Backgrounder:

CCUS Investment Tax Credit

BRIEFING NOTE

Dec 2021

environmental defence

Summary

- Carbon capture, utilization and storage (CCUS) refers to technologies that are designed to collect or "capture" carbon dioxide generated by high-emitting activities (such as oil refineries, cement plants, fossil fuel power plants) and then transport the captured carbon to sites where they are used for industrial processes or stored underground.
- The Government of Canada is currently designing a new investment tax credit for capital invested CCUS projects. The final tax will be published in Budget 2022, likely in spring 2022.
- If the new CCUS investment tax credit is made eligible for oil and gas projects including blue hydrogen, this would create a significant new fossil fuel subsidy. This would contradict the government's election promises to end fossil fuel subsidies by 2023 as well as Canada's international obligations under the Paris Agreement.
- The oil and gas industry is hard at work lobbying for governments to subsidize CCUS. In fact, CEOs of Canadian oil and gas companies have asked government to provide over $50 billion to equip the sector with CCS. Despite their 'climate commitments', oil and gas companies are spending very little of their own money on CCUS investments.
- To date, CCUS has a track-record of over-promising and under-delivering. The vast majority of projects never get off the ground. The technology remains riddled with problems, unproven at scale and prohibitively expensive.
- Despite decades of research and tens of billions in subsidies globally, there are only 28 CCUS projects around the world which can capture just 39 MT per year, 0.1% of emissions from fossil fuels.
- CCUS for the energy sector is not a climate solution. In fact, CCS perversely *increases* emissions, since most of the captured carbon is actually used to get more oil out of the ground. CCUS does nothing about the 80% of emissions from oil and gas that occur downstream.
- Providing public financial support for CCUS diverts resources from proven, cost-effective climate solutions (electrification and grid modernization, renewable energy generation and storage, energy efficiency).

What is CCUS?

CCUS technologies collect or "capture" carbon dioxide generated by high-emitting activities (such as an oil refinery, cement plant or fossil fuel power plant) and then transport the captured carbon to sites where it can be used for industrial processes or stored underground. CCUS technologies do not remove carbon from the atmosphere: at best they prevent some emissions from polluting facilities from entering the atmosphere. The focus of this background is on

engineered CCUS, and therefore does not include natural carbon sequestration, for example through reforestation or enhanced soli carbon uptake. For this briefing note, we will be using CCUS and CCS interchangeably.

CCUS: A dead-end technology

Though carbon capture and storage projects exist at the demonstration level, **industry has not been able to scale up deployment at the scale needed to make CCUS part of a viable pathway to achieve zero emissions by 2050.** Despite five decades of research and tens of billions of dollars in subsidies globally, the current scale of CCUS is minute compared to the scale that would be required. Current global carbon capture capacity is 39 MT, or about 0.1% of annual emissions from fossil fuels.[1] For CCS to play a significant role in achieving the global Paris Climate Agreement goal, gigatonnes (Gt) of CO2 would need to be captured and permanently stored.[2]

A 2021 study found that more than 80 per cent of the CCS projects attempted in the U.S. have ended in failure.[3] One of Canada's flagship CCS projects, Boundary Dam 3, initially promised a capture rate of 90%. It never reached that rate, so SaskPower eventually lowered its expectations to 65%—a target the facility still regularly fails to meet.[4]

One of the most significant barriers to widespread deployment of CCS technologies is the high cost of the technologies. Building carbon capture infrastructure, capturing and compressing carbon dioxide, building the infrastructure to pipe captured carbon, and developing suitable geological storage sites requires huge sums of money. In the power sector, renewable power is already cheaper than natural gas or coal, and that's without natural gas power plants having to invest huge sums in carbon capture, which would increase the cost at a time when renewable power costs continue to fall rapidly.

CCUS diverts significant financial resources from proven - and cheaper - climate solutions back to fossil fuels. Effective solutions to achieve deep emission reductions in the next decade along a pathway to zero emissions are already at hand, including renewable energy, electrification and energy efficiency. These proven, more cost effective solutions are available on the timeframes required to mitigate climate change.

[1] Garcia Freites, S. & Jones, C. (2020) A Review of the Role of Fossil FuelBased Carbon Capture and Storage in the Energy System. Friends of the Earth Scotland. Online: https://foe.scot/wpcontent/uploads/2021/01/CCS_REPORT_FINAL.pdf

[2] IEA. Sustainable Development Scenarios. WEO-2021. Available: https://www.iea.org/reports/world-energy-model/sustainable-development-scenario

[3] Abdulla A. *et al* (2021) Explaining successful and failed investments in U.S. carbon capture and storage using empirical and expert assessments. Environ. Res. Lett. Available: https://iopscience.iop.org/article/10.1088/1748-9326/abd19e/pdf

[4] Schlissel, D. (2021) Boundary Dam 3 Coal Plant Achieves Goal of Capturing 4 Million Metric Tons of CO2 But Reaches the Goal Two Years Late. IEEFA. Available: https://ieefa.org/ieefa-saskpower-hits-carbon-capture-goals-at-boundary-dam-3-more-than-two-years-late/

CCUS is not a climate solution

Carbon capture and storage projects have put more CO2 into the atmosphere than they have removed, through "enhanced oil recovery".[5] In 2020, 80% of the carbon captured was tied to EOR, whereby CO_2 is injected into depleted underground oil reservoirs to boost oil production - extraction that otherwise wouldn't have been possible.[6] EOR is currently the primary market driver for captured CO_2. Furthermore, the injection of CO2 into aging oil fields to increase production has helped extend the life of some fields by more than 25 years.[7] Only a handful of highly subsidized demonstration projects actually permanently store captured carbon underground.

CCUS locks us into prolonged fossil fuel dependence. Putting carbon capture technology on greenhouse-gas emitting facilities enables those facilities to continue operating, effectively providing those emitters with a license to pollute. Put simply, rather than replacing fossil fuels, carbon capture prolongs our dependence on them at a time when preventing catastrophic climate change requires *winding down* fossil fuel use.

CCUS technologies address only a fraction of emissions. At best, it prevents some carbon dioxide from polluting facilities from reaching the atmosphere. However, the technology does nothing to address the emissions that result from burning fossil fuels (to drive cars, heat our homes, etc) - which is where 80% of the emissions from oil and gas occur. Similarly, CCUS does not address the significant methane leakage from the production and distribution of oil and gas. Methane is 80 times more powerful a greenhouse gas than carbon dioxide.

Experts do not trust CCUS to produce emission reductions. According to the Intergovernmental Panel on Climate Change (IPCC), the emissions reduction pathway with the best chance of keeping warming at or below 1.5°C makes limited to no use of engineered carbon capture technologies. This pathway involves a rapid phase-out of fossil fuels along with limited carbon removal by natural sources such as reforestation and enhanced soil carbon uptake.[8] The IPCC points to uncertainty in the future deployment of CCS and cautions against reliance on the technology.[9]

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[5] Sekera, J. & Lichtenberger, A. (2020) Assessing Carbon Capture: Public Policy, Science, and Societal Need: A Review of the Literature on Industrial Carbon Removal. Biophysical Economics and Sustainability. Available: https://link.springer.com/article/10.1007/s41247-020-00080-5

[6] Garcia Freites, S. & Jones, C. (2021) A Review of the Role of Fossil Fuel-Based Carbon Capture and Storage in the Energy System, Tyndall Centre. Online: https://www.research.manchester.ac.uk/portal/files/184755890/CCS_REPORT_FINAL_v2_UPLOAD.pdf

[7] IHS Energy (2016) CO2 EOR Potential in North Dakota. Online: https://www.legis.nd.gov/files/committees/64-2014%20appendices/IHS%20Energy%20-%20Final%20Report.pdf

[8] IPCC (2018) Summary for Policymakers in IPCC, Global Warming of 1.5°C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels at 14, Section C.1.1., Figure SPM 3b (Pathway 1); see also IPCC SR1.5, at Ch. 2.3.3 and Table 2.SM.12. Available: https://www.ipcc.ch/sr15/

[9] IPCC, Summary for Policymakers in IPCC, Global Warming of 1.5°C: An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (2018) Ch. 5, Section 5.4.1.2. Available: https://www.ipcc.ch/sr15/

Significant challenges and gaps in relying on CCUS at scale

Scaling up CCUS would require a huge build up of carbon transportation infrastructure, including a vast network of pipelines roughly equivalent to the scale of today's oil and gas pipeline network. This would be both expensive and logistically complex.

Leaks from captured carbon can pose a serious public health risk. For example, when a CO2 pipeline ruptured in Mississippi in 2020, 300 people were evacuated and 45 people had to be hospitalized.[10]

Safe, permanent, and verifiable storage of CO2 is difficult to guarantee. The financial and liability risks related to carbon storage are highly likely to be transferred from the private sector to the public. Governments in Canada are already struggling to deal with the financial liabilities of the oil and gas sector.

CCUS does not address the hazardous air and water pollutants that come from the combustion of fossil fuels, such as fine particulate matter. The additional energy required to power the carbon capture process generates even greater amounts of these pollutants, if supplied by fossil fuels, with real health and safety implications for frontline communities.

CCUS does not address environmental, social and health impacts associated with the mining, extraction, and transport of fossil fuels, faced primarily by Indigenous and front-line communities.[11]

CCUS and fossil-derived 'blue' hydrogen

The federal government has been working on developing Canada's hydrogen fuel sector. Hydrogen, like electricity, can be used to store or transport energy, and when burned, it doesn't create any greenhouse gas emissions. But the vast majority of hydrogen is produced from fossil fuels—with huge emissions. Industry promises to deal with emissions through CCS. A recent study from Cornell and Stanford found that 'blue' fossil hydrogen is even worse for the climate than burning coal or natural gas directly, and concludes there is no role for fossil hydrogen in a carbon-free future.[12]

[10] Zegart, D. (2021) Gassing Satartia: Carbon Dioxide Pipeline Linked To Mass Poisoning. The Huffington Post. Available: https://www.huffpost.com/entry/gassing-satartia-mississippi-co2-pipeline_n_60ddea9fe4b0ddef8b0ddc8f
[11] Donaghy, T. & Jiang, C. (2021) Fossil Fuel Racism: How phasing out oil, gas and coal can protect communities. Greenpeace. Available: https://www.greenpeace.org/usa/reports/fossil-fuel-racism/
[12] Howarth, R. & Jacobson, M. (2021) How green is blue hydrogen? Energy Science and Engineering. Available: https://www.actu-environnement.com/media/pdf/news-38015-etude-energy-science-engineering-hydrogene-bleu.pdf

Canada's approach to CCUS & the proposed tax credit

Existing federal and provincial subsidies for CCUS

Oil and gas companies are already receiving subsidies for CCUS from both the federal and provincial governments, including a $329 million commitment in Budget 2021. Canada's existing CCS projects were largely paid for by governments: $865 million from the Governments of Canada and Alberta for Shell's Quest project in 2011; $240 million from the federal government for the Boundary Dam project in 2014; and $550 million from Alberta and Canada for the Alberta Carbon Trunk Line). Collectively these expensive projects capture less than 3 MT per year, and most of that is used for enhanced oil recovery.

The oil and gas industry expects significant additional subsidies for CCUS

The proposed tax credit is the result of lobbying from oil and gas companies.[13] Oil and gas companies have asked the Canadian government to design the tax credit to pay for 75% of the cost to build carbon capture facilities that will curb greenhouse gas emissions.[14] More generally, oil and gas executives have estimated that equipping the oil sands with CCS technology will cost $75 billion, and that they expect over $50 billion of that to come from government spending.[15] Unfortunately, few industries are more adept at getting governments to subsidize and de-risk its investments than the oil industry. Furthermore, oil and gas companies are spending very little of their own money on CCUS investments - in 2021, oil and gas companies spent less than 1% of their capital expenditures on CCUS.[16]

It should come as no surprise that the oil and gas sector is only looking after its own self-interest. These are the same companies that have been misleading the public for decades about climate change science. They have also consistently undermined policy efforts to address climate change.[17] Despite all the talk from Canadian oil and gas companies about climate leadership, their current business plans would fuel further climate disaster.[18]

The federal government's proposed CCUS investment tax credit

In Budget 2021, the federal government proposed the introduction of a new investment tax credit for capital invested in CCUS projects, with the stated goal of reducing emissions by at least 15 megatonnes (MT) of CO2 annually. (In 2019, Canada's oil and gas sector accounted for 191 megatonnes of greenhouse gas emissions). The government ran consultations from

[13] Public Policy Forum (July 2020) Carbon Capture, Utilization and Storage: It's Time to Act. Available: https://www.newswire.ca/newsreleases/carbon-capture-utilization-and-storage-it-s-time-to-act-813263831.html
[14] Nickel, R. (2021) EXCLUSIVE Oil companies ask Canada to pay for 75% of carbon capture facilities. Reuters. Available: https://www.reuters.com/world/americas/exclusive-oil-companies-ask-canada-pay-75-carbon-capture-facilities-2021-10-07/
[15] Tuttle, R. (2021) Oil sands carbon cuts come with US$60-billion bill, loose ends. Bloomberg. Available: https://www.bnnbloomberg.ca/oil-sands-carbon-cuts-come-with-us-60-billion-bill-loose-ends-1.1626645
[16] Joshi, K. (2021) Carbon capture keeps proving its critics right. What comes next? Available: https://medium.com/lobbywatch/carbon-capture-keeps-proving-its-critics-right-what-comes-next-32ac9750a7aa
[17] Environmental Defence (2019) The single biggest barrier to climate action in Canada: the oil and gas lobby. Available: https://environmentaldefence.ca/report/oil_barrier_climate_action_canada/
[18] Marshall, D., Tong, D. & Trout, K. (2021) Canada's big oil reality check: Assessing the climate plans of Canadian oil and gas producers. Environmental Defence, Oil Change International. Available: https://environmentaldefence.ca/report/canada-big-oil-reality-check/

June until September. Environmental Defence's submission is here. The government intends to make the investment tax credit available starting in 2022.

Environmental Defence does not support the creation of a CCUS investment tax credit. The federal government is already falling short on its commitment to eliminate inefficient fossil fuel subsidies. The tax credit would add yet another taxpayer subsidy for the oil and gas industry. Once new subsidies are put in place, they are very hard to repeal. Introducing a tax credit for CCUS for the energy sector will lock-in continued dependence on Canada's largest and most rapidly growing source of greenhouse gas emissions. Numerous modelling studies show that Canada is not on track to meet its climate change targets and this is in part due to Canada's current approach of leaning too much on short-term solutions that promote more efficient use of fossil fuels.[19]

The creation of a CCUS investment tax credit will not be an effective way to reduce emissions. The Government of Canada should only proceed with the tax credit if it meets the following conditions:

- The Government of Canada has been clear that the tax credit will not be applicable towards enhanced oil recovery projects. We urge the government to stay firm on this commitment. Only permanent storage projects should be considered.
- The tax credit should only be made available for sectors for which there are no decarbonization options. Oil and gas projects, including fossil or blue hydrogen, as well as plastics and petrochemical production, should not be eligible for the credit.
- The implementation of a tax credit must be contingent on the development of a robust governance framework for carbon storage as well as strong monitoring, reporting, verification and enforcement requirements. The issue of companies claiming credits for unverified tons of captured carbon is rampant in the United States, where a similar tax credit is in place. An investigation by the US Internal Revenue Service found that 87% of the total credits claimed, amounting to nearly US $1 billion, were not in compliance with the Environmental Protection Agency.[20]
- Companies receiving tax credits must be held accountable to mitigate harmful impacts on frontline communities, and provide compensation where mitigation isn't possible. These communities must be involved in the design and implementation of the tax credit.

The tax credit is being modelled on the American 45Q tax credit. However, Canada already has in place a robust policy to incentivize companies to invest their own funds in reducing their emissions that the United States lacks: a carbon price. The Canadian Institute for Climate Choices (CICC) found that the average cost signal in Canada is exceptionally low for large emitter programs, ranging from $1.80 to $25.60 per tonne, with an average price per tonne of $4.96.[21] Rather than creating a CCUS tax credit, the Government of Canada should ensure that

[19] Langlois-Bertrand, S. *et al.* (2021). Canadian Energy Outlook 2021 — Horizon 2060. Institut de l'énergie Trottier and e3c Hub. Available: http://iet.polymtl.ca/energy-outlook/
[20] Inspector General for Tax Administration (April 2020) Department of Treasury Letter. Online: https://www.eenews.net/assets/2020/04/30/document_gw_07.pdf
[21] Canadian Institute for Climate Choices (2021) 2020 expert assessment of carbon pricing systems. Available: https://publications.gc.ca/site/eng/9.900084/publication.html

companies have a real incentive to invest in carbon reductions by closing the loopholes in the design which currently allow for around 80% of oil and gas emissions to avoid paying the full carbon price.[22]

During the tax consultations over the summer of 2021, over 500 organizations from Canada and the United States expressed concern about Canadian and US governments' support for CCS.[23] These concerns are shared by the International Climate Action Network - a global network of more than 1,500 civil society organisations in over 130 countries.[24]

[22] Environmental Defence (2018) Canada's oil & gas challenge. Available: https://environmentaldefence.ca/report/canadas-oil-and-gas-challenge/
[23] Environmental Defence (2021) Letter to Government: Carbon capture is not a climate solution. Available: https://environmentaldefence.ca/report/ccs_letter/
[24] Climate Action Network International (2021) CAN Position: Carbon Capture, Storage and Utilisation. Available: https://climatenetwork.org/resource/can-position-carbon-capture-storage-and-utilisation/