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.
• Verification requirements for aggregate facilities:
  – Further discussion of 2020 benchmarking in later slides.
  – 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 tCO$_2$e
  - Facilities that are less than 10,000 tCO$_2$e
  - Facilities that have fuel consumption that is not reported or accessible in Petrinex (i.e. propane, gasoline, diesel, etc.)
Methods

<table>
<thead>
<tr>
<th>Level</th>
<th>Methods</th>
<th>Conventional Oil and Gas Facility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Less than 10,000 tCO$_2$e</td>
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<tr>
<td><strong>Fuel Consumption</strong></td>
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<tr>
<td>0</td>
<td>Method 1 – Single gas stream approach</td>
<td>✓</td>
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<tr>
<td>1</td>
<td>Method 2 – Multiple gas stream approach</td>
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<td></td>
<td>Method 3 – Third party supplied fuels</td>
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<tr>
<td><strong>Carbon Dioxide Emissions</strong></td>
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<tr>
<td>0</td>
<td>Method 4 – Single default CO$_2$ emission factor</td>
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<tr>
<td>1</td>
<td>Method 5 – Default CO$_2$ emissions factors for non-variable fuels</td>
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<td></td>
<td>Method 6 – Higher heating value correlation</td>
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<td>Method 7 – Gas compositional analysis</td>
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<tr>
<td><strong>Methane and Nitrous Oxide Emissions</strong></td>
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<td>Method 8 – Default emission factors for non-variable fuels (Table 15-5)</td>
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<tr>
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<td>Method 9 – Variable fuel sector-based emission factors (Table 15-6)</td>
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<td>Method 10 – Variable fuel technology-based emission factors (Table 15-7)</td>
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<td><strong>Production</strong></td>
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<td>Method 11 – Petrinex production volumes</td>
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</tbody>
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Method 1: Single fuel gas stream approach

- Only COGs with less than 10,000 tCO$_2$e 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 CO$_2$ emissions based on a single default CO$_2$ emission factor.
Method 2: Multiple fuel gas stream approach

- All COGs may use this method
- COGs equal to or greater than 10,000 tCO$_2$e are required to 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 tCO$_2$e may use default fuel gas emission factor
  - COGs ≥ 10,000 tCO$_2$e 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: CO$_2$ emissions based on default emission factors for non-variable fuels not reported in Petrinex

- Default CO$_2$ 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: \( \text{CO}_2 \) emissions based on fuel gas correlation

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

\[
\text{CO}_2, p = v_{fuel, p} \times \left( 60.554 \times HHV_p - 404.15 \right) \times 10^{-6}
\]

- 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: CO\textsubscript{2} emissions based on fuel gas carbon content

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

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

\[
CO_{2,p} = \frac{ENE_{fuel\,(gas),p} \times CC_{gas,p} \times 3.664 \times 0.001}{HHV}
\]
Method 7: CO$_2$ emissions based on fuel gas carbon content

- Equation for liquid fuels:

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

- 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:

\[
CH_4,p \text{ or } N_2O_p = Fuel_p \times HHV \times EF_{ene}
\]

\[
CH_4,p \text{ or } N_2O_p = Fuel_p \times EF_{vol \text{ or } Ene}
\]

• 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 NOx controlled and uncontrolled emission factors).
Benchmarking Unit Quantification
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 m$^3$ oil equivalent),
- Disposition (in m$^3$ oil equivalent),
- Receipts (in m$^3$ 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