

2023

CCUS AND **BUSINESS CERTAINTY**

NAVIGATING POLICIES, INCENTIVES, AND CREDITS
FOR CARBON CAPTURE AND STORAGE PROJECTS
IN ALBERTA



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Executive Summary

Carbon capture, utilization, and storage (CCS/CCUS) technologies are a solution for hard-to-abate and critical industrial sectors to make reductions in GHG emissions. Businesses considering large-scale CCUS always ask the question relating to their bottom line – is there a business case for this project? When exploring that question, capital and operating expenses, although detailed, can be relatively straightforward. However, there is less certainty about how benefits offered through credits and incentives factor into the accounting equation. An ever-growing number of emission reduction programs and policies are being put forth by federal and provincial governments to incent industry to reduce emissions, including through the implementation of CCUS technologies. Navigating the layers of support, incentives and credits, as they pertain to cost savings and revenue-generating opportunities, can be complex.

Canada's first large-scale CCUS projects, Boundary Dam CCUS and Shell's Quest, had initial capital and operating costs of more than a billion dollars each. Government support was critical for the success of the projects. Those grant-type supports were effective to aid in the development of a first-of-a-kind project that showed Canadian leadership on the global landscape. The next wave of CCUS projects in Canada will be enabled through different mechanisms that offer broader support to many industries, some of which are expected to decrease as the price on carbon emissions increases.

The focus of this report is on projects that will be developed in Alberta, Canada. In the province, CCUS capture facilities have been proposed at facilities across a wide range of industrial sectors including cement, oil and gas, electricity generation, and petrochemical manufacturing. In order to be successful, these next projects need credit revenues and government support.

The report identifies and explains each of the key federal and provincial government incentives and supports available to CCUS projects in Alberta, and the different types of credits that could be generated on a sector-by-sector basis. This resource hopes to support the development of robust and well-informed project feasibility assessments and may help prospective CCUS projects identify how government incentives impact financial models. The work highlights the varying support across different industrial sectors, creating a starting point for identifying any gaps, challenges and opportunities between sectors. The report maps provincial and federal incentives, credits and supports across industrial sectors including upstream oil production, power generation, downstream petroleum manufacturing, bioenergy, direct air capture, renewable fuels, renewable natural gas, hydrogen, fertilizer and cement manufacturing. Key takeaways are listed below.

FEDERAL TAX INCENTIVES Across all industrial sectors, CCUS projects and facilities along the capture, transportation and sequestration pathway can access federal tax incentives. The federal government has published legislation showing that CCUS projects will receive an investment tax credit (CCUS ITC) of 37.5% to 60% for eligible carbon capture CO₂ transport and storage equipment up to the year 2030, with rates halved between 2031 and 2040. Capital cost allowance classes (CCA) have been created for CCUS-related property, and through the Accelerated Investment Incentive have higher rates and more favourable rules in the first year a property is purchased. However, the CCUS ITC, and most classes of CCUS capital cost allowance, are not available for enhanced oil recovery (EOR) projects.



FEDERAL CARBON CAPTURE DIFFERENCES To address political uncertainty over the future of climate policy the federal government has proposed it would enter into bilateral contracts with proponents over the market price for credits, including CCUS credits. The federal government has identified the source for carbon contracts for difference (CCfD) funding and the organization that will administer the fund but is otherwise still at the early stages of developing this incentive.

TRANSFER OF LONG-TERM LIABILITY Following project closure, all Alberta-based CCUS projects (except EOR) also have the ability to transfer many forms of long-term liability and remaining project assets to the provincial government, provided the project has sequestration tenure, has prepared a Closure Plan and updated it through the project operations period, and has received a project Closure Certificate.

ALBERTA CARBON CREDITS In Alberta, CCUS and EOR projects are able to generate Alberta Emission Offset Credits under the Technology Innovation and Emissions Reduction (TIER) Regulation. CCUS proponents may then have the ability to convert Alberta Emission Offsets into Sequestration Credits, and then again into Capture Recognition Tonnes, and potentially into Emission Performance Credits. Understanding the details of how, when and why to convert credits and apply them is important for projects in maximizing the potential opportunities for CCUS crediting in Alberta.

CARBON DIOXIDE REMOVALS Both Direct Air Capture with CCS (DAC-CCS/DAC) projects and Bioenergy with CCS (BECCS) projects currently have impediments to generating Alberta Emission Offsets. Project proponents will need project-specific approvals from the province to enable credit generation for DAC and BECCS. Additionally, DAC and BECCS may be eligible to generate credits under the federal Output-Based Pricing System (OBPS) offset credit system. The federal government has a quantification protocol for DAC-CCS under development and has announced a quantification protocol for BECCS is also pending

APPLICATION-BASED GOVERNMENT ASSISTANCE Provincial and federal governments provide project-specific investments through a variety of organizations and programs. Relatively smaller-scale programs are critical to the development of CCUS technologies and early-stage project development including feasibility and front-end engineering and design studies. Larger programs, such as the Strategic Innovation Fund, invest directly in the construction phase of innovative CCUS projects often through repayable and partially forgivable loans. Application-based programs are competitive, are based on specific project circumstances and cannot be generalized across different industrial sectors.

CLEAN FUEL REGULATIONS The federal government has introduced Clean Fuel Regulations (CFR) that apply to parties that produce or import retail gasoline or diesel in Canada. CCUS projects that capture CO₂ at a facility along the gasoline or diesel or gasoline life-cycle pathways, and developers of renewable fuels that include CCUS in facility operations may be eligible to generate CFR Credits.

OTHER POLICIES IN DEVELOPMENT Details on potential programs under development, such as an Alberta Petrochemical Incentive Program (APIP)-style program tailored for CCUS projects, will provide greater certainty for prospective projects. Additionally, the federal government has introduced a Clean Electricity Regulation, which would directly impact power generators and CCS projects in other sectors making decisions on the type of any fuels used in production and the inclusion of combined heat and units.



There are many crediting opportunities and incentives for CCUS already in place, but also a marked lack of certainty. A number of additional incentives and details on policies intended to deliver critical assistance for CCUS projects, and that would support proponents in investment decisions, remain under development, which causes concern. The list of policies still under development and that require attention from policymakers includes:

1

Carbon Capture Utilization and Storage Investment Tax Credit

- Clarity is required to understand whether other forms of government assistance may reduce tax credits received by CCUS proponents
- Crown corporations, Indigenous community-led enterprises and municipalities are not “qualifying taxpayers” and are ineligible for the CCUS ITC. Given the broad scope of these organizations, there may be an argument to contemplate equivalent support.

2

Carbon Contracts for Difference

- CCfDs are intended to address political uncertainty and provide some level of confidence in carbon price. However, the government has yet to begin proposed consultation with stakeholders. Critical details on CCfDs remain outstanding.

3

Quantification Protocols for CDR

- In the federal and provincial offset systems, protocols guiding the quantification of credits from BECCS and DAC projects remain outstanding.

Proponents across several industrial sectors are proposing CCUS to reduce facility GHG emissions and gain a competitive edge in the low-carbon economy by reducing the carbon intensity of their products. Gaining clarity on these essential policies, incentives and supports for CCUS projects is of paramount importance.





About Us

EMISSIONS REDUCTION ALBERTA (ERA)

ERA was created in 2009 to help deliver on the province’s environmental and economic goals. Since 2009, ERA has been investing revenues from the carbon price paid by large emitters to accelerate the development and adoption of innovative clean technology solutions. These technologies will lower costs, improve competitiveness, and accelerate Alberta’s transformation to a low emissions economy.



INTERNATIONAL CCS KNOWLEDGE CENTRE (KNOWLEDGE CENTRE)

The International CCS Knowledge Centre was founded in 2016 as a non-profit organization by BHP and SaskPower, with its head office in Regina, Saskatchewan. The organization is dedicated to advancing the understanding and use of large-scale carbon capture and storage as a means of managing greenhouse gas emissions.





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1. Introduction

Carbon capture utilization and storage (CCUS) is gaining considerable interest globally. The momentum to develop large-scale CCUS to mitigate CO₂ emissions from industrial activities continues to grow, including in Canada, an early global leader in the development of CCUS projects. CCUS technology will be an essential part of Canada's efforts to meet its Nationally Determined Contribution (NDC)- its target to reduce greenhouse gas (GHG) emissions 40 to 45% below 2005 levels by 2030 as committed under the Paris Agreement¹, and to achieve its legislated target of net-zero GHG emissions by 2050². With exceptional large-scale storage potential, Western Canada – Alberta in particular – is advancing in efforts to support the development of large-scale CO₂ sequestration projects.

Alberta has vast geology well-suited for the sequestration of CO₂, and a regulatory framework that both supports projects and ensures sequestration is permanent. Capitalizing on this, large industrial operators have proposed several carbon capture and storage (CCS) projects, with some approaching critical investment decision points. To support this development, federal and provincial governments have proposed a number of project-level incentives. In Budget 2021³, the Government of Canada first announced the CCUS Investment Tax Credit with the goal of reducing emissions by over 15 Mt annually. According to the International Energy Agency, carbon capture projects in planning or development stages in Canada have a combined nameplate capacity of 26 Mt of CO₂ annually, with the majority located in Alberta. Recent scenario analysis by the Canadian Energy Regulator shows that Canada may need as much as 60-80 Mt of CO₂ sequestered annually by 2050 to achieve net-zero GHG emissions targets. With these metrics in mind, emitters have become acutely aware that time is of the essence to make step-change reductions in GHG emissions and to secure a competitive edge associated with meeting the growing global demand for low-carbon products.

A Final Investment Decision (FID) to develop a CCUS project is a significant financial commitment and requires the alignment of business opportunities and clear policy incentives. Business plans for CCUS projects factor in the maturity of technologies, the availability of infrastructure, and access to key material and labour supply chains. Weighed with these considerations is the support that government policies and programming can contribute to reducing project costs or providing other forms of assurance. Key government policies such as a regulated, known, and stable price of carbon and carbon credits; clear, significant, and easily accessible incentives; and clear regulatory frameworks impact the viability of CCUS projects.

Policies that explicitly support CCS, such as regulations that mandate or incentivize emission reductions or government initiatives that specify targets for CCS deployment, provide confidence to developers that there is a long-term vision and commitment to reduce emissions. Given the capital-intensive nature of CCUS projects and the fact that they often lack revenue streams other than environmental credits, government incentives play a crucial role in bridging the financial viability gap.

Both the federal and Alberta provincial governments have dedicated policy and programming to incentivize the deployment of CCS in the province. When these incentives are coupled with environmental crediting systems, both capital and operating costs can be reduced for project developers.

While there is a concerted and ramping effort from governments and operators to reduce GHG emissions with CCUS, the layers and details of policy over various industries result in a not quite one-size-fits-all approach. **Navigating business certainty for a CCUS project is complex because not all projects have the same opportunities.** Different projects may be eligible for varying incentives, support and credit types.

This report introduces key federal and provincial government incentives and supports available to CCUS projects, and the different types of credits

that could be generated on a sector-by-sector basis. It intends to support the development of robust and well-informed project plans, though individual projects will need to consider opportunities on a case-by-case basis. An understanding of differing support across project types and sectors will also provide a starting point for policymakers to evaluate solutions for gaps or challenges facing industrial sectors with fewer supports.

Table-1: Industrial Sectors Analyzed

<p>Bioenergy with CCS (BECCS) The production of energy using biomass as feedstock, and the capture and geologic sequestration of the associated biogenic CO₂ emissions.</p>	<p>Cement Manufacturing The heating of limestone, clay and sand before further refinement.</p>	<p>Direct Air Capture with CCS (DAC-CCS) The capture of CO₂ from ambient atmosphere rather than an industrial point source, and geologic sequestration of the captured CO₂.</p>	<p>Downstream Petroleum Manufacturing Refining and processing of crude oil feedstock into end-use products such as gasoline, diesel and jet fuel.</p>
<p>Fertilizer Manufacturing The production of plant nutrients, primarily nitrogen-based solutions.</p>	<p>Hydrogen Manufacturing Extraction of hydrogen gas, from water or hydrocarbons.</p>	<p>Petrochemical Manufacturing The conversion of hydrocarbons into a range of chemicals and plastics.</p>	<p>Power Generation Relevant to CCS is electricity generated from fossil fuel energy sources.</p>
<p>Renewable Fuels Manufacture of gasoline or diesel replacement fuels from sustainable sources like plants or waste lipids.</p>	<p>Renewable Natural Gas The production of methane derived from organic waste sources such as landfills and agricultural operations.</p>	<p>Upstream Oil Production The extraction of crude oil from geologic reservoirs.</p>	

This report will provide an introductory overview of the federal and provincial incentives, supports, and credits listed in Table-2.

Table-2: Summary of Analyzed and Current Government Incentives, Supports, and Credits

	Government of Canada	Government of Alberta
Government Incentives and Supports	CCUS Investment Tax Credit (CCUS ITC)	Transfer of long-term liability
	Capital Cost Allowance (CCA) classes	
	Proposed Carbon Contract for Differences (CCfD)	
	Application-Based Government Investments	
Environmental Credits	Clean Fuel Regulation (CFR) Credits (CFR)	Technology Innovation and Emissions Reduction (TIER) Offset Credits
	Output-Based Pricing System (OBPS) Offset Credits	Sequestration Credits
		Capture Recognition Tonnes
		Emissions Performance Credits (EPCs)



2. Application-Based Government Investments

Application-based project investments from governments incentivize economic diversification and innovation by improving project financing options and mitigating project-level risks associated with the utilization of new technologies. Funding is allocated via competitive processes that are time-limited and have a fixed program budget with specific and sometimes narrow guidelines, scopes, objectives and supports. Government-affiliated financial organizations have dedicated funding to support key infrastructure or economic development projects.

For CCUS projects, these investments typically fall into two forms: support for early project stage demonstrations or studies; or larger scale project investments.

Programs providing early-stage support focus on technology readiness, the growth of small and medium-sized enterprises, research and development, and/or feasibility and front-end engineering and design (FEED) studies. Programs that are now closed for application but have provided support for CCUS in this way include the Emissions Reduction Alberta's Carbon Capture Kickstart Program⁴, Alberta's Industrial Efficiency and CCUS Grant Program and Natural Resources Canada's Energy Innovation Program.⁵

Government departments and crown corporations also invest in the construction phase of a CCUS project. For example, Innovation, Science, and Economic Development Canada's Strategic Innovation Fund⁶ and the Canadian Infrastructure Bank⁷ have funding available through repayable (though sometimes forgivable) contributions or with convertible debt structures as opposed to grants. These contributions improve project financing and mitigate risks for private capital investment. The purpose of these investments is to grow the economy and achieve strategic economic outcomes.

As such, application-based supports take into consideration the technology readiness level⁸ (TRL) for projects. Programs from Alberta Innovates, for example, are primarily open only to projects that are not yet at a commercial and/or scalable level. Key programs that are designed to support innovative CCUS projects located in Alberta are summarized in Table-3.

Table-3: Key Application-Based Programs for Innovative CCUS Projects in Alberta

Program	Description	TRL	Project Size	Application Process
Strategic Innovation Fund Innovation, Science, and Economic Development Canada	Investments in major projects including 'net zero acceleration'	6 to 9	The project must be greater than \$20 million Average 11% of total project costs	Continuous intake 6 to 24-month process
Project Acceleration Canada Infrastructure Bank	Investments to reduce the risk of FEED Study expenditures	8 to 9+	"The project is meaningful in terms of its ultimate GHG reduction potential"	Continuous intake Three-stage Process length TBD
CCUSH Program Alberta Innovates	Investments in innovative projects related to CCUS and hydrogen	3 to 7	Up to \$2 million to cover 25 to 50% of project costs	Continuous intake 6 to 18-month process
Energy Innovation Program – CCUS Utilization Natural Resources Canada	Investments in research, development, and demonstration of CO ₂ uses	2 to 7	Expected to be between \$0.5 and \$10 million for 4 years Up to 50% of costs	Opening Fall 2023, expected deadline of Winter 2024.

CCUS project proponents need to understand the 'stackability' of application-based funding programs, especially larger investments, and how they interact with other incentives, such as the CCUS-ITC. Government assistance from one source may reduce eligibility for funding or assistance from a second source. As a recent example, in the case, CAE Inc. v. His Majesty the King, the Supreme Court of Canada found that low-interest loans provided to CAE Inc. by the government related to scientific development, and as a result, the amounts of the loans "had to be subtracted from the amount of qualified SR&ED expenditures for CAE's investment tax credit for those taxation years". Government and non-government assistance, as defined by the Income Tax Act (ITA), reduces the eligible costs for investment tax credits, though these amounts

could become eligible again in the future if the assistance will not be used or is repaid. Early-stage support may not, however, have implications on project 'stacking,' and these early supports also often provide secure funding and financing for later stages in project development.

The draft legislation for the CCUS-ITC does not explicitly define government assistance as it pertains to the ITC. Clarification is crucial for projects to make final investment decisions as the 'stackability' of programs and incentives is needed to make business cases work.



3. Government of Alberta Incentives, Supports and Credits

Alberta is host to CCUS projects including large-scale capture of CO₂, a large-capacity trunkline for CO₂ transport, sequestration operations in saline aquifers, enhanced oil recovery (EOR) operations, and other projects that inject and sequester GHG emissions in the geology. Alberta is recognized as a global leader for its CCUS regulatory framework including quantification protocols for the development of related emission offset credits and regulatory requirements to ensure permanence of sequestration. Alberta has developed project-level incentives and supports and crediting opportunities for CCUS projects in the province. Key opportunities are introduced below.

3.1 Transfer of Liability in Alberta

With the enactment of the *Carbon Capture and Storage Statutes Amendment Act*⁹ in November 2010, Alberta became the first jurisdiction in Canada to have comprehensive CCUS legislation. Previous legislation was amended to address areas of legal uncertainty including:

- **Pore Space:** Clarification that all pore space is owned by the province, except pore space under federally owned land.
- **Tenure:** Enables the Minister of Energy to enter into agreements to grant pore space rights.
- **Long-Term Liability:** Enables the province to accept long-term liability for sequestered CO₂.
- **Post-Closure Stewardship Fund:** Enables government to create a fund and to charge project proponents to cover government costs for assuming liability.

A project proponent must meet extensive requirements to enable the transfer of liabilities. This includes the development and update of Measurement, Monitoring, and Verification (MMV) Plans and Closure Plans, and the need to apply for and receive a Closure Certificate. Liabilities that transfer to the Government of Alberta include:

- Statutory obligations for a site (e.g., abandonment, reclamation, remediation)
- Tort law liability to third parties for accidents (e.g., contamination of groundwater, well blowout)
- Liability for physical CO₂ leakage

Currently, responsibility for climate change liabilities would, however, remain with the operator and are not transferred to the government along with other obligations. The ability to transfer long-term liabilities for CO₂ storage to the government is an incentive offered only to carbon capture and storage projects in the province and is not available for enhanced oil recovery project proponents.

3.1.1 Industrial Sector Accessibility for the Transfer of Liability to Alberta

All CCS projects in Alberta that receive sequestration tenure and that receive a Closure Certificate from the Government of Alberta would be eligible to transfer specified long-term liabilities to the government. EOR projects in the province, however, are not eligible.

3.2 Alberta Credits

3.2.1 Alberta TIER Emission Offset Credits

Under the Alberta *Technology Innovation and Emission Reduction (TIER) Regulation*¹⁰, CCUS projects that voluntarily reduce GHG emissions and/or that have sequestration located offsite from the CO₂ capture facility can generate Alberta Emission Offset Credits. These offsets are quantified using Alberta-approved quantification protocols. Quantification protocols are project-agnostic documents that specify information all projects will need to provide in order to develop offset credits.

The protocol for the development of offsets from CCUS projects in Alberta is the *Quantification Protocol for CO₂ Capture and Permanent Storage in Deep Saline Aquifers*¹¹. The protocol for the development of offsets from enhanced oil recovery projects in Alberta is the *Quantification Protocol for Enhanced Oil Recovery (Version 2)*.¹²

Under these quantification protocols, a “project” is not just the capture operations but is instead inclusive of all operations along the full CO₂ capture, compression, transport and sequestration pathway. The “project” includes all GHG emissions from on-site operations (i.e., Scope 1 GHG emissions) as well as offsite GHG emissions (i.e., Scope 2 GHG emissions). For EOR projects, the

project condition also includes the GHG emissions associated with the production, isolation and subsequent reinjection of produced CO₂.

Quantification will require operations data all along the project pathway from the full CO₂ capture, compression, transport and sequestration. If the project definition includes joint CO₂ transport and/or shared CO₂ sequestration facilities, the pipeline or sequestration operators will calculate the GHG emissions from their facilities for the project period and then allocate those emissions on a weighted basis across all projects sharing those facilities across the period.

Alberta Emission Offsets cannot be deducted directly from the annual GHG emissions from a facility as reported to the government as part of facility-level reporting. Rather, the CCUS project would generate Emission Offsets, the facility would calculate and report on facility GHG emissions as though the captured CO₂ was still going to the atmosphere, and then apply the serialized Emission Offsets against the facility GHG emissions and compliance obligation. This may then appear as though the operator is purchasing market offset credits to satisfy regulatory obligations even though they have developed a capture project at large capital and operating expense to reduce GHG emissions.

Crediting Period

The crediting period is the length of time an offset project can generate offset credits. Under both the *Quantification Protocol for CO₂ Capture and Permanent Storage in Deep Saline Aquifers* and the *Quantification Protocol for Enhanced Oil Recovery (Version 2)* CCUS projects in Alberta have a crediting period of 20 years. The initial crediting period for most other project types in Alberta is 10 years.

Credit Pricing

In the 2022 revisions to TIER, the Government of Alberta introduced that the cost to obtain a TIER Fund Credit will increase annually in \$15 increments, from \$65 per credit in 2023 to \$170 per credit in 2030. This change will then bring Alberta’s TIER system in line with the Federal Carbon Pricing Schedule to 2030.

3.2.2 Alberta TIER Sequestration Credits Credits

In 2022, the Government of Alberta amended its TIER regulation and introduced changes to the crediting process for CO₂ sequestration projects in the province. CCUS project developers are now able to convert an Alberta Emission Offset into a Sequestration Credit. The CO₂ must have originated from a registered large emitter facility, and the Emission Offset must have been created from a geological sequestration project. Sequestration Credits will be serialized, recorded in an Alberta Carbon Registry account and can be banked or transferred to other parties. Like Emission Offsets, Sequestration Credits cannot, however, be deducted directly from reported annual facility GHG emissions, but instead must be applied against compliance obligations following and subsequent to facility-level reporting.

3.2.3 Alberta TIER Capture Recognition Tonnes

Under TIER, a Sequestration Credit can be converted into a Capture Recognition Tonne (CRT) provided the CO₂ was captured at the facility applying to convert the Sequestration Credit. This conversion must be done by May 31st each year if the facility intends to utilize the CRT volumes in their annual reporting on facility GHG emissions, due at the end of June. Unlike other credits, CRT can be subtracted directly from reporting on facility annual GHG emissions. The CRT must, however, be used in the same year the CO₂ capture occurred.

This process of converting Emission Offsets, into Sequestration Credits, and then into Capture Recognition Tonnes enables the original carbon capture facility to apply all net sequestration via the full CCUS pathway directly against facility GHG emissions, and potentially in the same year the CO₂ is sequestered. This enables the operator to apply the GHG emission reductions via carbon capture directly on annual reporting for facility GHG emissions and show that they are reducing GHG emissions directly from the large capital CCS project rather than from the application of offsets.

3.2.4 Alberta TIER Emission Performance Credits

As stated above, CCUS projects generate Alberta Emission Offset credits. Operators can then apply to convert the offsets into Sequestration Credits and convert them further into Capture Recognition Tonnes. These CRTs can be directly applied against the facility reporting on annual GHG emissions. If the application of CRT volumes reduces facility GHG emissions to a point below regulatory obligation, the facility would receive Emission Performance Credits (EPCs) for the reductions made beyond the obligation. EPCs are fully fungible- that is, they can be banked and transferred to other parties, and can be used by other parties to satisfy their regulatory obligations.

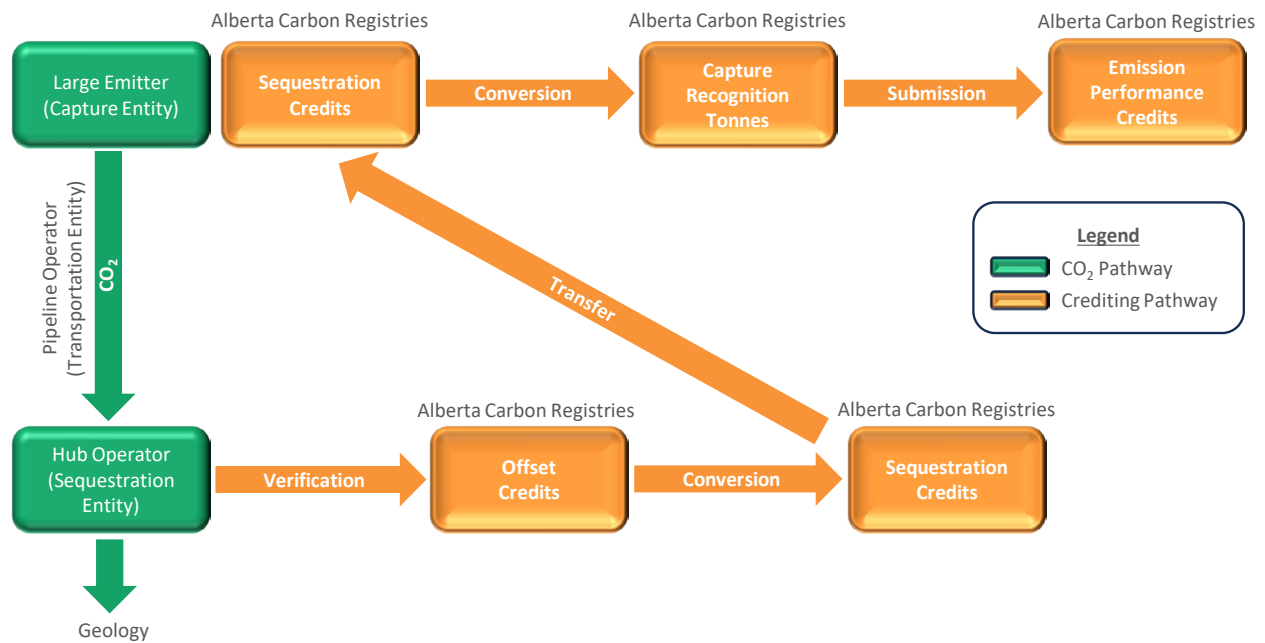


Figure-1: Carbon Capture and Storage Crediting Pathway under Alberta Technology Innovation and Emissions Reduction Regulation (TIER). Figure provided courtesy of Nexus Climate and Energy Strategy.

3.2.5 Industrial Sector Accessibility for TIER Credits

The crediting pathways under TIER are open to all large industrial emitters in Alberta. Projects with carbon capture operations can generate Emission Offset Credits. Offsets can then be converted into Sequestration Credits and Capture Recognition Tonnes. Following the inclusion of CRT in annual facility-level reporting on GHG emissions, any CRT not needed to satisfy regulatory obligation are then returned to the operator as Emission Performance Credits.

BECCS is the production of energy using biomass as feedstock, and the capture and geologic sequestration of the CO₂ emissions. If biomass facilities develop carbon capture operations there would, however, be some challenges in developing Alberta Emission Offsets. There is no single approved quantification protocol for BECCS in place within the provincial offset system. There are protocols for guidance on the calculation of net environmental benefit for CCS projects, EOR projects, and energy generation from the combustion of biomass waste, but no protocol that is inclusive of the full BECCS project description. Under the Standard for Greenhouse Gas Emission Offset Project Developers,¹³ project proponents can, however, apply for a letter from the relevant director for deviations from any protocol. BECCS proponents may be able to receive a director's letter that would provide direction on the methodology the project would utilize to quantify net environmental benefit.

Direct Air Capture (DAC) with CCS is the extraction of CO₂ from ambient air using mechanical and chemical processes and the geologic sequestration of the CO₂. If DAC facilities develop carbon capture operations, they would not, currently, be eligible to utilize the Alberta Emission Offset System to generate Emission Offsets. The quantification protocols for CCS projects and EOR projects both have wording that would make

them ineligible for use by DAC projects. The CCS protocol states that “the project developer must provide sufficient evidence to demonstrate... the project captures CO₂ directly from an industrial or non-industrial facility”. With DAC, the project would capture CO₂ from the ambient atmosphere, not a facility. This would make the DAC facility ineligible to use the CCS quantification protocol. Further, the EOR protocol writes that “only new CO₂ (i.e. anthropogenic CO₂ recently captured and not previously injected and produced from an EOR reservoir) reported as exported from a regulated large emitter or opted-in facility that is ultimately captured and used is eligible.” CO₂ captured from the ambient atmosphere would not be anthropogenic, nor would the CO₂ be captured from a regulated large emitter facility. As mentioned above, under the Standard for Greenhouse Gas Emission Offset Project Developers, project proponents can apply for a director’s letter to enable the use of the quantification protocols. DAC-CCS proponents may be able to receive a director’s letter that would provide eligibility and direction on the quantification methodology the project would utilize to quantify net environmental benefit.

3.3 Programs Under Evaluation in Alberta

Alberta is currently evaluating incentive programs similar to the Alberta Petrochemical Incentive Program (APIP) for carbon capture, utilization, and storage,¹⁴ which may provide another key support to CCUS projects in the province. APIP offers grants that cover up to 12 percent of capital costs for completed petrochemical production facilities. It is expected that more details on such a program will be released in the fall of 2023.¹⁵





4. Government of Canada CCUS Incentives, Supports and Credits

The Government of Canada tax incentives and crediting opportunities are cornerstone supports for CCUS projects across all provinces. These supports are organized and operated by a combination of Finance Canada, Environment and Climate Change Canada, and Energy and Natural Resources Canada. Since 2016, the Government of Canada has introduced several different policies and programs that contribute to the long-term viability of CCS projects.

4.1 Federal Carbon Capture Utilization and Storage Investment Tax Credit (CCUS ITC)

Draft legislation for the CCUS-ITC was released on August 4, 2023, as part of Budget 2023 tax measures. The CCUS-ITC complements four previously introduced Capital Cost Allowance (CCA) classes for CCUS. The CCUS-ITC will offset the costs of purchase and installation for eligible equipment and will be available to claim as a tax credit in the year the expenses are incurred, regardless of when the equipment becomes available for use.

For the years 2022-2031, the CCUS-ITC is:

- 60 percent for eligible capture equipment used in a “direct air capture project”;
- 50 percent for other eligible capture equipment; and
- 37.5 percent for eligible transportation, storage, and use equipment.

For the years 2031-2040, the CCUS-ITC will be reduced to:

- 30 percent for eligible capture equipment used in a “direct air capture project”;
- 25 percent for other eligible capture equipment; and
- 18.75 percent for eligible transportation, storage, and utilization equipment.

Eligible expenses for the CCUS-ITC are defined by the new CCA Classes 57 and 58. Class 57 encompasses

costs related to carbon capture, transportation and storage, while Class 58 represents expenses for carbon use and monitoring. Furthermore, all CCUS expenditures need confirmation from NRCan.

Eligible equipment must be used solely to capture, transport, store or use CO₂ in Canada and be part of an “eligible CCUS project.” An eligible project captures CO₂ either directly from, or before release to the atmosphere, and must then compress, transport and use the captured CO₂ for an “eligible use.” Eligible use includes dedicated geological storage or storage in concrete. For projects to be eligible for the CCUS ITC the CO₂ must be stored in dedicated geological storage in a “designated jurisdiction”. To date, only Alberta, Saskatchewan and British Columbia have been identified by the federal government as being “dedicated jurisdictions,” that is they are deemed to have regulatory regimes sufficient for ensuring dedicated permanent geologic CO₂ storage. Other provinces may be added to this list in the future. Notably, the use of captured CO₂ for EOR is not an eligible use.

Dual use equipment, that is water circulation systems and combined heat and power systems, are eligible property under the CCUS ITC. Dual use equipment is *verified* by the Minister of Natural Resources as per the definitions and Class 57. Combined heat and power equipment must use more than 50% of its power and/or heat for either CCUS or hydrogen production. Additionally, for combined heat and power units, the value of the portion eligible for the CCUS tax credit is proportional to the amount used in either hydrogen production or CCUS processes. This is the only property that can be used for hydrogen production that is eligible for the CCUS ITC.

For a more detailed analysis please view the Knowledge Centre’s CCUS ITC Primer¹⁶ and summary of the CCUS ITC¹⁷ draft legislation. Figure 2 provides a summary overview of the CCUS ITC.

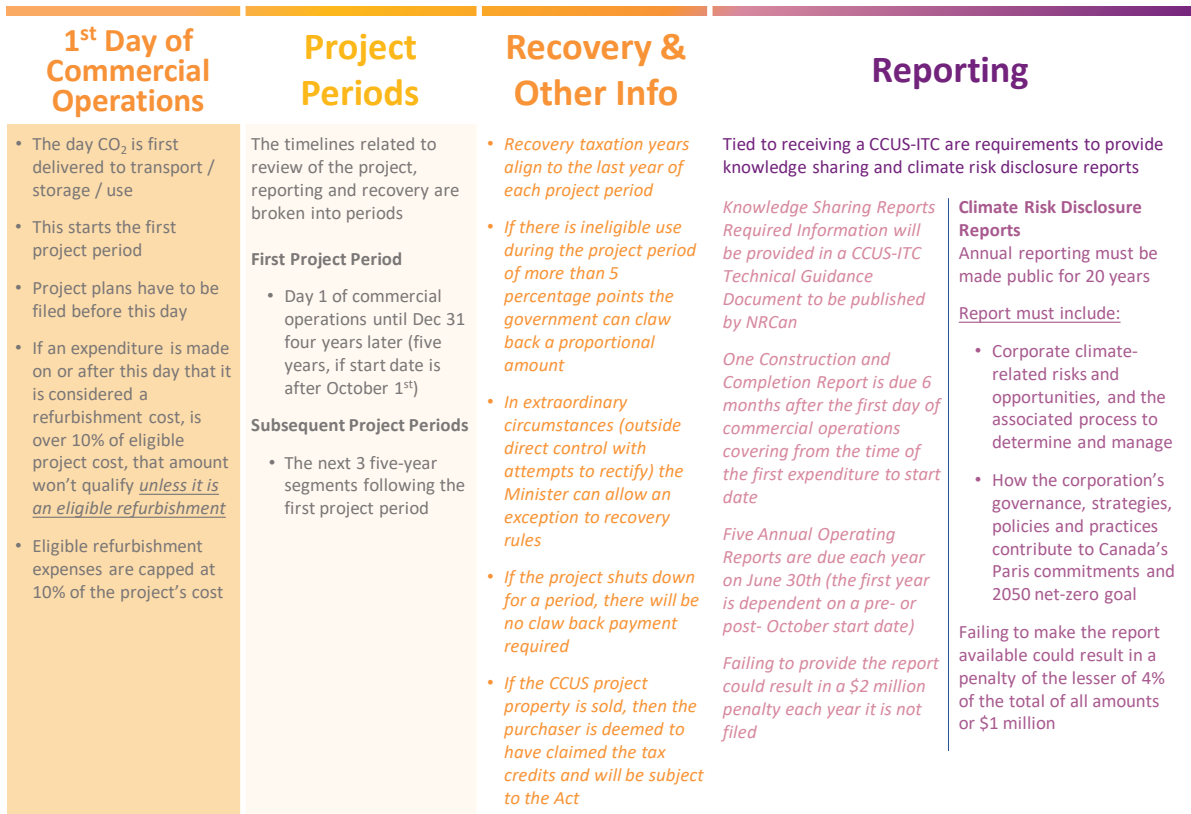
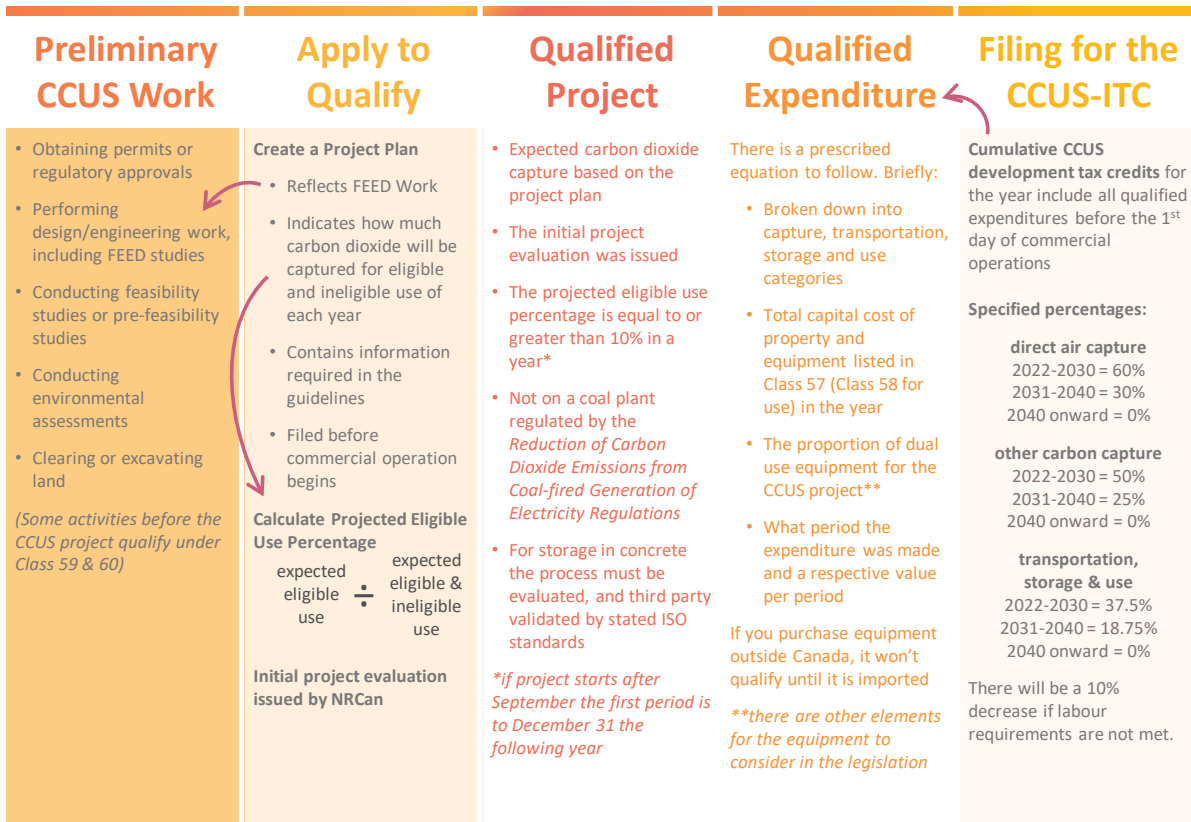


Figure-2: Carbon Capture Utilization and Storage Investment Tax Credit (CCUS ITC) Summary

4.1.1 Industrial Sector Accessibility to the Federal CCUS Investment Tax Credit

As per above, the Government of Canada recognizes Alberta as a “dedicated jurisdiction” with a regulatory regime for CCS projects sufficient for ensuring permanent geologic storage. CCS projects from qualifying taxpayers in all industries that use captured carbon for eligible uses, have expenditures between 2022 and 2040, and operations that satisfy all other criteria should then be eligible for the federal CCUS-ITC. DAC-CCS projects are eligible to receive additional tax credits relative to other project descriptions.

For the CCUS-ITC, a “qualifying taxpayer” refers to a taxable Canadian corporation that isn’t tax-exempt. While Canadian municipalities, Indigenous community-owned enterprises, and crown corporations may be exempt from certain taxes, they’ve shown clear interest in CCUS project participation. The potential contributions from ineligible entities, which usually aren’t purely profit-driven, merit consideration for additional governmental backing.

4.2 Capital Cost Allowance (CCA) Classes for CCUS

As part of the legislative proposals for Budget 2023 Income Tax Act and Regulations,¹⁸ four new CCA classes will be enacted for the exploration of CCUS storage opportunities and the purchase of CCUS equipment. Eligible property may also qualify for an accelerated rate (1.5 times) for the first year through the Accelerated Investment Incentive¹⁹. Each of the classes includes refurbishments of property matching the described property.

CLASS 57 8 percent CCA rate for capture equipment, including processing and compression equipment; transportation equipment, including pipelines and dedicated vehicles for transporting CO₂; and, storage equipment including injection and storage equipment.

CLASS 58 20 percent CCA rate for equipment that is used solely for using CO₂ in industrial production including monitoring and control equipment.

CLASS 59 100 percent CCA rate for exploration expenses associated with storing CO₂ including environmental studies and community consultations undertaken to characterize geological formations.

CLASS 60 30 percent CCA rate for development expenses associated with storing CO₂ including drilling, and well conversion to monitor stored carbon.

4.2.1 Industrial Sector Accessibility of Federal Tax Incentives

The CCA Classes apply to eligible equipment and expenses for CCS projects independent of the CCUS-ITC. Classes 57 through 60 would be available for all CCS projects in Alberta. EOR projects in Alberta are not eligible for CCA Classes 57, 59, or 60 but, notably, are eligible for CCA Class 58.

4.3 Federal Carbon Contracts for Difference (CCfD)

CCUS projects are large endeavors with significant capital costs. The future price of carbon and the future value of carbon credits are both key variables for CCUS project proponents in the assessment of CCUS project feasibility. Many potential CCUS project developers may not have confidence that the federal and/or provincial climate policies and carbon-pricing systems have durability, and then see risk in the potential future pricing for CCUS credit revenues.

A change in the federal government could bring changes to key aspects of the carbon pricing regulations and/or the credit markets. This uncertainty affects project investment. To address this uncertainty, in the 2030 Emissions Reduction Plan²⁰, the Government of Canada committed to exploring measures to provide stability and predictability on the price of carbon and carbon credits. The key mechanism proposed is access to a Carbon Contracts for Difference (CCfD), a contract between the federal government and low-carbon project investors like CCUS project proponents to provide assurance on future price levels for carbon and carbon credits.

Budget 2022 announced the government's intention to create the Canada Growth Fund (CGF), to be capitalized with \$15 billion, and to

provide all funding support for CCfDs, along with other initiatives. Finance Canada then published a Technical Backgrounder.²¹ The document lists a set of strategic principles and investment criteria that projects will also have to fall under, and projects will be monitored under performance metrics, creating more administrative hoops for projects. Importantly, contracts for differences involve an investment so there is a requirement to earn a return – it is not just another grant mechanism.

Budget 2023 did not expand on how CCfDs will work for CCUS projects, however, it did provide some new information:

- The government will consult on the development of a broad-based approach to carbon contracts for difference that aims to make carbon pricing more predictable.
- The Canada Growth Fund will be managed by the Public Service Pension Investments Board (PSP) (separately from PSP's main investments). The stated goal of PSP involvement is to increase the speed of investment.

With Budget 2023, the federal government has committed to consultation with stakeholders on the development and details of the CCfD.

4.3.1 Industrial Sector Accessibility to Carbon Contracts for Differences

The proposed federal CCfDs are contracts between the federal government and low-carbon project proponents, on the market price of carbon credits. As facilities with carbon capture would be eligible to generate Emission Offsets under the Alberta Emission Offset System, these projects may also be eligible for a CCfD. The important and explicit details regarding the process and eligibility of specific projects are, however, yet to be released. These details will be important for CCUS projects in understanding how and whether CCfDs will affect individual projects. CCfDs may address a key risk for proposed CCUS projects and provide important certainty on credit pricing. Timely consultation on CCfDs and an announcement of the details of the program will support investment decisions.

4.4 Federal Output-Based Pricing System (OBPS) Offset Credits

Canada introduced the *Greenhouse Gas Pollution Pricing Act* (GGPPA)²², a nationwide regulation for the pricing of GHG emissions, in mid-2019. The GGPPA gives the provinces and territories the flexibility to develop their own GHG pricing systems, but the provincial systems must meet a set of minimum national stringency standards including the escalating price schedule for carbon. These criteria are known as the ‘federal benchmark’. If a province or territory introduces regulation that meets the federal benchmark, the federal and provincial regulations are deemed to be equivalent. In this case, the federal regulations will not be applied. If a province or territory decides not to price GHG emissions or proposes a system that does not meet these Standards, the federal system is then applied by the federal government. This is known as the ‘federal backstop’.

The GGPPA has two parts: a regulatory charge on retail fossil fuels like gasoline and natural gas, known as the federal fuel charge, and a performance-based large emitter system for industries, known as the Output-Based Pricing System (OBPS).

The Government of Canada sees that the TIER regulation in Alberta meets the federal ‘benchmark’ stringency requirements, so Alberta remains the regulator of GHG emissions in the province, and the federal Output-Based Pricing System is not applied.

The federal government developed and administers an emissions trading system under OBPS. To generate OBPS Offset Credits, project proponents must apply and register their project using a federal offset quantification protocol. According to federal legislation, CCUS projects located in provinces or territories where facilities fall under the regulation of the Output-Based Pricing System, as well as those in regions where facilities are not governed by OBPS and lack applicable CCUS quantification protocols, may qualify to generate emission offset credits utilizing the protocols under Canada’s GHG Offset Credit System.

Environment and Climate Change Canada (ECCC) has begun the development of quantification protocols. Included in the list of first quantification protocols to be developed is a protocol for Direct Air Carbon Dioxide Capture and Sequestration (DAC). ECCC has also stated that a list of subsequent project types under consideration for future federal offset protocol development includes Bioenergy Carbon Dioxide Capture and Sequestration (BECCS). ECCC has not, however, provided indication it intends to develop quantification protocols for either carbon capture and storage or EOR under the OBPS offset system.

It is important to know that a project will not be eligible to generate credits under the OBPS system if the province in which the project is sited has an offset credit regime recognized by ECCC (like the Alberta Emission Offset System) and an offset quantification protocol that covers the same activities (like the Alberta CCS Quantification Protocol). The federal OBPS regulations are intended only to be a “backstop” for jurisdictions that do not otherwise have equivalent provincial regimes. As such, even if ECCC were to develop quantification protocols for either CCS or EOR projects, Alberta-based CCUS projects would not be eligible to utilize these federal protocols to develop Emissions Offset Credits as Alberta has these protocols available for use under TIER. However, since Alberta currently does not have quantification protocols developed for either DAC or BECCS project types, once these quantification protocols are developed and eligible for use under the federal OBPS offset system, Alberta projects may be eligible to utilize these federal quantification protocols to develop Emission Offsets under the federal Output-Based Pricing System. These credits would be eligible for compliance under the federal Output-Based Pricing System but would not be eligible as compliance under the Alberta TIER regulation.

4.4.1 Industrial Sector Accessibility to Federal OBPS Credits

As Alberta has approved CCS and EOR quantification protocols published and eligible for use, Alberta-based CCS projects would not be eligible to utilize federal quantification protocols to generate credits under the federal regulations if these respective quantification protocols were to be developed.

Environment and Climate Change Canada has, however, identified plans to develop a quantification protocol for BECCS projects and is in the process of developing a quantification protocol for DAC to utilize in the development of federal Emission Offset Credits. As Alberta does not have an Alberta-approved protocol for BECCS or DAC, once the federal protocols are developed, Alberta-based BECCS and DAC projects may be eligible to utilize the federal quantification protocols to generate credits under the federal regulations. Proponents are directed to ECCC for discussion.

4.5 Federal Clean Fuel Regulations (CFR) Credits

The final federal Clean Fuel Regulations²³ (CFR) came into force in July 2023. The regulations apply to parties that produce or import retail gasoline or diesel in Canada. Obligated parties will have an annual emissions reduction requirement based on the amount of gasoline and/or diesel fuels they produce or import. Regulated parties satisfy their regulatory requirement by submitting credits, not via the blending of fuels to reach an actual level of carbon intensity. The credits represent GHG emission reductions within the system.

Obligated parties address their regulatory obligation through four primary options:

- 1 Credit Purchase: Purchase credits directly from other market participants
- 2 Credit Clearing Mechanism (CCM): Government administered.
- 3 Compliance Fund Mechanism: Contributions to a Compliance Fund at a price of \$350/tonne
- 4 Carry Forward: Carry forward up to 10% of obligation to the next compliance year.

There are three compliance categories within CFR:

Category 1: Action Along Life-Cycle of a Fossil Fuel

- Actions to reduce life-cycle GHG at any point in the gasoline or diesel fuel chain pathway.
- Examples include electrification, cogeneration, fuel switching and CCS.

Category 2: Supplying Low-Carbon-Intensity Fuels

- Credits are generated based on the volume of low-carbon fuels supplied to the market and the carbon intensity of the volumes supplied.
- Examples include ethanol, renewable diesel and renewable natural gas.

Category 3: End-Use Fuel Switching

- Credits are generated by enabling fuel switch away from gasoline or diesel.
- Examples include hydrogen fuels and electric vehicle charging.

CCUS proponents then have two opportunities to generate value within the CFR. First, under Credit Category 1, carbon capture operations developed at facilities that produce, process, store, transport or distribute fossil fuels along the gasoline or diesel fuel pathways, or that supply hydrogen, electricity or heat to the facility along the gasoline or diesel fuel pathways, may be eligible to generate CFR Credits under Credit Category 1. To generate CFR Credits under Credit Category 1 requires using ECCC quantification methodologies:

Crediting Period	Credit Pricing
<p>Under both the <i>Quantification Method for CO₂ Capture and Permanent Storage</i> and the <i>Quantification Method for Enhanced Oil Recovery with CO₂ Capture and Permanent Storage</i> the crediting period is 20 years with the potential for a single five-year extension.</p>	<p>The Compliance Fund Mechanism sets the ceiling price for CFR Credits in the market at \$350. The clearing price below that ceiling for credits purchased within the market will be a function of supply and demand for the credits</p>

Second, carbon capture operations developed at facilities that produce low-carbon intensity fuels under Credit Category 2 would reduce the calculated life-cycle carbon intensity of those low-carbon fuels and, accordingly, would result in the generation of larger volumes of credits.

4.5.1 Industrial Sector Accessibility to Federal CFR Credits

For projects where the CO₂ would be captured from a facility along the diesel or gasoline fuel life-cycle pathways, CO₂ capture from such facilities would be eligible to generate CFR credits under the guidance of the federal documents *Quantification Method for CO₂ Capture and Permanent Storage* or the *Quantification Method for Enhanced Oil Recovery with CO₂ Capture and Permanent Storage*.

Upstream oil production, downstream petroleum manufacturing, renewable fuels and renewable natural gas facilities with CCS would be able to generate CFR credits. A facility that produces hydrogen and supplies it to a fossil fuel facility along the diesel or gasoline life-cycle pathways in Canada or generates electricity that is directly supplied to and consumed at a fossil fuel facility is eligible to generate CFR credits under Credit Category 1, too. BECCS, DAC and the manufacturing of cement, fertilizers and petrochemicals would not be eligible to generate Clean Fuel Regulations credits.

4.6 Federal Clean Electricity Regulation

The draft federal Clean Electricity Regulation²⁴ (CER) may have an impact on industries considering applying CCS technologies. The purpose of the CER is to help transition Canada to a net-zero electricity grid by 2035 by setting a GHG emissions standard on electricity generators that use fossil fuels, have a capacity greater than 25MW and are connected to the North American Reliability Corporation Grid. To comply with the draft CER, grid-connected natural gas-fueled power generation units may need to develop CCS in conjunction with the facility to reduce facility GHG emissions below the regulated performance standard.



5. Industrial Sectors: Incentives, Supports and Credits Summary

Figure-3 shows the incentives, supports, and credits that may be available for different CCUS project descriptions in Alberta. Key industrial sectors are listed in the left column. Potential incentives, support and credits as issued by the Government of Alberta and the Government of Canada are listed across the top row.

CO ₂ Capture Facility	Federal						Alberta				
	CCUS ITC ¹	Carbon Contract for Differences ²	Accelerated Capital Cost Allowance ¹	Federal OBPS Offsets	Federal CFR Credits	Transfer of Storage Liability ³	Alberta Emission Offset Credits	Sequestration Credits	Capture Recognition Tonnes	Emission Performance Credits	APIP-Style CCUS Incentive
Upstream Oil Production	Green	Yellow?	Green	Pink	Green	Green	Green	Yellow	Yellow	Yellow	Yellow?
Electricity Generation	Green	Yellow?	Green	Pink	Yellow	Green	Green	Yellow	Yellow	Yellow	Yellow?
Downstream Manufacturing	Green	Yellow?	Green	Pink	Green	Green	Green	Yellow	Yellow	Yellow	Yellow?
Petrochemical Manufacturing	Green	Yellow?	Green	Pink	Pink	Green	Green	Yellow	Yellow	Yellow	Yellow?
Hydrogen Manufacturing	Green	Yellow?	Green	Pink	Yellow	Green	Green	Yellow	Yellow	Yellow	Yellow?
Fertilizer Manufacturing	Green	Yellow?	Green	Pink	Pink	Green	Green	Yellow	Yellow	Yellow	Yellow?
Cement Manufacturing	Green	Yellow?	Green	Pink	Pink	Green	Green	Yellow	Yellow	Yellow	Yellow?
Renewable Fuels	Green	Yellow?	Green	Pink	Green	Green	Green	Yellow	Yellow	Yellow	Yellow?
Renewable Natural Gas	Green	Yellow?	Green	Pink	Green	Green	Green	Yellow	Yellow	Yellow	Yellow?
Bioenergy with CCS (BECCS)	Green	Yellow?	Green	Yellow	Pink	Green	Yellow	Yellow	Yellow	Yellow	Yellow?
Direct Air Capture with CCS	Green	Yellow?	Green	Green	Pink	Green	Yellow	Yellow	Yellow	Yellow	Yellow?

¹ Federal incentives. Project descriptions that include EOR are not eligible (except for CCA Class 58).
² Federal policies are proposed and under consultation. Eligibility for CCUS projects is under consideration.
³ EOR projects are not eligible for transfer of liability to the government.

Figure-3: Federal and Provincial Incentives, Supports, and Credits Available for Carbon Capture Utilization and Storage (CCUS) Projects in Alberta.

Incentives, supports and credits available from the Alberta provincial and federal governments are listed across the top row. Different sectors that may develop CCUS projects are listed in the left column. Green indicates the incentive or credit is likely available to CCUS projects in that sector if the project meets eligibility criteria. Yellow indicates the incentive or credit is potentially available to CCUS projects in that sector if the project meets key eligibility criteria, or if the proponent receives key approvals from the government. Red indicates the incentive or credit is likely not available to CCUS projects in that sector. CCUS projects generate Alberta Emission Offset Credits and can then convert the offsets into other forms of credits as per details in the Alberta TIER Regulation.



6. Conclusion

There are many important crediting opportunities and incentives for CCUS offered by both the federal and Alberta governments already in place. The various policies and programs outlined in this document help to add certainty. An understanding of the details will enable projects to benefit from the support and incentives for CCUS deployment available and provide a starting point to support decision-making.

Additional incentives and details on policies intended to deliver critical assistance for CCUS projects, and that would support proponents in those investment decisions, remain under development. Because of this, there is a marked lack of certainty. To reduce this uncertainty, CCS proponents are hoping to see the legislation and implementation of key programs, actions taken to stabilize carbon pricing, the development of policies to support CDRs and preparations to manage potential project constraints. Finalizing, legislating and implementing pivotal programs, namely the CCUS-ITC, is essential. This initiative serves as a cornerstone that is imperative for large-scale CCUS projects to make final investment decisions and achieve noteworthy GHG reductions in the near term. Moreover, it will offer insights to policymakers about any prevailing financial gaps that might deter CCUS projects across industries and the role of carbon pricing in project economics.

The federal benchmark for carbon prices is set up to 2030. Nonetheless, at least two federal and provincial elections are planned to occur during that timeframe. Recognizing the inherent variability in democratic processes, carbon price stability is a noted pivotal concern for operators and investors alike. CCfDs can act to provide assurances in the absence of legislated carbon price certainty. Consultations on how the proposed CCfD will be implemented are still anticipated, and a timely and transparent conclusion will provide a signal for industries on carbon prices even if individual contracts may vary.

Both the federal and provincial offset systems' protocols guiding the quantification of credits do not account for all attributes of BECCS and DAC projects. Moreover, the development of policies that are under development, such as an APIP-style CCUS program and the federal Clean Energy Regulation, will offer further clarity for project proponents. Further analysis is also required regarding the labour market and supply chain for CCUS as incentives from the US and Europe have begun to improve CCUS project viability and competition for resources could occur.

CCUS technologies, with their potential to dramatically reduce GHG emissions in critical industrial sectors, merit public backing. While several support mechanisms, incentives and credits related to CCUS are already established, navigating them can be intricate. Proponents across diverse sectors aim to adopt CCUS to decrease facility GHG emissions and establish a competitive edge in the emerging low-carbon economy. Achieving clarity on these pivotal policies, incentives and supports for CCUS projects is vital.



Endnotes

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