Alberta Government

Standard for Developing Benchmarks

Technology Innovation and Emissions Reduction Regulation

Version 1.0

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Summary of Revisions

Version	Date	Summary of Revisions
1.0	October 2019	• First version of this standard to accompany the Technology Innovation and Emissions Reduction Regulation

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Introduction

Part 1 of the Standard for Developing Benchmarks is adopted by the Technology Innovation and Emissions Reduction Regulation (the "Regulation"), under the authority of the *Emissions Management and Climate Resilience Act* (the "Act"). Part 1 of the Standard is enforceable as law.

In addition to the legal requirements in Part 1 of this standard, persons responsible must comply with the Act, the Regulation, and all other applicable laws.

Part 2 of the Standard for Developing Benchmarks sets out additional requirements for persons responsible.

Part 1 – Regulatory Details

Definitions

1(1) Terms that are defined in the Act and Regulation are incorporated into and become part of this standard.

(2) In this standard,

(a) "AB-CWB" means Alberta Complexity Weighted Barrel, which is a standardized production unit of a refining facility or upgrading facility in Alberta, which is used to represent its specified gas emissions potential based on its configuration and processing complexity;

(b) "ABGPI" means Alberta Gas Processing Index, which is a specified gas emissions potential of an Alberta natural gas processing facility based on its configuration and processing complexity;

(c) "ammonia" means a colourless compound with the chemical formula NH_3 that is typically produced by steam-methane reformation, followed by the reaction of hydrogen with atmospheric nitrogen. For ammonia produced by a fertilizer plant, ammonia is the gross production from the ammonia plant. For ammonia produced in the metals sector, the ammonia is the ammonia sales.

(d) "calcined coke" means a carbon-rich solid that is typically produced by the heating of green coke in a rotary kiln at high temperatures to remove residual volatile hydrocarbons;

(e) "cogeneration" means the process that employs a combustion engine to power a generator, the exhaust from which is used to produce useful heat for an industrial purpose.

(f) "ethanol" means a mixture whose most abundant component is the organic compound with the molecular formula C_2H_5OH, which is denatured by adding other chemical compounds such as methanol, isopropyl alcohol, acetone, methyl ethyl ketone, methyl isobutyl ketone, denatonium, gasoline, xylene, or toluene, in order to render it unfit for human ingestion;

(g) "ethyl alcohol" means a mixture which contains un-denatured food grade alcohol and is intended for human ingestion, including liquor and spirits, but excluding beer and wine;

(h) "iso-octane" means an organic compound also known as 2,2,4-Trimethylpentane, with the chemical formula $(CH_3)_3CCH_2CH(CH_3)_2$, that is typically produced by the dimerization of isobutylene followed by hydrogenation, and includes the pentane by-product resulting from the production of iso-octane;

(i) "industrial process emissions" means industrial process emissions as defined in Part 1 of the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports;

(j) "landfill gas methane" means methane generated by the anaerobic decomposition of organic waste materials within a waste management facility at which waste is disposed of by placing it on or in land, but does not include a land treatment facility, a surface impoundment, a salt cavern or a disposal well;

(k) "live weight of cattle" means the mass of live animals entering a meat processing facility;

(l) "nickel + cobalt" also referred to as "Metals" means the total sum of pure nickel and cobalt typically produced by the refining of ore through pressure hydrometallurgy;

(m) "natural gas processing" means the treatment of raw natural gas by the extraction of hydrogen sulphide, carbon dioxide, helium, ethane, natural gas liquids or other substances;

(n) "other fertilizer products" means a product comprising a combination of fertilizer products including one or more of urea, coated urea, ammonium sulphate, ammonium phosphate, and UAN, but excluding ammonia and ammonium nitrate;

(o) "Part 1" means the portion of this standard identified by the subtitle "Part 1 – Regulatory Details";

(p) "Part 2" means the portion of this standard identified by the subtitle "Part 2 – Policy Development and Benchmark Setting";

(q) "polyethylene" means a compound typically having the chemical formula of $(C_2H_4)_n$ produced by the polymerization of ethylene and includes, but is not limited to low density polyethylene (LDPE), linear low density polyethylene (LLDPE), and high density polyethylene (HDPE);

(r) "process unit" means the portion of a facility that is associated with the production of a product.

(s) "Refining AB-CWB" means the AB-CWB for a refining facility;

(t) "Regulation" means the Technology Innovation and Emissions Reduction Regulation;

(u) "subbituminous coal" means coal that is recovered or obtained from a coal mine located in the Plains Region as defined in the Natural Regions and Sub-regions of Alberta published by the department, as amended or replaced from time to time;

(v) "this standard" means the Standard for Developing Benchmarks, including the Introduction, Part 1, and Part 2;

(w) "upgrading" means the processing of oil sands bitumen to create a feedstock for further refining;

(x) "Upgrading AB-CWB" means the AB-CWB for an upgrading facility;

(y) "weighted mean sales price" means the weighted mean sales price (WMSP) in Canadian dollars calculated in accordance with 6.1.5 of Part 2 of this standard.

In the event of a conflict

2(1) If there is any conflict between this standard and the Act or the Regulation, the Act or the Regulation prevails over this standard.

(2) If there is any conflict between Part 1 and Part 2 of this standard, Part 1 prevails.

Application for Facility-Specific Benchmarks for Large Emitters and Opted-in Facilities

3(1) In an application submitted under section 7 of the Regulation, the person responsible for a large emitter or opted-in facility must include each of the following:

(a) the contact information for the person responsible;

(b) the contact information for the large emitter or opted-in facility;

(c) the location of the large emitter or opted-in facility;

(d) information on the boundaries where imports and exports of fuels, inputs, production, and carbon dioxide are measured;

(e) information on the specified gas emissions and production of the large emitter or opted-in facility, including but not limited to:

(i) data related to the total regulated emissions of the large emitter or opted-in facility,

(ii) production of all products listed in the table in Schedule 2 of the Regulation,

(iii) the amount of electricity imported to the large emitter or opted-in facility,

(iv) the amount of heat imported to the large emitter or opted-in facility,

(v) the amount of hydrogen imported to the large emitter or opted-in facility, and

(vi) any other information required by the director;

(f) a process flow diagram that indicates in schematic detail:

(i) the processes that produce total regulated emissions at the large emitter or opted-in facility, and

(ii) each source of direct emissions at the large emitter or opted-in that typically produces over 1,000 CO_2e tonnes including any of the following

(A) imported carbon dioxide,

(B) exported carbon dioxide, and

(C) carbon dioxide used as feedstock for the production of urea;

(g) information for each product the large emitter or opted-in facility produces for which a facility-specific benchmark is requested including each of the following:

(i) the type of product,

(ii) the quantity of product produced by the large emitter or opted-in by year,

(iii) the direct emissions released by the large emitter or opted-in facility as a result of the production of the product by year,

(iv) the amount of carbon dioxide produced as a result of the production of the product that is exported from the large emitter or opted-in facility by year,

(v) the amount of carbon dioxide imported to the large emitter or opted-in from a different regulated facility that is used in the production of the product by year,

(vi) in the case of the product urea, the amount of carbon dioxide used by the large emitter or opted-in facility as feedstock for the production of that urea by year, and

(vii) any other information required by the director;

(h) the following forms in respect of the large emitter or opted-in facility as prescribed by the director:

(i) a third party verification report

(ii) a completed Conflict-of-Interest Checklist,

(iii) a completed Statement of Qualification form,

(iv) a completed Statement of Verification form,

(v) a simplified process flow diagram,

(vi) a completed Quantification Methodology Document (QMD),

(vii) a completed Statement of Certification form that must be in electronic form, and

(viii) where the person responsible is requesting confidentiality for any of the information included in the application, a completed Confidentiality Request and supporting documentation;

and

(i) any other information required by the director.

Application for a facility to be designated as an opted-in facility

4(1) In an application submitted under section 4 of the Regulation, the person responsible for a facility must include each of the following:

(a) the contact information for the person responsible;

(b) the contact information for the facility;

(c) the location of the facility;

(d) evidence demonstrating that the facility

(i) competes directly with a facility to which the Regulation applies, or

(ii) is in an emissions-intensive trade-exposed sector and that the facility

(A) had direct emissions of 10,000 CO_2e tonnes or more in 2017 or a subsequent year, or

(B) is likely to have direct emissions of 10,000 CO_2e tonnes or more in its third year of commercial operation;

(e) information on any benefit that has been or is being provided in respect of the facility under an initiative of the Government of Alberta, or an agency of the Government of Alberta;

(f) a facility boundary file showing the boundary of the facility;

(g) where the facility is a renewable electricity facility:

(i) the total nominal capacity of the facility,

(ii) information respecting any renewable electricity support agreement that has been entered into under section 7(4) of the *Renewable Electricity Act* with respect to the facility, and

(iii) information on any economic benefits being provided under a program or other scheme that are attributable to the electricity produced at the facility having been produced from an energy resource referred to in section 1(1)(nn) of the Regulation;

(h) a completed Statement of Certification form that must be in electronic form;

(i) where the person responsible is requesting confidentiality for any of the information included in the application, a completed Confidentiality Request and supporting documentation; and

(j) any other information required by the director.

Application for designation as an aggregate facility

5(1) In an application submitted under section 5(1)(a) of the Regulation, the person responsible for 2 or more conventional oil and gas facilities must include each of the following:

(a) the contact information for the person responsible;

(b) the location of each conventional oil and gas facility;

(c) the boundary of each conventional oil and gas facility having direct emissions of 10,000 CO_2e tonnes or more in the previous year;

(d) a certified statement confirming that each conventional oil and gas facility:

(i) is a conventional oil and gas facility, and

(ii) has the same person responsible;

(e) where the person responsible is requesting confidentiality for any of the information included in the application, a completed Confidentiality Request and supporting documentation;

(f) a completed Aggregate Facility Designation Application Form published by the department, as amended from time to time, and

(g) any other information required by the director.

Application for designation as opted-in facility to be revoked

6(1) In an application submitted under section 4(6) of the Regulation, the person responsible for an opted-in facility must include each of the following in respect of the facility:

(a) the contact information for the person responsible;

(b) the contact information for the opted-in facility;

(c) the location of the opted-in facility; and

(d) a completed Statement of Certification that must be electronic form.

Application to add conventional oil and gas facilities to an aggregate facility

7(1) In an application submitted under section 5(1)(b) of the Regulation, the person responsible for an aggregate must include each of the following in respect of each conventional oil and gas facility being added:

(a) the contact information for the person responsible;

(b) the location of each conventional oil and gas facility;

(c) the boundary of each conventional oil and gas facility having direct emissions of 10,000 CO_2e tonnes or more in the previous year;

(d) a certified statement confirming that each conventional oil and gas facility:

(i) is a conventional oil and gas facility, and

(ii) has the same person responsible;

(e) where the person responsible is requesting confidentiality for any of the information included in the application, a completed Confidentiality Request and supporting documentation;

(f) a completed Aggregate Facility Change Form published by the department, as amended from time to time, and

(g) any other information required by the director.

Application for a Facility-Specific Benchmark for an Aggregate Facility

8 (1) In an application submitted under section 7 of the Regulation, the person responsible for an aggregate facility must include each of the following:

(a) the contact information for the person responsible;

(b) information on the specified gas emissions from the aggregate facility, including but not limited to:

(i) data related to the total regulated emissions of the aggregate facility, and

(ii) a list of each piece of stationary fuel combustion equipment that typically produces over 1,000 CO_2e tonnes per year, including exported carbon dioxide from stationary fuel combustion;

(c) information for each product the aggregate facility produces, including but not limited to:

(i) the type of product(s),

(ii) the quantity of product produced by the aggregate facility by year,

(iii) the stationary fuel combustion emissions released as a result of the production of the product by year, and

(iv) the amount of carbon dioxide from stationary fuel combustion that is exported from the aggregate facility from each product produced by year;

(d) the following forms as prescribed by the director:

(i) a completed Aggregate Facility Specific Benchmark Application form, published by the department, as amended from time to time

(ii) a third party verification report

(iii) a completed Conflict-of-Interest Checklist,

(iv) a completed Statement of Qualification form,

(v) a completed Statement of Verification form,

(vi) a completed Statement of Certification form that must be in electronic form, and

(vii) where the person responsible is requesting confidentiality for any of the information included in the application, a completed Confidentiality Request and supporting documentation;

Quantification methodologies for facility-specific benchmark applications

9(1) In completing an application for a facility-specific benchmark for a large emitter or opted-in facility, the person responsible for a large emitter or opted-in facility must use the applicable quantification methodology set out in the Alberta Greenhouse Gas Quantification Methodologies for each of the following emissions sources or parameters for each year which is 2020 or later:

(a) imports;
(b) industrial process emissions;
(c) production;
(d) stationary fuel combustion;
(e) carbon dioxide from combustion of biomass;
(f) venting;
(g) on-site transportation; and
(h) fugitive emissions.

(2) In completing an application for a facility-specific benchmark for an aggregate facility, the person responsible for an aggregate facility must use the applicable quantification methodologies set out in the Alberta Greenhouse Gas Quantification Methodologies for stationary fuel combustion emissions and production.

(3) In determining the applicable quantification methodologies for an emission source listed in 9(1)(b), (d), (e), (f), (g), (h), and (i), the person responsible for a large emitter or opted-in facility must use the applicable tier for that emissions source set out in Table 4 of Part 2 of the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports.

(4) In determining the applicable quantification methodologies for stationary fuel combustion emissions, the person responsible for an aggregate facility must use the applicable tier for that emission source set out in Table 5 of Part 2 of the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports.

Application for cost containment designation

10(1) In an application submitted under section 14(1) of the Regulation, the person responsible for a large emitter or opted-in facility must include each of the following in respect of the large emitter or opted-in facility:

(a) the contact information for the person responsible;

(b) the contact information for the large emitter or opted-in facility;

(c) the location of the large emitter or opted-in facility;

(d) a certified statement for the large emitter or opted-in which includes each of the following:

(i) the true-up obligation,

(ii) the total regulated emissions,

(iii) the net electricity import or export,

(iv) the net heat import or export,

(v) the net hydrogen import or export, and

(vi) the amount of royalties that would be paid in respect of the large emitter or opted-in facility to the Government of Alberta under the *Mines and Minerals Act*, if the Regulation were not in force and there was no costs associated with direct emissions at the large emitter or opted-in facility,

for the first year for which a person responsible for the facility is seeking a cost containment designation;

(e) a certified forecast for the large emitter or opted-in facility of each of the following:

(i) the production of all salable products,

(ii) the true-up obligation,

(iii) the total regulated emissions,

(iv) the net electricity import or export,

(v) the net heat import or export,

(vi) the net hydrogen import or export,

(vii) the the weighted mean sales price for each product produced by the facility and sold,

(viii) the the amount of royalties that will be paid in respect of the facility to the Government of Alberta under the *Mines and Minerals Act*, and

(ix) the amount of royalties that would be paid in respect of the facility to the Government of Alberta under the *Mines and Minerals Act*, if TIER were not in force and there was no costs associated with direct emissions at the large emitter or opted-in facility,

for each additional year the person responsible for the large emitter or opted-in facility is seeking a cost containment designation;

(f) information on any benefit that has been, is being, or will be provided to the person responsible for the facility in respect of the facility under an initiative of the Government of Alberta, or an agency of the Government of Alberta;

(g) information on the timeframe for permanent closure, temporary closure, or intentional operation at reduced capacity of the large emitter or opted-in facility, where applicable;

(h) where the person responsible is requesting confidentiality for any of the information included in the application, a completed Confidentiality Request and supporting documentation; and

(i) any other information required by the director.

(2) In the financial statements for the large emitter or opted-in facility required under section 14(2)(b) of the Regulation, the person responsible for the large emitter or opted-in facility must include audited statements of:

(a) the total quantity of each product produced by the large emitter or opted-in facility and sold, based on sales transactions;
(b) if applicable, confirmation that the quantity of each product produced by the large emitter or opted-in facility and sold, as reported under subsection 10(2)(a), is equal to the quantity of product produced by the large emitter or opted-in facility and sold as reported under the *Mines and Minerals Act*, and where there is a discrepancy, an explanation for the discrepancy;
(c) the weighted mean sales price for each product produced by the large emitter or opted-in facility and sold, based on the actual sales price of transactions for the product sold from the large emitter or opted-in facility;
(d) if applicable, confirmation that the weighted-mean sales price for each product produced by the large emitter or opted-in facility and sold, as reported under subsection 10(2)(c), is equal to any sales price as reported under the *Mines and Minerals Act*, and where there is a discrepancy, an explanation for the discrepancy; and
(e) if applicable, the amount of royalties paid in respect of the large emitter or opted-in facility to the Government of Alberta under the *Mines and Minerals Act*;

for the first year the person responsible is seeking a cost containment designation and the two years immediately preceding the first year for which the person responsible is seeking a designation.

(3) In an emissions reduction plan required under section 14(2)(c) of the Regulation, the person responsible must include, each of the following:

(a) all specified gas emissions and sources at the large emitter or opted-in facility which are intended to be impacted by the plan;

(b) the quantity of emission offsets and emission performance credits the person responsible intends to use in determining the net emissions for the large emitter or opted-in facility for each year for which the person responsible is seeking a cost containment designation;

(c) a description of each proposed emissions reduction project to be implemented under the emissions reduction plan;

(d) identification of, and rationale for, the emissions baseline that will be used for each proposed emissions reduction project;

(e) the projected reduction in specified gas emissions associated with each proposed emissions reduction project;

(f) a schedule of implementation for each proposed emissions reduction project, including identification of any project milestones;

(g) a projected timeframe for expected specified gas emission reductions;

(h) a monitoring plan to assess emissions reductions over the course of each emission reduction project;

(i) an estimate of capital costs and annual operating costs required to implement the emissions reduction plan;

(j) an estimate of any cost savings or revenue associated with the emissions reduction plan, such as fuel cost savings; and

(k) any benefit that the person responsible has applied for in respect of the large emitter or opted-in facility under an initiative of the Government of Alberta, or an agency of the Government of Alberta, but that has not yet been granted that would support capital and operating cost expenditures required to implement the emissions reduction plan, and the impact on the emissions reduction plan if the application for the benefit is not approved.

Application for compliance cost containment allocation benchmark

11(1) In an application submitted under section 8(2) of the Regulation, the person responsible must:

(a) determine the compliance cost containment allocation benchmark (BCCA) for a product of a facility in accordance with section 6.3.2.3 of Part 2 in the Standard for Developing Benchmarks;

(b) complete a Compliance Cost Containment Allocation Benchmark Application Form published by the department, as amended from time to time;

(c) sign the Statement of Certification for the application; and

(d) provide any other information required by the director

for the year a person responsible is seeking a compliance cost containment allocation benchmark.

Effective date

12 This standard is effective November 1, 2019.

Part 2 – Policy Development and Benchmark Setting

1.0 Regulatory Overview

1.1 Purpose of this Document

The purpose of this document is to assist persons responsible for facilities that are regulated by, or considering application to be regulated by, the Technology Innovation and Emissions Reduction Regulation (or "the Regulation" or "TIER").

This document outlines the methods for developing emissions intensity benchmarks (i.e. facility-specific benchmarks, high-performance benchmarks, and cost containment allocation benchmarks) that apply to the production of goods and processes at regulated facilities, including data sets and methodology used for calculating benchmarks. It also outlines criteria detailing designation as an opted-in facility and the application process for opting into TIER. Additional information regarding details on emissions scope and coverage, tightening rate, and the eligibility and application process for cost containment is also provided.

1.2 Overview of the Regulatory Program

TIER replaces the Carbon Competitiveness Incentive Regulation on January 1, 2020. The Regulation automatically applies to facilities producing direct emissions of 100,000 carbon dioxide equivalent (CO_2e) tonnes or more per year in 2016 or any subsequent year. In addition, facilities under this threshold can designated as an opted-in facility or an aggregate facility.

The Regulation reduces carbon costs for these industries when compared to full pricing of all emissions and rewards top performers with emissions performance credits for low emissions intensity. The Regulation also supports comparability with carbon pricing in other jurisdictions to help to maintain industry competitiveness in Alberta.

1.3 Newly Operating Facilities

Section 1(9) and Section 1(10) of the Regulation provide information on the treatment of new facilities. Section 36(7) of the Regulation provides information on the phase out of new facility treatment for electricity facilities.

Aggregate facilities are subject to a compliance obligation from the first year they are designated as an aggregate facility.

1.4 Designation of Year of Commercial Operation

Sections 1(5) through 1(10) of the Regulation establish the year of commercial operation for a large emitter or opted-in facility, including the circumstances under which the year of commercial operation can be designated by the director.

The following sections outline criteria the director may consider when determining whether to designate the year of commercial operation of a large emitter or opted-in facility.

1.4.1. Significant Expansion or Change

In determining whether an expansion is significant under subsection 1(6) of the Regulation, the director will consider:

- Whether output increased by 25%, or by a magnitude similar to a typical new facility in the sector (for a new product, 25% increase in facility sales).
- Whether changes in output are attributable to new output, production, processing, or supply capacity and not due to inter-year variability in existing output, production, processing, or supply.

In determining whether a change is significant under subsection 1(6) of the Regulation, the director will consider:

- Whether significant re-investment in the facility is made, measured as a fraction of:

    - The original capital required for the facility (>25%, inflation adjusted, not including de-commissioning and removal of existing infrastructure if that is part of the significant change), or
    - A comparable new facility (>50% of the cost to build a comparable new facility of similar capacity), and
- Whether one of the following are met:
    - The facility no longer significantly produces past products as final products and instead produces new products,
    - The facility now uses different feedstock in production processes, which require significant additional process steps or energy inputs, or
    - The facility is transitioning to first of kind technologies in Alberta, which are expected to significantly improve specified gas emissions performance.

1.4.2. Criteria for Appropriateness of Designation

Technologies employed

In determining whether it is appropriate to designate the year of commercial operation of a facility on the basis of a significant expansion or change, the director will consider the technologies being employed in the significant expansion or change. The director will consider the following, per subsection 1(6) of the Regulation:

- Whether the technologies are in-line with environmental control technologies expected or required at a similar new facility with respect to non-specified gas emissions, waste water etc. and
- Whether the technologies are first-of-kind in Alberta and are expected to significantly improve specified gas emissions performance at the facility or are best available technologies economically achievable within the sector known to improve specified gas emissions performance at the facility.

Fair and reasonable

In determining whether it is fair and reasonable to make the designation for a significant expansion or significant change, the director will consider the, per subsection 1(8) of the Regulation, whether the facility meets comparable environmental outcomes to a new greenfield facility with a similar product, as required under the approval process.

In considering whether it is fair and reasonable to designate the year of commercial operation of a facility for a significant change or significant expansion, the director will consider the effect that granting compliance relief through year of commercial operation would have on specified gas emissions over the life of the facility. This will generally include:

- The impact of the change to the specified gas emission profile of the facility;
- The potential of the expanded or modified production to displace higher emitting production; and
- The potential of the granting to de-risk adoption of new specified gas reducing technologies.

The director will also consider:

- The treatment of other comparable or competing facilities where new facilities would receive the period of relief; and
- The comparability of cost savings through compliance relief versus investment of capital in the facility.

If the year of commercial operation is being designated in the case of a significant expansion or significant change, the designation will be made for either the year of or the year following the significant expansion or significant change and may be made as either the first or second year of commercial operation. In cases where a significant change causes a significant drop in emissions intensity, designation for the year following the significant change will be preferred.

1.4.3. Request for Designation of Year of Commercial Operation

A request for a designation under section 1(6) of the Regulation for a facility that is undergoing or has undergone a significant expansion should include:

- A description of the nature and timing of the expansion including production capacity before and after;
- A description of the environmental controls implemented as part of the expansion and a comparison of what would be required of a new facility;
- A description of the specified gas characteristics of the technology involved in the expansion in comparison to the existing site and other available technologies; and
- A forecast of the emissions and emissions intensity for the year of the expansion as well as the year following.

A request for a designation under section 1(6) of the Regulation for a facility that is undergoing or has undergone a significant change should include:

- A description of the nature and timing of the change;
- A description of the environmental controls implemented as part of the significant change and a comparison of what would be required of a new facility;
- A description of the specified gas characteristics of the new technology deployed with the significant change in comparison to the existing site and other available technologies;
- Quantification of the re-investment in the facility and of the original cost of facility; and
- Indication of change in product, change in feedstock or first of kind technology.

Facilities may desire an understanding of how a change or expansion would be viewed in advance of proceeding with their project or may be proceeding with a project on uncertain timelines. In these cases the facility is encouraged to contact the department with the details of their plans and the director can provide an indication if the project, as planned, is likely to meet the criteria for designation of year of commercial operation.

2.0 Designation as an Opted-in Facility, Revoking Designation as an Opted-in Facility and Designation as an Aggregate Facility

Facilities considering opting in to TIER are strongly encouraged to consider the obligations and cost of complying with the regulatory requirements under TIER. Opted-in facilities are subject to all regulatory reporting and compliance obligations, many of which will require third party verification and other expenses, which are wholly the responsibility of the facility.

The application for designation as an opted-in facility process is described in Part 2, section 2.3 of this standard. High-performance benchmarks are set out in the Table in Schedule 2 of the Regulation and published by Ministerial Order. The person responsible for the facility can also apply for a facility-specific benchmark or benchmarks, if applicable, by following the process described in Part 2, section 5.5 of this standard. A facility may have both high-performance benchmarks and facility specific benchmarks for the products that are produced by the facility.

Opted-in facilities may seek to have their designation revoked in the following calendar year through an application to the director. If the director revokes the opted-in designation, the facility may be subject to requirements imposed under an alternative regulatory system or other carbon pricing programs, if applicable.

The person responsible for a conventional oil and gas facility with annual direct emissions of less than 100,000 CO_2e tonnes has a choice to either:

(1) apply for the facility to be designated as an opted-in facility under TIER,

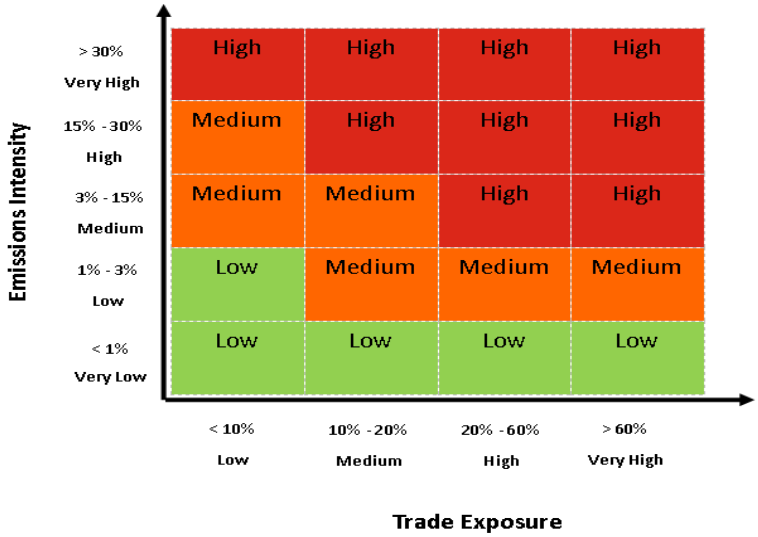
(2) apply for a designation of a new aggregate facility including this conventional oil and gas facility in that application or,

(3) apply to have the facility added to an existing aggregate facility with the same person responsible.

2.1 Emissions-intensive-trade-exposed (EITE) Criteria

The emissions-intensive-trade-exposed (EITE) criteria are derived from an assessment of all sectors in the economy on their degree of emissions intensiveness and trade exposure. Sectors are assessed as high, medium or low emissions intensiveness and high, medium or low trade exposure. The criteria are then combined to determine an assessment of the EITE level of the sector. Only sectors that are considered high EITE, using these criteria, qualify as emissions-intensive-trade-exposed sectors under TIER.

Figure 1: Emissions Intensity and Trade Exposure



Emissions intensiveness and trade exposure is measured using Statistics Canada data on the value of goods and services in the Alberta economy. The EITE level of Alberta sectors is evaluated at the level of best available data. Most sectors are evaluated at a four digit North American Industry Classification System (NAICS) code using data from 2013. A detailed list of sectors evaluated by NAICS code is available in Table A1 of Appendix A; this list includes sectors that did not meet EITE criteria, but were evaluated for it.

Trade exposure is the intensity of trade with jurisdictions outside Alberta as defined in section 4(1) of the Regulation.

Emissions intensiveness measures the costs to industry if exposed to full pricing on all emissions in the absence of allowable emissions provided to protect against carbon leakage.

The full carbon pricing costs are determined as a $30 per tonne charge applied to estimates of direct emissions.

EITE criteria is established by sector, not product. However, if a facility that exceeds the 10,000 CO_2e tonnes threshold qualifies under the application process as part of an emissions-intensive-trade-exposed sector, then it can be designated as an opted-in facility under the Regulation and will be eligible to receive a benchmark for one or more of its products.

2.2 Applicability Criteria

2.2.1 Opted-in Facility

Opted-in facilities under the Carbon Competitiveness Incentive Regulation (CCIR) will automatically be designated as an opted-in facility under TIER. These facilities may apply to revoke the designation as an opted-in facility under the Regulation.

Facilities that produce a product listed in Table 1 may apply to be designated as an opted-in facility as there are currently facilities producing these products that are required to comply with TIER. Table 1 may be updated as more facilities become subject to TIER and new products become covered under the Regulation. Please see the opt-in fact sheet on the website for the most up to date version of this table.

Table 1: Sectors and Products that Compete Directly with Facilities regulated by TIER

Sector	Product	North American Product Classification System
Agroindustry	Crude Canola Oil	182133
Agroindustry	Refined Canola Oil	182133
Agroindustry	Biodiesel Fuel	2612221
Agroindustry	Distilled Liquor	21113
Agroindustry/Chemical	Ethanol (Denatured)	2711314
Chemical	Carbon Black	2711251
Chemical	Ethanol Fuel	261213
Chemical	Ethylene	2632111
Chemical	Ethylene Glycol	2711315
Chemical	Hydrogen Peroxide	2711284
Chemical	Iso-octane	2632131
Chemical	Linear Alpha Olefins	2632131
Chemical	Pentane	2632131
Chemical	Styrene Monomer	2632121
Chemical	Calcined Coke	2611112
Chemical	Hydrogen	2711115
Chemical	Methanol	2711315
Chemical	Polyethylene	2811121
Coal Mines	Bituminous Coal	144112
Coal Mines	Sub-bituminous Coal	144121
Distilling	Ethyl Alcohol	2111321
Fertilizer	Ammonia	2721122
Fertilizer	Ammonium Nitrates	2721122
Fertilizer	Ammonium Phosphate	2721131
Fertilizer	Ammonium Sulphate	2721122
Fertilizer	Urea	2721111
Fertilizer	Urea Ammonium Nitrate	2721141
Food Processing	Live Weight of Cattle	1111111
Food Processing	Refined Sugar	1821421
Forest Products	Pulp	25112
Metals	Cobalt	1552321
Metals	Nickel	1531111
Mineral	Cement	465111
Mineral	Lime	4651311
Mineral	Magnesium Oxide	2911441
Natural Gas Processing	Natural Gas	142
Natural Gas Processing	Natural Gas Liquids	143
Oil Sands	Bitumen	141121
Power Plant	Electricity	146111
Refining	Refined Petroleum Products	261
Upgrading	Synthetic crude oil	14113

A list of the emissions-intensive-trade-exposed sectors that include at least one facility that met or exceeded the 50,000 CO_2e tonnes threshold in 2013 through 2015 are included in Table 2.

Table 2 may be updated from time to time. Please see the opt-in fact sheet on the website for the most up to date version of this table.

Table 2: Emissions-intensive-trade-exposed sectors that include at least one facility that meets or exceeds 50,000 CO_2e tonnes[1,2]

NAICS[3]	Name
21111	Oil and gas extraction (except oil sands)
21114	Oil sands extraction
2121	Coal mining
2211	Electric power generation, transmission and distribution
3112	Grain and oilseed milling
3113	Sugar and confectionery product manufacturing
3221	Pulp, paper and paperboard mills
3241	Petroleum and Coal Product Manufacturing
3251	Basic chemical manufacturing
3253	Pesticide, fertilizer and other agricultural chemical manufacturing
327	Non-metallic mineral product manufacturing
33111	Iron and steel mills and ferro alloy manufacturing
3314	Non-ferrous metal (except aluminum) production and processing
48621	Pipeline transportation of natural gas

Facilities that fall under one of the North American Industry Classification System (NAICS) codes listed in Table 2, and have had, or are expected to have, direct emissions that meets or exceeds 10,000 CO_2e tonnes may apply to be designated as an opted-in facility under TIER.

In addition, persons responsible for any other facility that has direct emissions that meets or exceeds, or expects to meet or exceed, 10,000 CO_2e tonnes and is of the view that their sector meets the EITE criteria are encouraged to contact the Department to discuss their application. Applications must be supported by documentation that demonstrates they meet the relevant criteria, generated at the expense of the facility.

2.2.2. Entry into TIER for Conventional Oil and Gas Facilities

There is no minimum emission threshold for a conventional oil and gas facility to be designated as an aggregate facility. An aggregate facility has a different treatment under the TIER than a facility designated as large emitter or opted-in facility.

- The person responsible for an aggregate facility is described in section 1(2)(c) of the Regulation.
    - Where a facility is sold during a year, the person responsible remains responsible for compliance reporting for that year and should ensure access to the information required to fulfil this obligation for the remainder of the year.
- Total regulated emissions for aggregate facilities are calculated according to section 13(4) of the Regulation.
- The annual tightening rate does not apply to facility specific benchmarks for aggregate facilities,

[1] Services are excluded from EITE consideration under opt-in.
[2] This table includes sectors currently regulated under the TIERR, and may be added/change to in the future as new sectors become regulated under the TIERR and/or when the EITE review is complete.
[3] According to NAICS Canada 2017 Version 3.0

- Aggregate facilities submit a single annual compliance report for the aggregate facility, rather than a separate report for each individual facility within the aggregate,
- Aggregate facilities are not eligible to receive support under the Regulation's compliance cost containment program.
- High-performance benchmarks have not been set for aggregate facilities at this time.

2.3 Application to designate an opted-in facility and to revoke designation as an opted-in facility

The person responsible for a facility applying to be designated as an opted-in facility under TIER must follow these procedures:

1. Complete the Opt-In Application Form provided on the Alberta Environment and Parks (AEP) website. As part of the application, the person responsible for the facility will be required to:
    a. Confirm that the facility:
        i. produces one of the products listed in Table 1 of Part 2 of this standard, or
        ii. has a NAICS code listed in Table 2 of Part 2 of this standard and direct emissions met or exceeded 10,000 CO_2e tonnes in any year since 2017 or is expected to exceed 10,000 CO_2e tonnes in its third year of commercial operation;
    b. Provide evidence that demonstrates that the facility:
        i. Competes directly with a facility regulated under TIER, or
        ii. Meets the definition of EITE in TIER and has direct emissions that exceeded 10,000 CO_2e tonnes in any year since 2017 or is expected to exceed 10,000 CO_2e tonnes in its third year of commercial operation.
    c. Provide information on benefits that have been or are being provided to a facility under an initiative of the Government of Alberta, or an agency of the Government of Alberta;
    d. Provide a map file delineating the physical boundary of the facility in .kmz or .kml format.

The person responsible for the facility must submit the Opt-In Application electronically to AEP.GHG@gov.ab.ca. Separate email submissions are required for each facility seeking to opt into TIER. An email confirming receipt of the application will be sent to the applicant.

As part of the review of the application, the director may reach out to the applicant to request additional information. Once the review is complete, the director will send the applicant a letter indicating whether the facility is designated an opted-in facility.

A person responsible for a facility applying to revoke their designation as an opted-in facility must include a rationale for their request to have the designation revoked.

The application for the opt in designation to be revoked must be submitted electronically to AEP.GHG@gov.ab.ca. Separate email submissions are required for each facility. An email receipt will be sent to the applicant.

As part of the review of the application for the designation to be revoked, the director may reach out to the applicant with questions, or to request additional information.

2.4 Application to be designated as an Aggregate Facility and to revoke Aggregate Facility designation

The person responsible for a group of two or more conventional oil and gas facilities applying for the designation of an aggregate facility under TIER must follow these procedures:

1. Complete the Aggregate Facility Designation Application Form provided on the Alberta Environment and Parks (AEP) website. As part of the application, the person responsible for the facilities will be required to:
    a. Confirm that all the facilities are conventional oil and gas facilities as defined in Section 1(1)(k) of TIER,

b. List all individual conventional oil and gas facilities included in the application to become an aggregate facility and the required information for each facility, which includes and is not limited to each individual facility's Petrinex reporting ID and the facility's GHGRP ID,
c. Submit a facility boundary file in .kml or .kmz format for all facilities having direct emissions of 10,000 CO_2e tonnes or more in the previous year,
d.

The person responsible for the facility must submit the Aggregate Facility Designation Application electronically through Alberta's Electronic Transfer System (ETS) at https://ets.energy.gov.ab.ca.

Aggregate Facility Designation Applications must be received by the Director on or before September 1, 2020 for the 2020 compliance year. Note that the compliance calculation includes emissions and production for the full year, regardless of when the application is received.

For 2021 and subsequent compliance years, an application must be received on or before December 1 of the year preceding the year in which the Aggregate facility is applying to be designated.

Applications for multiple aggregate designations by the same person responsible may be submitted either in a single submission or as one submission per aggregate. If a person responsible does not have access to ETS, then they may contact the director to request an exemption to allow their Aggregate Facility Designation Application submitted to be electronically to AEP.GHG@gov.ab.ca on or before the applicable deadline.

As part of the review of the application, the director may contact the applicant to request additional information. Once a review is complete, the director will notify the applicant of the outcome of the review and whether an aggregate facility designation has been granted.

The person responsible for an aggregate facility wishing to have their designation as an aggregate facility revoked must follow the following procedures:

1. Provide an application to the director requesting to have the designation of the aggregate facility be revoked.
2. The application must be signed by a certifying official who has the authority to bind the company that owns the facilities that are within the aggregate facility. An electronic copy of the signed statement must be submitted to the department in the form that is prescribed by the director.

The aggregate facility revocation application must be submitted electronically to AEP.GHG@gov.ab.ca. Separate applications are required for each aggregate facility. An application to revoke an aggregate facility designation must be received by the director on or before December 1 of the year preceding the year in which the revocation is requested to be effective.

The director may reach out to the person responsible with questions or to request additional information. Once the review is complete, the director will send the facility a letter indicating whether the facilities' aggregate designation has been revoked.

2.5 Application to Add or Request to Remove Facilities from an Aggregate Facility

A person responsible for an aggregate facility may add or remove conventional oil and gas facilities to and from an existing aggregate facility for the next compliance year using the following procedure:

1. Complete the Aggregate Facility Change Form provided on the Alberta Environment and Parks (AEP) website. As part of the application and/or request, the person responsible for the aggregate facility will be required to:
    a. List all of the conventional oil and gas facilities to be included or removed in the aggregate facility and the required information for each facility,
    b. Confirm that all the additional facilities are conventional oil and gas facilities as defined in Section 1(1)(k) of TIER and have the same person responsible, and
    c. Submit a facility boundary file in .kml or .kmz format for all facilities to be added having direct emissions of 10,000 CO_2e tonnes or more in the previous year if applying to add the facility,

2. Sign the Aggregate Facility Change Form confirming the company is aware of its compliance obligation for the removed facilities. The form must be signed by a certifying official who has the authority to bind the company that owns facilities within the aggregate facility as well as the facilities to be added. An electronic copy of the signed statement must be submitted to the department in the form that is prescribed by the director,
3. Submit the Aggregate Facility Change Form electronically to AEP.GHG@gov.ab.ca.

For the 2020 compliance year only, the person responsible looking to add facilities must submit the Aggregate Facility Change Form on or before September 1, 2020. Note that the compliance calculation includes emissions and production for all facilities the full year, regardless of when the person responsible submits the form. No mechanism currently exists to remove individual facilities from an aggregate for the 2020 compliance year.

For 2021 and subsequent compliance years, the person responsible must submit the Aggregate Facility Change Form on or before December 1 of the year preceding the year in which the individual facilities will be added or removed to the aggregate facility.

As part of the review of the Change Form, the director may contact the applicant to request additional information. Once a review is complete, the director will notify the applicant whether they have approved the addition or removal of individual facilities.

Upon approval of an application to add or request remove conventional oil and gas facilities from an aggregate facility, the director may assign a revised facility-specific benchmark to the aggregate facility. As per section 7(2)(b) of the Regulation, the person responsible for an aggregate facility may also apply to the director for the review of a facility-specific benchmark on or before September 1 of the year in which they wants to use a facility-specific benchmark.

2.6 Notice of Changes that Lead to the Removal of Facilities from an Aggregate Facility

Individual facilities in an aggregate that no longer meet the conditions of being part of an aggregate are required to submit a formal notice to the director. The person responsible must notify the director as soon as practicable after the person responsible becomes aware of the new state of the individual facilities in the aggregate facility.

Events that require an aggregate facility to submit a notice are listed in section 25(2) of the regulation.

As part of the notice, the person responsible for an aggregate facility must follow the following procedures:

1. Complete the Aggregate Facility Notice Form provided on the Alberta Environment and Parks (AEP) website. As part of the notice, the person responsible for the aggregate facility must:
    a. List all of the conventional oil and gas facilities that trigger the requirements of a notice in the aggregate facility and the required information for each facility.
    b. Submit the reason for triggering of the notice for each individual facility.

The director may contact the person responsible for the aggregate to request additional information about the notice. Once a notice is received, each individual facility within aggregate identified in the notice will be automatically removed from the aggregate facility for the year following the year the notice event occurred. The director will confirm in writing the removal of the individual facility to the person responsible of the aggregate.

A notice to remove a conventional oil and gas facility from an aggregate facility must be received on or before December 1 of the year prior to the year the remove is intended to take effect.

As per section 5(5) of the Regulation, a conventional oil and gas facility that is part of an aggregate facility on January 1 of a compliance year, continues to be part of the aggregate facility for the remainder of that year for the purposes of reporting and compliance requirements, even if a notice of removal for that facility is received by the director.

3.0 Emissions Scope in Total Regulated Emissions (TRE)

3.1 Total Regulated Emissions for Large Emitter and Opted-in Facilities

The calculation of TRE is provided in section 13(3) of the regulation.

Facility direct emissions for large emitters and opted-in facilities are reported in the following source categories: stationary fuel combustion, industrial processes (IP), on-site transportation emissions from fuels that are not subject to carbon pricing, venting, flaring, fugitives, formation CO_2, waste and wastewater emissions, and emissions from the use of HFCs, PFCs and SF_6. Biomass CO_2 emissions are reported, but are not included in the calculation of TRE.

3.1.1 Biomass Emissions

Biomass CO_2, CH_4, and N_2O emissions are generated from the combustion, decomposition, or fermentation of biomass from plant materials and animal waste.

Biomass CO_2 emissions are not included in direct emissions. As such, biomass CO_2 emissions are excluded from the benchmark setting and TRE, and are not counted toward the emissions threshold for inclusion in TIER; however, these emissions are required to be reported under TIER.

CH_4 and N_2O emissions from biomass decomposition including waste and wastewater, or from biomass combustion, are included in benchmark setting and are included in calculating the facility's TRE and emissions threshold for inclusion in TIER.

3.1.2 Industrial Process Emissions

IP emissions are included in the TRE. The inclusion of IP emissions in the benchmarking process takes into consideration the difficulty to reduce these emissions. See Part 2, section 4.1.1 of this standard for details.

3.2 Total Regulated Emissions for Aggregate facilities

The formula for determining total regulated emissions for an aggregate facility is included in section 13(4) of the Regulation.

4.0 Benchmark Development

There are three general categories of benchmarks: facility-specific benchmarks, high-performance and compliance cost containment allocation benchmarks. Compliance cost containment allocation benchmarks may be assigned for facilities that have a cost containment designation. See Part 2, section 6.3.2 for details.

Where a high-performance benchmark is not available for a product produced at a facility, the facility will be subject to the facility-specific benchmark (see Part 2, section 5.3.3 for more information on facility-specific benchmarks).

4.1 Emissions Scope for Benchmark Calculation for Large Emitter and Opted-in Facilities

4.1.1 Industrial Process Emissions

IP emissions are included in benchmarks at 100% of facility-specific production weighted average emissions intensity for facility-specific benchmarks, or the average emissions intensity of the top 10% of facilities in a sector for the high-performance benchmarks.

4.1.2 Indirect Emissions

Benchmarks are adjusted to account for indirect emissions associated with the use of electricity, heat, and hydrogen. Indirect emissions from the electricity and heat that are consumed at a facility are included in the facility's baseline emissions when determining facility-specific benchmarks; indirect emissions associated with

the net import or export of hydrogen from a facility are included in the facility's baseline emissions as well. In this way, indirect emissions associated with electricity, heat, and hydrogen are included in the benchmark-setting allowing for future changes of where electricity, heat or hydrogen are produced.

The Allowable Emissions calculation shown in section 9(1) of the regulation includes similar adjustments.

4.1.3 Cogeneration Treatment (Stand-alone and Integrated)

Emissions associated with cogeneration facilities that are an integrated part of a facility covered under TIER are included in the determination of a facility's TRE. In benchmarking calculations, however, facilities' net cogeneration emissions are removed from TRE, and the emissions associated with electricity and industrial heat used in production are added back in. In this way, a consistent allocation is applied in setting product benchmarks for both facilities that have integrated cogen and facilities that make use of imported heat and electricity from a merchant cogen or another source.

In compliance calculations, facilities receive allocations associated with net exports of electricity, hydrogen, and industrial heat, as shown in section 9(1) of the regulation. See section the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports for more information on the compliance calculations.

4.1.4 Fugitive Emissions

Fugitive emissions for all large emitter and opted-in sectors are included in both facility-specific emission intensity benchmarks and high-performance benchmarks. In addition, fugitive emissions are included in the TRE for all large emitter and opted-in facilities across product categories and benchmarks.

4.2 Products and High Performance Benchmarks

Under TIER, high performance benchmarks are established to provide a transparent, predictable regulatory environment for new investors and to facilitate comparison of emissions performance across facilities producing similar products.

Products for which high-performance benchmarks have been determined are listed in the Table in Schedule 2 of TIER and through a Ministerial Order. For products that have not been specified in the Regulation or through a Ministerial Order, facilities may request a high-performance benchmark for a new product. The requesting facility will be required to provide additional information to support the creation of a high performance benchmark.

A high-performance benchmark for a product not listed in the table in Schedule 2 of the Regulation may be assigned by Ministerial Order. In determining whether a high-performance benchmark is appropriate, the department will, subject to the availability of data, assess the EITE status of the product category, taking into consideration the EITE criteria used to determine sector level EITE.

A fuller description of some specific products specific to TIER is included below.

4.2.1 Complexity-Weighted-Barrel (CWB)

The CWB approach represents refining and upgrading production for the purpose of reporting emissions intensity and developing benchmarks. The CWB approach accounts for various refinery and upgrader sizes and process complexities when determining production values, and allows reporting of refining or upgrading output with the standardized volume metric of a CWB.

The Canadian CWB (CAN-CWB) was developed specifically for the Canadian Fuels Association and Ontario Refineries. The CAN-CWB refining methodology and factors have been revised for Alberta facilities to produce an Alberta CWB (AB-CWB) for refining (Refining AB-CWB). This revision adopts a majority of CAN-CWB data, and includes updated factors and more detailed/modified approaches for coking, hydrogen production, and steam and electricity production and consumption to reflect specific conditions within Alberta and to work within the multi-product framework of TIER.

The CAN-CWB upgrading methodology was developed specifically for the Canadian Fuels Association and the Canadian Association of Petroleum Producers for Canadian bitumen upgraders. The CAN-CWB upgrading

methodology and factors have been revised for the currently operating Alberta facilities to produce an AB-CWB for upgrading (Upgrading AB-CWB).

The Refining AB-CWB and the Upgrading AB-CWB differ in that the Refining AB-CWB includes several process unit emissions factors specific to refining operations, whereas the Upgrading AB-CWB contains several process unit emissions factors specific to upgrading operations.

The methodology for quantification of the AB-CWB for refining and upgrading will be described in the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports and Alberta Greenhouse Gas Quantification Methodologies. The person responsible for a facility must ensure they are using the most up to date version of this document.

High performance benchmarks of upgrading and refining have not yet been set.

4.2.2 Alberta Gas Processing Index (ABGPI)

Natural gas processing facilities using the high-performance benchmark will have their compliance obligation assessed by utilizing the Alberta Gas Processing Index (ABGPI) product. This sector-wide benchmarking approach is based on assigning emission potentials to individual standardized processing units in a facility depending on unit (module)'s presence, complexity, and its production/throughput.

The following are standardized functional units for natural gas processing:

- Inlet Compression
- Dehydration
- Amine Sweetening
- Total Refrigeration
- Fractionation
- Stabilization
- Sales Compression
- Sulphur Plant
- Acid Gas Injection
- Ethane Extraction
- Cavern Storage
- CO_2 Plant
- Flaring, Venting, Fugitives

Specified gas emission potential in CO_2e tonnes or production for each of the modules is determined by multiplying the sector production weighted average (PWA) emission intensity of a particular module ("weighting factor") with the production/throughput of that module. The sum of all weighting factors multiplied by production/throughput of each applicable module represents the facility's total ABGPI.

Please refer to the Table A2 of Appendix A for Alberta Gas Processing Index weighting factors.

The methodology for quantification of the ABGPI, including the weighting factors for each module, will be provided in the Alberta Greenhouse Gas Quantification Methodologies. The person responsible for the facility must ensure they are using the most up to date version of this document.

4.2.3 Product and Benchmarking Units for Aggregate Facilities

The product(s) and benchmark unit(s) for an aggregate facility must be representative of the aggregate facility's composition, configuration and emissions. For example, the benchmark unit for an aggregate facility could be the quantities of all energy products produced in m^3 oil equivalent or the benchmark unit could be the energy of all energy products produced in GJ.

The department is not defining the products and benchmark units for aggregate facilities at this time. The product(s) and benchmarking unit(s) for aggregate facilities will be provided in a future version of this standard. Aggregate facilities are encouraged to submit proposals for product(s) and benchmarking unit(s) in their Facility-Specific benchmark applications.

4.3 Benchmark Reference Years

For currently regulated large emitter and opted-in facilities, the facility-specific benchmarks are generally developed using data from 2013-2015 as the reference years. The director has the authority to request data from alternate years for benchmark setting, where appropriate.

For new facilities, except for electricity facilities, the facility-specific benchmarks will be developed using verified data from years 2, 3, and 4 of commercial operation as the benchmark reference years, as outlined in Table 3 below.

Table 3: Facility-Specific Benchmark Years for New Large Emitters and Opted-in Facilities

Year of Commercial Operation	New Facility Compliance Year	Benchmarking Requirements
1st Partial year & 1 – 2nd year	Year(s) prior to being subject to compliance.	• No compliance requirements.
3rd year	First year that the facility is subject to compliance.	• The facility-specific benchmark is set using the emission and production data from year 2 of commercial operation as the benchmark reference year.
4th year	Second year that the facility is subject to compliance.	• The facility-specific benchmark is set using the emission and production data from years 2 and 3 of commercial operation as the benchmark reference years.
5th and subsequent years	Third and additional years that the facility is subject to compliance.	• The facility-specific benchmark is set using the emission and production data from years 2, 3, and 4 of commercial operation as the benchmark reference years.

The director may consider departures from this approach or the above approaches where necessary to account for facility or sector specific circumstances. In these cases, the rationale for such departures will be provided to the affected facility(ies).

For currently regulated large emitter and opted-in facilities, the high-performance benchmarks are generally developed using data from 2013-2015 as the reference years, with the following exceptions:

- For mined bitumen, a 1-year data set from 2015 was used to reflect the emissions intensity of current operations due to changes in sector-wide emissions intensity in 2013 and 2014;
- For bituminous coal, a 5-year data set was used, as 2013-2015 does not provide a representative dataset to establish a benchmark for this sector;
- For natural gas processing, 2015 and 2018 are being used as reference years considering those were the years with the most complete data for the sector.
- For high value chemicals, a 1-year data set from 2015 was used because it was more representative of the emissions intensity of current operations.

4.3.1 Benchmark Reference Years for Aggregate Facilities

The person responsible for an aggregate facility will be required to set the facility-specific benchmark for that aggregate facility using production and emissions data based on three consecutive years of operations. The facility-specific benchmark for an aggregate facility will be based on the schedule provided in Table 4. The first benchmark year is the calendar year prior to the aggregate facility's first year of designation as an aggregate facility. Production and emissions data for an aggregate facility's first and second year of designation as an aggregate facility will be used as the second and third benchmarking years to update the facility-specific benchmark.

Table 4: Facility-Specific Benchmark Years for Aggregate Facilities

Compliance Year	Aggregate Facility Status	Benchmarking Requirements
Year 0	Year prior to being designated as an aggregate facility.	No compliance requirements.
Year 1	First year being designated as an aggregate facility.	• Based on emissions and production data from compliance year 0 • Emissions from compliance year 0 are quantified using tier 0 methods (at minimum) for carbon dioxide and tier 2 methods for methane and nitrous oxide as prescribed in the Alberta Greenhouse Gas Quantification Methodologies. • Benchmark is used for compliance year 1 only. • Aggregate Facility Specific Benchmark Application due September 1 of compliance year 1.
Year 2	Second year being designated as an aggregate facility.	• Based on the production weighted average of emissions and production data from Compliance years 0 and 1. • Emissions from compliance year 0 are quantified using tier 0 methods (at minimum) for carbon dioxide and tier 2 methods for methane and nitrous oxide as prescribed in the Alberta Greenhouse Gas Quantification Methodologies. • Emissions from compliance year 1 are quantified based on tier 3 methods for carbon dioxide and tier 2 methods for methane and nitrous oxide, as prescribed in the Alberta Greenhouse Gas Quantification Methodologies.
Year 3 and subsequent	Third and subsequent years being designated as an aggregate facility.	• Based on the production weighted average of emissions and production data from compliance years 0, 1, and 2. • Emissions from compliance year 0 are quantified using tier 0 methods (at minimum) for carbon dioxide and tier 2 methods for methane and nitrous oxide as prescribed in the Alberta Greenhouse Gas Quantification Methodologies. • Emissions from compliance years 1 and 2 are quantified based on tier 3 methods for carbon dioxide and tier 2 methods for methane and nitrous oxide, as prescribed in the Alberta Greenhouse Gas Quantification Methodologies.

5.0 Benchmark Calculation Methodology

5.1 Facility-Specific Benchmark Approaches

For facility-specific benchmarks, a facility-specific emissions intensity reduction target will be applied, starting at 90% of production weighted average emissions intensity for non-IP emissions. Facility-specific benchmarks are calculated using the formulas in Part 2, section 5.3.3 of this standard.

For new facilities, the facility-specific benchmark will start at 95% production-weighted average emissions intensity for non-IP emissions, set in the fourth year of commercial operation. See Part 2, section 5.5.1 of this standard for more information on the application process for a benchmark as a new large emitter facility.

IP emissions are included in benchmarks at 100% of facility-specific production weighted average emissions intensity for facility-specific benchmarks.

The director may consider departures from this approach or the above approaches where necessary to account for facility or sector specific circumstances. In these cases, the rationale for such departures will be provided to the affected facility(ies).

5.2 High-Performance Benchmark Approaches

High-performance benchmarks are typically provided where more than one facility regulated under TIER in the province is producing a given product. High-performance benchmarks are set to the average emissions intensity of the top 10 per cent of facilities in a given sector, over the benchmark reference years, as described in section 5.3.4. For sectors with less than 10 facilities, the high-performance benchmark is set to the emissions intensity of the best performing facility, over the benchmark reference years. This approach ensures that that no benchmark is more stringent than the emissions intensity of the best performing facility producing the product.

New high-performance benchmarks will be considered during future TIER regulatory reviews and can be issued through a Ministerial Order. Development of new high-performance benchmarks will take into consideration the methodology used to determine existing high-performance benchmarks in TIER. Relevant alternative methodologies may also be considered.

The hydrogen benchmark is an exception to this approach, and has been carried forward from the Carbon Competitiveness Incentive Regulation where it was based on the CWB method and the performance of the benchmark setter.

The department may consider departures from this approach or the above approaches where necessary to account for facility or sector specific circumstances. In these cases, the rationale for such departures will be provided to the affected facility(ies).

5.3 Benchmarking Emissions Intensity

The following information provides the emissions intensity calculations used to develop facility-specific, high-performance, and aggregate facility benchmarks. TRE for a reference period are used to set the benchmarks. See Part 2, section 4.3 of this standard on benchmark reference years for further detail.

5.3.1 Cogeneration Recognition

Cogeneration is the combined production of heat for use in industrial facilities and the production of electricity as a by-product. Electricity not used within the plant may be offered to the competitive electricity market. Combined use of fuel to produce heat for production and to generate electricity improves the overall efficiency of the plant and can displace higher emissions grid electricity. Treatment of cogeneration under the Regulation recognizes the environmental benefits associated with the higher energy efficiencies generally afforded by cogeneration

operations. Under TIER, this treatment is extended to all self-generation; in this way, efficient self generation is rewarded, and inefficient generation does not result in obtaining larger benchmarks.

Standalone cogeneration does not produce any other regulated products for export other than industrial heat and electricity. Since cogeneration produces industrial heat and electricity more efficiently together than they would otherwise be produced separately, applying the high-performance benchmarks for industrial heat and electricity to standalone cogen provides the cogeneration incentive; no facility-specific benchmarking exercise is required.

Integrated cogeneration occurs in a facility that produces regulated products in addition to industrial heat and electricity. The emissions from such a facility would be higher than those from a facility that makes the same regulated products but imports industrial heat and electricity. In the facility-specific benchmarking formula, the variables EE_{fossil}, D_e, and D_h are used to prevent a punitive treatment and instead provide an incentive to cogeneration.

5.3.2 Emissions Associated with Intermediate Products Used in the Production of Final Products

In order to provide facility-specific benchmarks to facilities that do not favour one business model over another, emissions associated with intermediate input products must be treated similarly across business models. This refers to the electricity, industrial heat, and hydrogen that are consumed or used in the production of a final product, regardless of whether or not any of those products are produced inside or outside of the facility boundary. The following formulas are illustrative of how the quantities used or consumed can be determined.

$$H_{used} = H_{cogenerated} + H_{import} - H_{export}$$

Similarly,

$$Elec_{used} = Elec_{self-generated} + Elec_{import} - Elec_{export}$$

And,

$$H2_{used} = H2_{import} - H2_{export}$$

Where

$\boldsymbol{H_{used}}$	is the heat used at a facility, not including heat produced onsite using a conventional boiler, in the making of a product.
$H_{cogenerated}$	is heat generated by fossil fuel-fired integrated cogeneration.
H_{import}	is the heat imported into a facility, that is, heat that was generated outside of the facility boundary.
H_{export}	is the heat exported from a facility by being moved outside of the facility boundary.
$Elec_{used}$	is the electricity used at a facility in the making of a product.
$Elec_{self-generated}$	is the electricity generated at the facility.
$Elec_{import}$	is the electricity imported across the facility boundary, that is, electricity that was generated outside of the facility boundary.
$Elec_{export}$	is the electricity exported from the facility by being moved outside of the facility boundary.
$H2_{used}$	is the offsite hydrogen used at a facility in the making of a product.
$H2_{import}$	is the hydrogen imported across the facility boundary, that is, hydrogen that was generated

outside of the facility boundary.

$H2_{export}$ is the hydrogen exported from a facility by being moved outside of the facility boundary.

Expressed on an emissions-basis, these formulas become:

$$E_{heat\ used} = D_{h,fossil} + \left(H_{import} - H_{export}\right)B_{heat}$$

$$E_{electricity\ used} = D_e + (Elec_{import} - Elec_{export})B_{electricity}$$

$$E_{H2\ used} = (H2_{import} - H2_{export})B_{hydrogen}$$

Where

$\boldsymbol{E_{heat\ used}}$ is the emissions associated with the heat used in the making of a product at the facility, not including heat from a conventional boiler in the facility.

$D_{h,fossil}$ is the deemed heat emissions attributable to the combustion of fossil fuels at a facility, a representation of emissions associated with the production of heat used in the making of a product through cogeneration. It is determined by multiplying the heat generated by combustion of fossil fuels at a facility times the industrial heat high-performance benchmark.

B_{heat} is the high-performance benchmark for heat.

$E_{electricity\ used}$ is the emissions associated with the electricity used in the making of a product at the facility.

D_e is the deemed electricity emissions at a facility, a representation of emissions associated with the production of electricity used in the making of a product. It is determined by multiplying the electricity generated (net of station load) at a facility times the electricity high-performance benchmark.

$B_{electricity}$ is the high-performance benchmark for electricity.

$E_{H2\ used}$ is the offsite emissions associated with the hydrogen used in the making of a product at the facility

$B_{hydrogen}$ is the high-performance benchmark for hydrogen.

5.3.3 Emissions Information Used to Set Facility-Specific Benchmarks

Where facilities produce more than one product, other than electricity, heat or hydrogen, emissions information for the reference period is attributed to individual products using the following formulas:

$$\boldsymbol{TRE_Y = \sum_{j=1}^{m} TRE_{j-Y}} \qquad \boldsymbol{IP_Y = \sum_{j=1}^{m} IP_{j-Y}}$$

$$\boldsymbol{EE_{fossil,Y} = \sum_{j=1}^{m} EE_{fossil,j-Y}} \qquad \boldsymbol{D_{e,Y} = \sum_{j=1}^{m} D_{e,j-Y}} \qquad \boldsymbol{D_{h,fossil,Y} = \sum_{j=1}^{m} D_{h,fossil,j-Y}}$$

$$\boldsymbol{E_{heat\ used,Y} = \sum_{j=1}^{m} E_{heat\ used,j-Y}}$$

$$\boldsymbol{E_{electricity\ used,Y} = \sum_{j=1}^{m} E_{electricity\ used,j-Y}}$$

$$\boldsymbol{E_{H2\ used,Y} = \sum_{j=1}^{m} E_{H2\ used,,j-Y}}$$

Where:

m	is the number of products produced at the facility.
TRE_{j-Y}	is the portion of total regulated emissions of a facility that has been allocated to product j in year Y
TRE_Y	is the total regulated emissions of a facility in year Y
IP_{j-Y}	is the industrial process emissions at a facility for product j in year Y.
IP_Y	is the industrial process emissions at a facility in year Y.
$EE_{fossil,j-Y}$	is the emissions from fossil fuel combustion attributable to self-generation of electricity for product j in year Y. In facilities where cogeneration is utilized, these are cogeneration emissions from combustion of fossil fuels.
$EE_{fossil,Y}$	is the emissions from fossil fuel combustion attributable to self-generation of electricity in year Y. In facilities where cogeneration is utilized, these are cogeneration emissions from combustion of fossil fuels.

$$FSB_{j-2020} = FSB_{non-IP,j-2020} + FSB_{IP,j-2020}$$

Where:

FSB_{j-2020}	is the facility-specific benchmark for product j for 2020.
$FSB_{non-IP,j-2020}$	is the non-industrial process emissions portion of the facility-specific benchmark for product j for 2020.
$FSB_{IP,j-2020}$	is the industrial process emissions portion of the facility-specific benchmark for product j for 2020.

$$FSB_{non-IP,j-2020} = \frac{1}{\sum_{Y=1}^{n} P_{j-Y}} \times \sum_{Y=1}^{n} \left(\left[TRE_{j-Y} - IP_{j-Y} - EE_{fossil,j-Y} + E_{heat\ used,j-Y} + E_{H2\ used,j-Y} \right] \times (1 - RT) + E_{electricity\ used,j-Y} \right)$$

$$FSB_{IP,j-2020} = \frac{1}{\sum_{Y=1}^{n} P_{j-Y}} \times \sum_{Y=1}^{n} \left(IP_{j-Y} \right)$$

Where:

$\boldsymbol{P_{j-Y}}$	is the amount of production by a facility of product j in year Y.
n	is the number of years in the reference period.
B_{heat}	is the benchmark for industrial heat. (0.06299 t/GJ)
B_{H2}	is the benchmark for hydrogen. (9.068 t/tH_2)
B_{elec}	is the benchmark for electricity. (0.37 t/MWh)
RT	is the reduction target which increases with time. In 2020, RT is 0.10 in a year subsequent to the third year of commercial operation and is 0.05 for new facilities in their third year of commercial operation.

The above facility-specific benchmark equation does not apply to the refining and upgrading sectors. A specific equation for these sectors will be provided in a future version of this standard.

5.3.4 Emissions Information Used to Set Facility-Specific Benchmarks for New Facilities

A new facility is a facility whose third year of commercial operation is after 2020. The calculation procedures for setting facility-specific benchmarks at new facilities are similar to those employed for setting facility-specific benchmarks for existing facilities in section 5.3.3. The reduction target (*RT*) for a facility in year three of commercial operation is reduced from 10% to 5%, reflecting the new status and the expectation that equipment in a new facility should be using updated technology and producing improved emissions efficiency compared to equipment in TIER facilities that are already operating. Additional rules for how to apply for a benchmark for a new facility are outlined in section 5.5.1. Further guidance on applying for benchmarks for new entrants to TIER that are not new facilities are available in section 5.5.2.

In addition to the change in emissions reduction target, benchmark years for new facilities are also adjusted to reflect the start of commercial operation for an individual facility. See Part 2, section 4.3 of this standard for more information.

5.3.5 Emissions Information Used to Set High-Performance Benchmarks

The high-performance benchmarking approach takes the arithmetic average emissions intensity of the top 10 per cent performing facilities in a sector, using the formulas below. Where there are less than 10 facilities in a sector, the benchmark is set to the emissions intensity of the best performing facility.

$$EI_{j,k} = \frac{1}{\sum_{Y=1}^{RYn} P_{j-Y}} \times \sum_{Y=RY1}^{RYn} \left(TRE_{j-Y} - EE_{fossil,j-Y} + E_{heat\ used,j-Y} + E_{H2\ used,j-Y} + E_{electricity\ used,j-Y} \right)$$

Where:

$\boldsymbol{EI_{j,k}}$	is the emissions intensity for product j at each top ten percent performing facility, k.

$$HPB_j = \frac{\sum_{k=1}^{q} EI_{j,k}}{q}$$

Where:

HPB_j	is the high-performance benchmark for product j.
q	is the number of facilities producing product j, divided by ten, and rounded up.

5.3.6 Emissions Information Used to Set Facility-Specific Benchmarks for Aggregate Facilities

$$FSB_{AGG} = \frac{\sum_{k=1}^{r} \sum_{y=0}^{2} (E_{SFC\,k-y} + E_{CO2\,k-y})}{\sum_{k=1}^{r} \sum_{y=0}^{2} P_{k-y}} \times (1 - RT_{AGG})$$

Where:

FSB_{AGG}	is the facility specific benchmark for an aggregate facility
k	is individual facility that is part of an aggregate facility
y	is the benchmarking years for each individual facility, corresponding to the methodology set out in Table 4 of this standard
r	is the number of individual facilities in the aggregate
E_{SFCk-y}	is the stationary fuel combustion emissions for each individual facility, k for each benchmarking year y in CO_2e tonnes
$E_{CO2,k-Y}$	is the net export CO_2 of captured stationary fuel combustion emissions for each individual facility, k for each benchmarking year y in CO_2e tonnes
P_{k-y}	is the quantity of benchmark units for an aggregate facilities, produced at each individual facility, k for each benchmarking year, y
RT_{AGG}	is the reduction target for aggregate facility, which is currently fixed at 10%

Aggregate facilities that may require multi-product treatment will be required to allocate stationary fuel combustion and exported CO_2 by product.

5.3.7 Significant Figures

All facility-specific and high-performance benchmarks are rounded to four significant figures.

5.4 Tightening Rate

A tightening rate is applied to the annual reduction target for the facility-specific benchmarks. A 1% annual tightening rate will be applied to the emissions from large emitter and opted-in facilities effective January 1, 2021. The high-performance benchmarks will act as the tightening rate floor for the facility-specific benchmark. The tightening rate does not apply to high-performance benchmarks, aggregate facility-specific benchmarks or industrial process emissions.

A future version of this standard will provide further clarification on the application of the tightening rate to the facility-specific benchmarking formulas in years subsequent to 2020.

5.5 Application for a Facility-Specific Benchmark

A person responsible for a facility may apply for a benchmark under TIER.

A person responsible for a large emitter or opted-in facility, other than an electricity facility, that has not completed the facility's third year of commercial operation may apply for a benchmark following section 5.5.1 below.

A person responsible for a regulated facility that has added a new product may apply for a benchmark following section 5.5.2 below.

A person responsible for an aggregate facility may apply for a benchmark following the treatment of aggregate facilities outlined in section 5.5.3 below.

Additional rules for submitting benchmark applications to the Government of Alberta are outlined in section 5.5.4 and will assist in the timely development and issuance of benchmarks to regulated facilities.

5.5.1 Application for a Facility-Specific Benchmark for a New Large Emitter or Opted-in Facility

Large emitter or opted-in facilities, other than electricity generators, within the first three years of commercial operation have distinct treatment as new facilities. The facility does not have a compliance reporting obligation for up to three calendar years from the start of production, to allow time for the facility to stabilize operations. These facilities should review the guidance related to benchmark application and setting below:

1. When a facility-specific benchmark is provided to a facility for its third year of commercial operation, that benchmark will be set using a 5% reduction target.
2. The new facility-specific reduction target will be increased by 5% per year until the normal reduction target for that calendar year is reached. The person responsible for a new facility may apply to have its year of commercial operation set to later year if they wish to start filing compliance reports earlier.

Additional guidance on new facilities may be found in Part 2, sections 4.3 and 5.3.4 of this standard.

5.5.1.1 Electricity facilities not eligible for facility-specific benchmarks

Electricity facilities produce electricity as their primary product and are subject to the "good-as-best-gas" electricity high-performance benchmark once compliance obligations begin (see Part 2, Section 1.3 of this standard for further information on new entrants to the regulation). Electricity facilities that produce electricity and heat as primary products are additionally subject to the industrial heat high-performance benchmarks.

Electricity facilities are not eligible for facility-specific benchmarks.

5.5.2 Application for a Facility-Specific Benchmark for a Large Emitter or Opted-In Facility That is Not a New Facility

Large emitter or opted-in facilities, other than electricity generators, which are not new, may receive benchmarks according to the following rules:

1. A facility may receive a facility-specific benchmark based on 2013 to 2015 performance data according to Part 2, sections 5.1 and 5.3.3 if the product was produced in that period.
2. If the product is newly being produced by the facility, more recent time periods may need to be used.
3. The full reduction target of the year would apply in setting the facility-specific benchmark.

The director may consider departures from the above approaches where necessary to account for facility- or sector-specific circumstances. In these cases, the rationale for such departures will be provided to the affected facility (or facilities).

5.5.3 Application for a Facility-Specific Benchmark for an Aggregate Facility

A person responsible for an aggregate facility must submit an application for a facility specific benchmark utilizing the Aggregate Facility-Specific Benchmark Application Form. For 2020, the Aggregate Facility-Specific

Benchmark Form will be used to determine an aggregate facility's benchmark utilizing one year of production and emissions data.

Application procedure:

- Complete Aggregate Facility Specific Benchmark Application Form, which is to be available on AEP's website, as amended from time to time. Information provided must include at least the following:
    a. Emissions and production information as outlined in the form, and in accordance with the prescribed quantification methodologies, where available.
    b. Proposed products and benchmark units for the aggregate facility (optional).
- Prepare a verification following the Standard for Validation, Verification and Audit for verification requirements.
- The Aggregate Facility-Specific Benchmark Application Form application must be submitted electronically to AEP.GHG@gov.ab.ca. Electronic copies of the signed statements are preferred. An email receipt will be sent to the applicant.

The director or department staff may reach out to the applicant during the review with questions or to request additional information.

If the person responsible for an aggregate facility believes that the benchmarking years do not accurately reflect the operating behaviour of the aggregate facility, they should contact the director to discuss alternative benchmarking years.

5.5.4 Procedures for Facility-Specific Benchmark Applications for Large Emitters or Opted-in Facilities

- Complete the facility-specific benchmark application form, which is available on AEP's website, as amended from time to time for each product of the facility for which a facility-specific benchmark is being requested. Information provided must include at least the following:
    a. Emissions and production information as outlined in the form, and in accordance with the prescribed quantification methodologies, where available. In the case of a new product type or uncertainty on how to allocate emissions between products, the applicant should contact the director for further guidance.
    b. The person responsible for the facility must follow the procedures in the form to calculate a facility-specific benchmark. The director may, upon review of the application, assign the appropriate facility-specific benchmark for the facility, as described in Part 2, sections 5.1 of this standard.
- The Standard for Completing Compliance and Forecasting Reports provides requirements related to the QMD and Standard for Validation, Verification and Audit for verification requirements.
- The benchmark application must be submitted electronically to AEP.GHG@gov.ab.ca. Electronic copies of the signed statements are preferred. An email receipt will be sent to the applicant.

The director or department staff may reach out to the applicant during the review with questions, or to request additional information.

Following the completion of the review of the application, the director will notify persons responsible for a facility of the decision to assign a benchmark and indicate the benchmark(s) that has been assigned for a facility and its product(s).

6.0 Ability to Receive Cost Containment Designation and Revoke Cost Containment Designation

The cost containment program provides additional relief mechanisms to persons responsible for large emitter or opted-in facilities who are likely to experience economic hardship attributable to compliance costs incurred in respect of the facilities under TIER.

Economic hardship can be demonstrated using either of the following two criteria:

- Compliance costs as defined in Part 2, section 6.1.2 exceed 3% of facility sales for a facility in a sector whose trade-exposure is designated as high or very high.
- Compliance costs as defined in Part 2, section 6.1.2 exceed 10% of facility profits for a facility in a sector whose trade-exposure is designated as high or very high.

Facilities considering applying for a cost containment designation are strongly encouraged to assess the associated administrative costs prior to making an application. Applications require reporting, verification, validation and auditing. Facilities that are admitted to the cost containment program will be subject to additional regulatory reporting obligations, which will require auditing, third party verification, and third party validation. These additional costs are wholly the responsibility of the facility and will not be considered as part of compliance costs when assessing eligibility for cost containment relief mechanisms.

The cost containment designation application process is described in Part 2, section 6.2 of this standard.

If the Minister revokes the cost containment designation, the facility will remain subject to TIER.

6.1 Economic Hardship Criteria

6.1.1 Economic Hardship Attributable to TIER Compliance Costs

A large emitter or opted-in facility is considered likely to experience economic hardship attributable to the compliance costs incurred in respect of the facility for one or more years for which the cost containment designation is requested when:

- The facility belongs to a sector that has high or very high trade exposure. The trade exposure levels of sectors regulated under TIER are listed in Table A4 of Appendix A, and
- The facility's compliance costs result in failing of the sales or profit tests defined in Part 2, sections 6.1.3 and 6.1.4, respectively, of this standard.

Sectors with low or medium trade exposure are assumed to have very high cost pass through and are therefore are unlikely to experience economic hardship attributable to compliance costs under the Regulation. Although very-high trade exposure, the pipeline sector is considered to have a very high ability to pass through costs and are therefore unlikely to experience economic hardship attributable to compliance costs under the Regulation.

For this reason, facilities from this sector should not proceed to the sales or profits tests in sections 6.1.3 and 6.1.4 of Part 2.

For all other sectors, any cost pass through is expected to be reflected through an increase in the actual sales price of the product, therefore cost pass through factors are not applied to these facilities. Cost pass through factors are not included in the sales and profit tests applied under the cost containment program.

The sales and profit tests estimate the economic hardship attributable to the compliance costs under the Regulation.

6.1.2 TIER Compliance Costs

For a facility with high or very high trade exposure, the compliance costs incurred in respect of the facility is the facility's estimated net TIER compliance cost, on a post-tax and post-royalty basis, in a given compliance year as estimated in the Cost Containment Application Form. Compliance costs are defined by the equation below.

$$\text{Compliance Cost}_{\text{TIER}-\text{Y}} = (TrueUp\ Obligation \times FC\ Price)_{TIER-Y} - \Delta Tax_Y + \Delta Royalty_Y$$

Where,

FC Price$_{TIER-Y}$	is the amount of money that a person must contribute to the TIER Fund to obtain one fund credit for year Y. Fund credit prices to be assumed from 2021 onwards can be found in Table A5 of Appendix A.
TrueUp Obligation$_{TIER-Y}$	is the true-up obligation as defined in the Regulation, for the facility for year Y.
ΔTax $_Y$	$= (TrueUp\ Obligation \times FC\ Price)_{TIER-Y} \times Tax\ Rate_Y$, where Tax Rate are the percentages listed in Table A7 of Appendix A.
ΔRoyalty $_Y$	is the amount of royalties that will be paid in respect of the facility to the Government of Alberta in year Y, minus the amount of royalties that would be paid in respect of the facility to the Government of Alberta if the regulation were not in effect and there was no costs associated with the direct emissions at the at the facility in year Y.
Y	is the year in which the compliance cost is being estimated or determined.

A facility should contact the director if further guidance is required with respect to the facility accounting of any of the terms in this equation.

6.1.3 Sales Test

The sales test is the ratio of facility's compliance costs to its gross sales revenue, based on accrual accounting, in a given year. A facility fails the sales test when its Facility Sales Ratio (FSR) in year Y is greater than or equal to 0.03 according to the following equation, and it is not a pipeline but is part of a sector whose trade exposure is high or very high.

$$\text{FSR}_Y = \frac{Compliance\ Cost_{TIER-Y}}{\sum_i \sum_m (\text{P}_{Sold} \text{ x Sales Price})_{i-Y,m}}$$

Where,

FSR$_Y$	is the sales ratio for the facility for year Y.
i	is each product of the facility t
m$_{i,}$	is each sale in year Y of each product i produced by the facility.
P$_{Sold,i-Y,m}$	is the amount of product i sold by the facility in year Y at a given sales price (benchmark unit).
Sales Price$_{i-Y,m}$	is the price for which product i is sold in each transaction in year Y ($ per benchmark unit).

A facility should contact the director if further guidance is required with respect to the facility accounting of production sold or sales price transactions.

6.1.4 Profit Test

The profit test is the ratio of facility's compliance costs to an estimate of its earnings before interest, taxes, and amortization (EBITA) in a given year. A facility fails the profit test when its Facility Profit Ratio (FPR) in year Y is greater than or equal to 0.10 of its EBITA according to the following equation, and it is not a pipeline or part of a sector whose trade exposure is high or very high:

$$\mathrm{FPR}_Y = \frac{Compliance\ Cost_{TIER-Y}}{\sum_i \sum_m (\mathrm{P}_{Sold} \times \text{ Sales Price } \times \mathrm{PM})_{i-Y,m}}$$

Where,

FPR_Y is the facility profit ratio (FPR) for year Y;

$PM_{i\text{-}Y,m}$ is a facility's profit margin for product i sold in year Y. The estimates are developed using revenue minus expenses before interest, taxes, and amortization adjustments (EBITA), expressed as a ratio between 0 and 1. Profit margins (PMs) to be used in the calculation are included in Table A6 of Appendix A. Where the PM value in Appendix A is based on four digit NAICS industry group, the department may instead use a PM value based on the six digit NAICS sector data, if the facility can demonstrate through an independent, third-party verified submission to the director that the four digit NAICS code PM value is not representative of the sector's profitability.

A facility should contact the director if further guidance is required with respect to the facility accounting of production sold, sales price transactions, or profit margins.

6.1.5 Weighted-Mean Sales Price

Facilities must include the weighted-mean sales price (WMSP) for each product sold from the facility for each year seeking a cost containment designation in its annual emissions reduction plan report. Facilities must also report the actual WMSP for the current compliance year, and the two years of commercial operation immediately preceding the first year each sold product from the facility, in its cost containment application. The WMSP shall be determined as follows:

$$WMSP_{\ i-Y} = \frac{\sum_m (P_{sold} \times Sales\ Price)_{i-Y}}{\sum_m (P_{sold})_{i-Y}}$$

Where,

$WMSP_{i\text{-}Y}$ is the weighted-mean sales price (WMSP) for each product i sold by a facility in year Y ($ per benchmark unit).

6.1.6 Alternative Economic Hardship Tests

The person responsible for a large emitter or opted-in facility may propose alternative economic hardship tests that demonstrate economic hardship attributable to compliance costs incurred in respect of the facility, other than the sales and profit tests defined in Part 2, sections 6.1.3 and 6.1.4, respectively, which may be considered for adoption into this standard. Alternative economic hardship tests may consist of variations of the existing sales and profit tests, or may consistent of new economic hardship test methodologies. Alternative economic hardship tests may be conducted at either the sector or facility level, so long as the test can be equitably applied across all sectors or facilities within a sector. In considering whether to issue a cost containment designation in respect of a facility, the Minister may only consider economic hardship tests that have been incorporated into this standard.

6.1.7 Significant Figures

All sales and profit test results are rounded to two significant figures.

6.2 Application for Cost Containment Designation

The person responsible for a facility should provide notice of intent to the director 6 to 8 weeks prior to applying for a containment designation under section 14(1) of TIER. Refer to the Standard for Validation, Verification and Audit for information on the recommended audit process.

An application for cost containment designation must be completed using the Cost Containment Designation Application Form provided on the Alberta Environment and Parks (AEP) website.

The Statement of Certification included in the application must be signed by a certifying official who has the authority to bind the company. An electronic copy of the signed statement is preferred.

The person responsible for the facility must submit the Cost Containment Designation Application Form electronically to AEP.CCP@gov.ab.ca. Separate email submissions are required for each facility seeking to receive a cost containment designation. An email confirming receipt of the application will be sent to the applicant.

A request to revoke a cost containment designation must be signed by a certifying official who has the authority to bind the person responsible. An electronic copy of the signed statement is acceptable.

6.3 Cost Containment Relief Mechanisms

Facilities who receive a cost containment designation may be eligible for the following relief mechanisms:

- The first form of relief provided will be removing the credit usage limit for the facility outlined in section 13(11) of the Regulation.
- If increased credit usage is insufficient to relieve economic hardship attributable to compliance costs, the Director may assign a compliance cost containment allocation benchmark for a compliance year in which a facility is designated for any product of the large emitter or opted-in facility that has a high-performance benchmark or facility-specific benchmark.

6.3.1 Compliance Flexibility Valuation

Increased compliance flexibility must be valued in order to ensure that a cost containment designated facility does not receive cost relief benefits exceeding the maximum value of its true-up obligations.

The value of the compliance flexibility benefit received by a cost containment designated facility in a given year is determined as follows:

$$\mathrm{CFV_Y} = [\text{TrueUp Obligation} \times (\text{FC Price} \times 0.15) \times (1 - \mathrm{CUL})]_{\mathrm{TIER-Y}}$$

Where,

$\mathrm{CFV_Y}$	is the compliance flexibility valuation (CFV) assessed for additional compliance flexibility granted to a facility with a cost containment designation ($ in year Y);
$\mathrm{CUL_Y}$	is the facility's credit usage limit (CUL), which represents the ratio of the combined maximum of emission offsets and emission performance credits to the true-up obligation of the facility for year Y if it were subject to section 13(9) of the Regulation.

And where FC Price and TrueUp $\text{Obligation}_{\text{TIER-Y}}$ have the same definition as in section 6.1.2 of Part 2 of this standard.

Note: A proxy value of 0.15 x FC Price_{Y} is applied in the above equation to represent the market discount of EPCs and EOs relative to the fund price. The director may consider alternative methods and values for compliance flexibility valuation where the value a facility derives from compliance flexibility is significantly different from the default values in the equation above.

The compliance flexibility valuation for a cost containment facility is rounded to the nearest dollar.

6.3.2 Compliance Cost Containment Allocation Benchmarks (BCCAs)

6.3.2.1. Compliance Cost Containment Allocation Benchmark Application

The person responsible for a large emitter or opted-in facility may apply to the director to receive a compliance cost containment allocation benchmark (BCCA) for a year for which a facility cost containment designation is in effect or for which the person responsible is applying for a cost containment designation for the facility.

Prior to completing a Compliance Cost Containment Allocation Benchmark Application form, a person responsible should determine whether the facility is likely to be eligible to receive a compliance cost containment designation (if a designation has not already been assigned), and if the facility may be eligible to receive a BCCA as per the methodology outlined in section 6.3.2.2

BCCAs are assigned for a single compliance year and a facility must submit a separate application for a BCCA for each compliance year using actual emissions and production data for the year to which the application applies.

An applicant may use unverified emissions and production data for the facility for the purposes of completing the application. However, the person responsible must certify the information included in the application.

The Compliance Cost Containment Allocation Benchmark Application form must be submitted electronically to AEP.CCP@gov.ab.ca.

6.3.2.2. Compliance Cost Containment Eligibility Facility Sales and Profit Ratios

A large emitter or opted-in facility may be eligible for a compliance cost containment allocation benchmark, expressed as a ratio, if either the BCCA Eligibility FSR or the BCCA Eligibility FPR in year Y is greater than or equal to 0.03 or 0.10, respectively. The compliance cost containment allocation benchmark is calculated, using actual facility data for a year, according to the following formula:

$$\text{BCCA Eligiblity FSR}_{Y} = \frac{[\text{Compliance Cost}_{\text{TIER}-Y} - \text{CFV}_{Y} - \text{GOAFunding}_{Y}]}{\sum_{i}\sum_{m}(P_{\text{Sold}} \times \text{Sales Price})_{i-Y,m}}$$

$$\text{BCCA Eligiblity FPR}_{Y} = \frac{[\ \text{Compliance Cost}_{\text{TIER}-Y} - \text{CFV}_{Y} - \text{GOAFunding}_{Y}]}{\sum_{i}\sum_{m}(P_{\text{Sold}} \times \text{Sales Price} \times \text{PM})_{i-Y,m}}$$

Where,

BCCA Eligibility FSR_{Y} is the facility sales ratio for year Y used to determine eligibility for a compliance cost containment allocation benchmark. The BCCA Eligibility FSR is the original facility sales ratio from Part 2, section 6.1.3 of this standard modified to include the value of compliance flexibility and total funding received by the facility in year Y from the Government of Alberta or one its agencies, where the funds originate from the TIER Fund,

BCCA Eligibility FPR_{Y} is the profit ratio for the facility for year Y used to determine eligibility for a compliance cost containment allocation benchmark. The BCCA Eligibility FPR is the original facility profit ratio from Part 2, section 6.1.4 of this standard modified to include the value of compliance flexibility and total funding received

	by the facility in year Y from the Government of Alberta or one its agencies, where the funds originate from the TIER Fund
$GOAFunding_Y$	is the total funding received by the facility in year Y from the Government of Alberta or one its agencies where the funds originate from the TIER Fund plus total carryover from previous years where this funding was in excess of the amount required to bring the facility sales ratio and profit ratio down to 0.03 and 0.10, respectively, when the facility had a cost containment designation.

Where, Compliance $Cost_{TIER\text{-}Y}$ has the same meaning as in section 6.1.2; P_{sold} and Sales Price have the same meaning as in section 6.1.3; PM has the same meaning as in section 6.1.4; and CFV_Y has the same meaning as in section 6.3.1.1.

All compliance cost containment eligibility facility sales and profit ratio results are rounded to two significant figures.

6.3.2.3. Determination of Compliance Cost Containment Benchmark Allocations (BCCAs)

Compliance cost containment allocation benchmarks will be determined according to the following rules and equations:

1. A compliance cost containment benchmark allocation (BCCA) may only be assigned for a product of a large emitter or opted-in facility to which a facility-specific or high-performance benchmark applies.
2. The BCCA for a product will be calculated so that the facility will no longer exceed the sales or profit thresholds, net of the cost containment benefits received via compliance flexibility and any benefits received which originate from the TIER Fund.
3. The BCCA value will be rounded to the nearest fourth significant figure at which the facility sales or profit test ratios no longer exceed either 0.03 or 0.10, respectively, subject to the condition that the BCCA does not result in the facility earning any EPCs.
4. For any facility, where a $BCCA_{l\text{-}Y}$ calculated under this section for a product is zero or a negative value, then the director will not assign a BCCA to the facility for that year.

If the facility is determined by the director to be eligible for a BCCA for the compliance year under review, the director will review the compliance cost containment allocation benchmark application form provided by the facility and, if the application is approved, issue a letter to the person responsible for a facility assigning a BCCA value for its applicable product(s), if in accordance with this standard. The facility will then include its BCCA value(s) as part of its allowable emissions calculation in its annual TIER compliance report. The director may reassign a new cost compliance containment allocation benchmark for the product(s) for the facility if the director is of the opinion that there is a discrepancy between the certified data on which the compliance cost containment allocation benchmark was based on and the verified data provided in the annual TIER compliance report for the compliance reporting period.

Compliance cost containment allocation benchmarks will be determined according to the following equation:

$$BCCA_{l-Y(n+1)} = BCCA_{l-Y(n)} + \frac{1}{FC\ Price_{TIER-Y}} \times \frac{C_n}{P_{l-Y}} \times \frac{Sales\ Price_{l-Y} \times P_{l-Y}}{\sum_i (Sales\ Price \times P)_{i-Y}}$$

The value of $BCAA_{l\text{-}Y}$ can then be solved iteratively, using the following equations, where the compliance cost, and *C* are updated at each iteration. Start by calculating compliance costs with the cost containment benchmark set to zero and iterating (index n) until the cost containment benchmark converges to the fourth significant figure:

$$BCCA_{l-Y(0)} = 0$$

$$\mathrm{A}_n(\$) = Actual\ Compliance\ Cost_{Yn} - 0.03 \times \sum_{\mathrm{i}} \sum_{\mathrm{m}} (\mathrm{P}_{\mathrm{Sold}} \times \mathrm{Sales\ Price})_{\mathrm{i-Y,m}} - CFV_{Yn} - \mathrm{GOAFunding}_Y$$

$$\mathrm{B}_n(\$) = Actual\ Compliance\ Cost_{Yn} - 0.1 \times \sum_{\mathrm{i}} \sum_{\mathrm{m}} (P_{\mathrm{Sold}} \times \mathrm{Sales\ Price} \times \mathrm{PM})_{\mathrm{i-Y,m}} - CFV_{Yn} - \mathrm{GOAFunding}_Y$$

$$C_n(\$) = MAXIMUM(A_n, B_n)$$

where,

Actual Compliance $\mathrm{Cost}_{\mathrm{Yn}}$	is the nth iterative estimate of compliance cost for the facility in year Y determined using the equation in Part 2, section 6.1.2 of this standard using actual certified facility emissions and actual, audited production data submitted as part the facility's cost containment application and emission reduction plan report.. Cost containment allocation benchmarks need to be solved iteratively because royalty and tax effects are both included in compliance costs and a function of compliance costs and the compliance flexibility valuation is a function of the facility's TIER true-up obligation.
$\mathrm{CFV}_{\mathrm{Yn}}$	is the nth iteration of the compliance flexibility valuation (CFV) assessed for additional compliance flexibility granted to a facility with a cost containment designation ($ in year Y);
$\mathrm{P}_{\mathrm{l\text{-}Y}}$	is the production for each product for the facility during year Y.

And where, P_{i} has the meaning of P_{i} as in section 5(1) of the Regulation; $\mathrm{P}_{\mathrm{sold}}$ and Sales Price have the same meaning as in section 6.1.3; PM has the same meaning as in section 6.1.4; $\mathrm{CUL}_{\mathrm{Y}}$ has the same meaning as in section 6.3.1.1; and $\mathrm{GOAFunding}_{\mathrm{Y}}$ has the same meaning as in section 6.3.2.1.

BCCA values determined using the equations above must also satisfy the following conditions to ensure that the compliance cost containment allocation benchmark will not result in the facility generating EPCs:

1. The total BCCA value(s) for the facility must be limited such that the product of the BCCA value(s) and the total production of the product(s) to which BCCAs are assigned at the facility for the year cannot exceed the facility's true-up obligation for the year as defined by the following relationship:

$$\sum_l (BCCA_{l-Y}\ x\ P_l) \leq$$
$$TRE - \sum (ARi\text{-}Y\ x\ Pi)\ +\ ((BHPE\text{-}Y\ x\ IE)\ +\ (BHPHy\text{-}Y\ x\ IHy)\ +\ (BHPIHe\text{-}Y\ x\ IHe))$$

Where each term that is given a meaning in Section 9(1) and 9(2) of the Regulation has that same meaning.

The compliance cost containment allocation benchmark value is rounded up to the next fourth significant figure to ensure that the facility BCCA sales and profit ratios are less than the respective thresholds of 0.03 or 0.10.

6.4 Emissions Reduction Plan

6.4.1 Emissions Reduction Plan

The person responsible for a facility must include an emissions reduction plan when applying for a containment designation under section 14(2) of TIER. The emission reduction plan should include the following:

a. A baseline for the emissions reduction plan where the certified forecast, as required by the Regulation and referenced in section 10(1)(e) of Part 1 of this standard, is based on continuation of facility operation under projected three-year historical emissions intensity performance without implementation of the emissions reduction plan.
b. Emission reduction plan project(s) where the certified forecast is based on implementation of the emissions reduction plan. If an applicant intends to use Government of Alberta grant funding as part of its emissions reduction plan project(s), then this facility should assume that it will receive grant funding from the Government of Alberta for these projects in accordance with applicable grant program funding criteria. The emissions reduction plan should also state the impact on the plan if the application for this funding is not approved.
c. Identification of how the implementation of the emissions reduction plan will reduce the emissions intensity with respect to the large emitter or opted-in facility as per Section 14(6)(d) of Regulation.

In the case that the emissions reduction plan extends beyond the years for which the person responsible for the facility is seeking a cost containment designation, the plan must demonstrate that the person responsible will implement all known emissions abatement opportunities that have marginal abatement costs less than or equal to the cost of a fund credit in respect of the facility in each year.

A facility should contact the director if further guidance is required with respect to the contents of the emissions reduction plan.

6.4.2 Annual Emissions Reduction Plan Report

Please refer to the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports for further information regarding the Annual Emissions Reduction Plan Report.

Original signed by: Justin Wheler **Date: October, 2019**

Executive Director
Regulatory and Compliance Branch
Climate Change Division
Alberta Environment and Parks

APPENDIX A

Table A1: Sectors evaluated based on NAICS Codes (based on 2013 data)[4,5,6]

NAICS	Name
111	Crop production
112	Animal production and aquaculture
113	Forestry and logging
114	Fishing, hunting and trapping
115	Support activities for agriculture and forestry
211	Oil and gas extraction
212	Mining and quarrying (except oil and gas)
213	Support activities for mining and oil and gas extraction
221	Utilities
23	Construction
311	Food manufacturing
312	Beverage and tobacco product manufacturing
313	Textile mills
314	Textile product mills
315	Clothing manufacturing
316	Leather and allied product manufacturing
321	Wood product manufacturing
322	Paper manufacturing
323	Printing and related support activities
324	Petroleum and coal product manufacturing
325	Chemical manufacturing
326	Plastic and rubber products manufacturing
327	Non-metallic mineral product manufacturing
331	Primary metal manufacturing
332	Fabricated metal product manufacturing
333	Machinery manufacturing
334	Computer and electronic product manufacturing
335	Electrical equipment, appliance and component manufacturing
336	Transportation equipment manufacturing
337	Furniture and related product manufacturing
339	Miscellaneous manufacturing
481	Air transportation
482	Rail transportation
484	Truck transportation
4862	Pipeline transportation of natural gas

[4] NAICS codes were evaluated in the groupings for which data available from Statistics Canada based on NAICS Canada 2012. In some cases, the codes represent multiple NAICS codes. The subsectors included or excluded for each grouping are described in the description for each sector.

[5] Four- five- and six-digit NAICS subsector codes nested within the listed codes were included in EITE analysis.

[6] Services are excluded from EITE consideration under opt-in.

Table A2: Alberta Gas Processing Index Weighting Factors

	Module	Stream		Weighting Factor	
		Type	Unit	Value	Unit
1	Inlet Compression	throughput	e^3m^3	0.03304	t_{CO2e} / e^3m^3
2	Dehydration	throughput	e^3m^3	0.00247	t_{CO2e} / e^3m^3
3	Gas Sweetening	throughput	e^3m^3	0.03040	t_{CO2e} / e^3m^3
4	Total Refrigeration	throughput	e^3m^3	0.01835	t_{CO2e} / e^3m^3
5	Fractionation	production	m^3_{OE}	0.04141	t_{CO2e} / m^3_{OE}
6	Stabilization	production	m^3_{OE}	0.05537	t_{CO2e} / m^3_{OE}
7	Sales Compression	throughput	e^3m^3	0.02135	t_{CO2e} / e^3m^3
8	Sulphur Plant	production	$t_{Sulphur}$	0.4249	$t_{CO2e} / t_{Sulphur}$
9	Acid Gas Injection	throughput	$e^3m^3_{Acid\ Gas}$	0.3960	$t_{CO2e} / e^3m^3_{Acid\ Gas}$
10	Ethane Extraction	production	m^3_{OE}	0.1251	t_{CO2e} / m^3_{OE}
11	CO_2 Plant	throughput	$e^3m^3_{CO2}$	0.1881	$t_{CO2e} / e^3m^3_{CO2}$
12	Flaring, Venting, Fugitives	production	m^3_{OE}	0.004452	t_{CO2e} / m^3_{OE}

Table A3: Oil Equivalent Factors used in the Calculation of m3 of Oil Equivalent

Product Code	Product	Units	Conversion Factors to m^3 OE	
			Gas at standard conditions (101.325 kPa, 288.15 K)	Liquid at 288.15 K
OIL	Lite Oil	m^3	-	1.00
GAS	Gas	e^3m^3	0.971	-
C1MX	Methane Mix	e^3m^3	0.971	-
LITEMX	Lit Mix	e^3m^3	0.971	-
C2SP	Ethane Spec	m^3	0.0017	0.48
C2MX	Ethane Mix	m^3	0.0017	0.48
C3SP	Propane Spec	m^3	0.0024	0.66
C3MX	Propane Mix	m^3	0.0024	0.66
NGL	Natural Gas Liquids	m^3	-	0.71
IC4MX	Iso-Butane Mix	m^3	0.0032	0.72
IC4SP	Iso-Butane Spec	m^3	0.0032	0.72
C4SP	Butane Spec	m^3	0.0032	0.75
C4MX	Butane Mix	m^3	0.0032	0.75
NC4MX	Normal Butane Mix	m^3	0.0032	0.75
NC4SP	Normal Butane Spec	m^3	0.0032	0.75
IC5MX	Iso-Pentane Mix	m^3	-	0.79

Product Code	Product	Units	Conversion Factors to m^3 OE	
			Gas at standard conditions (101.325 kPa, 288.15 K)	Liquid at 288.15 K
IC5SP	Iso-Pentane Spec	m^3	-	0.79
C5MX	Pentane Mix	m^3	-	0.80
C5SP	Pentane Spec	m^3	-	0.80
NC5MX	Normal Pentane Mix	m^3	-	0.80
NC5SP	Normal Pentane Spec	m^3	-	0.80
COND	Condensate	m^3	-	0.86
C5+	Pentane Plus	m^3	-	0.86

Notes:

- m^3OE conversion factors derived from Higher Heating Values (HHV) based on 38.5 GJ/m^3 HHV light crude oil
- HHVs Sources: CAPP, "Calculating Greenhouse Gas Emissions", 2003; GPSA, "Engineering Data Book", 1998; AER, "ST98: Alberta's Energy Reserves and Supply/Demand Outlook", 2018, EPA, "AP-42: Compilation of Air Emissions Factors", 2009

Table A4: Trade Exposure by Sector[7] (by North American Industry Classification System (NAICS))

NAICS	Name	Trade Exposure
3314	Non-ferrous metal (except aluminum) production and processing	Very High
32741	Lime manufacturing	Very High
3253	Pesticide, fertilizer and other agricultural chemical manufacturing	Very High
21111	Oil and gas extraction (except oil sands)	Very High
21114	Oil sands extraction	Very High
2121	Coal mining	Very High
3221	Pulp, paper and paperboard mills	Very High
48621	Pipeline transportation of natural gas	Very High
3279	Other non-metallic mineral product manufacturing	Very High
3116	Meat product manufacturing	Very High
3112	Grain and oilseed milling	Very High
3251	Basic chemical manufacturing	High
3241	Petroleum and coal product manufacturing	High
3273	Cement and concrete product manufacturing	High
562	Waste management and remediation services	Medium
2211	Electric power generation, transmission and distribution	Low

[7] This table includes sectors currently regulated under the TIERR, and additional sectors may be added/updated in the future as new sectors become regulated under the TIER and/or when a EITE review is complete.

Table A5: TIER Fund Price Assumptions

Year	TIER Fund Price ($ per CO_2e tonne)
2020	**$30**
2021	**$30**
2022	**$30**
2023	**$30**
2024	**$30**
2025	**$30**

Table A6: Profit Margin Ratios for Industry Groups or Sectors[8]

NAICS[9]	Industry Group or Sector	Profit Margin Ratio
3251	Basic Chemical Manufacturing	23.6%
3241	Petroleum and coal product manufacturing	12.5%
2121	Coal Mining	11.1%
21111	Oil and Gas Extraction (except oil sands)	21.3%
2211	Electric power generation, transmission, and distribution	25.0%
3253	Pesticide, Fertilizer and other agricultural chemical manufacturing	13.6%
3116	Meat product manufacturing	3.2%
3273	Cement and concrete product manufacturing	10.1%
3274	Lime and gypsum product manufacturing	13.1%
21114	Oil sands extraction	27.8%
3221	Pulp, paper and paperboard mills	5.0%
4862	Pipeline transportation of natural gas	6.2%
3314	Non-ferrous metal (except aluminium) production and processing	8.6%
5622	Waste treatment and disposal	2.0%

Table A7: Cost Containment Tax Rates

Year	Tax Rate
2020	25%
2021	24%
2022	23%

[8] Profit Margins are developed based on Statistics Canada data amongst other sources. NAICS codes were evaluated in the groupings for which data available from Statistics Canada. In some cases, the codes represent multiple NAICS codes. The subsectors included or excluded for each grouping are described in the description for each sector.

[9] According to NAICS Canada 2017 Version 3.0