

MEMORANDUM

DATE: June 28, 2022

TO: Adrienne Hegedus and Kurt Baumgarten, Port of Bellingham

FROM: Janice Gedlund, Cogent Environmental Consulting, LLC



SUBJECT: Recommendations for 2019 and Future Greenhouse Gas Inventories

Introduction

The Port of Bellingham (Port) requested a review of its 2019 greenhouse gas (GHG) inventory and recommendations for future inventories. The 2019 GHG Inventory was completed in December 2020 as the Port began developing a Climate Action Strategy (CAS). Now that plans for the CAS are coalescing, we are reevaluating the 2019 GHG Inventory as the base year for future inventories that will help gauge progress in meeting the Port's climate mitigation goals. This memo presents the results of that evaluation, per Task 2.1.a of the Climate Action Strategy 2022 Scope of Work.

Included below are a summary of the 2019 GHG Inventory process, suggestions to refine the 2019 GHG inventory, and recommendations for future inventory management—including discussion of individual emission sources and overall GHG accounting practices. (A separate analysis of Green Marine reporting requirements for GHG inventories was completed in April 2022.)

Summary of the 2019 GHG Inventory Process

Purpose

The Port's 2019 GHG Inventory (Inventory) was developed to quantify the Port's Scope 1-2 emissions, as well as Scope 3 employee commute emissions, to inform the development of a CAS. We expect that 2019 will be the base year against which emissions will be tracked going forward.

Methodology

The Climate Registry General Reporting Protocol, a widely accepted methodology, was the reference for the Inventory.¹ The Inventory was prepared with assistance from Cogent Environmental, based on emission source data provided by the Port and its vendors. The Port has indicated that it does not plan to have the inventory third-party verified, which is an optional step under the protocol.

¹ [General Reporting Protocol | The Climate Registry](#)

The organizational boundary of the Inventory encompasses all activities within the Port's legal and organizational structure over which it can introduce and implement operating policies. This includes operation of Bellingham International Airport, Bellingham Cruise Terminal, Bellingham Shipping Terminal, Blaine Harbor Marina, Squalicum Harbor Marina, real estate holdings, and public parks.

The operational boundary of the Inventory includes Scope 1 and 2 emissions, as well as one type of Scope 3 emissions (employee commuting). Scope 1 emissions are those that are under the direct control and operation of the Port, and include natural gas burned in Port-controlled buildings, fuel burned in the Port-owned fleet, and fugitive emissions from refrigerants used in Port-controlled buildings and vehicles. Scope 2 emissions come from indirect sources such as purchased electricity used in Port-controlled buildings and operations. Scope 3 emissions come from indirect sources resulting from the Port's activity, but not directly controlled by the Port, such as employee commuting.

GHGs: As shown in Table 1, the Inventory calculates emissions from relevant GHGs including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and hydrofluorocarbons (HFC). It also reports the values in carbon dioxide equivalent units (CO₂e).

Emission source data: Emission sources were identified by the Port's Sustainability Manager who applied knowledge of the Port and was confirmed via meetings with Port staff as well as records searches and data provided by vendors. The Inventory uses Port-specific data on building energy use, fleet fuel use, refrigerant use, and employee commuting.

Table 1. Emission Sources and GHGs Included in the Port of Bellingham 2019 GHG Inventory

Scope	Emission source	Greenhouse Gas				
		CO ₂	CH ₄	N ₂ O	HFC	CO ₂ e
1	Port-owned fleet of vehicles, vessels, equipment	✓	✓	✓		✓
1	Port-owned refrigerant & air conditioning systems				✓	✓
1	Port-owned building natural gas use	✓	✓	✓		✓
2	Port-owned building/facility electricity use	✓	✓*	✓*		✓
3	Port employee commutes	✓	✓	✓		✓

* Emission factors for CH₄ and N₂O were not available for electricity purchased from City of Blaine but were provided for electricity purchased from Puget Sound Energy.

Emission factors: The Inventory uses the most precise emission factors available in December 2020 from published sources such as The Climate Registry, United States Environmental Protection Agency, Puget Sound Energy, and Bonneville Power Administration.

Calculation methods: The Inventory applies calculation-based methods and simplified estimation methods described in The Climate Registry protocol. Emissions were calculated by fuel/energy type and total quantity of GHG emissions.

Documentation

The Inventory was prepared using a Microsoft Excel workbook that includes emission calculations and detailed information about data sources, emission factors, emission estimation methods, references, and source files. The Excel file was accompanied by a summary report. The Port has back-up documentation on file.

Recommendations for Emission Source Estimates - 2019 and beyond

We identified some refinements to the Inventory to improve completeness, accuracy, and transparency in characterizing emissions from each source category. These suggestions will streamline the inventory process and promote consistency in future inventories. This section discusses each emission source in turn, looking at the 2019 inventory and future inventories.

Fleet

2019 Inventory – ensuring completeness: The Inventory relied on fuel purchase data provided by the Port’s fuel vendor, Yorkston Oil. On rechecking the fuel invoice summary information, I noted a potential data gap. It is unclear whether the Inventory includes all fuel used by non-road or portable equipment such as lawn mowers, leaf blowers, forklifts, golf carts, tractors, etc. used for landscaping or other maintenance activities. We had previously established that the records include fuel used by small gas-powered equipment and the boat at Blaine Harbor, but not necessarily from other worksites. We should also check on whether the Port uses additional types of fuel, such as propane, to power small equipment.

Future inventories – calculating CH₄ and N₂O emissions: Gallonage data is adequate to estimate CO₂ emissions, which are mainly a function of the type and amount of fuel burned. However, CH₄ and N₂O emissions vary based on a vehicle’s engine and emission control system and miles traveled. Rather than compiling vehicle-specific data, the Inventory used The Climate Registry’s simplified estimation method to quantify emissions of CH₄ and N₂O. The simplified method applies a default ratio of CH₄ and N₂O to the corresponding fleetwide CO₂ emissions. The direct method requires calculating CH₄ and N₂O emissions for each vehicle. This would require pairing vehicle type/engine year with accurate odometer readings to calculate emissions for each vehicle and summing results. In the next inventory, the Port may wish to compare the simplified and direct methods and decide on the best approach.

Refrigeration and air conditioning

2019 Inventory – data limitations: The Port’s Maintenance Department provided a summary of HFC purchases in 2019, but we could not ascertain how much refrigerant was still in stock at the end of the year. As a result, the Inventory assumed a worst-case scenario, i.e., that the total amount of HFC purchased was used in 2019 to replace leaked refrigerant. If additional records become available, the Inventory should be updated to reflect that information.

The Climate Registry
General Reporting Protocol
**GHG Accounting and
Reporting Principles**

- Relevance
- Completeness
- Consistency
- Transparency
- Accuracy

Future inventories - recordkeeping: The Port typically maintains detailed records of refrigeration and air conditioning system maintenance, which will enable more accurate estimates of fugitive emissions in future inventories. Records on refrigerant purchases, amounts reclaimed, amounts used to recharge equipment, and amount on hand at the beginning and end of the year would be useful.

Natural gas

2019 Inventory – “Port controlled” sources: For the Inventory, the Port intended to capture Scope 1 emissions from Port-controlled use of natural gas in buildings and exclude Scope 3 (tenant-controlled) use. The Inventory relied on the Port’s prior working definition of “Port controlled” to assign metered use to this category. Due to metering configurations, Port-controlled natural gas usage includes emissions from some tenant-occupied spaces in buildings that have shared use with the Port. To assign natural gas use to Port control vs. tenant control, the Port had previously reviewed its tenant cost recovery allocation for each natural gas account held in the Port’s name. If the Port’s share of a metered use was at least 66%, the entire metered usage and associated emissions were designated as Port-controlled. (The Port set the threshold at 66% to represent significant Port use, which would diminish the tenant(s) perceived operational control over energy use in the shared building.) The Climate Registry protocol allows leeway in addressing emissions from tenants if the process is disclosed and justified. The Inventory should be amended to include additional detail on the Port’s definition of “Port-controlled” natural gas use.

Future inventories – “Port controlled” sources: The Port should reevaluate its definition of “Port-controlled” natural gas use for Scope 1 GHG accounting. If the definition is revised, adjustments to the 2019 (base year) Inventory may be warranted (see discussion of base year adjustments in the next section). Alternative approaches may include:

- Breaking out the Port-controlled portion of meter use as Scope 1, rather than the entire metered usage for affected meters.
- Creating additional gas meter accounts to segregate Port from tenant energy use, though this may be costly and impractical for some buildings.

Regardless of approach, it will be important to reevaluate the meter cost recovery allocations in each inventory cycle, given that tenant spaces may be reconfigured, or new leases developed, over time.

Electricity

2019 Inventory – “Port-controlled” sources: For the Inventory, the Port intended to capture Scope 2 emissions from Port-controlled use of electricity and exclude Scope 3 (tenant-controlled) use. The Inventory relied on the Port’s prior working definition of “Port controlled” to assign metered use to this category. Due to metering configurations, Port-controlled electricity usage includes emissions from some tenant-occupied spaces in buildings that have shared use with the Port. To assign electricity use to Port control vs. tenant control, the Port had previously reviewed its tenant cost recovery allocation for each electricity account held in the Port’s name. If the Port’s share of a metered use was at least 66%, the entire metered usage, and associated emissions, were designated as Port-controlled. (The Port set the threshold at 66% to represent significant Port use, which would diminish the tenant(s) perceived operational control over energy use in the shared building.) The Climate Registry protocol allows some leeway in addressing emissions from tenants if the process is disclosed and justified. The Inventory

should be amended to include additional detail on the Port’s definition of “Port-controlled” electricity use.

Future inventories – “Port-controlled” sources: The Port should reevaluate its definition of “Port-controlled” electricity use for Scope 2 GHG accounting. If the definition is revised, adjustments to the 2019 (base year) Inventory may be warranted (see discussion of base year adjustments in the next section.) Alternative approaches may include:

- Breaking out the Port-controlled portion of meter use as Scope 2, rather than the entire metered usage for affected meters.
- Creating additional electricity accounts, or installing sub-meters, to segregate Port from tenant energy use, though this may be costly and impractical for some buildings.

Regardless of approach, it will be important to reevaluate the meter cost recovery allocations in each inventory cycle, given that tenant spaces may be reconfigured, or new leases developed, over time.

Future inventories – renewable energy: In 2021 the Port began buying renewable energy from Puget Sound Energy’s Green Direct program and began generating energy from the solar array on the Bellingham Cruise Terminal. Per The Climate Registry protocol, both the conventional location-based electricity emissions and the market-based emissions, e.g., Green Direct zero emissions, must be quantified and documented in future inventories. (However, in tracking progress toward CAS targets, the Port should use the market-based emissions of zero from Green Direct electricity.)

Employee commutes

2019 Inventory – data accuracy: To estimate emissions from employee commutes in 2019, the Inventory assumed an average number of commuting days based on a five-day work week, deducting estimated vacation leave, sick leave, and holidays. As part of this evaluation of the Inventory, we asked the Port’s Human Resources Department to review the assumptions used to establish the number of annual commute days. The Department confirmed that the assumptions were valid.

Future inventories – estimation approach: With the Port’s updated telework policy, adopted in August 2021, it will be more challenging to estimate the average number of commuting days per year and mode of travel. Employee decisions to telework may be influenced by the length of their commute. Additionally, the Port is expected to increase its efforts toward commute trip reduction by other means such as promoting mass transit and providing electric vehicle charging for employees’ personal vehicles. For future inventories, the Port should consider developing an employee survey to collect data on employee commutes. Washington State’s Commute Trip Reduction Program provides one example of an employee survey.²

Recommendations for Overall GHG Inventory Management

Given the Port’s interest in conducting periodic inventories, it is a good idea to integrate inventory practices into a holistic program. The U.S. Environmental Protection Agency provides guidance on an inventory management plan, defined as “an internal process for an organization to institutionalize the

² [paper-survey-sample.pdf \(kingcounty.gov\)](https://www.kingcounty.gov/~/media/2018/04/paper-survey-sample.pdf)

completion of a high-quality inventory.”³ Some key elements to include in your inventory management plan and/or future inventories are discussed below.

Base year selection

The Port should document why it chose 2019 as the base year for its inventory program (assuming it has). For example, due to the COVID-19 pandemic, 2019 may be the most recent year representing the Port’s typical emissions profile, and for which it has compiled extensive records.

Base year adjustment policy

As the Port begins tracking emissions over time and conditions change, base year emissions may need to be recalculated. To a certain extent, GHG inventories are living documents; they may be updated to address significant errors, changes in calculation methodology, organizational changes such as acquisition, or addition of emission sources. The Port should set and document a policy threshold, e.g., 5% of total emissions, to define whether a change is significant enough to warrant recalculation of base year emissions.

Emission trends

Future inventories should include information on the base year emissions and emissions from each subsequent inventory to provide the emissions profile over time.

Future inventories should also include calculation of any emissions intensity metrics or ratio indicators that the Port will use to track its program. (This is also a Green Marine criterion.)

Use of offsets and renewable energy certificates

We expect that the CAS will establish goals or policies regarding the future role of carbon offsets and renewable energy in reducing emissions. The Climate Registry protocol prescribes how these instruments are addressed in GHG inventories. In general, gross emissions are reported separately from GHG offsets, and offsets purchased or developed outside of the inventory boundary are treated differently than those that are within the inventory boundary.

Data management

The Port should evaluate on-going inventory data needs and whether that data can be integrated into existing recordkeeping systems (e.g., when recording account-specific energy charges, add the amount of energy used.) This may require new data collection and data management procedures involving staff outside of the Environmental team. It should also include a quality assurance process to ensure data accuracy. The Inventory Management Plan Guidance covers data management issues in more detail.

Auditing and verification

In lieu of third-party verification, the Port should consider an internal auditing process to verify the accuracy of the GHG inventory. Some organizations have internal financial auditors perform this work, for example.

³[Inventory Management Plan Guidance | US EPA](#)

Conclusions and Recommendations

2019 Inventory

We identified several refinements to the Inventory to improve completeness, accuracy, and transparency. The following actions are recommended:

- Confirm that the fleet data includes all fuels used in small power equipment, including gasoline, diesel, propane and other fuels in 2019. Update the Inventory if needed to incorporate any new information.
- If new information is available on HFC stock and usage in 2019, update the refrigerant and air conditioning data (fugitive emissions) in the Inventory.
- For both natural gas and electricity sources, provide additional explanation on how Port-controlled emissions were defined. No change in the emission calculations is needed.

Future Inventories

Recommendations address future inventories and are designed to streamline the inventory process and promote consistency in future inventories, and include the following:

- In the next inventory cycle, calculate fleet emissions using both the simplified and direct methods, and compare results to decide if the direct method is worth the extra effort.
- For both natural gas and electricity sources, reevaluate the approach used to quantify Port-controlled emissions and reassess meter cost recovery allocations for each inventory cycle.
- Update the approach used to estimate employee commute emissions to reflect changes in telework practices, employee vehicles, and commuting options.
- Justify and document selection of the base year inventory.
- Develop a base year adjustment policy.
- In each subsequent inventory, include prior year emissions and emission intensity metrics to enable tracking of trends.
- Improve data management methods.
- Add an internal auditing process before finalizing future inventories.
- Review EPA's guidance on inventory management plans and adopt applicable elements.