City of Eugene, Oregon
2016 Operational Greenhouse Gas Inventory

Report prepared by Good Company, May 2017

Introduction

The City of Eugene previously conducted operational greenhouse gas (GHG) inventories based on 2000, 2005, and 2010 data. This inventory, based on 2016 data, provides an update to allow the City to assess its progress towards meeting its operational GHG goal of carbon neutrality by 2020 for Scope 1 and Scope 2 emissions (based on a 2010 baseline). The sources of emissions include: natural gas combustion by buildings; gasoline and diesel combustion by City-owned vehicles and equipment; and electricity and district steam use by buildings.[1]

Summary of Findings

Between 2010 and 2016, the City's Scope 1 and Scope 2 emissions have *decreased* by -1,416 MT CO_2e, or -19.5% compared to emissions in 2010, using market-based accounting for electricity.[2] This decrease is the result of Scope 2 electricity-related emissions, which have decreased by -489 MT CO_2e or -56.2%. Emissions from the City's fleet have *increased* by 81 MT CO_2e or 2.7%. Emissions from natural gas and district steam used to heat air and water at City facilities have *decreased* by -1,033 MT CO_2e or -30.1% since 2010. Scope 1 and Scope 2 emissions from City operations have *decreased* by -1,416 MT CO_2e or -19.5%. To meet Eugene's Climate Recovery Ordinance (CRO) targets, emissions will need to decrease another -2,951 MT CO_2e by 2020, or another 40.5% compared to 2010 emissions. City operational emissions have continued to *decrease* even as Eugene's population *increased* by 5% over the same period. As a result, City operational emissions per resident served (MT CO_2e / person) has decreased by -23% since 2010.

Figure 1: Summary of Scope 1 and Scope 2 (market-based) emissions, 2010, 2013, and 2016.

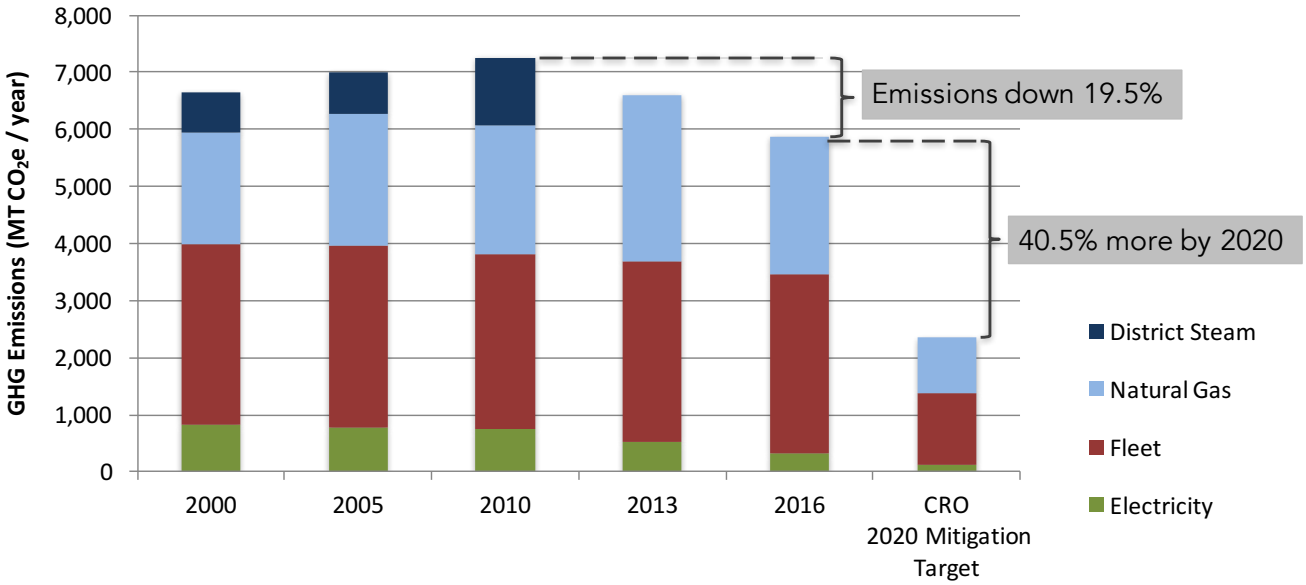


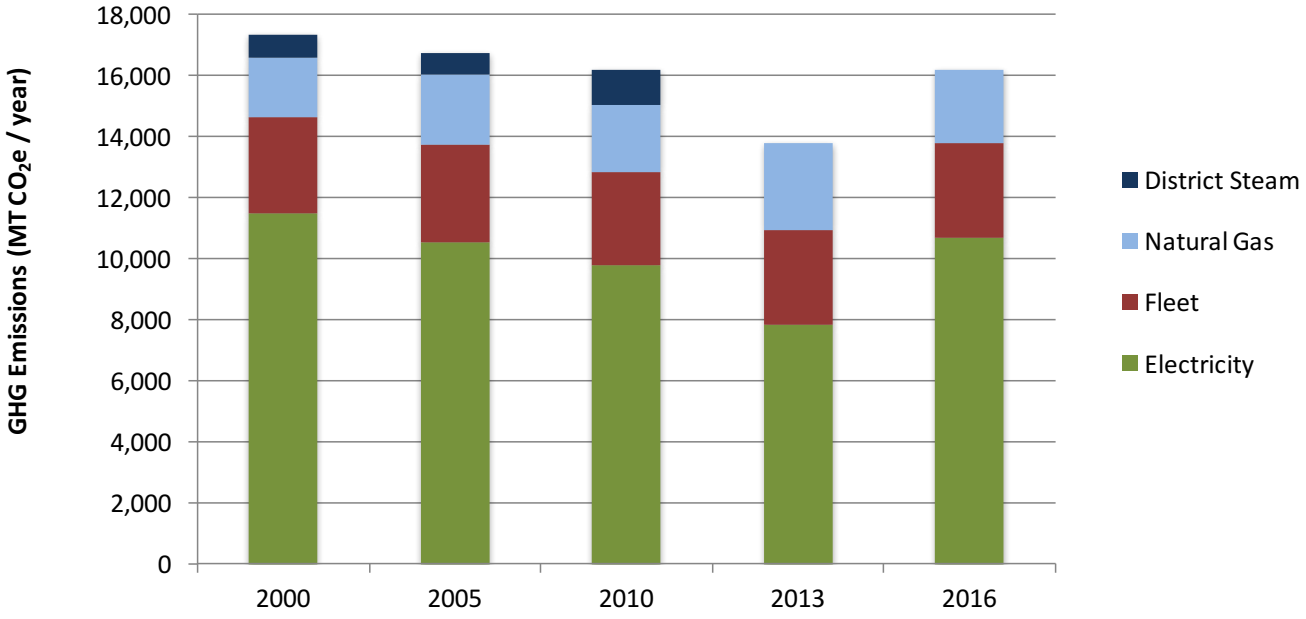
Figure 2 on the next page considers the same emissions sources, but uses the location-based accounting methodology for electricity emissions. For more details, see the Location-based versus Market-based accounting section on Page 4. All emissions values on Figure 2 are identical to Figure 1,

[1] Fugitive refrigerant leakage, a Scope 1 emissions source included previous inventories, is excluded from this update because these emissions were previously found to be relatively small in scale and data is time intensive to collect.

[2] While inventories were conducted in 2000 and 2005, 2010 is the first year presented here because the City's Climate Recovery Ordinance (20567) states that targets should be set and measured against a 2010 baseline.

except electricity which is significantly greater using the location-based methodology. This results in greater overall emissions, as well as a significant increase between 2013 and 2016. This increase is the result of significantly less low-carbon hydro-electricity being available on the regional grid, which increased the emissions intensity of Northwest electricity by more than 35% compared to 2012. Using the location-based electricity accounting method, Scope 1 and Scope 2 emissions are unchanged since 2010.

Figure 2: Summary of Scope 1 and Scope 2 (location-based) emissions, 2010, 2013, and 2016.

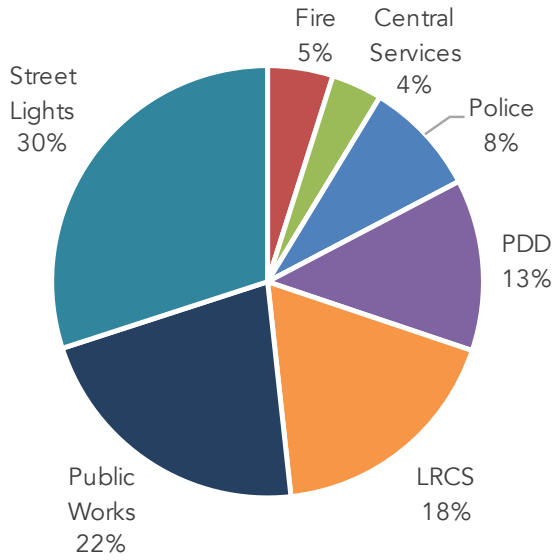


Detailed Findings

Electricity

In 2016, City buildings consumed 25,725 MWh of electricity and emitted 10,659 MT CO_2e (using location-based accounting) and 334 MT CO_2e (using market-based accounting). Within City operations the largest consumers of electricity include street lights, Public Works, Library, Recreation, and Cultural Services (LRCS), and Planning and Development (PDD). Overall the City's electricity consumption has increased by 1% between 2010 and 2016.

Figure 2: Summary of 2016 electricity use, by department / service area.



Location vs. Market-Based Electricity Accounting

The most widely used standard for public agency greenhouse gas inventories is the Greenhouse Gas Protocol's *Scope 2 Guidance*, which suggests that organizations account for Scope 2 emissions using two methods - location-based[3] and market-based[4].

Figure 3: Comparison of the City's location-based vs. market based electricity emissions. Note: Scope 1 emissions are provided for comparison purposes.

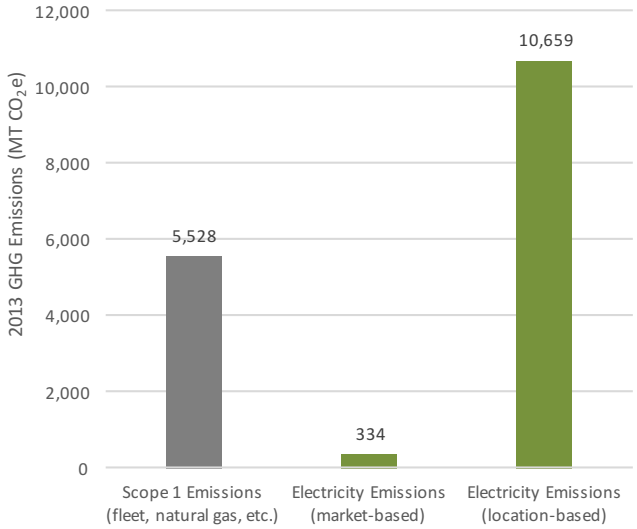


Figure 3 and 4 provide a comparison of emissions calculated using the location-based and market-based accounting methodologies. As is shown in Figure 4, the City purchases its electricity exclusively from EWEB and therefore market-based emissions are calculated solely using EWEB's utility-specific emissions factor. EWEB's emission factor is about 30 times less carbon intensive than the regional average. This is because EWEB is predominantly supplied through contracts with Bonneville Power Administration (BPA) and their generation supply is largely from low-carbon, hydroelectric and nuclear resources. EWEB's owned-generation resources are also from low-carbon sources (hydro and wind).

Figure 4: Details of location-based and market-based emissions calculations.

Accounting Method	Activity Data[1]		Emissions Factor		Emissions
	MWh / year	% of Total Use	Description	MT CO_2e / MWh	MT CO_2e
Location-Based	25,725	100%	Regional Grid Ave. (NWPP)[2]	0.414	10,659
				Location-Based Total:	**10,659**
Market-Based	25,725	100%	Utility-Specific (EWEB)[3]	0.013	334
	0	0%	Power Purchase Agreements	-	-
	0	0%	Renewable Energy Credits	-	-
				Market-Based Total:	**334**

Note 1: Activity data based on City of Eugene's 2016 electricity consumption.
Note 2: Northwest Power Pool (NWPP) Emissions Factor is from eGRID 2014. 2014 is the most recent factor available.
Note 3: Utility-Specific factor is based on 2016 reporting by Oregon Department of Environmental Quality (ODEQ).

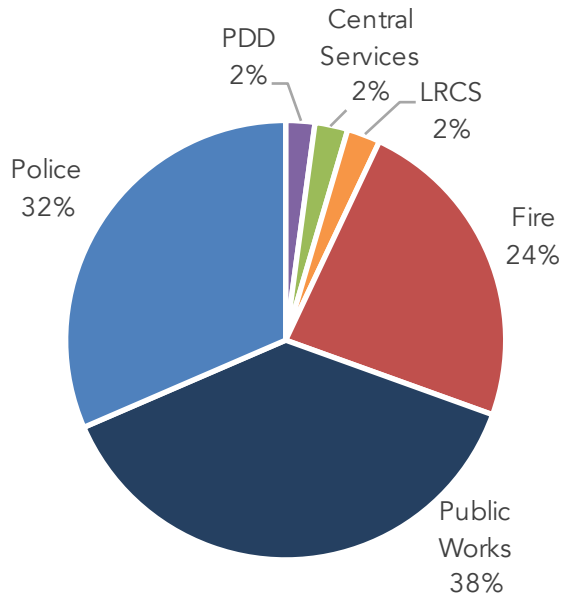
[3] **Location-based method (or regional grid)** represents the average emissions intensity of a specific electricity grid with defined geographic and temporal boundaries. It therefore represents the average GHG impacts associated with using or not using (due to efficiency or conservation) a kilowatt-hour of electricity by an organization. This method is focused on the connection between collective consumer demand and the emissions associated with supplying that demand and maintaining grid stability.

[4] **Market-based method (or utility specific)** represents emissions from the electricity generation contracts that an organization has purposefully chosen. Related choices could include selection of a specific electricity utility (in markets with more than one); contracting with a specific supplier (in a Power Purchase Agreement (PPA)); or the purchase of renewable energy credits (RECs). This accounting method documents the carbon intensity of "contractual instruments" that convey the "environmental attributes" from a specific electricity supplier to the purchaser.

Fleet

In 2016, the City's fleet consumed 382,000 gallons of fuel and emitted 3,552 MT CO_2e. The City's fleet is made up of a variety of vehicles and equipment that are primarily fueled with gasoline blended with ethanol (E10) and diesel blended with biodiesel (B5). The fleet also uses B20 and B50 blends for certain applications during certain times of the year. Biodiesel made up roughly 19% of the City's total diesel use in 2016. Figure 5 summarizes emissions, by department. Within City operations the largest consumers of fleet fuels include Police, Public Works, and Fire.

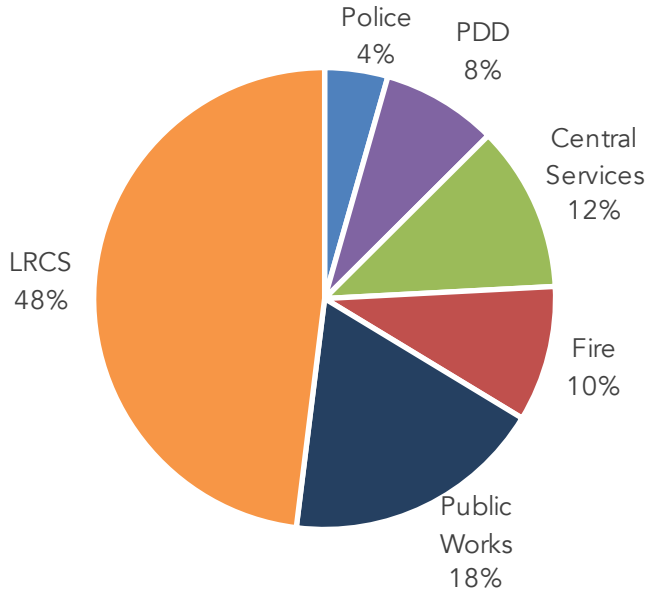
Figure 5: Summary of combined 2013 gasoline and diesel emissions, by department.



Facility Heat (Natural Gas and District Steam)

In 2013, City buildings consumed 467,746 therms of natural gas and emitted 2,481 MT CO_2e. The City's emissions from grid-supplied district steam and natural gas for facility heating needs have *increased* by 6% since 2010 and *decreased* by 18% since 2013. The recent decrease is likely due to the warmer winters we have experienced in recent years and the corresponding decrease in facility heating needs. City operations no longer use district steam as an energy source. These facilities have been transitioned to high-efficiency natural gas furnaces, which resulted in a net decrease in GHG emissions. Within City operations the largest consumers of natural gas include Fire and Emergency Services, Cultural Services, Library, Recreation, and Planning.

Figure 6: Summary of 2016 natural gas emissions, by department.



Methodology

The methodology used for this inventory follows The Climate Registry's *Local Government Operations Protocol*. Methodological details, as well as "GHG 101" information, is documented in the City's previous GHG inventory reports. The 2010 report may be downloaded at https://www.eugene-or.gov/DocumentCenter/View/9467. Note: Eugene's wastewater treatment plant emissions are under the management of a cooperative community partnership, Metropolitan Wastewater Management Commission (MWMC), not the City of Eugene. MWMC has completed independent GHG inventories for calendar years 2010, 2012, and 2014.

Thanks to City of Eugene staff – Lynne Eichner (facilities) and Denora Garfield (fleet fuel) – for providing data to support this inventory.