MEMORANDUM

EUGENE WATER & ELECTRIC BOARD

Rely on us.

TO:	Commissioners Brown, Carlson, Mital, Simpson and Helgeson
FROM:	Mike McCann, Electric Generation Manager; Lisa McLaughlin, Environmental Supervisor
DATE:	November 21, 2018
SUBJECT:	2017 EWEB Operational Greenhouse Gas Inventory
OBJECTIVE:	Information Only

Issue
EWEB has been tracking operational (internal) greenhouse gas (GHG) emissions since 2009. Included with this correspondence is the 2017 report.

Background
Sources of operational GHG emissions include natural gas, fleet fuel, electricity, and fugitive releases of refrigerants and insulating gas (SF_6).

Discussion
The purpose of the 2017 GHG report is to track progress towards EWEB's emissions reduction goals. It will also be posted on the EWEB website so that it may be easily viewed by the public.

Requested Board Action
None. This memorandum is provided for informational purposes only.

EUGENE WATER & ELECTRIC BOARD
2017 OPERATIONAL GREENHOUSE GAS INVENTORY

Executive Summary

Between 2009 and 2017, the Eugene Water & Electric Board's (EWEB) Scope 1 and 2 emissions have decreased by 3,972 MT CO_2e, or 35%, using location-based accounting for electricity. This decrease is primarily due to a 39% reduction in fossil fuel fleet emissions and a 30% reduction in electricity based emissions, which is largely the result of a reduction in the location-based emissions factor for electricity consumption (Figure 1). EWEB's emissions in 2016 were the lowest during the reporting period (2009-2017) at 7,404 MT CO_2e. This is primarily related to the relatively low location-based emissions factor that was applied to energy consumption that year, during which there was above average Columbia Basin snowpack that resulted in an optimal year for hydropower generation. EWEB's fleet also had its greatest reduction in emissions in 2016, at 56%, due to the increased use of biofuels. Figure 2 considers the same emissions sources, but uses the significantly lower market-based emissions factor (first made available in 2010). For more details on location-based vs. market-based accounting, see the section *Calculating the Carbon Footprint of Electricity Use* on page 12.

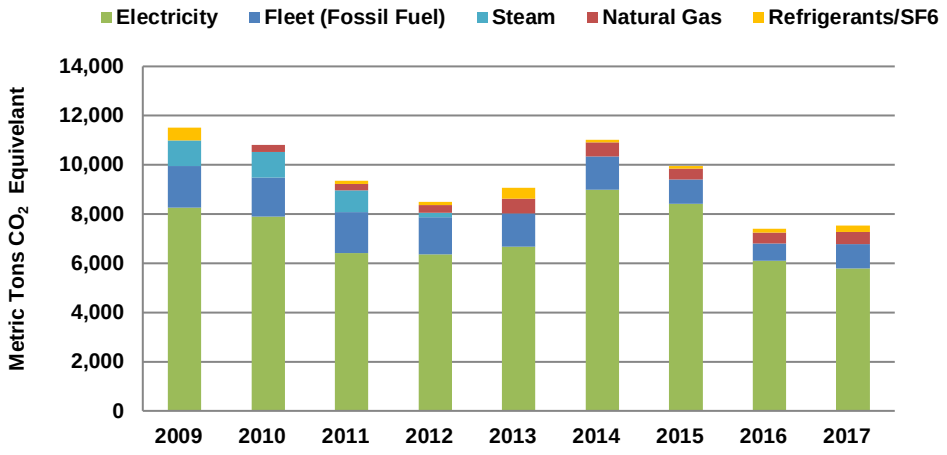


Figure 1. Scope 1 and 2 emissions using location-based emissions factor, 2009-2017.

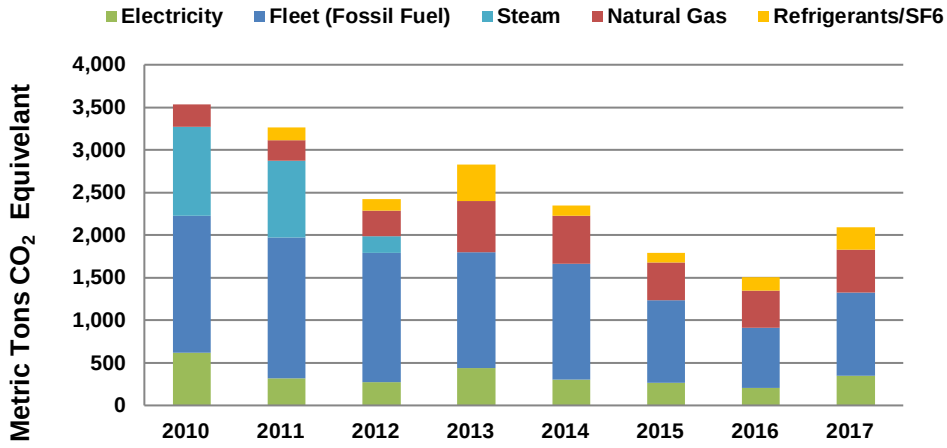


Figure 2. Scope 1 and 2 emissions using market-based emissions factor (first made available in 2010), 2010-2017.

Overview

In order to better understand our contribution to global climate change and to measure our progress in reducing our climate impacts, EWEB annually prepares a greenhouse gas (GHG) inventory. The focus is on the GHG emissions associated with core business operations, such as fleet fuel consumption, electricity, and natural gas use. In 2011, EWEB GHG emission reduction goals were developed to set a target for reductions within our own operations. The goals are:

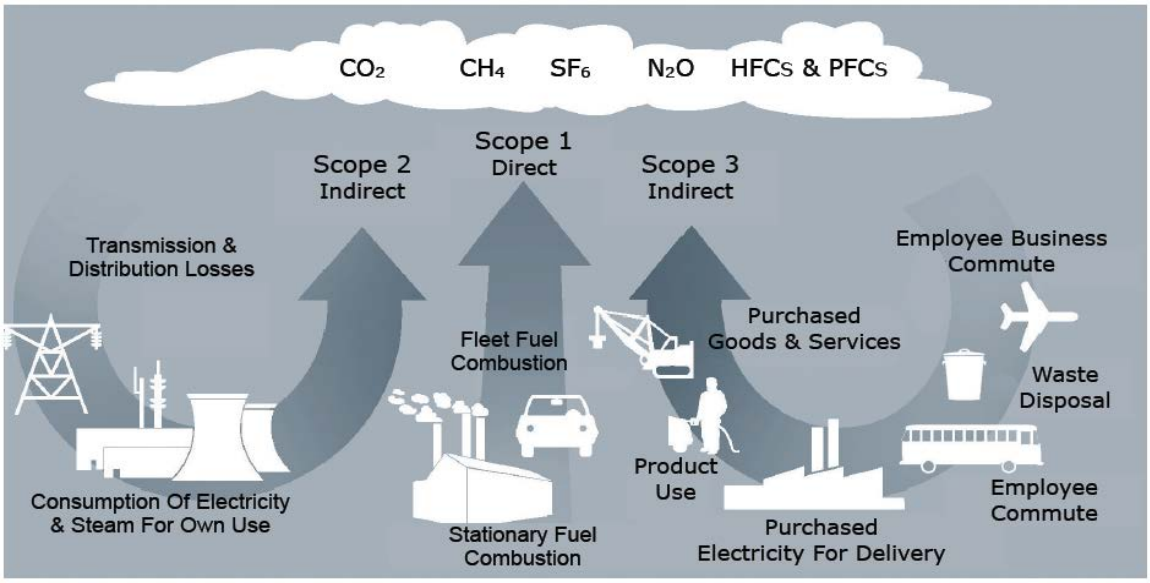
- By 2020 achieve greenhouse gas levels 25% below 2009 levels in all EWEB operations
- By 2030, reduce fossil fuel use by 50% (compared to 2009 levels)
- By 2050, EWEB operations will be carbon-neutral (i.e. reduce net carbon to zero)

In quantifying our operational emissions, EWEB follows the guidelines of The Climate Registry's General Reporting Protocol. Per The Climate Registry's protocol, emissions sources are divided into three reporting scopes (see Figure 3 below).

Scope 1 – This includes direct GHG emissions that originate from operations-based equipment and facilities owned or operated by EWEB, such as the stationary and mobile combustion of fossil fuels, including vehicles and generators. This also includes the fugitive release of sulfur hexafluoride (SF_6) from the operation of high voltage equipment used in electricity transmission and distribution equipment.

Scope 2 – This includes indirect GHG emissions associated with the purchase of electricity and steam for internal consumption.

Scope 3 – This includes all other indirect GHG emissions resulting from EWEB's operational activities that occur from sources owned or controlled by another entity, such as business travel, employee commute, embodied emissions in purchased goods and services, and emissions from land-filled solid waste.



Source: WRI/WBCSD Greenhouse Gas Protocol, Corporate Accounting and Reporting Standard (Revised Edition), Chapter 4.

Figure 3. Greenhouse gas accounting reporting scopes.

This inventory estimates emissions associated with EWEB's facility operations. The quantification of our facility operations emissions is limited to EWEB facilities in the Eugene-Springfield metropolitan area as well as the McKenzie River hydroelectric facilities (Leaburg-Walterville and Carmen-Smith).

In 2009-2014, the largest single source of emissions associated with EWEB's operations continued to be from our supply chain – those GHG emissions embodied in purchased goods and services. However, given the limitations of the methodology used to calculate these emissions, they should be considered estimates[1]. Due to changes in accounting practices that occurred in late 2014, it is no longer possible to estimate supply chain emissions. Therefore it wasn't calculated in 2015, nor will it be in future reports. This report focuses on Scope 1 and 2 emissions, specifically those attributed to natural gas combustion by buildings, gasoline and diesel combustion by EWEB owned vehicles and equipment, fugitive releases of refrigerants and insulating gas (SF_6), and electricity use in buildings.

EWEB's ability to manage our GHG emissions varies considerably across emission scopes. We have specific control over some sources, such as our vehicle fleet, and can and do take direct steps to minimize emissions associated with the utilization of these vehicles. Influencing emissions in our supply chain is more challenging, as we do not control the energy and carbon intensity of our suppliers manufacturing processes. However, we can seek to mitigate our supply chain emissions by making changes in our purchasing decisions by specifying lower carbon intensive products (e.g., choosing goods with high recycled content).

Calculating the Carbon Footprint of Electricity Use: Location vs. Market-Based Electricity Accounting

The most widely used standard to account for Scope 2 (Electricity) emissions is the Greenhouse Gas Protocol's Scope 2 Guidance, which directs organizations to use two methods -location-based and market-based.

The location-based method (or regional grid) reflects the average emissions intensity of the Northwest Power Pool (NWPP). The market-based (or utility specific) method reflects emissions from the specific utility.

EWEB's market-based emissions factor is developed through the annual reporting process to the Oregon Department of Environmental Quality (DEQ), in which consumer-owned utilities, like EWEB, are required to report the megawatt hours of electricity distributed to end users of electricity in Oregon (i.e., our retail customers) and the source of that electricity. EWEB's market-based emissions factor is about 17 times less carbon intensive than the regional average and about 25 times less than the national average (Table 1 & Figure 4).

EWEB's 2017 GHG report to DEQ reflects that 81% of the power distributed to our retail customers in 2017 was from BPA (a combination of hydroelectric, nuclear, wind, and unspecified market purchases), 12% was from EWEB's owned hydroelectric resources, and the remaining 7% came from a combination of owned and purchased resources. The carbon intensity can fluctuate significantly from year to year based on the amount of hydroelectric power generated by BPA.

[1] The methodology for estimating supply chain carbon is Economic Input-Output Life-Cycle Analysis (EIOLCA). EIOLCA, while reputable and credible as an estimation tool, lacks precision because the analysis is not built on vendor-specific data. Therefore, the estimate, while useful for "sense of scale", is not precise.

Table 1. Comparison of location-based and market-based emission factors.

Accounting Method	2017 EWEB Operational Consumption (MWh)	Emissions Factor (MT CO_2e/MWh)	Emissions (MT CO2e)
Location-Based (NWPP)[2]	19,509	0.297	5,794
Market-Based (EWEB)[3]		0.018	351
National Average[2]		0.455	8,876

2. Northwest Power Pool (NWPP) Emissions Factor is from eGRID 2016. 2016 is the most recent factor available.

3. EWEB Emissions Factor is based on 2017 reporting by Oregon Department of Environmental Quality.

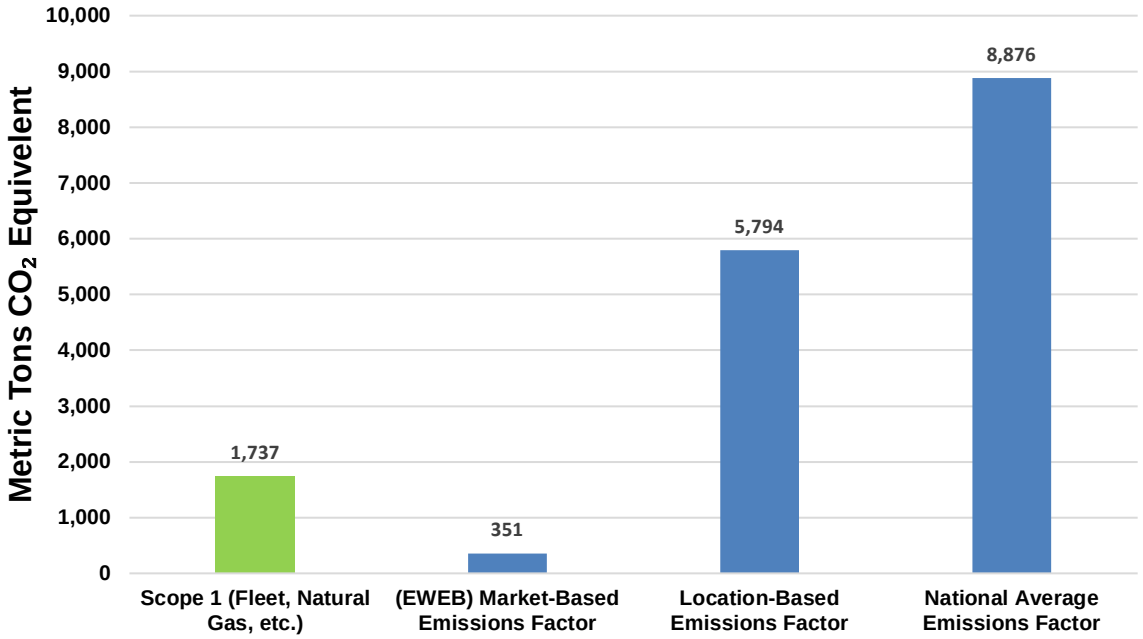


Figure 4. Comparison of market-based, location-based, and the national average emissions factors for Scope 2 (electricity) GHG emissions. Scope 1 emissions are presented for comparison purposes, 2017.

Electricity Consumption

In 2017, EWEB buildings consumed 19,509 MWh of electricity and emitted 5,794 MT CO_2e (using location-based accounting) and 351 MT CO_2e (using market-based accounting). The operation of the Hayden Bridge Treatment Plant and pump stations account for the majority (60%) of EWEB's electricity consumption, at 11,714 MWh. The Headquarters building is the second-largest source of electricity consumption (3,198 MWh), followed by the Roosevelt Operations Center (2,591 MWh). Electricity use at EWEB's McKenzie River hydroelectric facilities, substations, and other Eugene facilities accounted for (2,006 MWh) (Figure 5). There was a 9% reduction in electricity consumption in 2017 compared to 2009 (Figure 6).

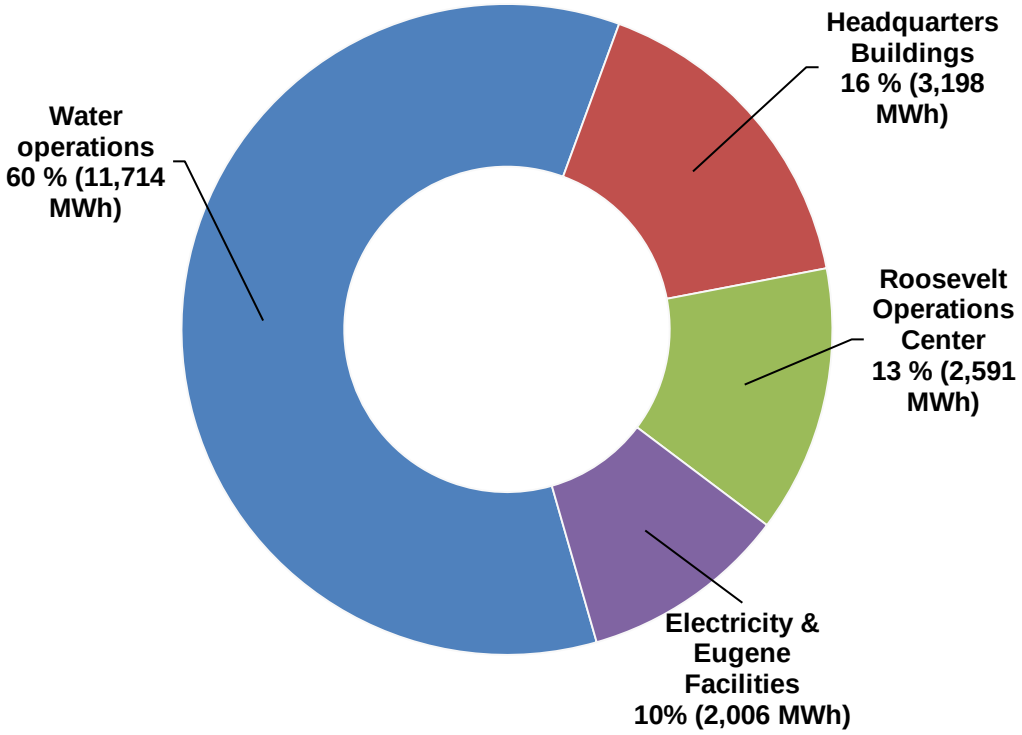


Figure 5. Electricity consumption by EWEB facilities, 2016-2017 average.

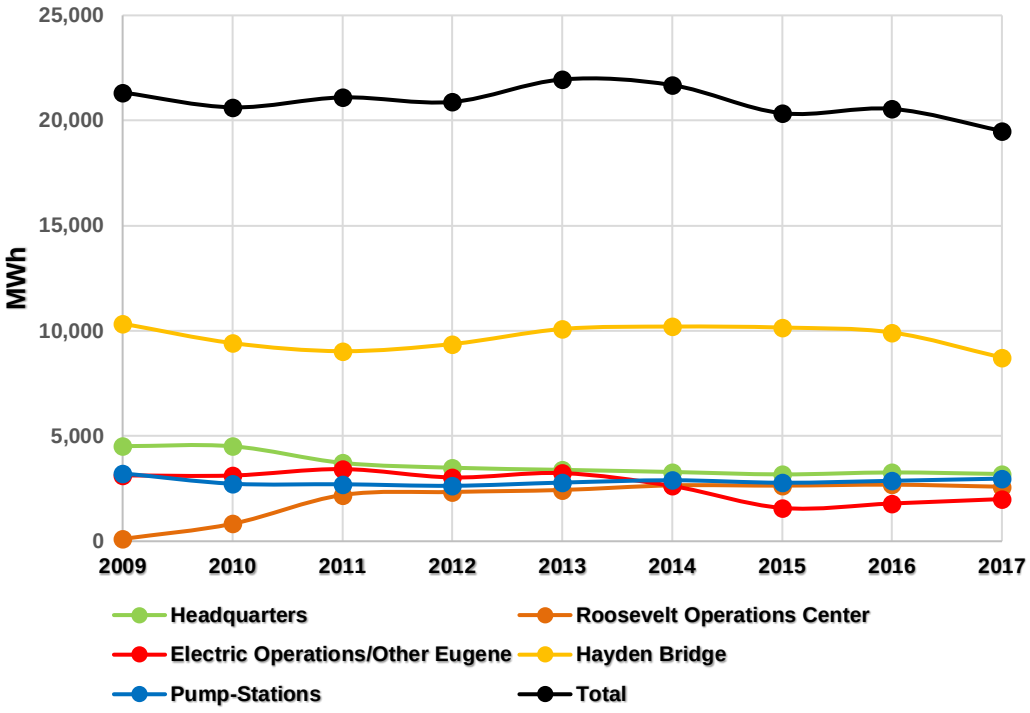


Figure 6. Electricity consumption by EWEB facilities, 2009-2017.

Natural Gas Consumption

EWEB facilities consumed 98,922 therms of natural gas in 2017 and emitted 505 MT CO_2e. Natural gas consumption at the Headquarters building and the Roosevelt Operations Center were 47,522 and 51,401 therms, respectively. Natural gas consumption at the Headquarters building began in 2012, following the decommissioning of the steam plant, which had supplied steam heating for 50 years up to that point. Although there was an 8% reduction in natural gas consumption between 2013 and 2016, there was a 16% increase in 2017 (Figure 8).

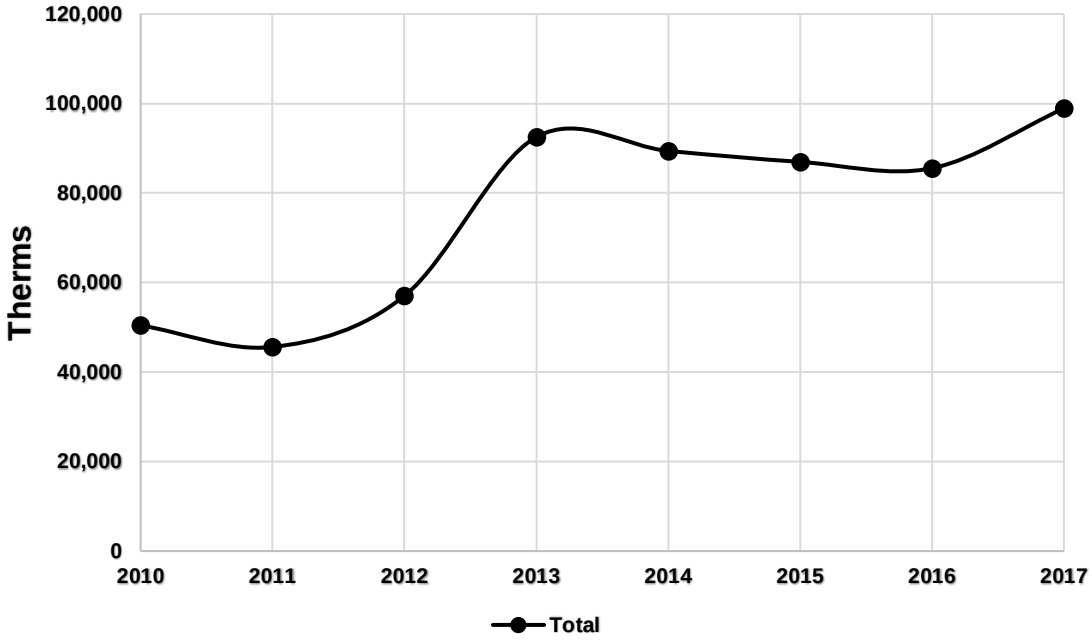


Figure 8. Natural gas consumption by the Roosevelt Operations Center and Headquarters Building, 2010-2017.

Fleet Fuel Consumption

In 2017, EWEB's fleet consumed 175,383 gallons of fuel, 60% of which was fossil fuels (gasoline and diesel) and 40% was biofuels (ethanol and biodiesel) (Figure 9). Fossil fuel consumption accounted for 973 MT CO_2e of emissions. There has been a 42% decrease in the use of fossil fuels and an almost sixfold increase in biofuel use since 2009, which has resulted in a 42% decrease in emissions during this time period. Although EWEB's fleet is primarily fueled by gasoline blended with ethanol (E15 and E85) and diesel blended with biodiesel (B5, B15, B30), an increased amount (80,295 gal.) of renewable diesel (R99) was purchased in 2016, which resulted in a 56% reduction in emissions and the lowest levels during the reporting period (2009-2017), at 708 MT CO_2e.

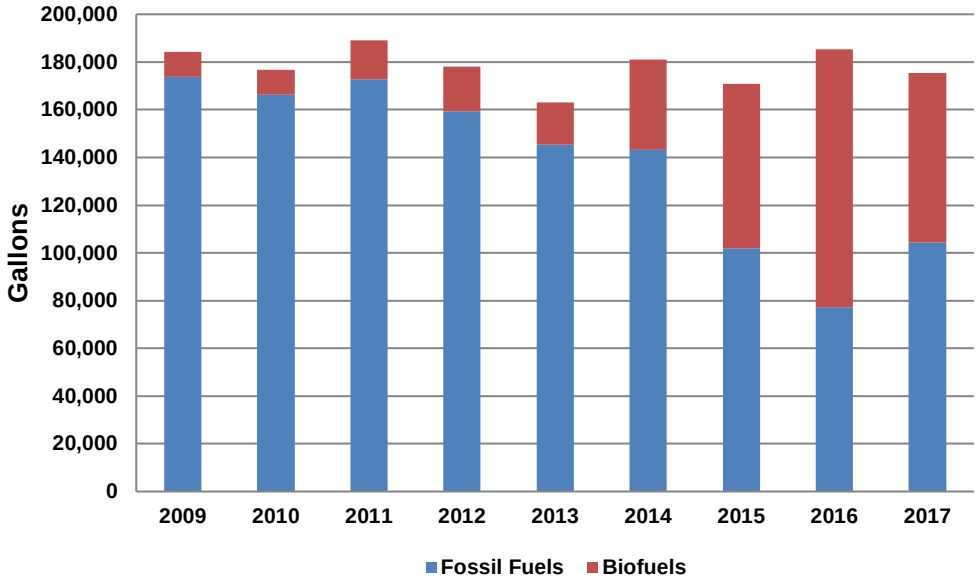


Figure 9. Fuel consumption by EWEB's fleet, 2009-2017.

Conclusion

Using the location-based (regional) emission factor, Scope 1 (fleet, natural gas, etc.) and 2 (electricity) emissions were 7,531 MT CO2e in 2017, however when using the market-based (EWEB) factor they were 72% less, at 2,088 MT CO2e. Figure 10 shows the trend, using the location-based emissions factor, in Scope 1 and 2 emissions (the dashed red line) compared to historic GHG emission levels (the shaded blue area) and the GHG emission levels EWEB needs to meet to achieve emissions reduction goals (the shaded green area). At the current rate, EWEB has already reduced emissions by 35%, ahead of the 25% goal, and is projected to reduce emissions by 38% by 2020. Figure 11 shows the trend, using the market-based emissions factor (2010 is the earliest year with this factor) for Scope 1 and 2 emissions. At the current rate, EWEB has already reduced emission by 41% and would achieve a 76% reduction by 2020. The discrepancy in emissions underscores the importance of considering both factors when conducting a GHG inventory and the context provided by the location-based factor suggests that the combination of a low carbon power portfolio and marginal changes in internal electricity consumption can translate into meaningful emissions reduction. The significant reduction (56%) in fleet emissions in 2016 highlights the importance that biofuels and fuel conservation play in EWEB's emissions reduction strategy.

For more information, contact Lisa McLaughlin, EWEB's Environmental Manager, at Lisa.mclaughlin@eweb.org, or Andrew Janos, Environmental Specialist, at Andrew.janos@eweb.org.

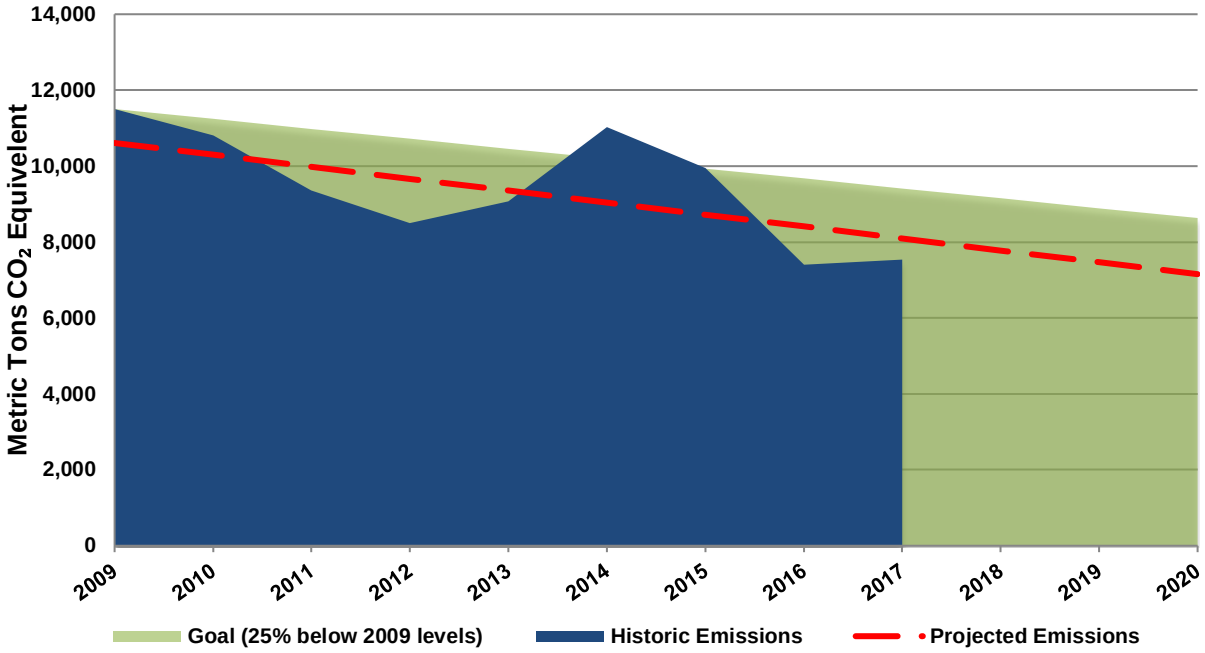


Figure 10. Projected Scope 1 and 2 GHG emissions using the location-based (regional) emissions factor.

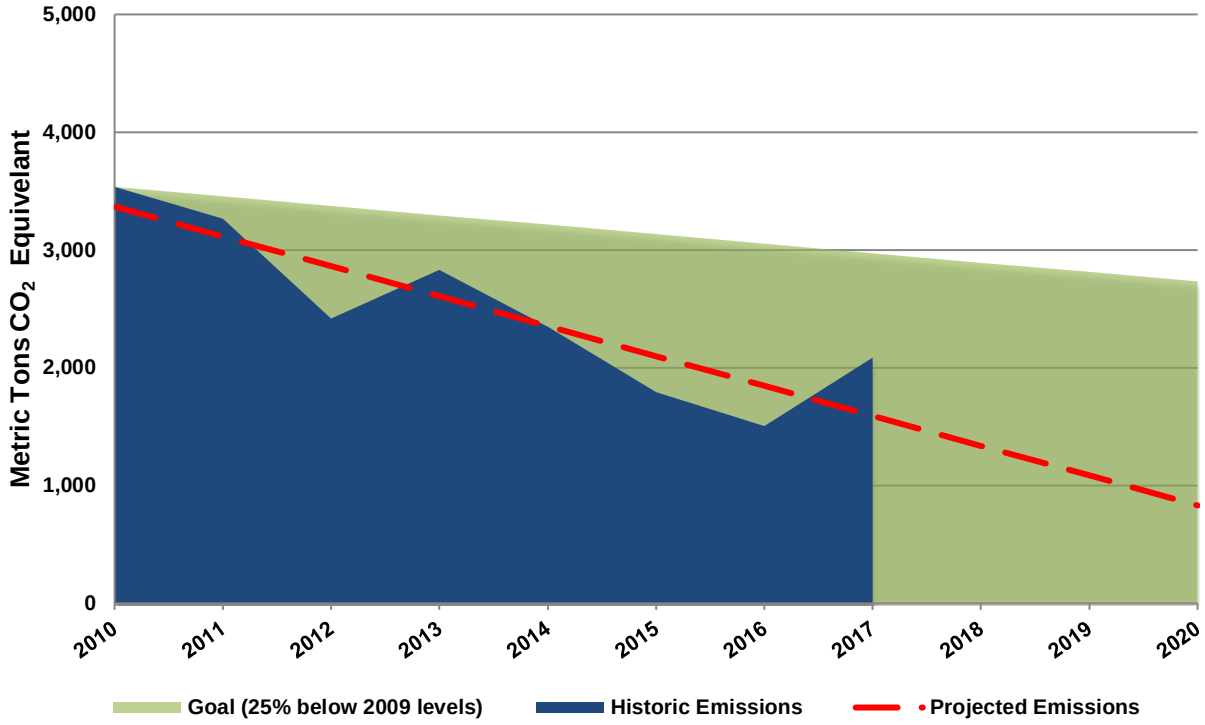


Figure 11. Projected Scope 1 and 2 GHG emissions using the market-based (EWEB) emissions factor.