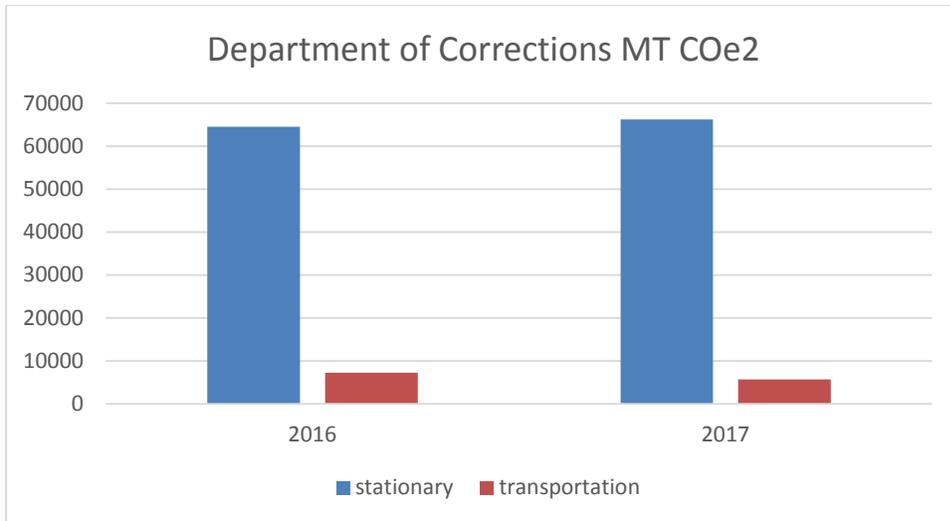


Figure 2 GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

During the 2016 thru 2017 period Department of Corrections completed investment grade energy audits at the:

- Clallam Bay Corrections Center
- Monroe Correctional Complex
- Washington Corrections Center

Preliminary audits were conducted at five other facilities. The Department continues to consider pursuing these recommendations given the information provided.

The actions taken that resulted in energy conservation were attention to deferred maintenance and the replacement of inefficient and failing building equipment and systems. The department also continued to complete lighting upgrades, both in interior and exterior applications, taking advantage of local utility incentives.

A collaboration with the Pacific Northwest National Laboratories (PNNL) was initiated to audit, assess and recommend energy conservation projects at a number of our major facilities. PNNL will also assist the Department in the development of an enterprise wide energy plan.

Ecology, Department of

Figure 1 indicates that the Department of Ecology greenhouse gas emissions are below their 2020 target.

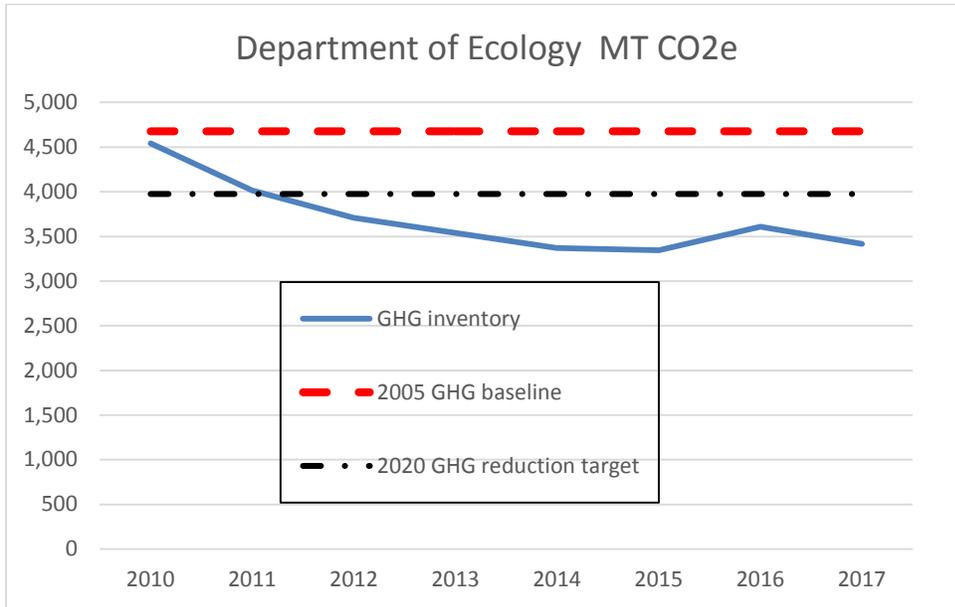


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, for the Department of Ecology, both stationary and transportation are important greenhouse gas emission sources.

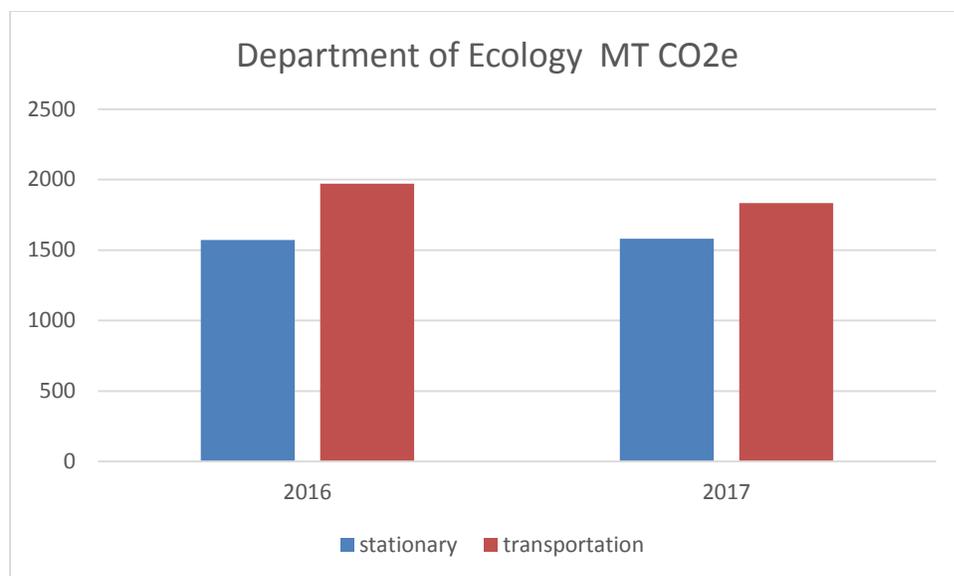


Figure 2 GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

The Washington Department of Ecology is the agency charged with protecting our state’s environment and preserving our natural resources. As an agency with more than 1,600 employees and offices spread across Washington, the Department of Ecology has taken a number of steps to further reduce its greenhouse gas emissions.

In 2018 the Department of Ecology converted approximately 3,000 fluorescent lights to LED fixtures. The replacement of fluorescent lights with LEDs reduces the energy consumption per fixture from 50 watts to 15 watts, approximately a 70 percent reduction in the energy used. The lighting replacement will offset 765,175 pounds per year of CO₂, will save 496,582 kWh per year of electricity and \$62,037/year in operating and energy costs.

The Department of Ecology participates in renewable energy credits at both its Spokane location and the Lacey Headquarters location as part of an emission reduction strategy. The renewable energy credits from Renewable Choice Energy totaled 323,000 kWh per year for 2017 for the Spokane facility. Ecology also has a Green Power Purchase Agreement with Puget Sound Energy to purchase 2,988,000 kWh per year of green power resources for the Lacey Headquarters facility.

In 2016, Ecology partnered with the Department of Enterprise Services (DES) to install four additional electric vehicle chargers at Ecology’s headquarters facility in Lacey. However, in order to install the additional chargers Ecology needed to expand its electrical capacity from the electrical grid. The cost of the electrical expansion was approximately \$200,000 and took a year to complete. The increased electrical capacity afforded Ecology the ability to add a total of 31 additional level-2 charging stations. Ecology also allocated approximately \$100,000 in 2018 to add a further 22 charging ports across the state bringing the total number of charging ports at Ecology facilities to 64. The additional chargers allows Ecology to purchase electric vehicles as they become available, adding to the current total of 13 purely electric vehicles.

The Department of Ecology also has solar arrays at three locations: the Eastern Regional Office located in Spokane, the Padilla Bay National Estuarine Research Reserve in Mount Vernon, and the Central Regional Office in Union Gap. In 2017, onsite renewable solar generation totaled 86,647.54 kWh between the three sites up from the 2016 solar generation of 73,736.8 kWh. The Union Gap office produced 43,362 kWh accounting for 10 percent of the office's energy in 2017 and offsetting 19 tons of CO₂ emissions.

Enterprise Services, Department of

Figure 1 indicates that the Department of Enterprise Services greenhouse gas emissions are below its 2020 target.

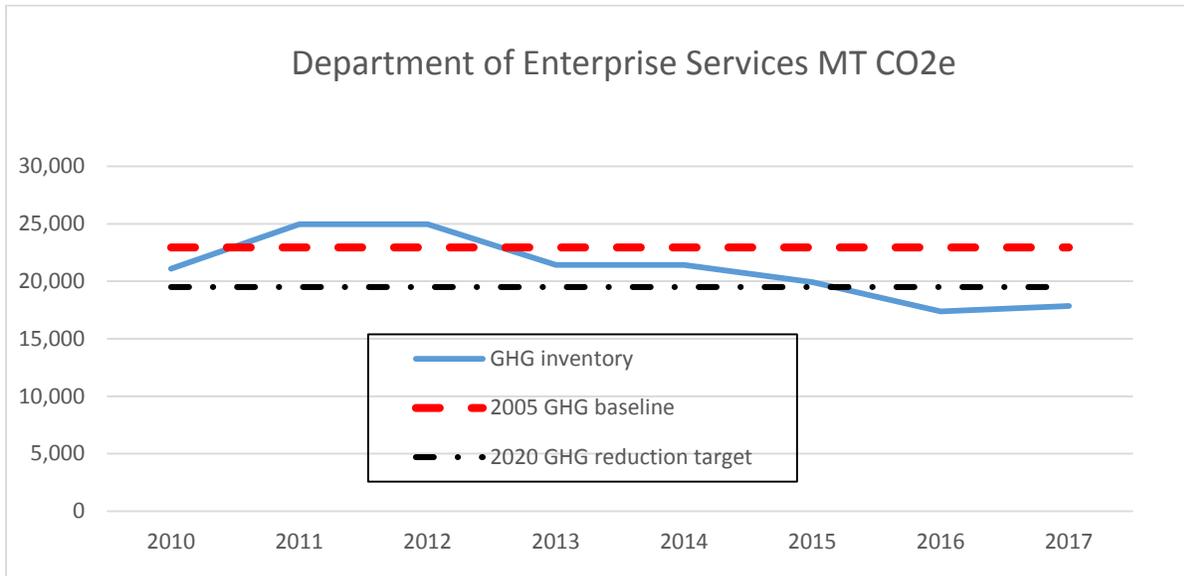


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions; however, the Department of Enterprise Services has reduced its overall emission below the 2020 target.

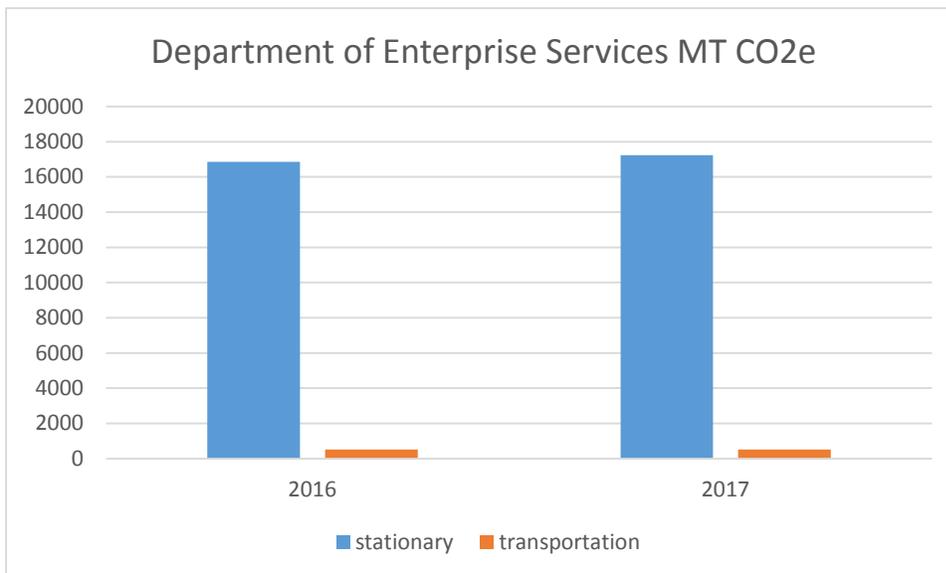


Figure 2 GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

One of the key strategies for the DES is the Resource Conservation Manager (RCM) program. The RCM assists the agency in adopting low cost operational efficiencies and developing energy projects for the agency. These efforts result in decreased energy consumption, lower operating costs and lower greenhouse gas emissions.

Current efforts include:

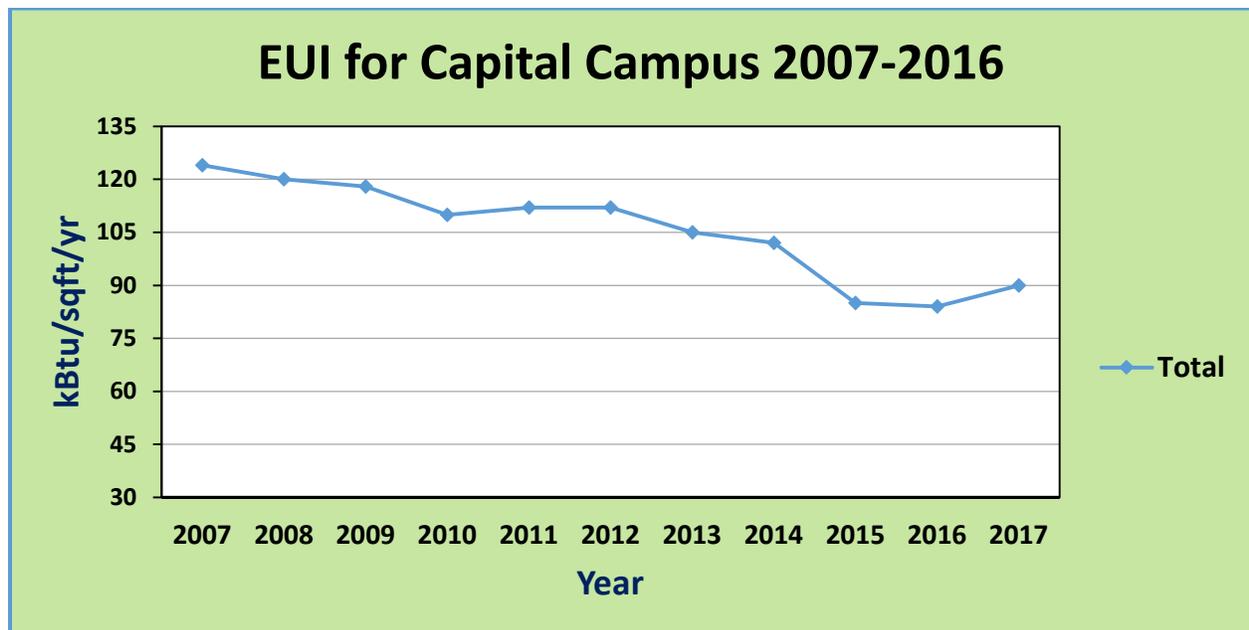
- Tracking utility consumption in all buildings
- Improved building operations, through the monitoring of schedules and general building operation.
- Installation of the Capitol Campus Energy Dashboard which allows building occupants to see the energy consumption patterns of their building.

- Development of a low carbon pathway – the Next Century Capitol Campus – to heat and cool the Capitol Campus buildings.

These efforts have resulted in a marked decrease in the Energy Use Index (EUI) of the Capitol Campus as a whole. The chart below shows the steady progress made on Capitol Campus.

CY 2017 saw a 2 percent increase in consumption on Capitol Campus. The increase is attributed to two events on Capitol campus:

- The extended Legislative session that ran from January to June. This required the 24/7 operation of five buildings for six months.
- The addition of a 225,000-sqft building – the Helen Sommers Building.



Lighting

In CY 2017, the DES completed a project to retrofit all Capitol Campus exterior lighting to Dark Sky compliant LED fixtures and lamps.

The DES also completed an investment grade audit of all interior lighting in preparation for a targeted interior lighting project in the 2019 -21 biennium. The project will replace interior lighting with LED fixtures and add enhanced lighting controls. This approach typically results in a 30-50 percent reduction for the lighting systems. Lighting accounts for about a third of total building energy consumption.

HVAC

CY 2017 was the first full year of operation for the new Central Chilled Water plant. This project replaced two 45-year-old chillers that used an outdated refrigerant with a new chiller. The reduction from 1.4 kW /ton to 0.6 kW/ton (annual average) is a significant reduction in energy use and GHG emissions.

Another project replaced an inefficient air-cooled chiller in the Legislative building. This chiller serves the Legislative data center and provides cooling to the Senate and House chambers during session. Replacing the chiller resulted in improved operation and over 50 percent reduction in energy use for the system.

Eastern Washington University

Figure 1 indicates that Eastern Washington’s greenhouse gas emissions have decreased in 2017.

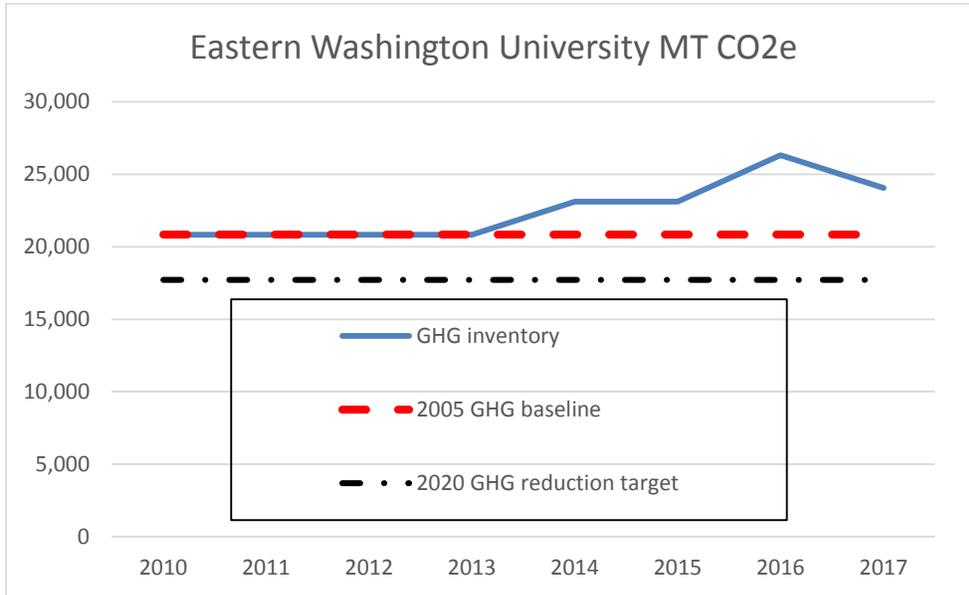


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions.

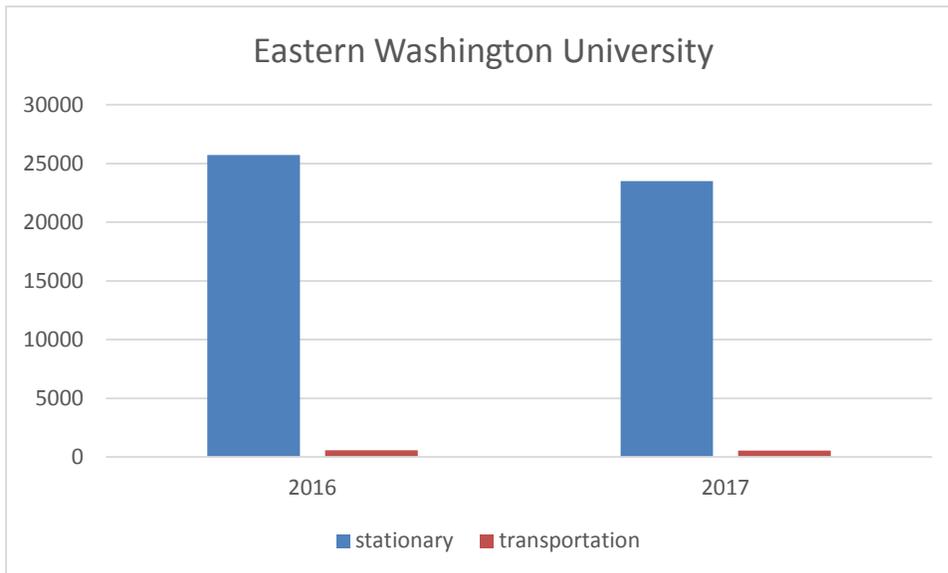


Figure 2 GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

- Retired some older, less efficient vehicles from fleet. Added hybrid for commuting to meetings off campus.
- Modernized central chillers to increase capacity while simultaneously reducing energy usage.
- Ongoing LED retrofitting across campus to reduce energy usage for lighting.
- Installed building sub-metering and software systems to track electricity, heating, cooling, water usage, and waste water output so as to study ways to reduce building resource demands.
- Upgraded energy management systems in Sutton Hall to reduce building energy use
- Upgraded energy management systems in Science Building to reduce building energy use
- Energy management systems/software upgrade to reduce campus energy use

Fish and Wildlife, Department of

Figure 1 indicates that the Department of Fish and Wildlife greenhouse gas emissions has met its 2020 reduction target in 2017.

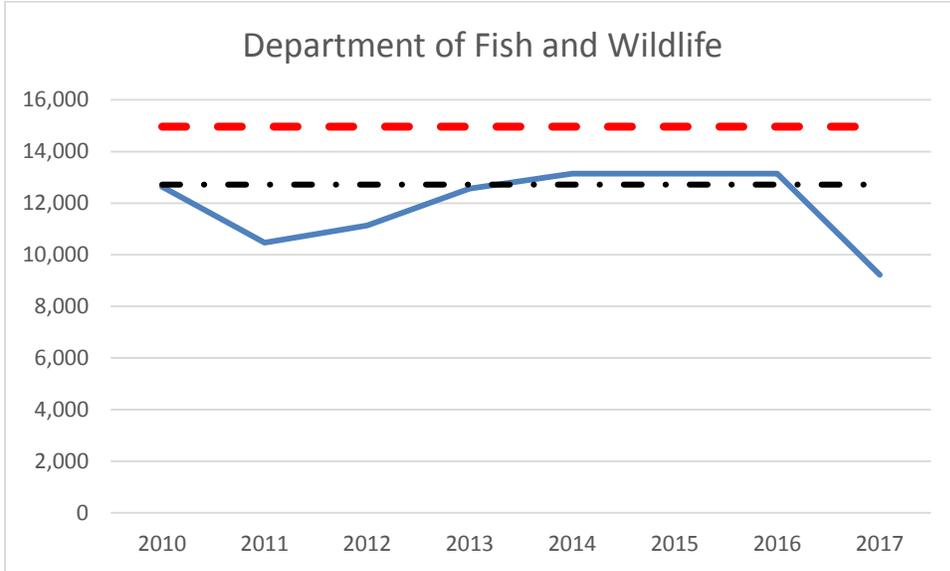


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, greenhouse gas emissions are from stationary sources has decreased compared to transportation emissions.

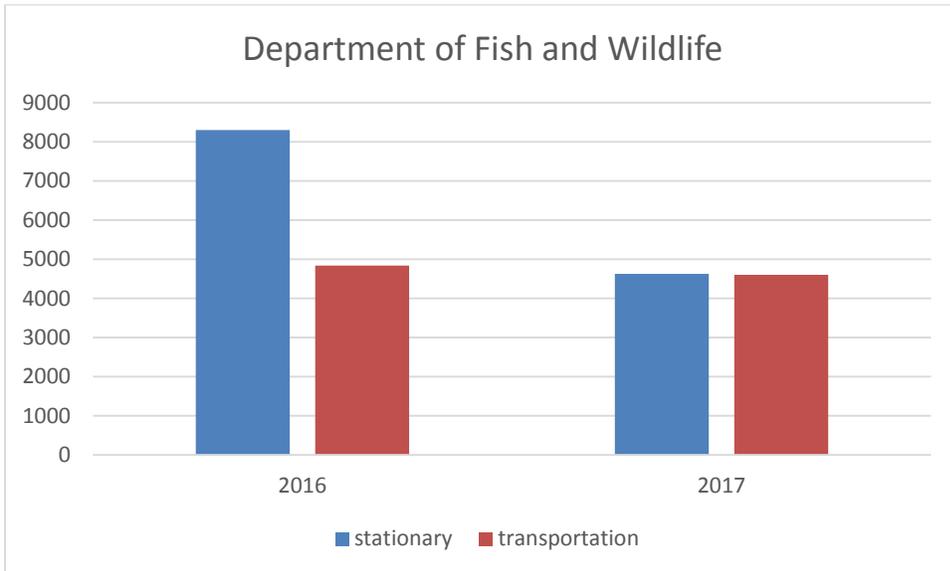


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

**Greenhouse Gas Emissions Reduction and Vehicle Miles Reduction
Department of Fish and Wildlife
FY17-19**

- The Agency's capital budget plan takes major steps to implement its Greenhouse Gas Reduction strategy. The enacted FY 2017-19 capital budget includes projects that recapitalize outdated facilities and infrastructure to meet present code and construction standards...these projects will result in more efficient agency operations and reduced GHG emissions.
- In particular, WDFW's capital budget included \$600K for upgrades to facility components to improve energy efficiency. Project types included replacing outdated oil fired furnaces with improved energy efficient furnaces and ductless heating/cooling systems; replacing old single pane windows with more efficient modern windows in facilities and residences; replacing old hot water systems; and utilizing DES' statewide Energy Savings Performance Contracting (ESPC) program to optimize the HVAC system at our regional headquarters office in Spokane.
- The Agency maintains a comprehensive list of backlogged maintenance items related to capital assets critical to ongoing operations which when completed will improve efficiency and reduce GHG emissions.
- The Agency also maintains a fleet of heavy and medium trucks and construction equipment to support the construction and maintenance program. WDFW replaced several 20-plus year old service trucks with modern energy efficient service trucks; and five 30-plus year old dump

Health, Department of

Figure 1 indicates that the Department of Health greenhouse gas emissions are below its 2020 target.

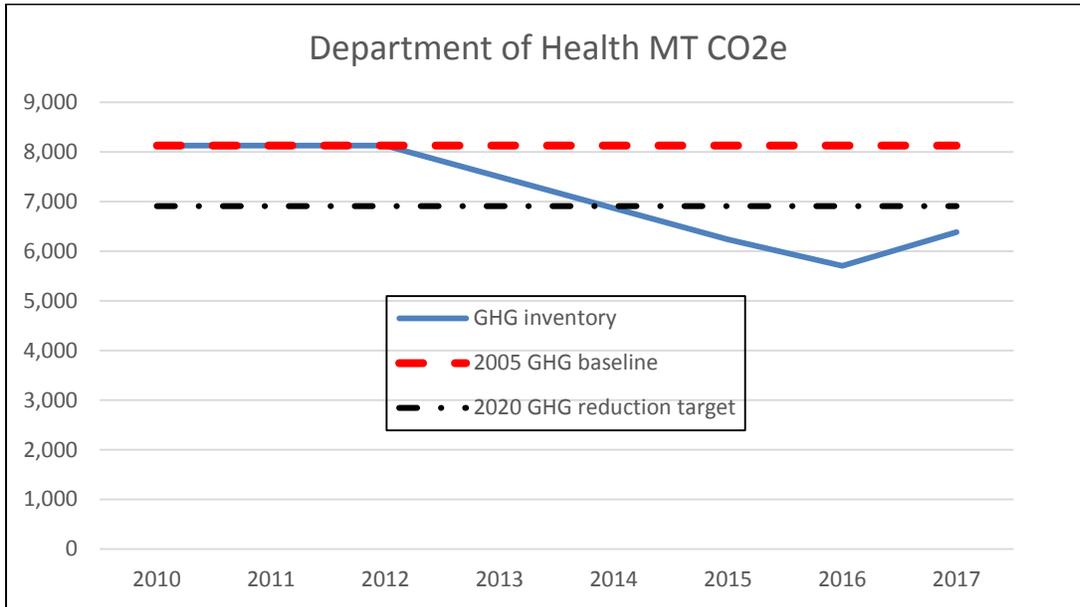


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions.

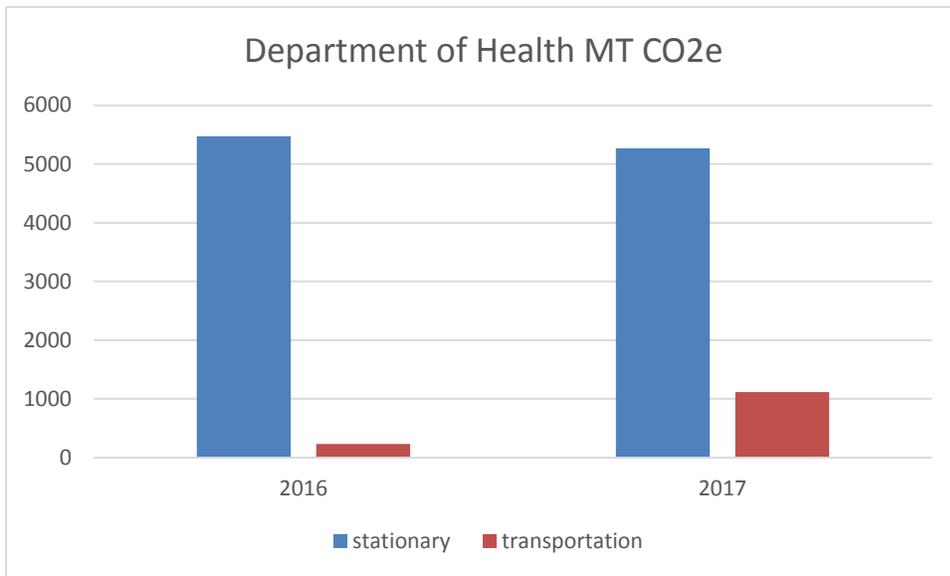


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

During 2017 the Washington State Department of Health took several actions to meet the emissions reduction targets set for the year. Below is a summarized list of these items. These items were completed in the agency's Tumwater (Town Center 1, 2, 3 and Point Plaza East 4, 5, 6) and Shoreline locations.

Tumwater

Stationary Energy Use – Buildings

- Installed new HVAC control system
- Removed the thermostats from exterior walls and relocated them to the interior wall to provide a more accurate readings
- Installed HVAC occupancy sensors in select conference rooms. The sensors communicate with the HVAC so that it turns off in those rooms when they are not being occupied
- Upgraded the controls for the exhaust system for HVAC. This includes restrooms, coffee bars, lunch rooms and printer alcoves
- Balanced the HVAC air system
- Standardized all set points to: 70 degrees heating and 72 degrees cooling
- Replaced all lighting in restrooms with LED lights
- Replaced all stairwell lighting with LED lights
- Replaced certain lobby lighting with LED lights
- Began appliance replacement project to replace all appliances (refrigerator and microwaves) to EPA Energy Star rated equipment
- Removed portable heaters for individual workspaces

Shoreline

Stationary Energy Use–Buildings

- Installed LED lighting in Newborn Screening Wing Addition
- Installed occupancy sensors in Newborn Screening Wing Addition
- Updated and installed new ultra-low freezers and refrigerators replaced with Energy Star equipment. Staff lunchroom refrigerators replaced with Energy Star appliances
- Updated HVAC building controls changed from Siemens to ATS in Newborn Screening Wing
- Programed the chillers to run 20 percent less

Labor and Industries, Department of

Figure 1 indicates that the Department of Labor and Industries greenhouse gas emissions have decreased in 2017.

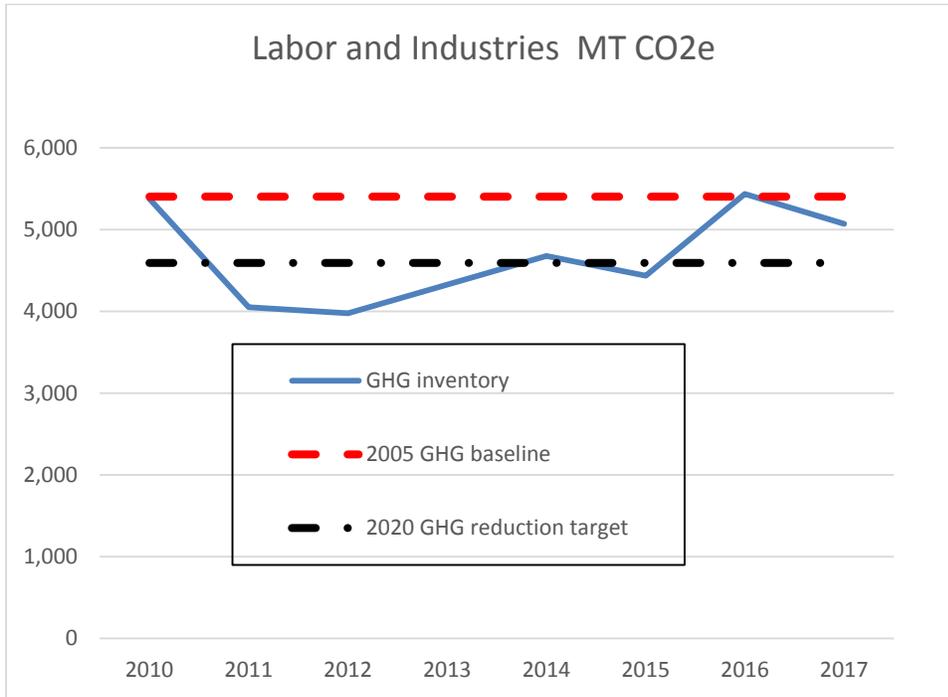


Figure 1: Greenhouse Gas Emissions profile

The data in figure 2 suggests a decrease in stationary greenhouse gas emissions.

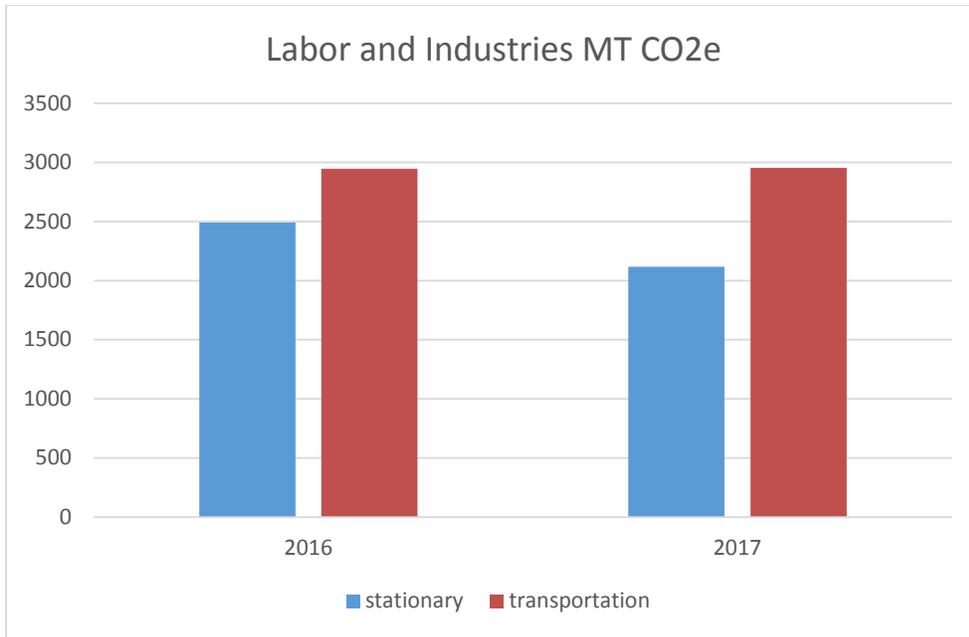


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

The Washington Department of Labor and Industries is conscious about temperature setbacks: the building HVAC system shuts down at 6 p.m. and is placed in the unoccupied mode during weekends. Labor and Industries has removed approximately 140 heaters from the building which were recalled and not replaced. Areas are checked for temperature sensor locations to provide more efficient seasonal heating and cooling.

Labor and Industries leased eight Nissan Leaf electric fleet vehicles and reduced the agency's use of gasoline fueled vehicles as a result. Late last year, the department replaced the eight Nissan Leaf vehicles with a range of 90 miles per charge with Chevrolet Bolts which have a 230 mile range and plans to lease an additional four. Labor and Industries also installed four electric charging stations for employee use and is installing charging stations at some of the agency's field offices to reduce fuel demands. The department has installed some charging stations at employee houses to allow them to park an agency car at home and charge overnight. Since many of Labor and Industry compliance employees are mobile, due to the various locations of the inspections and investigations work sites, the department cannot completely eliminate fossil fuel vehicles, but the agency is taking some strides to reduce greenhouse gas emissions from vehicles.

The department also completed a phased investment-grade audit with DES Energy services and University Mechanical. They developed proposals to upgrade lighting, HVAC system controls, chillers, and boilers as well as implement some renewable energy measures such as solar panels. The department hopes to fund these projects next biennium.

Liquor and Cannabis Board

Figure 1 indicates significant greenhouse gas profile changes due to organizational changes in this agency.

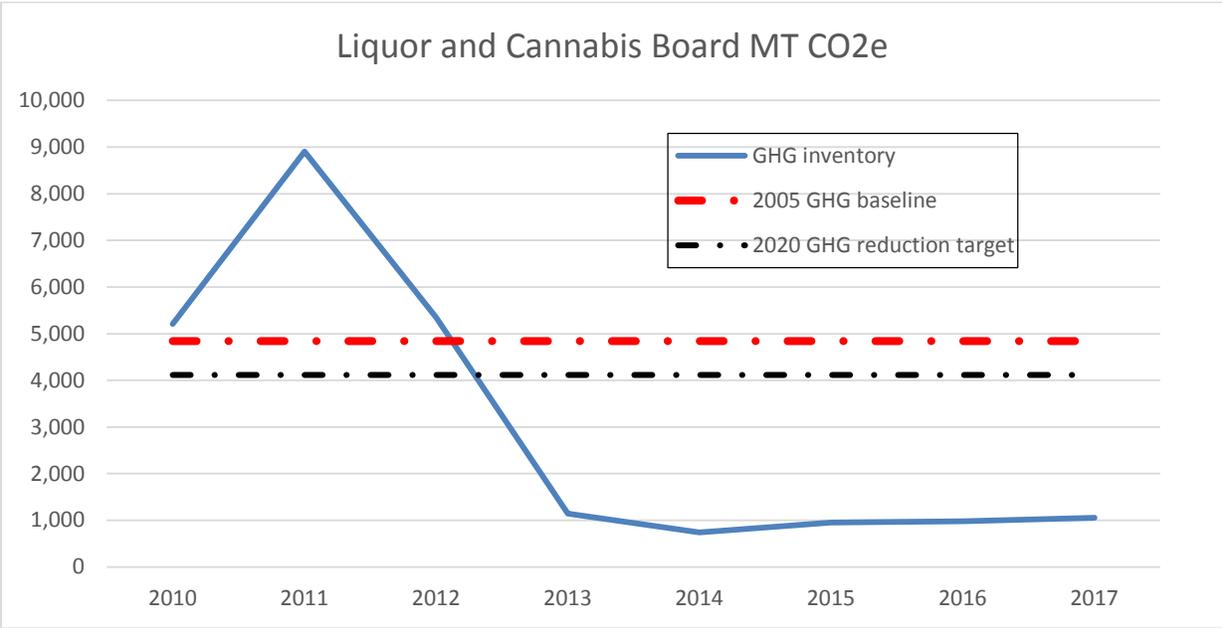


Figure 1: Greenhouse Gas Emissions profile

The Liquor and Cannabis Board has changed drastically with the sale of state operated liquor stores, followed by adding regulatory oversight of privately operated cannabis operations to the agency’s responsibilities. The 2005 greenhouse gas baseline included multiple state owned building operations. With the sale of state liquor stores this agency may reconsider establishing its baseline on 2013 operations. Given current threshold criteria, the Liquor and Cannabis Board would not be required to participate in annual greenhouse gas emissions reporting.

The data in figure 2 suggests a slight increase in transportation greenhouse gas emissions.

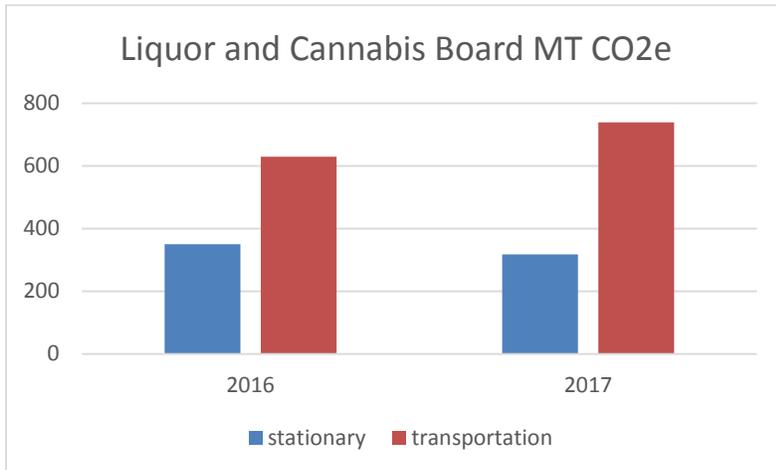


Figure 2: GHG Sources: Stationary and Transportation

Agency GHG Mitigation Actions.

The agency contacts every new employee within the first 10 days to let them know about sustainability and commute trip reduction program. The agency encourages alternative forms of transportation to attend meetings and is test piloting take home electric vehicles. To reduce energy consumption, the Liquor and Cannabis Board uses the State Appliance contract for all appliances with an Energy Star rating

Natural Resources, Department of

Figure 1 indicates that greenhouse gas emissions for the Department of Natural Resources is decreasing but it may be a challenge to meet the agency’s 2020 reduction target.

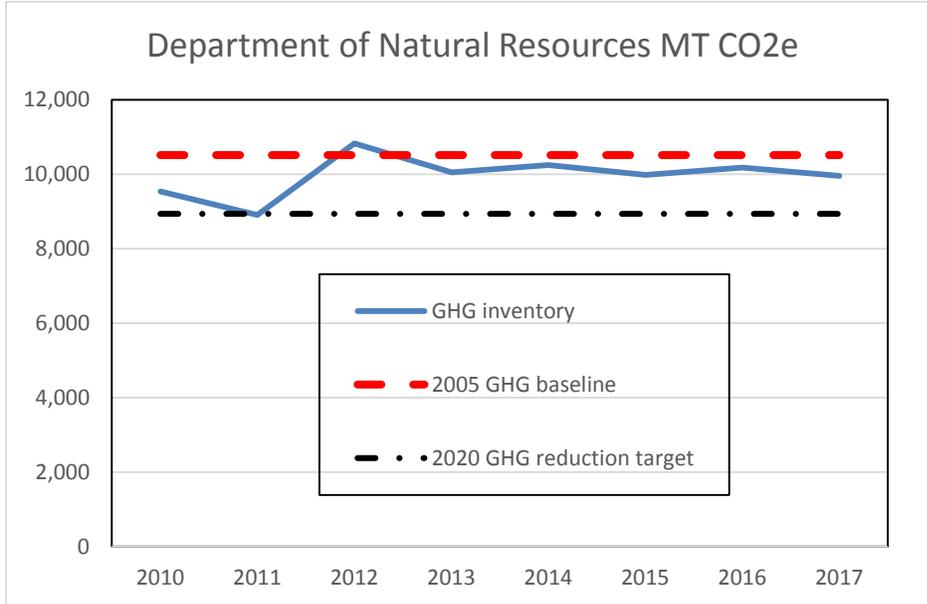


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, transportation sources are the most significant source of greenhouse gas emissions as compared to stationary emissions.

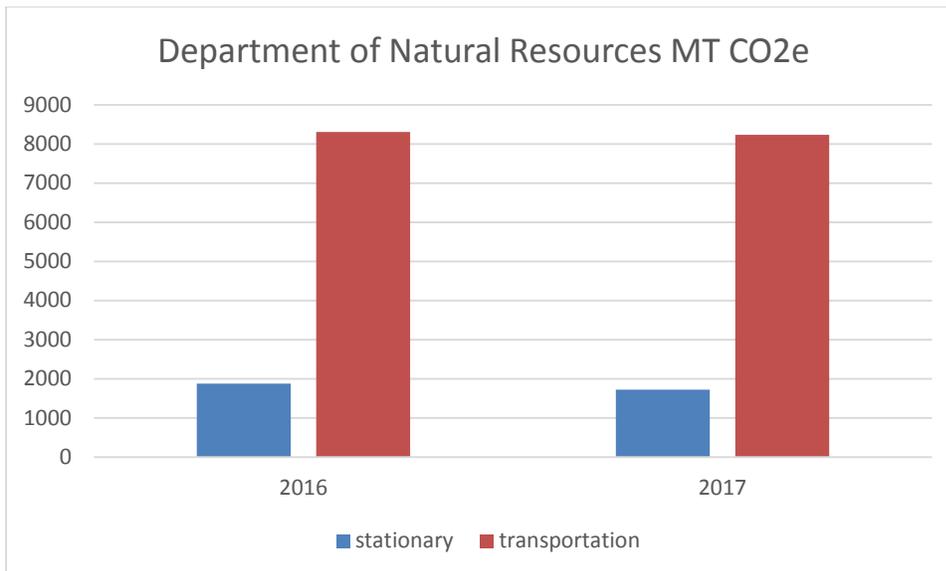


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

For specific fleet actions for the past two years:

- Replaced five gasoline-powered vehicles with fully electric sedans.
- Installed eight electric-vehicle charging stations at region facilities to support expansion of EV fleet.
- Eliminated all non-hybrid sedans from the fleet.
- Three of our four heavy (OTR) trucks were replaced with models that get 50 percent better fuel economy.
- Heavy equipment (two excavators, two graders and four dump trucks) have been replaced with more fuel efficient models.
- Many gasoline powered heavy duty pickups have been replaced with diesel models that get significantly better fuel economy and are capable of using up to 20 percent biodiesel (B20).
- Dozens of fire trucks have been replaced with a more fuel efficient model.
- ITD has made Skype for business available to provide a tool that helps reduce the need to travel. Large monitors have been installed in many conference rooms to support this effort as well.
- DNR's carpentry maintenance crew started using a hybrid sedan (Prius) with a roof rack instead of a full sized service truck to perform many service calls.
- DNR's vehicle and equipment repair shop started using a hybrid sedan instead of a shop truck for most errands and some service calls.

For specific facility actions in the past two years:

- Addition of insulation to multiple facilities
- Repair or replacement with newer, more efficient HVAC systems for several facilities.
- Replacement/conversion to LED lighting in a number of shop and warehouse facilities.
- Replacement of an aging tree cooler facility with a newer, more efficient facility and cooling system.
- Repairs and efficiency upgrades to a seed freezer facility.
- Replacement of a greenhouse roof with newer, more efficient materials.

Seattle Colleges

Figure 1 indicates that Seattle Colleges have met its 2020 GHG reduction target.

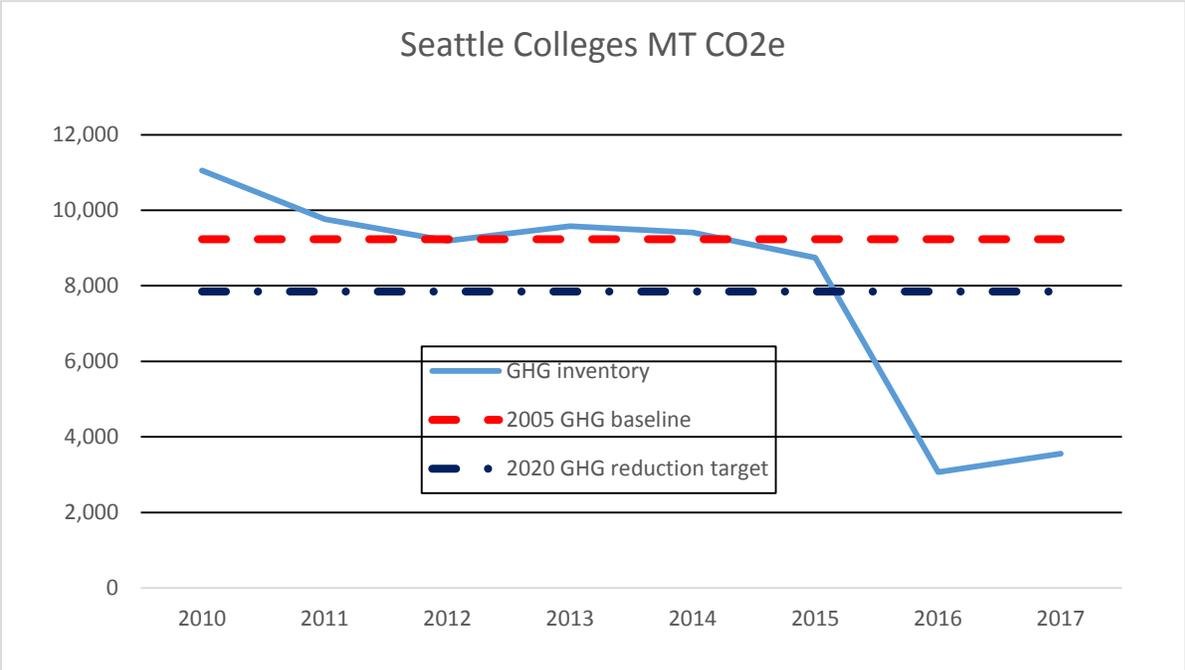


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions. Seattle Colleges are significantly below their 2020 GHG emissions target.

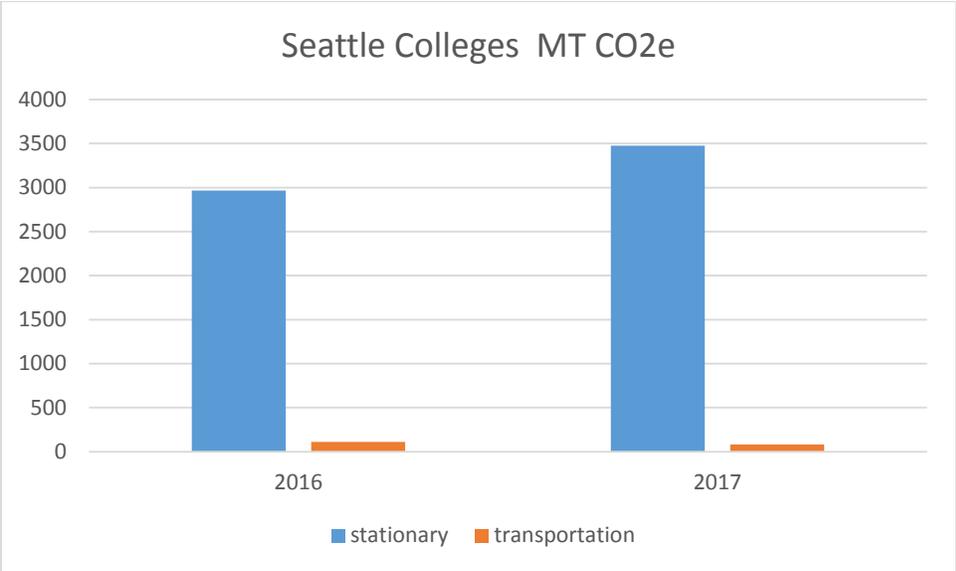


Figure 2 GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

Summary: Over the past two years, significant greenhouse gas (GHG) reduction initiatives suffered from lack of local financial resources for capital improvement projects. This lack of funding was made worse by a delay in the state capital budget. With this uncertainty, facility staff struggled to have adequate time to schedule and deliver capital improvement projects. Despite these challenges, Seattle Colleges undertook a few steps toward reducing GHG emissions, especially at Seattle Central College.

Projects:

A. Seattle Central College

1. **ICONICS-** The College has been strategically implementing a fault detection system over several years. This project provides building-level metering for all utilities (e.g. electricity, natural gas, steam, and water). Meters report data in real-time. These meters are connected to the ICONICS energy management system platform, which runs Building Analytix and Facility Analytix software. Building Analytix runs simple data collection, generates reports, normalizes data, and provides a comprehensive real-time view of utility usage. Facility Analytix provides 24-hour fault detection diagnostics on all pieces of equipment connected to the building automation system (BAS), which alerts facility staff when any piece of equipment is not operating at maximum efficiency. This system is in final implementation stage, so results are preliminary, but it was designed to realize \$55,000 per year in utility savings.
2. **Siegal Center-** The Seattle College's district office received new double pane windows, new roof with insulation, cooling tower fan VFD, and a cooling tower bypass control valve in 2017-2018.
3. **2018 Energy Service Company (ESCO) project-** The College is also beginning to implement a series of energy saving projects as part of an ESCO agreement with McKinstry. Individual facility improvement measures include:
 - i. Replacing an air-water heat pump
 - ii. Clean and seal duct work
 - iii. LED upgrades
 - iv. 72 kw solar array
 - v. Envelope air sealing

B. North Seattle College

1. **Lighting-** upgraded to LEDs in several areas
2. **Roof repair-** the Arts and Sciences roof required major repairs. During that project, it was noted that a significant portion of the roof lacked adequate insulation, so while the repairs we're being done, more insulation was added.
3. **Chiller replacement-** the Education Building received a new, more efficient chiller

Social and Health Services, Department of

Figure 1 indicates that the Department of Social and Health Services has met its 2020 reduction target.

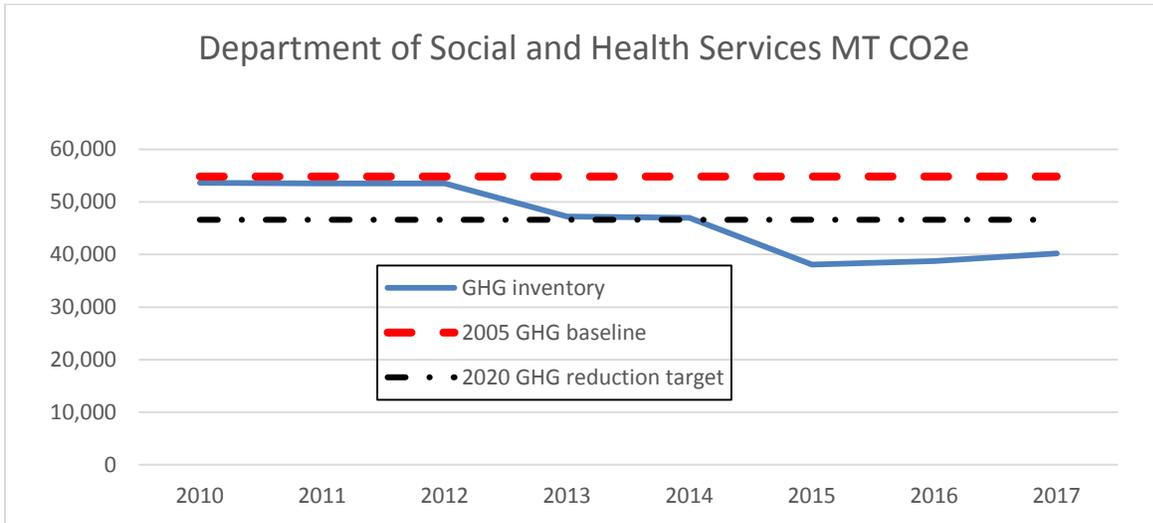


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions. The Department of Social and Health Services has significantly reduced its greenhouse gas emissions and has already met its 2020 target.

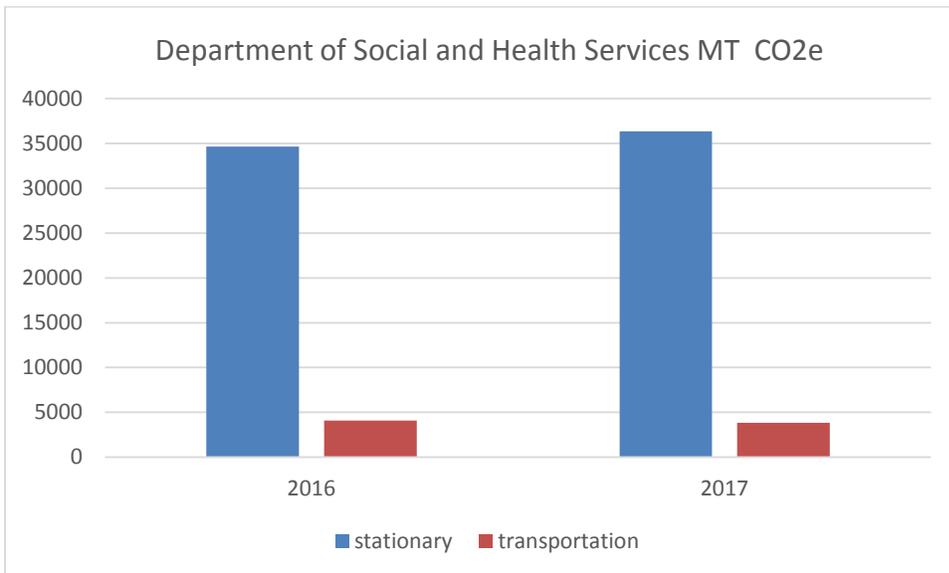


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions

In its' effort to reduce GHG emissions, the Washington Department of Social and Health Services (DSHS) has taken several big steps, including fervently participating in the State Efficiency & Environmental Performance statewide work groups related to Exec. Order 18-01. Prior to the issuance of EO 18-01, DSHS was already working towards minimizing its impact on the environment by making small changes like switching to more energy efficient lighting in the agency's leased and owned facilities, to larger changes like purchasing electric or hybrid vehicles whenever possible.

Currently, DSHS is working towards transitioning to an all-electric fleet. DSHS is working to determine locations where we have under-utilized charging capacity as well as identifying opportunities for financing the installation of charging infrastructure. The agency's Capital Program Office, as it proceeds with planning/designing related to each project, is taking in to consideration and working towards implementing zero net energy use criteria. DSHS has also submitted budget requests for funding for several Resource Conservation Managers, who would be able to assist our Facilities Management & Design group with executing processes to reduce the agency's GHG emissions.

State Parks and Recreation Commission

Figure 1 indicates that State Parks and Recreation Commission has met its 2020 reduction target.

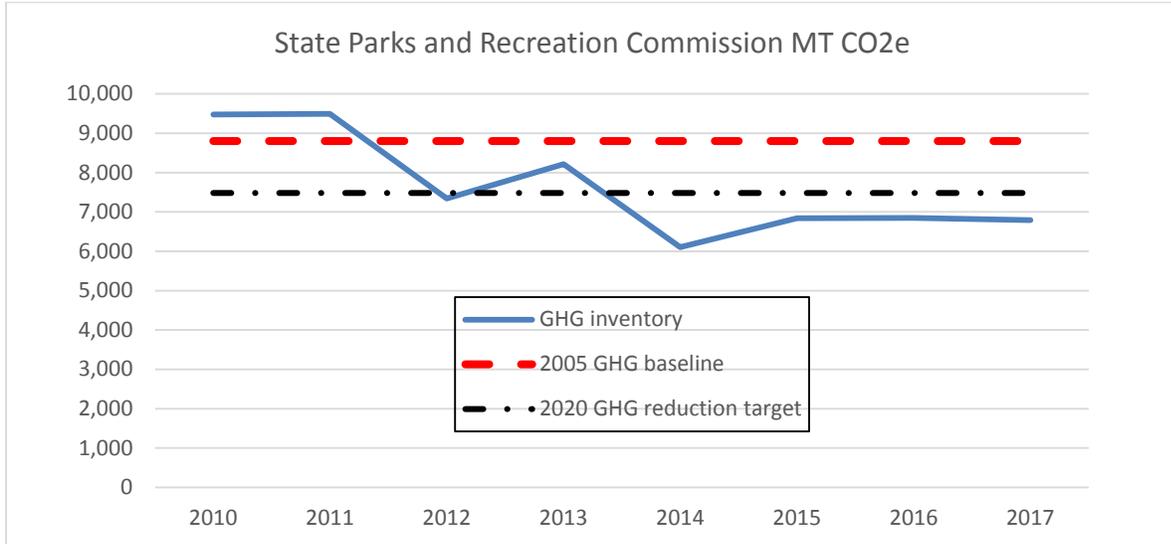


Figure 1: Greenhouse Gas Emissions profile

The data in figure 2 suggests a slight increase in stationary greenhouse gas emissions; however, State Parks and Recreation have already met its 2020 greenhouse gas reduction target and continue to implement mitigation strategies.

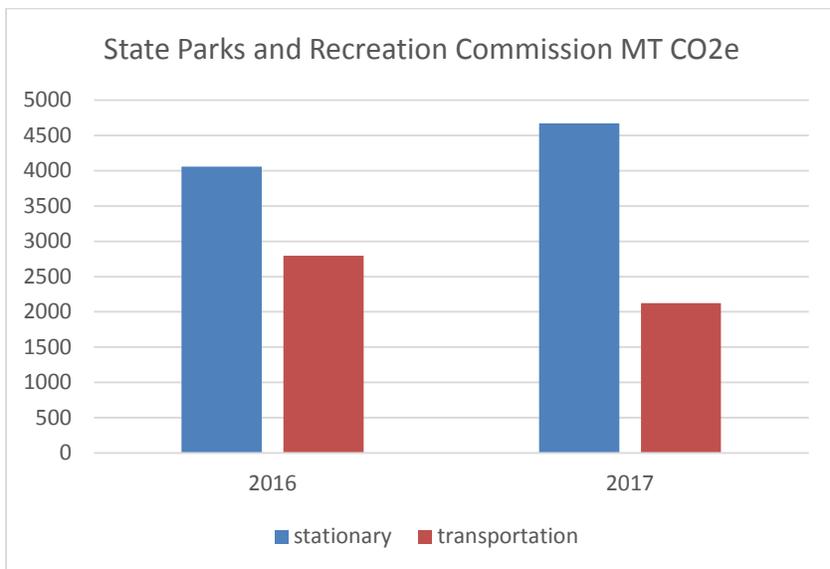


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

Fleet Energy Efficiency

- Parks' commitment to using efficient vehicles continues. 2017 fleet size totaled 603, with a wide array of vehicles, including hybrids and electric vehicles
- Bikes save energy and help park staff shine.

Stationary Energy Efficiency

- Agency's Sustainability and Energy program manager developed a series of energy audits, retrofits and facility upgrades.
- Several parks upgraded lighting to save energy and reduce emissions
- Agency continues to support the increased use of solar power in parks. Renewable energy is making headway in parks
- Interpretive panel installed at Grayland Beach State Park highlights the park's solar photovoltaic array.
- Lake Sammamish State Park won an award from the American Institute of Architects (AIA) for its bathhouses, which includes a covered outdoor seating area with green roof and roof top solar photovoltaic power system.
- In 2015, the State Parks Commission directed staff to form an interdisciplinary team to develop a climate change preparedness plan. In 2017 "Preparing Washington State Parks for Climate Change Vulnerability Assessment" was developed in cooperation with the University of Washington's Climate Impacts Group.

Washington State Patrol

Figure 1 indicates that Washington State Patrol has met its 2020 greenhouse gas emissions target.

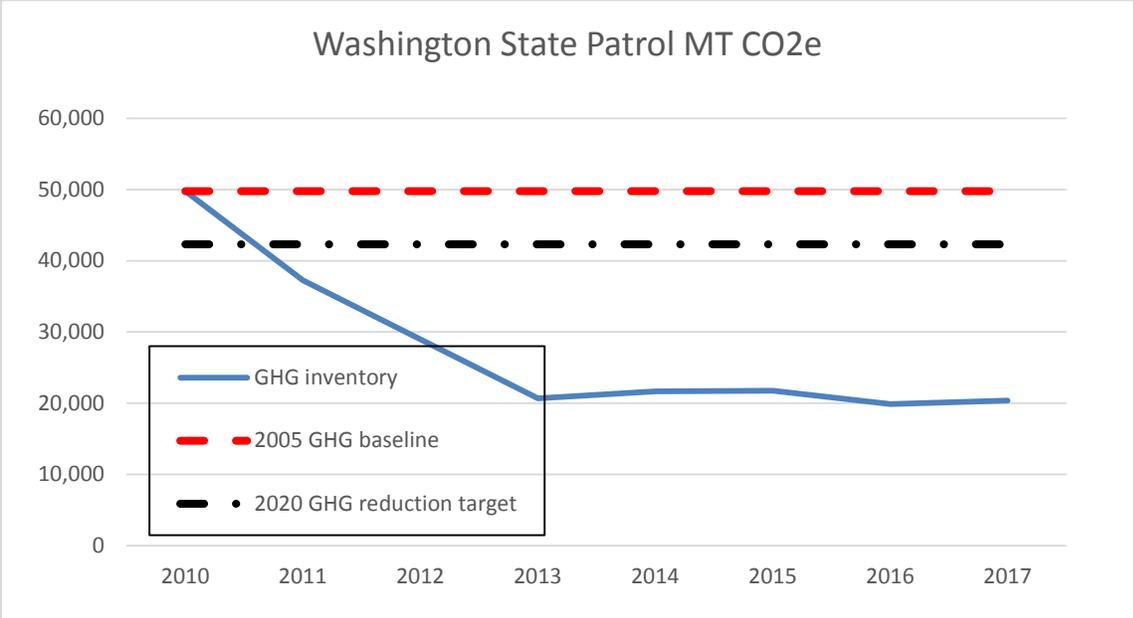


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, transportation is the most significant source of greenhouse gas emissions as compared to stationary emissions. The Washington State Patrol (WSP) has significantly reduced their greenhouse gas emissions and has already met its 2020 target.

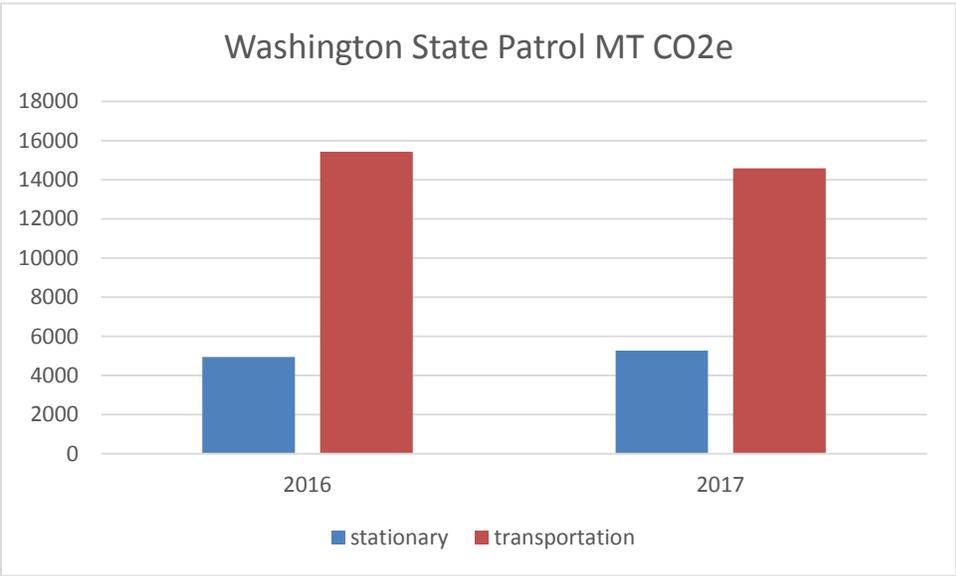


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

Washington State Patrol (WSP) is committed in reducing greenhouse gas emissions. Over the last two years, the agency has made efforts in reducing emissions in the following areas:

- HVAC Systems – WSP replaced HVAC systems at four locations. Also, the agency replaced failing systems as well as completed system improvements and upgrades to current HVAC systems in 39 facilities.
- Lighting Improvements/Upgrade – The WSP completed lighting improvements and LED replacement upgrade to 42 WSP facilities.
- Miscellaneous Energy Improves/Upgrades – The agency made a variety energy improvements to six of the agency’s facilities that included a new hot water heaters, freezer compressors, and exhaust fans.

The Fleet Section has taken the following steps to reduce vehicle emissions:

- Fleet has implemented a tracking system for compiling data on idle hours for patrol cars.
- Fleet worked with agency leadership to reduce or eliminate vehicles idling while troopers are handling administrative tasks in the offices.
- Fleet is in the process of replacing eight old full-size four-wheel drive trucks and large four-wheel drive sport utility vehicles (2000-2011 model years), used by property evidence custodians, with new Dodge Promaster city cargo vans. The vans have an estimated mpg of 21/28.

The Evergreen State College

Figure 1 indicates that The Evergreen State College has met its greenhouse gas emissions target.

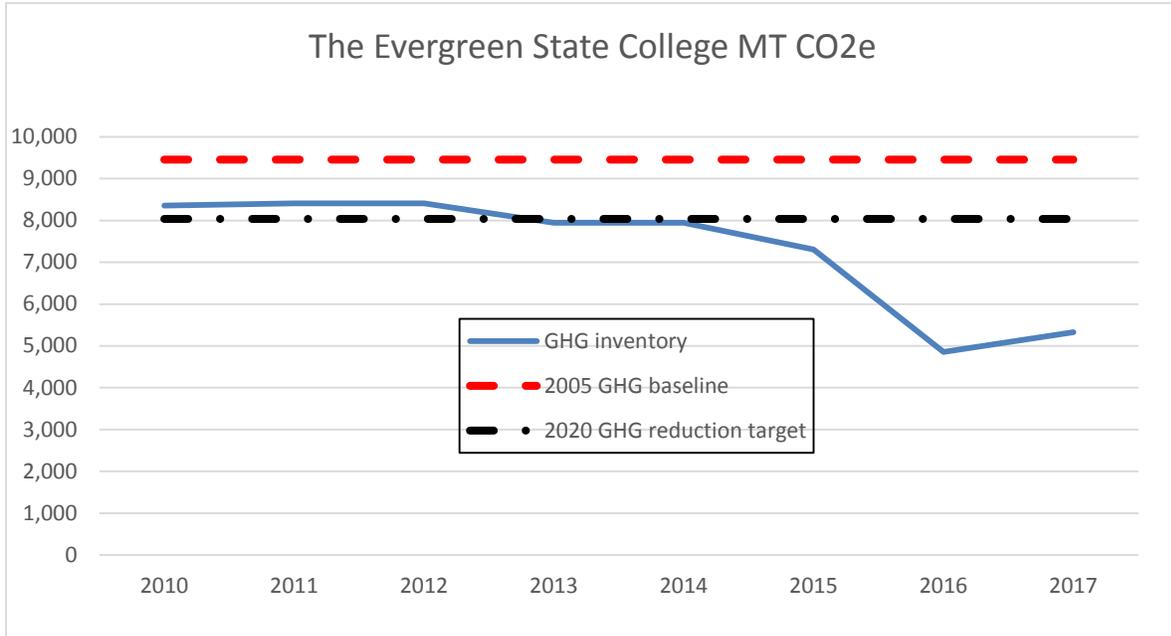


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions.

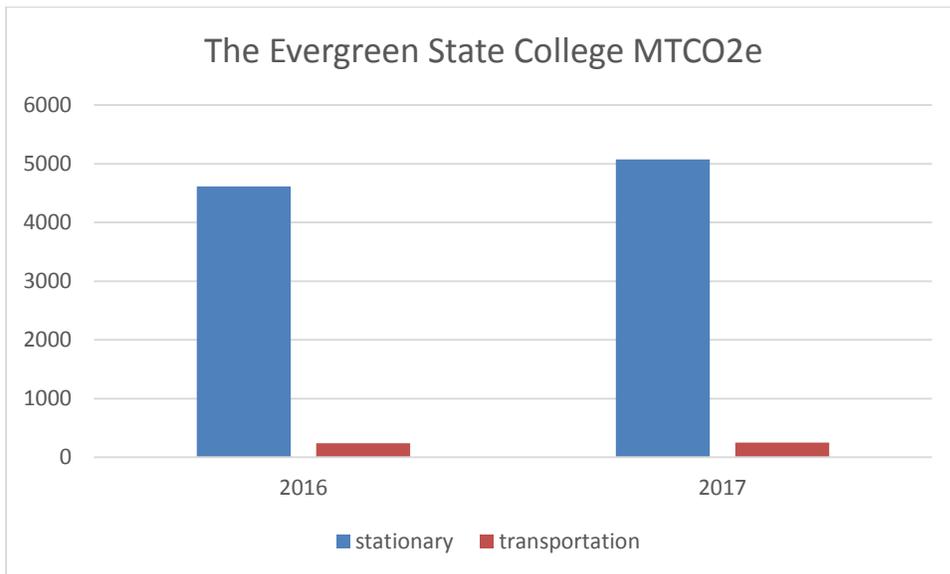


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

Evergreen has been purchasing Renewable Energy Credits for 100 percent of purchased electricity from Puget Sound Energy since 2006. These purchases are supported by a student-initiated fee. The College has also been actively pursuing energy conservation projects. In the past two years, Evergreen has upgraded nearly all external lighting to LEDs, has been steadily changing over internal lighting from compact fluorescent lamps to LEDs, and has installed a 20kW solar photovoltaic system on the College's Tacoma campus building.

The College also recently renovated Purce Hall on the Olympia campus to LEED Gold standards. (Certification is still in process.)

Mitigating emissions associated with space heating has been the College's greatest challenge. Evergreen is currently pursuing funding for an innovative planning process to help identify low-carbon, cost-effective alternatives to their aging natural gas district steam system.

Washington Department of Transportation

Figure 1 indicates that Washington Department of Transportation has not decreased its greenhouse gas emissions over time; however, this is highly influenced by GHG emissions from the state ferry system.

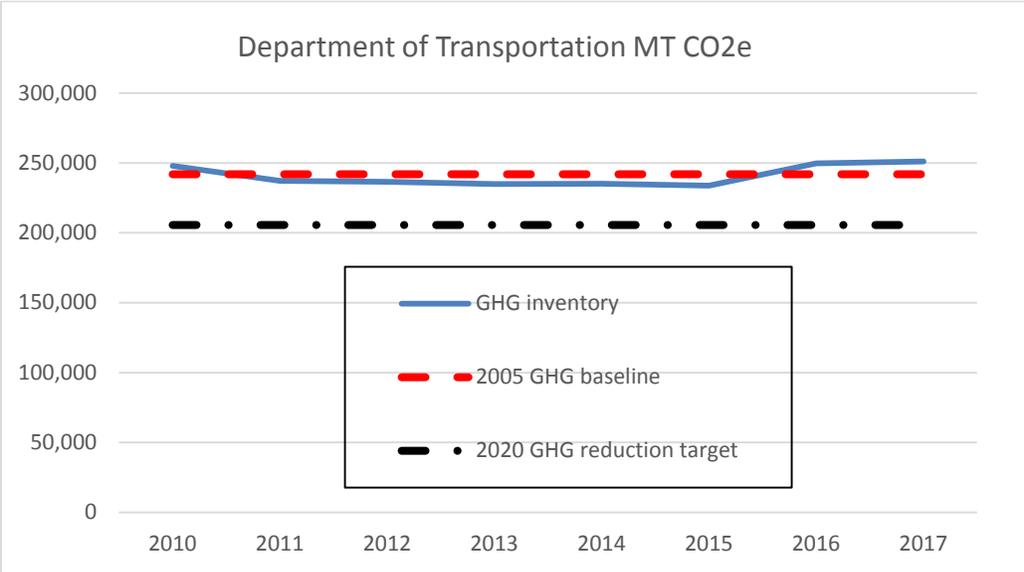


Figure 1. Greenhouse Gas Emissions profile

WSDOT greenhouse gas emissions are dominated by emissions associated with the ferry fleet as illustrated in Figure 2. This poses a special challenge to the agency which is investigating opportunities to reduce ferry greenhouse gas emissions. GHG emissions from stationary sources have decreased.

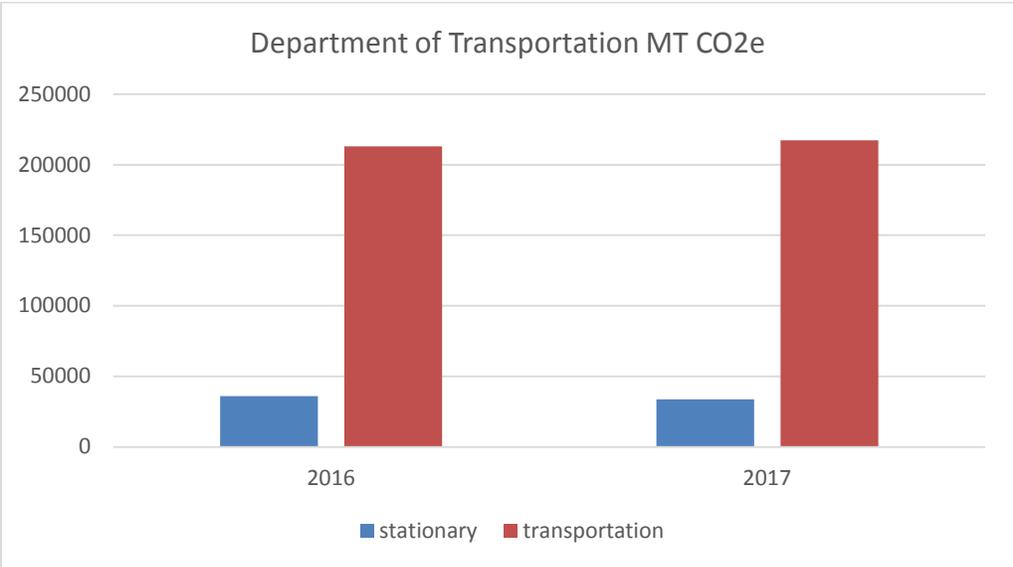


Figure 2 GHG Sources: Stationary and Transportation

Agency GHG Mitigation Actions:

Stationary Energy Use – Buildings

- Continued Energy Service Company (ESCO) project to update building controls and lighting (project started in 2015, will finish in 2018)
 - 821 buildings at 163 sites
 - 770 lighting projects: internal and external lighting conversion to LED
 - 492 HVAC projects: programmable thermostats and some system replacements
 - 569 plumbing projects: low flow fixture upgrades/replacements
 - 471 weatherization projects (weather stripping)

Stationary Energy Use – Highway Operations

- LED lighting project in Northwest Region
 - Removed 505 lights
 - Converted 1,974 light fixtures to LED

Mobile Energy Use – Vehicle Fleet

- Purchased 19 Chevrolet Volt plug-in hybrid electric vehicles to replace conventional or hybrid sedans, vans, and sport utility vehicles
- Purchased eight Chevrolet Bolt all electric vehicles
- Reduced the number of sedans, vans, and SUVs from 455 to 405
- Used 14.5 percent biodiesel in the vehicle fleet – purchasing over 360,000 gallons of B100 annually
- Converted medium- and heavy-duty work trucks to Propane Autogas bi-fuel, currently have 65 on the road as of December 2017.
- Installed Autogas fueling stations in Olympia and Seattle to support bi-fuel work trucks. The Seattle station did not go on line until January 2018.
- Began installing telematics – a wireless automated fueling (WAF) system that automatically sends vehicle information to our Fleet Management System electronically when a WSDOT vehicle visits a WSDOT fuel station.

Mobile Energy Use – Ferry Vessels

- Used biodiesel in the ferry vessels
 - 2016 = 4.3 percent, the equivalent of 809,800 gallons of B100
 - 2017 = 4.7 percent, the equivalent of 884,000 gallons of B100

Conducted successful trial of B10 in the Tacoma, a Jumbo Mark II ferry, the largest of the vessel classes

University of Washington

Figure 1 indicates that the University of Washington has met its 2020 greenhouse gas reduction target.

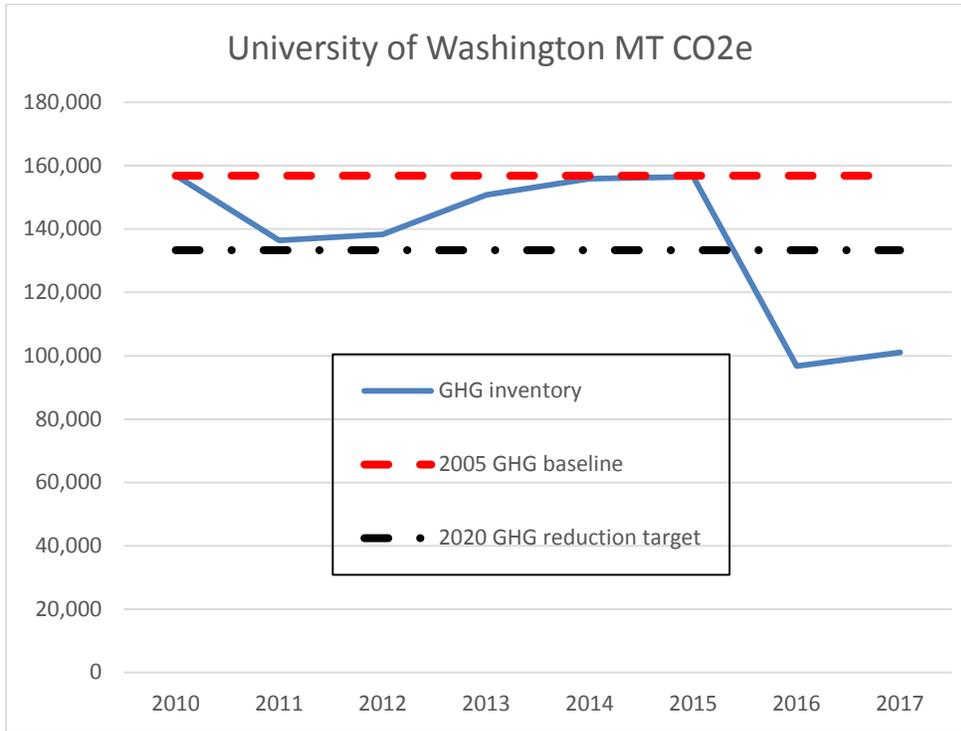


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions.

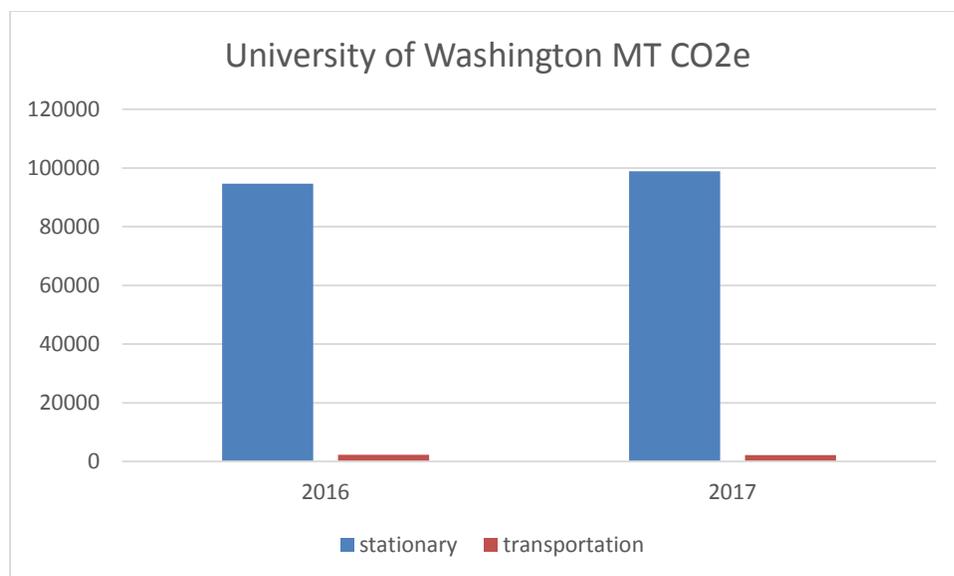


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

In September 2009, the University of Washington (UW) published the Climate Action Plan (CAP), which described the commitments being made by the UW to meet its obligations under the American College and University Presidents' Climate Commitment (<http://green.uw.edu/inform/uw-climate-action-plan>) primary focus of the CAP was to set broad goals and strategies, providing a number of proposed actions, in order to achieve a climate-neutral university having not net greenhouse gas emissions. The first carbon reduction target is 15 percent below 2005 levels by 2020, consistent with the State Agency Leadership Act.

The UW regularly publishes progress reports on meeting its carbon reduction goals (<http://green.uw.edu/cap/progress-and-updates>). Recently, the UW analyzed potential carbon reduction actions and evaluated them based on factors such as potential for carbon reduction, and financial and political costs. The findings are published in the Marginal Abatement Cost Curve (http://green.uw.edu/sites/default/files/machorizontal_4_26.pdf). The UW also published a document describing how the UW sets and plans to meet future carbon reduction goals.

(http://green.uw.edu/sites/default/files/draft_setting_and_meeting_ghg_goals_at_uw.pdf).

Veterans Affairs, Department of

The greenhouse gas emissions profile in Figure 1 only includes reported inventory data to 2011. Afterwards, 2011 data was used as a placeholder.

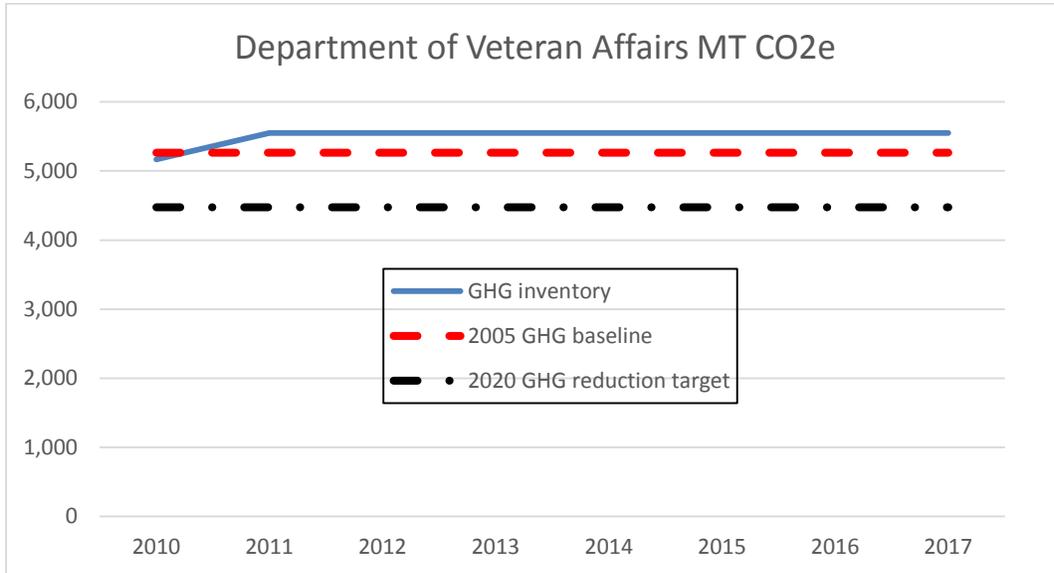


Figure 1: Greenhouse Gas Emissions profile

As Figure 2 indicates that stationary sources are the most significant source of greenhouse gas emissions.

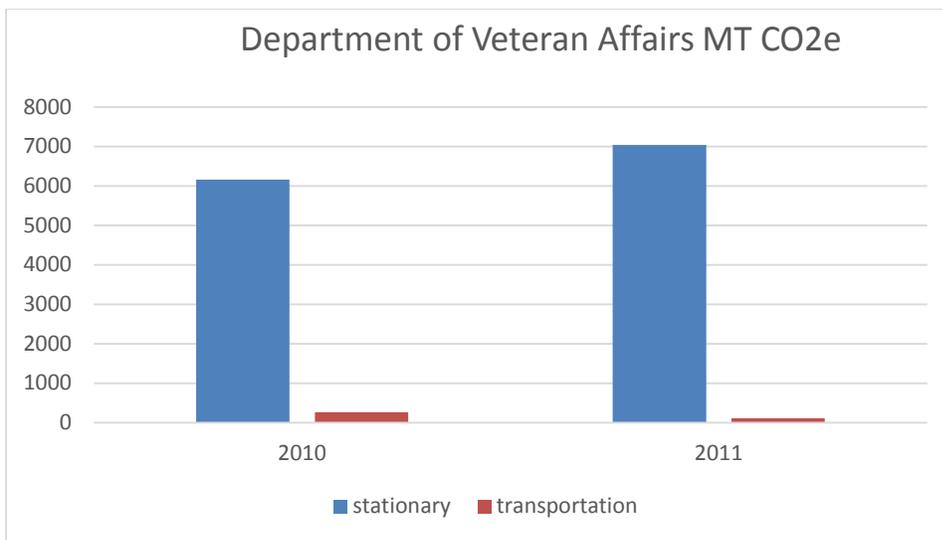


Figure 2: GHG Sources: Stationary and Transportation

Agency GHG Mitigation Actions:

No greenhouse gas mitigation narrative provided.

Washington State University

Figure 1 indicates Washington State University may not meet its 2020 greenhouse gas emissions reduction target.

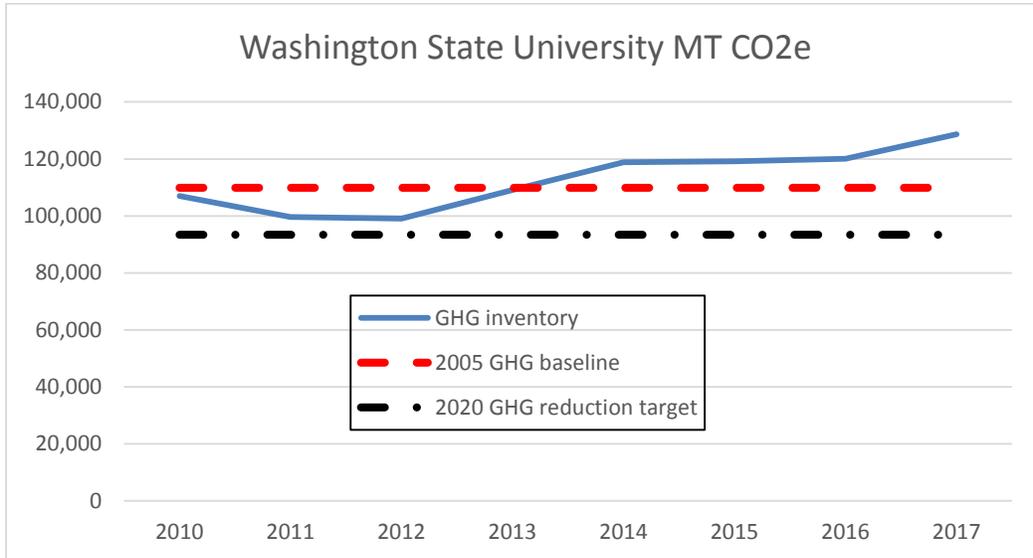


Figure 1: Greenhouse Gas Emissions profile

As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions.

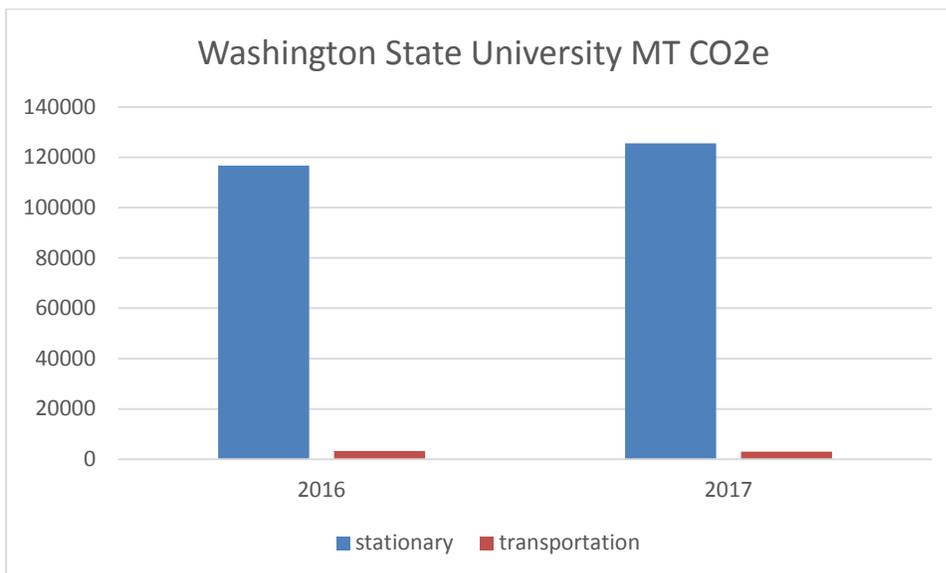


Figure 2: GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions

The overall campus population and building space has increased since 2015. These increases are offset by implementation of strategies to reduce energy use and greenhouse gas (GHG) emissions. Changes in the Ecology calculator for scope 2 emission factors has lowered these emissions significantly. Washington State University's (WSU) two major GHG contributors are stationary combustion and purchased electricity. If WSU's utilities provider changed its power source profile, if funding were available to purchase green power renewable energy credits (electricity), carbon credits (boiler fuel) and/or building a new biofuels steam plant along with providing for the additional operating costs, WSU can meet its GHG reductions goals in 2020 and into the future

- As part of a Master Transportation Plan, WSU has made a considerable commitment to provide more mobility options. In February 2011, WSU contracted with Zimride to provide a social network for ridesharing. In August 2011, WSU launched a partnership with Zipcar to provide car sharing which continues to the present and WSU expects to be adding an eighth Zipcar in the near future. Pullman Transit ridership in 2017 reached over 1.35 million rides provided (of which the vast majority were students). Saveonenergy.com recently listed the nation's top Green Commuter cities. Pullman ranked first among medium sized cities for percentage of green commuters. The survey found that 36% of Pullman residents either bus, bike, walk or carpool to work. Pullman Transit currently operates five hybrid buses (with one on order) as part of its wider fleet. The hybrid buses improve the mpg by ~ 60 percent. Moving forward, Pullman transit is pursuing grants to convert its fleet to total electric with the construction of a new bus charging station and new all electric vehicles. Vanpools are operated every work day between WSU Pullman and Spokane (three vans), Lewiston / Clarkston / Asotin (three vans), Moscow (one van) and Colfax (one van). The University has completed a Bicycle and Pedestrian Plan with the goal of transforming WSU Pullman into a more friendly and safe environment for active transportation. One of the driving factors for creating a Bike and Pedestrian Plan is the considerable success of the "Coug Bike" bike sharing program.
- Energy Projects
 - Continue to re-lamp with LEDs
 - Added more cooling towers at the chiller plant to improve efficiency
 - Installation of variable frequency drives for energy savings
- Replace failed in-vessel composter with technology to decrease incinerator use
- Solar
 - WSU constructed a 75kW solar array at the WSU's Research and Technology Park. The array will provide energy to the facility with the excess being incorporated back into Avista's power grid
- Campus
 - WSU continues to operate one of the largest University composting operations in the United States.

State Agency GHG Inventory Report

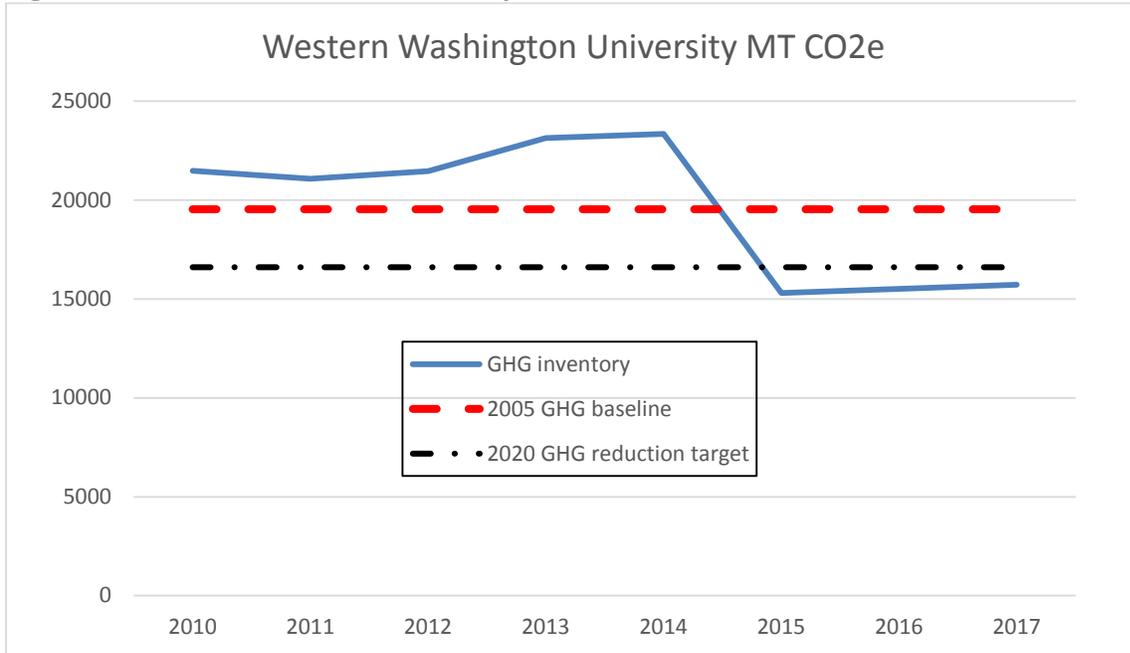
- It is estimated that the operation saves about 4000 metric tons of carbon emissions annually
- Completed construction of new LEED standard buildings: PACCAR (Gold, Public Safety Building (Silver Equivalent), Chief Joe Apartments Building E, F (LEED for Homes), Digital Classroom Building (Silver), Chief Joe Apartments Building B, C (LEED for Homes Equivalent), Elson S Floyd Cultural Center (Gold), and WSU Everett NPSE (Gold).
- Green Fund projects
- Motor Pool
Improved fleet fuel efficiency
34 hybrids / electric alternative fuel vehicles
- CEREO (<https://cereo.wsu.edu/>)
 - The Center for Environmental Research, Education, and Outreach (CEREO) is a progressive network of more than 350 faculty, staff, students, and industry leaders working to resolve environmental issues through collaborative partnerships. Guided by a roster of distinguished scientist, CEREO seeks to apply innovative technologies and management tools to the ever-growing challenges of global climate change and environmental sustainability. Research varies from developing new bio-fuels to improving photovoltaic technology
- Current Research related to climate change at the Center for Atmospheric Research (<http://lar.wsu.edu>)

WSU made a significant reduction in its GHG emissions when the new campus steam plant became operational in 2005. However, this was also the baseline year for the State Agency GHG reporting program.

Western Washington University

Figure 1 indicates that Western Washington University has met its 2020 greenhouse gas reduction target.

Figure 1: Greenhouse Gas Emissions profile



As indicated in Figure 2, stationary sources are the most significant source of greenhouse gas emissions as compared to transportation emissions; however, Western Washington University has reduced its overall greenhouse gas emissions below the 2020 target.

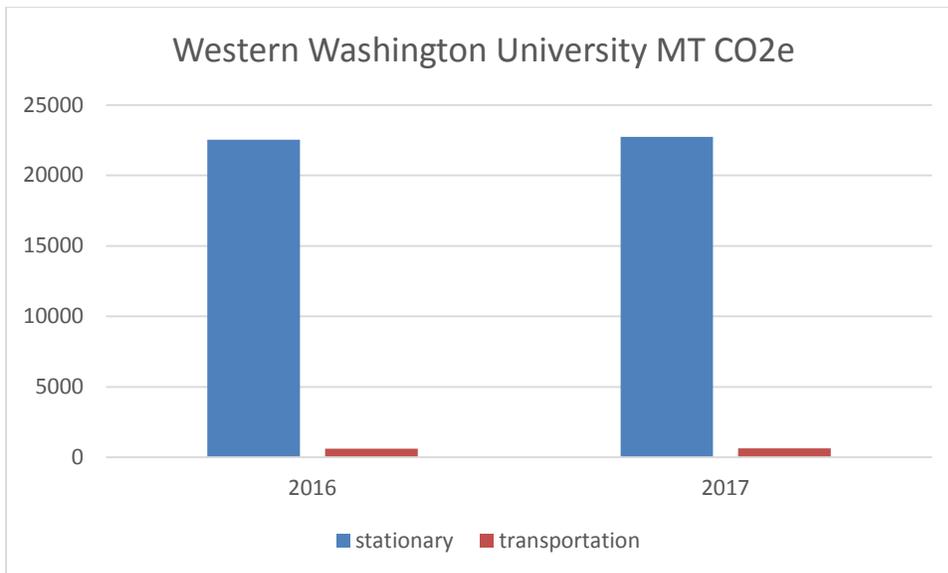


Figure 2 GHG sources: Stationary and Transportation

Agency GHG Mitigation Actions.

WWU SUSTAINABILITY ACTION PLAN

Western's Sustainability Action Plan is the University's road map for protecting local and global ecology, upholding social equity, creating economic vitality, and maintaining human health.

AREA: BUILT ENVIRONMENT

Vision: Western realizes outstanding resource efficiency and carbon neutrality in its facilities portfolio.

Goal 1: Carbon Neutrality: Reduce the carbon intensity of university energy supply sources and achieve 100 percent net university carbon reduction.

- In the short term, identify and implement financially viable carbon reduction projects to reduce carbon emissions by 15 percent, per state requirements, by 2020.
- In the mid-term, where reduction is not yet technologically feasible, seek and commit to credible carbon offsets for all continuing direct hydrocarbon use by 2030.
- In the long term, achieve carbon neutrality by 2035, first through reduction and secondly through offset.

Goal 2: Maximize cost-effective energy efficiency investments in university building while steadily improving building performance and occupant comfort and health.

- Continue to reduce the need for new construction by prioritizing the use of current facilities.
- Develop energy performance targets and sustainable design standards by 2018.
- Minimize light pollution while maximizing energy efficiency in exterior lighting by 2025.
- Adopt policies or guidelines designed to minimize energy use and emissions from non-fixed assets such as refrigerators, freezers, custodial and other mobile equipment by 2025.
- Employ clean, renewable energy sources on- or off-campus to offset existing and new demands by 2030.
- Design a university plan to support deep, holistic renovations and energy efficiency investments by 2035.
- Design, construct, renovate, and operate buildings using a closed-loop process involving minimal to no waste in all processes by 2035.

Goal 3: Green Building Certification: Acquire third party certification of the environmental performance of new and existing university buildings through the USGBC's LEED certification or equivalent process.

- Complete the USGBC's LEED Gold certification or equivalent for all new and fully renovated university buildings starting in 2018.

Goal 4: Utilize accepted Low Impact Development (LID) practices as standard to reduce rainwater/storm-water volume, improve outgoing water quality, and make on-campus use of collected rainwater.

- Apply LID to all new construction, major renovation and other projects that increase paved surface area or otherwise significantly change university grounds by 2035.

Goal 5: Build and maintain publicly accessible databases of energy use, water consumption, and carbon emissions for all university buildings.

- Build and maintain a publicly accessible database of available information for ongoing energy consumption and emissions for all university buildings by 2018.
- Build and maintain a publicly accessible database of available information for ongoing water consumption for all university buildings by 2018.
- Build and maintain a publicly accessible database of available information for ongoing carbon emissions for all university buildings by 2018.

Goal 6: Develop an active learning, living laboratory within Western's built environment.

- Expand support for courses and co-curricular programs for students that teach about local and regional stewardship solutions through skill development and campus and community engagement beginning fall 2017.