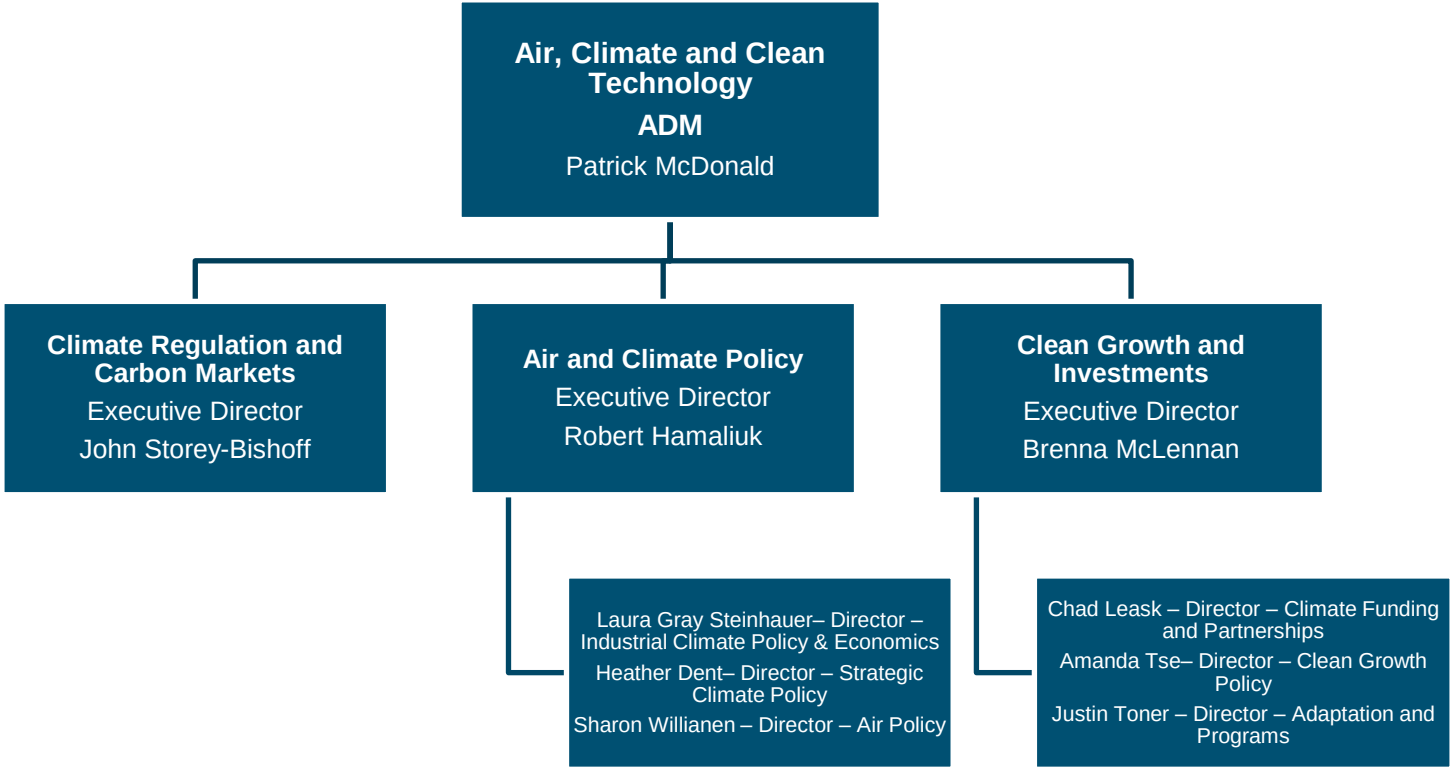
Annual TIER Compliance Workshop

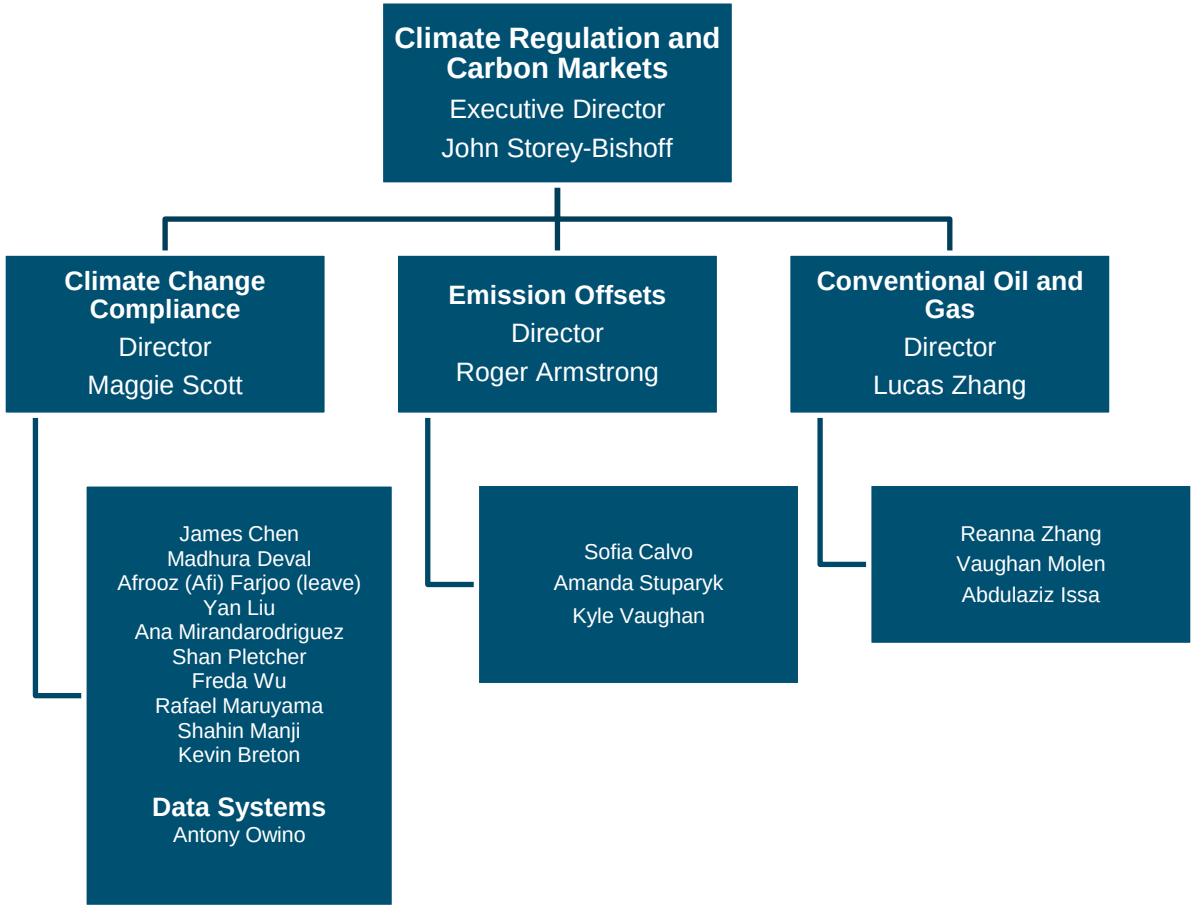
(2024 Compliance Period)

Technology Innovation and Emissions Reduction Regulation (TIER)

Climate Regulation and Carbon Markets
Alberta Environment and Protected Areas
February 28, 2025

Alberta


Air, Climate and Clean Technology
ADM
Patrick McDonald
Climate Regulation and Carbon Markets
Executive Director
John Storey-Bishoff
Air and Climate Policy
Executive Director
Robert Hamaliuk
Clean Growth and Investments
Executive Director
Brenna McLennan
Laura Gray Steinhauer– Director – Industrial Climate Policy & Economics
Heather Dent– Director – Strategic Climate Policy
Sharon Willianen – Director – Air Policy
Chad Leask – Director – Climate Funding and Partnerships
Amanda Tse– Director – Clean Growth Policy
Justin Toner – Director – Adaptation and Programs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Executive Director
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Maggie Scott
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Regulatory Overview

Alberta's Industrial Greenhouse Gas Regulatory System

Regulatory Background

- Specified Gas Emitters Regulation (2007 – 2017)
  - Facility specific baselines based on historical performance
  - Applied to direct emissions only
- Carbon Competitiveness Incentive Regulation (2018 – 2019)
  - Output based allocation system using assigned and established benchmarks
  - Applied to direct and indirect emissions
  - Provincial carbon levy in place until June 2019 with exemption for conventional oil and gas
  - Opted-in facilities

TIER Overview

TIER Overview

- Technology Innovation and Emissions Reduction Regulation (TIER) (2020 – present)
  - TIER implemented on January 1, 2020, amended regulation January 1, 2023
  - Regulated facilities:
    - Large emitters with annual emissions above 100,000 tonnes of carbon dioxide equivalent in 2016 or subsequent;
    - Imports more than 10,000 tonnes of hydrogen
    - Voluntarily entered the regulation (including aggregate facilities and opted-in facilities)
- TIER is a recognized provincial program under the *Greenhouse Gas Pollution Pricing Act* for 2020 to 2030 (review at 2026)

TIER Overview

- Facilities must comply with the least stringent of:
  - High Performance Benchmark (HPB)
    - In regulation and can be set or updated through Ministerial Order
    - “best in class”
  - Facility-Specific Benchmark (FSB)
    - Based on facility historical performance
- TIER Fund price established by Ministerial Order:

Year	2024	2025	2026	2027	2028	2029	2030
Fund Price ($/tonne)	80	95	110	125	140	155	170

TIER Overview

- Reduction Targets
  - 2% annual tightening to FSBs and HPBs starting in 2023
  - 4% annual tightening in 2029 and 2030 for oil sands mining, in situ, and upgrading
  - Industrial process emissions not subject to reduction target at this time

Reduction Target

Reduction Target	2024	2025	2026	2027	2028	2029	2030
FSB - General	**0.16**	**0.18**	**0.20**	**0.22**	**0.24**	**0.26**	**0.28**
FSB – Bitumen - Oil Sands In Situ	0.16	0.18	0.20	0.22	0.24	0.28	0.32
FSB – Bitumen - Oil Sands Mining; Upgrading	0.22	0.24	0.26	0.28	0.30	0.34	0.38
HPB - General	**0.04**	**0.06**	**0.08**	**0.10**	**0.12**	**0.14**	**0.16**
HPB – Bitumen - Oil Sands In Situ	0.04	0.06	0.08	0.10	0.12	0.16	0.20
HPB – Bitumen - Oil Sands Mining; Upgrading	0.10	0.12	0.14	0.16	0.18	0.22	0.26
FSB – Aggregate Stationary Fuel Combustion	0.14	0.16	0.18	0.20	0.22	0.24	0.26
FSB – Aggregate Flaring	0.12	0.14	0.16	0.18	0.20	0.22	0.24

TIER Overview

- Regulated Emissions
  - Large emitter and opted in facilities:
    - Scope 1 emissions
    - Some scope 2 emissions through allocation adjustment– imported electricity, heat and hydrogen
    - Can subtract capture recognition tonnes for facilities with capture.
  - Aggregate facilities
    - Stationary fuel combustion emissions
    - Flaring emissions (starting in 2023)
    - No scope 2 emissions
  - Excludes biomass CO_2 and fuels where federal fuel charge applied

TIER Overview

- True-up Obligation

  = Total Regulated Emissions (TRE) – Allowable Emissions (AE)

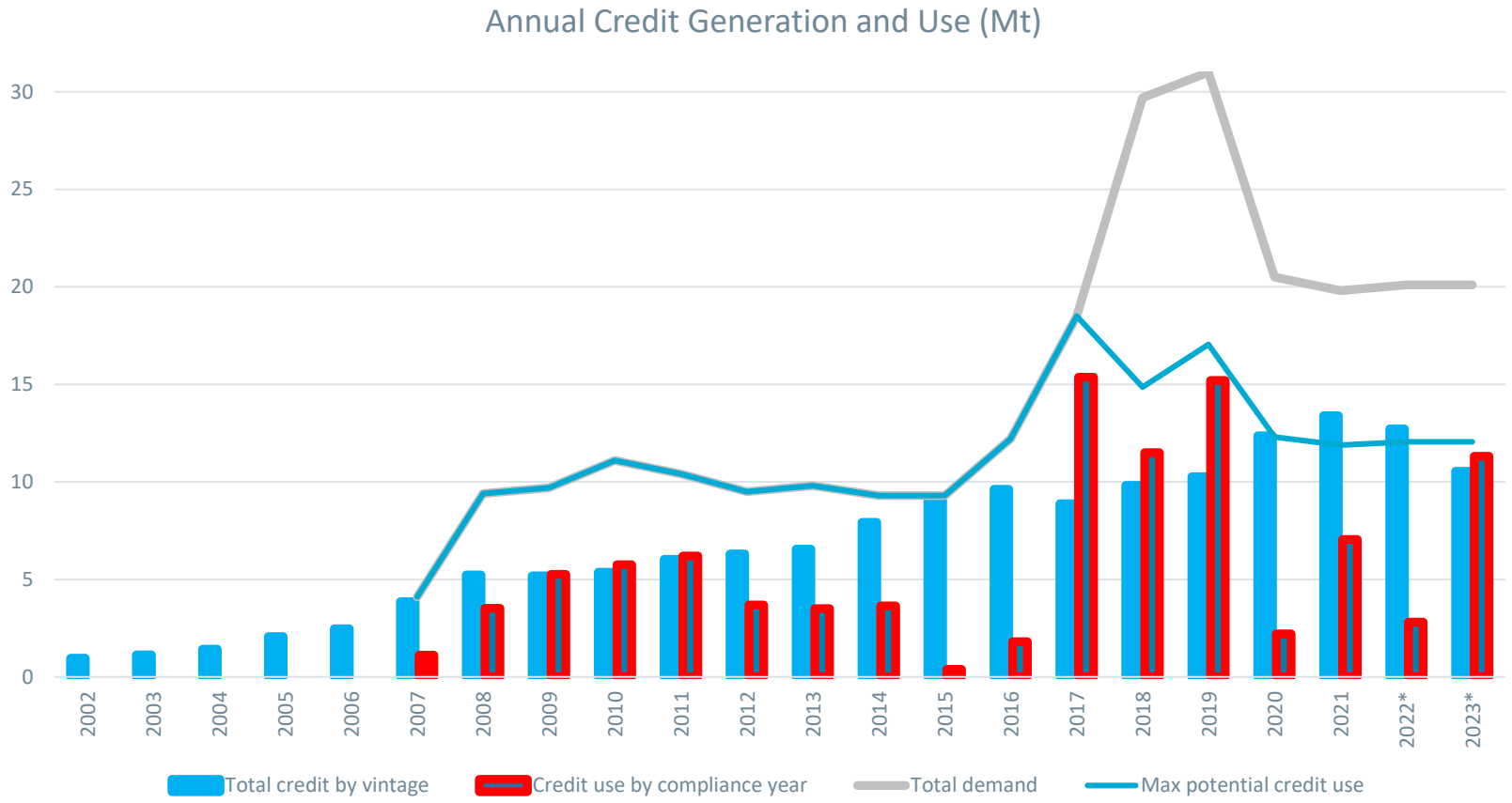
- Treatment of Indirect (Scope 2) Emissions
  - Large emitter and opted in facilities - scope adjustment to Allowable Emissions (2024 numbers):
    - Imported heat (I_{he}) = 0.06047 tonnes CO_2e / GJ
    - Imported hydrogen (I_{hy}) = 8.919 tonnes CO_2e / tonne
    - Imported electricity (I_E) = 0.3552 tonnes CO_2e / MWh
  - Ex. AE = Product(s) x Benchmark(s) – [I_{He} x 0.06047 + I_{Hy} x 8.919 + I_E x 0.3552]
  - Aggregate facilities – no scope adjustments to Allowable Emissions

Credit Usage Limit and Expiration

- Credit use limit to increase 10% per year, starting in 2024.
- Designed to increase credit demand in TIER, and to allow increased compliance flexibility for TIER regulated facilities.

Compliance Year	2024	2025	2026 or later
Maximum % credit usage	70%	80%	90%

- Credit expiration occurs after 5 years from year generated
- Use of Capture Recognition tonnes decreases TRE so usage limit does not apply

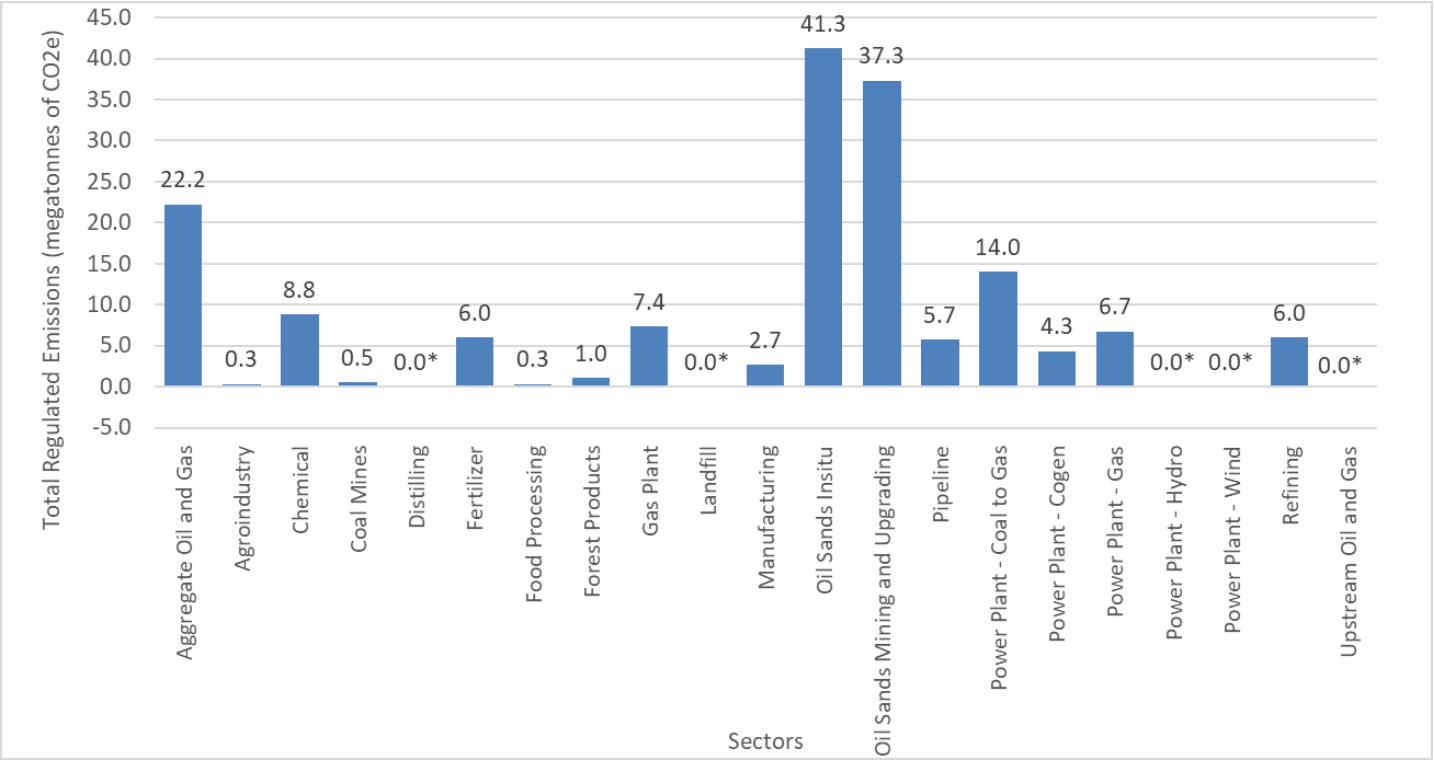


* Total credit generation 2022/2023 not yet final

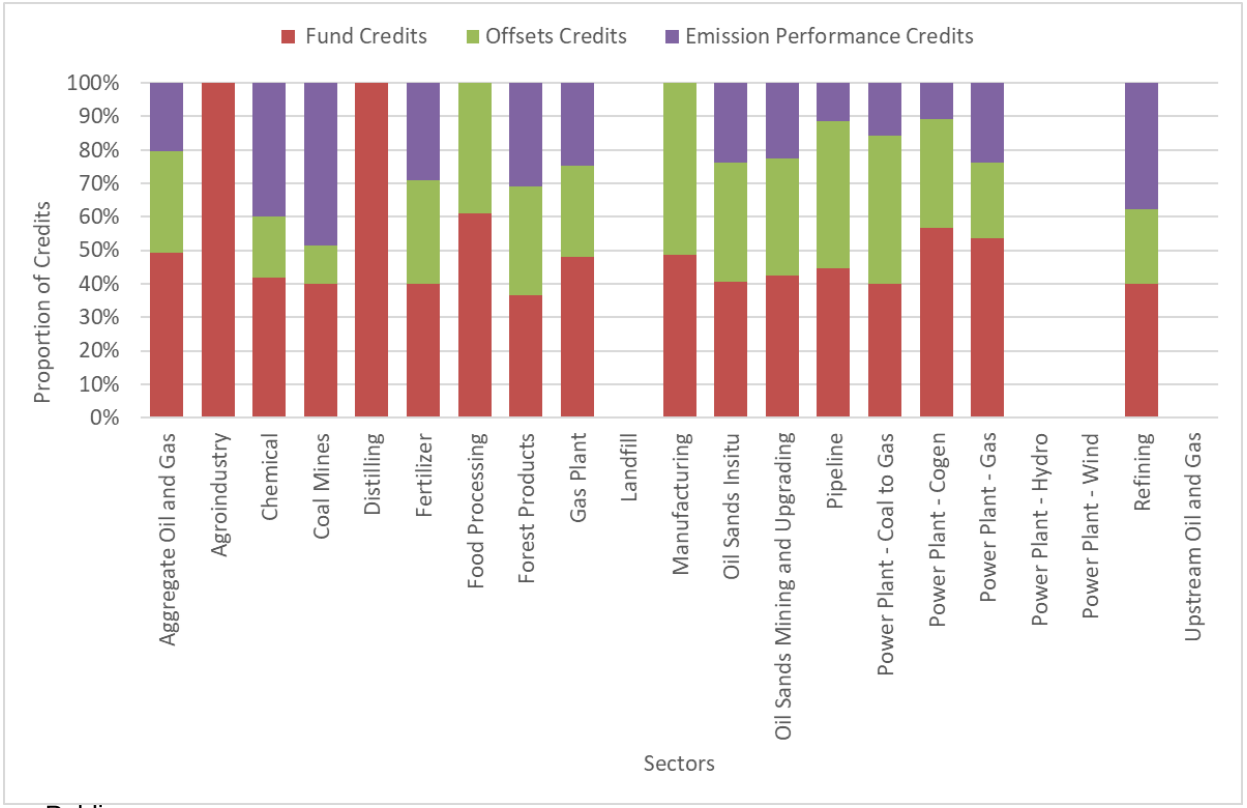
TIER 2023 Compliance Results

2023 Emissions and Compliance Outcomes

2023 Total Regulated Emissions by Sector



2023 True-Up Obligation by Sector



Total True-Up Obligations

Compliance Year	Emission Offsets Submitted (megatonnes CO_2e)	EPCs Submitted (megatonnes CO_2e)	Fund Credits Submitted (megatonnes CO_2e)	Total Compliance (megatonnes CO_2e)	Fund Payment ($Million)
2007 (half year)	0.9	0.2	3	4.1	45.2
2008	2.9	0.6	5.9	9.4	88.3
2009	3.8	1.5	4.4	9.7	66.3
2010	3.9	1.9	5.3	11.1	78.9
2011	5.4	0.8	4.2	10.4	62.9
2012	3	0.7	5.9	9.5	93.7
2013	2.2	1.3	6.3	9.8	94.4
2014	2.3	1.3	5.6	9.3	84.3
2015	0	0.3	9	9.3	135.7
2016	0.8*	1	10.3	12.2	206.5
2017	9.2*	6.1	3.1	18.5	94.2
2018	8.0*	3.9	17.8	29.6	533.2
2019	9.9*	5.3	15.9	31.0	476.1
2020	1.2*	1	18.3	20.6	547.6
2021	5.1*	2.1	12.6	19.8	503.5
2022	2.2*	0.6	17.3	20.1	864.0
2023	7.2*	4.1	8.7	20.1	564.1
Total	68.0	32.7	153.6	254.5	4,538.9

*Includes 5.7 Mt total from 2016-2023 of additional credits issued under section 7(1.2) of the SGER and section 16(3) of the CCIR and section 19(3) of TIER.

Alberta

2023 Compliance Results

- The department publishes TIER results on a regular basis.
  - Published to open.alberta.ca
  - Alberta industrial greenhouse gas compliance - Open Government
- Oil sands emission intensity is also published on a regular basis
  - This data requires post-processing and cogeneration corrections
  - 2023 data update is being worked on, will be posted to open.alberta.ca when approved
  - Alberta Oil Sands Greenhouse Gas Emission Intensity Analysis - Open Government

Department Review and Assurance Process

Review and Assurance Process

- Risk-based approach applied in internal review and assurance process

Higher Risk Facilities

Detailed review conducted by compliance reviewer

Lower Risk Facilities

Basic review conducted mostly by automation

Review and Assurance Process

- Risk factors considered:
  - Facility emissions
  - Facility complexity
  - True-up obligation
  - EPC generating potential
  - Changes and trends

Review and Assurance Process

- Batch automation tools used for core checks:
  - Initial administrative checks
  - Key compliance checks
  - Trending and analytical

Ensure that compliance report form is filled out correctly!

Review and Assurance Process

- Detailed reviews conducted by engineers
  - Understand facility operations and emission sources
  - Conduct analysis (i.e., sector level comparisons)
  - Work with facilities
  - Reviewers provide recommendations
- Department aiming to increase efficiency in reviews and close out prior reviews more timely

EPC Issuance

- Ensure facility is registered on Alberta Carbon Registries
- EPCs need to be issued to the Person Responsible
- Facilities to provide reasons for EPC generation
- Department uses a risk-based approach to issues EPCs
  - Preliminary assessments conducted
  - Timelier issuance of EPCs
- EPCs will not be issued or will be adjusted if:
  - Quantification methodology issues
  - Reviewer questions are unresolved
- EPCs are revocable licenses

2024 Compliance Reporting

Requirements and Improvements

Upcoming Key Dates for TIER

Report	Deadline	Compliance Year
Forecasting Report Update	March 15, 2025	2024 (previous year)
Cost Containment Application	March 31, 2025	2024
Compliance Report and True Up	June 30, 2025	2024
Facility Specific Benchmark Application	September 1, 2025	2025
Opted-in and Opt-in Revocation Application	September 1, 2025	2026
Forecasting Report	November 30, 2025	2026 (future year)

Opt-in Process

Opt-In Process

- Two pathways:
  - Competitively impacted
    - Review Standard for Developing Benchmarks for currently regulated products
  - Emissions-Intensive and Trade Exposed
    - Emissions threshold lowered to **2,000 tCO_2e** for emissions-intensive-trade-exposed pathway
- Standard for Developing Benchmarks lists tables of regulated products and EITE sectors.

Opt-In Process

- Emissions Intensity:
  - Carbon Costs divided by Gross Value Add
- Trade Exposure
  - Ratio of dollar value:

$$\frac{\text{Exports} + \text{Imports}}{\text{Production} + \text{Imports}}$$

- Any sector with EITE classified as “Medium” or higher qualifies for TIER opt-in

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			

Opt-In Process

- Application Reminders:
  - Ensure applicant is *Person Responsible* as set out in regulation
  - Include boundary file
    - https://www.alberta.ca/system/files/custom_downloaded_images/sgrr-steps-to-creating-a%2520-facility-boundary-map.pdf
- Director discretion clause to consider opt-in applications after the deadline is for extenuating circumstances
  - Applicant must submit evidence of why application was not submitted by deadline, such as
    - The facility was unable for reasons beyond their control to conduct an assessment prior to September 1
    - The inability for the facility to opt into the Regulation would result in significant financial impact or there is significant stranding of investment for the facility

Exemption from Federal Fuel Charge

- Once accepted, letter from director sent to Certifying Official and copied to Environment and Climate Change Canada
- Person responsible must complete Application for Determination form to submit to Environment and Climate Change Canada
- Exemption certificate is then applied for from Canada Revenue Agency
- Fuel Charge Relief: Facilities subject to provincial carbon pricing systems for industry: Alberta - Canada.ca

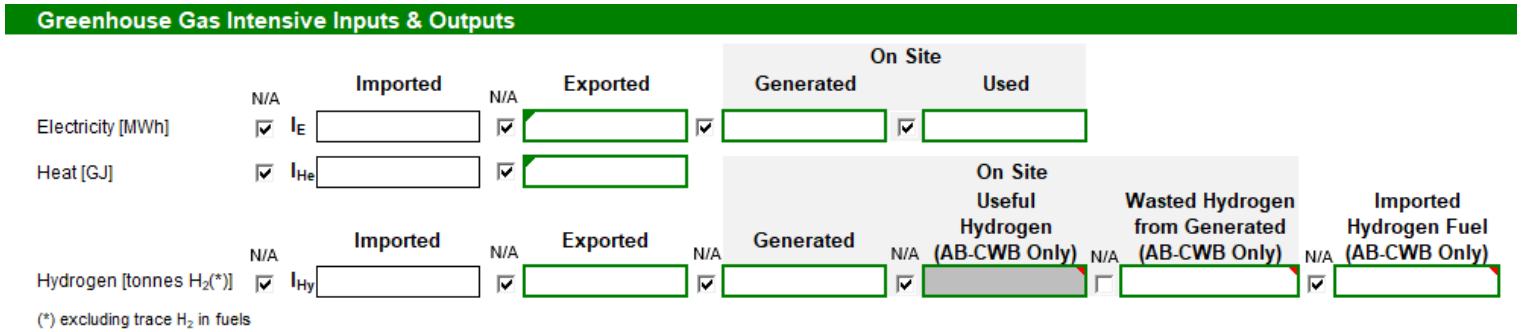
Updates to the 2024 Compliance Reporting Form

2024 Compliance Reporting Form

- Compliance Reporting forms for 2024 have been sent to **Reporter** and **Certifying Official** for each LFE or opted-in facility under TIER
  - Please let the department know if you have NOT received a compliance reporting form EPA.GHG@gov.ab.ca
- Cosmetic and clarifying updates to the compliance reporting form
  - Pre-populated administrative information in Section A1
  - Cosmetic Updates to Section B4
  - Improved automation tools
- Updated video walkthrough to be posted to TIER website

2024 Compliance Reporting Form

- Most updates to the compliance form are “behind the scenes”
- Section B4 updated for AB-CWB facilities (refineries and upgraders)
  - Improved clarity and alignment with Regulation and Standards
  - Wasted hydrogen only applies to on-site generation
  - Clarified distinction for on-site vs imported hydrogen



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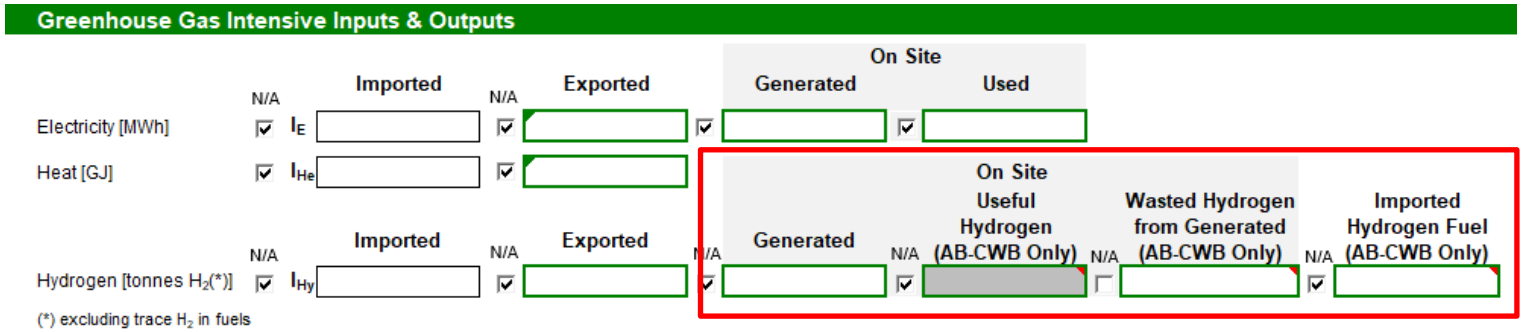


Standard for Developing Benchmarks

Benchmark Years and Adjustments

- The TIER Regulation sets criteria for changing benchmark years for a facility with an existing FSB:
  - TIER 1(6) sets the criteria for designating the first year of commercial operation of a facility, including:
    - Significant disruption in normal business operations;
    - Significant expansion, generally classified as 25% increase in production;
    - Significant change, generally classified as change in products or feedstocks
  - TIER 7(6) sets the criteria re-assigning an FSB, including:
    - Inaccuracy in existing FSB;
    - Significant expansion;
    - Significant change in production
- The Benchmark Standard has been updated to reflect that while some Director discretion exists, the regulatory boundaries are paramount.

Computing Load at Aggregate Facilities

- New, simplified process for allocating electricity emissions for aggregate facilities with computing loads (e.g. cryptocurrency mining)
- Facilities with integrated electricity production can report the generated electricity and receive an FSB equal to the TIER electricity HPB for electricity.
- Eligible electricity uses include:
  - Export to the Alberta Interconnected Electricity System
  - On-site use for computational load by aggregate facility
  - Use by third-party host computational load (data centres, cryptocurrency mining)
- Requests for benchmarks for integrated electricity production must be made to the department, similar to other aggregate FSBs.

Cost Containment Program

- Designed to alleviate economic hardship imposed as a result of TIER compliance on regulated facilities.
  - Economic hardship defined as TIER compliance costs exceeding:
    - 3% of facility sales, or
    - 10% of facility profits (based on sector profit margin)
- To be eligible for cost containment, facilities must:
  - Meet the sales and/or profit thresholds
  - Have a first year of commercial operation earlier than 2023
  - Belong to a sector with a trade exposure measured as high or very-high
- Cost containment application must include:
  - Cost containment application form
  - **Audited** financial statements (multiple years)
  - **Validated** emissions reduction plan
- Provide notice to department 6 – 8 weeks in advance
  - This is intended to allow department time to work with facilities to ensure completeness of submission

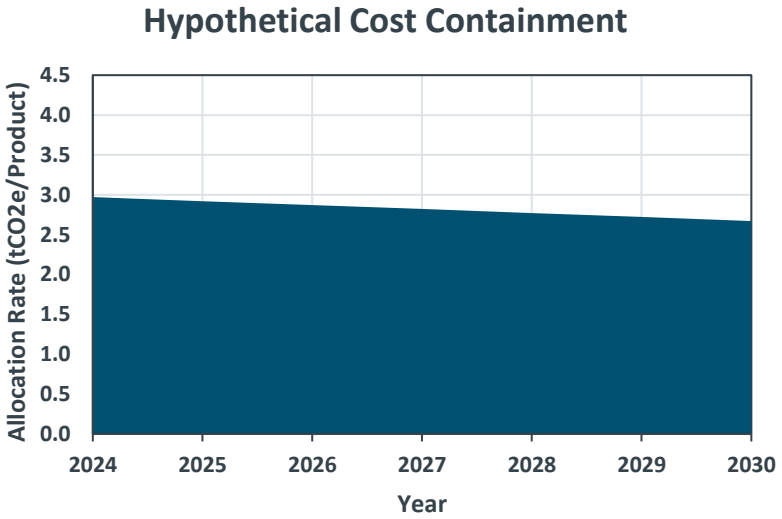
Cost Containment Program

- Cost Containment Program provides relief for facilities experiencing economic hardship:
  - Compliance Flexibility – No credit use limit
  - Cost Containment Benchmark (BCCA) – Additional emissions allocations
- Application deadline is March 31 of the following year
  - i.e. March 31, 2025 is deadline for 2024 compliance year
- Cost containment designation will apply for a fixed period, up to 5 years.
- Any additional emissions allocations provided are ramped down over the 5-year period.
- Facilities with cost containment designation can earn EPCs

Cost Containment Program - Example

- Hypothetical facility in highly a trade exposed sector
  - Trade exposure by sector is included in Table A4 of the Standard for Developing Benchmarks.
- In 2025, TIER compliance costs exceed the thresholds of 3% sales and 10% profit.
  - First relief is in the form of “Compliance Flexibility”

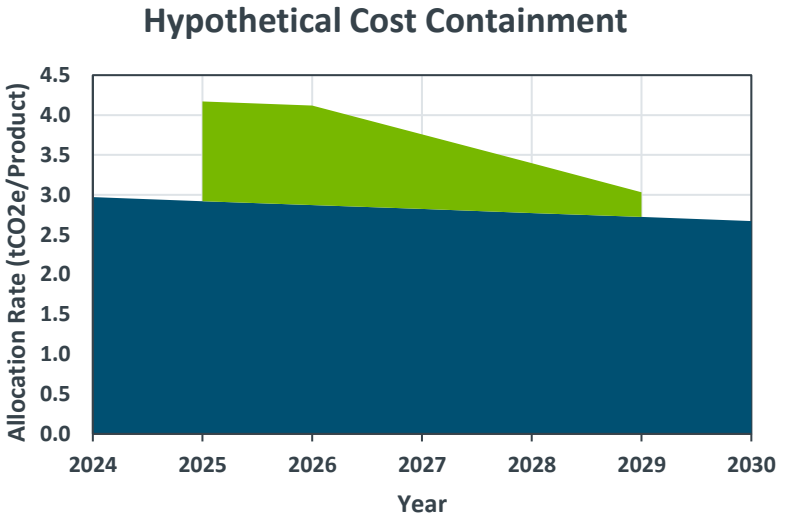
$$CFV_{avg} = \frac{\sum_{Y=Y_0}^{Y_{0+(z-1)}} [TrueUp\ Obligation_Y \times (FC\ Price_Y \times 0.15) \times (1 - CUL_Y)]}{z}$$



Cost Containment Program

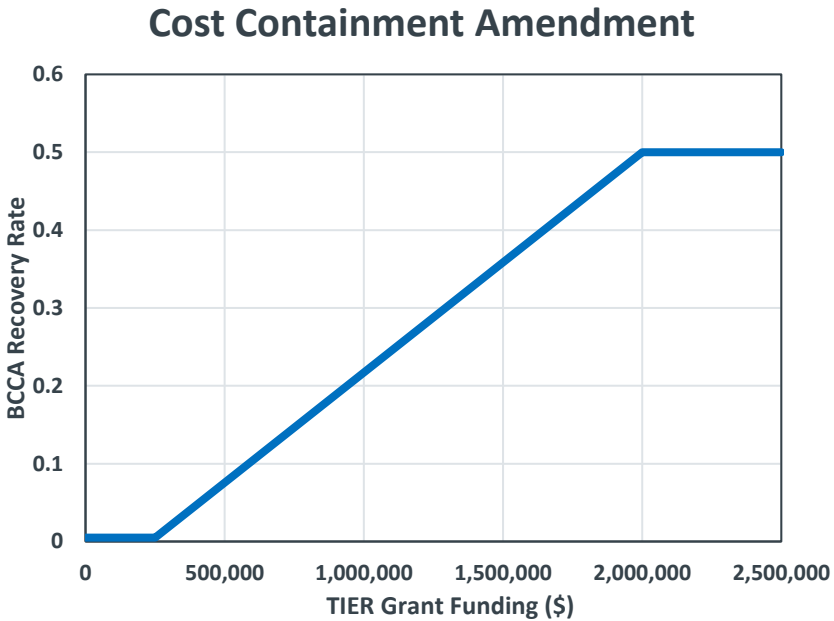
- If CFV is not sufficient to alleviate economic hardship, the facility may receive BCCAs
- BCCAs provide “front-loaded” benefits
  - Calculation of BCCAs considers TUO from Y_0 (the year of application), but evaluates TIER cost at the average level over the application period
  - BCCA envelope tightens over time, to bring allocations in-line with previous FSB

Year	BCCA Fraction
0	1.00
1	1.00
2	0.75
3	0.50
4	0.25



Cost Containment Updates

- GoA Funding term has been removed from BCCA eligibility and valuation formulas
- New Section 12.4 in the BM Standard details Cost Containment Amendment Process
- Cost Contained facilities that receive a TIER-funded grant may forfeit some BCCA allocations to recover a portion of grant funding:
  - 0% up to $250,000
  - 50% for $2,000,000 or more
  - Linear ramp in between
- Updated standard includes formula to determine amount of BCCA allocations to recover.
  - This applies only for year(s) with TIER grant funding



Alberta Greenhouse Gas Quantification Methodologies

Alberta Greenhouse Gas Quantification Methodologies

- Provide consistent and standardized approach to quantifying emissions, production and other reported parameters
- Provide level playing field for facilities within the same sector and across all sectors
- Standardize benchmarking approaches for regulated facilities
- Aligned with federal greenhouse gas reporting where appropriate
- Department will continue to work on developing more chapters (fugitive, waste and wastewater, etc.)

Mandatory Quantification Methodologies

- Chapter 1 – Stationary Fuel Combustion
- Chapter 2 – Flaring
- Chapter 4 – Venting
- Chapter 5 – On-Site Transportation
- Chapter 8 – Industrial Processes
- Chapter 12 – Imports
- Chapter 13 – Production
- Chapter 14 – Carbon Dioxide Emissions from Combustion of Biomass
- Chapter 15 – Aggregate Facilities
- Chapter 16 – Cogeneration Benchmark Calculation
- Chapter 17 – Measurements, Sampling, Analysis and Data Management

Mandatory Quantification Methodologies

- Mandatory Quantification Methodologies
  - Appendix A – References
  - Appendix B – Fuel Properties
  - Appendix C – General Calculation Instructions
  - Appendix D – Conversion Factors
  - Appendix E – Additional Information for the Alberta Gas Processing Index

- Facilities submit deviation requests to the department to propose alternative method if unable to adhere to mandatory method
  - Department will provide a time limited approval letter to facility if deviation request is accepted.

Quantification Methodologies not in AQM

- “If a quantification methodology is not provided in the Alberta Greenhouse Gas Quantification Methodologies for a certain emission source or parameter, a facility may use a site-specific methodology. Site specific methodologies should be documented in the facility's Quantification Methodology Document (QMD).”

- Choose methodology that is appropriate
  - Technically representative of site operations
  - **Accurate and/or Conservative**
  - Consistent with benchmark period, if relevant
  - Verifier to confirm appropriateness

TIER Compliance Submission Requirements

Standard for Completing Greenhouse Gas Compliance and Forecasting Reports

- Provides requirements for compliance and forecasting reporting
- Provides level requirements for required quantification methodologies
- No updates to compliance standard ahead of June 30th deadline

Person Responsible

- Definition in Section 1(1)(hh) of TIER
- For LE/Opt-in, person responsible is the person responsible on the last day of the compliance year:
  - Ex., For 2024 compliance year, the person responsible is defined on Dec 31, 2024
- Department will process notification of change in Person Responsible after Dec 31 (not in year)
  - Will process notification of change for facility contacts (i.e. reporters and certifying officials)
- Emission performance credits are issued to the Person Responsible for the compliance period

Emissions Completeness

- “Direct Emissions”: all specified gases released from sources located at a facility
  - *not including* biomass CO_2 emissions
  - *not including* fuel for which a fuel charge has been paid under the *Greenhouse Gas Pollution Pricing Act* (Canada) with exemption certificate covering the period
- All direct emissions within facility boundary must be reported
  - Emissions from contractors, drilling rigs, etc.
  - Negligible emissions
- If the source meets the definition for “negligible emissions”, can use alternative quantification method
  - defined in Standard for completing greenhouse gas compliance reports
  - all “negligible emissions” count in the Direct Emissions

Usage of Credits

- TIER Requirements
  - Maximum credit usage for 2024: 70% of tonnes owed
- Credits must be
  - held by person responsible
  - in pending retired status
  - in the account of the regulated facility (EPCs only)
  - Correctly tabulated on compliance report
    - Separate tabs for EPCs and Offsets
    - Serial ranges must be correct and match reported totals
  - Ensure that there is no overlap with credits already used

Quantification Methodology Document

- QMD an essential reference for verification and department internal reviews
  - Still seeing QMDs missing information (examples: equations, emission factors, sample calculations, negligible emissions method, justifications for chosen methods and emission factors)
- QMD must be kept up-to-date
  - Update quantification methodologies as each becomes mandatory
  - Must follow format in Compliance Standard
- Do not need value updates, but should have sample calculations
  - Sample calculation workbooks must supplement use of emission management software, and provided to verifier
- If deviation request(s) granted by department, include in QMD

Deviation Requests

- Where unable to fully implement the prescribed quantification requirement, a deviation request can be made
- If a missing data procedure can be used according to Chap 17 AQM, a deviation request is not needed.
- If mandatory quantification method is not followed and deviation not in place, verification finding should result
- Deviations are limited
  - granted for one year
  - review approval letter carefully, often conditions included
  - request should include how facility will comply with mandatory requirements in subsequent reporting
  - Alternative quantification methodologies proposed are conservative
- Department tracks deviations to inform review of quantification requirements

Confidentiality Requests

- Indicate in the compliance report form and include letter
- Be clear on what is being requested
  - Specific fields in the compliance report form
- Provide justification for request
  - Section 28 of TIER
- Requests not meeting regulatory requirements will be denied
  - Review decision letter

Key Take-Aways

- Person responsible to submit verified compliance report by ***June 30, 2025*** for the 2024 compliance year
- Facilities that do not meet true-up obligation by June 30th could receive a compliance order
- Positive verification opinion required
  - Any material errors must be resolved before submission
- Required true-up (credits retired or fund payment made) must be complete *before* submitting your compliance report
- Fund Credit price is ***$80*** per tCO_2e for 2024
  - Ministerial Order 62/2022 - Environment and Protected Areas

Contents of Compliance Submission Package

- Completed Compliance Report Form (Excel workbook)
- Signed Statement of Certification (SoC)
- Verification Report, including
  - Signed Statement of Verification (SoV)
  - Signed Statement of Qualifications (SoQ)
  - Signed Conflict Of Interest Checklist (COI)
- Fund Credit Purchase Form
- EPC Request Form
- Quantification Methodology Document
- Area Fugitives Report (as required)
- Emissions reduction plan report for facilities with cost containment designation
- Confidentiality request for specified parts of the submission (optional)

Compliance Report Submission

- Send to EPA.GHG@gov.ab.ca by June 30, 2025
- Payment by cheque
  - Submit a cheque payable to “Government of Alberta” along with the fund credit purchase form:

    Government of Alberta
    Finance and Administration Branch
    Alberta Environment and Protected Areas
    6th floor, South Petroleum Plaza
    9915 108 Street NW
    Edmonton, Alberta
    T5K 2G8

Compliance Report Submission

- Electronic payment
  - Submit payment by electronic fund transfer and **provide the fund credit purchase form**. Note that it takes 3 or more days to process.

Account Name	PA Technology Innovation & Emission
Bank Name SWIFT Code	CIBC CIBCCATT
Bank Address	10102 Jasper Avenue Edmonton
Institution Number	0010
Transit Number	00059
Account Number	92-74219
Ministry/Department	Alberta Environment and Protected Areas, Finance and Administration Branch
E-mail	EPA.Revenue@gov.ab.ca

- Receipt will be provided

Renewable Energy Facilities in TIER

Renewable Electricity Facilities EPCs

- Will issue EPCs in June for renewable electricity facilities that submit compliance package by March 31
  - Renewable Energy Certificates must be retired in WREGIS
- Retired RECs must match claimed production in Section B6
- Electricity export in Section B4 must not exceed AESO export

WREGIS REC Retirement

- New process was initiated to retire RECs in WREGIS system for electricity production claimed under TIER, for 2022 onwards
- Alberta Climate Compliance administers annual compliance program
  - Organizations invited to participate in program, instructions emailed separately
  - RECs from opted in renewable electricity facilities (generators in WREGIS) must be retired to program by compliance deadline

Specified Gas Reporting Regulation (SGRR)

SGRR Overview

- Alberta's mandatory Greenhouse Gases (GHG) reporting program for facilities emitting over 10,000 tonnes of CO_2 equivalent per year
- Single Window with Environment and Climate Change Canada (ECCC) GHG Reporting Program
- 780 facilities reported to SGRR for 2023
- Annual reporting deadline is ***June 1, 2025***

SGRR/GHGRP links

- Federal GHGRP Single Window Information Management (SWIM) website: https://ec.ss.ec.gc.ca/
- SGRR: https://www.alberta.ca/specified-gas-reporting-regulation
- GHGRP: https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/about.html
- Boundary file link (use polygon, not line features): https://www.alberta.ca/system/files/custom_downloaded_images/sgrr-steps-to-creating-a%2520-facility-boundary-map.pdf

TIER Verifications

TIER Verifications

- Compliance reports and benchmark applications must be verified before submission
- Emission offset project reports must be verified before offset credits are serialized
- Verifications must be conducted to a reasonable level of assurance
- A positive opinion is required
  - No opinion is considered a negative opinion
- Requirements for third party assurance providers (verifiers and validators) and auditors
  - TIER Regulation Section 27 – accreditation is required
  - Standard for Validation, Verification and Audit

TIER Verifications

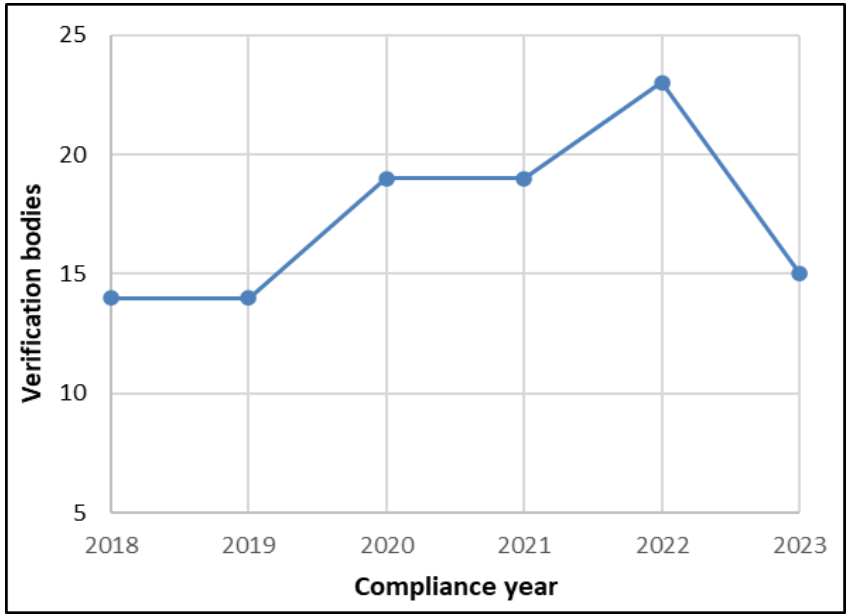
- New verification report template
  - Not mandatory for 2024
- Conducted verifier engagement session in Fall 2024
  - Updated Standard for Validation, Verification and Audit
- Regulated facilities should be to be active participants in verification
  - Ensure that verifier meets regulatory requirements
  - Ensure that you understand the verification process
  - Review verification plans and reports before submission

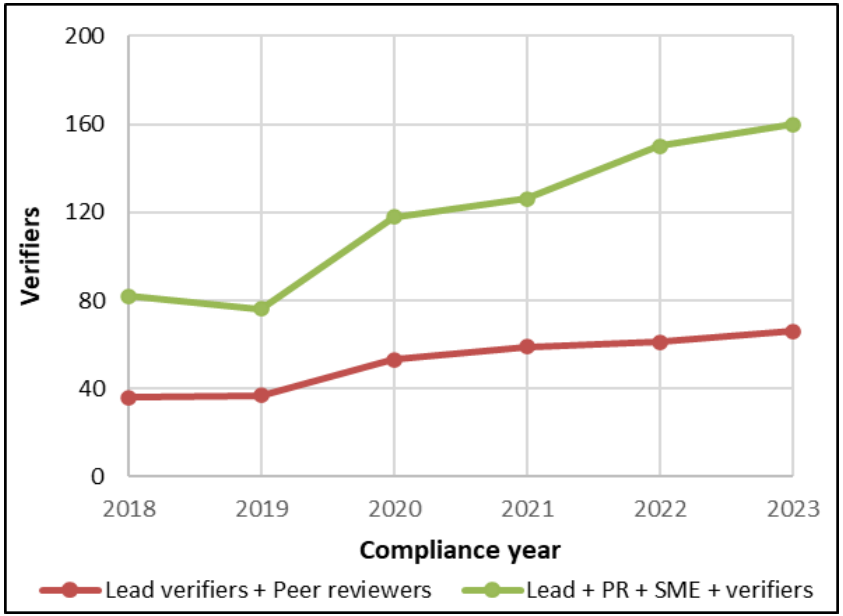
Objectives of TIER Verifications

1) Provide assurance that there are no material errors in a GHG statement (i.e., compliance report, emission offset project reports)
   – Finding and resolving issues that are not easily identified by the Department
2) Provide assurance that regulatory submissions are meeting the regulation and standards
3) Provide assurance that there are no material impacts to TIER fund revenue to the Province
4) Provide assurance that there is no over-issuance of emission performance credits (EPCs) or emission offsets under TIER system

Alberta

Verification Bodies





Key Updates to Verification Standard

- Clarification on qualifications and experience requirements
  - Greenhouse gas verification experience
  - Peer reviewer, lead verifier, subject matter expert
- Virtual site visits
  - Risk assessment conducted to ensure reasonable level of assurance
- Total error calculation
  - Large emitter/opted in – Equation 5-8
  - Aggregate facility – Equation 5-12
- No new training modules for 2024

Key Updates to Verification Standard

- Assess conservativeness of compliance outcomes
- Assess facilities with EPC generating potential
- Assess QMDs
- Working papers
  - Documentation of verification work (i.e. recalculations and analyses) transparently
  - Documentation of contributions of team members
- Aggregate facilities
  - Verify electricity used by to data centres

Observations and Highlights

Verification Team

- Section 3(1) of Part 1 of the Standard – Lead Verifiers and Peer Reviewers
- Ensure that verification team members meet the requirements in the standard
  - Technical expertise
  - Verification training
    - ISO 14064-3 training
    - TIER verifier training
  - Verification experience
  - Regulatory understanding

Verification Team

- Ensuring that the peer reviewer is independent
- Documentation of activities conducted by verification team
  - Site visits
  - Peer reviewers
  - Technical experts

Successful verifications starts with the selection of the right verification team!

Verification Procedures

- Reliance on controls without adequate testing and substantive testing
- Wrong criteria in verification process
- Incomplete risk assessment that does not address all relevant sources and areas of risk
- Verification scope is incomplete or inaccurate
- Lack of transparency in working papers and findings
- Incorrect materiality assessment
- Documentation
  - Correct representation of verification team
  - Peer review documentation

Site Visits

- Site visits are mandatory – Section 3(1)(h)
- Section 3(1)(h.1) provides criteria for virtual site visits
  - Risk assessment needs to be conducted to ensure reasonable level assurance
- Request for site visit exemptions or virtual site visits:
  - Verifier responsibility to request and receive approval beforehand
  - Risk assessment needs to be conducted
- Documentation and timelines of site visit activities conducted
- Documentation of why certain sites were selected for site visits – aggregate facilities and aggregated subproject sites

Verification Report

- Using templates in verification process:
  - Verification reports and working papers with references to incorrect facilities and/or projects
  - Copy and paste of descriptions of verification activities, risk assessments, site visits, and findings
  - Statements made in reports that are incorrect
  - Generic verification procedures that do not apply to all facilities and sectors
- Verification reports that have limited or no findings
  - Risk assessment should align with verification procedures
  - Documentation of verification activities

Quantification Methodologies

- Frequent missed findings:
  - Incorrect methodologies applied
  - Missing assessment of negligible emissions
  - Missing assessment of facility's chosen methodology for source not covered by AQM
  - Missing components of the Quantification Methodology Document
  - Limited assessment of production or fuel meters
  - Limited assessment of source data
- ***Deviation requests are not required for verifications***

Production

- Limited assessment of production quantities
  - Production is a critical part of assessing compliance
- Limited understanding of different types of production metrics such as AB-CWB and ABGPI
- Heat versus industrial heat – section 1(1)(h) of TIER
  - Heat exported from a regulated facility to another large emitter / opted-in facility or certain offset projects get allocations

Opportunities for Improvement in TIER Verification Process

- Exploring opportunities to streamline verification processes
- Conducting further review of verifier qualifications and experience requirements
- Continuing to develop verification training materials
- Continuing to engage and work with verifiers to understand challenges and ways to improve verification process
- Working with accreditation bodies to ensure that verifier performance is meeting TIER requirements

TIER Offset System Update

Overview of offset system updates

Environment and Protected Areas
February 28, 2025

Alberta

Agenda

- Overview & Context
- Updated Offset Stats
- Offset System Updates
- Protocol Updates
- Q&A

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Alberta's Emission Offset System

- Offsets are generated by projects that have voluntarily reduced GHG emissions via an approved activity
- Offsets are quantified using gov approved quantification protocols
- Large emitters can use offsets to be compliant under TIER
- Creates and supports an economic and environmental market by driving private investment

18 PROTOCOLS

420

PROJECTS

OVER 94 MILLION TONNES
OF EMISSION OFFSETS
TO DATE

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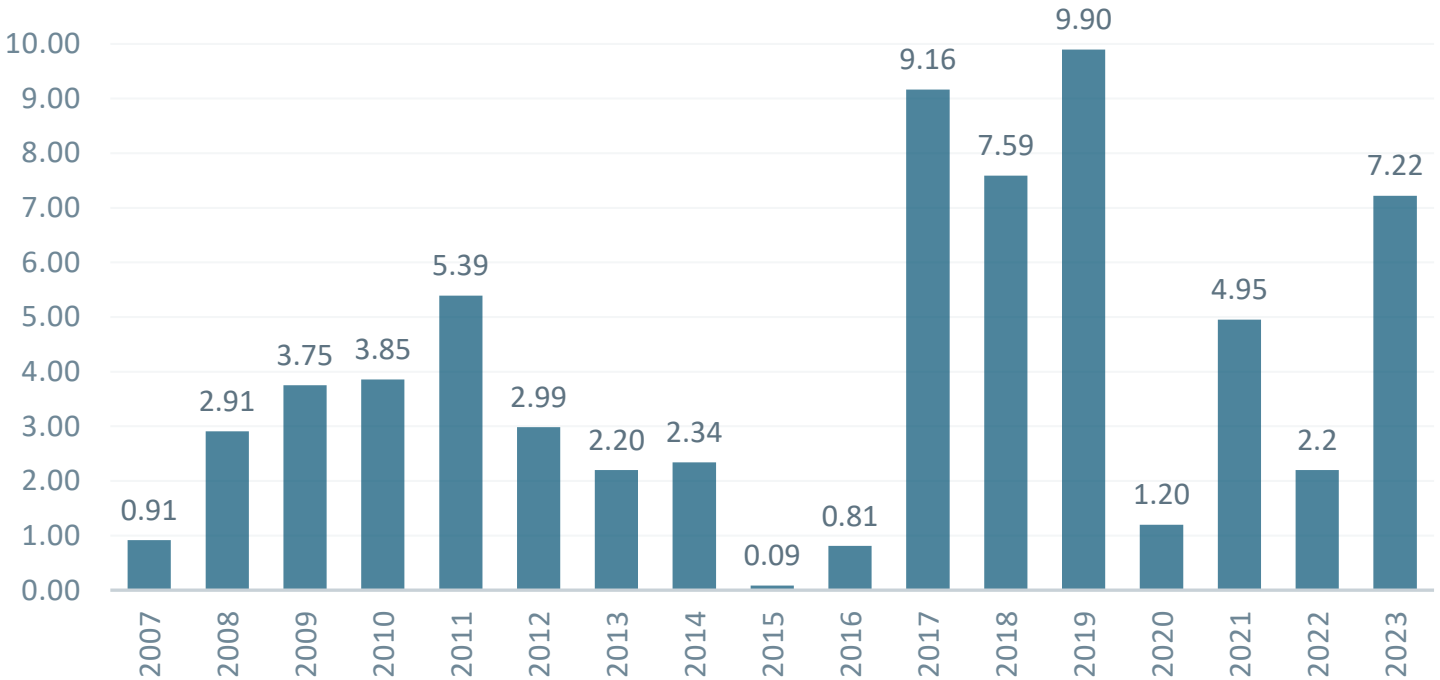
Emission Offsets Submitted for Compliance by Year



2023 Compliance Top 3 Used Credits

Wind = 1.74
Pneumatics = 1.56
CCS = 0.90

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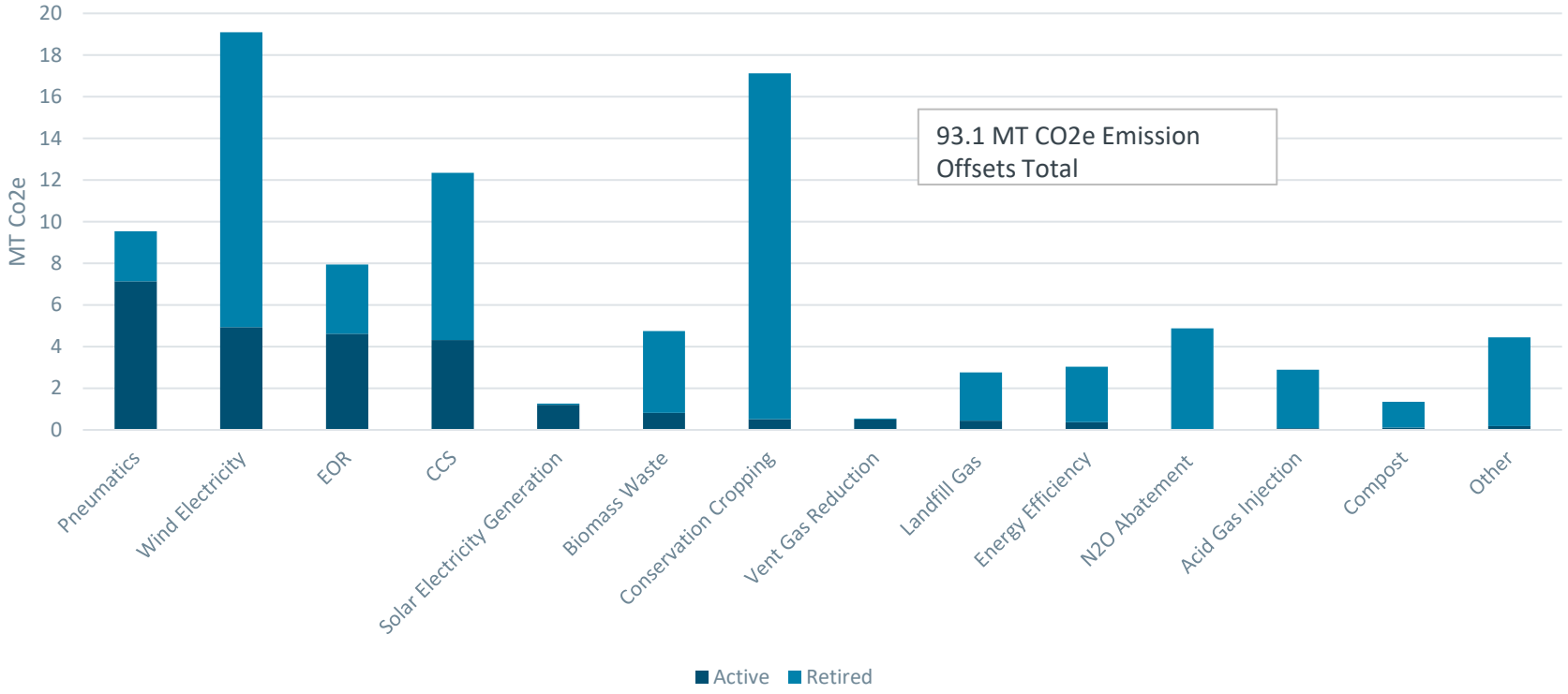
Alberta Emission Offsets per Protocol February 1, 2025



Offset System Updates

Project Standard

- Updated version 3.3 in development
- Offset Project Reporting Period: Maximum 2 year reporting period for 2023+ vintage onwards, updated required to submit report from 6 to 9 months.
- NERP projects clarify requirements (info later slide)
- Contiguous reporting – Project Update Notice form

Vintage Year	2023+
Reporting Period	2 years maximum
Report Due	Within 9 months after end of reporting period (e.g. Reporting Period of 2023 & 2024 vintages = submission into by end day September 30/25)

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Carbon Offset Emission Factors Handbook (version 3.1)

- Offset projects initiated on or after January 1, 2024 must use version 3.1 of the Handbook.
- Projects initiated in 2024 forward will use the grid factor published for each vintage year (i.e. each yearly emission reduction quantification will apply factor for that year)
- Grid factor will mirror the benchmark after 2030.

Electricity Grid Displacement Factor:

	2024	2025	2026	2027	2028	2029	2030
Electricity Benchmark (tCO2e/MWh)	0.3552	0.3478	0.3404	0.3330	0.3256	0.3182	0.3108
EGDF (tCO2e/MWh)	0.4901	0.4602	0.4303	0.4005	0.3706	0.3407	Matches HPB onward

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Verification Standard

- Updated version 5.2
- All third-party assurance providers that provide validations or verifications under TIER must meet each of the eligibility requirements in section 27 of TIER.
- As of June 30, 2023, all third-party assurance providers must be accredited as a verification body to ISO 14065 by an International Accreditation Forum (IAF) accreditation organization.

UPDATED

- Offset Verification Report Template (version 4.0) Starting January 1, 2025, the Alberta Emissions Offset Registry will only accept verification reports completed using the Offset Verification Report Template (Version 4.0).

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EPA Annual Reverifications

- Focus on pneumatics, solar, and wind projects.
- No negative results – Persistent immaterial errors…

Compliance Year	# of projects	# of offsets audited
2023	6	317,561
2022	5	1,598,733

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Registry Submissions for Compliance

- TIER 2024 compliance is June 30th
- Credits (EO's and EPC's) must be in responsible persons acc't & pending retirement prior to deadline
- Registry processes all actions as received so plan transfers AND pending retirement requests accordingly
- Project registrations are not guaranteed to be processed if submitted after June 1st

Protocol Updates

Biological Methane

- Aerobic Composting
- Fed cattle
- Landfill gas capture and combustion
- Low residual feed intake markers in beef cattle
- Aerobic landfill bioreactor
- Biogas production and consumption

Renewables

- Biofuel production and usage
- Distributed renewable energy generation
- Biomass waste energy
- Solar electricity generation
- Wind powered electricity generation

Agricultural

- Agricultural N_2O reductions (NERP)

CO_2 Sequestration

- CO_2 capture and permanent geologic sequestration
- Enhanced oil recovery

Energy Efficiency

- Energy efficiency projects
- Waste heat recovery

Oil and Gas Methane

- Pneumatic devices
- Vent gas reduction

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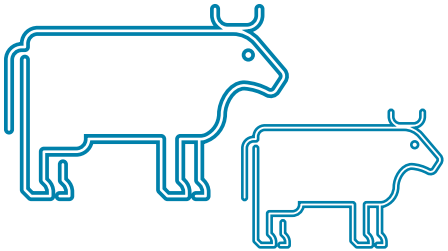
Updates to NERP projects

- NERP projects must comply with annual submission of all participating subprojects.
- The annual submission for the updated APPS will change from May 1st to July 31st, starting in 2025.
- The offset start date is January 1st if the project plan is submitted on or before July 31st or January 1st of the following year if the project plan is submitted after the July 31st deadline.
- If an annual aggregated project planning sheet is not submitted by the deadline, the project is unable to claim offsets for that vintage year.
- Updates and clarifications are included in the Standard for Greenhouse Gas Emission Offset Project Developers.

Beef cattle feeding protocol limited revisions

- Expanding the scope to include backgrounding operations.
- Including the option to use either live weight or hot carcass weight to calculate emission reductions per kilogram produced in the feedlot.
- Adding recognition for reductions from using steam-flaking corn.
- Analyzing options to include other feed additives.
- Anticipate public posting in March/April.



Improved Forest Management – Private Lands

Technical Seed Document – Improved Forest Management on Private Lands has been submitted to the Department.

Activities include extending rotation age, reducing harvest intensity, improving forest growth rates and mitigating wildfire risk.

Targeted lands include Métis Settlements and private lands.

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GHG Emission Reductions from Pneumatic Devices

- Version 3.0 published in December 2023.
- Forthcoming memo provides guidance on:
  - Overall Vent Gas Limit monthly reporting
  - Reconciliation requirements for sites with multiple pumps
  - Biannual inspections requirements for pumps
  - Correction to equation for volume of chemical injected

CO_2 Capture and Permanent Geologic Sequestration

- Version 2.0 released December 2024.
- Revisions include:
  - Eligible reservoir expansion
  - Definition and true-up requirements for a reversal
  - TIER liability clarity in the event of a reversal
  - Flexibility mechanism for liability limitation
  - Inclusion of direct air capture as eligible capture source
    - Removal credit type
  - Other updates and regulatory alignments
- Continued work on PPA possible inclusion

Where to Learn More

- Website will link to all relevant materials
  - Alberta Emission Offset System | Alberta.ca.
  - Subscribe to mailing list to stay up to date.

- Questions or concerns can be addressed to epa.ghg@gov.ab.ca.

Aggregate Facilities

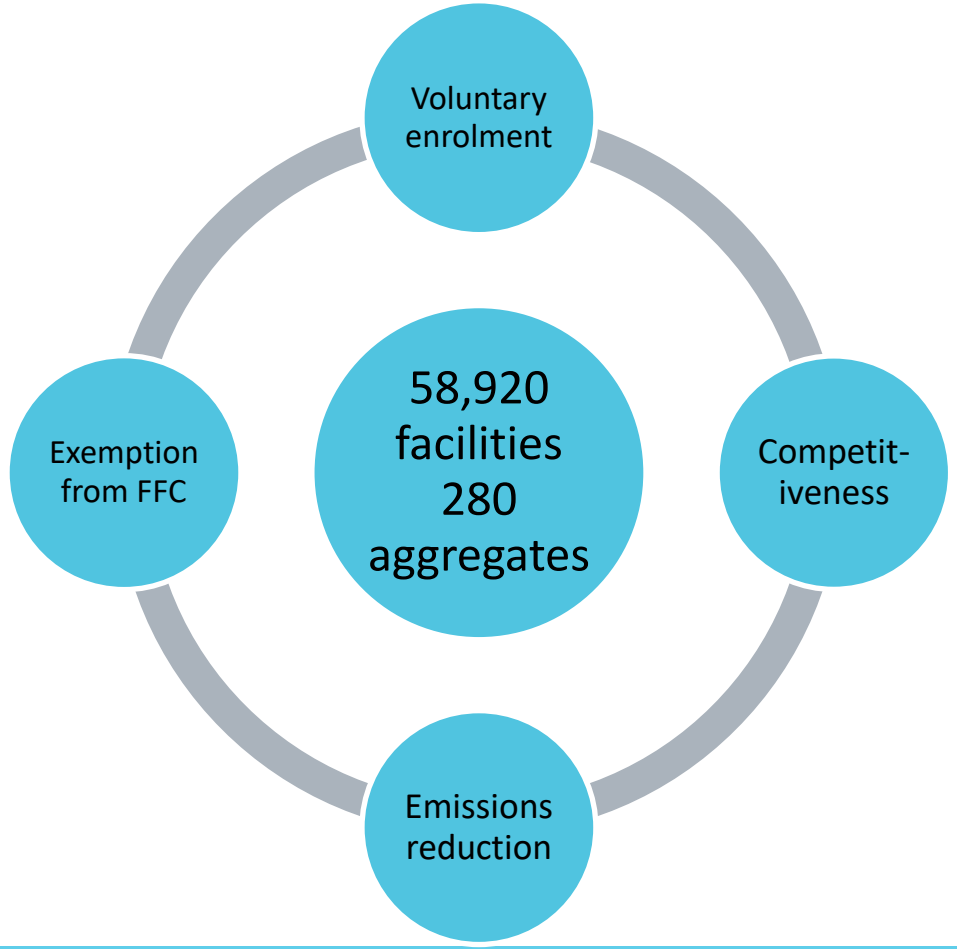
Environment and Protected Areas
February 28, 2025

Agenda

- Aggregate program background
- Enrollment updates and reminders
- 2023 aggregate facility emissions
- 2023 compliance issues
- 2024 compliance reporting updates
- 2024 default FSBs
- 2024 benchmark applications and requests

Facility Enrollment

TIER aggregate program background



Aggregate Enrollment Updates and Reminders

- Forms
  - New Designation, Add and Remove forms
- TBD IDs
  - TBD IDs : Director’s Yearly Review Complete
- Duty to notify both EPA and ECCC
  - Contact information, e.g. CRA audit
  - Change in Administrative information
- Petrinex Display current and previous year TIER information

Aggregate Enrollment Updates and Reminders (cont'd)

- Annual automatic renewal letters
  - For aggregates that have no change to their compositions
- Avoid double enrollment (e.g., in TIER aggregate and opt-in)
- Operator's responsibility to review their facility lists without delay

Aggregate Application Statistics

426	424	99.5%	7
Total Received Applications	Total Uploaded Applications	Upload Percentage	Average Review Business Days

Submission Date

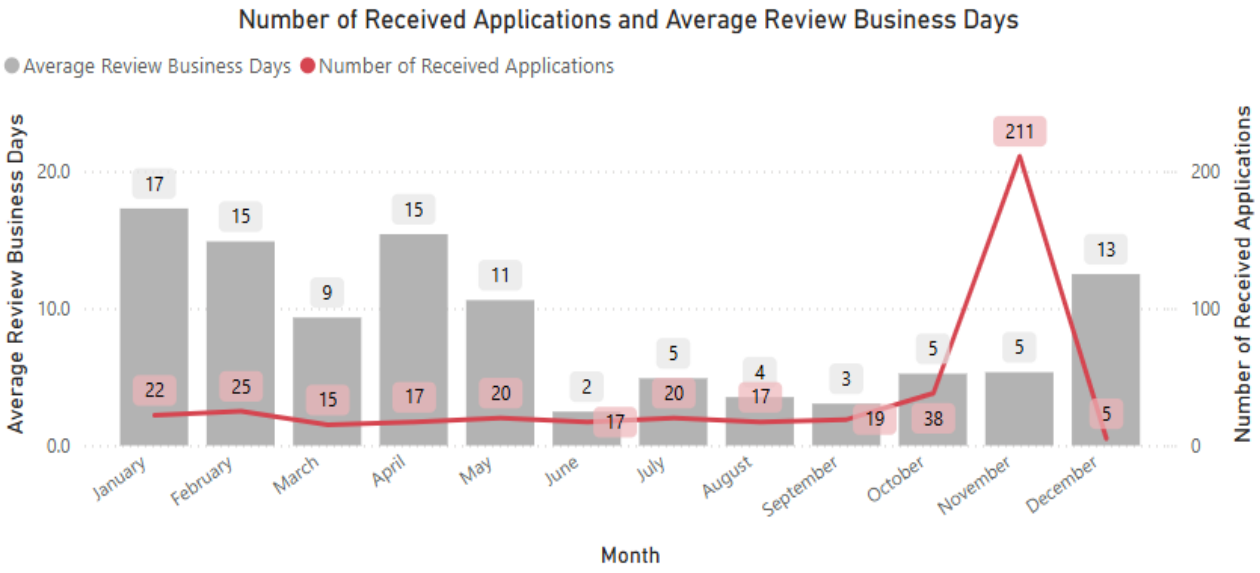
01/01/2024 31/12/2024

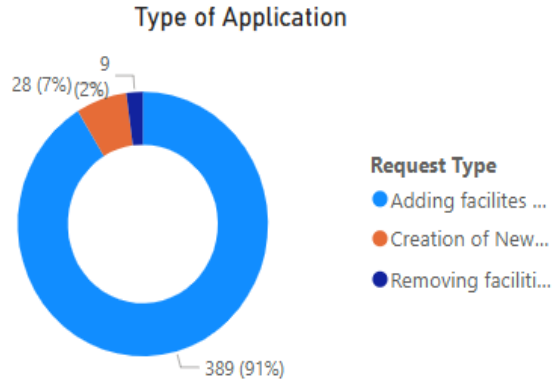
Request ID

All

Company

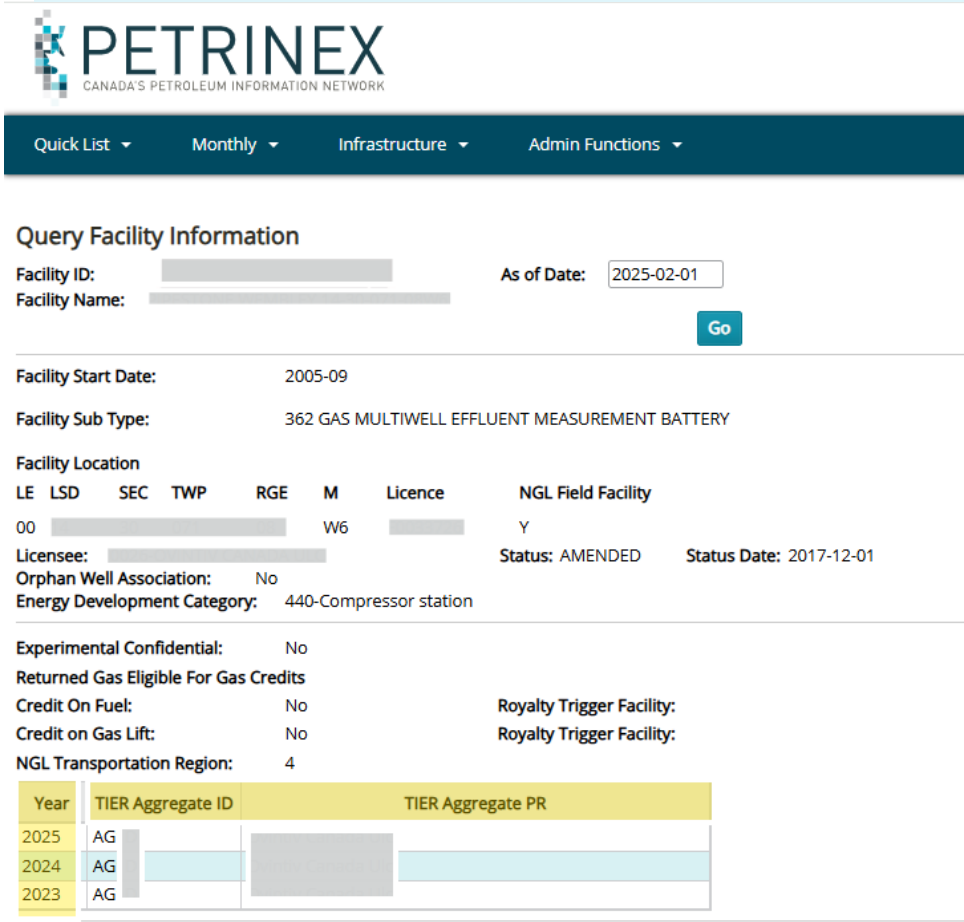
All





Petrinex TIER Aggregate Information

- Petrinex Facility enrolment display for 2023, 2024, 2025
- The CoR list is the official list for compliance purposes



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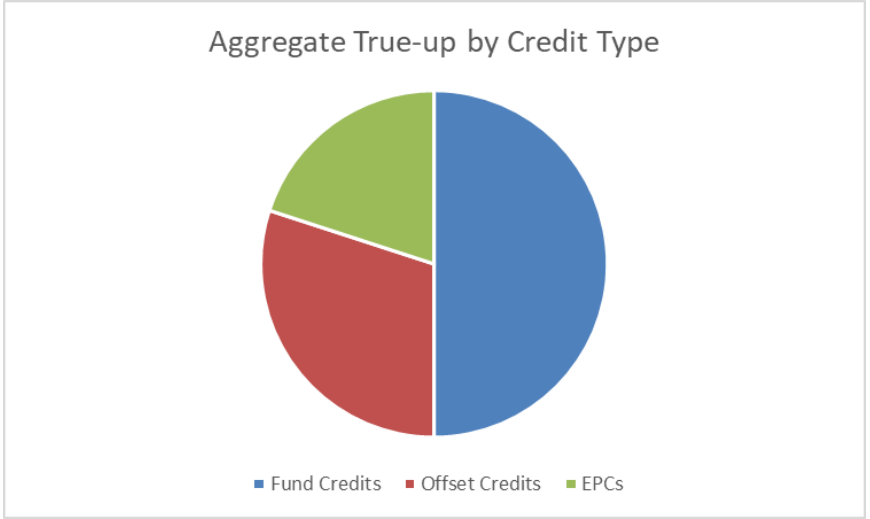
Compliance Reporting

2023 Aggregate Compliance Outcomes

- 263/264 compliance reports submitted
- TRE: 22.2 megatonnes of CO_2e, 3rd largest sector after OS *in situ* and OS mining and upgrading
- Credit usage
- 18 compliance orders
- Compliance rate: 95%



2023 Compliance Gaps

- Petrinex volumes amended following the submission of the report
- Status of EPC or EO credits not set to “Pending Retirement” on the Registries
- Wrong facility list (CoR)
  - TIER information in Petrinex infrastructure data is for reference only, not the official records.
- Inconsistent GHG quant methods reported vs benchmark reference years
  - E.g., default open flaring of rich gas in benchmarking vs. incinerators in the report
- Incorrect Facility Specific Benchmark (FSB) or product/benchmark unit
- Empty EPC comments in the EPC Request form
  - Section 15(4) of the TIER Regulation – “… include the information required…”

2023 Compliance Gaps (cont'd)

- Not updating TBD facility IDs with actual Petrinex IDs
- Did not submit FC Purchase Form ahead of payment and **note the aggregate facility ID in the deposit memo**
- No payment
- Referral to Crown Debt Collections, Treasury Board and Finance
  - A potential next step if a compliance order is breached

Reductions to Requested EPCs

- TIER Regulation, sections 20(1), 15(4)
  - "… the director may issue one or more…"
  - "… the report must … include the information required…"
    - Description of activities taken at the facility that resulted in emissions intensity improvements
    - Note: EPCs must result from a demonstrable improvement in facility performance, and cannot be generated through changes in reporting methodology
- Compliance standard, section 5.2.2
  - "The department reviews requests for EPCs and the director issues serial numbers for the credits generated, if approved."

What are “zero emitting” facilities?

- “zero emitting” facilities or “zero emitters”, for simplicity, are facilities that do not have fuel or flare volumes reported in Petrinex. E.g., some GS, PL, TM, MS, and IF.
- The department is addressing the issue of "zero emitting" facilities for 2024 FSBs.

B	C	D	E	F	G	H	I
ReportingFacilityID	SummedActivityID	2019	2020	2021	2022	2023	2024
ABGS0155	FUEL						
	FLARE-OtherGases						
	FLARE-ACGAS						
	DISP	706.1112	67398.66	66804.41	64306.03	71488.03	66984.53
	PROD, PROC, FRAC						
	REC	706.1112	67398.66	66804.41	64306.03	71496.77	66984.53

Year 1	Facility	Production Volume	Emissions	Intensity
Field 1	ABBT 1	100	5	
	ABBT 2	100	5	
Field 2	ABBT 3	100	5	
	ABBT 4	100	5	
Total		400	20	0.050
Year 2				
Field 1	ABBT 1	200	10	
	ABBT 2	200	10	
			0	
Field 2	ABBT 3	200	10	
	ABBT 4	200	10	
Total		800	40	0.050
Year 2				
Field 1	ABBT 1	200	10	
	ABBT 2	200	10	
	ABGS (new)	800	0	
Field 2	ABBT 3	200	10	
	ABBT 4	200	10	
Total		1600	40	0.025

Ideas on addressing “zero emitting” issues

- Production is in general a more robust and preferred benchmark unit as most emission sources are often associated with facilities that have production volumes. Most “zero emitting” facilities typically do not have production volumes (only REC and/or DISP).
- Are there REC or DISP volumes that are associated and well correlated with emission sources but not captured by PROD, PROC, FRAC at least once?

Ideas on addressing “zero emitting” issues (cont’d)

- How many times are the production accounting volumes counted at various facilities based on the benchmark unit?
  - Are they consistent between benchmarking and reporting (e.g., a new “zero emitting” facility that reported volumes in a compliance year but not in the reference years)?
- Are the emissions associated with producing the "zero emitting" volumes, especially third-party volumes, reported within the aggregate?
- If the "zero emitting" facilities’ production accounting (on the benchmark unit) volumes are removed from the aggregate, are there any emissions left in the report that do not have any production accounting volumes associated with them?

Ideas on addressing “zero emitting” issues (cont’d)

- What is the percentage of third-party volumes in the aggregate? The From/To column can be used to extract internal and external (non-op) volumes.
  - Do third-party volumes go through the same processes as the native volumes and have the same emissions profiles?
- If the benchmark unit is not Production, are there any concerns of changing the benchmark unit to Production?
- The purpose is to ensure accounting consistency, fair comparison between benchmarking and reporting, and demonstrable emissions intensity reduction.

Ideas on addressing “zero emitting” issues (cont’d)

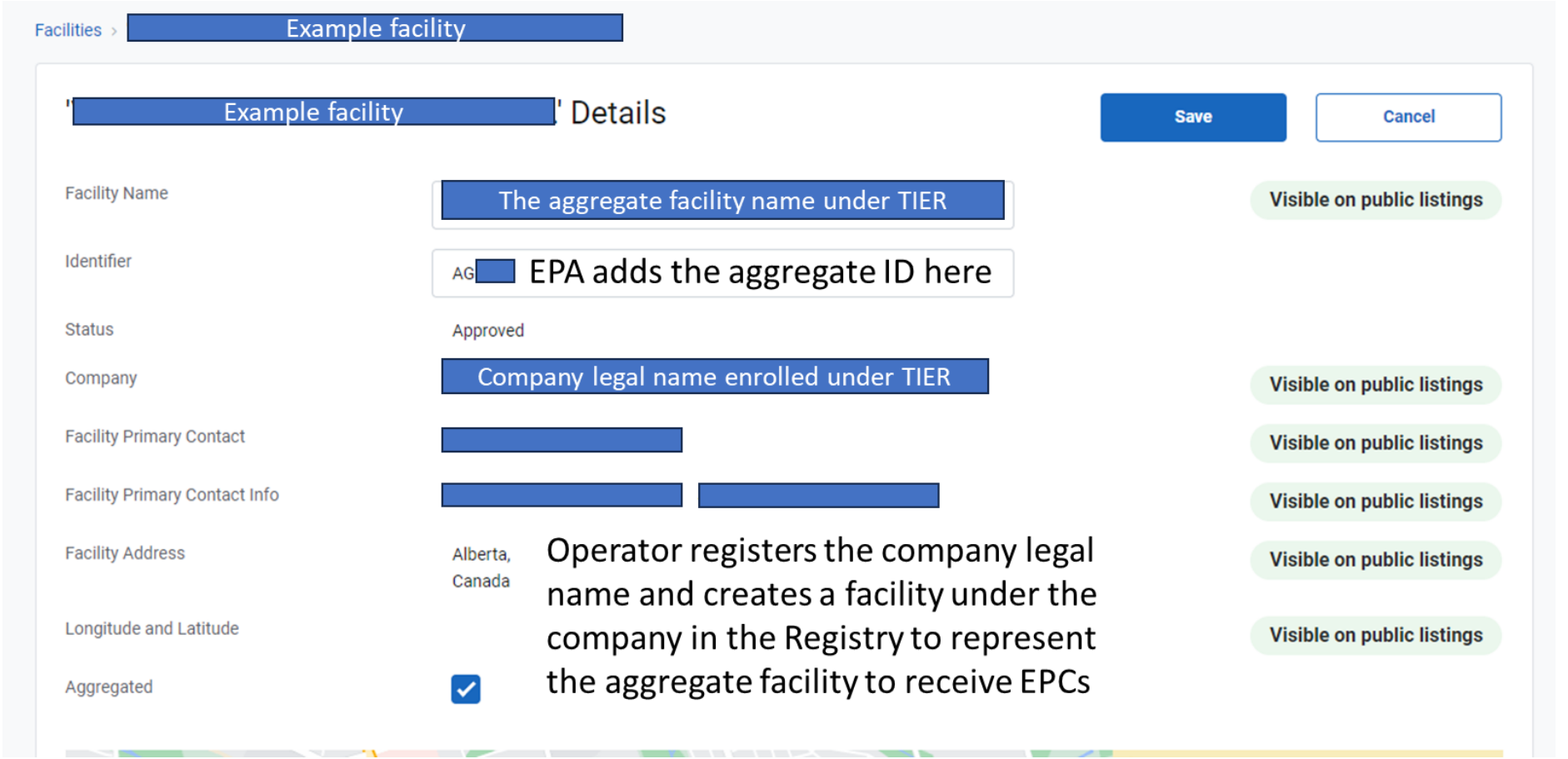
- The department is planning the following process for default FSB and benchmark applications
  - Scan for “zero-emitters”, with a focus on facilities that have 5% or more production accounting volumes compared to the aggregate total volume.
    - Also scan for new “zero-emitters” that do not have data in the reference years.
  - Switch the benchmark unit to Production if possible
    - Correlation results should be better or comparable based on Production
    - No significant volumes that are associated and well correlated with significant emissions are missed
  - Otherwise, use REC or DISP excluding certain volumes
    - E.g., DISP to non-op (external facilities), REC excluding GS volumes

Ideas on addressing “zero emitting” issues (cont’d)

- Supporting information on benchmark unit changes or adjustments will be included in the default FSB assignment letters / emails
- Meetings can be requested by replying to the FSB assignment email

Aggregate EPC Issuance

- If you have not done so, please create a facility that represents the aggregate facility under your company in the Registry. For details, please refer to the Alberta Carbon Registries Manual (Help - Resources; e.g., **Create a Facility** on page 37 of 47).
- Having an account in the Registries for offset projects does not mean there is a facility created under the account for the aggregate to receive (or use) EPCs


Facilities
Example facility
' Example facility ' Details
Save
Cancel
Facility Name
The aggregate facility name under TIER
Visible on public listings
Identifier
AG EPA adds the aggregate ID here
Status
Approved
Company
Company legal name enrolled under TIER
Visible on public listings
Facility Primary Contact
Visible on public listings
Facility Primary Contact Info
Visible on public listings
Facility Address
Alberta, Canada
Visible on public listings
Operator registers the company legal name and creates a facility under the company in the Registry to represent the aggregate facility to receive EPCs
Longitude and Latitude
Visible on public listings
Aggregated

2024 Aggregate Reporting Reminders

- All compliance reports need to be third-party verified
  - E.g., retracing and reviewing the **original data records** (e.g., Petrinex) for the year
- Register **both** aggregate facility and company **names** on the Alberta Carbon Registries to receive EPCs and retire them for compliance usage
- Use the latest Confirmation of Regulation List issued for **2024**
  - Automatic renewal letters were sent to aggregates that did not have population changes
- Submit FC Purchase Form ahead of payment: **Note AGID in deposit memo**
- $80 per tonne to obtain one fund credit for 2024 compliance true-up
- 70% credit usage limit
- 14% and 12% reduction targets for SFC and flaring emissions, respectively
- Due June 30, 2025
- Addressing the issues of “zero emitting” facilities through benchmarking – a potential change of unit for some aggregates

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2024 Aggregate Compliance Report Form Update

- In tab B2, AESO IDs and relevant Petrinex IDs that supplied the gas for power generation (exported electricity or data centre electricity)
  - Read the **pop-up Note** for details
  - Memo sent out recently
- Credit usage limit, fund credit price, reduction targets
- Electricity HPB / **FSB** (new), the same value of 0.3552 tonnes CO_2e/MWH for 2024

Electricity for data centres / computing load

- Definition in BM standard (new)
- “data centre electricity” means electricity generated at a conventional oil and gas site which is part of a TIER aggregate and used on-site for powering of data centres (i.e., for a host on-site computational load).

Computing Load at Aggregate Facilities

- New, simplified process for allocating electricity emissions for aggregate facilities with computing loads (e.g. cryptocurrency mining)
- Facilities with integrated electricity production can report the generated electricity and receive an FSB equal to the TIER electricity HPB for electricity.
- Eligible electricity uses include:
  - Export to the Alberta Interconnected Electricity System
  - On-site use for computational load by aggregate facility
  - Use by third-party host computational load (data centres, cryptocurrency mining)
- Requests for benchmarks for integrated electricity production must be made to the department, similar to other aggregate FSBs.

Facility-Specific Benchmark

2024 Facility-specific Benchmarks

In 2024, EPA received

- 10 notifications for benchmark units
- 22 notifications for benchmark years
- 9 benchmark applications

Three types of benchmarking for 281 facilities in 2024

- Director's default benchmark (31 facilities)
  - Assigned to facilities for their first compliance year if no benchmark application is submitted
  - Use the public Petrinex data and Director's default emission factors
- Default benchmark adjustment (241 facilities)
  - Assigned to facilities that did not submit benchmark applications for 2024
  - Previous SFC emissions and flare emissions are available in the submitted CRs or FSB applications;
  - Population adjustment may apply
- Benchmark application (9 facilities)
  - Assigned after the acceptance of the submitted FSB applications

Selecting a Benchmark Unit

- “The benchmark unit (s) for an aggregate facility must be **representative** of the aggregate facility’s composition, configuration and emissions” (Section 9.1.2 of the TIER Standard for Developing Benchmarks v2.3)

Selecting a Benchmark Unit (cont'd)

- Option 1 - Utilizing one of the following benchmark units:
  - Production (PROD, PROC, FRAC)
  - Disposition (DISP) or
  - Receipts (REC)

  of specified energy products, expressed in m^3 oil equivalent volumes.
- Option 2 – Utilizing an alternative benchmark unit derived from any other Petrinex activity category using a single or multi-products. Multi-variable linear regression would be used in the case.
  - E.g., DISP to External (non-OP)

Selecting a Benchmark Unit (cont'd)

- Pearson's correlation coefficient, r_{Agg}, is used to evaluate the representativeness of a benchmark unit
- Correlation coefficients, ranging from -1 to 1, can be categorized into four simplified categories
  - Typically, the following categories can be used to indicate the strength of a correlation (positive or negative):
    - Weak: |r| < 0.3
    - Moderate: 0.3 <= |r|<0.5
    - Strong: 0.5 <= |r| <0.7
    - Very Strong: |r| >=0.7
  - Two correlation coefficients that are within 0.2 are considered at a comparable level

Selecting a Benchmark Unit (cont'd)

- Poor correlations could mean significant and maybe unfair fluctuations in payments and/or EPC credits

- Consider "zero emitters"

  - Use PROD, PROC, FRAC, or
  - Use REC or DISP excluding certain "zero emitting" volumes (evolving).

Example Correlation Matrix for an Aggregate

- The department generates correlation matrices for each aggregate for the approved reference years and the most recent three years, using volumetric data in Petrinex

	FUEL+FLARE	FUEL	FLARE
PROD, PROC, FRAC	0.87	0.89	-0.63
DISP	0.85	0.86	-0.58
REC	0.85	0.86	-0.54

	FUEL	DISP	FLARE	PROD, PROC, FRAC	REC	FUEL+FLARE
FUEL		0.86	-0.51	0.89	0.86	1.00
DISP			-0.58	0.97	1.00	0.85
FLARE				-0.63	-0.54	-0.45
PROD, PROC, FRAC					0.94	0.87
REC						0.85
FUEL+FLARE						

Selecting Benchmark Years

- Benchmark years and units are inter-connected and are evaluated together in correlation analyses
- “The default reference period includes the year prior to being accepted into TIER and the first two years regulated under TIER.”
  - Table 7, section 9.1.1, Standard for Developing Benchmarks (v2.3)
- The intention of allowing two or three reference years (vs. one year) is to capture a **representative** period of an aggregate facility’s operations

Requests to Change Reference Years / Units

- To request for reference years other than the default three years or changing product unit, submit
  - Aggregate Facility Reference Years Notification Form; or
  - Benchmark Unit Request Form

to the department on or before September 1 of the year to which the benchmark is to apply.

- Supporting information of changes to population, operation, and/or product is required for the proposed years / units
  - TIER Reg section 7 (6)(b) the regulated facility has undergone a significant expansion or significant change, (c) the product has significantly changed
  - The proposed years / units are more representative

Benchmark Application

- 2024 benchmark applications are being reviewed
  - Correlations for each BM year and for all BM years, and for fuel, flare, and flare +fuel
  - Volumes: 2024 COR casted back to BM years, and no adjustment applied
  - GHG quantification methodologies
  - Benchmark unit will be evaluated in the context of the “zero emitter” effect

Reminders

- If you would like to submit a benchmark application for the 2025 compliance year, the deadline is September 1st, 2025
  - The benchmark applications need to be third-party verified
  - In preparing a benchmark application, companies should consider and assess what production unit is the most representative
  - Additional data submissions are allowed before January 31st, 2026 (new).

2024 Default Benchmark Adjustment

- Use data from the submitted compliance reports or FSB applications
- Re-evaluate the representativeness of the current BM unit and BM years for aggregates that are impacted by the “zero emitter” effect
- Adjust FSBs to account for significant population change impacts
  - Added and updated formulas for i, icast and intensity ratio in the *Standard for Developing Benchmarks*
  - An intensity ratio is calculated separately for each of the fuel and flare categories, based on the total Petrinex volumes for all benchmark years
- Internal computer code was developed / updated to assist in the adjustment process

2024 Benchmark- 4 key Intensity Equations

- SFC

$$i_{SFC} = \frac{\sum_{y=1}^{n} V_{SFC,y,l_y}}{\sum_{y=1}^{n} V_{PROD,y,l_y}}$$

Equation 9-13

$$icast_{SFC} = \frac{\sum_{y=1}^{n} V_{SFC,y,l_r}}{\sum_{y=1}^{n} V_{PROD,y,l_r}}$$

Equation 9-15

- Flare

$$i_{FL} = \frac{\sum_{y=1}^{n} V_{FL,y,l_y}}{\sum_{y=1}^{n} V_{PROD,y,l_y}}$$

Equation 9-14

$$icast_{FL} = \frac{\sum_{y=1}^{n} V_{FL,y,l_r}}{\sum_{y=1}^{n} V_{PROD,y,l_r}}$$

Equation 9-16

Benchmark Adjustments for Population Changes

- FSB adjustment depends on the Intensity Ratio (IR_{fuel} or IR_{flare})

$$IR_{SFC} = icast_{SFC} / i_{SFC} \qquad IR_{flare} = icast_{FL} / i_{FL}$$

(*icast*: Intensity of Petrinex fuel or flare at the BM years using the COR lists of 2024 compliance year,

i: Intensity of Petrinex fuel or flare at the BM years using COR list of the BM years)

Fuel/Flare Intensity Ratio IR	SFC Emissions Adjustment	Non-Petrinex SFC Emissions Adjustment	Flaring Emissions Adjustment
0.98 < IR < 1.02	No adjustment	No Adjustment	No Adjustment
1.02 =< IR <= 1.10	Multiply by IR	Multiply by IR	Multiply by IR
IR > 1.10	Multiply by IR	No Adjustment	Multiply by IR
IR < 0.98	Multiply by IR	Multiply by IR	Multiply by IR

- **Note:** If there is not population change since the benchmark was previously assigned, no adjustment will be applied.

2024 FSB Population Impact Analysis

Table 2: Data used for calculating ratios of 2024 to past fuel intensities

Item	2019	2020	2021	2022	2023	2024	Combined (All Reference Years)	
Fuel (prior facility list)	31270.4	30099	38734.3	38137.4	43569.5		68833.3	A
Flare (prior facility list)	1481.6	1667.7	2031.6	1975.6	1544.8		3699.3	B
Production Accounting Volume (pr	901750.4627	844864.7402	1093886	1291146	1486689		1938750.552	C
Prior F/P Intensity (a.k.a, "i" as in C	-						0.035503949	D
Prior FL/P Intensity	-						0.001908085	E
Fuel (2024 facility list)	29811.4	29147.7	37855.2	38137.4	43572.6		67002.9	
Flare (2024 facility list)	1086.8	1475.9	1959.5	2025.8	1554.3		3435.4	
Production Accounting Volume (20	879354.3826	839936.3784	1086075	1291308	1516978		1926011.689	
Current F/P Intensity for Ref Yrs (a	-						0.034788418	
Current FL/P Intensity for Referenc	-						0.001783686	
Ratio (icast_SFC/i_SFC)							0.979846453	
Ratio (icast_FL/i_FL)							0.934804458	
Benchmark Unit						PROD, PROC, FRAC		
Reference Years						2020 2021		

Equation 9-13 (D = A/C)

Equation 9-14 (E = B/C)

Equation 9-15

Equation 9-16

Example FSB letter supporting workbook

- Highlighted intensity ratios will be the scaling ratio for both SFC ($\frac{icast_{SFC}}{i_{SFC}}$) and flaring ($\frac{icast_{FL}}{i_{FL}}$).
- Using the Intensity ratios cut offs, will apply the appropriate adjustments

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FSB Calculation

- $FSB_j = \frac{E_{SFC,tj} \times (1 - RT) + E_{FL,tj} \times (1 - RT_{FL})}{P_{t,y,l_y}}$ Equation 9-19(a)
- $E_{SFC,tj} = \sum_{y=1}^{n} E_{SFC,y,l_y} \times \frac{icast_{SFC}}{i_{SFC}}$ Equation 9-17
- $E_{FL,tj} = \sum_{y=1}^{n} E_{FL,y,l_y} \times \frac{icast_{FL}}{i_{FL}}$ Equation 9-18

FSB Adjustment

AggregateFacilityID	2020 Total Production Volume (m3OE) (P20)	2020 Pet Em. (A)	2020 non Pet Em. (B)	2020_Total Flare Em. (C)	2021 Total Production Volume (m3OE) (P21)	2021 Pet Em. (D)	2021 non Pet Em. (E)	2021_Total Flare Em. (F)
	839936.3784	66071.8936	2747.509	3825.510662	1086075.31	87276.8065	12163.9509	5078.994608

Ratio (icast_SFC/i_SFC) (G)	EPA Adjusted SFC Emissions (All refYear combined)	Ratio (icast_FL/i_FL) (H)	EPA Adjusted Flare Emissions (All refYear combined)	EPA Assigned 2024 FSB	Three sig figs (B*D)
0.979846453	164869.121	0.934804458	8323.971219	0.077420371	0.0774

SFC: (A+B+D+E)*G

FL: (C+F)*H

(SFC*(1-14%)+ FL*(1-12%)) / (P20 + P21)

Example FSB letter supporting workbook- cont.

- We simply plug in the adjusted SFC and flare emissions from Equations 9–17 and 9–18 into Equation 9–19(a) to derive each facility's final benchmark.

FSB checks - Data Validity Through Automation

- **Automated Tools**: we have setup python script to fast track the FSB generation and internal checks to ensure data accuracy and integrity.
- **Cross-Source Volume Comparisons:** We analyze data from multiple sources to validate volumes used for benchmarking, including:
  - Prior compliance reports
  - Benchmark applications
  - Default calculations derived from Petrinex data
  - Historical snapshots (e.g., comparing Petrinex volumes from today vs. one year ago) to isolate recent data amendments that impact benchmarking
- **Continuous development**
  - Regular code updates ensure scalability as data size increase.
  - Frequent reviews of flagged items by tracking changes and known issue to maintain high data accuracy and integrity.

Alberta

Contact the Department

Conventional Oil and Gas
Climate Regulation and Carbon Markets
Alberta Environment and Protected Areas

Web site:
https://www.alberta.ca/conventional-oil-and-gas.aspx

- Email: EPA.GHG@gov.ab.ca
- Request an MS Teams meeting
- Request a phone call back

Specified Gas Reporting Regulation (SGRR)

SGRR Overview

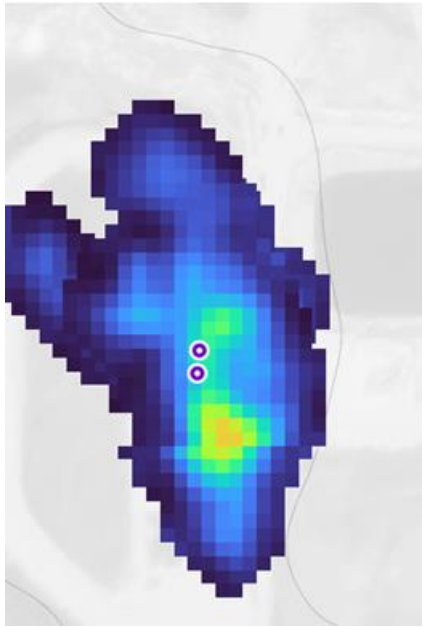
- Alberta's mandatory Greenhouse Gases (GHG) reporting program for facilities emitting over 10,000 tonnes of CO_2 equivalent per year
- Single Window with Environment and Climate Change Canada (ECCC) GHG Reporting Program
- 780 facilities reported to SGRR for 2023
- Annual reporting deadline is ***June 1***

SGRR/GHGRP links

- Federal GHGRP Single Window Information Management (SWIM) website: https://ec.ss.ec.gc.ca/
- SGRR: https://www.alberta.ca/specified-gas-reporting-regulation
- GHGRP: https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/facility-reporting/about.html
- Boundary file link (use polygon, not line features): https://www.alberta.ca/system/files/custom_downloaded_images/sgrr-steps-to-creating-a%2520-facility-boundary-map.pdf

Public Satellite and Aircraft Measurements

- Public Data: Dashboard | Carbon Mapper



Thank You