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SHELL'S QUEST PROJECT IN ALBERTA, CANADA

PHOTO: ALBERTA NEWSROOM

BUYER BEWARE:

Fossil Fuels Subsidies and Carbon Capture Fairy Tales in Canada



environmental
defence

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EXECUTIVE SUMMARY

In 2021, people across Canada and around the world experienced the real threats and impacts of climate change. Yet even as communities across the country were fleeing or being evacuated from their homes – because of heat domes, atmospheric rivers, wildfires, droughts or floods – the Government of Canada continued providing financial support to an industry that we need to be winding down in order to avoid catastrophic levels of warming.

Each year, Environmental Defence produces a tally of how much financial support has been provided to fossil fuels by the federal government. In 2020, the number was a whopping \$18 billion. **In 2021, the figure was \$8.6 billion.** Though a lower amount, this is still a substantial use of taxpayer money that went towards making it cheaper to find, extract, process, transport and export fossil fuels.

Meanwhile, real climate solutions aren't being properly funded. The most important steps for decarbonizing our economy are increased electrification, wide-scale use of renewable energy and increasing energy efficiency – yet these sectors have received limited government support.

In the past two years, we have seen oil and gas industry players resurrect an old stall tactic to try to head off the clean energy transition. Specifically, oil and gas companies are calling for governments to spend tens of billions on false climate solutions: carbon capture, utilization and storage (CCUS) and fossil-derived “blue” hydrogen. **Higher oil and gas prices made 2021 a windfall year for oil and gas companies, who raked in huge profits and are expected to make even more money this year. However, instead of using their own funds to pay for CCUS and emissions reductions, they're pushing for even more government subsidies.**

Though there is no inventory of public funding that has been made available for carbon capture and storage projects, this report provides the first estimate of public funding for CCUS projects in Canada. From what was possible to track, since 2000, the federal government has provided \$2 billion, the Government of Alberta has provided \$2.6 billion and the Government of

Saskatchewan has provided \$1.2 billion, bringing **the total amount of subsidies for CCUS to \$5.8 billion**, which has resulted in a yearly capture rate of less than 4 MT (representing 0.05% of Canada's emissions), most of which is used for enhanced oil production. **The CCUS handouts are poised to grow exponentially**, with a new investment tax credit set to be released shortly.

At the same time, in 2021, in response to considerable public pressure, the federal government made new commitments to end fossil fuel subsidies and public financing. While these commitments are positive developments, for the Government of Canada to correct its poor track record it must end all subsidies and supports to fossil fuel companies, align with international definitions and close loopholes that have been created to continue subsidizing oil and gas companies under the guise of emissions reductions or environmental outcomes.

The pathway to zero emissions and a climate-safe future does not include subsidies or public financing for the oil and gas industry.

14X

Between 2018 and 2020, Canada provided 14 times more fossil fuel finance than support for renewables.

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\$5.8 B

Total amount of subsidies for carbon capture, utilization and storage (CCUS) since 2000.

.05%

Amount of Canadian emissions captured using CCUS since 2000.

MAKING THE RIGHT POLICY DECISIONS MEANS INVESTING IN CLIMATE SOLUTIONS

When it comes to aligning government spending priorities with the climate crisis, the question cannot be whether an initiative is incrementally better than an alternative. The question must be whether the project is consistent with a commitment to limit warming to 1.5 degrees. Support must only be given to sectors that can achieve zero emissions. In terms of the oil and gas sector, Canada must leave over 80% of its remaining oil in the ground if the world is to have even a 50% chance of holding average global warming to 1.5°C.¹

Subsidies are a common public policy tool that governments employ to support a specific economic sector or to achieve a desired social outcome. There are numerous circumstances that justify the use of subsidies. For example, subsidies could be useful in supporting new and emerging sectors that are in line with government priorities, like renewable energy. In this case, the subsidy corrects against the fact that impacts of pollution are not fairly accounted for by the market, and it helps new industries overcome the incumbent advantage held by fossil fuels. Yet, between 2018 and 2020, on average G20 countries provided two and a half times more public finance to fossil fuels than they did for renewable energy. During those same years, **Canada provided 14 times more fossil fuel finance than support for renewables.**²

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 solutions are critical for the necessary transition away from oil and gas. Moreover, their costs are falling dramatically: the cost of renewable energies have plummeted to the point that they are

cheaper than fossil fuels.³ However, fossil fuels retain an incumbent advantage in Canada – for example, because the infrastructure is already in place. Fossil fuel subsidies maintain that advantage and divert resources from these proven, more cost effective solutions that are available on the timeframes required to mitigate climate change.

Currently Canada is not deploying these technologies at anywhere near the pace required. For example, in order to ramp up solar and wind production sufficiently to decarbonise electricity production, the necessary investment has been estimated at \$8 billion a year until 2050.⁴ In contrast, in 2021, the federal government announced \$960 million for renewable energy and grid modernization projects – but over four years.⁵ In order to tackle the emissions that come from residential and commercial buildings, the federal government, in partnership with the provinces, should be investing \$10–15 billion per year for ten years. Though the federal government has made significant investments in retrofits, the tally falls far short of what is needed at approximately \$9 billion over seven years, much of which is in the form of loans.⁶

The scale of spending needed to tackle the climate crisis is significant. Given that governments don't have infinite spending capacity, they must be strategic. Oil and gas companies have profited immensely for decades from public resources. Instead of continuing to subsidize the sector, the government must implement strong regulatory frameworks that ensure oil and gas companies are doing their fair share, while investing in the activities that put us on a climate-aligned pathway, including energy efficiency, renewable energy and electrification.

**\$8 billion/year
until 2050**

Estimated required investment of to ramp up solar and wind production.

vs.

**\$960 million
over four years**

Government's plan for renewable energy and grid modernization projects.

EVALUATING GOVERNMENT COMMITMENTS

Canada has a poor track record when it comes to fossil fuel subsidies and supports. Since the Government of Canada initially committed to ending fossil fuels subsidies in 2009, Canada's level of subsidies and support for the fossil fuel industry has only increased. A report from Bloomberg New Energy Finance found that between 2015–2019 the Government of Canada provided \$100 billion to the fossil fuel sector and raised its level of support to fossil fuels by 40% over those years — the second-largest increase among G20 countries.⁷ Between 2018 and 2020, Canada provided more public financing to oil and gas companies than any other G20 country.⁸

The federal government responded to significant public pressure by promising greater ambition during the federal 2021 election and at COP26.

Specifically, the federal government committed to:

- Eliminate fossil fuel subsidies by 2023.
- Phase-out public financing of the fossil fuel sector, including from Crown corporations, consistent with our government's commitment to reach net-zero emissions by 2050.
- Eliminate direct public financing for international overseas projects before the end of 2022.

These commitments are positive developments. This is the first time that a government has promised to eliminate public financing to the fossil fuel sector. The commitment to eliminate subsidies by 2023 is an acceleration of the G7 promise, which was to eliminate subsidies by 2025.

Furthermore, when Canada first committed to eliminating fossil fuel subsidies in 2009, the promise was to end “inefficient” subsidies. The government has used this loophole to excuse continued subsidies by deeming some spending programs or tax breaks are “efficient”. Therefore, dropping the word “inefficient” from their commitment is a positive step.

However, as will be discussed below, government ministers continue to argue that some programs that provide financial support to fossil fuels aren't subsidies. Canada must align with international definitions and best practice of what constitutes a fossil fuel subsidy – specifically the WTO definition⁹ – and close loopholes that have been created to continue subsidizing oil and gas companies under the guise of emissions reductions or environmental outcomes.

BOX 1: PUBLIC FINANCING VERSUS SUBSIDIES

Though there is overlap between the terms subsidies and public financing, generally subsidies refers to financial contributions including direct grants or tax credits. Public finance takes the form of loans, equity, bonds insurance, guarantees, and technical assistance provided by the government or a government agency. In Canada, most public financing provided to the fossil fuel sector is done by crown corporation Export Development Canada.¹⁰

FOSSIL FUEL FINANCING IN 2021

Due to a lack of transparency and public reporting, quantifying yearly financial support provided to the oil and gas sector by the Government of Canada and its agencies remains a difficult task.

For 2021, we were able to track \$8.649 billion in financial support provided by the federal government, which includes:

- **\$5.149 BILLION** in public financing provided through Export Development Canada
- **\$500 MILLION** of this went to support the exploration and production of oil and gas, including financing of up to \$75 million for Parex, a Canadian company involved in fracking operations in Colombia and implicated in human rights violations.¹¹
- **\$14 MILLION** through Sustainable Development Technology Canada for projects in the oil and gas sector deemed to be 'cleantech'.
- **\$597 MILLION** in direct transfers to oil and gas companies, through funding programs such as Natural Resource Canada's Clean Growth Program, Emissions Reduction Fund, Low Carbon Economy Leadership Fund; the Oil and Gas Industry Recovery Fund, and Innovation, Science and Economic Development's Strategic Innovation Fund.

Public financing provided in 2021 through Export Development Canada:

\$5.149 BILLION

- **\$2.4 BILLION** in foregone tax revenue. Federal tax deductions are not disclosed. However in December 2021, the Parliamentary Budget Office estimated the cost of tax provisions to oil and gas companies and found that on average oil, gas and coal mining companies reduced annual federal tax revenue by \$1.8 billion on average between 2015 and 2019. Since data is not available for subsequent years, the number here reflects 2019 levels of foregone revenue.¹²
- **\$600 MILLION** was distributed to oil and gas extraction and mining companies through the Canada Emergency Wage Subsidy in 2021. Though this was a COVID support program that was not limited to the oil and gas industry, it is included here because it is still public funding that was offered to the oil and gas industry. Despite receiving this support, oil and gas companies still laid off thousands of workers and they did not stop the practice of paying shareholder dividends. Furthermore, oil and gas hit record high prices in 2021 and the sector profited greatly.

Though lower than the \$18 billion tally from 2020, this is still a substantial level of support for an industry that must be phased out to ensure a safe future. Furthermore, given that the federal government still fails to provide a comprehensive inventory, it is likely that this is an underestimate of total support.

The difference between 2020 and 2021 is largely as a result of Export Development Canada. Given that the crown corporation's lending is demand driven, this decrease could just be a result of fewer oil and gas companies applying for loans in 2021. Furthermore, in 2020, Export Development Canada provided \$5 billion in loan renewals for financing the construction of TMX, an ongoing project which we reported on last year and is therefore not included above although some of the loan may have been spent in 2021.

As a final note, these numbers do not include the significant subsidies from provincial governments to oil and gas companies.¹³



The latest estimated cost for the Trans Mountain expansion project is now

\$21 BILLION

BOX 2: THE TRANS MOUNTAIN PIPELINE

One of the most notable examples of the federal government's financial support to the fossil fuel industry is the purchase and construction of the Trans mountain pipeline and expansion project. The buyout and construction has been financed through Export Development Canada. In 2018, the government paid Kinder Morgan \$4.5 billion to buy Trans Mountain. The projected cost to complete the controversial Trans Mountain pipeline expansion have skyrocketed. The initial cost to complete the project was \$5.4 billion. The latest estimates now forecast the expansion to cost over \$21 billion - and it could go higher.¹⁷

The disastrous climate implications of the project have been clear all along, but federal government agencies are now finding that the economic rationale behind the pipeline has evaporated. Even without ramped-up climate action and with the recent cancellation of the Keystone XL pipeline, the Canadian Energy Regulator concluded that Canada's oil exports can be met with existing capacity, so there is no reason for any additional pipelines - including the Trans Mountain Expansion pipeline.¹⁸ The Parliamentary Budget Office found that even modest new climate policies, in line with what governments have already committed to, would result in the pipeline becoming a money-loser.¹⁹

As this spending did not occur during 2021, it is not included in our summary above - but it should still be understood as major, ongoing and risky financial support that the federal government has undertaken on behalf of the fossil fuel sector.

BOX 3: EXTERNALITIES

The scope of this report also does not include externalities - costs resulting from the production and consumption of fossil fuels that are being downloaded onto governments - including the healthcare costs stemming from the impacts of fossil fuels, the cost of pollution clean up and more. A 2015 report by the International Monetary Fund found that, when externalities are included, Canada provided \$63 billion to the oil and gas sector that year.¹⁴ Cleaning up Alberta's oil patch - including the 90,000 abandoned oil wells, toxic tailing ponds and ageing pipelines - could cost up to \$260 billion.¹⁵ Without changes to existing regulations, there is a risk that these cleanup costs will be left to taxpayers, as has happened in the past. According to the Canadian Medical Association, the burning of fossil fuels is responsible for \$53.5 billion in health-related costs each year in Canada.¹⁶

BOX 4: A BIG BREAK ON CARBON PRICING

Oil and gas producers pay among the lowest average carbon costs of any sector – and it’s threatening Canada’s climate targets. Canada’s approach to carbon pricing allows provinces to design their own systems for charging industrial emitters. Provinces like Alberta grant generous exemptions to oil and gas companies. These systems let oil and gas companies off the hook: around 80–90% of emissions from the oil and gas sector are exempt.²⁰

These exemptions constitute an enormous fossil fuel subsidy. However, given that the approach varies widely by province, the exact amount is difficult to quantify.²¹ As a result, this subsidy is not included in the 2021 inventory.

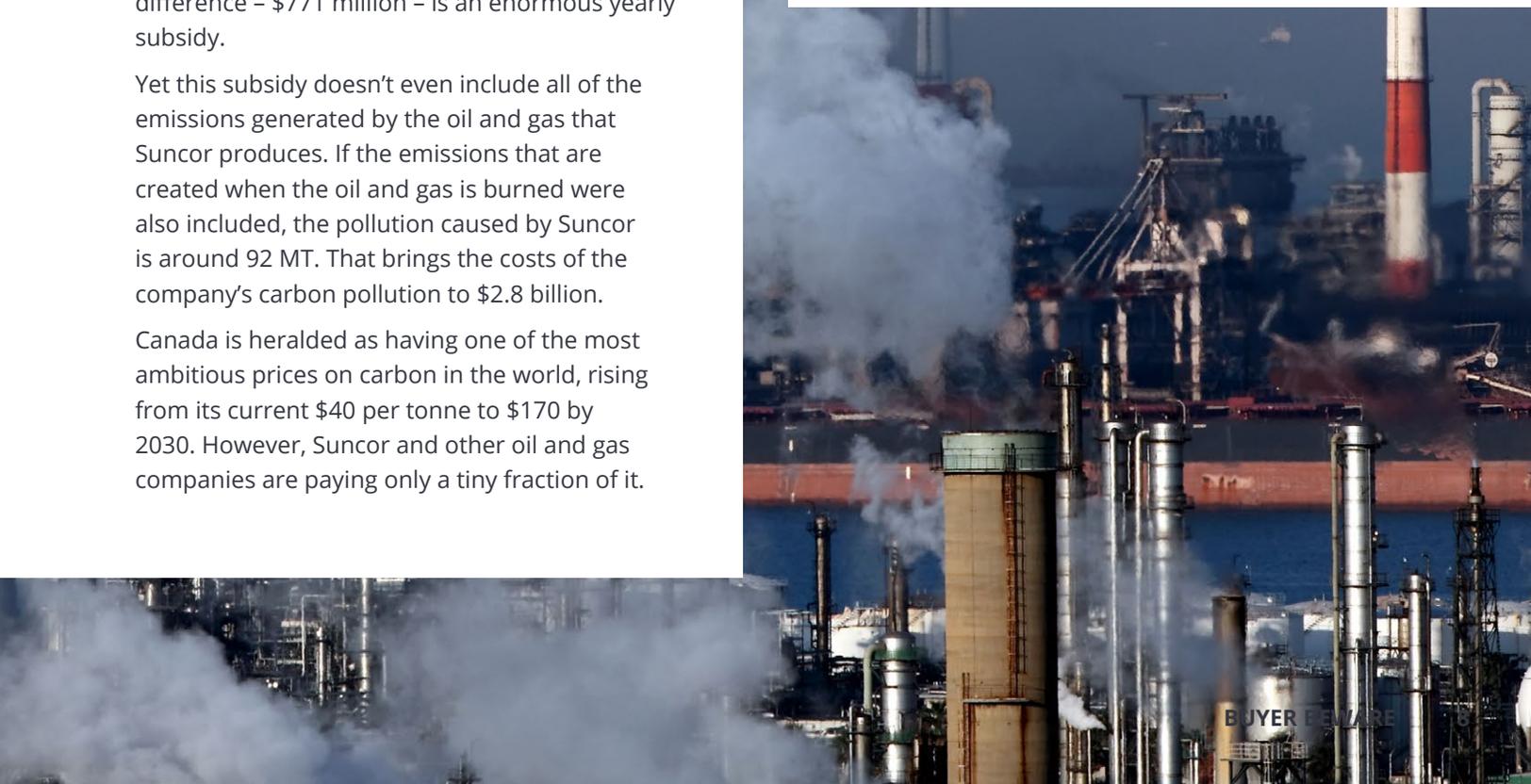
The significance of this subsidy can be better understood through a case study of Suncor – the oil and gas sector’s largest emitter. In 2020, Suncor’s emissions were 27.7 million tonnes (MT) of greenhouse gas pollution.²² **If it had paid the full carbon price in 2020 – that which Canadians are paying – of \$30 per tonne, that would have cost Suncor \$830 million. Instead, Suncor only paid \$59 million in 2020.**²³ That difference – \$771 million – is an enormous yearly subsidy.

Yet this subsidy doesn’t even include all of the emissions generated by the oil and gas that Suncor produces. If the emissions that are created when the oil and gas is burned were also included, the pollution caused by Suncor is around 92 MT. That brings the costs of the company’s carbon pollution to \$2.8 billion.

Canada is heralded as having one of the most ambitious prices on carbon in the world, rising from its current \$40 per tonne to \$170 by 2030. However, Suncor and other oil and gas companies are paying only a tiny fraction of it.

BOX 5: PETROCHEMICAL SUBSIDIES

The federal government has provided significant funding to petrochemical companies that turn fossil fuels into plastic polymers and to plastics companies that convert polymers into other manufactured items. Environmental Defence has calculated that the federal government provided more than \$200 million in direct support to plastics and petrochemical companies between 2018 and 2021²⁴, not including the \$7.3 billion provided by Export Development Canada²⁵ to the plastics, packaging, biofuels and chemicals sectors in that period. These numbers are not included in the total amount of public financing for oil and gas in 2021. The Chemistry Industry Association of Canada, the industry lobby group, has called on the government of Canada to establish a \$200 million “innovation” fund for the petrochemical sector. It opposes the bans on single-use plastics being implemented by the federal government as part of a plan to address plastic pollution and instead calls for support for expensive and unproven incineration projects to turn plastic waste into chemicals, fuels or energy while leaving behind significant pollutants.



VIOLATING THE POLLUTER PAYS PRINCIPLE: ENVIRONMENTAL CLEAN UP AND EMISSIONS REDUCTIONS

Over the past two years, many new funding programs have been created under the guise of environmental outcomes and job creation, such as the \$750 billion Emissions Reduction Fund or the \$1.7 billion provided to oil and gas companies to remediate inactive and orphan oil and gas wells.

According to the internationally recognized WTO definition, these programs are fossil fuel subsidies.²⁶ They lower the cost of production and doing businesses for oil and gas companies, resulting in increased profitability. They distort the market, even further benefiting fossils over less polluting solutions like renewables and the electrification of transport. These programs socialize the environmental cost of fossil fuel production, while allowing oil and gas companies to reap enormous benefits from public resources. Oil and gas companies have profited immensely for decades from activities that are fueling the climate crisis as well as polluting our land and water.

By putting taxpayers on the hook to clean up industry's mess, these programs violate the polluter pays principle enshrined in Canadian law,²⁷ which places responsibility on those who cause the

damage to bear the costs. These same outcomes could be reached – with no public cost – by putting regulations in place to require companies to invest their own funds into solutions.

Now that oil prices are at an all time high, oil and gas companies are using their record profits not to reduce their own emissions or pay for environmental remediation, but instead they are increasing shareholder dividends and buybacks.²⁸ Oil and gas companies made \$86 billion in after-tax revenues in 2021 and are estimated to rake in \$115 billion in 2022. In comparison, their average after-tax revenue between 2012 and 2020 was \$45 billion.²⁹ It is critical that governments use this period of high oil prices to ensure companies deal with their ongoing liabilities, including ageing infrastructure, and pay for their own emissions reductions.

Furthermore, none of these programs did what policymakers claimed they wanted to achieve in terms of emissions reduction, environmental clean up or job creation or retention. For example, an audit conducted of the Emissions Reduction Fund by the Commissioner of the Environment and Sustainable Development found the program was poorly designed, that there was no evidence that the funds were ensuring credible and sustainable emissions reductions and that there was no requirement that companies use these funds to support worker retention, despite this having been a key claim for the initial creation of the program. The commissioner concluded that the Emissions Reduction Fund is an inefficient use of taxpayer dollars.³⁰

Oil and gas companies made

\$45B

**annually between
2012 and 2020**

vs.

\$115B

**estimated profits
in 2022**

BOX 6: CLIMATE CONDITIONS MISSING ON NEW GOVERNMENT SPENDING PROGRAMS

This failure to design spending programs with robust conditions regarding climate pollution is concerning. Several large funding programs have been created but have yet to distribute much or any funding. For example, the \$8 billion Net Zero Accelerator program was established to decarbonize large emitters and accelerate clean technology. The \$1.5 billion Clean Fuels fund was established to increase the production and use of low-carbon fuels. \$750 million is being made available through Sustainable Development Technology Canada to grow the cleantech market. However, currently there is no mechanism or standard to ensure that these programs actually reduce carbon pollution – without that, it is possible that these programs will result in significant fossil fuel subsidies without any environmental benefit.³¹

SUBSIDIZING FALSE CLIMATE SOLUTIONS

Over the past two years, oil and gas industry players have resurrected an old stall tactic to try to head off the clean energy transition: subsidies for “greening” the oil and gas industry. Specifically, oil and gas companies are calling for handouts for two false climate solutions: carbon capture, utilization and storage (CCUS) and fossil-derived “blue” hydrogen. Few industries are more adept at getting governments to subsidize and de-risk its investments than the oil industry.

Unfortunately, the federal government seems primed to significantly increase handouts for CCUS for the oil and gas sector and fossil hydrogen, both through funding programs such as the \$8 billion Net Zero Accelerator and the \$1.5 billion Clean Fuels Fund as well as through a proposed CCUS investment tax credit (see below). Oil and gas executives have estimated that equipping just the oil sands with CCUS technology will cost \$75 billion, and that they expect at least \$50 billion of that to come from government spending.³² 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.³³

Subsidizing CCUS and fossil hydrogen diverts significant financial resources from proven – and cheaper³⁴ –

climate solutions that are available on the timeframes required to mitigate climate change, including renewable energy, electrification and energy efficiency.³⁵

CARBON CAPTURE, UTILIZATION AND STORAGE

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.

CCUS relies on the flawed premise that we can continue burning fuels indefinitely by capturing some of the carbon emissions from polluting facilities before they escape into the atmosphere. Putting carbon capture technology on greenhouse-gas emitting facilities is used to justify new polluting projects and enables existing facilities to continue operating, effectively providing emitters with a license to pollute and locking in greenhouse gas emissions for decades to come.

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.

It also hasn’t worked. Despite decades of research and investment, in Canada and globally, CCUS is neither economically sound nor proven at scale, with a terrible track record and limited potential to deliver significant, cost-effective emissions reductions.³⁶

3-15%

At best, CCUS only prevents 3-15% of GHGs from entering the atmosphere

There is an enormous risk of subsidies to CCUS ending up as stranded assets, leaving provinces like Alberta with abandoned CCUS refineries and pipelines – on top of the significant environmental liabilities they are already facing in the form of old, unreclaimed wells, toxic ponds of tailings waste and massive mine sites.

CCUS IS NOT A CLIMATE SOLUTION

CCUS technologies address only a fraction of emissions. They are not negative emissions technologies and they do not remove carbon from the atmosphere. At best, CCUS prevents some carbon dioxide from polluting facilities from reaching the atmosphere. Many of the proposed projects in Canada are in the upstream oil and gas sector. In this context, applying CCUS 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. At best, in the context of using CCUS for oil and gas production, the technology only prevents 3–15% of greenhouse gas emissions from entering the atmosphere.³⁷

For example, Shell claims that its Alberta-based Quest CCUS project – which captures carbon from the production of hydrogen from fossil gas – has a capture rate of 80%. But when you consider the plant's full emissions, as well as the emissions from the energy used to power the CCUS system and the methane leakage from the extraction and transportation of the fossil gas, the total capture rate falls to 39%.³⁸

Perversely, since 80% of the carbon being captured globally is used to recover more oil (a process called enhanced oil recovery), **carbon capture and storage**

projects have put more CO₂ into the atmosphere than they have removed.³⁹ Only a handful of highly subsidized demonstration projects actually permanently store captured carbon underground.

Though some modelling shows a role for CCUS, 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 relies on natural solutions like afforestation, not CCUS, to remove carbon from the atmosphere.⁴⁰

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. **Current global carbon capture capacity is 39 MT, or about 0.001% of annual carbon pollution globally.**⁴¹

Most CCUS projects never get off the ground. A 2021 study found that more than 80 per cent of the CCUS projects attempted in the U.S. have ended in failure.⁴²

One of the most significant barriers to widespread deployment of CCUS 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. For example the per-tonne cost at Shell's Quest CCUS project is \$200.⁴³ According to the International CCS Knowledge Centre, the average cost of a CCUS in Canada is \$1 billion for a megatonne per year of reductions.⁴⁴



CCUS DOESN'T ADDRESS OTHER EXISTING PROBLEMS WITH FOSSIL FUELS

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.⁴⁵

Leaks from captured carbon can pose a serious public health risk.⁴⁶ Safe, permanent, and verifiable storage of CO₂ is difficult to guarantee.

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.⁴⁷

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.⁴⁸

CANADA'S CARBON CAPTURE SPENDING TO DATE

There is no inventory of public funding that has been made available for carbon capture and storage projects. From what was possible to track, since 2000 the federal government has provided \$2 billion,⁴⁹ the Government of Alberta has provided \$2.6 billion⁵⁰ and the Government of Saskatchewan has provided \$1.2 billion. **This brings the total to \$5.8 billion.** Of course, given that this is only what was reasonably possible to track, this is likely an underestimate. Where CCUS was added to existing projects as a retrofit, understanding the role of public spending was straightforward. However in some cases where CCUS was part of the initial design of a refinery or other fossil fuel project, it was not possible to separate out the subsidy for CCUS technology specifically.

What have the subsidies resulted in? Collectively these expensive projects capture around 3.55 MT per year (see Table 1 for projects included).

To put that into perspective, the emissions from Canada's oil and gas industry were 191 MT of CO₂ eq in 2019.⁵¹ CCUS projects are currently capturing 0.05% of Canada's emissions.

Furthermore, 70% of the carbon captured in Canada is used for enhanced oil recovery. For example, the carbon captured at Boundary Dam in Saskatchewan is one source of captured carbon which is transported to Weyburn oil fields for enhanced oil recovery. (In fact, part of the rationale behind the CCUS retrofit at Boundary Dam was to supply Weyburn with captured carbon – in essence a subsidy paid for by SaskPower ratepayers for enhanced oil production.⁵²) Weyburn estimates that enhanced oil recovery will result in an additional 130 million barrels of oil and extend the life of the field by over two decades.⁵³ The impact of these subsidies have likely been that they've resulted in more emissions rather than less.

There has also been an opportunity cost to these subsidies. If instead of paying for the CCUS retrofit of the Boundary Dam thermal coal power plant, the government of Saskatchewan had instead turned to wind power generation, it could have saved electricity consumers in Saskatchewan more than \$1 billion while generating the same amount of electricity.⁵⁴

Beyond subsidies, governments are providing CCUS projects with other types of support. For example, the federal clean fuel regulations allows companies to generate credits through CCUS. Companies can offset their costs by selling the credits, therefore incentivizing investments in CCUS.⁵⁵ The federal government is also developing a national CCUS strategy.

Since 2000 the federal government has provided \$2 billion, the Government of Alberta has provided \$2.6 billion and the Government of Saskatchewan has provided \$1.2 billion. This brings the total to

\$5.8 BILLION

BOX 7: PROPOSED CCUS TAX CREDIT

The Government of Canada is currently designing a new investment tax credit for capital invested in CCUS projects. The final details are expected to be released in Budget 2022.

The proposed tax credit is the result of lobbying from oil and gas companies.⁵⁶ 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.⁵⁷

If the new CCUS investment tax credit is made available for oil and gas projects including fossil hydrogen, this would create a significant new fossil fuel subsidy, therefore contradicting the government's promise to eliminate subsidies. Once new subsidies are put in place, they are very hard to repeal.

The tax credit is being modelled on the American 45Q tax credit. However, Canada already has in place a policy to incentivize companies to invest their own funds in reducing their emissions that the United States lacks: a carbon price. Rather than creating a CCUS tax credit, the Government of Canada should ensure that 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.⁵⁸

The creation of a CCUS investment tax credit will not be an effective way to reduce emissions. In fact, 400 academics express their concerns with this tax credit in a letter to Minister Freeland.⁵⁹ "Deploying CCUS at any climate-relevant scale, carried out within the short timeframe we have to avert climate catastrophe without posing substantial risks to communities on the frontlines of the buildout, is a pipe dream."

TABLE 1: OVERVIEW OF CCUS PROJECTS IN CANADA

Project Name & Proponent	About the project	Amount of Public Funding	Capture Rates*	Permanent storage or enhanced oil recovery?
Alberta Carbon Trunk Line (ACTL)⁶⁰	CO ₂ pipeline	Government of Canada: \$63 million	N/A	N/A
Wolf Midstream, Enhance Energy	Currently transports carbon from NWR's Sturgeon Refinery and Nutrien's ammonia plant to an enhanced oil recovery project run by Enhance Energy. It has the capacity to transmit 14.6 megatonnes of captured CO ₂ per year and is operating at about 10% capacity. Part of the justification for ACTL was to stimulate depleted and ageing wells, minimizing the liabilities associated with their abandonment, and resulting in cheap oil production. ⁶¹	Government of Alberta: \$495 million Canada Pension Plan Investment Board: \$305 million ⁶² 70% government subsidized ⁶³		

Project Name & Proponent	About the project	Amount of Public Funding	Capture Rates*	Permanent storage or enhanced oil recovery?
Boundary Dam SaskPower	Carbon capture retrofit on coal power plant Commenced operations in October 2014. The world's only project capturing carbon from a coal power plant.	Federal Government: \$240 million Government of Saskatchewan: \$1.2 billion 100% government funded ⁶⁴	Initially promised a capture rate of 90%, which would mean 1 MT captured per year. However the project has dealt with ongoing operational challenges and design oversights and has never reached that rate, so SaskPower eventually lowered its expectations to 65%—a target the facility still regularly fails to meet. ⁶⁵ The actual CO ₂ capture rate between October 2014 and December 2021 was 53% ⁶⁶ However, at times the rate has been much lower. For example in 2021, the carbon capture rate was less than 37%. ⁶⁷ As a result, instead of capturing the promised 7 MT since it opened in 2014, the project has only captured 4 MT. ⁶⁸	Enhanced oil recovery
Horizon Oil Sands – bitumen upgrading CNRL	Carbon is captured from production of hydrogen from fossil gas. Hydrogen is used to refine bitumen.	Unclear/None	According to CNRL, the annual capture rate is 0.4 MT CO ₂ ⁶⁹	Enhanced oil recovery, as well as injection into tailings ⁷⁰
Lashburn CO₂ Capture Demonstration Project⁷¹ Husky Energy	Capture CO ₂ from a steam assisted gravity drainage facility	Government of Alberta: \$2.8 million	Pilot project – negligible capture rates (between 2015–2017, 1,933 tonnes of CO ₂)	Enhanced oil recovery
Lloydminster plant & Lashburn & Tangleflags Pilot Project⁷² Husky Energy	Carbon captured from the ethanol plant for gasoline blending	Government of Canada: \$14.5 million ⁷³	Husky aims to capture 0.1 MT per year	Enhanced oil recovery in heavy oil reservoirs Transported via tanker
Redwater Fertilizer facility Nutrien	Carbon is captured from production of ammonia from fossil gas Supplies captured carbon to ACTL	Unclear/None Nutrien generates tax credits which it sells as offsets	Capture rate: 0.3–0.6 MT ⁷⁴	Enhanced Oil Recovery

Project Name & Proponent	About the project	Amount of Public Funding	Capture Rates*	Permanent storage or enhanced oil recovery?
Sturgeon Refinery North West Redwater (NWR) Partnership between CNRL and the Alberta Petroleum Marketing Commission (APMC)	<p>Carbon is captured from production of hydrogen from fossil gas. Hydrogen is used to refine bitumen.</p> <p>The first heavy oil refinery in the world designed and built with carbon capture</p> <p>The carbon is transported via the ACT</p> <p>The project commenced in 2020.</p>	<p>APMC is a crown corporation.</p> <p>This was public-private partnership that relied heavily on public support⁷⁵</p> <p>However since the CCUS component was part of the refinery, hasn't been possible to determine how much public support for CCUS specifically there was</p> <p>The cost of building the project was over \$10 billion</p>	<p>The project is capable of capturing 1.2 MT of CO₂ a year,⁷⁶ with a capture rate of 70%.⁷⁷</p>	Enhanced Oil Recovery
Project Pioneer⁷⁸ TransAlta Corporation, Capital Power and Alstom	<p>Carbon capture retrofit on coal power plant</p> <p>The project was cancelled in 2012 due to financial reasons.</p>	<p>Government of Canada: \$343 million</p> <p>Government of Alberta: \$436 million⁷⁹</p>	N/A	N/A
Quest⁸⁰ Operated by Shell on behalf of the Athabasca Oil Sand Project, a joint venture of Shell, Marathon and Chevron.	<p>Carbon is captured from production of hydrogen from fossil gas. Hydrogen is used to refine bitumen.</p> <p>Project began operation in 2015. The project has captured more carbon than any other project globally.⁸¹</p>	<p>Government of Canada: \$120 million</p> <p>Government of Alberta: \$745 million</p> <p>Public funds covered 75% of overall costs.</p> <p>In addition, Shell receives tax carbon credits from the Government of Alberta</p>	<p>The project has the capacity to capture 1.2 MT per year, however in practice the capture rate is a bit lower. Over the five years it has been in operation, it has captured 4.8 MT, for a yearly capture rate of just under 1 MT.</p> <p>Annual capture rate ranges from 77% to 83%.⁸²</p>	Permanent geological storage
Swan Hills In-Situ Coal Gasification Project⁸³	<p>Swan Hills Synfuels</p> <p>Project was cancelled in 2013 due to financial reasons.</p>	<p>Government of Alberta: \$285 million</p>	N/A	N/A

* Estimating capture rates is not straightforward. For some of these projects, such as Boundary Dam, there is data available on actual capture levels, not just what is technically feasible. For others, including the Sturgeon Refinery, the capture rate is based on projections by companies themselves have claimed. As noted above with the Quest example, the capture rates generally ignore most life cycle emissions, including carbon emitted from the energy required to operate the carbon capture technology, emissions from the power used to run the facility, methane leaks upstream during the extraction, processing and transportation of fossil fuels and the downstream emissions.⁸⁴

SUBSIDIZING CANADA'S HYDROGEN STRATEGY

The federal government has been working on developing Canada's hydrogen sector. Hydrogen can act as a battery, to store energy, or it can be transported and used as a fuel. Today, most hydrogen is used in petroleum refining and fertilizer production.

Hydrogen doesn't typically exist by itself in nature. Hydrogen can be produced in different ways and from a wide variety of sources – and though it always burns cleanly, whether its actually zero emissions or not depends on how it was produced. While hydrogen can be produced using renewable energy to split water (a process called electrolysis), the vast majority of hydrogen is produced from fossil gas, also called "natural gas" – with huge emissions. The industry promises to capture some of the emissions that occur during the production process through CCUS. This is what's referred to as blue hydrogen.

For many of the current uses of hydrogen being proposed by industry and government, direct electrification is actually a better solution. It's a more efficient use of renewable electricity and can achieve greater greenhouse gas reductions sooner than renewable hydrogen.⁸⁵ The widespread and untargeted use of hydrogen may actually complicate the task of decarbonizing world economies.⁸⁶ Deploying renewable hydrogen for the hardest-to-decarbonize sectors where electrification isn't an option could help Canada meet its Paris climate commitments. But given its energy requirements, the use of hydrogen must be strategic and limited.

No form of fossil hydrogen aligns with a transition off of oil and gas. **A recent study from Cornell and Stanford found that blue fossil hydrogen is even worse for the climate than burning coal or fossil gas directly, and concludes there is no role for fossil hydrogen in a carbon-free future.**⁸⁷

Not only is "blue" fossil hydrogen not a climate-aligned technology, it's also a competitive laggard. By the time planned blue hydrogen projects become operational, most of the expected market for energy demand will have been taken over by renewable energy, electrification and renewable hydrogen.⁸⁸ This means

that spending on blue fossil hydrogen comes with a significant risk of creating stranded assets.⁸⁹

Across various federal and provincial funding programs, hydrogen has received at least \$150 million in recent years, with approximately one third of that support going to fossil hydrogen, and none of it targeted specifically to renewable hydrogen. The real worry here is about upcoming subsidies through either the \$1.5 billion Clean Fuels Fund or the \$8 billion Net Zero Accelerator, both of which have stated hydrogen, including fossil hydrogen, as a priority sector.

The fossil fuel industry has multiple incentives for promoting hydrogen. First, the industry's vision for hydrogen calls for continued reliance on fossil gas to produce hydrogen, expanding existing revenue streams.⁹⁰ Second, industry sometimes uses rhetoric about green hydrogen to justify new infrastructure for fossil gas. Gas utility companies boost their profits when they build more pipelines to deliver fossil gas to homes and businesses, with the customers footing the bill. Some gas companies are fighting to expand their fossil gas infrastructure by claiming that blending hydrogen into their pipelines is a climate solution. But this will not meaningfully impact carbon emissions and will delay already available, more efficient, cheaper, cleaner and safer solutions like the electrification of home heating and cooking.⁹¹ Similarly, companies that profit from building gas-fired power plants are beginning to rely on the promise that they might one day retrofit these facilities to burn green hydrogen to justify investments in new gas-fired electricity generators.

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PHOTO: CHRISTIAN REIMER

RECOMMENDATIONS FOR THE GOVERNMENT OF CANADA

International leaders, such as the Executive Director of the International Energy Agency and the Secretary-General of the UN are urging countries to remove fossil fuel subsidies and supports, including public finance.

Numerous modelling studies show that Canada is not on track to meet its climate change targets.⁹² But Canada can be a climate leader.

With smart investment of public funding we could build a more resilient future where everyone can thrive. This will require a planned and deliberate phase-down of the oil and gas industry, with a just transition to ensure no one gets left behind. We have the solutions – they are affordable, available and reliable. But we are not deploying these technologies at anywhere near the pace required.

- **Eliminate *all* subsidies, public financing, and other fiscal supports provided to the oil and gas sector before the end of 2022**, including financial support provided through Export Development Canada – without any loopholes. Shift this spending power towards climate solutions.

- **Cancel all government programs and tax measures** that exclusively provide subsidies to oil and gas companies.
- **Make a formal and binding commitment** to not introduce any new fossil fuel subsidies.
- **Ensure robust climate conditions are attached to funding programs** administered by all government departments align all government spending with Canada’s obligations under the Paris Agreement.

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.⁹³ Despite all the talk from Canadian oil and gas companies about climate leadership, their current business plans would fuel further climate disaster.⁹⁴

The pathway to zero emissions and a climate-safe future does not include subsidies or public financing for the oil and gas industry. It’s time for Canada to turn off the financial taps.

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