Prospects for a green COVID-19 recovery in Canada

Submission to the Senate National Finance Committee

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Biographies of Submitting Authors

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Cameron has published widely on energy, resources and environmental challenges in the world's leading journals (such as Nature and Science) and across disciplines including engineering, biology, philosophy, economics, public policy and law, drawing on degrees in law and engineering (Melbourne University) and masters and doctorate in economics (Oxford as a Rhodes Scholar). He has co-founded three successful businesses and has provided advice on energy and environmental policy to government ministers and international institutions.

Brian O'Callaghan is a Researcher at the Smith School of Enterprise and the Environment, University of Oxford. He is an Australian Rhodes Scholar, completing a DPhil (PhD) with a focus on reducing risk in renewable energy finance. Brian is a Consultant at the Robertson Foundation, covering topics in Energy and the Environment. He is also a freelance consultant to government and business groups on issues relating to the energy and climate transitions.

Brian is on a leave of absence from the Boston Consulting Group (BCG). Before BCG Brian worked in macroeconomic and energy policy for the Asian Development Bank, and prior to that he was a Junior Fellow for the Australian Centre for Innovation and International Competitiveness. He holds degrees in Engineering (1st Class Honours with the University Medal) and Commerce (Finance and International Business) from the University of Sydney.

Biographies of Additional Authors in cited *Oxford Review of Economic Policy* Paper

Professor Lord Nicholas Stern is the IG Patel Professor of Economics and Government, Chairman of the Grantham Research Institute on Climate Change and the Environment and Head of the India Observatory at the London School of Economics. President of the British Academy, July 2013 – 2017, and was elected Fellow of the Royal Society in 2014. He was Chief Economist of the European Bank for Reconstruction and Development, 1994-1999, and Chief Economist and Senior Vice President at the World Bank, 2000-2003.

He was Second Permanent Secretary to Her Majesty's Treasury from 2003-2005; Director of Policy and Research for the Prime Minister's Commission for Africa from 2004-2005; Head of the *Stern Review on the Economics of Climate Change*, published in 2006; and Head of the Government Economic Service from 2003-2007. He was knighted for services to economics in 2004. He has published more than 15 books and 100 articles.

Joseph E. Stiglitz is an American economist and a professor at Columbia University. He is also the co-chair of the High-Level Expert Group on the Measurement of Economic Performance and Social Progress at the OECD, and the Chief Economist of the Roosevelt Institute. A recipient of the Nobel Memorial Prize in Economic Sciences (2001) and the John Bates Clark Medal (1979), he is a former senior vice president and chief economist of the World Bank and a former member and chairman of the (US president's) Council of Economic Advisers. In 2000, Stiglitz founded the Initiative for Policy Dialogue, a think tank on international development based at Columbia University. He has been a member of the Columbia faculty since 2001 and received that university's highest academic rank (university professor) in 2003.

In 2011 Stiglitz was named by Time magazine as one of the 100 most influential people in the world. Known for his pioneering work on asymmetric information, Stiglitz's work focuses on income distribution, risk, corporate governance, public policy, macroeconomics and globalization. He is the author of numerous books, and several bestsellers. His most recent titles are *People, Power, and Profits*, *Rewriting the Rules of the European Economy*, *Globalization and Its Discontents Revisited*, *The Euro* and *Rewriting the Rules of the American Economy*.

Dimitri Zenghelis is a Senior Visiting Fellow at the Grantham Research Institute at the LSE where, from 2013-2017, he was Head of Climate Policy. In 2014 he was Acting Chief Economist for the Global Commission on the Economy and Climate (a.k.a The New Climate Economy). He was recently Senior Economic Advisor to Cisco's long-term innovation group and an Associate Fellow at the Royal Institute of International Affairs, Chatham House.

Previously, he headed the Stern Review Team at the Office of Climate Change, London, and was a lead author on the Stern Review on the Economics of Climate Change, commissioned by the then Chancellor Gordon Brown. Before working on climate change, Dimitri was at HM Treasury including four years as Head of Economic Forecasting where he provided regular briefings to the Chancellor Gordon Brown and Prime Minister Tony Blair. He currently advises the Mayor of London and the UK Committee on Climate Change.

EXECUTIVE SUMMARY

The Government of Canada has announced that it will seek to achieve net-zero greenhouse gas (GHG) emissions by 2050 (Trudeau, 2019). Canada has already made a commitment to reduce GHG emissions to 30% below 2005 levels by 2030, as part of its "Nationally Determined Contribution" (NDC) under the Paris framework. These commitments will not be met under "business as usual". Canadian economic growth has historically been reliant on fossil fuel-intensive industries – change is necessary and in Canada's interest. Addressing this challenge can begin with the COVID-19 economic recovery.

The good news is that the economic argument for a green stimulus is very powerful. Green recovery measures can create more jobs, deliver greater long-term economic multipliers, and be deployed relatively quickly. Further, the trend in costs of clean technologies is clear – they are already cost competitive in many countries and they continue to decline in cost for understandable and predictable reasons. Given that the transition to a zero-carbon economy is required by the science, reflected in Canada's international commitments, and popular with voters, the economics and politics of green recovery is compelling. Other nations such as Germany (German Coalition Committee, 2020) have used their fiscal recovery packages to prioritise clean industry and to accelerate the transition away from a fossil-fuel intensive system. Germany is directing approximately 40% of spending to initiatives designed to stimulate future growth centres like electric vehicles, clean shipping, and artificial intelligence.

A recent paper in the *Oxford Review of Economic Policy* surveyed 231 central bank officials, finance ministry officials, and other G20 economic experts on the relative performance of 25 major fiscal recovery archetypes (Hepburn et al., 2020). These archetypes were assessed in four dimensions: speed of implementation, economic multiplier, climate impact potential, and overall desirability.

Our paper concludes that there are five priority policy archetypes with high potential to bring positive economic and climate impacts:

a. Clean physical infrastructure
b. Building efficiency retrofits
c. Investment in education and training
d. Natural capital investment
e. Clean research and development funding

In Canada, clean physical infrastructure investment could be directed to building new wind and solar electricity assets to complement existing hydroelectric generation. The prevalence of hydroelectricity in Canada, approximately 60% of the current electricity mix (Natural Resources Canada, 2020), puts the nation in a strong position to reach a 100% renewables future without concern for the grid balancing and stability issues which have limited progress in other countries. Further, there is an opportunity to expand cheap clean electricity generation beyond the domestic needs of Canada for export to the US or indeed to other markets.

Investment in green hydrogen infrastructure could enable electricity storage and transport and follow the European Union (European Commission, 2020), Germany (German Coalition Committee, 2020) and Australia (Department of Industry, Science, Energy and Resources, 2020). Transmission infrastructure and electric vehicle charging networks are also desirable investment options.

Canada could learn from the successes of EnerGuide and ecoENERGY Retrofit in the 2000s to quickly direct capital towards insulation, building electrification, and smart home systems. Associated opportunities are found in retraining programs, to redirect workers to capture green economy employment opportunities for new school, college, and university leavers.

Clean spending can also bring significant co-benefits in the form of positive health outcomes, reduced inequality, and supplementary environmental benefits like reduced air pollution. To achieve these benefits, policy design must be intentional, begin early and incorporate expert guidance.

The alternative to clean spending – support of old oil and gas industries – rests on a very weak business case. The risk of stranded assets and stranded labour in fossil sectors is already high and continues to grow. Fossil jobs are increasingly insecure jobs. On the balance of probability, only the very lowest cost producers like Saudi Arabia and Kuwait will continue to find profitable opportunities into the future. The decline of the fossil fuel industry is a challenge to Canadian prosperity without a strong response. By contrast, clean energy sources have the potential to reduce energy costs for Canadian consumers, while providing greater job opportunities and economic multipliers.

Without investment in clean technology, **Canada faces the risk of falling behind international peers.** Many nations are frantically building domestic capabilities to establish competitive advantage and position for leading roles in new and growing clean industries. Supporting oil and gas markets would reflect a focus on the past and necessarily direct attention away from the future.

Policy planning must begin in earnest now – this is not a decision to be postponed. The devil is in the detail when it comes to clean stimulus policy and every lost day will result in either suboptimal policy outcomes due to insufficient planning or delayed implementation leading to slowed recovery.

Overall, the economic case for a green recovery in Canada is strong. A well-designed stimulus package is important to enabling economic recovery and targeting green industries could bring significant job growth as well as high economic multipliers.

1. A SHORT-TERM DROP IN GHG EMISSIONS HAS MARGINAL CLIMATE IMPACT

Globally in 2020, GHG emissions might fall by 2%-7% in a low mobility restriction scenario or 3%-13% in a high restriction scenario (Le Quéré et al., 2020), which could be more in absolute terms than in any other year on record (Boden et al., 2017; Le Quéré et al., 2018). It has been estimated that Canada's shutdown has resulted in daily declines in CO_2 emissions of up to 19.8%, driven by reduced emissions in the power sector (down 38.5%) and transport (down 28.1%) (Le Quéré et al., 2020).

Without decisive government intervention, emissions will rebound once the lockdowns end. However, the magnitude of the rebound will depend on the speed of the economic recovery, the nature of rescue spending (keeping businesses and people alive) and recovery spending (reinvigorating the economy once mobility restrictions can be relaxed), the extent of a rebound in consumer demand, and the prescience of certain human and institutional trends. Conceivably, in the event of a rapid rebound, pent-up demand could even bring a short-term increase in GHG emissions above the long-term average. A rebound in emissions can already be seen in China, where mobility restrictions are being relaxed and factories are reopening.

2. ACADEMIC LITERATURE HIGHLIGHTS THE ECONOMIC ADVANTAGES OF CLEAN STIMULUS POLICIES

The response to the 2008-2009 Global Financial Crisis teaches us that green stimulus policies often have advantages over traditional fiscal stimulus. For instance, renewable energy investment is attractive in both the short and the long run. Renewable energy generates more jobs in the short-run (higher jobs multiplier), when jobs are scarce in the middle of a recession, which boosts spending and increases short-run GDP multipliers (which are derived from expanding demand). In the long run, renewable energy conveniently requires less labour for operation and maintenance (Blyth et al., 2014). This frees up labour as the economy returns to capacity. The more efficient use of labour and the savings on fuel means that renewables are also able to offer higher long-run multipliers (which are derived from expanding supply).

Green construction projects, such as insulation retrofits or clean energy infrastructure, can similarly deliver higher multipliers. These large construction projects are less susceptible to offshoring as supplies and labour tend to be sourced domestically (Jacobs, 2012). Clean energy infrastructure is also helpfully very labour intensive in the early stages – one model suggests that every $1m in spending generates 7.49 full-time jobs in renewables infrastructure, 7.72 in energy efficiency, but only 2.65 in fossil fuels (Garrett-Peltier, 2017). In the long run, these public investments offer high returns by driving down the costs of the clean energy transition (Henbest, 2020). Harnessing more of these opportunities could result in 'kick-starting the green innovation machine' (Acemoglu et al., 2012) and driving an efficient, innovative, and productive economy, with higher spillovers that benefit the wider economy (Aghion et al., 2014).

Speed of implementation is critical for the rescue packages but also valuable for the longer-term recovery packages. Fast-acting climate-friendly policies include residential and commercial energy efficiency retrofits, as well as natural capital spending (afforestation, expanding parkland, enhancing rural ecosystems) (Bowen et al., 2009;

Houser et al., 2009). When implemented through existing programs (Houser et al., 2009), energy efficiency retrofits can be the "most obvious option for a shovel-ready, local green investment" (Kamal-Chaoui and Robert, 2009). Natural capital spending is fast-acting because worker training requirements are low, many projects have minimal planning and procurement requirements, and most facets of the work meet social distancing norms. Through their NDCs, many countries have already prepared "shovel-ready" projects.

Investment could also be used for development and early-stage demonstration of key technologies that appear necessary to reach net-zero emissions. Greenhouse gas removal (GGR) technologies, including land-based biological processes and industrial carbon capture and storage (CCS), are one example. GGR technologies are necessary to meet the Paris goals, but barriers exist, and costs remain uncertain; more research, development and deployment could be beneficial (Hepburn et al., 2019).

3. SURVEY METHODS AND RESULTS

In April 2020, we surveyed 231 finance ministry officials, central bank officials, and other economists, representing 53 countries including all G20 nations, to ascertain their perspectives on COVID-19 fiscal recovery packages. These perspectives are relevant to policy design. A set of 25 policy archetypes – 6 rescue-type policies (A, C, D, I, K, O) and 19 recovery-type policies (Figure 1) – were defined, following a wide cataloguing effort of over 700 significant G20 fiscal stimulus policies proposed or implemented over the period 2008–2020.

Respondents were asked to assess, in a relative and subjective manner using sliding responses, each policy archetype on three core metrics; 'speed of implementation' from the time of legislation (scaled from less than a month to more than 3 years), 'long-run economic multiplier' (low to high), and 'climate impact potential' (highly negative to highly positive). A fourth summative metric, 'overall desirability' (strongly opposed to strongly support) was also tested to account for relevant social, political, and personal factors not addressed by the climate and economic metrics. In this way, each respondent answered 106–108 questions, giving a total of 24,703 data points.

Policies perceived to be in the desirable upper-right quadrant of Figure 1 (large long-run multiplier and strongly positive impact on climate) included connectivity infrastructure (S), general R&D spending (X), education investment (L), clean energy infrastructure (T), and clean energy R&D spending (Y). Each of these was also often identified as being in the top 10 desired recovery policies of respondents. Other notable policy options included healthcare investment (M) and worker retraining (N). Two archetypes scored highly on potential climate impact but were not recognised for high multiplier or speed of implementation: green spaces and natural infrastructure (V), and energy efficient buildings upgrades including retrofits (U). We found this perception surprising: policies U and V have low worker training requirements and are potentially able to be rapidly deployed.

Many traditional 'relief type' measures, clumped to the centre-right of the figure, including liquidity support for households, start-ups, and SMEs (D), direct provision of basic needs (K), and targeted direct cash transfers (O), predictably out-performed others in terms of speed of implementation and ranked amongst the highest for long-run multiplier. Non-conditional airline bailouts (E) performed poorly on all metrics and featured in fewer experts' top 10s than any other policy.

The clean R&D archetype, when directly compared to general R&D, was perceived to be significantly more desirable overall, and to have greater positive climate impact potential. However, it received a lower ranking for both speed (25th vs 20th) and multiplier (12th vs 6th), suggesting target group respondents placed a relatively strong weighting on the importance of climate impact.

Our results suggest that, in many cases, experts think that climate-positive policies also offer superior economic characteristics. However, there is the potential that these results are driven by participation and/or response bias related to any number of background factors. For instance, climate change beliefs of respondents could have influenced their responses to economic metrics in either direction. The survey was not framed as focused on climate change and the survey question on climate impact potential came after the questions on economic impact. However, the invitation came from the authors, who have a public track record of research on climate economics. We acknowledge the potential role of bias in our results and suggest that readers interpret them as uncorrected, subjective, and relative perspectives.

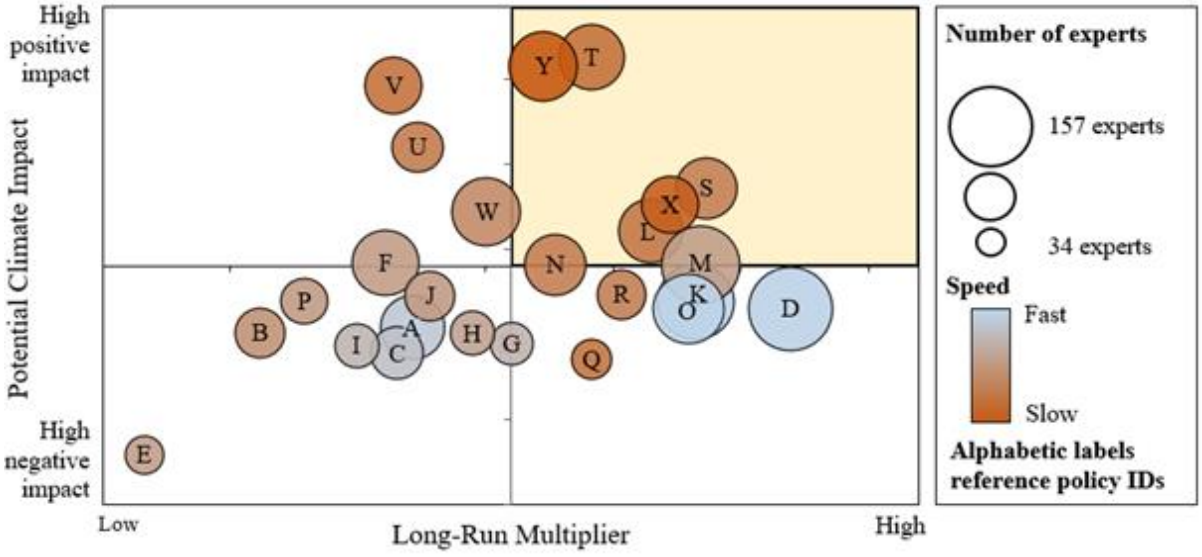

Figure 1. Results of our April 2020 survey of leading global economists, testing 25 fiscal policy types (represented by bubbles). Policies with higher long-run economic multipliers have greater economic impact per dollar spent. Faster policies achieve their desired economic impact more quickly. Policies with positive climate impact are likely to support efforts to achieve net-zero emissions.

4. RECOMMENDATIONS

Based on our review of the literature, the survey results and our own judgement, we suggest the following three key insights for policy-makers designing COVID-19 recovery packages.

1. **Recovery policies can deliver both economic and climate goals.** Following the "colourless" emergency rescue packages, there are a set of fiscal recovery policy types which offer high economic multipliers and positive climate impact. Combining survey responses with evidence from the literature, five policy types stand apart from the rest:

    - clean physical infrastructure investment in the form of renewable energy assets, storage (including hydrogen), grid modernisation and CCS technology,
    - building efficiency spending for renovations and retrofits including improved insulation, heating, and domestic energy storage systems,
    - investment in education and training to address immediate unemployment from COVID-19 and structural shifts from decarbonisation,
    - natural capital investment for ecosystem resilience and regeneration including restoration of carbon-rich habitats and climate-friendly agriculture,
    - clean R&D spending.

    Unconditional bailouts of incumbent companies operating in emission intensive industries should be avoided wherever possible. Such bailouts, and particularly those which may support incumbent upstream oil and gas players or coal players, are expected to perform poorly on both economic and climate metrics. In the small minority of cases where bailouts are essential to serving the national interest, policies should seek long-term positive climate outcomes by attaching appropriate conditions. For instance, conditional green bailouts for airlines could require the achievement of net-zero emissions by 2050 with intermediate targets set at 5- or 10-year intervals (O'Callaghan and Hepburn, 2020).

2. **Co-benefits can be captured.** As indicated by the survey results, there are non-economic, non-climate attributes of climate-positive policies which increase their overall desirability. For instance, electric vehicle incentives reduce local air pollution, which is especially valuable in dense urban areas. Support for energy efficiency retrofits could be directed towards lower-income households to decrease social and health inequality by shrinking real electricity costs and keeping homes warm in winter. In LMICs, new renewable energy can be used to increase rural electrification and provide support to citizens working to escape the poverty trap (Aklin et al., 2018).

    Policy-makers must proactively act to identify potential co-benefits during the policy design stage and shape implementation criteria to maximise impact. As national priorities and urgent social needs can differ manifestly between countries, the prioritisation of relevant co-benefits is likely to also differ. Governments can shape policy to best meet the needs of their constituency.

3. **Policy design is important.** Poorly designed recovery policy is likely to be ineffective in delivering economic, climate, and social outcomes, regardless of theoretical potential. During the GFC, many governments needlessly wasted the opportunity for significant long-run economic benefits and climate impact.

Policy timeliness and flexibility will be important characteristics since it is unclear how long the pandemic will last and whether there will be second or third waves. It also remains unclear whether the current recession will progress to a deeper depression with possible default cascades (Stiglitz, 2020).

Extreme urgency was appropriate in introducing rescue packages during the lockdown phase. There is probably more time to ensure that the recovery packages prioritise the sorts of investments that deliver productive assets for the future. This will be significantly more likely if policy design processes are fast but also consultative and evidence-based. Success will depend upon the specific social, political, environmental, and financial contexts of actors.

5. CONCLUSION

The COVID-19 crisis represents a dramatic shock to the global economy that will affect progress on climate change in multifaceted ways. The biggest driver of the long-term impact on climate is through fiscal recovery packages, along with possible shifts in power within and across national and international institutions. Green fiscal recovery packages can act to decouple economic growth from GHG emissions and reduce existing welfare inequalities that will be exacerbated by the pandemic in the short-term and climate change in the long-term. Short-term reductions in GHG emissions resulting from lockdowns will have minor long-term effects unless they facilitate deeper and longer-term human, business, and institutional changes. Urgent rescue packages have been necessarily 'colourless' and focused on preserving liquidity, solvency, and livelihoods, but their climate impact is also unlikely to be positive.

In our work, a survey of officials from finance ministries, central banks, and other leading organisations is combined with a large-scale policy cataloguing effort and review of expansionary fiscal policy literature. We emerge with the recommendation of five policy items well-placed to contribute to achieving economic and climate goals.

Several other insights emerged from our survey. Many climate-positive policies were perceived by our respondents to have high overall desirability; most climate-negative policies had relatively low desirability. This was true even for climate-positive policies that took more time to implement. Long-run multipliers of climate-positive policies were found to be high, reflective of a strong return on investment for government spending. Given the uncertainty in the future waves of the pandemic, flexibility and timeliness will also be important considerations.

As we move from the rescue to the recovery phase of the COVID-19 response, policy-makers have an opportunity to invest in productive assets for the long-term. In the lead up to COP26, recovery packages are likely to be examined on their climate impact and contributions to the Paris Agreement (UNFCCC, 2015). This may be a matter of building on existing NDCs, already framed to facilitate fast-acting investment. Recovery packages that seek synergies between climate and economic goals have better prospects for increasing national wealth, enhancing productive human, social, physical, intangible, and natural capital.