



Standard for developing benchmarks

Technology Innovation and Emissions Reduction Regulation
Version 2.1



Title:	Standard for Developing Benchmarks
Number:	2.1
Program Name:	Technology Innovation and Emissions Reduction Regulation
Effective Date:	January 1, 2021
This document was updated on:	December 2021

Summary of Revisions

Version	Date	Summary of Revisions
1.0	October 2019	<ul style="list-style-type: none"> • First version of this standard to accompany the Technology Innovation and Emissions Reduction Regulation
2.0	July 2020	<ul style="list-style-type: none"> • Re-organization to improve flow and usability • Clarification of greenhouse gas species considered in benchmarking • Updated information on aggregate facility benchmark process • Updates to Emission Intensive and Trade Exposure threshold to align with updated regulation • Additional details added for tightening rate • Additional clarity added on integration of aggregate facilities • More information on benchmarking approach for refining and upgrading. • Additional definitions
2.1	December 2021	<ul style="list-style-type: none"> • Updated benchmark approach for conventional oil and gas aggregate facilities • Updated benchmark approach for upgrading and refining facilities (including the complexity weighted barrel benchmark formula) • Updated benchmark stringency for oil sands mining and upgrading • Added high performance benchmarks established by Ministerial Order but not yet amended in the TIER regulation • Updated valuation of expanded compliance flexibility for cost containment facilities

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Related Publications

- *Emissions Management and Climate Resilience Act*
- Technology Innovation and Emissions Reduction Regulation
- Specified Gas Reporting Regulation
- Standard for Greenhouse Gas Emission Offset Project Developers
- Standard for Completing Greenhouse Gas Compliance and Forecasting Reports
- Technical Guidance for the Quantification of Specified Gas Emissions from Landfills
- Standard for Validation, Verification and Audit
- Alberta Greenhouse Gas Quantification Methodologies
- Quantification of Area Fugitive Emissions at Oil Sands Mines

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. Parts 2, 3, and 4 of the Standard for Developing Benchmarks set 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.

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) "aggregate facility" means a group of 2 or more conventional oil and gas facilities designated as an aggregate facility by the director under section 5 of the Technology Innovation and Emissions Reduction regulation;
- (d) "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.
- (e) "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;
- (f) "cogeneration" typically 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
- (g) "conventional oil and gas facility" means
 - (i) a facility for extracting, from an underground geological deposit or reservoir, gas, oil or primary bitumen,
 - (ii) a facility for processing gas,
 - (iii) a facility for the primary processing of oil or "primary bitumen,
 - (iv) a facility for disposing of waste, in an underground geological formation, resulting from an activity described in subclauses (i) to (iii),
 - (v) a facility for transporting, in a pipeline, gas, oil or primary bitumen, but does not include
 - A. any facility that constitutes a distribution system for the distribution of gas within a community to ultimate consumers, or
 - B. any facility for transporting oil, gas or primary bitumen across a provincial or international borderor
 - (vi) a facility for storing gas, oil or primary bitumen in the course of the gas, oil or primary bitumen being transported by a facility included in the definition in subclause (v) but does not include a large emitter;
- (h) "ethanol" means a mixture whose most abundant component is the organic compound with the molecular formula $\text{C}_2\text{H}_5\text{OH}$, 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;
- (i) "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;
- (j) "facility" means
 - 1) a plant, structure, thing or site, or
 - 2) any 2 or more contiguous or adjacent plants, structures, things or sites
 - A. that are operated and function in an integrated fashion, and
 - B. for which the same person is the person responsible,

where one or more activities listed in any of sections 2 to 11 of the Schedule of Activities to the Environmental Protection and Enhancement Act occur, including all the buildings, equipment, structures, machinery and vehicles that are part of the activity or activities;

- (k) “iso-octane” means an organic compound also known as 2,2,4-Trimethylpentane, with the chemical formula $(\text{CH}_3)_3\text{CCH}_2\text{CH}(\text{CH}_3)_2$, 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;
- (l) “industrial process emissions” means industrial process emissions as defined in Part 1 of the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports;
- (m) “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;
- (n) “live weight of cattle” means the mass of live animals entering a meat processing facility;
- (o) “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;
- (p) “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;
- (q) “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;
- (r) “Part 1” means the portion of this standard identified by the subtitle “Part 1 – Regulatory Details”;
- (s) “Part 2” means the portion of this standard identified by the subtitle “Part 2 – Policy Development and Benchmark Setting”;
- (t) “polyethylene” means a compound typically having the chemical formula of $(\text{C}_2\text{H}_4)_n$ 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);
- (u) “process unit” means the portion of a facility that is associated with the production of a product.
- (v) “Refining AB-CWB” means the AB-CWB for a refining facility;
- (w) “Regulation” means the Technology Innovation and Emissions Reduction Regulation;
- (x) “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;
- (y) “this standard” means the Standard for Developing Benchmarks, including the Introduction, Part 1, and Part 2;
- (z) “upgrading” means the processing of oil sands bitumen to create a feedstock for further refining;
- (aa) “Upgrading AB-CWB” means the AB-CWB for an upgrading facility;
- (bb) “useful hydrogen” means hydrogen generated at a facility excluding hydrogen that is combusted, or vented to the atmosphere.
- (cc) “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 CO₂e tonnes or more in 2018 or a subsequent year, or
 - (B) is likely to have direct emissions of 10,000 CO₂e 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 CO₂e 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;
 - (iii) where the person responsible is requesting confidentiality for any of the information included in the application, a completed Confidentiality Request and supporting documentation;
 - (iv) a completed Multisite Aggregation Application form published by the department, as amended from time to time, and
 - (v) 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 aggregate to which the conventional oil and gas facilities are to be added;
- (b) the contact information for the person responsible;
- (c) the location of each conventional oil and gas facility;
- (d) the boundary of each conventional oil and gas facility having direct emissions of 10,000 CO₂e tonnes or more in the previous year;
- (e) a certified statement confirming that each conventional oil and gas facility:
 - (i) is a conventional oil and gas facility,
 - (ii) has the same person responsible as the aggregate facility,
 - (iii) is a new or existing facility, and
 - (iv) has previously been part of an aggregate facility;
- (f) where the person responsible is requesting confidentiality for any of the information included in the application, a completed Confidentiality Request and supporting documentation;
- (g) a completed Aggregate Facility Change Form published by the department, as amended from time to time, and
- (h) 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 data related to the total regulated emissions of the aggregate facility;
- (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,
- (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; and
- (g) on-site transportation.

- (1) 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.
- (2) In determining the applicable quantification methodologies for an emission source listed in 9(1)(b), (d), (e), (f), and (g), the person responsible for a large emitter or opted-in facility must use the applicable level for that emissions source set out in Table 4 of Part 2 of the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports.
- (3) In determining the applicable quantification methodologies for stationary fuel combustion emissions, the person responsible for an aggregate facility must use the applicable level 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 compliance 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 of actuals 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 weighted mean sales price for each product produced by the facility and sold,
- (viii) 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.
- (1) 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.

- (2) 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) all benefits that the person responsible has applied for in respect of the large emitter or opted-in facility, under an initiative funded by the Government of Alberta, or an agency of the Government of Alberta, that has not yet been granted that would support capital and operating 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 12.3 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 January 1, 2021.

Part 2 - Regulated Facilities and Associated Designations

1 Overview

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”). There are three types of facilities regulated by TIER:

- Large Emitters,
- Opted-In Facilities, and
- Aggregated conventional oil and gas facilities

This document outlines the methods for developing benchmarks (facility-specific benchmarks, high-performance benchmarks, and cost containment allocation benchmarks) that apply to the production of goods and operation of processes at regulated facilities, including data sets and methodologies used for calculating benchmarks. It also outlines criteria for designation as an opted-in facility or aggregate facility, and the application process for these designations. Additional information about emissions scope and coverage, tightening rate, and the eligibility and application process for the cost containment program are also provided.

2 Large Emitters

The TIER Regulation replaced the Carbon Competitiveness Incentive Regulation on January 1, 2020. The Regulation automatically applies to facilities producing direct emissions of 100,000 carbon dioxide equivalent (CO₂e) tonnes or more per year in 2016 or any subsequent year.

3 Opted-in Facilities

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 3.2 of this standard.

3.1 Eligibility Criteria

Opt-in eligibility criteria are specified in section 4(4) of the regulation.

3.1.1 Direct Competition with a Regulated Facility

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 regulated under TIER. Note that any opted-in facility under the Carbon Competitiveness Incentive Regulation (CCIR) in 2019 was automatically designated as an opted-in facility under TIER for 2020-onwards. These facilities may apply to revoke the designation as an opted-in facility under the Regulation.

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 Government of Alberta's TIER 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	182112
Agroindustry	Biodiesel Fuel	261222
Agroindustry	Distilled Liquor	21113
Agroindustry	Malt	1821371
Agroindustry	Grain mill products	18212
Agroindustry/Chemical	Ethanol (Denatured)	261213 / 2711314
Chemical	Carbon Black	2711251
Chemical	Ethylene	2632111
Chemical	Ethylene Glycol	2711315
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
Chemical	Hydrogen Peroxide	2711284
Coal Mines	Bituminous Coal	144112
Coal Mines	Sub-bituminous Coal	144121
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	11111
Food Processing	Refined Sugar	182142
Forest Products	Newsprint	25121
Forest Products	Pulp	25112
Industrial Sand	Hydraulic Fracturing Sand (only)	1621221
Manufacturing	Fibreglass	291142
Metals	Cobalt	1552321
Metals	Nickel	1531111
Mineral	Cement	465111
Mineral	Lime	4651311
Mineral	Magnesium Oxide	2911441

Natural Gas Processing	Natural Gas	142 ¹
Natural Gas Processing	Natural Gas Liquids	143 ¹
Oil	Conventional crude oil	14111
Oil Sands	Bitumen	14112
Pipelines	Transportation of natural gas by pipeline	51111
Power Plant	Electricity	146
Refining	Refined Petroleum Products	261
Refining	Asphalt	262
Upgrading	Synthetic crude oil	14113

3.1.2 Emission-Intensive-Trade-Exposed Sector and Direct Emissions Threshold

A list of the emissions-intensive-trade-exposed sectors that include at least one facility that met or exceeded the 10,000 CO₂e tonnes threshold since 2018 are included in Table 2.

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 annual direct emissions of 10,000 CO₂e tonnes or greater may apply to be designated as an opted-in facility under TIER.

TABLE 2 may be updated from time to time.

TABLE 2: EMISSIONS-INTENSIVE-TRADE-EXPOSED SECTORS WITH AT LEAST ONE FACILITY ≥ 10,000 CO₂E TONNES^{2,3}

NAICS ⁴	Name
1114	Greenhouse, nursery and floriculture production (except cannabis)
2111	Oil and gas extraction
2121	Coal mining
2123	Non-metallic mineral mining and quarrying
2211	Electric power generation, transmission and distribution
3112	Grain and oilseed milling
3114	Fruit and vegetable preserving and specialty food manufacturing
3113	Sugar and confectionery product manufacturing
3119	Other food manufacturing
3121	Beverage manufacturing
3211	Sawmills and wood preservation
3212	Veneer, plywood and engineered wood product manufacturing

² Services are excluded from EITE consideration under opt-in.

³ This table may be updated from time to time to reflect updated EITE analysis for Alberta.

⁴ According to NAICS Canada 2017 Version 3.0.

3221	Pulp, paper and paperboard mills
3241	Petroleum and Coal Product Manufacturing
3251	Basic chemical manufacturing
3252	Resin, synthetic rubber, and artificial and synthetic fibres and filaments 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

In addition, persons responsible for any other facility that has, or is expected to have annual direct emissions of 10,000 CO₂e tonnes or greater 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.

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, as shown in Figure 1. Only sectors that are considered medium or higher EITE qualify as emissions-intensive-trade-exposed sectors under TIER.

Emission Intensity	>30% Very High	High	High	High	High
	15% - 30% High	Medium	High	High	High
	3% - 15% Medium	Medium	Medium	High	High
	1% - 3% Low	Low	Medium	Medium	Medium
	<1% Very Low	Low	Low	Low	Medium
		<10% Low	10% - 20% Medium	20% - 80% High	>80% Very High
Trade Exposure					

Figure 1: Emissions Intensity and Trade Exposure

Emissions intensiveness and trade exposure is measured using Statistics Canada and Trade Data Online for the value of emissions, gross valued added, and exports and imports by sector 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 2016. 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.

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

Emissions intensiveness measures the costs to a sector if exposed to full pricing on all emissions. The full carbon pricing costs are determined as a \$50 per tonne charge applied to estimates of direct emissions.

EITE criteria is established by sector, not product. If a facility exceeds the 10,000 CO₂e tonnes threshold and 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.

3.2 Application for Opted-in Facility Designation

The person responsible must follow these procedures to apply for an opted-in facility designation:

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 CO₂e tonnes in any year since 2017 or is expected to exceed 10,000 CO₂e 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 CO₂e tonnes in any year since 2017 or is expected to exceed 10,000 CO₂e 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 for all facilities having direct emissions of 10,000 CO₂e tonnes or more in the previous year.

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 department may reach out to the applicant to request additional information. Once the review is complete, the director will contact the applicant by letter indicating whether the facility is designated an opted-in facility.

3.3 Application for Revocation of Opted-in Designation

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. Applications must be received by September 1st of the year prior to the year the facility would like the regulation to no longer apply.

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.

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

4 Aggregate Facilities

4.1 Eligibility

There is no minimum emission threshold for a conventional oil and gas facility to be included in an aggregate facility. An aggregate facility has different treatment under the TIER Regulation 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.
 - The person responsible for an aggregate facility on January 1 of a compliance year remains responsible for the compliance obligation and reporting requirements for the full compliance year (January 1 to December 31) and should ensure access to the information required to fulfil this obligation for the remainder of the year. This remains true if the facility is sold, ceases operation or is decommissioned by the person responsible within a compliance year.
- Total regulated emissions for aggregate facilities are calculated according to subsection 13(4) of the Regulation.
- The annual tightening rate does not apply to facility specific benchmarks for aggregate facilities.
- Aggregate facilities submit a single annual compliance report for the aggregate facility, rather than a separate report for each individual conventional oil and gas facility within the aggregate facility.
- Aggregate facilities are not eligible to receive support under the TIER compliance cost containment program.
- High-performance benchmarks have not been set for aggregate facilities at this time.

The person responsible for a conventional oil and gas facility with annual direct emissions of less than 100,000 CO₂e tonnes has a choice to:

- not have the facility covered by TIER,
- apply for the facility to be designated as an opted-in facility under TIER (as per section 3.2 of this standard),
- apply for a designation of a new aggregate facility including that conventional oil and gas facility and at least one other conventional oil and gas facility, or
- apply to have the facility added to an existing aggregate facility.

4.2 Application for Aggregate Facility Designation

The person responsible for a group of two or more conventional oil and gas facilities may apply for those facilities to be designated as an aggregate facility under TIER using the following application process:

1. Complete the Multisite Aggregation Application Form provided on the Alberta Environment and Parks (AEP) TIER 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)w and 1(1)(k) of the TIER regulation,
 - b. List all individual conventional oil and gas facilities included in the application to comprise the aggregate facility and include 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 CO₂e tonnes or more in the previous year (guidance on creating a boundary file is included in a fact sheet on the Government of Alberta's TIER website).

The TIER regulation considers an individual facility to include all integrated components. Therefore, for the purposes of the application, multiple adjacent individual facilities working in an integrated manner, which have the same person responsible, should be grouped together as a single conventional oil and gas facility.

The grouping of multiple facilities (which may have unique Petrinex IDs) under a single conventional oil and gas facility is accomplished in the application form by using the same 'conventional oil and gas facility name' in the appropriate column of the application form for multiple Petrinex facilities. The name for the conventional oil and

gas facility can be the name of the primary Petrinex facility in the grouping or could be a new and unique identifier.

When grouping individual AER facilities from Petrinex under a single conventional oil and gas facility, it is recommended to adhere to the following guidance, where practically possible:

- When including a battery in a conventional oil and gas facility it will be understood that all wells linked to the battery are also part of the conventional oil and gas facility and therefore they do not need to be listed separately.
- A number of batteries in a relative physical proximity can be grouped into a single conventional oil and gas facility provided the facility IDs of the individual batteries have been stated.
- Facilities not in a physical proximity but connected through a pipeline could still be grouped under a single conventional oil and gas facility if they have a common person responsible and operate in an integrated way.
- Multiple facilities can be grouped, for example, as part of a gas gathering system, a custom treating facility or a tank terminal facility from Petrinex and declared as a TIER conventional oil gas facility, if the IDs of the individual facilities that the grouped facility is comprised of are provided.
- Injection facilities could be grouped under a waste plant linked to it, where practical.

The person responsible for the facility must submit the Multisite Aggregation Application electronically through Alberta's Electronic Transfer System (ETS) at <https://ets.energy.gov.ab.ca>. Multisite Aggregate Applications must be received by the director on or before December 1 of the year prior to the year the facility wishes to be subject to TIER.

Applications for multiple aggregate designations by the same person responsible should be submitted using one form per aggregate facility. If a person responsible does not have access to ETS, then they may contact the director to request an exemption to allow their Multisite Aggregate Application submitted to be electronically to AEP.GHG@gov.ab.ca prior to the applicable deadline.

As part of the review of the application, the department 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.

4.3 Amendments to Aggregate Facility Designation

4.3.1 Removing a Conventional Oil and Gas Facility from an Aggregate Facility

A person responsible for an aggregate facility may remove conventional oil and gas facilities 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 removed from the aggregate facility and the required information for each facility,
2. Sign the Aggregate Facility Change Form confirming the company desire to remove the facilities. The form must be signed by a certifying official who has the authority to bind the company that is the person responsible for the facilities 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,
3. Submit the Aggregate Facility Change Form electronically to AEP.GHG@gov.ab.ca.

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 are intended to be removed from the aggregate facility.

Note that the compliance obligation includes emissions and production for all facilities for the current full year, regardless of when the person responsible submits the form. The facility will be removed for the following compliance year.

As part of the review of the Aggregate Facility Change Form, the department may contact the applicant to request additional information. Once a review is complete, the director will notify the applicant whether the removal has been approved.

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

4.3.2 Adding a Conventional Oil and Gas Facility to an Aggregate Facility

A person responsible for an aggregate facility may add conventional oil and gas facilities to an existing aggregate facility using the following procedure:

2. 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,
 - c. Indicate whether the additional facilities are new facilities or have been previously regulated as part of another aggregate facility, and
 - d. Submit a facility boundary file in .kml or .kmz format for all facilities to be added having direct emissions of 10,000 CO₂e 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 added facilities. The form must be signed by a certifying official who has the authority to bind the company that is the person responsible for the facilities 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,
3. Submit the Aggregate Facility Change Form electronically to AEP.GHG@gov.ab.ca.

The person responsible must submit the Aggregate Facility Change Form on or before December 1 of the year in which the individual facilities are intended to be added to the aggregate facility.

Note that the compliance obligation includes emissions and production for all facilities for the full year, regardless of when the person responsible submits the form. As per to 5(3)(c) of the Regulation, only facilities that are not currently regulated under TIER may be added to the aggregate facility. Conventional oil and gas facilities that are currently opt-in facilities or part of another aggregate must first follow the processes outlines in sections 3.3 and 4.3.1 respectively. This process can be done in parallel with the process of adding a facility to an aggregate facility outlined in section 4.3.2.

As part of the review of the Aggregate Facility Change Form, the department may contact the applicant to request additional information. Once a review is complete, the director will notify the applicant whether the addition has been approved.

Upon approval of an application to add conventional oil and gas facilities to an aggregate facility, the director may assign a revised facility-specific benchmark to the aggregate facility or may request that the aggregate facility submit an updated facility-specific benchmark application. 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 want to use a facility-specific benchmark. Facility specific benchmark applications for the 2020 compliance year may be submitted on or before January 15, 2021.

4.4 Notice of Changes to Conventional Oil and Gas Facility

Events related to conventional oil and gas facilities that require an aggregate facility to submit a notice are listed in subsection 25(2) of the regulation. These events include but may not be limited to:

- Any change of the person responsible for an aggregate facility or for an individual conventional oil and gas facility that is part of an aggregate,
- If a conventional oil and gas facility that is part of an aggregate has direct emission of 100,000 tonnes of CO₂ equivalent or more in a single calendar year, or
- If a conventional oil and gas facility that is part of an aggregate has been decommissioned.

For any of these events, the person responsible for an aggregate facility must complete the TIER Notification Form provided on the Alberta Environment and Parks (AEP) website and submit it to AEP.GHG@gov.ab.ca. The department may contact the person responsible for the aggregate to request additional information about the notice.

Section 5(7) of the regulation describes certain events which will trigger automatic removal of a conventional oil and gas facility from the aggregate facility for the year following the year. The director will confirm in writing the removal of the individual conventional oil and gas facility to the person responsible of the aggregate. These events include:

- the conventional oil and gas facility ceases to be a conventional oil and gas facility,
- If a conventional oil and gas facility has direct emission of 100,000 tonnes of CO₂ equivalent or more in a single calendar year,
- the conventional oil and gas facility is decommissioned,
- the person responsible for the conventional oil and gas facility has changed unless the same change has occurred for all facilities in the aggregate, or
- the conventional oil and gas facility is designated as an opt-in facility.

4.5 Application for Revocation of Aggregate Facility Designation

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. Have the application signed by a certifying official who has the authority to bind the person responsible.
3. An electronic copy of the signed application must be submitted to the department.

The aggregate facility revocation application must be submitted electronically to AEP.GHG@gov.ab.ca. Separate applications are required for each aggregate facility. As indicated in section 5(10)(c) 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 contact 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.

5 Designation of Year of Commercial Operation for Large Emitters and Opted-in Facilities

Subsection 1(5) of the Regulation defines the year of commercial operation for a large emitter or opted-in facility. Subsections 1(6) through 1(10) establish 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.

5.1 New Facilities

Subsections 1(9) and 1(10) and sections 12 and 15 of the Regulation provide information on the treatment of new facilities. Subsection 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, and are never considered a new facility.

5.2 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.

5.3 Criteria for Appropriateness of Designation of Year of Commercial Operation

5.3.1 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, wastewater 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.

5.3.2 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 following, 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. That year may be designated 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.

5.4 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.

Part 3 - Methodologies for Developing Benchmarks

6 Overview

There are three general categories of benchmarks: facility-specific benchmarks, high-performance benchmarks, and compliance cost containment allocation benchmarks. Compliance cost containment allocation benchmarks may be assigned for facilities that have a cost containment designation. See Part 4, section 11 for details.

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

6.1 High-Performance Benchmarks

Under the TIER Regulation, 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 Schedule 2 of the TIER Regulation or through a Ministerial Order. Table A8 shows the high-performance benchmarks that have been developed or updated through a Ministerial Order but have not yet been added to the TIER regulation in an amendment. The AEP TIER website also has the latest published high-performance benchmarks. For products that have not been specified in the Regulation, facilities may request a high-performance benchmark. The requesting facility will be required to provide additional information to support the creation of a high performance benchmark.

In determining whether a high-performance benchmark is appropriate, subject to the availability of data, the department will assess the EITE status of the product category, taking into consideration the EITE criteria used to determine sector level EITE.

6.2 Facility-Specific Benchmarks

Every facility may be issued a facility-specific benchmark for products produced at the facility, with the exception of electricity, hydrogen and/or heat.

Facility specific benchmarks are assigned to individual products as set out in the regulation based on the historic performance of each facility. The Regulation is designed to accommodate production of multiple products at facilities. Where this is the case the historic total facility emissions will have to be allocated among the various products.

6.3 Cost Containment Benchmarks

Please refer to Part 4 of this Standard for information on cost containment benchmarks.

7 Emissions Scope for Benchmark Calculation for Large Emitters and Opted-In Facilities

7.1 Total Regulated Emissions

The calculation of total regulated emissions (TRE) is provided in subsection 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, on-site transportation emissions from fuels that are not subject to carbon pricing, venting, flaring, fugitives, formation CO₂, waste and wastewater emissions, and emissions from the use of HFCs, PFCs and SF₆.

7.2 Biomass Emissions

Biomass CO₂, CH₄, and N₂O emissions are generated from the combustion, decomposition, or fermentation of biomass from plant materials and animal waste.

Biomass CO₂ emissions are not included in direct emissions. As such, biomass CO₂ 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.

CH₄ and N₂O 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.

7.3 Industrial Process Emissions

Industrial Process 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.

For facilities using Alberta Complexity Weighted Barrel (AB-CWB) units, Industrial Process emissions are not specially treated in benchmark calculations. In order to allocate for Industrial Process emissions at levels approaching the 100%, hydrogen, the primary source of Industrial Process emissions in AB-CWB processes, is excluded from the quantification of AB-CWB product units. Emissions associated with useful hydrogen generation are addressed by using the hydrogen high-performance benchmark to reflect an appropriate level of Industrial Process allocations.

7.4 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 benchmark emissions when determining facility-specific benchmarks; indirect emissions associated with the import of hydrogen to a facility are included in the facility's benchmark emissions as well. 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. Hydrogen import to facilities that use Alberta Complexity Weighted Barrel units is an exception.

The Allowable Emissions calculation shown in section 9(1) of the regulation includes similar adjustments. Note that for facilities that use the Alberta Complexity Weighted Barrel units, the allowable emissions also includes the production of useful hydrogen multiplied by the hydrogen high-performance benchmark. To clarify, the allowable emissions formula for facilities that use Alberta Complexity Weighted Barrel units is the following:

$$AE = \sum_{i=1} (AR_{i-Y} \times P_i) + (HPB_{Hy} \times P_{Hy}) - ((HPB_{E-Y} \times I_E) + (HPB_{IHe} + I_{He}))$$

Where,

All the terms are defined in the Regulation and

P_{Hy} is the useful hydrogen generated or produced on-site. This excludes hydrogen vented or combusted.

7.5 Cogeneration (Stand-Alone and Integrated)

Emissions associated with a cogeneration system that is an integrated part of a facility covered under TIER are included in the determination of a facility's TRE. In benchmarking calculations however, facilities' cogeneration emissions are removed from TRE, and the "indirect" 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 cogeneration and facilities that make use of imported heat and electricity from a merchant cogeneration or another source.

In compliance calculations, facilities receive allocations associated with exports of electricity, hydrogen, and industrial heat, as shown in subsection 9(1) of the Regulation. See section 4 of the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports for more information on the compliance calculations.

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 self-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 cogeneration provides the cogeneration recognition and no facility-specific benchmarking exercise is required.

Integrated cogeneration occurs in a facility that produces regulated products other than industrial heat and electricity. The on-site emissions from such a facility would be higher than emissions from a facility that makes the same regulated products with imported industrial heat and electricity. This is taken into account in the facility-specific benchmarking formula to prevent a punitive treatment and instead provide recognition of cogeneration.

7.6 Fugitive Emissions

Fugitive emissions for all large emitter and opted-in facilities 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.

8 Benchmark Setting

8.1 High Performance Benchmarks

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 8.1.1. For sectors with less than or equal to 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 a regulated 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 generally follow the methodology used to determine existing high-performance benchmarks in TIER.

The director may consider departures from this approach where necessary to account for facility or sector specific circumstances. In these cases, the director will communicate the rationale to the affected facilities.

The hydrogen, heat and electricity benchmarks are exceptions to this approach, and remain the same as under the Carbon Competitiveness Incentive Regulation.

Oil sands high performance benchmarks (mining and upgrading) are also an exception as additional stringency is being applied beyond historic best performance.

8.1.1 Development of High Performance Benchmarks

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

For products not using Alberta Complexity Weighted Barrel units:

$$EI_{j,k} = \frac{1}{\sum_{B=1}^n P_{j,k-B}} \times \sum_{B=1}^n (TRE_{j,k-B} - EE_{j,k-B} + E_{heat\ used,j,k-B} + E_{H2\ used,j,k-B} + E_{electricity\ used,j,k-B})$$

For products using Alberta Complexity Weighted Barrel units:

$$EI_{j,k} = \frac{1}{\sum_{B=1}^n P_{j,k-B}} \times \sum_{B=1}^n (TRE_{j,k-B} - EE_{j,k-B} + E_{heat\ used,j,k-B} - E_{H2\ generated,j,k-B} + E_{electricity\ used,j,k-B})$$

Where:

- $EI_{j,k}$ is the emissions intensity for product j at each top ten percent performing facility, k.
- j is a regulated product produced at a facility for which a benchmark is being calculated.
- k is a facility performing in the top ten percent of a sector producing product j.
- B is a benchmarking year during the high performance benchmark-setting reference period.
- n is the number of benchmarking year(s) in the high performance benchmark-setting reference period.
- $P_{j,k-B}$ is the amount of production of product j by a facility k performing in the top ten percent of a sector in benchmarking year B.
- $TRE_{j,k-B}$ is the portion of total regulated emissions that has been allocated to product j by a facility k performing in the top ten percent of a sector in benchmarking year B.
- $EE_{j,k-B}$ is the emissions from fossil fuel combustion and CH₄ and N₂O from biomass attributable to self-generation of electricity for product j by a facility k performing in the top ten percent of a sector in benchmarking year B. In facilities where cogeneration is utilized, these are cogeneration emissions from the combustion of fossil fuel, and CH₄ and N₂O emissions from biomass combustion.
- $E_{heat\ used,j,k-B}$ is the emissions associated with the cogenerated and net imported heat used in the making of product j by a facility k performing in the top ten percent of a sector in benchmarking year B.
- $E_{H2\ used,j,k-B}$ is the offsite emissions associated with the hydrogen used in the making of product j by a facility k performing in the top ten percent of a sector in benchmarking year B.
- $E_{H2\ generated,j,k-B}$ is the emission associated with the amount of useful hydrogen generated or produced on-site in making of product j by a facility k performing in the top ten percent of a sector in benchmarking year B.

$E_{electricity\ used,j,k-B}$ is the emissions associated with the electricity used in the making of product j by a facility k performing in the top ten percent of a sector in benchmarking year B.

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

Where:

- HPB_j is the high-performance benchmark for product j.
- $EI_{j,k}$ is the emissions intensity for product j at each top ten percent performing facility, k.
- Q is the number of facilities producing product j, divided by ten, and rounded up.

8.1.2 Benchmark Years for Developing High-Performance Benchmarks

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.

8.2 Facility Specific Benchmarks

The director may assign facility-specific benchmarks to one or more products of a facility.

Facility specific benchmarks do not apply to electricity, industrial heat or hydrogen.

For facility-specific benchmarks, a facility-specific emission intensity reduction target will be applied, starting in 2020 at 10% such that facility-specific benchmarks will be set at 90% of production weighted average emissions intensity for non-IP emissions. The reduction target will increase at 1% per year resulting in reduction targets of 11% in 2021, 12% in 2022, and so forth. Facility-specific benchmarks are calculated using the formulas in Part 3, section 9.2.4 of this standard.

Oil sands facility-specific benchmarks (mining and upgrading) have had an increased emission intensity reduction target applied for 2021 and subsequent years. This represents a 17% target for 2021 tightening in subsequent years as discussed in section 8.5. For new facilities, the facility-specific benchmark will start at 95% production-weighted average emissions intensity for non-IP emissions, for the third year of commercial operation. See Part 2, section 9.2.2 of this standard for more information on the application process for a benchmark as a new large emitter or opted-in facility.

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

8.2.1 Application for a Facility Specific Benchmark

A person responsible for a facility may apply for a facility-specific benchmark under TIER, as per Section 7(2) of the regulation. This section provides additional guidance on the requirements, approach and application to facility-specific benchmarking under TIER.

The director may consider varying the facility-specific benchmark approach 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.

1. 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. Verified 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 department 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.

The Standard for Completing Compliance and Forecasting Reports provides requirements related to quantification methodologies and the 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.

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).

8.2.2 New Facility

As per sections 12(1), 15(1) and 36(7) of the TIER regulation, 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:

- 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.
- 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 calculation procedures for setting facility-specific benchmarks at new facilities are similar to those employed for setting facility-specific benchmarks for existing facilities. The reduction target (RT_y) for a facility in year three of commercial operation is reduced to 5%, reflecting the expectation that equipment in a new facility should be using updated technology with higher emissions efficiency compared to equipment in TIER facilities that are already operating. Rules on applying for benchmarks for new entrants to TIER are reflected in Part 2, section 5 of this standard.

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.

8.2.3 Existing Facility

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

- A facility may receive a facility-specific benchmark based on 2013 to 2015 performance data according to Part 3, sections 8 if the product was produced in that period.
- If the product is newly being produced by the facility, more recent time periods may need to be used.
- The full reduction target of the compliance year would apply in setting the facility-specific benchmarks.

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).

8.2.4 Aggregate Facility

Facility specific benchmarks may also be assigned to aggregate facilities based on historic performance of the aggregate. Typically, a benchmark will be assigned for a single product unless circumstances require a multiple product approach for specific aggregates.

Aggregate facilities are made up of individual conventional oil and gas facilities and the facility specific benchmark for the aggregate is developed as follows:

$$FSB = \frac{\sum_{c=1}^r \sum_{y=1}^z E_{SFC_{c,y}} + E_{CO2_{c-y}}}{\sum_{c=1}^r \sum_{y=1}^z P_{c,y}} \times (1 - RT)$$

Where:

<i>FSB</i>	is the facility specific benchmark for an aggregate facility
<i>c</i>	is an individual conventional oil and gas facility that is part of an aggregate facility
<i>y</i>	is the benchmarking year for each individual facility
<i>r</i>	is the number of individual conventional oil and gas facility that is part of an aggregate facility
<i>z</i>	is the number of benchmarking years for each individual facility
<i>E_{SFC_{c,y}}</i>	is the stationary fuel combustion emissions of a facility <i>c</i> for benchmarking year <i>y</i> in CO _{2e} tonnes
<i>E_{CO2_{c-y}}</i>	is the net export CO ₂ of captured stationary fuel combustion emissions for each individual facility, <i>c</i> for each benchmarking year <i>y</i> in CO _{2e} tonnes
<i>P_{c,y}</i>	is the quantity of benchmark units of a facility <i>c</i> in benchmarking year <i>y</i>
<i>RT</i>	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 CO₂ by product and are asked to contact the department. Please refer to the Quantification Methodologies Document for more details on how to determine the stationary fuel combustion emissions and the quantity of benchmark units.

8.2.5 Indirect Emissions

In order to provide facility-specific benchmarks to facilities that do not favour one business model over another, emissions associated with imported electricity, heat and hydrogen must be taken into account. Under the TIER approach, self-generation of electricity including cogeneration is functionally separated and treated as its own facility external to other production processes. The following formulas are illustrative of how the quantities used or consumed can be determined for large emitters and opt-in facilities (expressed on an emissions basis).

$$E_{heat\ used} = (H_{cogeneration} + H_{import} - H_{export}) \times HPB_{heat} \quad \text{if natural gas or other fossil fuel}$$

$$E_{heat\ used} = D_h + (H_{import} - H_{export}) \times HPB_{heat} \quad \text{if biomass fuel is used or SGER data is used}$$

$$E_{\text{electricity used}} = (Elec_{\text{self-generated}} + Elec_{\text{import}} - Elec_{\text{export}}) \times HPB_{\text{electricity}}$$

$$E_{H2 \text{ used}} = (H2_{\text{import}} - H2_{\text{export}}) \times HPB_{\text{hydrogen}} \quad \text{if regulated product is not in AB-CWB units}$$

$$E_{H2 \text{ generated}} = H2_{\text{generated}} \times HPB_{\text{hydrogen}} \quad \text{if regulated product is in AB-CWB units}$$

Where:

$E_{\text{heat used}}$	is the emissions associated with the cogenerated and net imported heat used in the making of a product at the facility.
D_h	is the deemed heat emissions attributable to the combustion of fossil fuels and CH ₄ and N ₂ O from biomass at a facility, a representation of emissions associated with the production of heat used in the making of a product through cogeneration.
$H_{\text{cogeneration}}$	is the net useful heat produced at the facility through 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.
HPB_{heat}	is the high-performance benchmark for heat.
$E_{\text{electricity used}}$	is the emissions associated with the electricity used in the making of a product at the facility.
$Elec_{\text{self-generated}}$	is the electricity generated at the facility net of any station load.
$Elec_{\text{import}}$	is the electricity imported across the facility boundary, that is, electricity that was generated outside of the facility boundary.
$Elec_{\text{export}}$	is the electricity exported from the facility by being moved outside of the facility boundary.
$HPB_{\text{electricity}}$	is the high-performance benchmark for electricity.
$E_{H2 \text{ used}}$	is the offsite emissions associated with the hydrogen used in the making of a product at the facility
$E_{H2 \text{ generated}}$	is the emission associated with the amount of useful hydrogen generated or produced on-site in making of a product at the facility.
$H2_{\text{import}}$	is the hydrogen imported across the facility boundary, that is, hydrogen that was generated outside of the facility boundary.
$H2_{\text{export}}$	is the hydrogen exported from a facility by being moved outside of the facility boundary.
$H2_{\text{generated}}$	is the useful hydrogen generated or produced on-site.
HPB_{hydrogen}	is the high-performance benchmark for hydrogen.

For facilities where the AB-CWB is used, emissions from hydrogen production will be deducted from the benchmark and credited in the compliance year at the high-performance benchmark rate for hydrogen.

8.2.6 Large Emitters and Opted-In Facilities

To calculate a facility-specific benchmark for a particular year Y for each regulated product j, aside from electricity, heat, hydrogen and Alberta Complexity Weighted Barrel products, the following equations are used:

$$FSB_{j,Y} = FSB_{tightening,j} \times (1 - RT_Y) + FSB_{non-tightening,j}$$

Where:

$FSB_{j,Y}$	is the facility-specific benchmark for product j for the year Y.
j	is a regulated product produced at a facility for which a benchmark is being calculated
Y	is the year that the facility-specific benchmark is calculated for.
$FSB_{tightening,j}$	is the portion of the facility-specific benchmark for product j that is subject to the reduction target.
$FSB_{non-tightening,j}$	is the portion of the facility-specific benchmark for product j that is not subject to the reduction target.
RT_Y	is the reduction target for the year, Y, and it increases with time. For existing facilities, $RT_Y = 0.10 + 0.01 \times (Y-2020)$ For new facilities whose third year of commercial operation is after 2020, RT_Y is 0.05 in the third year of commercial operation and will increase by 0.05 for every subsequent year until it reaches the normal reduction target (and the last increase can be less than 0.05).

$$FSB_{tightening,j} = \frac{1}{\sum_{F=1}^g P_{j-F}} \times \sum_{F=1}^g TRE_{j-F} - IP_{Generated,j-F} - EE_{j-F} + E_{heat\ used,j-F} + E_{H2\ used,j-F}$$

$$FSB_{non-tightening,j} = \frac{1}{\sum_{F=1}^g P_{j-B}} \times \sum_{F=1}^g IP_{Generated,j-F} + E_{electricity\ used,j-F}$$

Where:

P_{j-F} is the amount of production by a facility of product j in the benchmarking year F.

F	is a benchmarking year during the facility-specific benchmark-setting reference period.
g	is the number of benchmarking year(s) in the facility-specific benchmark-setting reference period.
TRE_{j-F}	is the portion of total regulated emissions of a facility that has been allocated to product j in benchmarking year F .
$IP_{Generated,j-F}$	is the quantity of specified gas generated from an industrial process source for product j in benchmarking year F , per the below equation.

$$IP_{Generated,j-F} = IP_{Emitted,j-F} + IP_{Export,j-F} + IP_{Urea,j-F}$$

Where,

$IP_{Emitted,j-F}$ is the industrial process emissions to atmosphere, as defined in Part 1 of the Standard for Completing Greenhouse Gas Compliance and Forecasting Reports, for product j in benchmarking year F .

$IP_{Export,j-F}$ is any CO₂ from an industrial process source that is captured and exported from the facility, for product j in benchmarking year F .

$IP_{Urea,j-F}$ is any CO₂ from an industrial process source that is captured and used as a feedstock for the production of urea, for product j in benchmarking year F .

EE_{j-F}	is the emissions from fossil fuel combustion and CH ₄ and N ₂ O from biomass attributable to self-generation of electricity for product j in benchmarking year F . In facilities where cogeneration is utilized, these are cogeneration emissions from the combustion of fossil fuel, and CH ₄ and N ₂ O emissions from biomass combustion.
$E_{heat\ used,j-F}$	is the emissions associated with the cogenerated and net imported heat used in the making of product j at the facility in benchmarking year F as set out in 8.2.5.
$E_{H2\ used,j-F}$	is the offsite emissions associated with the hydrogen used in the making of product j at the facility in benchmarking year F as set out in 8.2.5.
$E_{electricity\ used,j-F}$	is the emissions associated with the electricity used in the making of product j at the facility in benchmarking year F as set out in 8.2.5.

Consideration of on site generation in setting facility-specific benchmarks will typically occur when EE over the benchmark years exceeds the lesser of 2 per cent of TRE or 5,000 tonnes average per year or where non-emitting on site generation is used. The variables which capture on site generation are EE, $E_{heat\ used}$ and $E_{electricity\ used}$.

Emissions data for the benchmark years are attributed to products where facilities produce more than one product. In this treatment each production process can be thought of as its own facility including a distinct facility for cogeneration or self-generation. Emissions are divided between the products of a facility based on a methodology approved by the director. Where facilities produce more than one product, other than electricity, heat or hydrogen, emissions data are attributed to individual products under the following constraints:

$$TRE_F = \sum_{j=1}^m TRE_{j-F}$$

$$IP_{Generated,F} = \sum_{j=1}^m IP_{Generated,j-F}$$

$$EE_F = \sum_{j=1}^m EE_{j-F}$$

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

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

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

Where:

m	is the number of products produced at the facility.
TRE_F	is the total regulated emissions of a facility in benchmarking year F.
$IP_{Generated,F}$	is the total quantity of specified gas generated from an industrial process source at a facility in benchmarking year F.
EE_F	is the total emissions from fossil fuel combustion and CH ₄ and N ₂ O from biomass attributable to self-generation of electricity in benchmarking year F. In facilities where cogeneration is utilized, these are cogeneration emissions from the combustion of fossil fuel, and CH ₄ and N ₂ O emissions from biomass combustion.
$E_{heat\ used,F}$	is the total emissions associated with the heat used at the facility in benchmarking year F, not including the heat from a conventional boiler in the facility.
$E_{H2\ used,F}$	is the total offsite emissions associated with the hydrogen used at the facility in benchmarking year F.
$E_{electricity\ used,F}$	is the total emissions associated with the electricity used at the facility in benchmarking year F.

8.2.7 Upgrading and Refining Facilities

To calculate a facility-specific benchmark of a particular year Y, when product j is the Alberta Complexity Weighted Barrel, the following equations are used:

$$FSB_{j,Y} = FSB_{tightening,j} \times (1 - RT_Y) + FSB_{non-tightening,j}$$

$$FSB_{tightening,j} = \frac{1}{\sum_{F=1}^g P_{j-F}} \times \sum_{F=1}^g TRE_{j-F} - EE_{j-F} + E_{heat\ used,j-F} - E_{H2\ generated,j-F}$$

$$FSB_{non-tightening,j} = \frac{1}{\sum_{F=1}^g P_{j-F}} \times \sum_{F=1}^g E_{electricity\ used,j-F}$$

Where,

All terms are previously defined in section 8.2.6 of this standard (where product j is the Alberta Complexity Weighted Barrel), and

$E_{H2\ generated,j-F}$	is the emission associated with the amount of useful hydrogen generated or produced on-site in the making of product j at the facility in benchmarking year F as set out in 8.2.5.
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8.3 Updates to benchmark

Section 7(6) of the regulation sets out the conditions under which facility specific benchmarks will be reviewed. The person responsible for the facility may apply to have a benchmark reviewed before September 1st of the year they would like the updated benchmark to apply.

8.4 Benchmark Reference Years for Developing Facility-Specific Benchmarks

For currently regulated large emitter 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 alternative years for benchmark setting, where appropriate.

For facilities which are not new but have just opted-in to the TIER the most recent three operating years will typically be used.

For new facilities, except for electricity facilities, cogeneration facilities or hydrogen producers, the facility-specific benchmarks will typically 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
1 st Partial year & 1 – 2 nd year	Year(s) prior to being subject to compliance.	<ul style="list-style-type: none"> No compliance requirements.
3 rd year	First year that the facility is subject to compliance.	<ul style="list-style-type: none"> The facility-specific benchmark is set using the emission and production data from year 2 of commercial operation as the benchmark reference year.
4 th year	Second year that the facility is subject to compliance.	<ul style="list-style-type: none"> 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.
5 th and subsequent years	Third and additional years that the facility is subject to compliance.	<ul style="list-style-type: none"> 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 these benchmark years 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).

8.5 Tightening

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. For example the 10% reduction target in 2020 will become 11% for 2021. Oil sands facility-specific benchmarks will tighten at 1% per year starting at a level of 17% in 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, emissions associated with electricity usage, or industrial process emissions. It also does not apply to any CO₂ from an industrial process source that is captured and exported from the facility, or used as feedstock for the production of urea.

8.6 Cost Containment Benchmarks

Information on cost containment benchmark setting is found in Part 4 of this Standard.

9 Specific Product Considerations

9.1 Electricity Facilities

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 3, Section 8.2.2 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 benchmark.

Electricity facilities are not eligible for facility-specific benchmarks.

9.2 Aggregate Facilities

9.2.1 Benchmark Unit

The product(s) and benchmark unit(s) for an aggregate facility must be representative of the aggregate facility's composition, configuration and emissions. Chapter 15 of the Alberta Greenhouse Gas Quantification Methodologies, which is updated from time to time, contains information on how to determine the product(s) and benchmark(s) for an aggregate facility.

Aggregate facilities may select a benchmark unit using one of the following two approaches:

- The person responsible for an aggregate facility may request to utilize the production, disposition or receipts of specified energy products, or
- The person responsible for an aggregate facility may propose an alternative benchmark unit following the process outline in Chapter 15 of the Alberta Greenhouse Gas Quantification Methodologies.

Selection of benchmark units will be captured in the Facility Specific Benchmark Application forms. The person responsible must submit the Aggregate Facility Specific Benchmark Application Form on or before September 1 of the year in which the benchmark will be in effect for the aggregate facility. Note that for the 2020 compliance year, the aggregate facility specific benchmark application is not required.

9.2.2 Benchmark Reference Years

For the purpose of establishing a facility specific benchmark (FSB) for an aggregate facility for the 2021 compliance year and onward an aggregate facility can choose to use any two or three benchmark reference years from a consecutive three year period, starting with the year prior to being accepted into TIER.

During the benchmark setting period, the FSB is re-calculated annually by adding data from subsequent years until all the facility selected years have been included. Once all benchmark reference years have been incorporated, the FSB applies for all subsequent compliance years.

Default Approach – Aggregate Facilities with First TIER Compliance Year in 2020

For aggregates that entered TIER in 2020, the default first benchmark reference year for 2021 compliance onward will be the year used as the benchmark year for 2020 compliance. More specifically:

- Aggregates that elected to have 2019 as the benchmark reference year for 2020 compliance will, by default, have 2019 and 2020 as benchmark reference years for 2021 and have a three year benchmark for 2022 and onward, with 2019, 2020 and 2021 as the benchmark reference years.
- Aggregates that elected to have 2020 as the benchmark year for 2020 compliance will, by default, have 2020 as a benchmark reference year for 2021 and have a two year benchmark for 2022 and onward, with 2020 and 2021 as the benchmark reference years.

Alternative Approach (voluntary) - Aggregate Facilities with First TIER Compliance Year in 2020

Alternatively, aggregate facilities that entered the TIER program in 2020 may choose two or three reference years within a consecutive three year period, beginning with the year prior to the first year registered under TIER (2019), to form the benchmark reference years. To accommodate such requests, the *Aggregate Facility Reference Years Notification Form* must be submitted to the department by September 1 of the year to which the benchmark is to apply.

For example - an aggregate facility accepted into the TIER program for 2020 compliance year would have the following benchmark options:

FIGURE 2 – BENCHMARK REFERENCE YEAR OPTIONS FOR AN AGGREGATE FACILITY REGULATED UNDER TIER IN 2020

Selected reference years:	2019, 2020, 2021	2019, 2020	2019, 2021	2020, 2021
For 2021 compliance use:	2019, 2020	2019, 2020	2019	2020
For 2022 compliance year and onward use:	2019, 2020, 2021	2019, 2020	2019, 2021	2020, 2021

Submission of third-party verified data is required for each reference year comprising a facility benchmark. Verified annual data that has already been submitted, as part of a previously submitted annual TIER compliance report or TIER benchmark application, will not need to be resubmitted or be required to undergo further verification.

Aggregate facilities wishing to include 2019 year as a reference year, unless already submitted, must provide third-party verified 2019 data by Dec 1, 2021.

Aggregate Facilities with First Compliance Year in 2021 or Later

For aggregate facilities that entered TIER in 2021 for the first time, the first reference year for 2021 compliance will be 2020 unless one of the following exceptions apply:

- The aggregate facility was not operating in the year preceding its first compliance year.
- There is no sufficient period of representative operation in the year preceding its first compliance year.
- The year preceding the first year of compliance is significantly unusual such that it does not represent the aggregate facility’s typical performance.

Should any of the exceptions above be applicable for an aggregate facility, the *Aggregate Facility Reference Years Notification Form* must be submitted to the Department by September 1 of the year for which the benchmark is to be applied.

9.3 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) refining methodology was developed specifically for the Canadian Fuels Association. 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 Alberta Greenhouse Gas Quantification Methodologies. Department will also make available a workbook to help in the CWB calculations. The person responsible for a facility must ensure they are using the most up to date version of this document and workbook.

With the new approach to setting high performance benchmark and facility specific benchmarks for upgraders and refineries, the CWB factor for hydrogen production processes will be set to zero and hydrogen will be treated as a separate product using the hydrogen high performance benchmark. This will maintain a consistent and fair treatment of hydrogen production across all sectors. In addition, the imported indirect hydrogen will not be scope adjusted for products with CWB as its benchmark unit.

9.4 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
- CO₂ Plant
- Flaring, Venting, Fugitives

Specified gas emission potential in CO₂e 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.

The methodology for quantification of the ABGPI, including the weighting factors for each module, are 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. An additional tab is included in the annual compliance reporting form to assist in these calculations.

9.4.1 Formation CO₂ at Gas Plants

Emissions of formation CO₂ are included in total regulated emissions and in the setting of individual facility specific benchmarks for gas processing facilities.

9.4.2 Cavern Storage at Gas Plants

Due to the small number of sites at which cavern storage is featured it is not being included within the Alberta Gas Processing Index. Gas plants which include cavern storage may apply for and be assigned a facility specific benchmark for the cavern storage activity as a distinct product under the regulation.

Part 4 - Cost Containment Program

10 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.

Facilities considering applying for a cost containment designation are strongly encouraged to assess the associated administrative costs prior to making an application. 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 4, section 11.2 of this standard.

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

10.1 Economic Hardship Criteria

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

- Compliance costs as defined in Part 4, section 11.1.2 exceed 3% of facility sales revenues for a facility in a sector whose trade-exposure is designated as high or very high.
- Compliance costs as defined in Part 4, section 11.1.2 exceed 10% of facility profits for a facility in a sector whose trade-exposure is designated as high or very high.

10.1.1 Economic Hardship Attributable to the TIER Regulation 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 4, sections 11.1.3 and 11.1.4, respectively, of this standard.

Sectors with low or medium trade exposure are assumed to have high cost pass through and are therefore 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 11.1.3 and 11.1.4 of Part 4.

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.

10.1.2 TIER Regulation 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.

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

Where,

$\text{FC Price}_{\text{TIER-Y}}$ 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.

$\text{TrueUp Obligation}_{\text{TIER-Y}}$ is the true-up obligation as defined in the Regulation, for the facility for year Y.

$\Delta\text{Tax}_Y = (\text{TrueUp Obligation} \times \text{FC Price})_{\text{TIER-Y}} \times \text{Tax Rate}_Y$, where Tax Rate are the percentages listed in Table A7 of Appendix A.

$\Delta\text{Royalty}_Y$ 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 facility in year Y.

Y is the year in which the compliance cost is being estimated or determined.

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

10.1.3 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.

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

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.

$\text{P}_{\text{Sold},i-Y,m}$ is the amount of product i sold by the facility in year Y at a given sales price (benchmark unit).

$\text{Sales Price}_{i-Y,m}$ 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.

10.1.4 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:

$$FPR_Y = \frac{Compliance\ Cost_{TIER-Y}}{\sum_i \sum_m (P_{sold} \times Sales\ Price \times PM)_{i-Y,m}}$$

Where,

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

$PM_{i-Y,m}$ 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.

10.1.5 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,

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

10.1.6 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 4, sections 11.1.3 and 11.1.4, 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 consist 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.

10.1.7 Significant Figures

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

10.2 Application for Cost Containment Designation

The person responsible for a facility should provide notice of intent to the department 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.

10.3 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.

10.3.1 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:

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

Where,

CFV _Y	is the total compliance flexibility valuation (CFV) assessed for additional compliance flexibility granted to a facility with a cost containment designation (\$ in year Y);
CU _Y	is the facility's credit usage (CU), which represents the greater of the CUL _Y and the ratio of forecast use 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.
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 Obligation_{TIER-Y} have the same definition as in section 11.1.2 of Part 4 of this standard.

For the purpose of determining compliance cost containment allocation benchmark eligibility, a certified forecast of compliance flexibility utilization must be submitted as part of Compliance Cost Containment Allocation Benchmark Application, detailed in section 11.1, in the form and manner prescribed by the director.

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.

11 Compliance Cost Containment Benchmark

11.1 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 12.3.

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.

11.2 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 according to the following formula:

$$\text{BCCA Eligibility FSR}_Y = \frac{[\text{Compliance Cost}_{\text{TIER-Y}} - \text{CFV}_Y - \text{GOAFunding}_Y]}{\sum_i \sum_m (\text{P}_{\text{Sold}} \times \text{Sales Price})_{i-Y,m}}$$

$$\text{BCCA Eligibility FPR}_Y = \frac{[\text{Compliance Cost}_{\text{TIER-Y}} - \text{CFV}_Y - \text{GOAFunding}_Y]}{\sum_i \sum_m (\text{P}_{\text{Sold}} \times \text{Sales Price} \times \text{PM})_{i-Y,m}}$$

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 4, section 11.1.3 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 4, section 11.1.4 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-Y} has the same meaning as in section 11.1.2; P_{sold} and Sales Price have the same meaning as in section 11.1.3; PM has the same meaning as in section 11.1.4; and CFV_Y has the same meaning as in section 11.3.

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

11.3 Determination of Compliance Cost Containment Allocation Benchmark (BCCAs)

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

1. A compliance cost containment allocation benchmark (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-Y} calculated under this section for a product is zero or a negative value, 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 $BCCA_{t-Y}$ 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:

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

$$A_n(\$) = \text{Actual Compliance Cost}_{Yn} - 0.03 \times \sum_i \sum_m (P_{\text{Sold}} \times \text{Sales Price})_{i-Y,m} - CFV_{Yn} - \text{GOAFunding}_Y$$

$$B_n(\$) = \text{Actual Compliance Cost}_{Yn} - 0.1 \times \sum_i \sum_m (P_{\text{Sold}} \times \text{Sales Price} \times \text{PM})_{i-Y,m} - CFV_{Yn} - \text{GOAFunding}_Y$$

$$C_n(\$) = \text{MAXIMUM}(A_n, B_n)$$

where,

Actual Compliance Cost_{Yn}

is the nth iterative estimate of compliance cost for the facility in year Y determined using the equation in Part 2, section 10.1.2 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.

CFV_{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);

P_{i-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 9(1) of the Regulation; P_{sold} and Sales Price have the same meaning as in section 11.1.3; PM has the same meaning as in section 11.1.4; CUL_Y has the same meaning as in section 11.3.1; and GOAFunding_Y has the same meaning as in section 12.2.

BCCA values determined using the equations above must also satisfy the following condition 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:

$$\sum_l (BCCA_{t-Y} \times P_l) \leq TRE - \sum (AR_{i-Y} \times P_i) + ((BHPE_{-Y} \times IE) + (BHPH_{y-Y} \times IH_y) + (BHPIHe_{-Y} \times IHe))$$

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

11.4 Significant Figures

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.

12 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 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.
- 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.
- 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.

12.1 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:

X John Storey-Bischoff

Date: December 8, 2021

Signed by: John.Storey-Bischoff

Acting Executive Director,
Climate Regulation and Carbon Markets Branch,
Policy Division

Appendix A

TABLE A1: SECTORS EVALUATED BASED ON NAICS CODES (BASED ON 2016 DATA)^{5,6,7}

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

⁵ NAICS codes were evaluated in the groupings for which data available from Statistics Canada based on NAICS Canada 2016. 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.

⁶Four- five- and six-digit NAICS subsector codes are nested within the listed codes were included in EITE analysis.

⁷ 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 ³ m ³	0.03304	tCO _{2e} / e ³ m ³
2	Dehydration	throughput	e ³ m ³	0.00247	tCO _{2e} / e ³ m ³
3	Gas Sweetening	throughput	e ³ m ³	0.03040	tCO _{2e} / e ³ m ³
4	Total Refrigeration	throughput	e ³ m ³	0.01835	tCO _{2e} / e ³ m ³
5	Fractionation	production	m ³ OE	0.04141	tCO _{2e} / m ³ OE
6	Stabilization	production	m ³ OE	0.05537	tCO _{2e} / m ³ OE
7	Sales Compression	throughput	e ³ m ³	0.02135	tCO _{2e} / e ³ m ³
8	Sulphur Plant	production	tSulphur	0.4249	tCO _{2e} / tSulphur
9	Acid Gas Injection	throughput	e ³ m ³ Acid Gas	0.3960	tCO _{2e} / e ³ m ³ Acid Gas
10	Ethane Extraction	production	m ³ OE	0.1251	tCO _{2e} / m ³ OE
11	CO ₂ Plant	throughput	e ³ m ³ CO ₂	0.1881	tCO _{2e} / e ³ m ³ CO ₂
12	Flaring, Venting, Fugitives	production	m ³ OE	0.004452	tCO _{2e} / 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 ³ m ³	0.971	-
C1MX	Methane Mix	e ³ m ³	0.971	-
LITEMX	Lit Mix	e ³ m 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
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:

- m³OE conversion factors derived from Higher Heating Values (HHV) based on 38.5 GJ/m³ 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 SECTOR8 (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

TABLE A5: TIER FUND PRICE ASSUMPTIONS

Year	TIER Fund Price (\$ per CO ₂ e tonne)
2020	\$30
2021	\$40
2022	\$50 ⁹
2023	\$50 ⁹
2024	\$50 ⁹
2025	\$50 ⁹

⁸ 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.

⁹ The price increase to \$50/tonne CO₂e reflected in table A5 is subject to Ministerial approval and order.

TABLE A6: PROFIT MARGIN RATIOS FOR INDUSTRY GROUPS OR SECTORS¹⁰

NAICS ¹¹	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%
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 aluminum) 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%

TABLE A8: HIGH-PERFORMANCE BENCHMARKS THROUGH MINISTERIAL ORDER

Bituminous coal	0.07053 ¹²	tonne
Crude canola oil	0.1141	tonne
Ethyl alcohol	0.001402	litres absolute alcohol
Granular urea	0.2493	tonne
Sub-bituminous coal	0.01189	tonne
Upgrading	2.994	upgrading Alberta complexity weighted barrel (in thousands)

¹⁰ 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.

¹¹ According to NAICS Canada 2017 Version 3.0

¹² This bituminous coal high-performance benchmark replaces the one in Table in Schedule 2 of the Regulation.