Greenhouse Gas State to Federal Program Mapping Study

CAER GHG R&D Project Team Report

October 2, 2017

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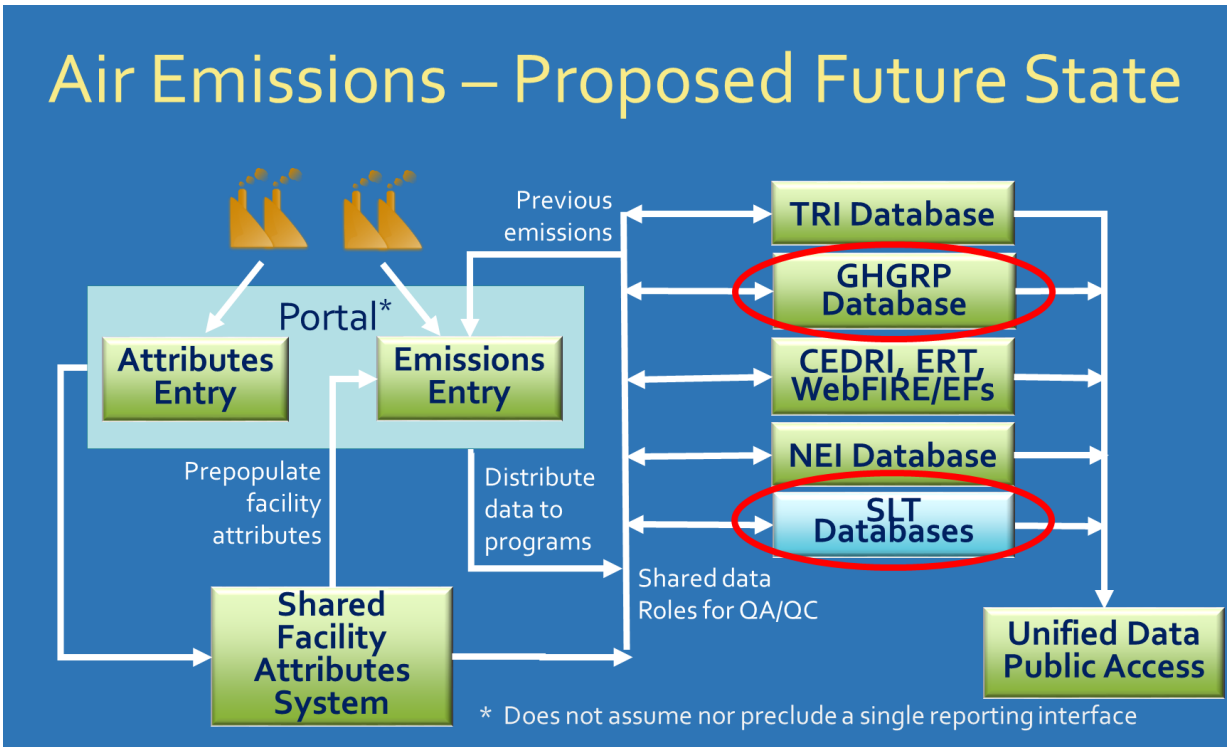
1 Introduction

This document is a compilation of the results of a pilot study to map emissions data in the national Greenhouse Gas (GHG) Reporting Program (GHGRP) to three state mandatory GHG reporting programs. Work was conducted by the Greenhouse Gas Mapping Study project team, one of five 'first round' research and development (R&D) projects conducted under the Combined Air Emissions Reporting (CAER) Product Design Team (PDT) between January and August of 2017.

Together with the work of other project teams under the PDT, the broader goal of this effort was to help inform what would be needed to support a potential future combined emissions reporting scenario as envisioned in the CAER project. The use of a common emissions reporting form is part of the broader CAER project's goal of decreasing reporting burden to facilities by allowing them the ability to reduce the number of times they must report the same data element to individual programs. The CAER project's conceptual "proposed future state"[1] is shown in Figure 1 and highlighted in red are the two types of databases this project addressed.

Figure 1. Proposed Future State

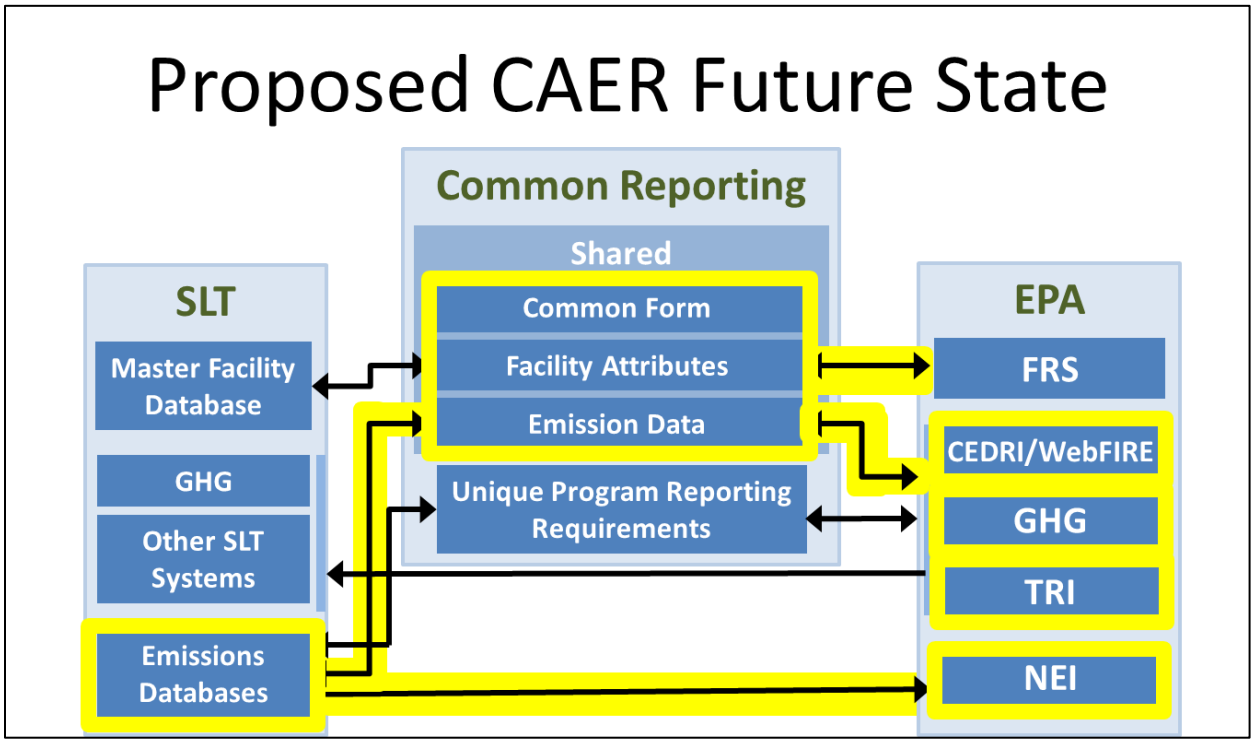


It is important to note, however, that the proposed future state is a conceptual design at this point, with many iterative R&D steps needed to progress towards a shared emissions system as envisioned under CAER. There are current systems in place with many capabilities that CAER teams need to understand

[1] The CAER "future state" resulted from a Lean event conducted on Air Emissions Reporting: the future state should reduce reporting burden to industry and states via a common reporting framework as well as time spent on "after-the-fact" reconciliation of emissions data by EPA staff.

and learn from before attempting to integrate into a shared emissions system. Therefore, separate entry points for state, local, and tribal programs (SLTs), GHG, Toxics Release Inventory (TRI), and the Compliance and Emissions Data Reporting Interface (CEDRI) should be accommodated as needed, sharing facility and emissions data where appropriate (see Figure 2).

Figure 2. Proposed Future State with Separate Entry Points for GHG



With these points in mind, specific questions to answer in this study were:

- Where is the overlap between the state programs included in this study and the GHGRP requirements?
    - In what ways are they similar and in what ways are they different?
    - Where different, how important are these differences?
- What should our next steps be in light of our findings and the broader CAER goal of decreasing reporting burden to facilities by using a common reporting form?

The scope of this project was limited. It was not possible to address all available GHG SLT programs at once, or to research all sectors and industries. Therefore, the scope of the project was to identify commonalities and differences between GHGRP and GHG reporting programs for 3 states, by comparing their data needs for 3 sectors. Consequently, care should be taken not to generalize the team's findings, as these cannot be considered universal. Rather, they should be considered as helpful information to guide next steps in our understanding.

There are important aspects to consider in future PDT work that are outside of the scope of this R&D project. State and federal GHG program database commonalities and interactions are just one aspect of

the overall CAER effort as related to GHGs. Three items outside the strict scope of state-federal GHG program nexus surfaced during the work of this R&D team: facility GHG data sharing (which is already being addressed with the Facility Registry Service and its new data model), sharing GHGRP data with states and others in CSV or excel type formats, and combined NEI and GHG reporting.

Yet, these issues are very relevant aspects of CAER to investigate further and are, therefore, documented in this report. At the time this R&D team had begun work several states and some industry members had expressed some interest in reporting GHGs with criteria pollutants, for example[2]. Additionally, using one input value in time to calculate all emissions means less of a need for "after-the-fact" reconciliation on the different pollutants, as shall be explained further in the comparison exercise done at the facility level, and is additionally, very relevant for reconciliation of reported GHG data with criteria and toxics data by EPA staff. For example, EPA must reconcile toxics, GHG and criteria data from a facility. But if data from each of those was reported at different times with different input values, these numbers may not make sense when put together to do any kind of analysis. As was discovered during the work, having GHGRP data in a csv or excel format would save time for anyone wanting to use that data in some form of comparison or analysis.

The team whose work is reflected in this document included: the states of Massachusetts, Minnesota and Oregon, and staff from EPA's GHGRP and the Emissions Inventory and Analysis Group (EIAG). Team members were:

States:

MA: Jordan Garfinkle

MN: Azra Kovacevic

OR: Stephanie Summers, Elizabeth Elbel

EPA:

GHGRP: Kong Chiu, Brian Cook, Sydnie Lieb

EIAG: Julia Gamas (Team Lead)

The document is divided into three sections. Our comparison progressed starting from the most general aspects to compare (Section 2), to the most detailed comparison of data elements and reported data for a facility at the unit level (Section 3). Section 4 contains the facility mapping exercise including a narrative and unit-to-unit comparison. Section 5 contains lessons learned so far towards a common emissions reporting form. It was not the goal of this work to reach any consensus of what the common reporting framework should or shouldn't do, nor to provide any kind of definitive guidance on its design, but rather, to present the team's findings so far. Section 6 concludes with outstanding questions that lead to next steps in exploring shared reporting for GHG air emissions data.

[2] States that participated in the Lean event that led to CAER where combined emissions reporting emerged as a solution were: Arizona and North Carolina. Other states who have expressed some interest in this issue are: Minnesota, Massachusetts, and South Carolina.

2 Comparison of State and Federal Greenhouse Gas Programs

Currently, 22 U.S. States have some form of greenhouse gas reporting program: 19 have a mandatory program and 3 have voluntary programs. Table 1 shows these states together with current references to their programs. While some states are running their own GHG programs, other states rely on EPA data to generate state reports as a tool towards meeting their GHG emissions goals (e.g. Georgia refers to GHGRP data whereas Idaho refers to national Greenhouse Gas Emissions Inventory[3]).

Table 1. U.S. States with Greenhouse Gas Reporting Programs

State	Reference	Legal Basis
California	https://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-regulation.htm	California Global Warming Solutions Act (AB 32, 2006)
Colorado	https://www.colorado.gov/pacific/cdphe/colorado-greenhouse-gas-permitting	Executive Order (E.O.) D004-08
Connecticut	http://www.ct.gov/deep/cwp/view.asp?a=4423&q=530290	22a-174-31 Regulations of Connecticut State Agencies (RCSA) ; Public Act 04-252: "An Act Concerning Climate Change"
Delaware	http://regulations.delaware.gov/AdminCode/title7/1000/1100/1147.shtml	Administrative Code: Title 7: 1000:1100
Iowa	http://www.iowadnr.gov/Environmental-Protection/Air-Quality/Greenhouse-Gas-Emissions	Iowa Code section 455B.152
Maine	http://www.maine.gov/dep/air/emissions/index.html	http://www.maine.gov/dep/air/rules/index.html
Maryland	http://www.mde.state.md.us/programs/Air/ClimateChange/Pages/Reports.aspx	Code of Maryland Regulations (COMAR) 26.11.01.01, 12, & 14
Massachusetts	http://www.mass.gov/eea/agencies/massdep/climate-energy/climate/approvals/ma-greenhouse-gas-emissions-reporting-program.html	Global Warming Solutions Act (GWSA) Sections 2 & 10
Minnesota	https://www.pca.state.mn.us/air/emissions-reporting	Minnesota Statutes Chapter 216H.021
Nevada	https://ndep.nv.gov/air/air-pollutants/greenhouse-gas-emissions	Nevada Revised Statutes (NRS) 445B.137

[3] For example, the Idaho Greenhouse Gas Inventory and Reference Case Projections 1990-2005 Report for DEQ used the following as one of its references: US EPA (2006), Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2004. The Greenhouse Gas Inventory or GHGI is different from the GHGRP.

State	Reference	Legal Basis
New Jersey	http://www.nj.gov/dep/aqes/sggi.html	New Jersey Administrative Code (NJAC) 7:27-8, NJAC 7:27-21.3,
New Mexico	https://www.env.nm.gov/air-quality/ghg-reporting/	New Mexico Administrative Code (NMAC) 20.2.73
New York	http://www.dec.ny.gov/chemical/68524.html	Compilation of Codes, Rules and Regulations of the State of New York (CRRNY) 6 CRR-NY 242.8.5
Ohio	https://www.theclimateregistry.org/programs-services/voluntary-reporting/membership-benefits/	Ohio Administrative Code (OAC) 4901:1-41-03
Oregon	http://www.oregon.gov/deq/aq/programs/Pages/GHG.aspx	Oregon's Administrative Rules (OAR) 340-215-0010
Rhode Island	http://www.dem.ri.gov/programs/air/emissions.php	Air Pollution Control Regulation No. 46
Vermont	http://climatechange.vermont.gov/climate-pollution-goals	Vermont Statutes Annotated, 10 V.S.A. § 582
Washington	http://www.ecy.wa.gov/programs/air/permit_register/ghg/ghg.html	Washington Administrative Code (WAC) 173-441
Wisconsin	http://dnr.wi.gov/topic/airemissions/historical.html	Wisconsin Administrative Code (WAC) Department of Natural Resources (NR) 438.03
New Hampshire	https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/ghgr.htm	Voluntary
North Carolina	https://deq.nc.gov/about/divisions/air-quality/air-quality-data/emissions-inventories/emission-inventories-tools	Voluntary
West Virginia	http://www.dep.wv.gov/daq/planning/Pages/GreenhouseGas.aspx	Voluntary

2.1 GHG Program Comparison

In this section, each state GHG program participating on the R&D project team is described, as is the federal GHGRP. Then a high level comparison is done for all four programs.

2.1.1 Summary of Minnesota Greenhouse Gas Program

The Minnesota greenhouse gas program has two parts:

(1) The state legislature set several reduction goals in 2007 under the Next Energy Generation Act. The goal called for 15% reduction in GHG emissions by 2015 from 2005 levels, and for 2025 and 2050 emissions levels to be 30% and 80%, respectively, below the 2005 emission levels. The statute also called for a statewide GHG emission inventory to include emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HCFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) emitted by anthropogenic sources within the state, from the generation of electricity imported from outside the state and consumed in Minnesota.

(2) Minnesota GHG reporting system requires facilities with a Title V permit, an Option D Registration Permit (small facilities such as schools)) and facilities holding a capped permit to report GHG emissions to the Minnesota Pollution Control Agency (MPCA). Minnesota has permitting or statute reporting requirements for most permit types so MN staff asked all facilities with an air quality permit to report GHG emissions. The program went into effect in 2011 for small facilities and for everyone else in 2012. The MPCA asks that facilities report emissions at the process level from all permitted units. Each process is associated with a source classification code (SCC). To make reporting easier MPCA has generic emission factors for CO_2, CH_4 and N_2O. Mandatory Reporting Program emission factors for fuel combustion have been mapped to individual SCCs. If facilities have GHG emissions from non-permitted units, they can report them under a generic emission unit labeled "Non-permitted GHG emissions." Facilities can report process emissions with several calculation methods including stack test, continuous monitoring, material balance or some sort of emission factor. About 1,400 facilities are collected in the annual emissions inventory, many of those emit small amounts of GHGs, with some 150 facilities that report more than 10,000 tons of carbon dioxide equivalent (CO_2e). The reporting deadline is April 1. The MN Greenhouse gas webpage can be found at: https://www.pca.state.mn.us/air/greenhouse-gas-emissions-minnesota-0.

2.1.2 Summary of Massachusetts Greenhouse Gas Program

The Global Warming Solutions Act (2008) requires GHG emissions reductions from each sector of the economy to a total of 25% below 1990 baseline levels in 2020 and an 80% reduction by 2050. It required that the Massachusetts Department of Environmental Protection (MassDEP) promulgate mandatory GHG reporting regulations.

Facilities required to report are those that hold a Massachusetts air operating permit (Title V of the U.S. Clean Air act and 310 CMR 7.00, Appendix C), or those whose aggregate annual emissions exceed 5,000 short tons CO_2e. The first emissions year reported was 2009. The regulation contains a "once-in-always-in" requirement, so some facilities report very low emissions (however, there is an exemption procedure).

Applicability and compliance are at the facility level, but reporting is at the unit or process level. Major sectors captured include:

- Electric Generating Units (EGUs, fossil and waste-to-energy)
- Institutions (hospitals, universities, public housing, etc.)

o Landfills

GHGs reported include: CO_2 (fossil and biogenic reported separately), CH_4, N_2O, SF_6, HFCs and PFCs.

About 300 facilities report. In 2015, the 25 largest emitters accounted for 76% of total CO_2e reported under the program. Over 90% of total emissions are from stationary combustion.

The reporting deadline is April 15.

More information on the MA GHG reporting program can be found at: http://www.mass.gov/eea/agencies/massdep/climate-energy/climate/approvals/ma-greenhouse-gas-emissions-reporting-program.html

2.1.3 Summary of Oregon's Greenhouse Gas Program

Oregon's Greenhouse Gas Reporting program collects data from petroleum importers, natural gas suppliers, landfills, electric utilities and air quality permit holders. The air quality permit holders reporting program is the portion of Oregon's program that most closely parallels EPA's 40 CFR Part 98. Below are the general details of that program:

- First emissions year reported – 2010
- Facilities report actual annual emissions
- Applicability:
    - Facilities with an air permit (Air Contaminant Discharge Permit or Title V permit) that emit over 2,500 $MTCO_2e$ in a calendar year.
    - If a facility falls below the threshold for three consecutive years, it may cease reporting
- Applicability and compliance are at the facility level. Reporting varies by source, some sources report fuel types and volumes, others aggregate process emissions which may or may not contain unit level information.
- In 2015 Oregon's reporting rule was updated to parallel the quantification methodology of EPA's GHG reporting rule. Sources are required to report all onsite combustion according to Subpart C and process emissions from any process covered by Part 98 Subparts D through UU.
    - Sources report both biogenic and anthropogenic emissions and must report CO_2, CH_4, N_2O, and fluorinated GHGs as defined in rule which is currently the same as EPA's definition in rule.
    - In 2015 we had 260 permitted facilities report GHG emissions to the program.
    - The majority of the facilities report stationary combustion
    - Major sectors for process emissions include:
        - Semiconductor manufacturing
        - Cement manufacturing
        - Pulp and paper
        - Landfills
- Reporting deadline is March 31st following the calendar year. The data is audited internally and posted annually to the website.
- All reporting is completed through an online reporting tool, EZ-Filer.

Data from the program is used to fulfill requests to support the Oregon Global Warming Commission, our partner agencies and the general public. A portion of this data is also used to update the statewide greenhouse gas inventory. For more specific details on reporting protocols can be found at: http://www.oregon.gov/deq/aq/programs/Pages/GHG-Reporting.aspx.

2.1.4 Summary of Federal Greenhouse Gas Program

The GHGRP (codified at 40 CFR Part 98) requires reporting of greenhouse gas (GHG) data and other relevant information from large GHG emission sources, fuel and industrial gas suppliers, and CO_2 injection sites in the United States. This data can be used by businesses and others to track and compare facilities' greenhouse gas emissions, identify opportunities to cut pollution, minimize wasted energy, and save money. States, cities, and other communities can use EPA's greenhouse gas data to find high-emitting facilities in their area, compare emissions between similar facilities, and develop common-sense climate policies.

A total of 41 categories of reporters are covered by the GHGRP. Facilities determine whether they are required to report based on the types of industrial operations located at the facility, their emission levels, or other factors. Facilities are generally required to submit annual reports under Part 98 if:

- GHG emissions from covered sources exceed 25,000 metric tons CO_2e per year.
- Supply of certain products would result in over 25,000 metric tons CO_2e of GHG emissions if those products were released, combusted, or oxidized.
- The facility receives 25,000 metric tons or more of CO_2 for underground injection.

A list of covered types of industrial operations and informational resources can be found at: https://www.epa.gov/ghgreporting/resources-subpart-ghg-reporting

Approximately 8,000 facilities are required to report their emissions annually (as of 2015). Total reported emissions from these facilities are about 3 billion metric tons CO_2e, which is about 50 percent of total U.S. GHG emissions. Additional GHGs are accounted for by approximately 1,000 suppliers. In total, data covering 85-90 percent of U.S. GHG emissions are reported. A complete accounting of total U.S. GHG emissions is available through a separate EPA report, the U.S. Greenhouse Gas Inventory. These inventories are different and more information can be found in: https://www.epa.gov/ghgreporting/greenhouse-gas-reporting-program-and-us-inventory-greenhouse-gas-emissions-and-sinks).

Facilities in most source categories subject to Part 98 began reporting for the 2010 reporting year while additional types of industrial operations began reporting for reporting year 2011. As of October 2016, GHGRP data are now publicly available for 2010 through 2015. Facilities calculate their emissions using methodologies that are specified at 40 CFR Part 98, and they report their data to EPA using the electronic Greenhouse Gas Reporting Tool (e-GGRT). Annual reports covering emissions from the prior calendar year are due by March 31st of each year. Once data are submitted, EPA conducts a multi-step verification process to ensure reported data are accurate, complete, and consistent.

In terms of pollutants covered, all greenhouse gases identified by the IPCC that are included in national inventory reports: CO_2, methane, nitrous oxide and F-GHGs (SF_6, NF_3, HFCs, PFCs, etc.). The GHGRP program also requires reporting of biogenic CO_2. Biogenic CO_2 doesn't 'count' toward a facility's

determination as to whether they have to report (25,000 metric ton CO_2e threshold) but if they're required to report due to emissions of other GHGs they must report biogenic CO_2 as well.

Reporting of emissions is required at the unit/process level. Units can be aggregated and their emissions totals reported as one.

"Facility" means any physical property, plant, building, structure, source, or stationary equipment located on one or more contiguous or adjacent properties in actual physical contact or separated solely by a public roadway or other public right-of-way and under common ownership or common control, that emits or may emit any greenhouse gas. Operators of military installations may classify such installations as more than a single facility based on distinct and independent functional groupings within contiguous military properties. There are a few exceptions for "area sources" such as onshore oil & gas production, SF_6 from electrical distribution systems and fugitive methane leaks from natural gas distribution systems but this is the general definition for most source types.

This webpage should provide a good introduction into the GHGRP program (reporting threshold, etc.): https://www.epa.gov/ghgreporting/learn-about-greenhouse-gas-reporting-program-ghgrp

2.1.5 Summary Comparison of Programs

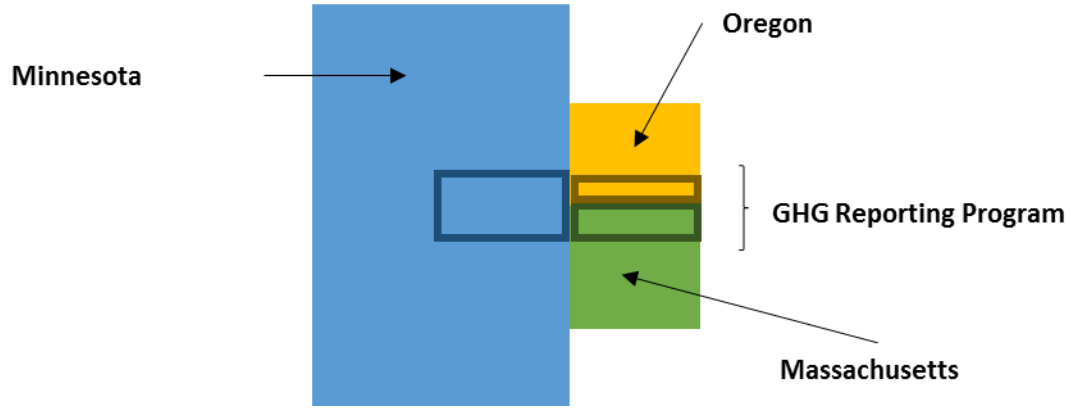
In 2015, about 2,700 facilities were reporting their greenhouse gas emission to the three PDT states. Table 2 shows the total facilities reporting to each state, and from those, how many were reporting to the federal program as well.

Table 2. Facilities Reporting Greenhouse Gases in OR, MN, and MA

Year 2015	**OR**	**MA**	**MN**	**TOTAL**
Total GHG Reporting Facilities	260	300	2,200	2,760
Facilities Also Reporting to EPA	55	84	150	289
% in Common	21%	28%	7%	10%

Figure 3 is a graphical representation of the number of reporting facilities from Table 2, where the size of the rectangle is representative of the number of facilities. Minnesota (blue) has the largest total of reporting facilities (2,700) and Oregon and Massachusetts have almost the same amount (260 and 300 respectively). The areas within the smaller rectangles marked with a dark gray border, represent the number of facilities also reporting to the GHGRP. While Oregon and MA have more than 20% of their facilities also reporting to GHGRP, MN only has 7% of their total facilities also reporting to the federal GHG program.

Figure 3. Facilities reporting Greenhouse Gases in OR, MN, and MA



Some programs have things in common with others and there are also many differences. Table 3 is a summary comparison of programs.

Table 3. Comparison of State and Federal GHG Programs

Criteria	Oregon	Minnesota	Massachusetts	EPA Federal
Basis	Greenhouse Gas Reporting Rule. Started in 2010, **facilities with an Air Contaminant Discharge Permit or Title V permit.** Data supports the Oregon Global Warming Commission, partner agencies and the general public. Data is used to update the statewide greenhouse gas inventory.	**First Part:** Next Energy Generation Act with specific reduction targets. **Calls for statewide emissions inventory. Second Part:** Minnesota GHG reporting system requires facilities with a Title V permit, an Option D Registration Permit (small facilities (i.e., schools)) and facilities holding a Capped permit to report GHG emissions to MPCA. **All facilities with an air quality permit report GHG emissions** (small facilities in 2011 & everyone else in 2012).	Global Warming Solutions Act (2008)	40 CFR Part 98
Reporters	Petroleum importers, natural gas suppliers, landfills, electric utilities and air quality permit holders *AND* those exceeding the threshold	All facilities with an air quality permit report GHGs; there are rule and stature requirements for title V, small registration permits, and capped	Facility holds a MA air operating permit *or* exceeds threshold	Large sources/direct emitters (exceeding emissions threshold); fuel and industrial gas suppliers (whose supply of certain products would

Criteria	Oregon	Minnesota	Massachusetts	EPA Federal
		permits. MN does not have a threshold.		exceed the threshold if those products were released, combusted, or oxidized); and CO_2 injection sites (amount of CO_2 for underground injection exceeding the threshold).
Threshold	2,500 metric tons of CO_2e in a calendar year for AQ permit holders.	Based on holding permit.	Aggregate annual emissions exceed 5,000 short tons of CO_2e	25,000 metric tons of CO_2e
Pollutants	CO_2 (fossil and biogenic reported separately), CH4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), nitrogen trifluoride (NF_3)	CO_2 (fossil, and biogenic is reported as CO2-B), CH_4, N_2O, HFCs, PFCs, SF_6	CO_2 (fossil and biogenic reported separately), CH_4, N_2O, HFCs PFCs SF_6,	CO_2 (fossil and biogenic reported separately), CH_4, N_2O, HFCs, PFCs, SF_6, NF_3, Other fully fluorinated GHGs, HFEs, very short-lived compounds, other).
Geographic Scope EGUs	Electric utilities report electricity use on a statewide level (includes *imported* electricity).	Statewide anthropogenic sources & emissions from *imported* electricity generated outside state	Imported emissions are calculated in the inventory, nobody who imports has to report those. Electricity consumption isn't included in GHG reporting. Scope 1 emissions are captured at the generator level, report their emissions.	Don't have reporting requirements for tracking electricity coming from outside the country. There are requirements on imports and exports of fuels.

Criteria	Oregon	Minnesota	Massachusetts	EPA Federal
Level of reporting	Varies by source: Some report fuel types and volumes, others aggregate process emissions (may or may not contain unit level information)	Process level (SCC) for each unit.	Unit or process level, to the degree practicable.	Unit/process. Can aggregate units as a single unit. Can aggregate emissions for a common stack.
"Facility" Definition	Source as defined by the Clean Air Act (CAA), 42 U.S. Code Chapter 85, Subchapter III, 7602.	Entity holding an air quality permit	Facility means a building, structure or installation located on contiguous or adjacent properties of an entity, or a natural gas facility.	Any physical property, plant, building, structure, source, or stationary equipment located on one or more contiguous or adjacent properties in actual physical contact or separated solely by a public roadway or other public right-of-way and under common ownership or common control, that emits or may emit any greenhouse gas. Operators of military installations may classify such installations as more than a single facility based on distinct and independent functional groupings within contiguous military properties.
Relevant sectors for comparison	Stationary combustion, semiconductor manufacturing, cement manufacturing, pulp and paper, landfills	Taconite (production in iron and steel or mining), ethanol, general stationary combustion	EGUs (fossil and waste-to-energy), Institutions (hospitals, universities,	All

Criteria	Oregon	Minnesota	Massachusetts	EPA Federal
			public housing, etc.), Landfills	
Methods	In 2015 parallels EPA's GHG rule methodology: Sources are required to report all onsite combustion according to Subpart C and process emissions from any process covered by Part 98 Subparts D through UU	Several calculation methods including: stack test, continuous monitoring, material balance or some sort of emission factor. MPCA has generic emission factors for CO_2, CH4 and N_2O. Mandatory Reporting Program emission factors for fuel combustion have been mapped to individual SCCs. If facilities have GHG emissions from non-permitted units, they can report them under a generic emission unit labeled "Non-permitted GHG emissions."	Rely on GRP and Part 98.	As described in 40 CFR Part 98.
GWP and EF Updates	Can recalculate emissions with new emissions factors. Some submissions are totals calculated outside the system and use of EPA data is needed for recalculating.	GWP are assigned by the agency, and they follow the latest IPCC report. They can resubmit emissions online for the current reporting year, including changing emission factors and calculation methodology. If changes need to be made for prior years, they	Use data that is available in the climate registry system.	Use AR4 factors. (IPCC 4th Assessment Report)

Criteria	Oregon	Minnesota	Massachusetts	EPA Federal
		have to resubmit a paper copy.		
Deadline	March 31st of the calendar year following reporting year	April 1st of the calendar year following reporting year	April 15th of the calendar year following reporting year	March 31st of the calendar year following reporting year
Reporting System	EZ-Filer	Online reporting system CEDR	Climate Registry Information System (CRIS) managed by The Climate Registry, but is switching to a new state specific platform currently undergoing review.	e-GGRT
GWP data	AR4 factors	AR4 factors	AR4 factors	Use AR4 factors (IPCC 4th Assessment Report)
Emission Factor Data	Emission factors from 40 CFR Part 98 Subpart C for combustion; facility determines emission factor for process emissions.	Generic emission factors from MRR are available or they can input site specific factors	Whatever is in the climate registry system is used.	As described in 40 CFR Part 98.

3 Data Element Comparison Among Programs

The program comparison allows for some high level conclusions about commonalities and differences among programs and how to think about the common reporting framework in light of those. However, details about differences might not become obvious from the previous exercise. A data element comparison was done to reveal any relevant details about program differences.

The team discussed which sectors would be informative to compare and chose:

- General Reporting Requirements (GHGRP Subpart A) was included because it applies to all facilities reporting to any of the sectors.
- Stationary combustion (GHGRP Subpart C), was chosen because it is a broad sector that is somewhat straightforward to report and would likely have commonalities among different states and the federal program.
- Iron and Steel (Subpart Q), and Municipal Solid Waste Landfills (Subpart HH), were included because they each contain some nuances that might be insightful in terms the ability of the common reporting framework to deal with them.

Each data element required by GHGRP for each of these sectors was compared to data elements required by the states. A total of 388 data elements were compared. Each state noted if the data element exists or doesn't exist as a state program requirement. The state noted if there was a data element that exists for the state but not for the GHGRP. If a data element is required by both, but there is some difference in the requirement, that difference was explained. Appendix A (excel file) contains the data element comparison under the "C Q HH A data elements" tab. Some items are highlighted here for discussion. The discussion is not intended to be exhaustive, but to highlight some of the issues that arose during the comparison.

3.1 Subpart A – General Reporting Requirements

Out of the data elements compared, 73 data elements in Subpart A were identified as being unique to GHGRP and were related to the use of Best Available Monitoring Methods (BAMM), which is not required by any of the states, and was relevant in 2010 and 2011. These can be found in the Appendix A excel file under tab "Other A data elements". In some cases more detail is required by some programs, but not others (e.g. fluorinated gases are reported separately in GHGRP, MN and MA, but not OR).

3.2 Subpart C – Stationary Combustion

From the comparison in Subpart C it was noted that some data elements can exist in one program and not another, and even if they do exist in both, they might be slightly different in their definition or required characterization. Examples include:

- OR doesn't require a unit ID but the other programs do.
- The maximum rated heat input capacity of the unit in mmBtu/hr is required by GHGRP and MN but not OR and MA.
- Some states align their requirements with those of the GHGRP while others do not. For example, for each type of fuel combusted OR requires the use of Tier 1 methodology or Tier 4 if they have Continuous Emissions Monitoring Systems (CEMS). The other states don't have that requirement.
- MA and OR don't require separate reporting of biogenic $CO_2$when using CEMS.
- The GHGRP and MN require the maximum rated heat input capacity at the unit level, but is not required by either OR or MA.
- OR and MN don't have the option to report total emissions for aggregated units, as opposed to individual units. GHGRP and MA allow for the aggregation of emissions from several units, for example, that vent to a single stack or are served by a common metered natural gas stream.
- The GHGRP asks for monthly quantity of fuel combusted but states only require the annual value.

3.3 Subpart Q – Iron and Steel

The comparison for this subpart excluded MA since it has no Iron and Steel facilities that would report emissions. Examples of data element differences and similarities are:

- All programs require annual CO_2 emissions for all units except de-carbonization vessels.
- Only the GHGRP requires information about the method used to determine carbon content (from lab analysis, not for CEMS) for all units except de-carbonization vessels that are not argon-oxygen de-carbonization vessels. Some states obtain this information through supplemental information that the facility can submit.

3.4 Subpart HH – Municipal Solid Waste Landfills

The landfills comparison highlighted differences such as GHGRP requiring more detail in some cases and some programs requiring information that others don't. For example:

- The GHGRP requires the year in which the landfill started accepting waste for disposal, landfill capacity, and details about leachate, but the three states don't have that requirement.
- The volumetric flow of landfill gas collected for destruction is required in MN and GHGRP but not in MA or OR.
- The annual quantity of recovered methane is required in OR and GHGRP but not MA or MN.

4 Unit-to-Unit Mapping

During team discussions staff from states explained that they use GHGRP data to validate GHG emissions submissions to their own programs. While data elements are not identical in some cases, there are enough similarities for the GHGRP to be helpful in weeding out submissions that look incorrect: for example, emissions off by several orders of magnitude.

This section includes highlights from the unit-to-unit mapping exercise by the states. Each state provided a narrative of how GHGRP data is used to validate data submitted to the state's GHG program. Then, each state selected one facility that submitted GHG emissions data to both the state GHG program and the EPA's GHGRP. The narratives and details are provided in Appendices B (Minnesota – Iron and Steel), C (Massachusetts – Stationary Combustion) and D (Oregon – Landfills). This section highlights some findings from each comparison.

During this exercise, the states indicated that data pulled from the GHGRP Flight site and Envirofacts is not in a format that lends itself to doing a side-by-side, emissions-by-unit comparison easily. This insight points to a different aspect of the combined reporting, outside the scope of this R&D team, that is, none the less, relevant to the CAER effort: the ability for combined reporting to allow for GHGRP sub-facility level data extraction in a readily usable format that does not require further manual or electronic post-processing (such as in excel format instead of pdf). This point is further discussed in Section 5.

4.1 Minnesota - Iron and Steel

Minnesota's unit-to-unit comparison was for an Iron and Steel facility for the year 2015. In that comparison the following differences between emissions reported to the state and to GHGRP arose:

- **Methodology:**
    - Boiler emissions (reported to Subpart C): Generic emissions factors were applied for emissions reported to the state but the tier 3 methodology was used for GHGRP.
    - A taconite industrial furnace (reported to Subpart Q): emissions reported to the state were calculated via the "in-process fuel use" method using generic emissions factors (SCC), but estimates submitted to GHGRP were based on a mass balance equation of taconite pellet production– results can be very different.
- **Units of measure:** nominal short tons were used to report to the state versus metric tons for GHGRP.
- **Aggregation of sub-facility data:** One emissions value for taconite production was reported to EPA but multiple processes for the same emission unit were reported to state
- **Facility definition:** One unit reported as part of the facility in GHGRP but not part of the facility in the state – definition of "facility"

4.2 Massachusetts – Stationary Combustion

The Massachusetts' unit-to-unit comparison was for a stationary combustion facility in the year 2016. Highlights from that comparison are:

Methodology:

- The same data is reported to both federal and state programs since the methodologies are derived from GHGRP for unit and process methodologies.
- In some cases, the state emissions factor is customized (state specific) and thus, different from that of GHGRP.
- MA tends to use emissions factors derived from The Climate Registry's General Reporting Protocol, which in many cases provides more technology specific emissions factors than EPA.

Source definitions:

- MA requires additional information for sources not reported to GHGRP. With the shift in reporting systems, these differences may no longer exist (i.e. emissions from onsite motor vehicles, refrigerants, and other small sources).

Units of measure:

- If the facility becomes confused about which emission factor to use, or which units of measure to use, it may report incorrectly.

4.3 Oregon – Landfills

OR's unit-to-unit comparison was for a Landfill facility for the year 2015. Highlights of the comparison are:

Methodology:

- Facilities can report either as combustion sources (fuel based) using IPCC AR4 emissions factors, or their own heating values. Conversely, they can report process emissions.
- In some cases, flare emissions were included in unit reporting to OR, but not to GHGRP.

Source definitions:

- Some units were reported together to OR, and separately to the state making a comparison at the unit level difficult. In that case, the state requested supplemental information, for example, to verify fuel use.

5 Insights and Implications for a Combined Reporting Framework

The team observed that there is some general overlap among programs, for example, in terms of the pollutants required, the types of facilities reporting, and that most programs require some sub-facility (unit/process) reporting. However, there are also various requirements and reporting methods unique to each program that a common emissions reporting form would have to address. Both from the comparison exercise, as well as from group discussions, the following items emerged as relevant for the common reporting framework. Each item discussed points to a question or capability the common reporting framework would have to address:

Burden: A common reporting emissions form or system SHOULD avoid duplicate entry of data/facility info wherever possible. Facilities reporting to both are having to submit data separately to their state system AND the GHGRP. To address this, one option is to enhance the interaction between the state and GHGRP, where they have facilities reporting to both. However, in the broader context of CAER, "burden" involves more than the state and GHGRP interactions so the definition of burden needs to be looked into. If 10% of facilities in a state are reporting to both programs, this "burden" may not appear large depending on what metric is used to define "burden" and how significant that burden is to that 10% of facilities. If the burden is minimal then the common emissions form may not be necessary.

Data Elements. In terms of a common emissions form, if some data elements are unique to one program then one option would be for the form to be set up to obtain the data for GHGRP but for the state this information would not be requested/sent. Another option would be to not include strictly unique program data elements as part of the common emissions form at all if they are not seen as a shared emissions data element. Understanding that these would have to be reported elsewhere to meet the relevant program's requirements.

Biogenic fuels. What is considered a biogenic fuel may vary between different programs. For example, GHGRP provides a list of biomass fuels with corresponding emissions factors in table C-1 of Part 98. CO2 emissions from these fuels are considered biogenic emissions. Part 98 provides a definition for biomass in §98.6.

How might the common form be able to determine if a fuel is biogenic for one program and not another? And then allocate its emissions according to the specific program requirements?

Input formats. When facilities are asked to report emissions the units of measure can be different (e.g. short versus metric tons). GHGRP incorporates data as reported and conducts the necessary conversions internally within the system.

For a common emissions form an option would be for the facility to report in whatever units of measure it wants to and for the form to also conduct the relevant conversions internally. Another option would be to request that the data be entered in specific units and for the conversion to be performed beforehand. Ease and speed for the user could be factored in, together with some thought to reduction in potential errors if the system performs the calculations versus outside system calculations. It would be helpful if the data outputs included emissions factors (EFs), conversion factors, and other methodology-specific variables.

Compatibility with current reporting systems: GHGRP and MA had "ground up" reporting systems built for electronic reporting. MA is moving towards this approach using the criteria reporting system but

they are finding there is no perfect overlap. MN is using the criteria pollutant reporting system already in place for GHG reporting. OR has a GHG reporting system (EZ-Filer) that automates calculation processes for fuel combustion and retains facility information (so a reporter doesn't have to re-enter it every reporting instance).

How could the common form accommodate different electronic reporting systems that already exist in some states? How could it better align with other reporting, such as for criteria pollutants. In other cases, some states might not have electronic reporting systems to work with and might be able to simply adopt the common form. For states that do have systems, some helpful features could be to have the data be exportable in spreadsheet format, ideally Excel. What features of current systems already in place could the common form take advantage of?

Subpart reporting. Whether a facility reports to one subpart or another is not always straightforward. For GHGRP in very general terms, reporters that do not employ a CEMS report their combustion emissions to Subpart C and their process emissions to the applicable corresponding subpart. However, for reporters that do employ a CEMS report combined process and combustion emissions under the applicable subpart associated with the industrial process. There are some nuances for specific industries like pulp and paper and cement. For OR it is very similar. In general, MN and MA have an approach of reporting at a unit level so combustion units report as combustion and process units as process. We had previously learned that MN has any permitted units reporting individually. Permits include all pollutants (criteria air pollutants (CAPs), hazardous air pollutants (HAPs) and GHG).

How could the common form keep track of the relevant emissions reporting and to which subpart they should be "sent"? One option is for the form to keep track of the sub-facility data via FRS and then allow the user to select what components of the facility they are reporting to and submit these to the relevant subpart. For example, if for the state they must report at the unit level, they would do so, then, depending on the parameters by which they are reporting, these components might be grouped to the level and subpart that GHGRP would require.

Confidential Business Information (CBI). For all programs, the emissions data reported is public and is not CBI. A facility can request protection of its data when applying for a permit on grounds that it is CBI, but this happens in a handful of cases. For example, in MN out of 2,200 facilities reporting only 15 have asked for their data to be considered CBI. Confidentiality can be at the process level. MA has the option for a facility to request its data be CBI but they have not received a request yet.

While emissions data may not be CBI, activity or input data to perform emissions estimates calculations may be CBI. For the GHGRP in some cases there are CBI considerations. For example, for some iron and steel facilities taconite production is considered CBI. However, activity data required to estimate emissions can be considered CBI and should not be disclosed publicly.

In consideration of the common emissions form, one issue to consider is whether the state faces CBI constraints that must be adopted and the relevant business rules must be incorporated into the common form. If the input data to do all relevant emissions calculations for both federal and state program is CBI, then the common form would have to be able to use that data and possibly store it for the facility (if that data is unlikely to change much from one year to the next), but not disclose it to state/local/tribal (SLTs) agencies or EPA (GHGRP has this capability).

Details in calculations. How detailed the reported data needs to be depends on the sector and program. For example, EPA asks for more detail than MN for materials balance calculations.

How could the common form account for these differences? A common form could keep the most detailed level data necessary. If one program (e.g. GHGRP) requires more detail, then the calculations could be done at that level of detail within the common form, and the totals shared with the program requiring less detail. (e.g. state). This would imply the facility entering some activity data for the common form to process.

Actual Emissions vs. Potential to Emit. Most plants in MN are Title V and all Title V report GHGs. They report actual emissions as opposed to potential to emit.

If some program reporting is based on potential to emit versus actual emissions, the common form could intake the report based on PTE but not need to transmit the data to the program based on actual emissions. The combined form might also keep track of the capacity of the facility, for example.

Methodology: In some cases, the methodology being used by programs is different. If the programs are happy to accept one methodology, then the common form could either intake the data calculated according to that methodology, or help the facility calculate its emissions by providing the necessary equations, conversion factors, emissions factors and parameters for the calculation. This could be akin to some web-based tax preparation services allowing the user to report both federal and state taxes. If different methodologies are required, the common form would have to be able to calculate emissions for each program according to its methodology. Ideally, the facility would only have to provide its activity data one time and the combined form would perform all necessary calculations.

So far, the discussion has centered on data submissions by reporting industries within the scope of the R&D project, dealing strictly with the interactions between GHGRP and state GHG programs. However, as mentioned in the introduction, some items outside the scope of the study but relevant to CAER emerged during the PDT work:

Facility Aspects: It is important to note that, from the CAER proposed future state vision, the shared facility data would be handled via interactions between SLT facility data management systems and the federal Facility Registry Service (FRS) and it's new data model. Work to this effect is already in progress as part of the Facility Integrated Planning Team (IPT). However, facility elements that emerged as part of this R&D project are documented here, since the group was tasked to report its findings.

> **Reporting Facilities:** Reporting thresholds are different for each program. Some are based on one criteria and others require more than one criteria such as size, emissions, potential to emit or the existence of an air permit.
>
> A combined reporting emissions form would have to be able to keep track of the thresholds, intake data for all facilities but only deliver a subset of facilities relevant to each program to federal and state, respectively.
>
> **Exiting Facilities**. GHGRP has data elements for facilities who no longer need to report if they meet certain criteria.
>
> The common emissions form would have to be able to keep track of the reporting criteria for each program.

Definition of Facility: In some cases the definition of "facility" might be different between the federal and the state program. So a unit or process that is considered part of a facility in one program, may not be part of it in another.

The combined form would have to be able to keep track of the definition of facility for each program.

Facility and Sub-facility Granularity. Some states (OR) as well as GHGRP allow for units/processes to be grouped and reported as one, including up to the facility level, e.g. units being fed by the same fuel line and/or units emitting to the same stack. Usually these units are very similar in technology. Other states (MA, MN) have separate reporting for individual units. MA allows the level of granularity to the most detailed degree possible. MN requires unit reporting for permitted units. Units that are non-permitted can be added and reported as a group.

How could the combined form accommodate different levels of reporting? (e.g. pull sub-facility data from the Facility Registry System (FRS), allow the user to select the units/group of units it is reporting to). The data should be at the level of granularity required by the more specific of the state and federal requirements. For example, data required at the process or unit level by one program, but at the facility level for another, would be processed so that the detailed data is delivered to the first, and aggregated data to the second.

Combined GHG and NEI data: With respect to reporting "burden, it is also related to the submission of other types of emissions data and the same facility data, which was beyond the scope of this study. So reporting burden of facilities to GHG reporting programs (state and federal) has to be considered in the context of reporting of other pollutants and duplication of reporting of facility data as well (see "Facility Aspects" above).

Data Retrieval. However, during team discussions, states reported using GHGRP data for quality checks, as explained in Section 4. While this is technically outside the scope of the PDT, it is nonetheless an issue within the scope of CAER and was thus captured in this report. GHGRP data is used to compare with data submitted to the states to find significant differences and make sure that there is some consistency in what is being reported. If data elements and methods are not identical but the comparison is helpful, then a benefit would be to provide the data in a format that would streamline the comparison. To this effect, OR provided the following suggestions:

1. Provide the ability to download the more detailed "Reported Data" report in a .csv format
2. Provide a table with grouped emissions under subpart C by fuel type
3. Make a jump to for the specific areas that people may be looking to verify (i.e. total gas collected by destruction systems)
    a. The current report structure makes it difficult to find
    b. Clearer labels would help as well
    c. For landfills, reporting the amount of methane recovered in scf instead of or in addition to metric tons

There are benefits to this for EPA as well. Within OAQPS, one important step in rulemaking has to do with issuing regulatory impact analyses (RIAs) for major rules, including the National Ambient Air Quality

Standards (NAAQS) for criteria pollutants. These RIA's are mandated. A significant portion of each analysis involves calculating benefits of pollutant reductions in terms of human health and the environment. Co-benefits are the benefits of the reductions from other pollutants that happen concurrently with reductions of the target pollutant. For example, a reduction in NOx from more energy efficient equipment might also lead to reductions of SO_2 and CO_2. Data retrieval that allows GHG data to be incorporated into flat files with National Emissions Inventory (NEI) data, for example, would allow EPA to conduct co-benefits analysis that include GHGs.

6 Next Steps

As described in Section 5, these findings are a first step towards understanding if and how a common reporting form could be used to alleviate GHG reporting burden to industry, states and the federal government. Some outstanding questions to investigate in a next phase of this project could include:

Further comparison between State and Federal GHG programs:

- Do our findings apply to other states? If not, what are the differences?
- Do our findings apply to all the other sectors?
- What features of a shared emissions reporting platform would promote reduced burden (and avoid increased burden) for input data that can be used to report to both programs, respecting CBI considerations?

Further CAER GHG emission-related items

- If states are already using same reporting system to collect both GHG and EI (criteria) data, could GHGRP data be incorporated into NEI through common reporting?
    - How might states with facilities reporting to both federal and state programs retrieve data in a format that would allow unit-to unit comparisons of what was reported to both, for their QA checks?. A similar concept would apply to data required to be paired with NEI data (for EPA co-benefits analyses, e.g.).

Potential next steps could include:

- A survey to understand which other state/local/tribal (SLT) agencies have GHG reporting programs and a comparison of these GHG programs to the EPA's GHGRP,
- A comparison of additional sectors.
- A pilot whereby a state might receive GHGRP directly and thus only need to supplement any additional data for facilities below their threshold.
- Whether there are other SLTs that would be interested in being able to obtain GHG data for their states or are planning to do so, and have/don't have electronic reporting systems of their own to collect this information.

Appendix A

Please refer to Excel File titled “Appendix A GHG PDT Data Element Comparison.xlsx” for the detailed data element comparison between state and federal GHG programs.

Appendix B

Minnesota Narrative and Unit-to-Unit Comparison for Iron and Steel

Iron and steel facilities report GHG emissions to Minnesota Pollution Control Agency (MPCA) along with CAPs on an annual basis. Many iron and steel facilities that report to MPCA also report to EPA under the Greenhouse Gas Reporting Program.

Several rules and statuses cover GHG reporting in MN, for example, facilities that hold a federal title V permit are required to report. Facilities report GHG emissions from all permitted units within the facility. Emissions are reported at process level for each unit. Each process is associated with a SCC. Facilities report emissions based on several calculation methods including engineering judgement, stack test, continuous monitoring, site specific emission factor, material balance, and generic emission factor among others.

MPCA reporting system includes generic GHG emission factors for CO_2, CH_4 and N_2O. These emission factors were augmented from EPA GHG Reporting Program (subpart C) and assigned to combustion SCCs. For example, a combustion SCC for natural gas (10200602) was assigned CO_2, CH_4, and N_2O emissions factors to match those listed for Natural Gas in tables C-1 and C- of 40 CFR 98. The emission factor units for each pollutant were converted from 'Kg of pollutant/MMbtu' to 'LBs of pollutant/MMBtu' (see an example below). In the Compliance Emissions Data Reporting Interface (CEDRI) (the MPCA reporting system) database, if facilities assign an SCC (10200602) to a unit, GHGs will automatically be calculated using the emissions factors provided in Table A 1 below.

Table A 1. Emissions Factors for Iron and Steel

SCC: 10200602		
CO_2	116.98	LB CO2/MMBTU
CH_4	0.0022	LB CH4/MMBTU
N_2O	0.00022	LB N2O/MMBTU

For comparison between MPCA and EPA emissions, I choose to look at a taconite facility Northshore Mining – Silver Bay. The facility reports to EPA under both subpart C (Stationary Combustion) and under subpart Q (Iron and Steel Production). Below are two screenshots (

Figure A 1 and Figure A 2) from the submitted reports showing the information reported in different formats. Both screetshots show combustion emisions for 'Power Boiler 2'.

Figure A 1. EPA GHGRP Data

Unit Details:
Unit Name : Northshore Power Boiler 2
Unit Type : OB (Boiler, other)
Unit Description :
Individual Unit Details:
Use Ivt Indicator: Y
Maximum Rated Heat Input Capacity: 765 (mmBtu/hr)

Emission Details:
Annual CO_2 mass emissions from sorbent: 0 (Metric Tons)
Annual Biogenic CO2 Emissions: 0 (metric tons)

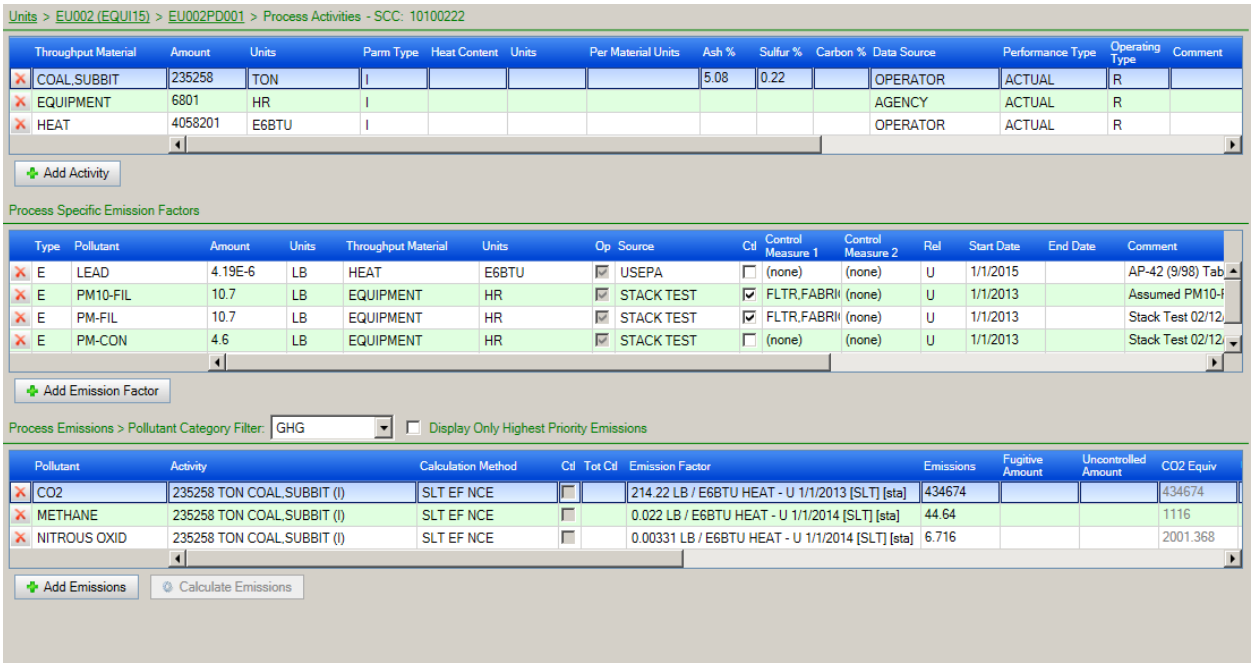
Tier Fuel Details:
Fuel : Subbituminous
Tier Name : Tier 3 (Equation C-3, solid fuel)
Tier Methodology Start Date : 2015-01-01
Tier Methodology End Date : 2015-12-31

Fuel Emission Details :

Total CO2 emissions	Total CH4 emissions	Total N2O emissions	Total CH4 emissions CO2e	Total N2O emissions CO2e
388729.0 (Metric Tons)	44.10 (Metric Tons)	6.414 (Metric Tons)	1102.4 (Metric Tons)	1911.3 (Metric Tons)

Carbon Content Substitute Data Information :
Total number of valid carbon content determinations : 12
Total number of carbon content substitute data values : 0
Frequency of carbon content determinations : Monthly
Total number of operating hours in the reporting year for which missing data substitution was used for fuel usage : 0

Figure A 2. MPCA Reporting



The screenshots provide information collected by both programs. Values reported are different for several reasons; one being MPCA GHG estimates relied on generic emission factors, while they did tier 3

methodology to estimate emissions reported to EPA; secondly MPCA emissions are reported in nominal short tons and those reported to EPA are in metric tons.

Next, I looked at information reported for Subpart Q. Below are screenshots of information reported to both programs (Figure A 3 and Figure A 4).

Figure A 3. EPA GHGRP (Subpart Q)

Average carbon content of byproducts: ()

No Cems Unit Details:

Unit Name: Northshore Taconite Line 11
Unit Description:
Unit Type: Taconite Indurating Furnace
CO2Emissions: 47790.3 (Metric Tons)

Inputs/Outputs:

Name	Type	Classification	# of Times Carbon Content Substituted	Carbon Content Basis	Other Carbon Content Basis	Annual Quantity Substituted Data Method
			0	Supplier		
			0	ASTM D5373-08		
			0	ASTM D5373-08		
			0	ASTM D5373-08		

Figure A 4. MPCA Reporting

Units > EU104 (EQUI27) > EU104PD001 > Process Activities - SCC: 30302381

Throughput Material	Amount	Units	Parm Type	Heat Content	Units	Per Material Units	Ash %	Sulfur %	Carbon %	Data Source	Performance Type	Operating Type	Comment
HEAT	503675	E6BTU	I							OPERATOR	ACTUAL	R	
PELLETS	958509	TON	O							OPERATOR	ACTUAL	R	
EQUIPMENT	7212	HR	I							AGENCY	ACTUAL	R	

Add Activity

This shows the information MPCA received on number of pellets produced by "Taconite Line 11, process one" however, the facility also reports in process fuel use. Below is a screenshot of that information (Figure A 5).

Figure A 5. MPCA Reporting (In-process Fuel Use)

Units > EU104 (EQUI27) > EU104PD003 > Process Activities - SCC: 39000699

Throughput Material	Amount	Units	Parm Type	Heat Content	Units	Per Material Units	Ash %	Sulfur %	Carbon %	Data Source	Performance Type	Operating Type	Comment
NATURAL GAS	465	E6FT3	I							OPERATOR	ACTUAL	R	

Add Activity

Process Specific Emission Factors

Type	Pollutant	Amount	Units	Throughput Material	Units	Op	Source	Ctl	Control Measure 1	Control Measure 2	Rel	Start Date	End Date	Comment
E	CO	0	LB	NATURAL GAS	E6FT3	☑	OTHER	☐	(none)	(none)	U	1/1/2012		
E	NOX	0	LB	NATURAL GAS	E6FT3	☑	OTHER	☐	(none)	(none)	U	1/1/2013		
E	PM10-FIL	0	LB	NATURAL GAS	E6FT3	☑	OTHER	☑	ESP	(none)	U	1/1/2013		
E	PM-FIL	0	LB	NATURAL GAS	E6FT3	☑	OTHER	☑	ESP	(none)	U	1/1/2013		

Add Emission Factor

Process Emissions > Pollutant Category Filter: GHG ☐ Display Only Highest Priority Emissions

Pollutant	Activity	Calculation Method	Ctl	Tot Ctl	Emission Factor	Emissions	Fugitive Amount	Uncontrolled Amount	CO2 Equiv
CO2	465 E6FT3 NATURAL GAS (I)	SLT EF NCE	☐		116.98 LB / E6BTU HEAT - U 1/1/2013 [SLT] [sta]	28558			28558
METHANE	465 E6FT3 NATURAL GAS (I)	SLT EF NCE	☐		0.0022 LB / E6BTU HEAT - U 1/1/2012 [SLT] [sta]	0.5371			13.4275
NITROUS OXID	465 E6FT3 NATURAL GAS (I)	SLT EF NCE	☐		0.00022 LB / E6BTU HEAT - U 1/1/2012 [SLT] [sta]	0.05371			16.00558

Add Emissions | Calculate Emissions

For taconite production GHG emissions are estimated based on in process fuel use. Emissions are calculated based on generic emission factors and are reported in nominal short tons.

EPA estimates are based on mass balance equation of taconite pallets. An additional difference between the two reporting programs is the facility reported one emissions value for taconite production line to EPA, while MPCA emissions are broken into multiple processes for the same emission unit. Table A 2 is a comparison of EPA and MPCA data:

Table A 2. EPA and MPCA Unit-to-Unit Comparison

Unit	GHGRP Total Emissions	State GHG Program Total Emissions	Reason for difference
Northshore Power Boiler 2: Subbituminous	388729 Metric Tons (MT) CO_2; 44.1 MT CH_4, 6.414 MT N_2O	434674 Short Tons (ST) CO_2; 44.64 ST CH_4, 6.716 ST N_2O	Methodology. EPA value estimated via tier 3; MPCA number estimated using generic emission factors. Also reported in different units.
Northshore Power Boiler 2: Natural Gas	544 Metric Tons (MT) CO_2, .01 MT CH_4, .001 MT N_2O	601.9 Short Tons (ST) CO_2, .011 ST CH_4, .001 ST N_2O	Methodology. EPA value estimated via tier 3; MPCA number estimated using generic emission factors. Also reported in different units.
GP Northshore Plant Heaters	5646.7 Metric Tons (MT) CO_2, .11 MT CH_4, .011 MT N_2O	Heaters are not reported to MPCA	
Northshore Babbitt Boiler	209.7 Metric Tons (MT) CO_2, .01 MT CH_4, .002 MT N_2O	Northshore Babbitt is a separate facility and they report GHGs for a number of units.	
Northshore Power Boiler 1: Subbituminous	174648.1 Metric Tons (MT) CO_2,	195703 Short Tons (ST) CO_2, 20.1 ST CH_4, 3.04 ST N_2O	Methodology. EPA value estimated via tier 3; MPCA number estimated using

Unit	GHGRP Total Emissions	State GHG Program Total Emissions	Reason for difference
	19.85 MT CH_4, 2.888 MT N_2O		generic emission factors. Also reported in different units.
Northshore Power Boiler 1: Natural Gas	25437.9 Metric Tons (MT) CO_2, .54 MT CH_4, .054 MT N_2O	31291 Short Tons (ST) CO_2, .5885 ST CH_4, .05885 ST N_2O	Methodology. EPA value estimated via tier 3; MPCA number estimated using generic emission factors. Also reported in different units.
Northshore Power Boiler 1: Distillate Oil	29.5 Metric Tons (MT) CO_2,	33.1 Short Tons (ST) CO_2, .001342 ST CH_4, 0.000268 ST	Emissions reported in different units
Northshore Taconite Line 11	47790.3 Metric Tons (MT) CO_2	57116 Short Tons (ST) CO_2, 1.0742 ST CH_4, .10742 ST N_2O	EPA estimated CO_2 emissions from taconite pallets based on mass-balance equation. MPCA estimates GHG emissions from in process fuel use. The facility used NG and estimated emissions from generic emission factors
Northshore Taconite Line 12	44356.6 Metric Tons (MT) CO_2	53124 Short Tons (ST) CO_2, .999 ST CH_4, .10742 ST N_2O	EPA estimated CO2 emissions from taconite pallets based on mass-balance equation. MPCA estimates GHG emissions from in process fuel use. The facility used NG and estimated emissions from generic emission factors

Unit	GHGRP Total Emissions	State GHG Program Total Emissions	Reason for difference
Northshore Taconite Line 6	21105.6 Metric Tons (MT) CO_2	24819 Short Tons (ST) CO_2, .4668 ST CH_4, 0.04668 ST N_2O	EPA estimated CO2 emissions from taconite pallets based on mass-balance equation. MPCA estimates GHG emissions from in process fuel use. The facility used NG and estimated emissions from generic emission factors
Northshore Taconite Line 5	4621.9 Metric Tons (MT) CO_2	5526 Short Tons (ST) CO_2, .10395 ST CH_4, .010395 ST N_2O	EPA estimated CO2 emissions from taconite pallets based on mass balance equation. MPCA estimates GHG emissions from in process fuel use. The facility used NG and estimated emissions from generic emission factors

Appendix C

Massachusetts Narrative and Unit-to-Unit Comparison for

Stationary Combustion

The MassDEP GHG Reporting Program is currently working to integrate GHG reporting into the existing in-house platform used to collect other air pollution data from facilities (eDEP). From the program's inception through emission year 2015, GHG emission reports were submitted using the Climate Registry Information System (CRIS), maintained by The Climate Registry (TCR). Beginning with reports for emission year 2016 (delayed until late 2017), reports will be submitted through eDEP instead. Due to technical differences between the platforms, this transition is likely to result in minor changes to the universe of emissions sources that can be reported. Currently, the MassDEP GHG reporting regulation requires facilities to report emissions from on-site motor vehicles, refrigerants, and other small sources that may not be accepted by eDEP.

For MassDEP GHG reporters that also report to EPA under Subpart C, the same information regarding stationary combustion units is reported to both programs. Below are two screenshots (Figure A 6 and Figure A 7) from reports submitted by **UMass – Amherst** showing the same information in different formats. Both screenshots show CO_2, CH_4 and N_2O emission from natural gas consumption by "Boiler #200."

Figure A 6. Emissions Displayed on EPA FLIGHT

Unit Name : Boiler #200
Unit Type : OB (Boiler, other)
Unit Description :
Individual Unit Details:
Use Ivt Indicator: N
Maximum Rated Heat Input Capacity: 179.7 (mmBtu/hr)

Emission Details:
Annual CO_2 mass emissions from sorbent: 0 (Metric Tons)
Annual Biogenic CO2 Emissions: 0 (metric tons)

Tier Fuel Details:
Fuel : Natural Gas (Weighted U.S. Average)
Tier Name : Tier 2 (Equation C-2a)
Tier Methodology Start Date : 2015-01-01
Tier Methodology End Date : 2015-12-31
Frequency of HHV determinations : Semiannually

Tier 2 Monthly HHV Details :

January	February	March	April	May	June	July	August	September	October	November	December
N	N	N	N	N	N	N	N	N	N	N	N

Fuel Emission Details :

Total CO2 emissions	Total CH4 emissions	Total N2O emissions	Total CH4 emissions CO2e	Total N2O emissions CO2e
12859.6 (Metric Tons)	0.24 (Metric Tons)	0.024 (Metric Tons)	6.1 (Metric Tons)	7.2 (Metric Tons)

Equation C2a/C9a Inputs :
Fuel Quantity : 236400000 (scf/year)
Use Default High Heat Value : true
High Heat Value : 0.00102521 (mmBtu/scf)

Figure A 7. Emissions Displayed on MassDEP Submission Report

Source Name	Activity Type	GHG	Qty (t)	CO2e (t)	Calc Method	End User Sector	Technology	Fuel Type	Fuel	Fuel Quantity	Emission Factor
BOILER #200-HP (EMISSION UNIT #16A)	Stationary Combustion - Scope 1	CO2	12,859.6216	12,859.6 ..	Emission Factor	Commercial	Boilers	Natural Gas	1,025 - 1,050 Btu / SCF	242360 MMBtu	53.06 kg/MMBtu
BOILER #200-HP (EMISSION UNIT #16A)	Stationary Combustion - Scope 1	CH4	0.21812	4.5806	Emission Factor	Commercial	Boilers	Natural Gas	1,025 - 1,050 Btu / SCF	242360 MMBtu	0.9 g/MMBtu
BOILER #200-HP (EMISSION UNIT #16A)	Stationary Combustion - Scope 1	N2O	0.21812	67.61844	Emission Factor	Commercial	Boilers	Natural Gas	1,025 - 1,050 Btu / SCF	242360 MMBtu	0.9 g/MMBtu

In this case, the fuel quantity and CO_2 emissions reported to both programs are identical, as seen above. However, the CH_4 and N_2O emissions are reported differently to each program; this is most likely a data entry error.[4] Regarding methodology, the Massachusetts regulation references TCR's General Reporting Protocol (GRP) for unit- and process-specific methodologies; the GRP is largely derived from EPA methodologies, so emissions that are reported to both programs are typically identical.

The Massachusetts program requires reporting of additional emissions beyond what is required by Subpart C. Massachusetts reporters have historically reported emissions from motor vehicles operated by the facility owners, refrigerants from on-site equipment, and other small sources. The differences between the EPA and MassDEP submission reports are largely due to the additional sources reported to MassDEP rather than to differences in calculation methodologies (Table A 3). As noted above, some of these additional sources may no longer be required through eDEP, which would bring the two programs closer together.

Table A 3. Unit-to-Unit Comparison of Data Reported to Both Programs

Unit	GHGRP Total Emissions	State GHG Program Total Emissions	Reason for difference
Boiler #200-HP (#16A): Natural Gas	12,859.6 Metric Tons (MT) CO_2; 0.24 MT CH_4; 0.024 MT N_2O	12,859.6 MT CO_2, 0.22 MT CH_4; 0.218 MT N_2O	Same for CO_2; CH_4 EFs differ slightly (GRP); N_2O EF error in state report
Boiler #300-LP (#16B): Natural Gas	13,498.4 Metric Tons (MT) CO_2, 0.25 MT CH_4; 0.025 MT N_2O	13,498.5 MT CO_2; 0.23 MT CH_4; 0.23 MT N_2O	Same (?) for CO_2; CH_4 EFs differ slightly (GRP); N_2O EF error in state report
Boiler #400-LP (#16B): Natural Gas	7,543.3 Metric Tons (MT) CO_2, 0.14 MT CH_4; 0.014 MT N_2O	7,543.3 MT CO_2; 0.13 MT CH_4; 0.13 MT N_2O	Same for CO_2; CH_4 EFs differ slightly (GRP); N_2O EF error in state report

[4] Facilities often submit the EPA reports several weeks before submitting to MassDEP. Occasionally, facilities have noted confusion about differences in units or conversion factors between the two programs that can cause errors when submitting to MassDEP.

Unit	GHGRP Total Emissions	State GHG Program Total Emissions	Reason for difference
Combustion Turbine Generator (#15A): Natural Gas	51,517.6 Metric Tons (MT) CO_2, 0.97 MT CH_4; 0.097 MT N_2O	51,517.6 MT CO_2; 3.69 MT CH_4; 0.87 MT N_2O	Same for CO_2; Very different EFs for CH_4, N_2O
Dining Commons - NG Cooking Equipment: Natural Gas	526.7 Metric Tons (MT) CO_2, 0.01 MT CH_4; 0.001 MT N_2O	526.7 MT CO_2; 0.05 MT CH_4; 0.001 MT N_2O	Same for CO_2 and N_2O; different EF for CO_2.
EU#28-Small Boilers: Natural Gas	654.2 Metric Tons (MT) CO_2, 0.01 MT CH_4; 0.001 MT N_2O	427.03 MT CO_2; 0.01 MT CH_4; 0.007 MT N_2O	Same for CH_4;Different fuel quantities reported (different units)
HRSG w/ Duct Burner (#15B): Natural Gas	13,649.3 Metric Tons (MT) CO_2, 0.26 MT CH_4; 0.026 MT N_2O	13,649.3 MT CO_2; 0.23 MT CH_4; 0.23 MT N_2O	Same for CO_2; CH_4 EFs differ slightly (GRP); N_2O EF error in state report
Space heating: Natural Gas	718.9 Metric Tons (MT) CO_2, 0.01 MT CH_4; 0.001 MT N_2O	718.9 MT CO_2; 0.1 MT CH_4; 0.001 MT N_2O	Same for CO_2 and N_2O, different EFs for CH_4
Boiler #200-HP (#16A): Fuel Oil #2	146.4 Metric Tons (MT) CO_2, 0.01 MT CH_4; 0.001 MT N_2O	155 MT CO_2; 0.00042 MT CH_4; 0.001 MT N_2O	Same for N_2O; For MA, used customized EF for #2 oil
Boiler #300-LP (#16B): Fuel Oil #2	4229.8 Metric Tons (MT) CO_2, 0.17 MT CH_4; 0.034 MT N_2O	4478.1 MT CO_2; 0.012 MT CH_4; 0.024 MT N_2O	For MA, used customized EF for #2 oil
Boiler #400-LP (#16B): Fuel Oil #2	3037.3 Metric Tons (MT) CO_2, 0.12 MT CH_4; 0.025 MT N_2O	3215.54 MT CO_2; 0.009 MT CH_4; 0.017 MT N_2O	For MA, used customized EF for #2 oil
Combustion Turbine Generator (#15A): Fuel Oil #2	2310.3 Metric Tons (MT) CO_2, 0.09 MT CH_4; 0.019 MT N_2O	2445.9 MT CO_2; 0.1 MT CH_4; 0.0198 MT N_2O	For MA, used customized EF for #2 oil; CH_4 and N_2O EFs differ slightly (GRP);
Small Boiler (3 Units): Fuel Oil #2	93.9 (MT) CO_2, 0 MT CH_4; 0.001 MT N_2O	99.4 MT CO_2; 0.01344 MT CH_4; 0.001 MT N_2O	Same for N_2O; No CH_4 reported to EPA; For MA, used customized EF for #2 oil
Propane Space heating	92.3 (MT) CO_2, 0 MT CH_4; 0.001 MT N_2O	90.2 MT CO_2; 0.01468 MT CH_4; 0.001 MT N_2O	Same for N_2O; No CH_4 reported to EPA.

Note: Many of the small discrepancies are due to minor differences between the emission factors (EFs) used by each program. The Massachusetts GHG Reporting Program points to The Climate Registry's General Reporting Protocol (GRP) for EFs; in several cases, the GRP provides more technology-specific EFs by fuel than EPA.

Appendix D

Oregon Narrative and Unit-to-Unit Comparison for

Landfills

Municipal Solid Waste Landfill reporting is complex in Oregon. If our facilities report to EPA, they are only required to send us the summary of the report from EPA. However, we encourage them to report through our application, EZ Filer, as well.

If they do not report to EPA because they are below the threshold (of 25,000 metric tons of CO2e), they are required to use EZ-Filer to report to the state. This is only true if they are above our threshold of 2,500 metric tons CO_2e and if they have an air quality permit. Even if they do hold an air quality permit, they do not need to report fugitive emissions from the landfill. DEQ can use the data from their solid waste permit to calculate fugitive emissions and to reduce the reporting burden on the facility, we do not require them to report using EZ Filer. If they don't hold an air quality permit they are not required to report. We use the data for their facility from the solid waste permit to determine their GHG related emissions.

Facilities can report in EZ-Filer using several different methods. One is reporting combustion devices (Subpart C). Using this option, facilities will enter the fuel being used and EZ-Filer will calculate the emissions from that fuel for CO_2, CH_4, and N_2O using IPCC AR4 emission factors. If they have their own heating value, they can report the fuel in mmBTU, otherwise, the heating value is the default from the IPCC AR4.

The other way they can report is choosing process emissions. This is where facilities report the process emissions associated with the specific subpart they are reporting under. Process emissions can be biogenic or anthropogenic and require the specific subpart the facility is reporting under be listed (in the case of municipal landfills, Subpart HH). They may also use this method if they are reporting tier 4 calculations, choosing subpart C as the subpart to report under. If they use this method they calculate any emissions themselves and then enter the total in CO_2e.

Figure A 8 is a screen shot of an exported report from a landfill that reported using EZ-Filer. The facility has combined comfort heaters using similar fuels, control devices, and listed the landfill emissions separately. With everything grouped in this way, it can be difficult to determine what is included in the 5 units. The grouping that occurs in EZ-Filer often does not follow how units are reported in their annual reports for their air quality permits to DEQ or how they are reported to EPA. Below is Table A 4 showing a direct comparison between Oregon and EPA reported emissions

Figure A 8. EZ Filer Landfill Report Example

Greenhouse Gas Emissions Calculation Details

Columbia Ridge Landfill

Facility: 11-0001 - Waste Management Disposal Services of Oregon, Inc. **Emissions Year: 2015**

Emissions Unit/Device ID	Fuel/Process	Annual Rate	Energy Content	Pollutant	Emission Factor	Emission Factor Unit	Emissions	Emissions Unit	GWP	CO2e	CO2e Unit
Comfort Heaters											
	Kerosene	52,560 mmbtu	5.67 mmbtu/barrel								
				CH4	0.0030	kg/mmbtu	0.158	metric ton	25	3.942	metric ton
				CO2	75.2000	kg/mmbtu	3,952.512	metric ton	1	3952.512	metric ton
				N20	0.0006	kg/mmbtu	0.032	metric ton	298	9.398	metric ton
									Sub total:	3965.852	metric ton
Comfort Heating											
	Propane	46,866 mmbtu	3.8227 mmbtu/barrel								
				CH4	0.0030	kg/mmbtu	0.141	metric ton	25	3.515	metric ton
				CO2	62.8700	kg/mmbtu	2,946.465	metric ton	1	2946.465	metric ton
				N20	0.0006	kg/mmbtu	0.028	metric ton	298	8.380	metric ton
									Sub total:	2958.360	metric ton
Control Devices											
	Biogas (methane)	2,868,346,400 cf	485 mmbtu/mmcf								
				CH4	0.0032	kg/mmbtu	4.452	metric ton	25	111.292	metric ton
				CO2	52.0700	kg/mmbtu	72,437.077	metric ton	1	72437.077	metric ton
				N20	0.0006	kg/mmbtu	0.876	metric ton	298	261.174	metric ton
									Sub total:	72809.543	metric ton
Municipal Waste Landfill											
	Process-Bio	309,052 metric ton									
				CH4		kg/mmbtu	0.000	metric ton	1	0.000	metric ton
				CO2	1.0000	kg/mmbtu	309052.000	metric ton	1	309,052.000	metric ton
				N20		kg/mmbtu	0.000	metric ton	1	0.000	metric ton
									Sub total:	309,052.000	metric ton
Comfort Heaters											
	Residual Oil #6	3.066 mmbtu	6.3 mmbtu/barrel								
				CH4	0.0030	kg/mmbtu	0.009	metric ton	25	0.230	metric ton
				CO2	75.1000	kg/mmbtu	230.257	metric ton	1	230.257	metric ton
				N20	0.0006	kg/mmbtu	0.002	metric ton	298	0.548	metric ton
									Sub total:	231.035	metric ton
									Total emissions for this facility:	**389016.789**	**metric ton**

Table A 4. Direct Emissions Comparison by Unit for EPA

Units	Fuel Type	Oregon	UOM	EPA	UOM	EPA converted	Oregon CO_2	EPA CO_2	Oregon CH_4	EPA CH_4	Oregon N_2O	EPA N_2O	Notes
Comfort Heaters	Kerosene	52,560	mmBTU	389,333.4	gallons	52,560	3,952.51	3,952.60	0.158	0.160	0.032	0.030	this is the only set of units whose fuel and emissions carry over perfectly
Comfort Heaters	Propane	46,866	mmBTU	18,627,186	scf	46,568	2,946.47	2,879.50	0.141	no value	0.028	no value	assuming conversion difference is causing the difference in total fuel and emissions CH_4 and N_2O emissions read 0 in spreadsheet sent by Kong (perhaps too small?)
Control Devices (generators)	Biogas	2,868,346,400	cf	2,016,711,000	scf	N/A	72,437.08	56,961.20	4.452	3.5	0.876	0.69	This should be the two generators burning landfill gas, however, the facility included flares in their reporting to Oregon which is why the numbers do not match between EPA and Oregon
Municipal Waste Landfill	Biogas						309,052 CO_2e	301,685 CO_2e					it appears the facility took this number from the top of the facility site details page. it is the CO_2e emissions from facility subparts C-II, SS, and TT in metric tons. it includes everything except the two generators burning landfill gas as the generators are the only biogenic emissions from the facility. What should have been reported here were the methane emissions coming from the landfill that were not captured by the flare. This is 301,685 $mtCO_2e$ and is noted in the less detailed breakout on EPA's website but nowhere else. It was quite difficult to compare this to the EPA report and figure out what the facility should have reported here.
Comfort Heaters	Residual Oil #6	3,066	mmBTU	22,217	gallons	3,332	230.26	226.9	0.009	0.01	0.002	0.002	used conversion of 6.3mmBTU/barrel to convert

Process for Verifying Emissions

1) Compare the units to see how the facility is reporting to us versus the EPA.
    a. In the example above, comfort heaters were reported as Subpart C emissions, grouped by fuel burned. These are not grouped for EPA, details of fuel use and emissions are listed separately for each unit.
        i. For this particular facility, I requested that they turn in supplemental information. I did this because all of the comfort heaters were listed separately (see Figure A 9) in the EPA report while they were aggregated by fuel type for our report and for verification of the fuel usage. This made it much easier to verify totals of fuels burned versus doing it using the EPA report because the format of the report detail from EPA does not allow for easy copy/paste into a spreadsheet or a .csv download.

Figure A 9. Example of Unit Listing in EPA Report

Unit Details:
Unit Name : PROPHTR031
Unit Type : CH (Comfort heater)
Unit Description :
Individual Unit Details:
Use Ivt Indicator: N
Maximum Rated Heat Input Capacity: 0.1 0 (mmBtu/hr)

Emission Details:
Annual CO_2 mass emissions from sorbent: 0 (Metric Tons)
Annual Biogenic CO2 Emissions: 0 (metric tons)

Tier Fuel Details:
Fuel : Propane Gas
Tier Name : Tier 1 (Equation C-1)
Tier Methodology Start Date : 2015-01-01
Tier Methodology End Date : 2015-12-31

Fuel Emission Details :

Total CO2 emissions	Total CH4 emissions	Total N2O em
53.8 (Metric Tons)	0 (Metric Tons)	0 (Metric Tons)

Equation C1/C8 Inputs :
Fuel Quantity : 348171.7 (scf/year)

Unit Name : PROPHTR032
Unit Type : CH (Comfort heater)
Unit Description :
Individual Unit Details:
Use Ivt Indicator: N
Maximum Rated Heat Input Capacity: 0.1 0 (mmBtu/hr)

Emission Details:
Annual CO_2 mass emissions from sorbent: 0 (Metric Tons)
Annual Biogenic CO2 Emissions: 0 (metric tons)

    b. Control Devices were also combined in reporting to us. The facility included two engines that run off of landfill gas under this heading. The numbers did not match up with what was reported to EPA.
        i. In talking to the facility, I found that they included all of the flare gas that had been collected (including portions that went to engines on-site and flares) in this section. The flares should have been reported separately as biogenic process emissions – only the CO_2 from those emissions are biogenic. The CH_4 and N_2O from the flares should have been reported separately as anthropogenic process emissions. In addition, the engines should have been separated out and reported as units under subpart C.

c. Municipal Waste Landfill CH_4 emissions were reported separately as process emissions.
    i. These emissions were reported as biogenic. These emissions should be reported as anthropogenic.
    ii. Municipal waste landfill reporting (emissions from landfill not captured by a collection system) can be a confusing area when verifying with EPA's reported numbers. The facility can choose between two different ways to calculate these emissions for the EPA reporting and the results can be quite different. Reporters often report different emissions to us than they do to EPA.
        1. It appears that what happened here is that the facility reported all the emissions, including stationary combustion emissions, in this section (see Figure A 10). The only portion that should have been reported here were the 301,685 CO_2e methane emissions coming off of the landfill and not being captured by the flares.

Figure A 10. Total Facility Emissions Reported to EPA GHGRP

Emissions by Source/Process in metric tons CO_2e (AR4 GWPs, excluding Biogenic CO_2)	
Stationary Combustion	7,367
Municipal Landfills	301,685
Landfill emissions estimated from modeled methane generation and other factors	120,978
Landfill emissions estimated from methane recovery, destruction and other factors	301,685
Landfills with active landfill gas collection systems must calculate and report GHG emissions in two ways. The results of each are displayed here. Only one of these numbers (in most cases the larger value) is used as the emissions from the landfill. Learn more about measuring emissions at landfills.	

2) After reviewing the submissions and talking to the facility contact, I did not have them re-submit for this year. We used the data from EPA for the emissions for this facility in our annual report. However, in 2017, the facility will be reviewed again and made to change any issues that are found.

<u>Updates EPA could make that would make comparison easier</u>

1. Provide the ability download the more detailed 'Reported Data' report in a .csv format
2. Provide a table with grouped emissions under subpart C by fuel type
3. Include landfill flares under subpart C for clearer reporting of N_2O and CO_2 from their combustion
4. Make a jump to for the specific areas that people may be looking to verify (i.e. total gas collected by destruction systems)

a. The current report structure makes it difficult to find
b. Clearer labels would help as well
c. Reporting the amount of methane recovered in standard cubic feet (scf) instead of/in addition to metric tons