

EUGENE WATER & ELECTRIC BOARD
2019 OPERATIONAL GREENHOUSE GAS
INVENTORY



Executive Summary

Between 2009 and 2019, the Eugene Water & Electric Board's (EWEB) cumulative operations based emissions (Scope 1 and 2) have decreased by 4,457 metric tons of carbon dioxide equivalent (MT CO₂e), or 39%, using location-based accounting for electricity. This decrease is primarily due to a 49% reduction in fossil fuel fleet emissions and a 33% reduction in electricity based emissions, which is largely the result of a reduction in the location-based emissions factor for electricity consumption (Figure 1). Figure 2 considers the same emissions sources, but uses the significantly lower market-based emissions factor (first made available in 2010). At the current rate, EWEB has reduced emissions by 39%, ahead of the 25% goal, and is projected to reduce emissions by 42% by 2020. Figure 12 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 reduced emission by 50% and would achieve a 63% reduction by 2020.

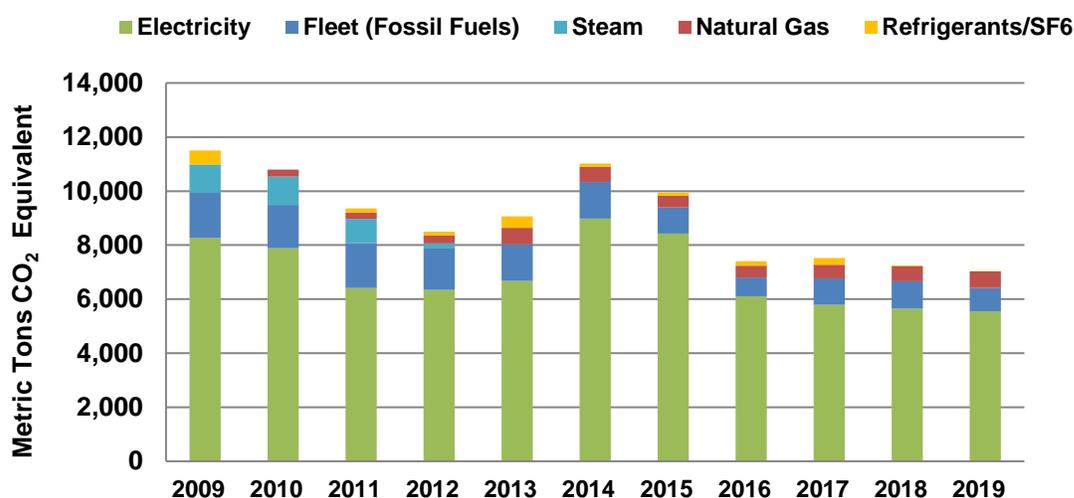


Figure 1. Scope 1 and 2 emissions using location-based emissions factor, 2009-2019.

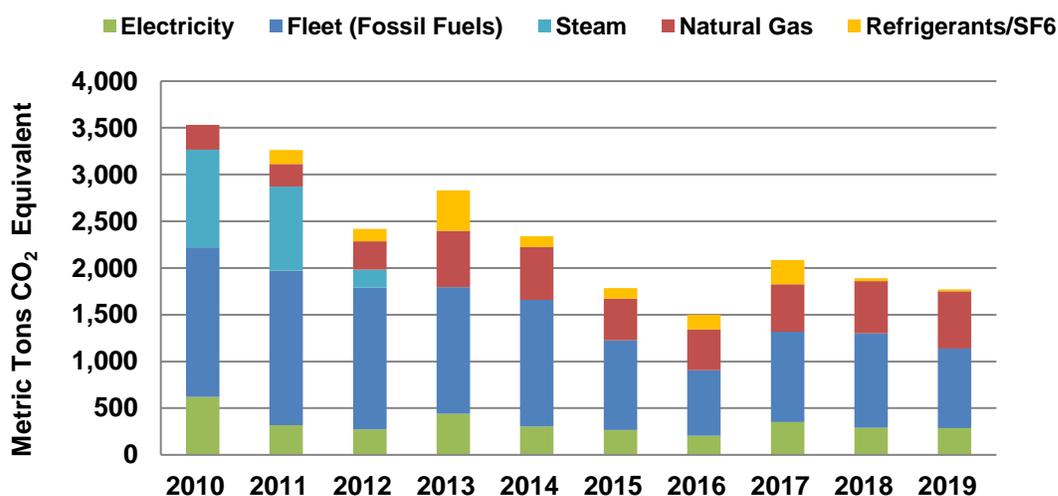


Figure 2. Scope 1 and 2 emissions using market-based emissions factor (first made available in 2010), 2010-2019.

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:

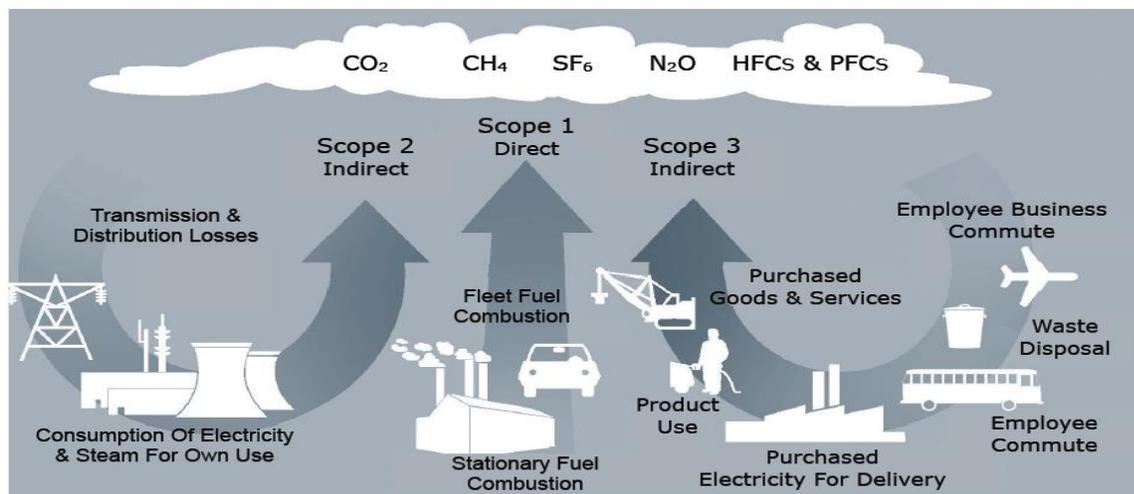
- By 2020 achieve greenhouse gas levels 25% below 2009 levels in all EWEB operations
- By 2030, reduce fossil fuel use by 50% (compared to 2009 levels)
- By 2050, EWEB operations will be carbon-neutral (i.e. reduce net carbon to zero)

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 (SF₆) from the operation of high voltage equipment used in electricity transmission and distribution.

Scope 2 – This includes indirect GHG emissions associated with the purchase of electricity and steam for internal consumption¹.

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.

¹ 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.

This inventory estimates emissions associated with EWEB's facility operations. It is limited to EWEB facilities in the Eugene-Springfield metropolitan area and the McKenzie River hydroelectric facilities (Leaburg-Waltermville and Carmen-Smith).

From 2009-2014, the largest single source of emissions associated with EWEB's operations were from our supply chain – those GHG emissions embodied in purchased goods and services. However, given the limitations of the method used to calculate these emissions, they should be considered estimates². It has not been possible to estimate supply chain emissions since 2014 due to changes in accounting and asset management practices that occurred late in that year. Therefore, 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 (SF₆), 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 actively take direct steps to minimize emissions associated with the utilization of these vehicles. Influencing emissions in our supply chain is more challenging because 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 purchasing decisions that consider the carbon intensity of 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 19 times less carbon intensive than the regional average and about 29 times less than the national average (Table 1 & Figure 4).

In 2019, 83% of the power distributed to EWEB's retail customers was from BPA (a combination of hydroelectric, nuclear, wind, and unspecified market purchases), 5% was from EWEB's owned hydroelectric resources, and the remaining 12% 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 and EWEB's own resources. Such was the case in 2019, when the Leaburg Project was offline for the whole year and the Carmen-Smith Project experienced prolonged outages.

² The methodology for estimating supply chain carbon is Economic Input-Output Life-Cycle Analysis (EIO-LCA). EIO-LCA, 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	2019 EWEB Operational Consumption (MWh)	Emissions Factor (MT CO ₂ e/MWh)	Emissions (MT CO ₂ e)
Location-Based (NWPP) ¹	19,029	0.292	5,557
Market-Based (EWEB) ²		0.015	285
National Average ¹		0.432	8,221

1. Northwest Power Pool (NWPP) and National Average emissions factors are from eGRID 2018. eGrid is the standard emissions factor in the Climate Registry's General Reporting Protocol and has been used since the 2009 baseline year. 2018 is the most recent factor available

2. The EWEB emissions factor for 2019 was not available from the Oregon Department of Environmental Quality at the time of this report. Therefore, the 2018 emissions factor was used.

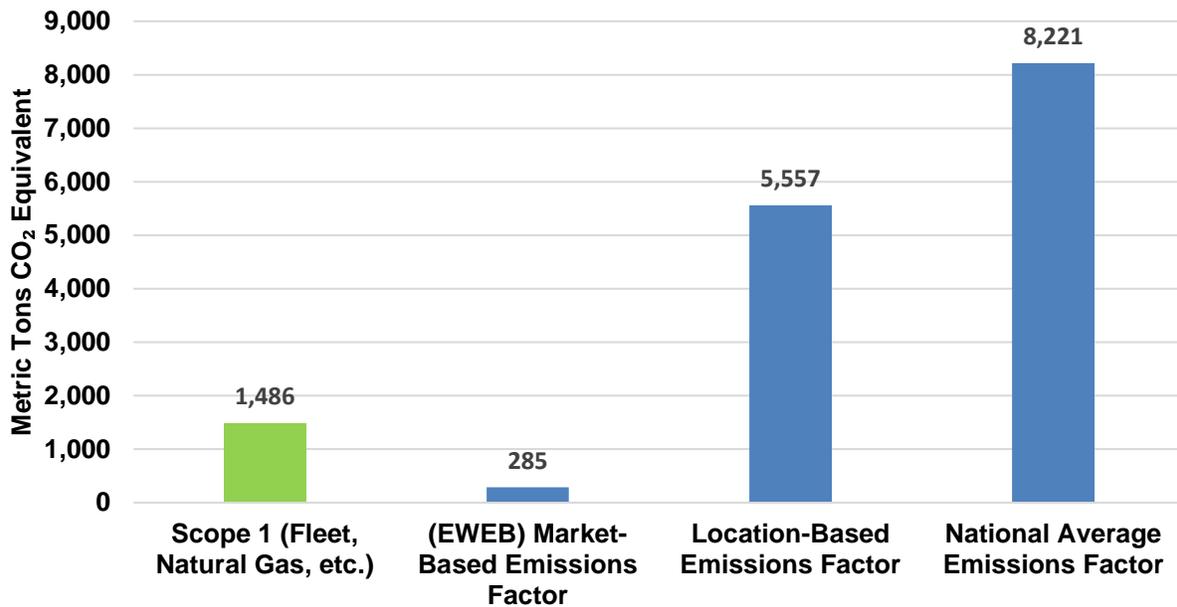


Figure 4. Comparison of market-based, location-based, and the national average emissions factors for Scope 2 (electricity) GHG emissions. Scope 1 emissions are presented for comparison purposes, 2019.

Electricity Consumption

In 2019, EWEB buildings consumed 19,029 MWh of electricity and emitted 5,557 MT CO₂e (using location-based accounting) and 285 MT CO₂e (using market-based accounting). The operation of the Hayden Bridge Treatment Plant and pump stations account for the majority (65%) of EWEB's electricity consumption, at 12,500 MWh. The Roosevelt Operations Center is the second-largest source of electricity consumption (2,583 MWh), followed by the Headquarters building (2,522 MWh). Electricity use at EWEB's McKenzie River hydroelectric projects, substations, and other Eugene facilities accounted for (1,424 MWh) (Figure 5). There was a 11% reduction in electricity consumption in 2019 compared to 2009 (Figure 6).

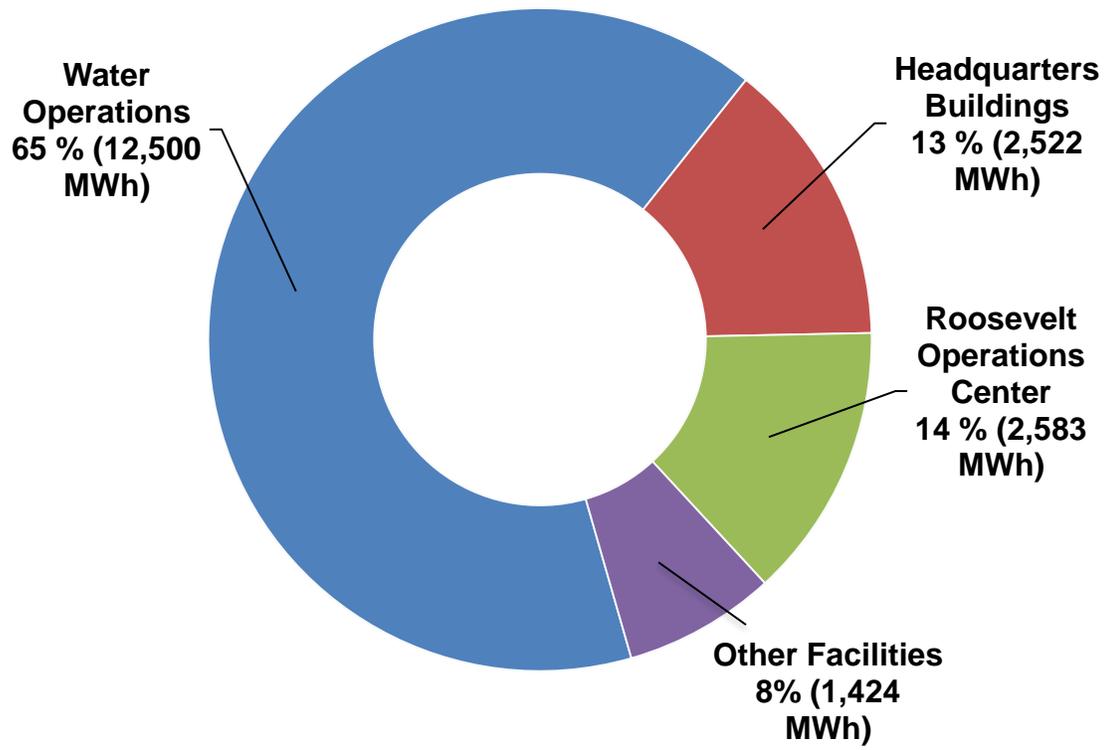


Figure 5. Electricity consumption by EWEB facilities, 2019.

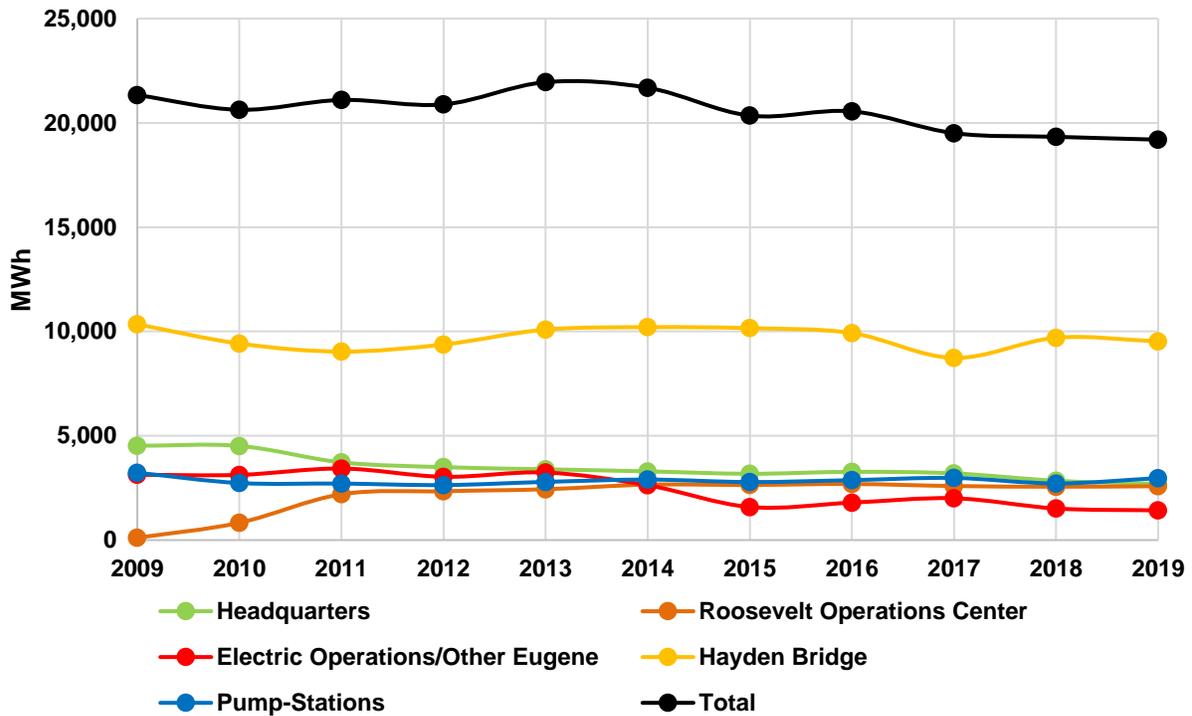


Figure 6. Electricity consumption by EWEB facilities, 2009-2019.

Natural Gas Consumption

EWEB facilities consumed 125,512 therms of natural gas in 2019 and emitted 611 MT CO₂e. Natural gas consumption at the Headquarters building and the Roosevelt Operations Center were 75,408 and 50,105 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 has been a 46% increase since then, primarily due to an increase of use at the Headquarters building (Figure 8).

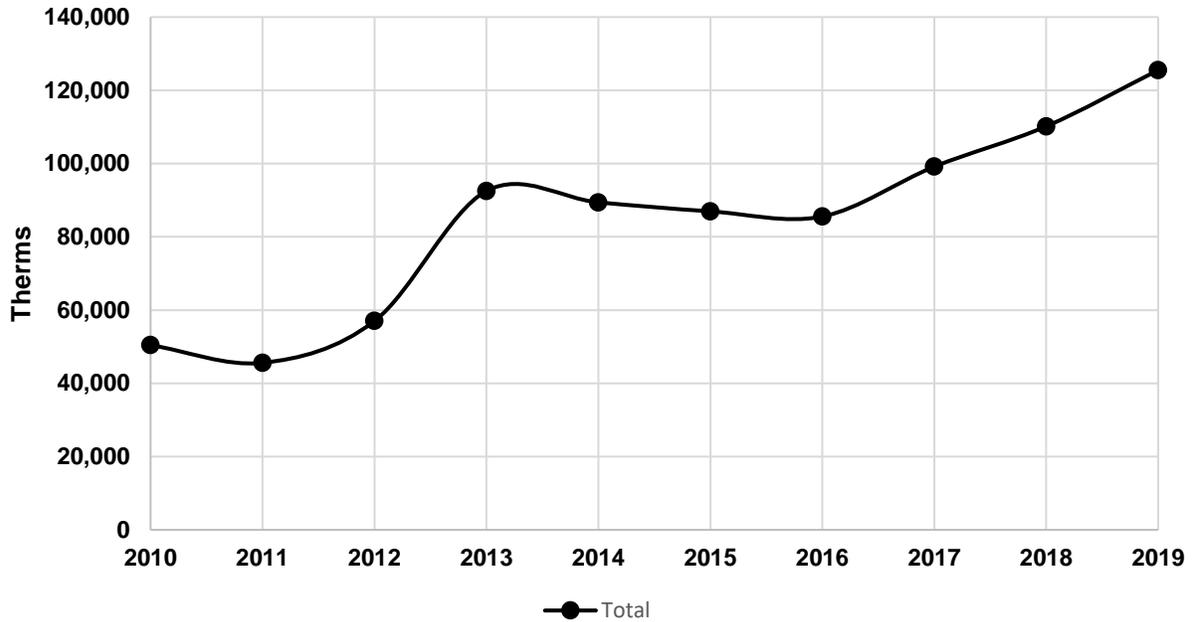


Figure 8. Natural gas consumption at the Roosevelt Operations Center and Headquarters Building combined, 2010-2019.

Fleet Fuel Consumption

In 2019, EWEB’s fleet consumed 187,308 gallons of fuel, 49% of which was fossil fuels (gasoline and diesel) and 51% was biofuels (ethanol and renewable diesel) (Figure 9). Fossil fuel consumption accounted for 854 MT CO₂e of emissions. There has been an almost thirteen-fold increase in biofuel use since 2009, which has resulted in a 49% decrease in emissions during this time period (Figure 10). 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 (2009-2019), at 702 MT CO₂e. As the demand for low carbon intensity (CI) fuels increased, lower blend levels of renewable diesel were purchased in 2017 and 2018 (68,039 and 60,997 respectively) due to higher cost. As Oregon’s Clean Fuels Program continues to mature, the greater availability of lower CI alternative fuels are beginning to offset the added cost. In 2019, EWEB increased its blend ratios of alternative fuels by 54% over 2018. As a result, fleet-based emissions were the second lowest in the reporting period (2009-2019), at 854 702 MT CO₂e.

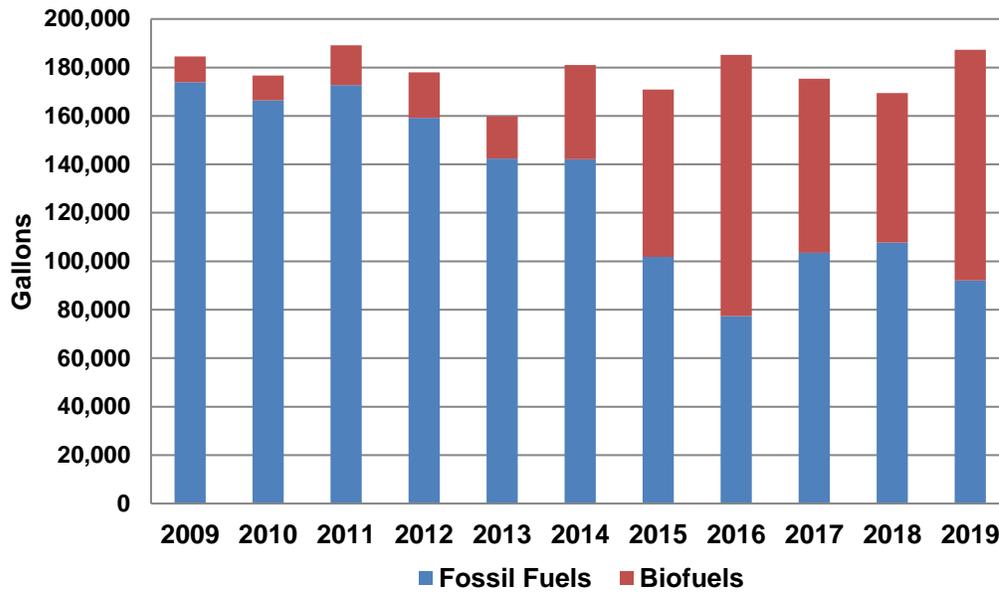


Figure 9. Fuel consumption by EWEB's fleet, 2009-2019.

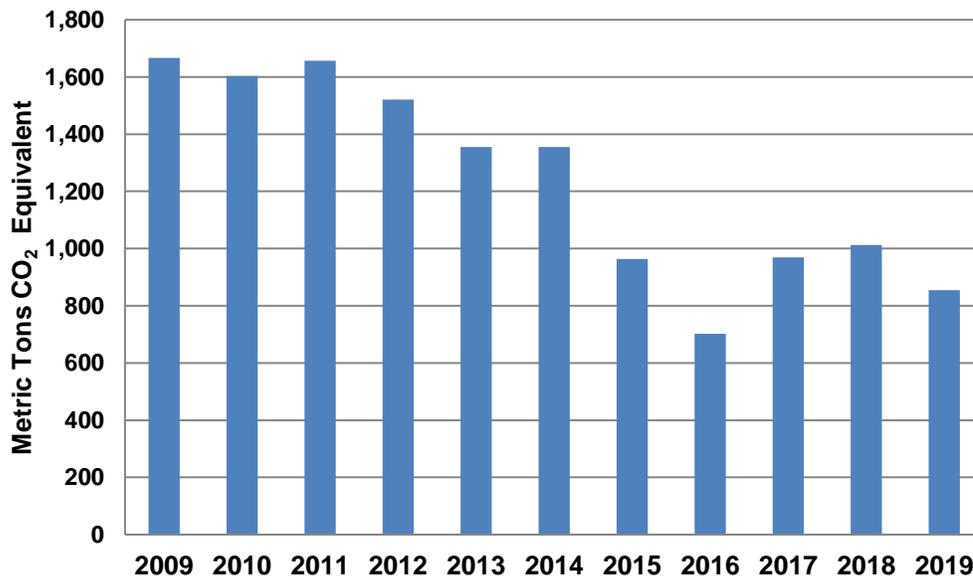


Figure 10. EWEB fleet emissions (fossil fuels), 2009-2019.

Conclusion

Using the location-based (regional) emission factor, Scope 1 (fleet, natural gas, etc.) and Scope 2 (electricity) emissions were 7,043 MT CO₂e in 2019. However, when using the market-based (EWEB) factor they were 75% less, at 1,771 MT CO₂e. Figure 11 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 39%, ahead of the 25% goal, and is projected to reduce emissions by 42% by 2020. Figure 12 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 emissions by 50% and would achieve a 63% 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 reductions in emissions. EWEB's fleet continues to be the component in EWEB's operations that offers the most tangible and effective emissions reduction potential. Fleet accounts for 49% of Scope 1 & 2 emissions (using the market-based factor for electricity). The 16% reduction in emissions in 2019 highlights the importance that biofuels and fuel conservation play in EWEB's emissions reduction strategy. The increase in the blend ratio of alternative fuels in 2019 suggests that this trend will continue. Although both electricity and fleet emissions are trending down, natural gas usage has increased by 46% since 2016 and has cut into those gains. This is likely due to the tenant occupying floorspace at the HQ building.

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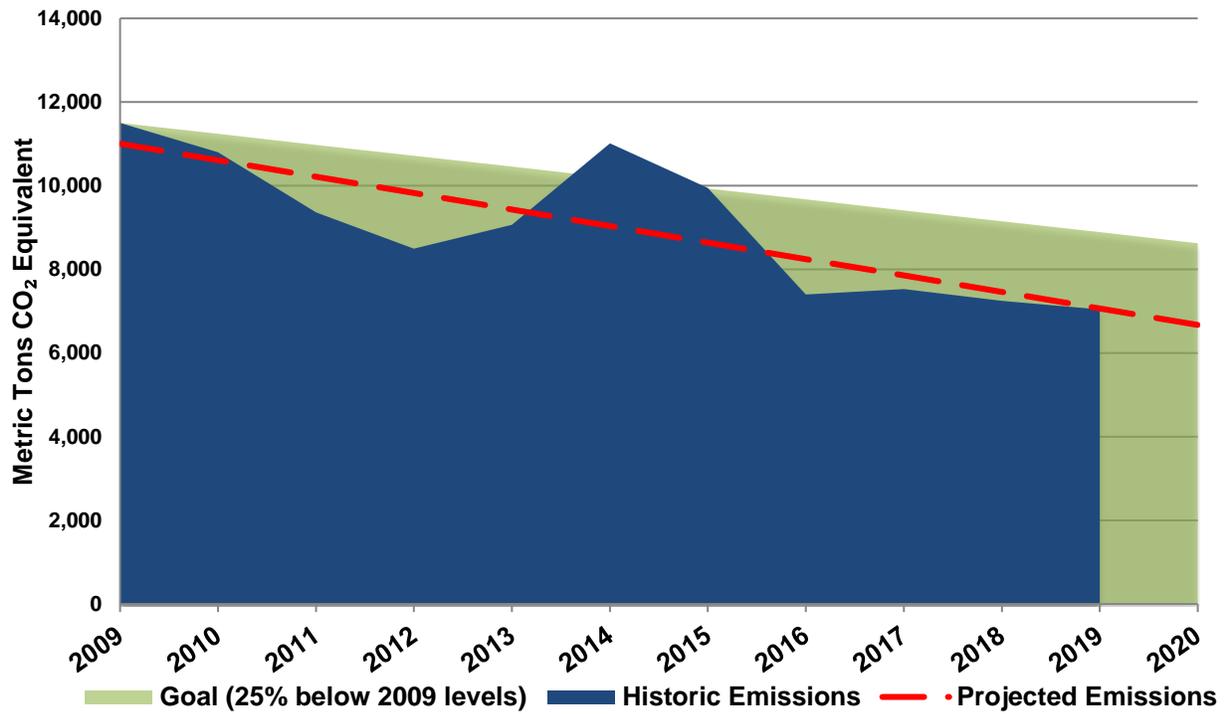


Figure 11. Projected Scope 1 and 2 GHG emissions using the location-based (regional) emissions factor.

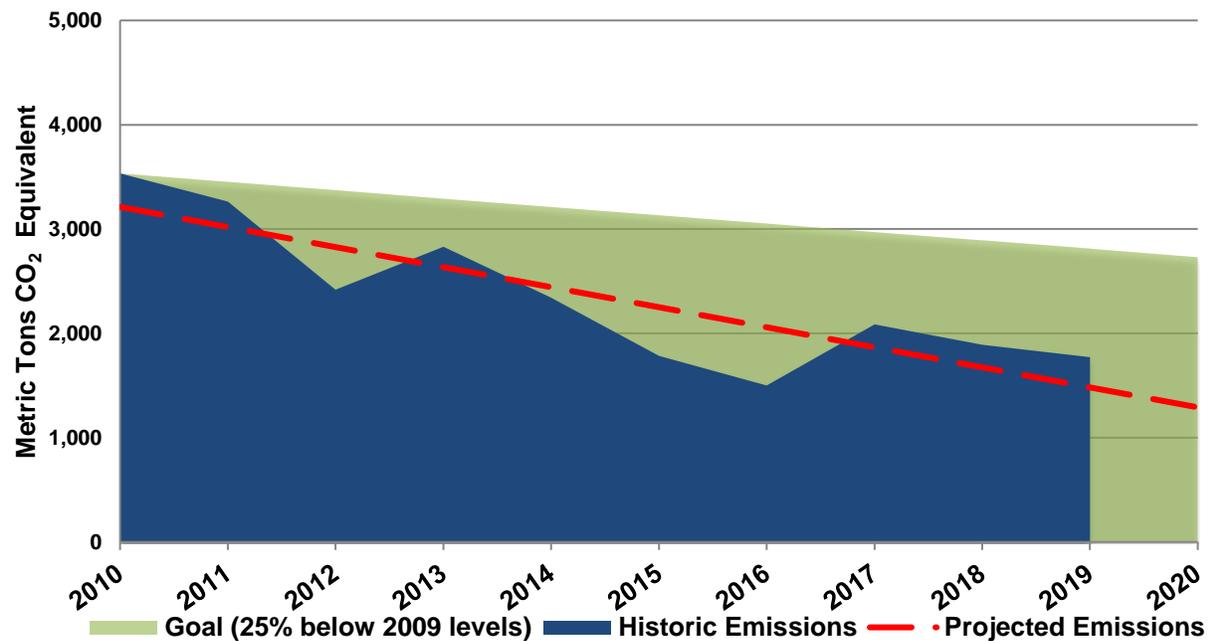


Figure 12. Projected Scope 1 and 2 GHG emissions using the market-based (EWEB) emissions factor.