Port of Olympia 2015 GHG Emissions Inventory Report

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List of Acronyms

Acronym	Explanation
Airport	Olympia Regional Airport
CH_4	Methane
CO_2	Carbon Dioxide
Ecology	Washington State Department of Ecology
kWh	Kilowatt Hour
Gal	Gallons
GHG	Greenhouse Gas
GHGRP	Greenhouse Gas Reporting Program
HFC	Hydrofluorocarbon
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 and its Airport locations.[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 locations and Airport locations during 2015, compare 2015 GHG emissions to 2013 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_20), and fluorinated gases (hydrofluorocarbons [HFCs], perfluorocarbons, and sulfur hexafluoride). Typically, GHG emissions are converted to metric tons of CO_2 equivalent (MT CO_2e). 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

1.2 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

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

[2] http://www.epa.gov/climatechange/ghgemissions/sources.html

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) and Airport (Olympia Regional Airport and Cleanwater Centre).

1.2.1 Downtown Olympia

The Port's 66-acre Marine Terminal is located on Budd Inlet in Olympia, Washington and consists of a container yard, a United States customs-bonded warehouse, on-dock rail, three 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 and a boat repair and maintenance facility (Boatworks). The Port also owns the Olympia Farmer's Market building, the Percival Plaza park space and other public amenities. Figure 1 shows the Downtown Olympia area.

1.2.2 Airport

The Olympia Regional Airport (Airport) is a general-aviation public Airport 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.

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 for 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 by replacing purchased fossil fuel energy with sustainable energy. The Port replaced the roof of this 25 year-old, 76,000 square foot building 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. 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;
- Spill prevention and control;

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

- 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 their operations and make improvements to better protect the natural environment at and surrounding the Port's waterways. To maintain their certifications, the Swantown Marina and Boatworks periodically undergo inspections and provide the programs information regarding their safety program 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 90% of this hazardous waste stream (4,770 lbs) and, in so doing, saved the Port over $4,200 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 a 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 (Tumwater 2016).

In 2014, the Port issued a Sustainable Airport Manual 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 our local heritage.

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, the East Bay Redevelopment Area, Budd Inlet, and the 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:

- Reproducible;
- Consistent with the current state of science regarding GHG emissions; and
- 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 their 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 (e.g., 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 their 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, including motor vehicles owned by employees and airplanes.
- Fuel used in motor vehicles that employees use for commuting to Washington State's Commute Trip Reduction program worksites.

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 their 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.

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

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.[5] Scope 1 and Scope 2 emissions were calculated for the 2015 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.

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 in Port-owned and -operated buildings.

Scope 2 emissions include indirect GHG emissions from:

- 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 their own 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, articulating Port energy use does facilitate identification of reduction opportunities and resultant cost saving potential.

[5] http://www.ecy.wa.gov/climatechange/WAleadership.htm#tools (see Appendix A)

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

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 (Worksheet 3) 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 and type of Downtown Olympia fleet vehicles and the type of fuel used in the vehicles
- Number and type 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 and therms of natural gas used to power Port-owned or Port-leased facilities

The information provided by the Port was compiled and entered into Ecology's State Agency GHG calculator to calculate the amount of MT CO_2e generated by vehicle type and building energy source (electricity or natural gas).

For fleet vehicles, GHG emissions are categorized as fossil CO_2 emissions, HFC emissions, CH_4 emissions, and N_2O emissions. 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 kWh of electricity and total natural gas therms 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 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 1,325 MT CO_2e in 2015, 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 2015 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.

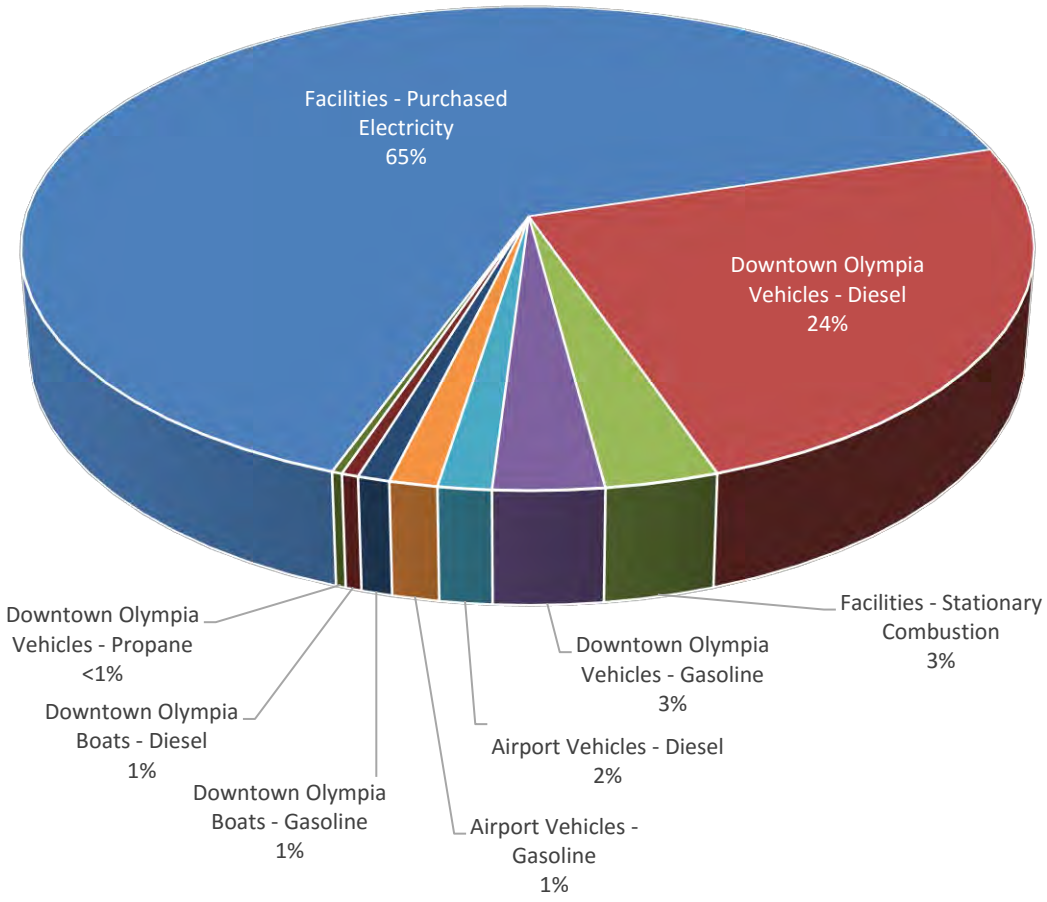

Chart 1: Port of Olympia 2015 GHG Emissions Summary

4.1 Fleet Results

During 2015, the Port's 107 vehicles generated 425 MT CO_2e due to GHG emissions (see Table 1 and Table 2). The vehicles and boats used 7,344 gallons (gal) of gasoline, 33,496 gal of diesel, and 516 gal of propane. A summary of MT CO_2e emissions are presented on Chart 2 by location, vehicle type, and fuel

type. Diesel and gasoline vehicles at the Downtown Olympia properties emitted the most MT CO_2e (324 and 41 MT CO_2e, respectively). The majority of the 2015 fleet emissions were due to diesel vehicles used at the Port's Downtown Olympia properties.

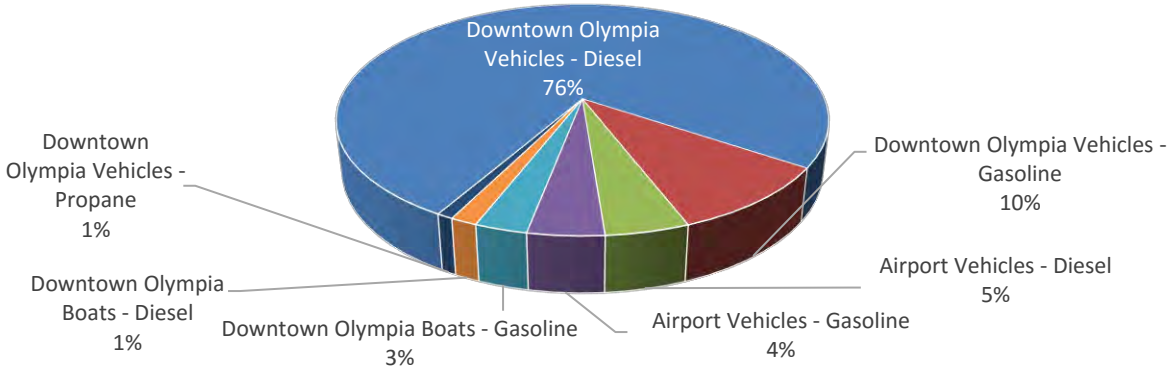

Chart 2: Port of Olympia 2015 Fleet GHG Emissions Summary

4.2 Facilities Results

During 2015, the Port's facilities generated 858 MT CO_2e due to purchased electricity and 42 MT CO_2e due to stationary (natural gas) combustion (see Table 3). The Port owns or leases eight facility groups. All eight of the facilities groups use purchased electricity and three of the building groups (Airport, Swantown Marina, and the Marine Terminal) use stationary combustion (natural gas). A summary of MT CO_2e emissions are presented on Charts 3 and 4 by building and energy source. The Swantown Marina and the Marine Terminal emitted the most MT CO_2e due to combined purchased electricity and stationary combustion use (426 and 206 MT CO_2e), respectively (see Table 3).

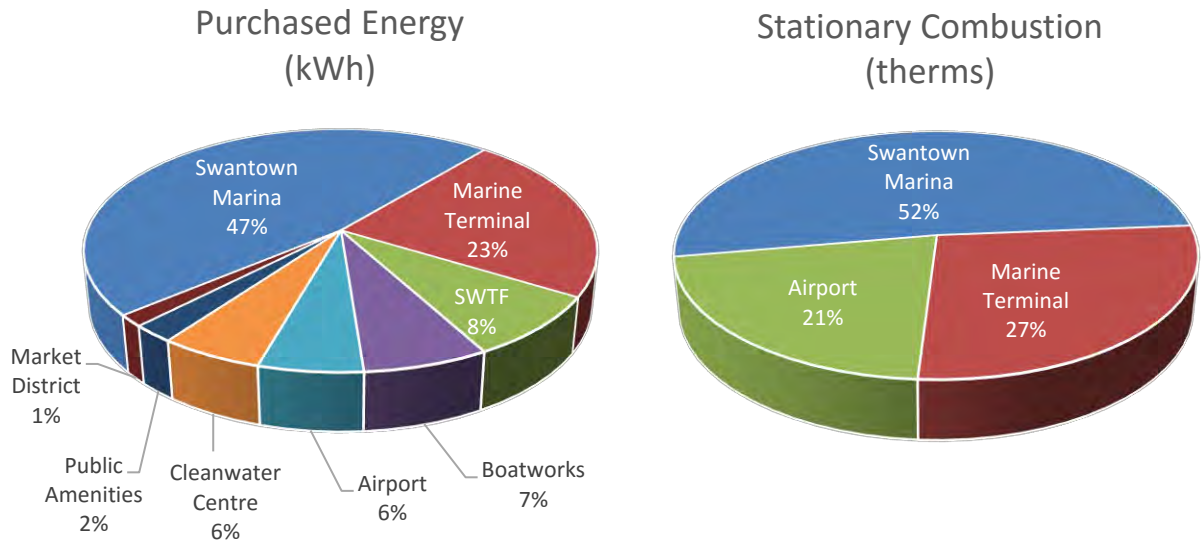

Chart 3 and Chart 4: Port of Olympia 2015 Facilities GHG Emissions Summary

4.3 2015 Results Compared to Previous Results

The GHG emissions inventory conducted by the Port in 2013 indicated that the Port generated approximately 113 MT CO_2e, though this only accounted for Scope 1 GHG emissions from fleet vehicles. Scope 2 GHG emissions (purchased electricity for Port facilities) and Scope 1 facilities emissions (on-site natural gas combusted) were not calculated in 2013.

The total GHG emissions for the Port's vehicle fleet were higher in 2015 (425 MT CO_2e) than in 2013 (113 MT CO_2e) due to increased goods traffic coming through the Port in 2015 and the need for off-road vehicles to unload goods and prepare them for transport. Diesel fuel use by Downtown Olympia fleet vehicles increased from 378 gal in 2013 to 31,202 gal in 2015.

The GHG emissions for the Port's facilities were not calculated in 2013; therefore, no comparison could be made.

4.4 2015 Results Compared to Other Washington State Agencies and Northwest Ports

The 2015 GHG emissions for Port facilities were compared with the emissions from all other Washington State agencies in 2013. The Port's greatest 2015 GHG emission source was generally consistent with the majority source of emissions from all other Washington State agencies in 2013 (52% from electricity used in State-owned and -leased buildings; Ecology 2014).

Total GHG emissions from the Port (1,325 MT CO_2e) for 2015 are much lower than other major Washington State agencies (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 84% of total GHG emissions by Washington State agencies.

Additionally, a 2011 combined annual GHG emissions inventory conducted by the Port of Seattle, Port of Tacoma, and Port Metro Vancouver indicated that together, the three ports emitted 1,660,000 MT CO_2e (Northwest Ports 2015).

SECTION 5: CONCLUSIONS AND RECOMMENDATIONS

The Port generated approximately 1,325 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., 858 MT CO_2e, or 65%) were generated from purchased electricity for facilities use.

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

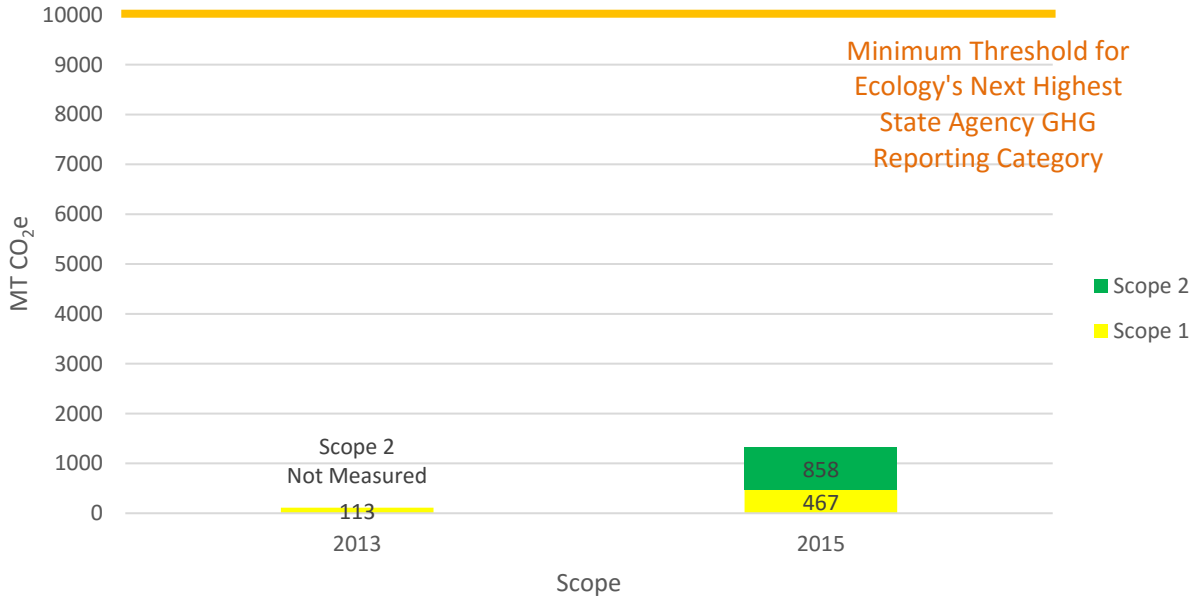

Chart 6: Port of Olympia GHG Emissions Summary by Scope and Year

The greatest sources of GHG emissions for the Port were purchased electricity for Port facilities (858 MT CO_2e, Part of Scope 2), and diesel fuel vehicle use at Downtown Olympia properties (324 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, by reducing the total number of vehicles in operation, 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

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PIONEER TECHNOLOGIES CORPORATION

Downtown Olympia Detail
Port of Olympia 2015 Greenhouse Gas Emissions Inventory
Olympia, Washington

Figure 1

PIONEER TECHNOLOGIES CORPORATION

Airport Detail
Port of Olympia 2015 Greenhouse Gas Emissions Inventory
Olympia, Washington

Figure 2

Tables

Table 1: Port of Olympia 2015 Fleet Information

Location	Vehicle Class	Fuel Type	Vehicle Description
Downtown Olympia Properties	Ligh Duty On-Road[1]	Gasoline	1997 Chevy S-10 Extended Cab
			1998 Chev K2500 Pickup
			2008 Ford F-250 Superduty-086
			2009 Ford Escape Sport Utility-085
			2013 Ford F-150
			2014 Ford F-150 4x2 Supercab Engineering
			2014 Ford F-150 4x2 Supercab Environmental
			1988 Chevy S-10, security uses it
			1990 Chev 3/4 Ton Pickup
			1993 Chev S-10 Pickup
			1997 Chevy C-10 plate# 43681C
			2004 Chev Silverado 2500
			2006 Ford Ranger Truck
			2014 F-150 Truck Harbor Ops Tech
			2016 Dodge Ram Quad 1500
			Chevy Express Van - Marina Maintenance
			Marina Truck - Ford 150 Plate #A3676C
			1969 GMC Gas Truck
			1986 Chev S-10 Pickup
			1988 Chevy Astro Van - Security
			1990 Chev 4x4 Pickup
			1991 GMC Sierra Pickup
			1995 Ford Taurus Sedan - Security
			1997 Chev Lumina
			2012 F-150 crew cab
			2012 Half ton truck white - Terminal
			Cube Van 1993 Ford E350
			F-350 white Plate #15857E Columbia Ford
			Ford F350 Pick Up Truck
			Security Response Moblie Command Truck
		Diesel	1996 International Truck
			Cube Van. 1993 Ford E350
	Heavy Duty On-Road[2]	Gasoline	Flat bed Truck
		Diesel	Box Trucks for Maintenace
			1981 Int'l Dump Truck
			1984 1-Ton Flat Bed Truck
			Box Trucks for Maintenace
			Bus for Longshoremen
			Fuel Truck - Terminal
			Service Truck - Terminal Maintenance
		Propane	Power Boss Dock Sweeper
			Water Tank for Truck #54

Table 1: Port of Olympia 2015 Fleet Information

Location	Vehicle Class	Fuel Type	Vehicle Description
Downtown Olympia Properties	Off-Road[3]	Gasoline	Kubota Garden Tractor
			Lawn Mower - Zero Turn
			Billy Goat Vacuum Sweeper
			Kubota Tractor w/ Mower Deck
			Scott Power Lawnmower
		Diesel	Kubota Tractor SN 13686
			Travel Lift
			Travel Lift Engine Rebuild
			Travel Lift: Model 70 BFM Mobile Boat Hoist
			1991 Hyster S/N C117E01566L
			1999 Athey Sweeper, used
			Hyster H1050E Lift Truck
			Kalmar 30,000# Forklift
			Komatsu Forklift S/N 44116-A
			Komatsu Forklift S/N 44117-A
			Linde # 2 - 2013 Forklift model/1100 396
			Linde #1 - Forklifts model H80D/1100 396
			Linde #3 - 2013 Forklift Model H80D/1100
			Mobile Harbor Crane
			Rail Car Pusher
			Sweeper Vacuum Truck
			TICO Tow Tracor
			TICO Tow Tractor
			TICO Tow Tractor
			TICO Tow Tractor
			Used 2011 Linde Forklift
			WA 400 Komatsu Loader Tag #1416
			WA 600 1L Komatsu Loader Tag #1422
			WA 600 Komatsu (WSST) Tag #1417A
			WA 600 Komatsu Loader Tag #1417
			WA600 1L Komatsu Loader Tag #1423
			Genie Manlift
		Propane	Hyster Forklift -H50XM
			Komatsu FG3OJT-12
			2003 Nissan 8,000# Forklift
			Nisan JC80LP Lift Truck
			Nissan 8,000# Forklift
			Pettibone-Mercury Lift Truck 6A80
			Telescopic Boom Lift - FEMA
			Telescopic Boom LIft - Port
	Boat	Gasoline	1999 Tuff Boat 18RW TAG #1713
			Engine (SN511466)
			Evinrude 175 HP Motor
			Evinrude 175 HP Motor
			Security Patrol Boat - 100% Grant Funded
		Diesel	Harbor Patrol Safety Boat

Table 1: Port of Olympia 2015 Fleet Information

Location	Vehicle Class	Fuel Type	Vehicle Description
Airport	Light Duty On-Road	Gasolline	2003 Chevy Silverado Truck
			2001 Dodge Ram Pickup
			2012 Dodge Ram 3500 Maintenance Truck
	Heavy Duty On-Road	Gasoline	1988 Chevy 1-Ton Dump Truck
		Diesel	5-yard Dump Truck with Snow Plow
	Off-Road	Gasoline	Honda Mower
			Pesticide Sprayer
		Diesel	1977 Chevrolet Versalift Tel-289 Manlift
			1989 Toro Diesel Tractor
			Kubota Mower G2160-60
			1993 Ford 4WD New Holland 9030 Tractor
			John Deere 6430 Cab Tractor, with Mower
			Kubota M9000 Tractor w/Mower
			2004 New Holland TV145 Tractor
			Tiger Flail Mower
			TR3177 Ford 4WD New Holland Tractor
			2002 ZD28 Kubota Mower
			1985 Bucket Truck
			1997 Tymco Sweeper

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 2015 Fleet Greenhouse Gas Emissions Summary

Vehicle Category	Fuel Type	Fuel Used (gal)	Number of Vehicles	Fossil CO_2 Emissions[1] (MT CO_2e)	HFC Emissions[2] (MT CO_2e)	CH_4 Emissions[3] (MT CO_2e)	N_2O Emissions[3] (MT CO_2e)	Total Emissions[4] (MT CO_2e)	Average Total Emissions per Gallon of Fuel (MT CO_2e/gal)
Downtown Olympia Vehicles	Gasoline	3,785	36	30	11	0.032	0.11	41	1.1E-02
	Diesel	31,202	36	312	8.9	0.36	2.1	324	1.0E-02
	Propane	516	10	3.0	0.92	0.0010	0.0015	3.9	7.5E-03
Downtown Olympia Boats	Gasoline	1,519	5	12	0.21	0.019	0.11	12	8.2E-03
	Diesel	620	1	6.2	0.043	0.0096	0.086	6.3	1.0E-02
Downtown Olympia Total	--	37,642	88	363	21	0.42	2.4	387	--
Airport Vehicles	Gasoline	2,040	6	16	1.8	0.018	0.074	18	8.8E-03
	Diesel	1,674	13	17	2.9	0.020	0.13	20	1.2E-02
Airport Total	--	3,714	19	33	4.7	0.038	0.20	38	--
Fleet Total	--	41,356	107	396	26	0.46	2.6	425	--

Notes:

[1] Fossil CO_2 emissions are the result of burning fuel to power the vehicle.

[2] HFC emissions are based on the number of vehicles operated and are not impacted by the amount of fuel used.

[3] CH_4 and N_2O emissions are determined based on estimated miles traveled (using Ecology defaults based on amount of fuel used).

[4] Total emissions for data reported by the Port of Olympia for January 1, 2015 through December 31, 2015.

--: Not calculated

Table 3: Port of Olympia 2015 Facilities Greenhouse Gas Emissions Summary

	Downtown Olympia Properties												Airport Properties			
	Boatworks		Swantown Marina		Market District		Other Public Amenities[3]		Stormwater Treatment Facility (SWTF)		Marine Terminal		Airport		Cleanwater Centre	
Month[1,2]	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)	Purchased Electricity (kWh)	On-Site Natural Gas Combusted (therms)
January	32,951	0.0	181,296	377	4,322	0.0	6,121	0.0	19,974	0.0	70,926	571	20,107	270	24,487	0.0
February	25,189	0.0	140,982	267	3,768	0.0	4,933	0.0	33,809	0.0	58,254	396	15,662	190	16,953	0.0
March	21,469	0.0	135,796	267	3,869	0.0	4,795	0.0	29,995	0.0	59,952	352	13,571	165	1,879	0.0
April	12,701	0.0	106,872	239	3,343	0.0	4,106	0.0	25,086	0.0	51,817	332	11,646	134	15,625	0.0
May	8,552	0.0	73,521	133	3,161	0.0	3,672	0.0	8,159	0.0	41,407	123	9,922	59	10,413	0.0
June	6,188	0.0	57,511	101	2,906	0.0	3,041	0.0	5,871	0.0	35,174	79	8,080	9.3	7,694	0.0
July	7,309	0.0	53,083	86	3,046	0.0	3,462	0.0	4,973	0.0	36,195	81	8,000	3.2	8,178	0.0
August	5,602	0.0	54,998	91	3,283	0.0	4,061	0.0	7,530	0.0	43,869	78	8,213	3.1	8,382	0.0
September	6,360	0.0	64,992	108	3,521	0.0	4,568	0.0	5,011	0.0	42,243	101	8,585	36	8,274	0.0
October	11,863	0.0	91,191	356	3,642	0.0	8,106	0.0	6,902	0.0	52,625	27	13,971	106	10,872	0.0
November	22,509	0.0	159,099	858	3,774	0.0	8,927	0.0	34,519	0.0	68,846	9.9	19,918	300	18,189	0.0
December	30,657	0.0	206,024	1,208	4,422	0.0	9,681	0.0	51,648	0.0	74,981	18	20,987	411	26,213	0.0
Totals:	191,350	0.0	1,325,365	4,091	43,056	0.0	65,474	0.0	233,478	0.0	636,288	2,168	158,661	1,687	157,158	0.0
MT CO_2e Totals:	58	0.0	404	22	13	0.0	20	0.0	71	0.0	194	12	48	9.0	48	0.0

Total Purchased Electricity (Scope 2)	**2,810,829 kWh**	**Total Emissions**	**858 MT CO_2e**
Total On-Site Natural Gas Combusted (Scope 1)	**7,946 therms**	**Total Emissions**	**42 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] Facility energy use data from January through September was an excel spreadsheet in email from Andi Mounts on August 30th, 2016.

[2] Facility energy use data from October through December, and for the Cleanwater Centre for January and February, was an excel spreadsheet in email from Andi Mounts on September 9th, 2016.

[3] Other Public Amenities includes street lights and railroad crossing lights in the Port of Olympia.

Appendix A

Agency GHG Calculator Instructions

Background

In 2009, the Legislature and Governor adopted the State Agency Climate Leadership Act codified in 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 greenhouse gas emissions from agency operations
- Every other year (in even years) report actions taken in the past two years to meet the emission reduction targets
- Project greenhouse gas emissions to 2035 (one-time requirement due June 30, 2010)
- Develop a strategy to reduce greenhouse gas emissions (one time requirement due June 30, 2011)

Every other year (in even years) Ecology compiles the information on agency GHG emissions and actions taken and submits a report to the Governor and Legislature. Reports were submitted in December 2014, December 2012 and December 2010.

Estimating Greenhouse Gas Emissions

Agencies can use an Excel-based greenhouse gas calculator to estimate their greenhouse gas emissions. **A simplified greenhouse gas calculator is also available and should be used only by agencies that only have passenger vehicles or lease vehicles from the state motor pool.**

Universities and community and technical colleges that participate in the American College and University President's Climate Commitment (ACUPCC) can submit to Ecology the ACUPCC report in lieu of using the calculator provided by Ecology.

We ask that agencies report on a calendar-year basis to provide a consistent basis for comparison across agencies and to maintain consistency with state and federal greenhouse gas reporting programs. Please clearly note if you use the fiscal year time period.

Sources of Greenhouse Gas Emissions

Agencies should estimate emissions from the following sources:

- **Energy use 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.
- **Business travel in vehicles not owned by the agency** including vehicles owned by employees and air travel.
- **Employee commuting** for worksites that participate in the commute trip reduction program.

There is a separate calculator for large agencies that want to estimate **"fugitive emissions"** from refrigerants and compressed gases leaked from commercial refrigeration, commercial air conditioning equipment and heat pumps, fire suppression equipment, and other types of equipment.

State and Federal GHG Reporting Overlap

Only about five or six of the largest universities and agencies may be required to report to Ecology or EPA under the statewide or federal greenhouse gas reporting program. The state and federal programs apply to agencies with a **single facility** that emits **over 10,000 or 25,000** metric tons of greenhouse gas emissions from a boiler or other **on-site stationary source**.

Greenhouse Gas Calculator

The sections below provide an overview and instructions for using the greenhouse gas calculator, which includes a cover page and eight tabs. The spreadsheets are locked so that you can only input data into the appropriate 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.

Cover Page: Contents and Notes

The cover page has links to the eight worksheets in the calculator. Agencies will enter their data into worksheets 1-4. A summary of agency GHG emissions will be automatically generated in worksheet 5. Use worksheet 6 for **optional** facility-level reporting. Worksheets 7 and 8 contain emissions factors and conversion factors for your reference.

Comments Sections

At the agency level, keep detailed notes on what information was gathered from whom so you can analyze changes over time as well as inform others how the numbers were collected in case of staffing changes or management inquiry. Enter any comments or notes you have on the methodology, data accuracy, assumptions, or any other information in the boxes provided. Please keep the comments in the data template brief, and directly related to the data.

Worksheet 1: General Agency Information

FTEs, Employees
Report the total FTEs and total employees. You can either calculate the average for the reporting year or report the total FTEs and total employees on a set date – for example, December 31 of the reporting year.

Students, patients, inmates, 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 report the students, patients, or inmates on a set date - December 31 of the reporting year.

Building Space
Please report square footage for conditioned space in the space provided. Conditioned space is space that uses electricity, natural gas, or other forms of energy.

Worksheet 2: Building Energy Use

Step 1: Enter the total annual fuel used by your agency in table 1 in the units specified. Report energy use for all space owned by your agency, space leased from another state agency where you receive a utility bill (do not include space leased from DES), and for all privately leased space. DES will report energy use for the Capitol Campus and for all DES-owned buildings. If you lease from another state agency, that agency will report energy use for your space unless you receive a utility bill with your actual energy consumption.

Step 2: If you cannot get your energy use information from a utility bill for some or all of your facilities, estimate the energy use based on square footage and the type of space. Use table 2 and 3 to enter your square footage by space type. The tables will calculate your estimated kWh and/or therms. Enter this total into table 1.

Step 3: If you do not have your utility bills or square footage, estimate energy use by dividing total purchases of electricity or natural gas by the 2015 prices provided in table 4 to get the kWh and/or therms. Add the total estimated kWh and therms to table 1 in the yellow highlighted cells to calculate GHG emissions.

Worksheet 3: Fleet Energy Use

Report fuel consumption in vehicles and motorized equipment owned by your agency or directly operated by your agency – this includes short-term rentals and vehicles permanently assigned from the DES Motor Pool.

Some agencies may only have one category of vehicles – passenger vehicles and light-duty trucks. If this is the case, you can use the simplified GHG calculator. All other agencies should use the full greenhouse gas calculator and split out fuel use by vehicle category (light-duty, heavy-duty, off-road, ferry, boat, and aircraft.)

The vehicle categories are separated because different types of vehicles have different emissions factors for methane (CH4), nitrous oxide (N2O) and also hydrofluorocarbons (HFCs). If you are not able to separate out fuel use by vehicle category, enter fuel use into the vehicle category in which it is used the most or make an estimate and document the approach.

Ecology is working with the departments of Commerce, Enterprise Services, and Agriculture to eliminate duplicative reporting requirements for biofuel usage.

Light Duty On-Road Motor Vehicles:

This includes passenger cars, trucks, SUVs, pick-up trucks, vans, motorcycles, and other on-road vehicles under 8,500 pounds, as per SAAM policy/OFM guidelines.

Activity Data to report on includes:

Fuel use in gallons or the specified unit. This is the most important piece of activity data to include for each type of fuel and vehicle category. This is used to quantify carbon dioxide (CO2) emissions.

Biofuel %. The default biofuel % is already included, and can be adjusted if necessary.

Number of vehicles. This is used to estimate the leakage of refrigerants, or hydrofluorocarbon (HFC) emissions. If you have vehicles that fall into more than one fuel category, only report the number of vehicles once in any given category.

Miles traveled. This is used to estimate methane (CH4) and nitrous oxide (N2O) emissions and also is useful in measuring progress in increasing fuel efficiency.

Notes. This is an optional section where you can enter any notes.

Fuel Types include the following:

Gasoline: Statewide average ethanol content in 2015 was 9.7%, based on Department of Agriculture testing.

E85 Flex Fuel

Diesel There are three categories:

- **Retail Purchases.** Statewide average biodiesel content in 2015 is estimated at 2%.

- **Diesel purchased at WSDOT Fueling Stations.** Statewide average biodiesel content in 2015 at these stations was 14.5%. Regionally, the average was 18% in Western Washington and 11% in Eastern Washington. Use the statewide or the regional averages as appropriate to calculate a percent biodiesel for your agency.
- **Bulk Purchases**. Biodiesel content is set at 0% and should be adjusted by each agency based on its records

Compressed Natural Gas (CNG): Report in units of gallons of gasoline equivalent (GGE)

Plug-in Hybrids: These vehicles use both grid-powered electricity and gasoline (e.g. Ford C-Max Energi) If data is available report the gallons of gasoline and report number of plug-ins.

Electric-only Vehicles: These vehicles use electricity only (e.g. Leaf) If data is available report kWh. Report number of electric-only vehicles.

Heavy Duty On-Road Motor Vehicles:
This includes cargo transport vehicles and more specialized heavy equipment, such as buses, heavy-duty trucks, semi-trucks, snow plows, fire engines, and other on-road vehicles over 8,500 pounds. Enter the fuel use. If you don't have miles traveled or hours of operation, you can either make an estimate or leave these sections blank.

Off-Road Motor Vehicles:
This includes construction, agricultural, lawn, and other equipment not used on the roads, including yellow irons, tractors, ATVs, forklifts, lawnmowers, etc. Enter the fuel use. Reporting miles traveled or hours of operation is optional.

Ferries:
This category will only be used by WSDOT and other agencies that own or operate ferries. In this section enter data on gallons of diesel/biodiesel blend and kWh of shore power consumed by ferries. Adjust the biofuel % to correspond with agency records. Enter the number of ferries and hours of operation. If you don't have the hours of operation you can make an estimate or leave it blank.

Boats:
This includes any watercraft owned or operated by your agency (except ferries.) Enter the fuel use. Hours of operation are optional and only used to track efficiency changes over time (similar to mpg for on-road).

Aircraft:
For aircraft, enter the gallons of aviation gasoline and/or jet fuel, the number of aircraft, and hours of operation. If you don't have hours of operation make an estimate or leave this blank. Note the type of aircraft.
Tables 6 and 7 (summarizing total fuel use, # of vehicles and miles traveled) are automatically generated based on the data entered into Table 5.

Worksheet 4: Employee Business Travel and Commuting

This worksheet quantifies emissions for employee business travel in employee-owned vehicles, business-related air travel, and employee commuting. These are indirect (scope 3) emissions from sources not owned or operated by your agency but where the emissions are indirectly influenced by your agency's work.

Personally Owned Vehicles
Report on miles traveled in personally owned vehicles. This includes vehicles driven for state business but owned by employees. Employees apply for a travel reimbursement to recoup costs for the use of their vehicles. Calculate miles traveled by dividing total dollars reimbursed by the rate of agency reimbursement per mile. For 2015, the reimbursement rate is $0.575 per mile.

Air Travel
Enter the miles traveled in short, medium, and long distance flights.
- **Short flights** are 0-300 miles (based on a one-way flight) and include all in-state flights and flights to parts of Canada and Oregon.
- **Medium flights** are 300-700 miles (based on a one-way flight) and include flights to Idaho, western Montana, southern and western Oregon, and Northern California.
- **Long flights** are over 700 miles (based on a one-way flight) and include flights to southern California, the Midwest, and the East Coast.

The calculator provides air travel distances for common destinations and there is also a link you can use to get mileage for other destinations. If you do not have the miles traveled you can use the table in the calculator to estimate miles traveled based on the number of one-way flights and the destination. To estimate air miles traveled based on cost, divide the total airfare expenditures by $0.142 per passenger mile (Bureau of Transportation Statistics).

Employee Commuting
Enter total GHG emissions from employee commuting. This information will come from the WSDOT CTR Reports. Only certain agencies with worksites in the nine largest counties (Clark, Thurston, Pierce, King, Kitsap, Snohomish, Whatcom, Yakima and Spokane) with over 100 employees per worksite or co-located worksites participate in the CTR program. Starting in 2011 all worksites in Thurston County will start to participate in the CTR program.
If data is available, universities and community and technical colleges can report on emissions from student commuting separately by entering this into the comments section in the first tab of the workbook called Contents and Notes.

Worksheet 5: 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 1-4. Carbon dioxide emissions associated with bioenergy sources are not included in the totals.

Worksheet 6: Energy Use by Facility

This worksheet is optional and can be used to track building-related energy consumption by facility and/or site. The information included in this worksheet is **not linked** to worksheet 2 on building energy use. You will have to total the data and enter it into worksheet 2 to quantify GHGs related to building energy use.

Worksheet 7: Emissions Factors

Emissions factor

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 1. 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 8: Conversion Factors

Conversion factors are included for your reference. There is also a link to an online conversion calculator.

Contacts

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