Note

Investment Tax Credit for Carbon Capture, Utilization and Storage

Legislative Costing Note

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As initially proposed in Budget 2021, the government introduced an investment tax credit (ITC) for capital invested in Carbon Capture, Utilization and Storage (CCUS) projects. This note contains the costing of the ITC for CCUS. It covers the announcement in Budget 2022 which introduced the refundable tax credit for CCUS as well as Budget 2023 which announced revisions to the credit.

The credit will apply to eligible expenses incurred starting on January 1, 2022.

From 2022 through 2030, the CCUS investment tax credit (ITC) offers a refundable ITC of up to:

- 60% on capture equipment using direct ambient air,
- 50% on other capture equipment, and
- 37.5% on qualified carbon transportation, storage or usage equipment.

From 2031 to 2040, the investment tax credit rates will be halved and fully phased out after 2040.

Eligible jurisdictions include Alberta, Saskatchewan and British Columbia.[1]

In Budget 2023, the government expanded eligibility to include dual use equipment that produces heat and/or power or that uses water. Dual use power or heat production equipment would be eligible only if the energy balance is expected to be primarily used (i.e., more than 50 per cent) to support the CCUS process or hydrogen production that is eligible for the proposed Clean Hydrogen Investment Tax Credit.

The PBO estimates that the cost of the CCUS investment tax credit will be $5.7 billion from 2022-23 to 2027-28.

6 -Year Cost

$ millions

Fiscal year	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028	Total
Total cost	8	110	491	1,153	1,834	2,150	5,746

Notes

- All years are estimates.
- Estimates are presented on an accrual basis as would appear in the budget and public accounts.
- A positive number implies a deterioration in the budgetary balance (lower revenues or higher spending). A negative number implies an improvement in the budgetary balance (higher revenues or lower spending).
- Totals may not add due to rounding.

Estimation and Projection Method

Confidential data was received from Natural Resources Canada (NRCan) and Finance Canada. NRCan provided an extensive list of anonymized current and proposed projects.[2] Data provided by Finance Canada included the 2021 consultations with stakeholders.[3] In addition to the confidential data provided, when available, we incorporated insights from publicly available company statements delineating new CCUS projects.

For projects with missing capital expenditure (CAPEX), costs were assumed based on industry averages, adjusted for the size and type of project.

Company level data provided by NRCan did not include annual profiles. To estimate the annual profile, we first projected construction start and end dates. Leveraging available information on project status[4] and size[5], we calculated the average number of years until the project was expected to be operational, referencing industry timelines for projects of a comparable scale. Subsequent adjustments were then made on a project-by-project basis.

After computing the start and end years, we derived the annual spending profiles by drawing insights from the consultation data provided by Finance Canada which included yearly breakdowns for select projects. Using this data, we computed spending profiles for each company, taking into consideration the project size.

Not all CAPEX is eligible for the ITC. Based on studies, we estimated that, on average, approximately 30% of total CAPEX would be eligible.[6] Applicable ITC rates for each project were then applied.

Lastly, we adjusted for the current depreciation rates that the equipment would otherwise be eligible to receive.

In Budget 2023, the government expanded eligibility to include dual use equipment that produces heat and/or power or that uses water. Information on dual-use projects is extremely limited. We received some confidential information from Finance Canada in

which companies self-indicated the use of dual use equipment. Our estimate was supplemented further with public announcements.

Sources of Uncertainty

Momentum for CCUS investment has progressed, yet the industry continues to evolve rapidly as significant scale-up is anticipated in the near term with new policy support. Given the relatively small number of projects currently operational in Canada and globally, inherent uncertainty persists. Data received consists of projects in the early stages of planning and have incomplete and/or estimated data.

We took all projects provided as given and assumed all projects would eventually be operational. Capital cost could decrease in the future due to economies of scale and mass production which would lower the future cost of the ITC.

In situations with incomplete information, assumptions were made based on other similar projects and public data sources. The majority of projects provided and used in this estimate were anonymized. Verifying the micro data provided was not possible in most cases.

The ITC will reduce the capital cost of the relevant capital cost allowance (CCA) classes in which the CCUS investment tax credit is claimed. When adjusting for CCA, we assumed that all corporations are taxable. This may underestimate the overall cost associated with the tax credit.

Due to limited available information, the impact of the labour requirements introduced in Budget 2023 was not considered in this note.

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Data Sources

Confidential Project List

Natural Resources Canada

Confidential Budget 2021 Consultations with Stakeholders
Department Finance Canada

Public Project Lists
British Columbia Projects
Alberta Projects
CCUS Projects Explorer – Data Tools - IEA

Levelised Capture Costs Across Sectors
Levelised cost of CO2 capture by sector and initial CO2 concentration, 2019 – IEA

Project Risks and Capacity
Canada's Carbon Management Strategy
Canada's Energy Future 2023: Energy Supply and Demand Projections to 2050
International Energy Agency
Canada's Oil & Natural Gas Producers
Carbon Capture Journal
National CCUS Assessment Framework

Capital and Equipment Costs
ERIA (2022), 'A Model Case Study: CCUS Cost Estimation', in Kimura, S., Shinchi, K., Coulmas, U., and Saimura, A. (eds.).
'Global Costs of Carbon Capture and Storage' (2017) Lawrence Irlam
McQueen N, Desmond MJ, Socolow RH, Psarras P and Wilcox J (2021) Natural Gas vs. Electricity for Solvent-Based Direct Air Capture.
Lang Factor and Return on Investment – Foundations of Chemical and Biological Engineering
Al Juaied, Mohammed, and Whitmore, Adam. Realistic costs of carbon capture (2009).
Solomon Aforkoghene Aromada, Nils Henrik Eldrup, Lars Erik, Capital cost estimation of CO2 capture plant using Enhanced Detailed Factor (EDF) method: Installation factors and plant construction characteristic factor.
Navius Research Net Zero Canada Methodology Report (2023)
IEAGHG (2017). Understanding the Cost of Retrofitting CO2 Capture in an Integrated Oil Refinery. 2017/TR8. August Cheltenham, UK: IEAGHG.
Canada's Energy Future 2023: CER's first long-term Outlook modeling Net-Zero by 2050
Lazard (2023) Levelized Cost Of Energy

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[1] Budget 2023 includes the addition of British Columbia as an eligible jurisdiction.
[2] Projects provided from NRCan were anonymized. A total of 91 projects were provided. 80 of the 91 projects were assumed to be eligible for the ITC. Due limited information, projects and their timelines are highly uncertain and those in early stages often had missing information. Assumptions were made based on industry standards to complete the dataset in cases of missing information such as CAPEX, timelines, and spending profiles.
[3] Investment Tax Credit for Carbon Capture, Utilization, and Storage - Canada.ca
[4] Each project was categorized based on its development stage, such as feasibility, pre-FEED, FEED, financial investment decision, shovel ready, construction or operating.
[5] Size, in this context, refers to projects categorized based on the annual volume of CO2 slated for capture. In our calculations, projects were segmented into five main categories. That is, projects with an estimated annual amount of CO2 captured (Mt CO2) to be:

- Between 0 and 0.5 Mt CO2 captured per year.
- Between 0.5 and 1 Mt CO2 captured per year.
- Between 1 and 2 Mt CO2 captured per year.
- Between 2 and 3 Mt CO2 captured per year.
- Greater than 3 Mt CO2 captured per year.

[6] Various studies were examined to ascertain the proportion of CAPEX eligible for inclusion under this ITC. On average, we estimated that 30% of CAPEX would be eligible. For the full list of studies considered, see the data sources provided under “Capital and Equipment Costs”.