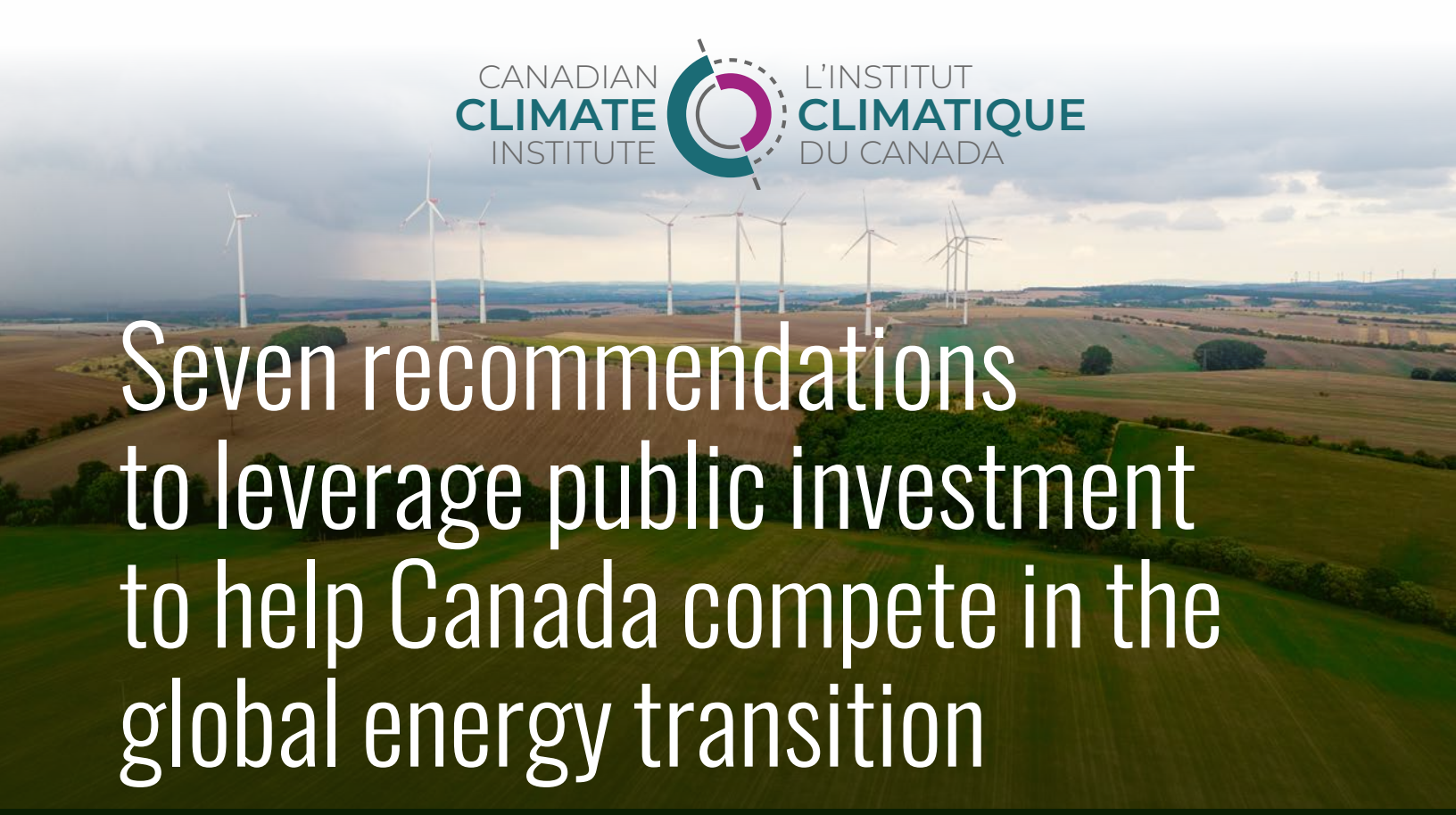


CANADIAN CLIMATE INSTITUTE | L'INSTITUT CLIMATIQUE DU CANADA

# Seven recommendations to leverage public investment to help Canada compete in the global energy transition

## A **MADE-IN-CANADA** APPROACH TO DRIVE CLEAN GROWTH

**By Marisa Beck, Dale Beugin, Calvin Trottier-Chi**

Canada's largest trading partners, including the United States and the European Union, have recently adopted climate policies that reshape and accelerate the global clean energy transition. To drive clean, inclusive growth and secure its competitiveness in the global energy transition, Canada must respond. While Canada's policy response should be tailor-made to the current circumstances, it also needs to be a custom fit for existing Canadian policies in order to secure a strong position in the newly competitive landscape.

The new Canada Growth Fund and Investment Tax Credits proposed in the 2022 Fall Economic Statement are a useful start. But how Canada wields public policy—and public dollars—will have big implications for its success in securing market share for Canadian firms in growing global markets centred around a shift toward a low-carbon economy. This policy brief provides practical advice for the federal government as it develops the Canada Growth Fund, but also as it hones its strategy for incubating new sources of economic growth that are consistent with a global energy transition.

In 2021, the Canadian Climate Institute's *Sink or Swim* report assessed the implications of the global low-carbon transition for Canada's economy (Samson et al. 2021). The analysis identified sectors that are transition-vulnerable, and those that represent transition opportunities for Canada. Now Canada's "sink or swim" moment has arrived: the time has come to scale up investment in Canada's transition opportunities to boost competitiveness in a low-carbon future. We have seven recommendations for the federal government at this crucial time:

March 2023

# RECOMMENDATIONS

## 1 Explicitly orient public support around fixing market and policy failures.

Clean growth policies will be most effective and efficient when governments step in to support projects that deliver benefits to society that markets alone won't deliver. Smart, targeted policy will drive emissions reductions and decrease fiscal costs.

## 2 Choose and tailor financial instruments according to risks as well as social and financial returns.

Different policy support instruments for clean growth projects differ with regards to the allocation of risks and returns associated with the projects. Efficient public support for clean growth projects requires addressing the market and policy failures that prevent private investors from advancing these projects while also optimizing the public risk and return ratio.

## 3 Require the Canada Growth Fund's investment portfolio to have a minimum share of projects with Indigenous majority ownership.

Policies to support clean growth projects must promote Indigenous economic reconciliation and Indigenous economic leadership in Canada's net zero transition. Failing to do so puts the effectiveness of these policies at risk.

## 4 Define metrics of success that include expected emissions reductions, equity and distributional outcomes, and Indigenous economic reconciliation.

Ongoing improvement and policy learning requires measurement of policy outcomes, which includes tracking multiple performance indicators and looking for unintended impacts.

## Build ‘exit strategies’ for public support.

The need for support changes over time. By failing to adjust support policies, governments can create new inefficiencies.

## The Canada Growth Fund’s governance models must combine a clear mandate with political independence and strong accountability.

Independence leads to better investments, encourages learning, and instills investor confidence. At the same time, strong accountability mechanisms ensure responsible spending of public dollars and instill public trust. return ratio.

## Embed the Canada Growth Fund, Investment Tax Credits, and other mechanisms for public finance of clean growth in a coherent strategy.

Public investment is only one element of a broader strategy for competitiveness, and policies like tax credits and the Canada Growth Fund remain piecemeal and ineffective if not integrated into a new vision of Canada’s trajectory to a net zero economy.

# Context and purpose of this policy brief

**Canada's goal is to generate clean, inclusive growth: Public investment is one tool that can deliver it.** Economic growth underpins the prosperity and well-being of Canadians. Clean growth provides those benefits in a way that is consistent with Canada's climate objectives. And inclusive growth ensures the benefits of growth are shared across regions, communities, and income levels in Canada. Yet private markets on their own will not mobilize investment at the necessary scale to live up to these goals. Although public investment isn't the only tool governments have to drive clean growth,it is an important one: if wielded carefully, it can effectively and efficiently support Canada's clean growth objectives.

**There is a global financing gap for clean growth projects.** The Climate Policy Initiative projects that annual climate investment must increase globally to US$4.3 trillion (C$5.6 trillion, all exchanges are 2022 equivalent) by 2030, but reports that global climate finance only averaged US$632 billion (C$822 billion) in 2019 and 2020 (Naran et al. 2022). Canada's 2022 Federal Budget identifies a need for $125 to $140 billion annually until 2050, with investment today reaching between $15 and $25 billion (Finance Canada 2022a). Capital markets have described this funding gap as a dearth of low-carbon projects with sufficient financial returns rather than a lack of potential capital (Kozloski et al. 2022).

**This large and unmet global demand for private investment in decarbonization illustrates how the meaning of competitiveness is changing.** As economies around the world prepare for a net zero future where low-carbon products are in high demand, markets are shifting. Previously, the goal was for climate policies to internalize climate risk and not undermine the competitiveness of incumbent industries. Now, as the cost of renewable energy falls and the number of governments and companies committed to achieving net zero emissions increases, there is a new conversation about competitiveness (McKenna et al. 2022): Canada now competes for the ability to attract capital and people for new low-carbon projects within Canada and for its share in emerging international markets, including those for hydrogen projects, clean fuel projects, and carbon capture, utilisation, and storage (CCUS) projects.

**To keep up in this new race for private investment, jobs, and market leadership, governments turn to policies that boost returns for investors in low-carbon technologies and projects.** The U.S. Inflation Reduction Act, passed in August 2022, was a game changer. Over the next 10 years, the Act is expected to channel around US$369 billion (C$480 billion) in subsidies in U.S.-based manufacturing and adoption of clean technologies. At the same time, U.S. carbon emissions are projected to drop by 40 per cent by 2030 as a result.

Canada, along with many European economies, is responding to the U.S. policy with its own policy package to incentivize investment in Canadian projects (Beck 2022), with the federal government announcing a new set of policies in November 2022 to mobilize private finance for low-carbon projects. The government's 2022 Fall Economic Statement included some details on the soon to be launched $15 billion Canada Growth Fund, an Investment Tax Credit for clean technologies, an Investment Tax Credit for clean hydrogen, and an Innovation and Investment Agency to support research and development in clean growth (Finance Canada 2022b; Finance Canada 2022c). Budget 2023 will include further actions.

**Public dollars have a role to play.** Clean growth projects may struggle to attract private capital as they typically face high risks and require large capital expenditures. The Climate Institute's analysis of first-of-kind clean fuel projects identified a set of

risks that tend to make these projects uneconomic for private investors, including various market and policy failures (Jared 2023). Market forces alone will be insufficient.

**But sound policy must also balance multiple policy priorities.** Not all projects that are unable to attract private investment should receive public support. Clean growth policy must ensure that limited public resources are used where they generate the highest return for society (Beck et al. 2023). These returns for society can come in various forms, including financial returns, emissions reductions, economic reconciliation for Indigenous peoples, and inclusion of disadvantaged individuals and communities.

**Ultimately, a made-in-Canada approach must reflect Canada's existing policy landscape.** Canada's carbon pricing policy provides a major advantage. It helps address the key market failure hindering investment in decarbonization by internalizing the costs related to the greenhouse gas emissions caused by the production and consumption of goods. However, carbon pricing alone is insufficient to address all market failures stymying investment. Targeted financial incentives and public investments can effectively and efficiently mobilize private capital by addressing remaining market distortions.

**The purpose of this policy brief is to inform the federal government's decisions about the design of policies for mobilizing private capital for clean growth projects, including the announced Investment Tax Credit for clean technologies and the Canada Growth Fund.** Drawing on international case studies of innovative policies for mobilizing capital (Box 1), this policy brief identifies seven policy design recommendations for implementing effective and efficient drivers of Canada's clean growth.

While the policy brief focuses primarily on the Canada Growth Fund and the Investment Tax Credit for clean technologies, the findings are applicable more broadly to decisions by both the federal government and provincial/territorial governments about various policies for directing private capital flows towards clean growth projects.

Box 1

## International policies for mobilizing private capital for clean growth project finance

The Climate Institute developed four case studies that looked at the policies implemented by four governments from around the world to mobilize private capital for clean growth. The case studies identify the policies' strengths and limitations as well as lessons applicable to Canada.

**Hydrogen tax credits in the U.S. Inflation Reduction Act:** The US$369 billion (C$480 billion) U.S. Inflation Reduction Act provides investment and production tax credits across a range of clean energy technologies, as well as subsidies for consumers. The level of support provided is adjusted by emissions intensity and wage and apprenticeship conditions. Additional tax credits are also available for usage of domestic content and servicing of energy communities, which are defined as communities that have been dependent on the fossil fuel economy. The Inflation Reduction Act supports traditional clean energy such as solar and wind as well as new forms such as clean hydrogen (Monahan and Beck 2023b).

**Longship Carbon Capture and Storage in Norway's North Sea:** The Longship project is envisioned as a network of carbon capture and storage (CCS) sites that enables emissions reductions for European heavy industry. The first phase of the project is expected to have a collective storage capacity of 1.5 megatonnes of $CO_2$ with the Norwegian government footing two-thirds of the initial NOK 25.1 billion (C$3.4 billion) in costs. Subsequent phases of the project will be financed by the private sector, but Norway intends to build a supportive environment by ramping up the price on carbon, securing carbon for sequestration in bilateral agreements, addressing regulatory barriers to CCS, and drawing on the expertise of the state enterprise Gassnova established for research and development on CCS (Monahan and Beck 2023c).

**The United Kingdom's Contracts for Difference policy for renewable electricity generation:** This program provides financial certainty for renewable energy projects, which are on course to cover 30 per cent of the U.K.'s power needs. The counterparty in the Contracts for Differences (CfD) is the private but government-owned Low Carbon Contracts Company and the CfD strike price is determined by renewable energy generators bidding to provide power at the lowest price. The energy generator then receives the difference if the price for power falls below the determined strike price and must pay the difference if it rises above. The contracts have a duration of 15 years, are indexed for inflation with annual adjustments, and can require supply chain plans from energy generators addressing supply chain green growth and infrastructure, innovation, and skills development (Monahan and Beck 2023d).

**Australia's Green Bank:** The Australian Clean Energy Finance Corporation (CEFC) operates as a green bank with an objective of facilitating the flows of finance into the clean energy sector. Created in 2012, it has made low-carbon investment commitments of A$10.76 billion (C$9.72 billion) from an initial endowment of A$10 billion (C$9.03 billion) and reports leveraging over A$37.15 billion (C$33.56 billion). It provides equity-based financing and concessional loans and, although the CEFC may offer finance at more generous rates than can be found from commercial finance, it follows a mandate to earn positive returns for taxpayers (Monahan and Beck 2023a).

# 1 Explicitly orient public support around fixing market and policy failures

Clean growth projects often struggle to attract private capital as these projects typically face higher risks and require large capital expenditures. However, not all projects should receive public support. Public dollars are scarce and valuable. Canada should be selective in terms of *which* projects to support to ensure that limited public resources are used where they generate the highest return for society (Beck et al. 2023).

In practical terms, this means that public investments in clean growth should focus on projects that do not go ahead because of "market failures" or "policy failures". A market failure is a situation where free markets lead to inefficient outcomes that fail to maximize benefits for society given the available resources. In these cases, governments have an opportunity to step in and correct incentives for market participants to align their decision making with efficient outcomes that maximize benefits for society. But policies do not always work as intended, and policy failure exists when policies fundamentally miss correcting market failures—or even create new ones. For example, policies fail to consistently change market participants' decision making when market participants fear that the policy might be abolished with the next government change (policy uncertainty).

## Clean growth projects can deliver benefits to society that markets alone won't deliver

The Climate Institute's analysis of first-of-kind clean fuel projects identified a set of risks that tend to make these projects uneconomic for private investors, including market risk, technological risk, policy uncertainty, and risks related to complex permitting processes (Jared 2023). However, not all of these barriers faced by private investors constitute market or policy failures that warrant government intervention—some simply reflect common risks that all investors face and that functioning markets compensate for with corresponding returns.

Some of these barriers do, however, constitute failures in markets, policy, or both, and impede clean growth development and warrant government intervention:

- Canada's carbon pricing system addresses the central market failure, namely that the cost of emitting carbon is not internalized in investment decisions. But Canada's carbon price is not (yet) high enough to fully correct this market failure and uncertainty about whether the price will increase as announced

makes investors hesitant to fully incorporate the planned price trajectory in their investment calculations.

- At the same time, decades of fossil fuel subsidies have created an uneven playing field for cleaner alternatives that markets on their own are not able to correct.
- While investors in clean growth projects often face relatively high capital costs, long return horizons, and high risks, they are typically unable to capitalize on the returns that these projects yield for Canadian society. Beyond emissions reductions, these returns can include the creation of new jobs in communities that have been dependent on transition-vulnerable sectors, new opportunities for Indigenous economic leadership, and new trade relationships. In short, these impacts of clean growth project development have value to Canadian society now or in the future, but private investors are unable to monetize this value in their funding decisions.
- Private companies and investors cannot always capture the full financial benefits generated from advancing a new technology, which results in less investment than would be optimal for Canadian society. Initial investors may drive costs of new technologies down the learning curve and contribute to building competitive industrial clusters, both of which increase returns for subsequent investors and thus support Canada's future economic growth (Porter 2009).

## Smart, targeted policy will reduce emissions and cut costs

Focusing on correcting market and policy failures helps governments avoid over-subsidizing projects that would have been economically viable without, or with less, government support.


Focusing on correcting market and policy failures helps governments avoid over-subsidizing projects that would have been economically viable without, or with less, government support.

Over-subsidizing is problematic for multiple reasons:

- First, it turns public funds into windfall profits for incumbent industries, increasing costs without necessarily delivering on other objectives, whether emissions reductions, innovation, or other goals.
- Second, public funding risks merely substituting—or "crowding out"—private investment, decreasing impact on economic growth and increasing costs (Marino et al. 2016; Müller and Kramer 2020).
- Third, internationally, heavy-handed policy interventions that are not limited to fixing market failures can challenge established rules of free trade and risk excluding emerging economies from participating in the global low-carbon transition because they are not able to compete in an emerging global subsidy race (The Economist 2023; Goldthau and Neuhoff 2022).

## Carbon pricing creates a solid foundation

The landscape of international climate and clean growth policies informs what markets can and cannot deliver. Both the Norwegian Longship project and the U.S. hydrogen tax credits provide financial incentives to investors to correct for market failures, but the American and the Norwegian governments have adopted very different approaches in their policy responses. While the Norwegian policy complements an existing carbon price, the U.S. policy substitutes for a carbon price.

The Longship carbon capture and storage project in the Norwegian North Sea will supply the decarbonization technologies for which the Norwegian and European carbon prices create increasing demand. The Norwegian government's policy interventions address the inability of markets left to their own devices to coordinate the development of industrial clusters around emerging technologies and across borders. CCUS is a technology that is dependent on large-scale infrastructure development, which is typically uneconomic for individual private companies and requires government investment. The Norwegian government chose to make a large investment in one specific project that is considered to have high strategic value for the Norwegian economy and that is building on, and leveraging, the country's existing comparative advantages, talents, skills, and experiences.

In contrast, there is no federal carbon price in the U.S. to incentivize private investment in decarbonization, which means that subsidies have to do all the heavy lifting. Core to the U.S. support for hydrogen projects is the Inflation Reduction Act's uncapped tax credit (although separate funding exists for hydrogen research and development, demonstration projects, and the creation of hydrogen hubs across the country). As a result, the investment and production tax credits are explicitly designed to provide broad, blanket support to the industry. Fiscal costs of such an approach are high, but the policy attempts to address multiple market failures.

Given that Canada's carbon pricing system is a strong lever for incentivizing investment in clean growth, the federal government should take action to boost its market signal for investors by reducing uncertainty. A key first step will be to release the carbon price schedule beyond 2030. Carbon contracts for differences (see Recommendation 2) can effectively and efficiently reduce the remaining uncertainty about whether future carbon prices will actually follow the projected trajectory and about the future value of carbon credits (Clark et al. 2022). Carbon pricing has been an essential driver of investment in Canada to date, and with increasing price trajectories and measures to reduce uncertainty about the pricing schedule and future credit values, the policy will remain a solid founda-

tion that other public investment instruments can build on (Beck et al. 2023).

## Implementation details still matter

Identifying market failures and assessing their size is complex and it requires a lot of information. For example, there may be regional differences in Canada when it comes to the existence and size of market failures. Blanket support instruments across regions (e.g., universal tax credits) risk over-subsidizing some regions and still underfunding others. However, varying the level of support to avoid these issues may create another set of challenges. For example, linking the level of support to how clean the project is requires governments to set emissions intensity thresholds, which can lead to perverse incentives by discouraging investors from investing in even cleaner solutions even if they exist—simply because there is no additional compensation.

While governments need information from the private sector to set thresholds, companies will have an incentive to lobby for less ambitious rules and more generous supports. For example, industry lobbies have recently urged the Canadian government to "match" support levels to those offered by the U.S. Inflation Reduction Act. However, comparing Canada's available public support to what is provided in other jurisdictions requires careful analysis, which may reveal that the comparison is fundamentally inaccurate and not a good basis for policy making. For instance, our comparison of financial incentives for CCUS investment in the upstream oil sector in Alberta and Texas revealed that support provided by policies in Alberta comes out ahead. Importantly, our analysis also shows that CCUS projects in Canadian and U.S. upstream oil sectors will rarely compete for capital due to differences in resource profiles and emissions sources in the two sectors. Specifically, CCUS will not be a priority abatement option for upstream producers in the U.S., and therefore, Canada should focus on determining the right suite of policy supports for CCUS given the specific Canadian context, rather than on matching policies with the U.S. (McKenzie and MacDougall 2023).

Governments can address some of these issues, and the remaining recommendations address how.

Given that Canada's carbon pricing system is a strong lever for incentivizing investment in clean growth, the federal government should take action to boost its market signal for investors by reducing uncertainty.

# 2 Choose and tailor financial instruments according to risks as well as social and financial returns

Effective and efficient instruments to leverage private investment for clean growth reallocate the risks and returns associated with these investments between private investors and Canadian taxpayers in a way that is acceptable to both these groups. Fundamentally, investment decisions are made based on perceived risk and expected return. Market and policy failures can lead to a situation where clean growth projects have risks that are too high or returns too low for private investors, because they are not able to capitalize on the full benefits of these projects for Canadian society. In these cases, governments have a strong rationale to intervene by assuming some of the risks or boosting returns, thereby better aligning incentives for private investors with socially optimal outcomes. Through these interventions Canadian taxpayers effectively become public investors in clean growth projects, sharing some of their market risks and sometimes holding a direct stake in project revenues. Different public investment instruments vary in terms of how they allocate risks and returns across public and private investors.

The 2022 Fall Economic Statement announced spending through two new sources of public support, Clean Technology Investment Tax Credits and the establishment of the Canada Growth Fund, which will invest with the aim of serving public interests while recovering capital invested. In pursuit of this, the Fund will make use of (at least) four different instruments: concessional equity or debt, contracts for difference, anchor equity, and offtake contracts. These supports all differ in important aspects, most fundamentally by their implications for risk and return and who they are borne by.

## Instruments vary in risk and return for public investors

**Investment tax credits** generally place the highest market risk exposure on public investors because they are effectively losses without any direct financial return. Tax credits subsidize one or more industries, which means that the public broadly assumes some of the market risks that these industries face. This is particularly true if tax credits are uncapped, similar to those in the U.S. Inflation Reduction Act. As they are not designed to yield a direct public revenue stream, any financial returns accruing to the government from tax credits are indirect.

**Concessional equity or debt** typically implies major risk exposure for public investors as it consists of financing on more generous terms than commercial lenders or investors, but unlike tax credits, there is a clear revenue stream associated with

the investment. Risk and returns for public investors ultimately depend on the instrument's specific design features. For example, investments can be concessional in terms of lower expected returns and/or longer maturity periods. The Canada Growth Fund can carefully manage its market risk exposure by balancing the various types of concessionality in its portfolio. For example, the Australian Clean Energy Finance Corporation concedes on a mix of higher risk, lower financial returns, and an average lifespan of 11 years for its loans, but also limits itself to only providing up to A$300 million (C$271 million) in concessional loans per year—which is about a third of its average annual investments (Global Infrastructure Hub 2019).

**Offtake contracts** are commitments for the future purchase of a product. They can pose significant risk exposure for the Canada Growth Fund. Products may not be delivered or may fall short of expectations without compensation. Offtake contracts are at risk of becoming liabilities for public investors if the prices they lock in end up being higher than current market prices. Diligent project selection and compensation arrangements can partly mitigate these risks. Successful offtake contracts also result in a revenue stream for the public investor in the form of the acquired products. Additionally, unlike tax credits or concessional finance, offtake contracts are common in the private sector, for instance when businesses secure power through corporate power purchase agreements. Public investors can provide support by coordinating offtake contracts between purchasers and producers without assuming all of the risks related to entering the contract.

**Contracts for difference** (CfD) expose the public to market risk by making the government liable if the relevant market price falls below the benchmark defined in the contracts. Two-way contracts balance this risk by obliging the counterparty to pay the difference if the market price rises above the benchmark. Generally, all CfD reduce price volatility for investors, but two-way contracts can also help hedge price volatility for the public. For example, two-way CfD for electricity prices can reduce the negative impacts of rising electricity market prices for households by creating a public income stream that can be used for rebates etc. Carbon contracts for difference (CCfD) that reduce uncertainty around future carbon prices can have the added effect of reducing the probability that governments abandon their carbon price commitments because that would make them liable for paying out contract counterparties. As a result, large-scale use of CCfD reduces the public risk exposure from the contracts.

**Anchor equity** has the potential to expose the public to the least amount of risk. Typically, anchor equity is provided sometime after the initial startup capital and before the launch of an initial public offering (IPO). By investing prior to the IPO, anchor equity investors lend their reputation and credibility to the startup, signalling to other investors the value of the upcoming issuance. Risk exposure is limited to the reaction of the stock market and the arrangement can be exited fairly quickly in comparison to the other instruments listed here. Experience in India, one of the first jurisdictions to create a formal policy framework for anchor equity in 2009, has shown that companies that receive anchor equity tend to perform better in terms of investor returns a year after the IPO than those that do not (Subba and Mahapatra 2021). Investors will likely perceive the Canada Growth Fund as a very stable and trustworthy anchor investor, leading to more successful IPOs. This, in turn, makes it more likely that the Canada Growth Fund will earn commercial rates of return on its anchor investments.

As a public investor, the Canada Growth Fund should apply its instruments wisely for different projects, depending on the level of risk exposure it is ready to assume. This, of course, will depend on the financial, environmental, and social returns that the project is expected to generate.

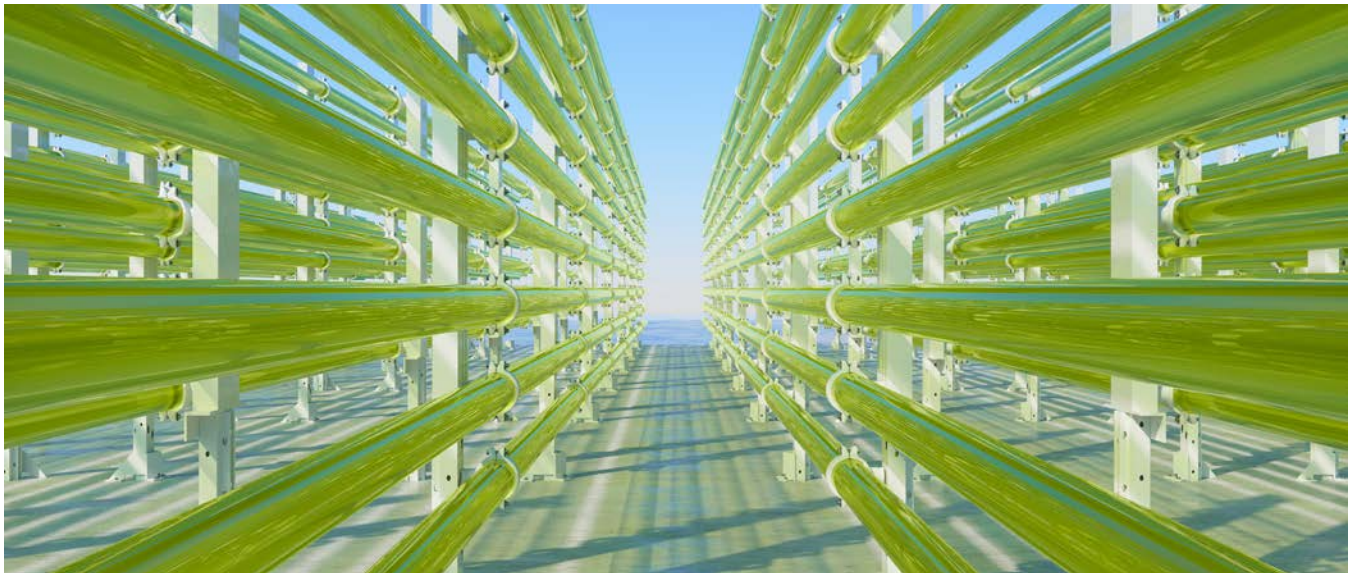
## Complementary instruments can help Canada refine its risk exposure

Other risk-sharing instruments exist that could usefully complement the Canada Growth Fund's toolkit by allowing it to match its instrument choice even more precisely to the level of risk it is ready to assume for any given project.

**Production tax credits** expose the public to lower risks than investment tax credits, because they more directly reward desirable outcomes rather than spending (Saha et al. 2021). Incentivizing spending itself runs the risk of being a wasteful and potentially inflationary policy, a concern that has previously been raised in regard to the E.U. using spending targets in its development policies (Darvas et al. 2019). The U.S. Inflation Reduction Act complements its investment tax credits with production tax credits, and Canada should similarly be aware of potential complements to its investment tax credits.

**Guarantees** are a common instrument used by other jurisdictions to mobilize private investment. They work in a similar way to insurance by providing cover in case a certain condition is not met. For instance, a loan guarantee compensates the lender if the borrower fails to make repayments. Guarantees can offer less risk exposure than contracts for difference for multiple reasons. First, they can be more targeted and are typically used to counter smaller-scale uncertainties. They can also provide the government with more reliable short-term financial returns. The U.S. Department of Energy's clean energy loan program office is a notable leader in the use of guarantees, having issued US$35.7 billion (C$46.5 billion) in loans and loan guarantees and suffering only US$810 million (C$1,054 million) in losses as of 2019 (Bhandary et al. 2019). The Canada Growth Fund can use guarantees as an intermediate instrument, sitting between offtake contracts and CfD on the risk exposure spectrum, to eliminate uncertainty in an established market.

In addition, provinces have offered loan guarantees to specifically help stimulate equity investment in projects by Indigenous communities, which often have difficulties accessing loans from commercial banks without loan guarantees (von der Porten et al. 2022). Examples include the Ontario Financing Authority's Aboriginal Loan Guarantee Program and the Alberta Indigenous Opportunities Corporation (see Recommendation 3).



## Using high-exposure instruments for a limited number of high-potential 'wild card' projects supports a strategic portfolio

While the Canada Growth Fund should deploy instruments with limited public risk exposure more broadly, it should reserve high-exposure instruments for a limited number of high-risk-high-reward projects. The Climate Institute's *Canada's Net Zero Future* report calls these types of projects "wild cards" (Dion et al. 2021).

Wild cards are technologies that are unlikely to make significant contributions to reaching Canada's 2030 climate target but could play a key role in reaching net zero emissions by 2050. These are technologies that are still in the early stages of development, face high uncertainty in their future scalability, and/or are only present in a subset of transition pathways. Wild cards include, for example, hydrogen fuel technologies and second-generation liquid biofuels, unconcentrated CCUS, and direct air capture. In contrast, safe bets are proven, scalable technologies that are consistently present in pathways for meeting the 2030 emissions reduction target. These solutions include non-emitting electricity, energy efficiency, and concentrated CCUS.

Canada must support a balanced portfolio of wild card and safe bet solutions, and its policies to mobilize private capital need to reflect this goal. Wild card technologies are likely to require more targeted and bespoke support instruments. For instance, the extensive and strategic support that the Norwegian government designed for the Longship project involves a high level of risk exposure for the Norwegian public, but the project is deemed a strategically valuable investment. The potentially high reward both in terms of economic and environmental returns can justify the assumption of high risks. In contrast, the U.K. CfD policy targets mostly mature, safe bet technologies such as offshore wind. Healthy competition in the auctioning process helps reduce public risk exposure associated with this financing instrument, but it requires a strong pipeline of projects and a cohort of developers, which typically exist only for mature technologies.

Technological progress will change our definition of wild cards vs safe bets over time, and it will change the risks and returns associated with these technologies. Canada's support policies need to evolve in parallel. This will require instruments to be nested within responsive institutions with clear objectives, metrics, and principles, points that are elaborated on in further recommendations.

# 3. Require the Canada Growth Fund's investment portfolio to have a minimum share of projects with Indigenous majority ownership

Based on what is known about the Canada Growth Fund and the Investment Tax Credits so far, it seems that no special consideration will be given to how public investment may support or hinder Indigenous economic reconciliation and Indigenous leadership in Canada's net zero transition. This omission puts the effectiveness of these policies at risk and would reflect a missed opportunity for Indigenous reconciliation.

## Economic reconciliation is an essential part of clean growth

Indigenous Peoples and nations are rights holders in Canada's net zero transition. Canada's commitment to reconciliation and to the U.N. Declaration on the Rights of Indigenous Peoples requires including Indigenous Peoples as equal partners in the national economy. Yet Indigenous Peoples in Canada have historically faced systematic barriers to benefiting from economic growth. Canada's net zero transition is an opportunity to decolonize and democratize existing power structures to strengthen Indigenous rights and further reconciliation through Indigenous-led clean energy, mining, and guardian programs (Indigenous Clean Energy 2022; Samson et al. 2021; Exner-Pirot and Ignasiak 2023).

Moreover, economic reconciliation can support clean growth. A large number of possible clean growth projects, such as mining of critical minerals, will be located on Indigenous territories and will require approval from Indigenous Peoples to go forward (Natural Resources Canada 2022b). Indigenous ownership of these projects can ensure that project design is firmly under Indigenous control and project returns directly benefit Indigenous communities. It also enables Indigenous communities to identify and address the risks that may be associated with these projects in terms of their impact on Indigenous rights and land (Garcha 2022).

Most importantly, Indigenous project ownership provides a direct avenue for fairly compensating and recognizing Indigenous expertise, experiences, and innovation in Canada's net zero transition (Thompson 2021; Calla 2021).

## Indigenous ownership can generate economic benefits for society

Indigenous communities often have difficulty accessing the capital from banks to acquire ownership shares in projects at costs that render the investment profitable (Calla 2021; Belliveau 2022). Governments can step in by providing guar-

antees or other securities to reduce the risks for commercial lenders.

Mandating that a minimum share of the investments that the Canada Growth Fund supports involves Indigenous equity ownership will facilitate the meaningful participation of Indigenous Peoples and nations in Canada's net zero transition. Such a portfolio requirement can work as an implicit premium paid to these projects, because it may require the Canada Growth Fund to prioritize investments it would not otherwise make based on the other investment criteria.

## Canada has an opportunity to lead the way in linking clean growth and Indigenous ownership

The Canada Growth Fund should tailor financial instruments to specifically enable Indigenous communities to access the capital necessary for acquiring meaningful equity stakes in clean growth projects—for example, through targeted loan guarantee programs. To further enable effective participation, the Canada Growth Fund should also support capacity building for Indigenous project proponents.

The failure to measure and motivate outcomes related to equity and reconciliation reflects one of the limitations of Australia's Green Bank. Investment decisions made by the Green Bank have to take into account potential negative impacts on Australia's Indigenous peoples and Torres Strait Islanders, but there is limited attention given to how the Australian Clean Energy Finance Corporation's financial instruments could actively create benefits for people in these communities.

However, Canada has some domestic examples and experiences to draw from:

- The Alberta Indigenous Opportunities Corporation has offered between $20 million and $250 million loan guarantees to Indigenous communities to invest in energy projects (AIOC 2022).
- Likewise, the Ontario Financing Authority's Aboriginal Loan Guarantee Program provides loan guarantees to corporations wholly owned by First Nation and Métis communities to purchase up to 75 per cent equity in a project (Ontario Financing Authority 2023). As of April 2021, 10 projects have used the program (Calla 2021).
- Multiple provinces have also operated feed-in tariff (FIT) programs in the past which Indigenous communities utilized to develop renewable energy projects. This includes Nova Scotia's Community FIT program (IEA 2017) and the Ontario FIT program that prioritized approval of Indigenous-led clean energy projects (Government of Ontario 2017).
- Alberta's Renewable Electricity Program invited power producers to three rounds of reverse auctions for contracts for difference that provided the lowest-cost bidders with a guaranteed price for the produced power. The second round required projects to have 25 per cent Indigenous equity participation to be eligible. This requirement had no apparent additional costs with capacity-weighted strike prices being roughly identical between the second and third rounds at $38.69/MWh and $40.14/MWh respectively (Hastings-Simon et al. 2022).
- Lastly, Natural Resources Canada launched the Clean Fuels Fund last year to support Indigenous-led projects from organizations with a minimum of 50 per centIndigenous ownership. They have received 10 submissions that identified 15 projects for funding (Natural Resources Canada 2022a).

# 4 Define metrics of success that include: emissions reductions, equity and distributional outcomes, and Indigenous economic reconciliation

The Technical Backgrounder for the Canada Growth Fund outlines a set of strategic objectives and investment principles and defines potential performance metrics. The Backgrounder recognizes the importance of performance monitoring and reporting. The suggested performance metrics address, among other things, expected emissions reductions, as well as employment impacts and the financial soundness of the investment.

## Ongoing improvement requires measurement of outcomes

Continuous monitoring and measuring of impacts enables policy learning and thereby helps avoid policy failure. It allows for changing course if necessary to achieve the desired effects or avoid unintended consequences.

Given that the Canada Growth Fund invests public money, detailed and accurate performance assessment across all of its stated objectives will also address concerns about accountability. The Technical Backgrounder specifies that the Fund's performance reports will be tabled in Parliament.

Gathering data and information on policy impacts also allows for designing and implementing complementary policies to address unintended consequences. For example, the U.K.'s CfD program is complemented by the Warm Home Discount Scheme, fuel vouchers, and Cold Weather Payments to mitigate regressive impacts.

## Delivering multiple benefits requires tracking multiple performance indicators

We propose refining and expanding the list of potential performance metrics for the Canada Growth Fund to include metrics to capture the extent to which its investments promote equity and desired distributional outcomes (e.g., the impact of the Fund's investments on consumer energy prices for consumers and cost of living) and the extent to which the Fund's investments further Indigenous economic reconciliation (e.g., direct permanent jobs created or supported in Indigenous communities).

## Impacts may appear in unexpected places and with a time delay

Measuring the environmental, economic, and social impacts of public investments is complicated by the fact that the scope and scale of impacts might be

hard to forecast or model. While it is easier to stick to leading indicators, it is essential to capture the actual outcomes. For example, clean growth project development in communities that were previously dependent on transition-vulnerable sectors can revive local economic growth and prosperity. But they may also lead to negative effects associated with communities experiencing sudden economic booms—infrastructure shortages, rising housing prices, and social disruption (Klasic et al. 2022).

Similarly, both wanted and unwanted impacts may only become visible after some time. For instance, U.K. renewable energy projects that were awarded contracts for difference in October 2019 will only reach their full capacity by 2027. Measurable emissions reductions can take years to come into effect.

In sum, to enable policy optimization, performance measurement itself needs to be subject to on-going learning and adaptation.


# 5 Build 'exit strategies' for public support

Clean growth projects should not receive public support for an unlimited amount of time. Rather, support policies such as financial incentives or risk-sharing mechanisms should cease once the project achieves profitability. If public investment continues beyond this point, it encourages free riding—in other words, it crowds-out rather than crowds-in private capital.

However, phasing out public support to specific industries is never easy in political terms (Steenblik 2007). Subsidies can create politically powerful constituencies that lobby for the continuation of the support (Inchauste and Victor 2017). Canada should therefore establish well-defined "exit strategies" in the policy design ahead of time. Public support should by design be finite in time, and it should be clear from the start when and under what conditions support will stop.

In short, public support should be targeted, transparent, and temporary (Beale et al. 2015).

## The need for policy support changes through time

The rationale behind temporary support policies is that, in many cases, market and policy failures are transitory in nature. For example, as the carbon price will increase along its announced trajectory through 2030 and beyond, the need for additional support policies to catalyze investment in clean growth projects will become smaller.

When market failures diminish over time but public support continues, it creates new inefficiencies. First of all, it encourages support recipients to free ride and removes the motivation for them to innovate and improve their productivity and carbon intensity to stay competitive in the marketplace. Over time, this can also lead to technology lock-in and, ultimately, carbon lock-in (Forman and Arnold 2023). Finally, oversubsidizing over time puts undue pressure on the public purse. Given the opportunity costs of public spending, providing projects with public support beyond their needs delivers fewer additional benefits at higher additional costs.

The Norwegian government provides significant public funding for phase one of the Longship CCS project, when market failures related to infrastructure requirements and market coordination are most pronounced, but expects the project to be profitable for private investors in the second phase when these challenges have been addressed.

## Long-term commitments provide certainty for investors but can become costly

Tax credits are generally hard to revoke. The most common approach to an "exit strategy" is to announce the expiry date of the policy. The tax credits in the U.S. Inflation Reduction Act are running for a predetermined time period of 10 years—the announced Canadian Clean Technology Investment Tax Credits will run until 2035, and the Canadian Clean Hydrogen Investment Tax Credits will run through 2030.

There is a tension: clean growth project development takes time and investors need certainty. However, markets and technologies will evolve over that period, possibly removing justification for the credits or their size and/or leading to technology lock-in. Even if the on-going monitoring and measuring of impacts (see Recommendation 4) would indicate changes should be made, the policies are not flexible. Therefore, an alternative approach would be to define a set of phase-out criteria that, when met, trigger an end to the tax credits. Criteria may include market share, emissions reductions achieved, or cumulative units produced (Saha et al. 2021).

The U.K. CfD policy provides renewable energy producers with price certainty for 15 years, but the system is set up to respond to declining technology costs. Specifically, the competitive process through which the contracts are awarded helps ensure that, at the time, the most cost-effective prices are locked in. And indeed, with each auction over time, the public support per kilowatt hour has come down significantly. This flexibility stands in contrast to the uncapped, static tax credits offered in the U.S. for the coming decade, which can cause an immense fiscal burden.

# 6 The Canada Growth Fund's governance models must combine a clear mandate with political independence and strong accountability

A clear and strong investment mandate should drive the Canada Growth Fund's operations. Once the mandate is established, the Fund should operate at arm's length from the government. Independent governance helps ensure that the Fund is aligned with Canada's policy commitments on net zero, Indigenous reconciliation, and distributional equity while minimizing the Fund's vulnerability to political interference in its day-to-day business decisions and lobbying from private interests.

## Independence leads to better investments and instills investor confidence

Apolitical governance and independence from industry lobbying (real and perceived) is crucial for ensuring that investment decisions are exclusively based on the quality of the project and their alignment with the Canada Growth Fund's mandate. Independence is also essential for building investors' trust in the new Fund. Investors' trust is necessary to establish the Fund as a strong and credible business partner. Only when investors have confidence that the Fund will continue to exist and operate in a predictable manner, will the risk of it becoming a policy uncertainty diminish.

The U.K.'s CfD program is administered through the Low Carbon Contracts Company, an independent private corporation, which means that the CfD are private-law contracts that are safe from political interference. It is impossible to identify the influence that this institutional set has had on the program's general success. However, the program has been in place since 2014 and has thrived through three general elections and five different heads of governments. Due to falling technology costs and sustained competition in the auctioning rounds, the public support on a per-kilowatt basis has fallen significantly over the years, while the government's commitment to renewable energy as an effective protection against exposure to volatile fossil fuel prices in global markets has grown.

In contrast, Australia's Green Bank may be more vulnerable to some political interference. Although the Australian Clean Energy Finance Corporation (CEFC) acts independently of the government, both its Board and investment mandate are determined by the ruling government, possibly opening the door for undue political interference. For example, Australia's ruling government has the power to identify the types of investments the CEFC should pursue and actively engage in the design of the CEFC's financial instruments. In July 2015, the government under then Prime Minister Tony Abbott

banned the CEFC from investing in wind power projects and small-scale solar projects—a move that was promptly reversed by the subsequent government only five months later (Keany 2015). Governance arrangements that enable such unpredictable course changes can reduce investors' trust in the institution.

## Independence enables learning—and course correction

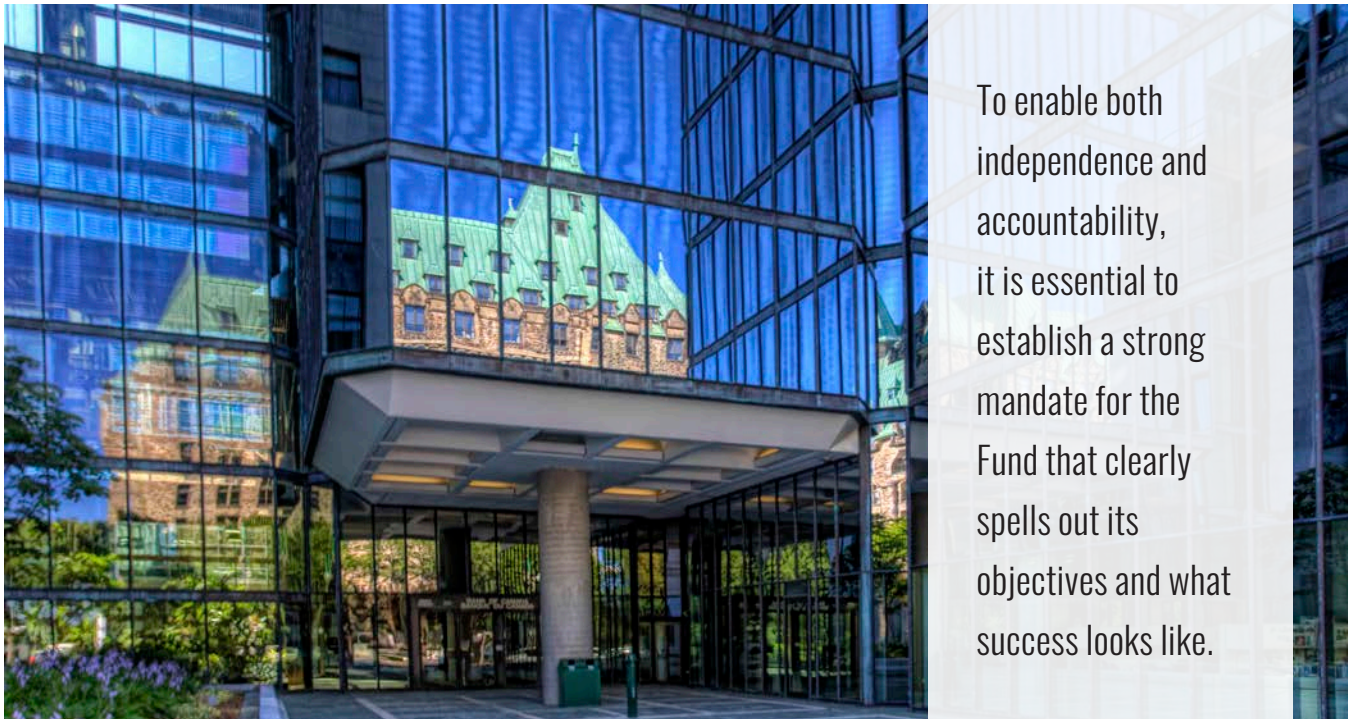
A governance model that focuses on a strong, clearly stated mandate and operational independence also allows the Canada Growth Fund to evolve and learn based on its performance—without the immediate fear of political repercussions. The Fund's institutional home outside of government bureaucracy promotes a decision-making environment that is not inherently constrained by the political costs of learning through trial and error. The Fund should be held accountable for its performance, but taking on calculated risks is part of its mandate.

As indicated in Recommendation 4, it is crucial to create conditions that foster policy learning and adjustments when something is not working the way it is intended to. The economic and technological landscape that the Canada Growth Fund operates in will continue to evolve. It will need to adapt to continue offering the appropriate set of support instruments (Recommendation 2) at the right time (Recommendation 5). Again, for the Canada Growth Fund, learning involves being wrong sometimes. Independent governance enables this.

While the Fund should operate independently from both government and industry, communication channels with both these sectors need to stay open to ensure that it has access to information it needs to adjust course if necessary.

## Strong accountability mechanisms should balance independent governance

The Canada Growth Fund is exempt from Section 91 of the Financial Administration Act, which allows it to make investment decisions without



To enable both independence and accountability, it is essential to establish a strong mandate for the Fund that clearly spells out its objectives and what success looks like.

requiring approval from the Governor in Council (Government of Canada 2022). The purpose of this exemption is to speed up the Fund's decision making to align it with fast-paced private markets.

While this degree of operational independence is important, it must be balanced through strong accountability mechanisms to ensure that the Canada Growth Fund spends public dollars in the public interest.

To enable both independence and accountability, it is essential to establish a strong mandate for the Fund that clearly spells out its objectives and what success looks like. The Fund's leadership should then be held accountable on how well it is delivering on its goals and why certain changes are made. Transparency about how the Fund's performance is defined and measured will help instill public trust in the new institution and help prevent decisions related to it from becoming the subject of partisan controversy.

The U.K.'s Green Investment Bank is an example of what can happen when independence is not balanced with strong accountability. It has been widely regarded as a missed opportunity, when privatization led the Bank to stray from its original mandate (Public Accounts Committee 2018; Rack 2021). The Bank was initially state owned, and although it suffered from a lack of clear impact measures, it did successfully achieve a leverage ratio of £2.50 (C$4) of private capital per £1 (C$1.6) invested. However, the government decided to sell it to an Australian investment bank in 2017 in a process that a parliamentary committee described as focused on making the sale rather than assuring the Bank's continued mandate (Public Accounts Committee 2018). Since privatization, the Bank has tended to seek high-profit projects globally that already have access to capital. Critics say the Bank could have had a greater impact domestically and on emerging technologies had it stayed committed to its original mandate and under public oversight. The U.K. is now in the process of developing its new state-owned green bank (Rack 2021).

So far, there has been a lack of public information on both the Canada Growth Fund's governance framework and its specific governance mechanisms, including its relationship with the government, performance review, and other accountability mechanisms. It is crucial to clarify these questions quickly and transparently.

# 7 Embed the Canada Growth Fund, Investment Tax Credits, and other mechanisms for public finance of clean growth in a coherent strategy

A coherent strategy for clean growth and Canadian competitiveness can provide the overarching context for the design and implementation of the Canada Growth Fund and Investment Tax Credits discussed in the previous recommendations. While the details matter, so too does the big picture.

## Public investment is one element of a broader strategy for competitiveness

The measures announced in the 2022 Fall Economic Statement were established within an existing system of policies and programs to set the Canadian economy on a clean growth trajectory. If the government fails to successfully integrate and coordinate the various elements, Canada's efforts to mobilize private investment to transform the Canadian economy in line with its net zero commitment will likely be unsuccessful.

An obvious starting point for integration and coordination is Canada's carbon price—to date, it's the strongest tool for channeling private investment toward decarbonization. If well coordinated, carbon pricing and other policies to mobilize capital toward clean growth projects such as tax credits and public investment can usefully complement each other. For example, Norway's carbon price helps create demand for CCUS which the government's support for the Longship project helps deliver.

However, when coordination and careful analysis of how various support policies interact with carbon pricing are lacking, redundancies can lead to free riding. For instance, tax credit design in Canada needs to consider the decarbonization incentives already provided by the carbon price: "Effectively, Canada's carbon price reduces the size of the tax credit required to effectively incentivize the desired action, pointing to a key difference between the U.S. and Canadian context that must inform domestic policy" (Monahan and Beck 2023b). But a key difference between the financial incentives offered by the U.S. Inflation Reduction Act and Canadian support policies is that future carbon prices and prices of carbon credits in Canada are uncertain for investors—while subsidy payments are locked in (Allan and Bernstein 2023, McKenzie and MacDougall 2023).

## Overlapping programs and funds can undermine effectiveness and increase costs

At the federal level, multiple funds and programs exist with a purpose similar to that of the Canada

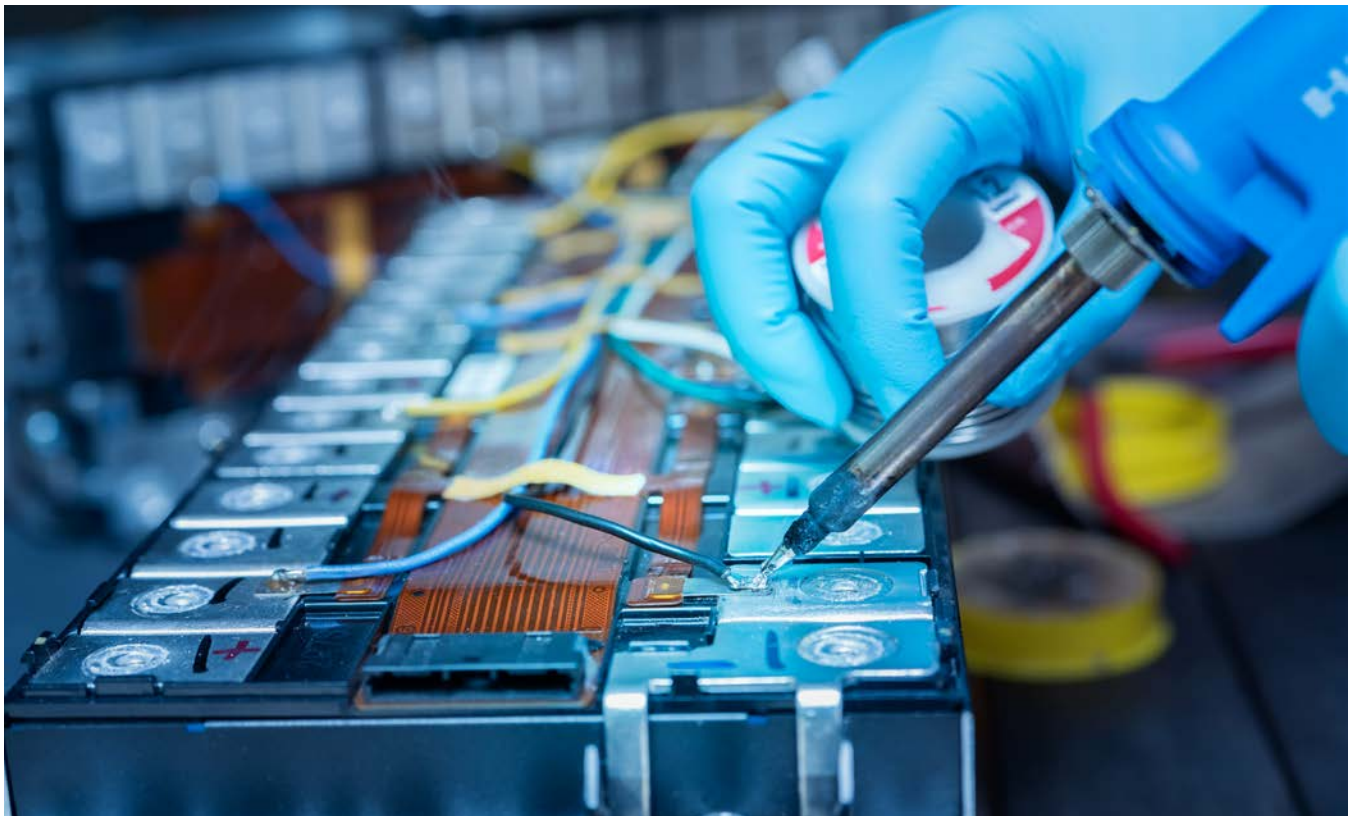
Growth Fund, and it is crucial to establish mechanisms for coordinating their interactions. Notably, there are the Climate Action Fund and the Strategic Innovation Fund, as well as programs linked to the Net Zero Accelerator. Further, the Canada Infrastructure Bank, the Business Development Bank of Canada, and Export Development Canada offer programs focused on low-carbon project finance. Add to this the multitude of provincial and territorial programs and policies, and the potential for overlap is even larger.

The Canada Growth Fund's Technical Backgrounder outlines the niche that it intends to hold in the existing funding landscape at the national level. In particular, the Fund will distinguish itself from others by focusing on projects that help scale-up the deployment of new technologies as opposed to technologies that are still at the research and development stage. It will not invest in technologies that are mature enough to attract non-concessional financing from private markets. Moreover, the Fund will not provide grants but exclusively use concessional finance instruments to share risks with private investors.

Yet potential interactions need further consideration to identify both complementarities and redundancies to avoid situations where parallel public funding from different sources crowds out private investment. To simplify the funding landscape for investors, opportunities for streamlining should be identified and implemented. A complicated funding landscape will favour incumbent companies who have the resources to navigate the system.

## Over time, government policies should aim to reduce the need for public investment

This policy brief discusses only a subset of the policies that should be part of Canada's larger clean-growth portfolio. The risk-sharing instruments



and financial incentives discussed here need to be complemented by more structural policy changes that will help drive private capital into clean growth projects.

First, governments should increase certainty for investors by reducing policy risks and regulatory risks. For example, carbon contracts for difference can enhance certainty about the future carbon price trajectory (Clark et al. 2022). Also, regulatory reforms to speed up and simplify permitting processes for clean growth projects can boost investor confidence and shorten the time period between capital investment in the project and the start of operations and revenue generation.

Second, governments should implement policies to reduce information asymmetries in financial markets—for example, through introducing a standardized taxonomy for sustainable investments or strengthening climate disclosure rules. For instance, the success of green bonds in capital markets today can, in large part, be traced back to the accessible development and diffusion of green bond principles and frameworks by institutions serving the public interest (Monk and Perkins 2020). These policies will help investors make choices that are more aligned with Canada's net zero transition in the first place, reducing the need for government intervention.

## Tax credits and the Canada Growth Fund remain piecemeal if not embedded in a new Canadian vision of competitiveness

While helpful starting points, the recently announced Clean Technology Investment Tax Credits and the establishment of the Canada Growth Fund will not—by themselves—put Canada firmly on a trajectory toward clean and inclusive growth. These new funding opportunities are tactical in nature. What is missing is a sector-by-sector strategy that identifies the priority technologies and pathways that are expected to drive Canada's global competitiveness in a net zero future (Allan et al. 2022). Only once these strategic objectives and pathways are defined, can the existing support policies be integrated into a coherent strategy for mobilizing the necessary private capital.

Establishing this new vision of Canadian competitiveness will require a collaborative and regionally specific process that brings together policymakers, industry, Indigenous nations, and civil society (Net-Zero Advisory Body 2023).

# Conclusion

This policy brief is not a complete construction manual for policies aimed at mobilizing private capital toward clean growth. Rather it is a collection of recommendations to inform these interventions, often based on lessons learned in other jurisdictions.

This analysis illustrates that designing good policies to mobilize private capital for clean growth projects is complex. There is no one-size-fits-all solution and no silver bullet. This discussion of our recommendations and of international examples illustrates that every policy has limitations and strengths. Tradeoffs exist across objectives. For instance, the case-by-case investment approach suggested for the Canada Growth Fund helps ensure that the Fund targets projects that would not go ahead without financial support, but this approach is also resource intensive and may not scale quickly enough. Canada will need a portfolio of policies and instruments to address different market failures and tailor solutions to manage public risk exposure and maximize public returns.

Importantly, it is an ongoing challenge to keep policies such as the Canada Growth Fund and the Investment Tax Credits responsive to changing market and policy environments to ensure effectiveness and efficiency over time. Once the Canada Growth Fund is up and running and the Investment Tax Credits come into effect, the real work begins: only diligent and continuous data collection about intended and unintended impacts will allow for learning and adjusting of the policies. These policies inherently require the government to take on risks, and course corrections will most likely be necessary. But embedding tax credits and the Canada Growth Fund in a new strategic vision of Canadian competitiveness can help give these risks strategic value.

Setting Canada on a clean growth path will require a portfolio of policies with a composition that is unique to Canada—a "made-in-Canada" approach. It will also require on-going monitoring, learning, and fine-tuning of policies to ensure that this made-in-Canada approach also remains "made-for-Canada" over time.

# References


AIOC (Alberta Indigenous Opportunities Corporation). 2022. *AIOC Annual Report 2021-2022 Purpose & Prosperity*. https://www.theaioc.com/wp-content/uploads/2022/07/AIOC-2021-22-Annual_Report_Online.pdf

Allan, Bentley and Michael Bernstein. 2023. *Creating a Canadian Advantage: Policies to help Canada compete for low-carbon investment*. Transition Accelerator and Clean Prosperity. https://transition-accelerator.ca/creating-a-canadian-advantage/

Allan, Bentley, Derek Eaton, and Anik Islam. 2022. "How Industrial Strategy Can Secure Canada's Future in a Net-Zero World." Smart Prosperity Institute. March 16. https://institute.smartprosperity.ca/IndustrialStrategy

Beale, Elizabeth, Dale Beugin, Bev Dahlby, Don Drummond, Nancy Olewiler, and Christopher Ragan. 2015. *Provincial Carbon Pricing and Competitiveness Pressures*. Canada's Ecofiscal Commission. November. http://ecofiscal.ca/wp-content/uploads/2015/11/Ecofiscal-Commission-Carbon-Pricing-Competitiveness-Report-November-2015.pdf

Beck, Marisa. 2022. "Responding to the Inflation Reduction Act: What are Canada's options?" Canadian Climate Institute. November 2. https://climateinstitute.ca/inflation-reduction-act-what-are-canadas-options/

Beck, Marisa, Don Drummond, and Stewart Elgie. 2023. "Optimizing Canada's policy toolbox for clean growth." *Policy Options*. February 21. https://policyoptions.irpp.org/magazines/february-2023/clean-growth-toolbox/

Belliveau, Matthew. 2022. *Indigenous Ownership: Overcoming Obstacles and Forging Partnerships*. The Conference Board of Canada. https://www.conferenceboard.ca/wp-content/uploads/2022/10/11825_impact-paper_indigenous-ownership.pdf

Bhandary, Rishikesh Ram, Kelly Sims Gallagher, and Fang Zhang. 2019. "Climate Finance Policy in Practice: A Review of the Evidence." Center for International Environment and Resource Policy. November. https://sites.tufts.edu/cierp/files/2019/11/CPL_ClimateFinancePolicyinPractice.pdf

Calla, Jason. 2021. *Improving Access to Capital for Indigenous Groups to Purchase Equity Stakes in Major Resource Projects*. First Nations Major Projects Coalition. https://fnmpc.ca/wp-content/uploads/2021/04/FNMPC_Reviewing_Access_final.pdf

Clark, Jason, Michael Bernstein, Dale Beugin, Blake Shaffer, and Jake Wadland. 2022. *Closing the Carbon-Pricing Certainty Gap*. Clean Prosperity and Canadian Climate Institute. October. https://climateinstitute.ca/wp-content/uploads/2022/10/Closing_the_Carbon-Pricing_Certainty_Gap.pdf

Darvas, Zsolt, Jan Mazza, and Catarina Midões. 2019. "How to improve European Union cohesion policy for the next decade." Bruegel. May 23. https://www.bruegel.org/policy-brief/how-improve-european-union-cohesion-policy-next-decade

Dion, Jason, Anna Kanduth, Jeremy Moorhouse, and Dale Beugin. 2021. *Canada's Net Zero Future: Finding our way in the global transition*. Canadian Climate Institute (formerly Canadian Institute for Climate Choices). https://climateinstitute.ca/reports/canadas-net-zero-future/

Exner-Pirot, Heather, and Martin Ignasiak. 2023. *From shield to sword: The evolution of Indigenous economic rights in Canada*. Macdonald-Laurier Institute. February 15. https://macdonaldlaurier.ca/indigenous-resource-development-is-crucial-for-reconciliation/

Finance Canada. 2022a. "A Plan to Grow Our Economy and Make Life More Affordable." Chapter 2, Budget 2022. *Government of Canada*. April 7. https://www.budget.canada.ca/2022/report-rapport/chap2-en.html#wb-cont

Finance Canada. 2022b. "Building an Economy That Works for Everyone." Chapter 2, Fall Economic Statement 2022. *Government of Canada*. November. https://www.budget.gc.ca/fes-eea/2022/report-rapport/chap2-en.html#a7

Finance Canada. 2022c. "Technical Backgrounder: Canada Growth Fund." Fall Economic Statement 2022. *Government of Canada*. November. https://www.budget.gc.ca/fes-eea/2022/doc/gf-fc-en.pdf

Forman, Jared. 2023. "Unpacking the barriers to first-of-kind clean fuel projects in Canada." Canadian Climate Institute. March 21. https://climateinstitute.ca/publications/unpacking-the-barriers-to-first-of-kind-clean-fuel-projects-in-canada/

Forman, Jared and Jonathan Arnold. 2023. "Locking out carbon lock-in (Part I)." Canadian Climate Institute. January 4. https://climateinstitute.ca/locking-out-carbon-lock-in-part-1/

Garcha, Neetu. 2022. "Why Indigenous-led projects could be key to combating Canada's energy dilemma." *Global News*. September 21. https://globalnews.ca/news/9142106/indigenous-projects-canada-energy-landlocked/

Global Infrastructure Hub. 2019. "Guidance Note on National Infrastructure Banks and Similar Financing Facilities." June. https://cdn.gihub.org/umbraco/media/2621/gih-national_infrastructure_banks_-full_report-web.pdf

Goldthau, Andreas and Karsten Neuhoff. 2022. "Europe's answer to the Inflation Reduction Act should be global cooperation." *EURACTIV*. December 20. https://www.euractiv.com/section/energy-environment/opinion/europes-answer-to-the-inflation-reduction-act-should-be-global-cooperation/

Government of Canada. 2022. "Regulations Amending the Crown Corporation General Regulations, 1995: SOR/2022-257." *Canada Gazette*. December. https://canadagazette.gc.ca/rp-pr/p2/2022/2022-12-21/html/sor-dors257-eng.html

Government of Ontario. 2017. "Archived – 4.0 Feed-In Tariff Program." April 19. https://www.ontario.ca/document/renewable-energy-development-ontario-guide-municipalities/40-feed-tariff-program

Hastings-Simon, Sara, Andrew Leach, Blake Shaffer, and Tim Weis. 2022. "Alberta's Renewable Electricity Program: Design, results, and lessons learned." *Energy Policy*, 171. December. https://www.sciencedirect.com/science/article/abs/pii/S0301421522004852

IEA (International Energy Agency). 2017. "Community Feed-in-Tariff (COMFIT) of Nova Scotia." May 10. https://www.iea.org/policies/6364-community-feed-in-tariff-comfit-of-nova-scotia

Inchauste, Gabriela and David G. Victor. 2017. *The Political Economy of Energy Subsidy Reform*. The World Bank. March 7. https://openknowledge.worldbank.org/handle/10986/26216

Indigenous Clean Energy. 2022. *Waves of Change: Indigenous clean energy leadership for Canada's clean, electric future*. February. https://climateinstitute.ca/wp-content/uploads/2022/02/ICE-report-ENGLISH-FINAL.pdf

Keany, Francis. 2015. "Federal Government lifts Tony Abbott's wind farm investment ban." *ABC News*. December 12. https://www.abc.net.au/news/2015-12-13/abbots-wind-farm-investment-ban-lifted/7024164

Klasic, Meghan, Madeline Schomburg, Gwen Arnold, Abigail York, Melissa Baum, Maia Cherin, Sydney Cliff, Parisa Kavousi, Alexandria Tillett Miller, Diana Shajari, Yuer Wang, and Luigi Zialcita. 2022. "A review of community impacts of boom-bust cycles in unconventional oil and gas development." *Energy Research & Social Science*, 93. November. https://www.sciencedirect.com/science/article/pii/S2214629622003462

Kozloski, Maria, Veronica Chau, Lily Han, Naomi Desai, Yvonne Yau, Qahir Dhanani, Katie Hill, Claudia Newman-Martin, Alex Bashian, Wendy Woods, and Vinay Shandal. 2022. *What Gets Measured Gets Financed: Climate Finance Funding Flows and Opportunities*. Rockefeller Foundation. November. https://www.rockefellerfoundation.org/wp-content/uploads/2022/11/Climate-Finance-Funding-Flows-and-Opportunities-What-Gets-Measured-Gets-Financed-Report-Final.pdf

Marino, Marianna, Stephane Lhuillery, Pierpaolo Parrotta, and Davide Sala. 2016. "Additionality or crowding-out? An overall evaluation of public R&D subsidy on private R&D expenditure." *Research Policy*, 45(9). November. https://www.sciencedirect.com/science/article/abs/pii/S0048733316300555

McKenna, Catherine, Arunabha Ghosh, et al. 2022. *Integrity Matters: Net Zero Commitments by Businesses, Financial Institutions, Cities and Regions*. Report from the United Nations' High-Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities. November. https://www.un.org/sites/un2.un.org/files/high-level_expert_group_n7b.pdf

McKenzie, Janetta and Scott MacDougall. 2023."Comparing Canadian and American Financial Incentives for CCUS in the Oil Sector." Canadian Climate Institute and Pembina Institute. March 15. https://climateinstitute.ca/publications/comparing-canadian-and-american-financial-incentives-ccus-oil-sector/

Monahan, Katherine and Marisa Beck. 2023a. "Australia's Green Bank." Canadian Climate Institute. February 14. https://climateinstitute.ca/publications/australias-green-bank/

Monahan, Katherine and Marisa Beck. 2023b. "Hydrogen tax credits in the U.S. Inflation Reduction Act." Canadian Climate Institute. February 14. https://climateinstitute.ca/publications/hydrogen-tax-credits-in-the-u-s-inflation-reduction-act/

Monahan, Katherine and Marisa Beck. 2023c. "Longship carbon capture and storage in Norway's North Sea." Canadian Climate Institute. February 14. https://climateinstitute.ca/publications/longship-carbon-capture-and-storage-in-norways-north-sea/

Monahan, Katherine and Marisa Beck. 2023d. "The United Kingdom's Contracts for Difference policy for renewable electricity generation." Canadian Climate Institute. February 14. https://climateinstitute.ca/publications/uk-contracts-for-difference-policy-for-renewable-electricity-generation/

Monk, Alexander and Richard Perkins. 2020. "What explains the emergence and diffusion of green bonds?" *Energy Policy*, 145. October. https://www.sciencedirect.com/science/article/abs/pii/S030142152030375X

Müller, Jonas and Anja Nina Kramer. 2020. "Additionality of mobilized private capital: Crowding-in or crowding-out?" KfW Development Bank. July 16. https://www.kfw-entwicklungsbank.de/PDF/Download-Center/PDF-Dokumente-Development-Research/2020_07_16_EK_Additionality_EN.pdf

Naran, Baysa, Jake Connolly, Paul Rosane, Dharshan Wignarajah, Githungo Wakaba, and Barbara Buchner. 2022. *Global Landscape of Climate Finance: A Decade of Data*. Climate Policy Initiative. October 27.

https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-a-decade-of-data/

Natural Resources Canada. 2022a. "Indigenous clean fuels projects – Clean Fuels Fund." Government of Canada. https://natural-resources.canada.ca/climate-change-adapting-impacts-and-reducing-emissions/canadas-green-future/clean-fuels-fund/indigenous-clean-fuels-projects-clean-fuels-fund/23784

Natural Resources Canada. 2022b. *The Canadian Critical Minerals Strategy – From Exploration to Recycling: Powering the Green and Digital Economy for Canada and the World*. Government of Canada. December. https://www.canada.ca/content/dam/nrcan-rncan/site/critical-minerals/Critical-minerals-strategyDec09.pdf

Net-Zero Advisory Body. 2023. *Compete and Succeed in a Net-Zero Future*. January 27. https://nzab2050.ca/publications/news_feed/net-zero-advisory-body-s-annual-report

Ontario Financing Authority. 2023. "Overview of the Aboriginal Loan Guarantee Program (ALGP)." *Government of Ontario*. https://www.ofina.on.ca/algp/index.htm

Porter, Michael E. 2009. "Clusters and Economic Policy: Aligning Public Policy with the New Economics of Competition." Institute for Strategy and Competitiveness. October. https://www.hbs.edu/faculty/Pages/item.aspx?num=46864

Public Accounts Committee. 2018. *The sale of the Green Investment Bank*. Government of the United Kingdom. March 14. https://publications.parliament.uk/pa/cm201719/cmselect/cmpubacc/468/46802.htm

Rack, Yannic. 2021. "Contentious Macquarie sale back in focus as UK plans new green investment bank." *S&P Global*. February 9. https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/contentious-macquarie-sale-back-in-focus-as-uk-plans-new-green-investment-bank-62480596

Saha, Devashree, Rajat Shrestha, and John Feldmann. 2021. "Designing the Next Generation of Federal Tax Credits for Low-Carbon Technologies." World Resources Institute. June 23. https://www.wri.org/research/federal-tax-credits-low-carbon-technologies

Samson, Rachel, Jonathan Arnold, Weseem Ahmed, and Dale Beugin. 2021. *Sink or Swim: Transforming Canada's economy for a global low-carbon future*. Canadian Climate Institute (formerly Canadian Institute for Climate Choices). https://climateinstitute.ca/reports/sink-or-swim/

Steenblik, Ronald. 2007. *A subsidy primer*. Global Subsidies Initiative of the International Institute for Sustainable Development. https://www.iisd.org/gsi/sites/default/files/primer.pdf

Subba, Sanjaya Kumar and Sudhansu Sekhar Mahapatra. 2021. "Pre and Post Anchor Investment Impact on IPO Returns." *Turkish Online Journal of Qualitative Inquiry*, 12(3). https://www.tojqi.net/index.php/journal/article/view/2716

The Economist. 2023. "What America's protectionist turn means for the world." January 9. https://www.economist.com/finance-and-economics/2023/01/09/what-americas-protectionist-turn-means-for-the-world

Thompson, Amanda. 2021. *The Atlin Hydro Project: Making a Meaningful Contribution to Community Health and Well-Being*. The Conference Board of Canada. https://www.conferenceboard.ca/wp-content/uploads/woocommerce_uploads/reports/10973_IP_The-Atlin-Hydro-Project_Jan2021.pdf

von der Porten, Suzanne, Niilo Edwards, Barry Vickers, Denise Mullen, and Mark Podlasly. 2022. "National Roundtable on Indigenous Access to Capital in Canada: Roundtable Primer." First Nations Major Projects Coalition. https://fnmpc.ca/wp-content/uploads/2022/07/FNMPC_BCBC_ACCESS_TO_CAPITAL_07192022.pdf

# Acknowledgments


### Staff authors

Marisa Beck, Clean Growth Director, Canadian Climate Institute

Dale Beugin, Executive Vice President, Canadian Climate Institute

Calvin Trottier-Chi, Research Associate, Canadian Climate Institute

### Staff contributors

Jonathan Arnold, Clean Growth Research Lead, Canadian Climate Institute

Jared Forman, Research Associate, Canadian Climate Institute

### Expert panelists

Catherine Beaudry, Canada Research Chair in Creation, Development and Commercialization of Innovation, Polytechnique Montreal

Preety Bhandari, Senior Advisor, Global Climate Program and Finance Center, World Resources Institute

Yves Bourgeois, Adjunct Professor and Dean of Studies, Université de Moncton

Don Drummond, Stauffer-Dunning Fellow in Global Public Policy and Adjunct Professor, School of Public Policy, Queen's University

Stewart Elgie, Professor of Law and Economics and Director, Institute of the Environment, University of Ottawa

Sara Hastings-Simon, Assistant Professor, Department of Physics and Astronomy and School of Public Policy, University of Calgary

Jane Kearns, Partner, Evok Innovations

Tamara Krawchenko, Assistant Professor, School of Public Administration, University of Victoria

Priyanka Lloyd, Executive Director, Green Economy Canada

Peter WB Phillips, Distinguished Professor of Public Policy and Founding Director of the Johnson-Shoyama Centre for the Study of Science and Innovation Policy, University of Saskatchewan

Mark Rowlinson, Partner, Goldblatt Partners LLP and (former) Counsel and Assistant to the Canadian National Director, United Steelworks

### Production support

Design and layout: Laurie Barnett, Graphic Designer

Translation: Coop Edgar





### Recommended citation:

Beck, Marisa, Dale Beugin, and Calvin Trottier-Chi. 2023. *Seven recommendations to leverage public investment to help Canada compete in the global energy transition*. Canadian Climate Institute.