Port of Olympia 2017 GHG Emissions Inventory Report

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List of Acronyms

Acronym	Explanation
CH_4	Methane
CO_2	Carbon Dioxide
Ecology	Washington State Department of Ecology
Gal	Gallons
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program
HFC	Hydrofluorocarbon
kWh	Kilowatt Hour
MT CO_2e	Metric Tons of Carbon Dioxide Equivalent
N_2O	Nitrous oxide
NPDES	National Pollutant Discharge Elimination System
Port	Port of Olympia
RCW	Revised Code of Washington
SWTF	Stormwater Treatment Facility
USEPA	United States Environmental Protection Agency

SECTION 1: INTRODUCTION

As part of its commitment to environmental sustainability, the Port of Olympia (Port) is voluntarily conducting biennial greenhouse gas (GHG) emissions inventories for its Downtown Olympia locations, Airport locations, and Lacey Properties.[1] A GHG emissions inventory is a quantification of the GHG emissions that occur within a designated area by a source (Browning and Bailey 2009). The purpose of preparing a GHG emissions inventory is to identify the greatest sources of GHG emissions, provide a basis for developing an action plan, and set goals and targets for reducing emissions in the future (United States Environmental Protection Agency [USEPA] 2007). The purpose of this GHG emissions inventory is to calculate the GHG emissions for the Port's Downtown Olympia, Airport, and Lacey Properties locations during 2017, compare 2017 GHG emissions to 2013 and 2015 GHG emissions and to Ecology's GHG emissions benchmark, and identify possible options for reducing GHG emissions in the future. In addition to the GHG emissions inventory, an overview of other sustainable port practices are presented in Section 2 of this report.

1.1 Overview of Greenhouse Gas Emissions

According to the Washington State Department of Ecology (Ecology), GHGs are substances that contribute to climate change by trapping heat in the atmosphere. The four main GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases (hydrofluorocarbons [HFCs], perfluorocarbons, and sulfur hexafluoride). Typically, GHG emissions are combined and converted to metric tons of CO_2 equivalent (MT CO_2e) in order to simplify analysis. GHGs are released from stationary combustion, mobile sources, production processes, or as fugitive releases from the production, processing, transmission, storage, or use of fuels and other substances that do not pass through a stack, chimney, vent, or exhaust pipe (Ecology 2012).

The primary sources of GHG emissions in the United States are:[2]

- Electricity production
- Transportation
- Industry
- Commercial and residential land use
- Agriculture
- Land use change and deforestation

[1] The first GHG emissions inventory was conducted in 2013 (PIONEER Technologies Corporation 2014). This report was never finalized but the data was used for comparative purposes in this analysis. The second GHG emissions inventory was conducted in 2015 (PIONEER Technologies Corporation 2016).

[2] https://19january2017snapshot.epa.gov/ghgemissions/sources-greenhouse-gas-emissions_.html

1.2 Overview of Port of Olympia Properties

The Port is a municipal corporation, which is organized under Washington State law and governed by a locally-elected board of commissioners. In Washington State, ports provide and operate commercial marine transportation facilities, maintain and operate airports, maintain and operate marinas, and provide many other services to enhance economic development in the Port district. The focus of this report is on the vehicle fleet and facilities at the Port's Downtown Olympia locations (Marine Terminal, Swantown Marina, and others), Airport locations (Olympia Regional Airport and Cleanwater Centre), and Lacey locations (Commerce Business Center).

1.2.1 Downtown Olympia

The Port's 66-acre Marine Terminal is located on Budd Inlet in Olympia, Washington and consists of a log yard, a United States customs-bonded warehouse, on-dock rail, two modern deepwater berths, and a stormwater treatment facility. Other private companies lease property from the Port to conduct business (e.g., shipping and rail) at the Marine Terminal. Swantown Marina consists of a public marina (the 7th largest marina in the state) and a boat repair and maintenance facility (Boatworks). The Port also owns property downtown on which the Olympia Farmer's Market building, the Percival Plaza park space and other public amenities are located. Figure 1 shows the Downtown Olympia area.

1.2.2 Airport

The Olympia Regional Airport is a general-aviation public airport in Tumwater, Washington which provides aircraft service and maintenance operations, flight instruction, hangars and tie down space, state and corporate aviation facilities, and land and buildings available for lease. In addition to typical Port operations, companies lease property from the Port to conduct business (e.g., office space at the Cleanwater Centre, aviation service and commodities) at and around the airport. Figure 2 shows the airport area.

1.2.3 Lacey Properties

The Commerce Business Center is a new acquisition for the Port in 2017. Three buildings located at 2625, 2626, and 2641 Willamette Dr NE in Lacey, Washington house various tenants and supply the Port with additional income. The buildings are large industrial warehouses with mixed storefront access, and serve a variety of clientele. Figure 3 shows the location of the Commerce Business Center.

SECTION 2: SUSTAINABLE PORT PRACTICES

The Port's goal is to operate its facilities in an environmentally-responsible and sustainable manner. Existing environmental programs include the implementation of best management practices and ongoing improvements to the stormwater treatment facility, incorporation of sustainable practices (e.g., recycling materials, energy and water conservation), remediation of historical contaminated sites, and implementation of improvements to existing facilities.[3] The Port continually seeks to improve its environmental footprint and be recognized as a local and regional leader in environmental sustainability. This section summarizes some of the sustainable practices the Port has implemented.

2.1 Marine Terminal Sustainable Practices

2.1.1 Marine Terminal Warehouse Solar Panels

The Port is working towards making the Marine Terminal warehouse close to energy neutral through the utilization of renewable energy. The Port replaced the roof of the 25 year-old, 76,000 square foot warehouse in 2010. The Port selected a PVC roof and stainless steel gutters to reduce the impact of stormwater run-off to Budd Inlet. In addition, the Port selected solar panels locally manufactured in Marysville, Washington to be installed to provide power for the warehouse during working hours. On weekends and holidays, when the normal energy use decreases (e.g., office buildings, warehouses, etc. are idle), energy generated by the solar panels is used to power the Port's computer servers. The goal of these efforts is to maximize the energy harvesting incentives offered through Puget Sound Energy and to rely less on fossil fuel energy sources.

2.1.2 Energy-Efficient Cargo Yard Lighting

Nine 80-foot tall light towers were installed in the Port's cargo yard to allow for nighttime terminal use. Energy-efficient metal halide lamps were installed rather than the typical high-pressure sodium lamps. Each lamp was fitted with a glare shield and carefully aimed to light only the designated area with little or no reflected light. The lamps are typically used during the winter months when the daylight hours are less than a full workday. The lamps are equipped with a photo-sensor to ensure the lights are off during the day when not needed.

2.1.3 Stormwater Management Program

The Port is committed to preventing, reducing, and eliminating the discharge of pollutants into Puget Sound. Port properties are governed under National Pollutant Discharge Elimination System (NPDES) permits. Additionally, the Port complies with its Stormwater Management Program (Port of Olympia 2015) and Stormwater Pollution Prevention Plan (Port of Olympia 2014), which contain the following components:

- Best management practices to control potential pollutants;

[3] http://www.portolympia.com/index.aspx?nid=112

- Spill prevention and control;
- Construction of site stormwater runoff control;
- Illicit discharge detection and elimination;
- Pollution prevention and good housekeeping for municipal operations;
- Post-construction stormwater management for new development and redevelopment; and
- Public education and outreach.

2.2 Swantown Marina and Boatworks Sustainable Practices

2.2.1 Clean Marina and Clean Boatyard Certification

The Port's Swantown Marina and Boatworks are individually certified under the State of Washington's Clean Marina (cleanmarinawashington.com) and Clean Boatyard (cleanboatingfoundation.org) programs. The voluntary programs aim to help marinas and boaters assess operations and make improvements to better protect the natural environment at and surrounding the Port's waterways. To maintain certification, the Swantown Marina and Boatworks periodically undergo inspections and provide the programs information regarding safety programs and working conditions, standard environmental policies, and habitat and species protection efforts.

2.2.2 Hazardous Waste Recycling at Boatworks

The Port of Olympia has implemented a program to recycle residual boat-bottom paints that result from Boatworks operations. Since 2012, the Port has recycled over 95% of this hazardous waste stream (6,332 lbs) and, in so doing, saved the Port approximately $18,600 in hauling costs.

2.3 Airport Sustainable Practices

In 1997, the Port constructed an eight-tank aboveground fueling facility with additional controlled catch basins at the airport to provide and safely store fuel and to greatly reduce the possibility of contamination from fuel spills. The Port does not use chemicals for aircraft and taxiway de-icing, in compliance with the City of Tumwater's aquifer protection standards (City of Tumwater, 2016).

In 2014, the Port issued a Sustainable Airport Manual – Administrative Chapter to promote the use of sustainable administrative processes in the Port's office spaces. To make the airport a model for long-term sustainability, document reduction and recycling, green meetings, green purchasing and procurement practices, and recycled-content paper were encouraged by the Port.

2.4 Community Involvement

The Port is committed to providing community activities at its facilities to increase community involvement. The Port, the Nisqually Indian Tribe, and the City of Olympia recently hosted the 2016 Paddle to Nisqually Canoe Journey. Tribes from all around the Puget Sound, even as far north as Vancouver B.C., traveled via canoe to the Port's NorthPoint where they were welcomed by the Nisqually Tribe for a week-long potlatch at the Nisqually Indian Reservation. In addition, the Port hosts an annual Harbor Days Festival and Brew Festival at Percival Plaza to provide the community with an opportunity to come together and celebrate local heritage. The Port maintains a walking trail along the waterfront,

recently dedicated to Billy Frank Jr., where community members can stroll and learn about native plants growing along the shoreline and the history of Billy Frank Jr.

2.5 Parcel Restoration and Cleanup

An integral component of the Port's commitment to environmental quality and restoration is in the cleanup of contaminated parcels (i.e., West Bay Park, East Bay Redevelopment Area, Budd Inlet, and Pearson Air tank farm). The Port and Washington State agencies are working together to remediate these parcels to facilitate their being put to higher and better uses.

SECTION 3: EMISSIONS INVENTORY APPROACH

To accommodate all types and sizes of businesses, facilities, and organizations, various methods for conducting a GHG emissions inventory have been developed. A thorough review of GHG emissions inventory methods and guidance was conducted to select a GHG inventory method that was:

- Replicable;
- Consistent with the current state of science regarding GHG emissions; and
- Broadly used by other federal or state agencies for comparison purposes.

The following GHG emissions inventory methods and guidance were evaluated to select an appropriate method for the Port's GHG emissions inventory.

3.1 National Methods and Guidance

In 2009, the USEPA published a rule that required all sources that generate 25,000 MT CO_2e per year to document and report GHG emissions. This rule (40 CFR Part 98) is often referred to as the Greenhouse Gas Reporting Program (GHGRP). The GHGRP requires reporting at the facility level for direct GHG emitters, fossil fuel suppliers, industrial gas suppliers, and facilities that inject CO_2 underground for sequestration or other reasons. Reports are submitted annually to the USEPA via an electronic GHG reporting tool (USEPA 2013).

The USEPA classifies GHG emissions into three scopes based on the source of the emissions.

- Scope 1 includes direct GHG emissions from sources that are owned or controlled by the entity (e.g., fossil fuels burned on-site, emissions from owned or leased vehicles, and other direct sources.)
- Scope 2 includes indirect GHG emissions associated with the consumption of purchased or acquired electricity, heating, cooling, or steam.
- Scope 3 includes indirect GHG emissions from sources not owned by the entity but related to the entities activities (employee travel and commuting, solid waste disposal, and site remediation activities.)[4]

3.2 Washington State Methods and Guidance

In 2009, Washington State adopted the State Agency Climate Leadership Act, codified in the Revised Code of Washington (RCW) 70.235.050, which mandates that state agencies annually inventory GHG emissions. This GHG reporting program requires the use of the Washington State Agencies GHG calculator (an Excel-based tool) to estimate emissions from the following sources:

- Energy used in buildings and stationary equipment (e.g., generators) such as electricity, natural gas, propane, fuel oil, diesel, or other fuels.
- Fuel used in motor vehicles owned by the agency or leased from the state motor pool, including passenger vehicles, heavy-duty vehicles, off-road vehicles, ferries, boats, and aircraft.

[4] https://www.epa.gov/greeningepa/greenhouse-gases-epa

- Fuel used in motor vehicles not owned by the agency which are used for business travel (e.g., motor vehicles owned by employees and airplanes.)

Additionally, based on the USEPA's GHG reporting rules, Ecology developed a GHG reporting program which requires the following types of large facilities and transportation fuel suppliers to report GHG emissions:

- Facilities that emit at least 10,000 MT CO_2e per year in Washington State; or
- Suppliers of liquid motor vehicle fuel, special fuel, or aircraft fuel that create at least 10,000 MT CO_2e per year in Washington State.

Because the Port does not generate large quantities of GHG emissions or supply large quantities of fuel, these two annual GHG reporting requirements are not applicable to the Port. The Port does operate a public-use fuel sales dock at the Swantown Marina, but this facility does not fall under the reporting requirements for typical transportation fuel suppliers.

3.3 Selected GHG Emissions Inventory Method for the Downtown Properties, Airport, and Lacey Properties

The Washington State Agencies GHG calculator was used to perform the GHG emissions inventory for the Port because it is specifically applicable to Washington State agencies and is the most relevant based on Port operations and estimated GHG emissions (Ecology 2017a).[5] Scope 1 and Scope 2 emissions were calculated for the 2017 inventory.[6] Utilization of this methodology facilitates in-state comparison and better helps to demonstrate the Port of Olympia's contribution to the State of Washington's overall GHG emissions.

Ecology periodically updates the format and/or fossil fuel emissions factors in the GHG reporting calculator. Each reporting year, the most recent calculator is obtained from Ecology's website and used in the calculation of the Port's GHG emissions. Changes from 2015 to 2017 reporting years in the Ecology GHG emissions calculator include combining the fleet reporting for light/heavy duty on-road and off-road motor vehicle types (vehicle types were previously reported separately), changes to the way purchased energy is reported (depending on the source of the purchased electricity), and changes to fossil fuel and purchased energy emissions factors.

3.3.1 Applicable GHG Emissions Sources

Scope 1 emissions include direct GHG emissions from:

- Port-owned and -operated fleet vehicles, including light and heavy duty on-road and off-road vehicles, and boats; and
- On-site stationary combustion of natural gas and diesel in Port-owned and -operated buildings.

Scope 2 emissions include indirect GHG emissions from:

[5] https://ecology.wa.gov/Regulations-Permits/Reporting-requirements/Climate-change-emissions-reporting/State-agency-reports-tools (see Appendix A)

[6] Scope 2 emissions were not calculated in 2013 but will be calculated during all future biennial GHG emissions inventories.

- Energy (electricity) purchased for use in Port-owned and -operated buildings.

Lessee activities were not included in this GHG emissions inventory. This was to avoid double counting should lessees conduct a GHG emissions inventory. It is unknown whether or not the emissions from electricity purchased by the Port will be counted/reported by the supplier of the electricity (i.e., Puget Sound Energy) and, thus, potentially double counted, as well. However, presenting Port energy use does facilitate identification of reduction opportunities and resultant cost saving potential.

3.3.2 GHG Emissions Inventory Process

To quantify Scope 1 emissions resulting from vehicles, motorized equipment, and boats owned and operated by the Port, the Fleet Energy Use Worksheet in Ecology's State Agency GHG calculator was used.

The following Information regarding Port's fleet and facilities operations was provided by the Port's Environmental Programs Director, Rachael Jamison and other Port employees. The complete Port fleet vehicle inventory is presented in Table 1.

- Number of Downtown Olympia fleet vehicles and the type of fuel used in the vehicles
- Number of Airport fleet vehicles and the type of fuel used in the vehicles
- Amount and type of fuel used by Downtown Olympia fleet vehicles
- Amount and type of fuel used by Airport fleet vehicles
- Monthly kWh of electricity, therms of natural gas, and gallons (gal) of diesel used to power Port-owned or Port-leased facilities

The information provided by the Port was compiled and entered into Ecology's 2017 State Agency GHG calculator to calculate the amount of MT CO_2e generated by vehicle type and building energy source (electricity, natural gas, or diesel). GHG emissions categories are totaled to determine the amount of total GHGs (in MT CO_2e) produced by each vehicle type.

For Port facilities, the total kilowatt hours (kWh) of electricity, total therms of natural gas, and total gal of diesel used at all facilities were entered into the calculator. GHG emissions for facilities are categorized as on-site stationary combustion sources (therms of natural gas or gal of diesel used on-site [Scope 1]) and purchased energy (in kWh [Scope 2]).

3.3.3 GHG Emissions Benchmark Criteria

The Port's GHG emissions were compared to 10,000 MT CO_2e annual GHG emissions benchmark criteria. The 10,000 MT CO_2e is not a benchmark that the Port will likely ever exceed, but is presented in this report for comparison purposes.

SECTION 4: RESULTS AND DISCUSSION

The Port (vehicle fleet and facilities combined) emitted approximately 1,239 MT CO_2e in 2017, well below the 10,000 MT CO_2e Ecology benchmark criteria. The overall GHG emissions for the Port are presented by source (vehicle location and fuel type or facility building) on Chart 1. The majority of the 2017 emissions were due to purchased electricity at Port facilities and diesel vehicles at Downtown Olympia Properties. Details regarding the vehicle fleet and facilities GHG emissions inventory are presented in Table 2 and Table 3, respectively, and discussed in the following sections.

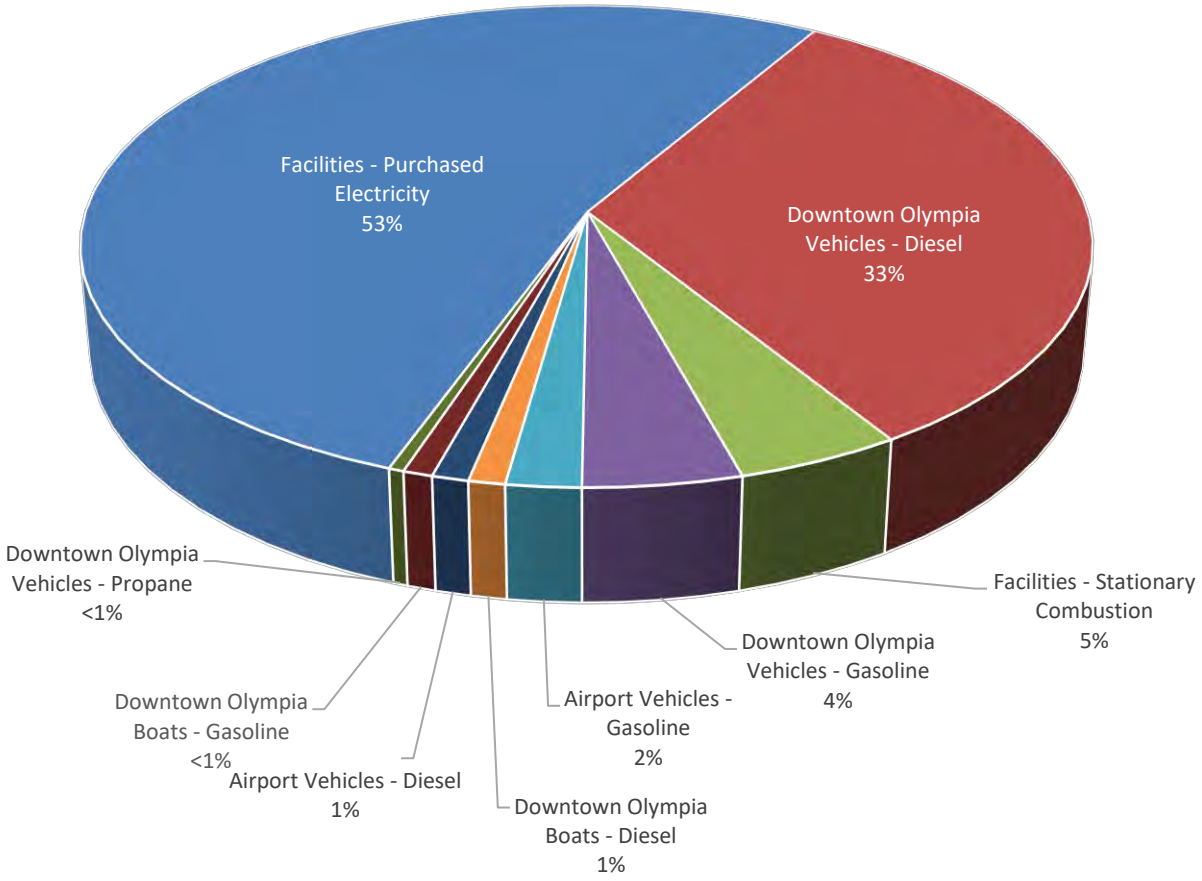

Chart 1: Port of Olympia 2017 GHG Emissions Summary

4.1 Fleet Results

During 2017, the Port's 97 vehicles generated 526 MT CO_2e due to GHG emissions (see Table 1 and Table 2). The vehicles and boats used 9,736 gal of gasoline, 43,543 gal of diesel, and 926 gal of propane. A summary of MT CO_2e emissions is presented on Chart 2 by location and fuel type. Diesel and gasoline vehicles at the Downtown Olympia properties emitted the most MT CO_2e (404 and 55 MT CO_2e,

respectively). The majority of the 2017 fleet emissions were due to diesel vehicles used at the Port's Downtown Olympia properties.

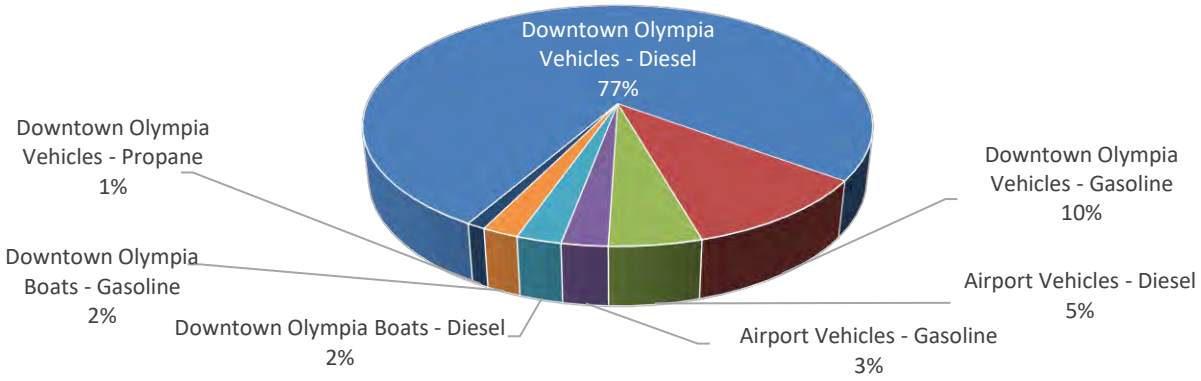

Chart 2: Port of Olympia 2017 Fleet GHG Emissions Summary

4.2 Facilities Results

During 2017, the Port's facilities generated 656 MT CO_2e due to purchased electricity and 57 MT CO_2e due to stationary (natural gas and diesel) combustion (see Table 3). The Port owns or leases nine facility groups. All nine of the facility groups use purchased electricity and three of the building groups (Airport, Swantown Marina, and the Marine Terminal) use stationary combustion (natural gas and/or diesel). A summary of MT CO_2e emissions are presented by building and energy source on Charts 3 and 4. The Swantown Marina and the Marine Terminal emitted the most MT CO_2e due to combined purchased electricity and stationary combustion use (333 and 187 MT CO_2e), respectively (see Table 3).

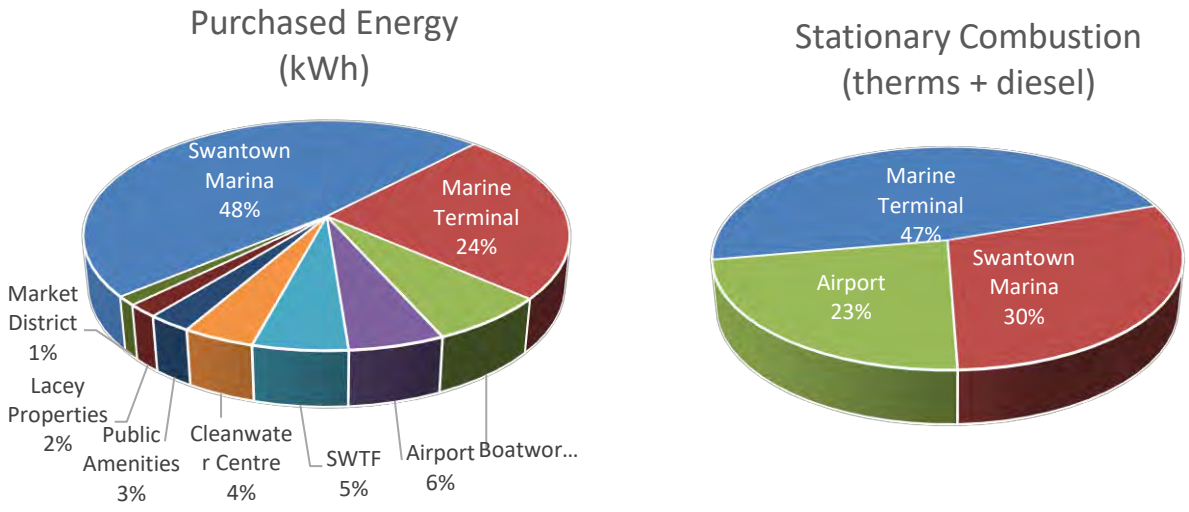

Chart 3 and Chart 4: Port of Olympia 2017 Facilities GHG Emissions Summary

4.3 2017 Results Compared to Previous Results

The GHG emission inventories conducted by the Port in 2013 and 2015 indicated that the Port generated approximately 113 and 1,325 MT CO_2e, respectively (PIONEER 2014, 2016). Scope 2 GHG emissions (purchased electricity for Port facilities) and Scope 1 facility emissions (on-site natural gas and diesel combusted) were not calculated for 2013.

The total GHG emissions for the Port's vehicle fleet were higher in 2017 (526 MT CO_2e) than in 2015 (425 MT CO_2e) due to increased goods traffic coming through the Port in 2015 and the need for off-road vehicles to unload and prepare goods for transport. Diesel fuel use by Downtown Olympia fleet vehicles increased from 31,202 gal in 2015 to 39,732 gal in 2017. GHG emissions from the Port's use of purchased electricity and on-site combusted fuels decreased from 2015 to 2017.

Despite the increased fleet fuel consumption and increased energy use at Port facilities, the Port's total GHG emissions were lower in 2017 than in 2015. This is primarily due to the change in emissions factors that are applied in the Ecology GHG emissions calculator (Ecology 2017a).

4.4 2017 Results Compared to Other Washington State Agencies

The 2017 GHG emissions for Port facilities were compared to the emissions from all other Washington State agencies in 2015. The Port's greatest 2017 GHG emission source was generally consistent with the majority source of emissions from all other Washington State agencies in 2013 (42% from electricity used in State-owned and -leased buildings; Ecology 2017b).

Total GHG emissions from the Port (1,239 MT CO_2e) for 2017 are much lower than other major Washington State agencies (e.g., Departments of Transportation, Corrections, and Social and Health Services, as well as universities) that emit over 10,000 MT CO_2e annually and together account for over 90% of total GHG emissions by Washington State agencies.

SECTION 5: CONCLUSIONS AND RECOMMENDATIONS

The Port generated approximately 1,239 MT CO_2e (see Table 2 and Table 3), well below the Ecology benchmark of 10,000 MT CO_2e for GHG emissions reporting. The majority of the emissions (i.e., 656 MT CO_2e, or 53%) were generated from purchased electricity for facilities use.

Chart 6 presents the total GHG emissions for each reporting year for Scope 1 and Scope 2, relative to the 10,000 MT CO_2e Ecology state agency reporting category benchmark.

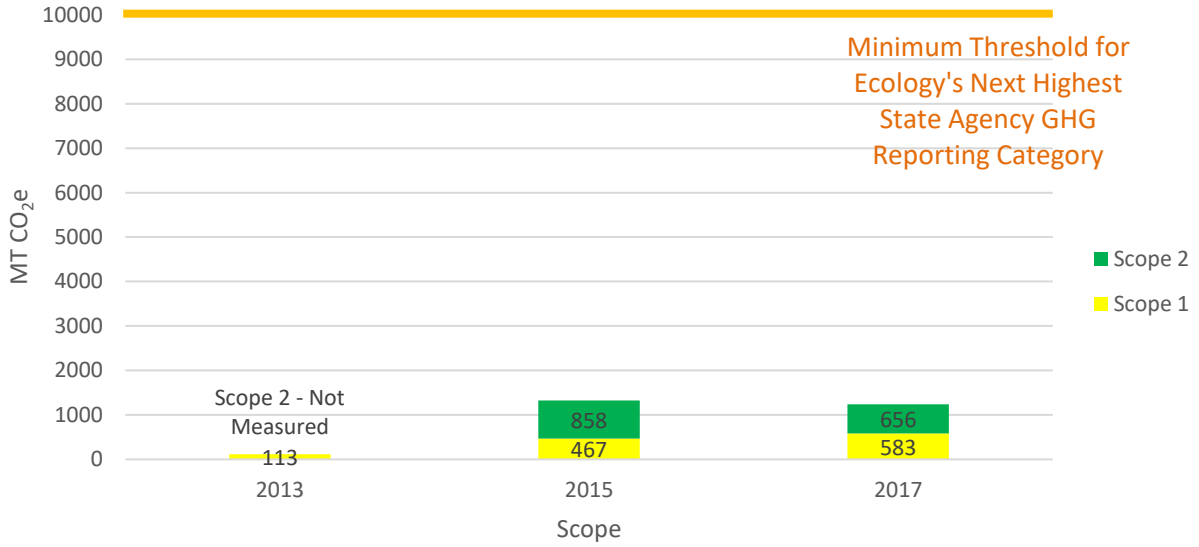

Chart 6: Port of Olympia GHG Emissions Summary by Scope and Year

The greatest sources of GHG emissions for the Port were purchased electricity for Port facilities (656 MT CO_2e, Part of Scope 2), and diesel fuel vehicle use at Downtown Olympia properties (404 MT CO_2e, Part of Scope 1).

Future efforts made by the Port to reduce GHG emissions could include a review and investigation of these leading emissions sources. The Port's GHG footprint could be further reduced by replacing older vehicles with more fuel efficient or electric-powered vehicles, increasing employee awareness of GHG emissions by department and promoting a workplace culture of energy conservation, and by constructing sustainable energy-usage infrastructure (e.g., Leadership in Energy and Environmental Design-certified construction, and more solar panels on Port facility roofs).

SECTION 6: REFERENCES

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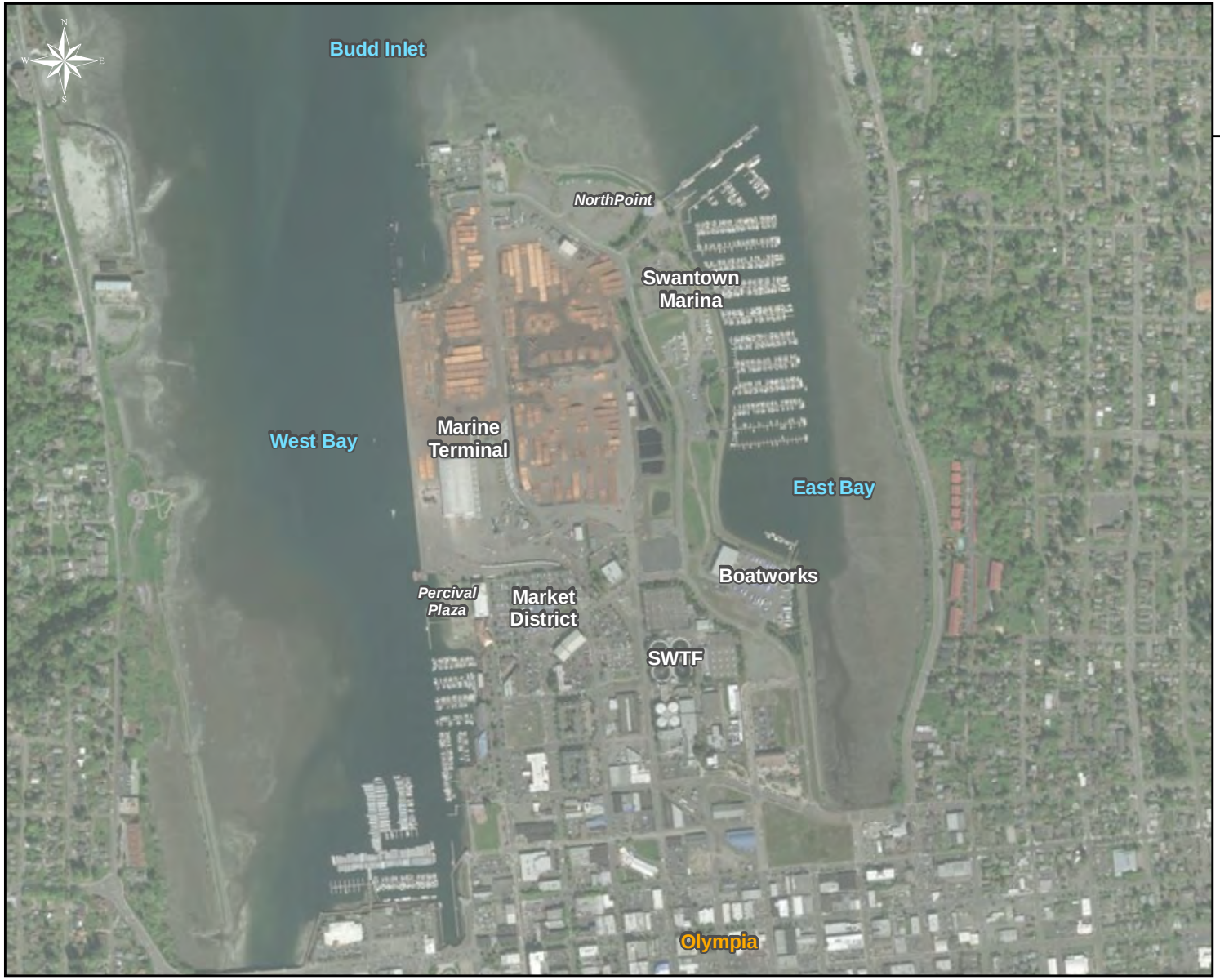
Figures



0 1,000 2,000 Feet

PIONEER TECHNOLOGIES CORPORATION

Downtown Olympia Detail
Port of Olympia 2017 Greenhouse Gas Emissions Inventory
Olympia, Washington

Figure 1

0 2,000 4,000
Feet

PIONEER TECHNOLOGIES CORPORATION

Airport Detail
Port of Olympia 2017 Greenhouse Gas Emissions Inventory
Olympia, Washington

Figure 2

0 2,000 4,000
Feet

PIONEER TECHNOLOGIES CORPORATION

Lacey Properties Detail
Port of Olympia 2017 Greenhouse Gas Emissions Inventory
Olympia, Washington

Figure 3

Tables

Table 1: Port of Olympia 2017 Fleet Information

Location	Vehicle Class	Fuel Type	Vehicle Description
Downtown Olympia Properties	Light Duty On-Road[1]	Gasoline	1990 Chev 3/4 Ton Pickup
			1990 Chev 4x4 Pickup
			1991 GMC Sierra Pickup
			1993 Chev S-10 Pickup
			1993 Ford E350 Cube Van
			1997 Chevy S-10 Extended Cab
			1998 Chev K2500 Pickup
			2005 F-350 white Plate
			2005 Ford F350 Pick Up Truck
			2006 Ford Ranger Truck
			2008 Ford F-250 Superduty
			2009 Ford Escape Sport Utility
			2012 Ford F150 Security Response Mobile Command Truck
			2012 F-150 crew cab
			2013 Ford F-150 Lic A3675C
			2013 Ford F150
			2014 Ford F-150 4x2 Supercab
			2014 Ford F-150 4x2 Supercab
			2014 F-150 Truck
			2016 Dodge Ram Quad 1500
			Chevy Express Van
	Heavy Duty On-Road[2]	Gasoline	2011 Ford F350 flat bed Truck,
		Diesel	1981 Int'l Dump Truck/Water Truck
			2000 Bluebird Bus
			2010 Kenworth Fuel Truck
			2014 Ford E350 Box Truck
			2014 Ford E350 Box Truck
			2015 Teamco Service Truck
		Propane	Power Boss Dock Sweeper
	Off-Road[3]	Gasoline	2016 John Deere ride-on Mower
			Billy Goat Blower, ModelF1302H
			Parker Vacuum, Model DV6430
			Scott Power Lawnmower
		Diesel	1991 Hyster Model 970 Top-Pick S/N C117E01566L
			1993 Ford 4WD New Holland 9030 Tractor
			1997 Tymco Sweeper
			1999 Athey Top Gun Sweeper,
			2010 Elgin Crosswind Sweeper Vacuum Truck
			2011 Linde Forklift
			Caterpiller Fork Lift
			Caterpiller Fork Lift
			Genie Z135 Articulated Boom Lift
			Gottwald Mobile Harbor Crane
			Hyster H1050E Top-Pick
			Kalmar 30,000# Forklift
			Komatsu Forklift S/N 44116-A
			Komatsu Forklift S/N 44117-A
			Kubota Tractor SN 13686
			Kubota Garden Tractor
			Kubota Garden Tractor
			Linde #1 - Forklifts model H80D/1100 396
			Linde # 2 - 2013 Forklift model/1100 396
			Linde #3 - 2013 Forklift Model H80D/1100
			Rail Car Pusher
			TICO Tow Tracor

Table 1: Port of Olympia 2017 Fleet Information

Location	Vehicle Class	Fuel Type	Vehicle Description
Downtown Olympia Properties	Off-Road	Diesel	TICO Tow Tractor
			Travel Lift: Model 70 BFM Mobile Boat Hoist
			TICO Tow Tractor
			TICO Tow Tractor
			WA 400 Komatsu Loader
			WA 600 1L Komatsu Loader
			WA 600 1L Komatsu Loader
			WA 600 1L Komatsu Loader
			WA 600 3L Komatsu Loader
			WA 600 3L Komatsu Loader
			WA 600 3L Komatsu Loader
		Propane	1997 Nisan JC80LP Lift Truck
			2003 Nissan 8,000# Forklift
			2016 Asphalt Hot Box Trailer w/ Propane Burners
			Genie 60 Telescopic Boom Lift
			Nissan 8,000# Forklift
	Boat	Gasoline	Evinrude E-Tech 115HP Engine (SN511466) for 1999 Tuff Boat
			Evinrude E-Tech 175 HP Motor #1 & #2 Boston Whaler
			Evinrude E-Tech 300 HP #1 & #2 Security Patrol Boat - Integrity
			Fire Monitor pump - Security Patrol Boat - Integrity
		Diesel	Harbor Patrol Safety Boat
Airport	Light Duty On-Road[1]	Gasoline	2001 Dodge Ram Pickup
			2003 Chevy Silverado Truck
			2012 Dodge Ram 3500 Maintenance Truck
			2016 Dodge Ram
	Heavy Duty On-Road[2]	Gasoline	1988 Chevy 1-Ton Dump Truck
		Diesel	2006 Ford F650 5-yard Dump Truck with Snow Plow
	Off-Road	Gasoline	Honda Mower
			Pesticide Sprayer w Honda motor
		Diesel	1977 Chevrolet Versalift Tel-289 Manlift
			1985 Lamp Lighter Bucket Truck
			1989 Toro Ride-On Mower
			1993 Tiger Flail Mower
			2002 ZD28 Kubota Ride-on Mower
			2004 New Holland TV145 Tractor
			2015 Toro Z-Master Ride-on Mower
			106 KW fixed Emergency Generator at Tower
			20KW Fixed Emergency Generator at Glacier Aviation
			John Deere 6430 Cab Tractor, with Mower
			Kubota Ride-on Mower G2160-60
			Kubota M9000 Tractor w/Mower
			TR3177 Ford 4WD New Holland Tractor w/ Back hoe

Notes:

[1] Light duty on-road vehicles include cars, sport utility vehicles, pick-up trucks, vans, and motorcycles.

[2] Heavy duty on-road vehicles include buses, heavy duty trucks, semi-trucks, dump trucks, and snow plows.

[3] Off-road vehicles include yellow iron, tractors, mowers, and forklifts.

Table 2: Port of Olympia 2017 Fleet Greenhouse Gas Emissions Summary

Vehicle Category	Fuel Type	Fuel Used (gal)	Number of Vehicles	Total Emissions[1] ($MT CO_2e$)	Average Total Emissions per Gallon of Fuel ($MT CO_2e/gal$)
Downtown Olympia Vehicles	Gasoline	6,968	26	55	7.9E-03
	Diesel	39,732	39	404	1.0E-02
	Propane	926	6	5.3	5.7E-03
Downtown Olympia Boats	Gasoline	1,169	4	10.3	8.8E-03
	Diesel	1,244	1	12.7	1.0E-02
Downtown Olympia Total	**--**	**50,039**	**76**	**488**	**--**
Airport Vehicles	Gasoline	1,599	7	13	7.9E-03
	Diesel	2,567	14	26	1.0E-02
Airport Total	**--**	**4,166**	**21**	**39**	**--**
Fleet Total	**--**	**54,205**	**97**	**526**	**--**

Notes:

[1] Total emissions for data reported by the Port of Olympia for January 1, 2017 through December 31, 2017.

--: Not calculated

Table 3: Port of Olympia 2017 Facilities Greenhouse Gas Emissions Summary

	Downtown Olympia Properties								Airport Properties				Lacey Properties
	Boatworks	Swantown Marina		Market District	Other Public Amenities	Stormwater Treatment Facility	Marine Terminal		Airport[1]			Cleanwater Centre	Commerce Business Center
Month[1]	Purchased Electricity (kWh)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	Purchased Electricity (kWh)	Purchased Electricity (kWh)	Purchased Electricity (kWh)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	On-Site Diesel Combusted (gallons)	Purchased Electricity (kWh)	Purchased Electricity (kWh)
January	29,755	243,830	517	4,269	9,346	36,602	87,452	1,005	21,374	402	11.25	32,006	6,690
February	25,722	199,006	383	3,592	7,606	32,628	85,462	798	18,369	317	11.25	22,572	5,366
March	24,337	193,615	379	3,678	7,394	24,462	91,932	684	19,191	277	11.25	15,519	5,454
April	20,864	145,162	268	3,261	6,058	8,825	66,007	387	16,451	199	11.25	7,791	4,258
May	13,040	90,893	159	3,111	5,250	6,480	54,860	111	13,541	82	11.25	6,400	3,810
June	7,998	59,809	105	2,713	4,617	5,269	45,180	43	10,696	28	11.25	5,027	3,492
July	7,362	50,332	98	2,849	4,873	3,371	41,212	31	9,104	3.0	11.25	5,999	4,641
August	8,454	51,051	89	3,025	5,694	3,203	46,152	39	8,879	0.0	11.25	6,372	5,243
September	9,061	61,057	116	3,061	6,280	5,375	49,876	84	8,640	36	11.25	6,821	4,287
October	16,481	106,394	226	3,522	7,549	13,536	63,515	260	14,912	171	11.25	9,039	4,640
November	28,644	162,384	370	3,924	8,767	20,167	78,335	753	17,359	290	11.25	9,071	5,284
December	33,680	217,805	482	3,952	9,540	17,800	88,370	910	21,026	381	11.25	7,613	6,411
Totals:	225,398	1,581,338	3,192	40,957	82,974	177,718	798,353	5,105	179,542	2,186	135	134,230	59,576
MT CO_2e Totals:	45	316	17	8	17	36	160	27	36	12	1	27	12

Total Purchased Electricity (Scope 2)	**3,280,086 kWh**	**Total Emissions**	**656 MT CO_2e**
Total On-Site Natural Gas Combusted (Scope 1)	**10,483 therms**	**Total Emissions**	**56 MT CO_2e**
Total On-Site Diesel Combusted (Scope 1)	**135 gallons**	**Total Emissions**	**1 MT CO_2e**

Notes:

The energy usage presented above is only for facilities that the Port is the lessee or owner of, and are purchasing energy for (i.e., the Port is receiving the energy bill).

[1] The diesel fuel burned in the stationary generators at the Airport was not recorded in 2017. Port personnel estimated that 135 gallons of diesel were used in the generators in 2017.

Appendix A

DEPARTMENT OF ECOLOGY
State of Washington

Washington State Agency Greenhouse Gas Reporting and Calculator Instructions

May 25, 2017

Washington State Agency GHG Reporting and Calculator Instructions

Background

In 2009, the Legislature and Governor adopted the State Agency Climate Leadership Act (RCW 70.235.050.) The Act directs state agencies, including universities, colleges, and community and technical colleges to lead by example in reducing their greenhouse gas (GHG) emissions to:

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

The requirements for state agencies include the following:

- Annually estimate and report to Ecology greenhouse gas emissions from agency operations
- Every other year (in even years) report actions taken in the past two years to meet their emission reduction targets.

Reporting Your Greenhouse Gas Emissions

Agencies need to report yearly to make reports consistent and comparable across agencies and with other state and federal greenhouse gas programs. **Reports are due to Ecology by July 1**.

Steps for reporting

1.) Download and complete the excel-based greenhouse gas emissions calculator. They can be found on our website.
2.) Log into your Secure Access Washington Account (SAW). If you do not have an account, you will need to create one and wait for an approval email from Ecology.
3.) Go to "My services" and select "State Agency and Academia GHG Reporting Tool" – Reporters commonly make the mistake of reporting their emissions under the wrong program, so please make sure you choose the correct tool.
4.) Search for your agency by name and upload your file.

Sources of Greenhouse Gas Emissions

Agencies should estimate emissions from the following sources:

- **Energy used in buildings and stationary equipment** such as a generator. This includes electricity, natural gas, propane, fuel oil, diesel, and other fuels.

- **Fuel used in vehicle fleets and mobile equipment** owned by the agency or leased from the state motor pool, including passenger vehicles, heavy-duty vehicles, off-road vehicles, ferries, boats, and aircraft.

Greenhouse Gas Emissions Calculator

Ecology provides agencies an Excel-based greenhouse gas calculator to estimate their emissions.

Universities and community and technical colleges that participate in the American College and University President's Climate Commitment (ACUPCC) can submit the ACUPCC report in lieu of using the calculator provided by Ecology. The electricity emission factor in these calculators may be from the Emissions & Generation Resource Integrated Database (eGrid) Northwest Power Pool not the Fuel Mix Disclosure (FMD) emission factor developed by Washington's Department of Commerce. This means you will need to:

- Recalculate your electricity emissions using the FDM emissions factor.
- If you are using green electricity you will need to get your emission factors from your utility and recalculate using these factors.

The sections below provide an overview and instructions for using the greenhouse gas calculator, which includes a contents and notes tab and six worksheets. The spreadsheets are locked so you can only input data into the correct cells. The unlocked cells where you enter your data are highlighted in yellow. Cells highlighted in blue are optional. Please be sure to report in the units requested.

Contents and Notes Tab

Use this space to briefly note:

- What information was gathered and from whom. This will allow you to analyze changes over time and inform others how the numbers were collected. .
- Methodologies, data accuracy, assumptions, and other helpful information.
- If you are reporting green electricity with market-based emission factors enter comments on the emission factors for CO2, N2O and CH4 provided by the utility.

Worksheets

There are six worksheets in the calculator:

- **Worksheets one-three-** are for agency data.
- **Worksheet four-** will automatically generate a summary of agency GHG emissions.
- **Worksheets five and six**-contain emission factors and conversion factors for your reference.

Worksheet 1: General Agency Information

Employees
Report total number of employees. You can either calculate the average for the reporting year or report the total number of employees on a specific date.

Students, patients, etc.
If you directly serve a population and this has a direct effect on your energy consumption, report the total population you serve, such as number of students, patients, offenders, etc. You can either calculate the average for the reporting year or the give the total population on a specific date.

Agency owned space
Please report square footage for conditioned space. Conditioned space is heated or cooled using electricity, natural gas, or other forms of energy.

Worksheet 2: Building Energy Use-

All reporters complete Table one.

If you are reporting green electricity (market-based):

- Fill out **both table one and two**. You will enter the same data into **both tables**, except for the purchased energy section. In table one, all electricity purchases, whether green market or not, will be calculated using the regional emission factor. In the second table, account for your specific green power purchases, including purchases that were not green power e.g. perhaps you have a contract for green power at headquarters but not regional operations, account for both types of purchases in Table 2

- In worksheet five, enter the emission factors provided by your utility contract including values for CO2, CH4 and N20 in cell C22, E22 and G22.

- Record these emission factors in the “contents & Notes” tab as well.

Worksheet 3: Fleet Energy Use

Light Duty, Heavy Duty and Off Road Fuels
Fleet reporting has been simplified to only include CO2 and biofuel emissions. Emissions from CH4, N20 and HFCs are minimal yet add complexity to the data collection. It is acceptable to estimate and add one-three percent of CO2 emissions for these GHG’s; however, this calculator does not make that adjustment automatically.

Ferries
Your biofuel percentage must be entered in cell D20.

Boats
This includes fuel use for all watercraft owned or operated by your agency (except ferries.)

Aircraft
For aircraft, enter the gallons of aviation gasoline and/or jet fuel used.

Worksheet 4: GHG Emissions Summary

This worksheet contains a summary of GHG emissions by source. These numbers will be automatically generated based on the data entered into worksheets one-three. Carbon dioxide emissions associated with bioenergy sources are not included in the totals.

Worksheet 5: Emissions Factors

Emissions factors are the average emission rate of a pollutant from a unit of activity. For example, emissions of carbon dioxide per gallon of gasoline consumed.

Carbon dioxide equivalent (CO2e)
A measure used to compare the emissions from various greenhouse gases based on their global warming potential (GWP). Carbon dioxide equivalents are commonly expressed as "metric tons of carbon dioxide equivalents (MMTCO2e)." The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP.
MTCO2e = (million metric tons of a gas) * (GWP of the gas)

Global Warming Potential (GWP)
Global Warming Potential (GWP) is a measure of the contribution of a greenhouse gas to global warming over a specific time period relative to carbon dioxide. Carbon dioxide (CO2) is the reference gas and has a GWP of one. Methane (CH4) has a GWP of 25 and a given mass of CH4 is 25 times more potent compared to the same mass of CO2 over a 100 year time horizon. GWP is used to convert emissions of greenhouse gases into a common measure, the carbon dioxide equivalent (CO2e), by multiplying emissions of a greenhouse gas times the GWP.

Worksheet 6: Conversion Factors

This worksheet provides conversion factors for your reference.

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