

2020 Benchmarking and Quantification Methodologies for Aggregate Facilities under TIER

June 9, 2020



Background

Overview of TIER

- Regulation implemented on January 1, 2020
- Applicable to facilities:
 - with annual emissions above 100,000 tonnes of carbon dioxide equivalent, or
 - that voluntarily enter the regulation (including aggregate facilities and opt ins).
- Facilities must comply with the least stringent of:
 - High Performance Benchmark (HPB)
 - Currently, no HPBs for aggregate facilities
 - No tightening rate
 - Facility-Specific Benchmark (FSB)
 - 90% of historical emissions intensity
 - All aggregate facilities will receive an FSB for 2020

Current Status

- Publication of standards anticipated by **July 2020**:
 - Standard for Developing Benchmarks, new version
 - Standard for Completing Greenhouse Gas Compliance and Forecasting Reports
 - Standard for Validation, Verification and Audit, new version
- Alberta Greenhouse Gas Quantification Methodologies (AQM)
 - Updated draft aggregate chapter (chapter 15) published for public comment - **May 29, 2020**
 - Comment period closes on **July 4, 2020**
 - Target to finalize and publish QM chapter - **July 2020**

Current Status

- Potential amendment to TIER: Person Responsible
 - Current “person responsible” for a facility under TIER is tied to EPEA approval holder, AER license holder or owner of the facility.
 - Stakeholder feedback:
 - administrative and reporting challenges occur when the operator of a facility is not one of these three parties (entry into TIER, data availability, use of fuel charge exemptions, compliance remittance).
 - Amendments to person responsible being actively considered to address the challenges. Will notify stakeholders of next steps when regulatory process completes.

Current Status

- Verification requirements for aggregate facilities:
 - Further discussion of 2020 benchmarking in later slides.
 - Verifications required for 2020 compliance reports submitted by June 30, 2021.
 - Requirements for verification of aggregate compliance reports and benchmark applications will be provided in the updated Standard for Validation, Verification and Audit – July 2020

Benchmarking Approach

Benchmarks for Aggregate Facilities

- Benchmark applications not required in 2020
- Benchmark unit application will be required in 2021 ahead of compliance reporting deadline (June 30).
- Assessment of appropriate years for 2021 compliance year-onwards will be ongoing.

Benchmark Period

- Same year baseline/benchmark and compliance for 2020.
 - True-up obligation for 2020 effectively 10% of an aggregate facility's stationary fuel combustion emissions.
 - Decrease administrative costs and adds predictability for regulated conventional oil and gas facilities in 2020,
 - Provide additional time to address the issue of person responsible.
 - Benchmark will continue to be rolled in, building to three baseline years.
 - Consideration may be given to excluding 2020 for 2022 compliance-onwards if significant variances from normal.
 - If individual aggregates interested to submit and use 2019 benchmark year please contact department at AEP.GHG@gov.ab.ca

Quantification Methodologies

Fuel Consumption and Emissions Quantification

Aggregate Facilities

- Aggregate facilities contain two or more conventional oil and gas facility (COG)
 - A COG may contain several sites that are integrated in operation
- Aggregate facilities have one or more of the following types of COGs:
 - Facilities that are equal to or above 10,000 tCO₂e
 - Facilities that are less than 10,000 tCO₂e
 - Facilities that have fuel consumption that is not reported or accessible in Petrinex (i.e. propane, gasoline, diesel, etc.)

Methods

Level	Methods	Conventional Oil and Gas Facility	
		Less than 10,000 tCO ₂ e	Equal to or greater than 10,000 tCO ₂ e
Fuel Consumption			
0	Method 1 – Single gas stream approach	✓	✗
1	Method 2 – Multiple gas stream approach	✓	✓
	Method 3 – Third party supplied fuels	✓	✓
Carbon Dioxide Emissions			
0	Method 4 – Single default CO ₂ emission factor	✓	✗
1	Method 5 – Default CO ₂ emissions factors for non-variable fuels	✓	✓
	Method 6 – Higher heating value correlation	✓	✓
	Method 7 – Gas compositional analysis	✓	✓

Methods

Level	Methods	Conventional Oil and Gas Facility	
		Less than 10,000 tCO ₂ e	Equal to or greater than 10,000 tCO ₂ e
Methane and Nitrous Oxide Emissions			
0, 1	Method 8 – Default emission factors for non-variable fuels (Table 15-5)	✓	✓
0, 1	Method 9 – Variable fuel sector-based emission factors (Table 15-6)	✓	✓
0, 1	Method 10 – Variable fuel technology-based emission factors (Table 15-7)	✓	✓
Production			
0, 1	Method 11 – Petrinex production volumes	✓	✓

Method 1: Single fuel gas stream approach

- Only COGs with less than 10,000 tCO₂e may use this method
- Assumes one type of fuel gas stream within the COG
- The aggregate may sum all of the fuel consumed by COGs using this method
- This fuel gas volume is then used to calculate the CO₂ emissions based on a single default CO₂ emission factor.

Method 2: Multiple fuel gas stream approach

- All COGs may use this method
- COGs equal to or greater than 10,000 tCO₂e are required use this method
- Method consistent with federal Greenhouse Gas Reporting Program (GHGRP)
- Gas compositions and high heating values (HHVs) are calculated using a weighted average.
- Sum of Petrinex volumes for each gas stream identified within the COG

Method 3: Fuel consumption based on internal facility or third party metering/invoices

- Fuels not reported in Petrinex such as fuel gases or non-variable fuels (propane, diesel, and gasoline)
- For non-variable fuels, default emission factors are used
- For fuel gases:
 - COGs $< 10,000$ tCO₂e may use default fuel gas emission factor
 - COGs $\geq 10,000$ tCO₂e are required to use gas compositions or HHVs

Method 4: CO₂ emissions based on default fuel gas emission factor

- Only COGs with less than 10,000 tCO₂e may use this method
- Rich gas composition:
 - 80% C1, 15% C2, 5% C3
 - Default emission factor is 0.00233 tCO₂/m³
- Use with fuel volumes calculated by Method 1
- Equation: $CO_{2,p} = v_{fuel,p} \times EF_{ene}$

Method 4: CO₂ emissions based on default fuel gas emission factor

- Generally, same method must be used for benchmarking and compliance reporting
- Sales gas composition may be used if aggregate facility would like to:
 - apply gas compositions or HHV for compliance reporting, but do not have required data for benchmarking; or
 - change methods from using default emission factor to gas compositions or HHVs for compliance reporting, but do not have data for benchmarking,
- Sales gas composition:
 - 98% C1, 1% C2, 0.3% C3, 0.1% C4, 0.3% CO₂, 0.3% N₂
 - Default emission factor is 0.00190 tCO₂/m³

Method 5: CO₂ emissions based on default emission factors for non-variable fuels not reported in Petrinex

- Default CO₂ emission factors for non-variable fuels - propane, diesel, gasoline
- Use with fuel volumes calculated by internal metering or third party metering or invoices

Method 6: CO₂ emissions based on fuel gas correlation

- Method consistent with federal GHGRP
- Equation is based on a high heating value correlation:

$$CO_{2,p} = v_{fuel,p} \times (60.554 \times HHV_p - 404.15) \times 10^{-6}$$

- Method requires measured high heating values for the fuel gas
- Use with fuel volumes calculated by internal facility metering or third party metering or invoices

Method 7: CO₂ emissions based on fuel gas carbon content

- Method consistent with federal GHGRP
- Equations based on carbon content and fuel consumption (volume or energy basis):
- Equations for gaseous fuels:

$$CO_{2,p} = v_{fuel(gas),p} \times CC_{gas,p} \times 3.664 \times 0.001$$

$$CO_{2,p} = \frac{ENE_{fuel(gas),p} \times CC_{gas,p} \times 3.664 \times 0.001}{HHV}$$

Method 7: CO₂ emissions based on fuel gas carbon content

- Equation for liquid fuels:

$$CO_{2,p} = v_{fuel(liq),p} \times CC_{liq,p} \times 3.664$$

- Use with fuel volumes calculated by internal metering or third party metering or invoices

Methane and nitrous oxide emissions

- Methods separated by different types of emission factors:
 - **Method 8** – Default emission factors for non-variable fuels
 - **Method 9** – Default sector-based emission factor for variable fuels
 - **Method 10** – Default equipment-based emission factors

- Equations:

$$CH_{4,p} \text{ or } N_2O_p = Fuel_p \times HHV \times EF_{ene}$$

$$CH_{4,p} \text{ or } N_2O_p = Fuel_p \times EF_{vol} \text{ or } EF_{ene}$$

- Use with fuel volumes calculated by Methods 1, 2 or 3, as appropriate.

Methane and nitrous oxide emissions

Method selection criteria for variable fuels:

- Apply one of sector-based or equipment-based emission factors within a COG
- Apply same methods for each COG in the benchmark and compliance report
- If equipment-based emission factors are selected, different equipment-based emission factors may be used between the benchmark and compliance report to reflect equipment present at the COG (i.e. use of NO_x controlled and uncontrolled emission factors).

Benchmarking Unit Quantification



Benchmark Unit Options

- A number of possible benchmarking units are made available to recognize the variety of facilities and aggregate configurations in the sector.
- Option 1 (pre-defined units):
 - Production (in m³ oil equivalent),
 - Disposition (in m³ oil equivalent),
 - Receipts (in m³ oil equivalent).
- Option 2 (metric correlation method):
 - Identifies one or multiple production accounting metrics (from a possible 15 total) that produce a linear relationship with the aggregate facility's emissions.
 - The identified production accounting metrics would then be requested to be used as the benchmark unit for the aggregate.
 - Detailed information included in section 15.4 of the draft QM for comment.

Benchmark Unit Criteria and Assignment

- A benchmark unit must meet the following criteria to be assigned to an aggregate facility:
 - A strong month-to-month correlation between the requested unit and the aggregate facility's emissions,
 - Minimizes variability of month-to-month emissions intensities over the course of a year,
 - Reasonably represents the composition and operation of the aggregate facility.
- A benchmark unit may be requested by the person responsible for an aggregate facility (application period for 2020 benchmark unit application will occur in 2021).
 - If approved, the requested benchmark unit will be assigned to the aggregate facility when the facility-specific benchmark is assigned.
- If a benchmark unit application is not received for an aggregate facility:
 - The most appropriate benchmark unit will be determined and assigned by the Director according to the best fit with the established benchmark unit criteria.

Next Steps

Comment Period

- Please provide any comments before July 4, 2020
- Draft methodology document and comment template available here: <https://www.alberta.ca/conventional-oil-and-gas.aspx#toc-7>
- E-mail comment document to AEP.GHG@gov.ab.ca

Assess Benchmark Unit

- Do the analysis to choose which benchmark unit you will request as best representing your aggregate.

Data and Records

- Ensure you have the data and associated records required to support the quantification of emissions and production for your sites for 2020.
- Consider your sites over and under 10,000 tonnes and your choice of methods.

Person Responsible – Stay tuned for further updates

Questions or Comments?



Contact: AEP.GHG@gov.ab.ca