An Emission and Cost Assessment of "A Real Plan to Protect Our Environment"

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Disclaimer

The authors of this report and the organizations we represent - EnviroEconomics and Canadians for Clean Prosperity – neither support nor oppose any political party. While this report does address positions taken by a political party - namely the Conservative Party of Canada - its purpose is to provide a better understanding of climate policy and, in an ideal world, to better inform politicians of all parties of both the potential benefits and shortcomings of the policies analyzed within the report.

Summary

This report analyzes the recently released Conservative Party of Canada Climate Plan (the Plan) to understand its emissions reduction potential and cost. We find that the Plan would increase emissions by 9.1 Mt in 2022, relative to the current and announced measures being planned by the federal and provincial governments, as described in the most recent "additional measures" scenario from Environment and Climate Change Canada. The Plan would have a net cost of $3.8 billion by 2022 accounting for savings from removing existing measures including the carbon tax (regulatory charge) and the Clean Fuel Standard. This translates into a cost of $295 per household in all provinces and territories except B.C., Quebec and Newfoundland and Labrador that are subject to the federal carbon pricing benchmark or implemented economy-wide carbon pricing to avoid the federal regulatory charge. Residents of provinces that do not have the economy-wide carbon price (B.C., Quebec, and Newfoundland and Labrador) would have a lower cost of $187. The report also finds that the Plan would result in Canada missing the Paris target of 513 Mt in 2030 by 109 Mt, an increase of 30 Mt or 38% from the current 2030 projection from Environment and Climate Change Canada. It is not reasonable to assume the Plan, as currently outlined, is scalable to close the 2030 gap to Canada's Paris target.

1. Introduction

This paper takes stock of "A Real Plan to Protect Our Environment," a climate change plan released by the Conservative Party of Canada (Plan) in June 2019. We assess the Plan's anticipated impacts on Canada's greenhouse gas (GHG) emissions and its expected implementation costs. Our baseline for comparing the outcomes of the Plan is Environment Canada and Climate Change's (ECCC) GHG "additional measures" projection to 2030,[1] which forecasts a gap of 79 megatonnes (Mt) to Canada's 2030 GHG target of 513 Mt. The "additional measures" projection includes a diverse range of federal, provincial, and territorial GHG and clean-energy policies either in place or in development, as well as an allocation for the land sector.[2]

1. ECCC (2018). Canada's GHG and Air Pollutant Emissions Projections. http://publications.gc.ca/collections/collection_2018/eccc/En1-78-2018-eng.pdf

2. Land use, land-use change, and forestry (LULUCF) accounting credit is 24 Mt for the "land use sector".

The "additional measures" projection is a good approximation of the current federal and provincial measures being implemented, including the federal carbon pricing backstop and the Clean Fuel Standard; the Government of Canada initiated both of these under the federal regulatory process. We evaluate the Plan against this base case.

Our assessment answers three important questions about the Plan:

1. What are the Plan's emission reductions and costs as of 2022?

We assess the Plan's actions and determine which current GHG measures it proposes eliminating, which are new and incremental, and which will likely not deliver new and incremental GHG reductions. We then estimate the net change in GHGs and the economic costs with and without the Plan. We use the ECCC 2018 "additional measures" projection as the point of reference. We focus on 2022 for the economic costs and GHG reductions, because the Plan provides only short-term expenditure commitments.

2. What is the Plan's net cost impact on Canadian households as of 2022?

The Plan proposes removing some measures that will impact Canadian households, while adding in some others. We focus on the net change in household costs. We account for abatement costs, carbon payments and rebates, and the personal income tax needed to support the subsidy measures. We also account for the ability of companies to pass on costs to households, to the extent the Plan changes their net costs.

3. Does the Plan have a reasonable chance of achieving Canada's 2030 Paris Target of 513 Mt?

We assess if the Plan could close the gap to Canada's 2030 target of 513 Mt. We carry forward our projected 2022 emission reductions from the Plan and compare the trajectory against the "additional measures" 2030 projection. We assess the measures contained in the Plan, the feasibility of clean exports, and the potential to scale up the large emitter program to close the 2030 gap.

We address each question in the sections that follow.

2. The emission reductions and costs of the Plan in 2022

We characterize the proposed Plan's impact on both GHGs and costs in three respects:

1. Some existing measures will be removed and will increase GHGs above the ECCC 2018 "additional measures" projection;
2. Some measures will decrease GHGs, as they are new and additional; and,
3. Some measures will have a negligible or no impact on GHGs due to overlap with measures already included in the ECCC 2018 "additional measures" projection.

We use these three characterizations to estimate the net change in emissions and costs relative to the current "additional measures" projection. Measures not listed in the Plan, such as Canada's vehicle efficiency standards, are assumed to continue as announced or implemented. We therefore only assess measures that are explicitly mentioned in the Plan.

Our analysis indicates that the Plan, if implemented as proposed, would yield a net increase in GHG emissions in 2022. Further, those additional emissions would represent a net increase in cost relative to the ECCC 2018 "additional measures" projection (Figure 1):

• **9.1 Mt of additional GHGs above the "additional measures" projection.** Our assessment indicates that the Plan will increase Canada's emissions in 2022 approximately 9.1 Mt, when compared with the current "additional measures" projection from ECCC. Repealing the regulatory charge in benchmark jurisdictions, the Clean Fuel Standard, and changing the inclusion threshold (no opt-in below 40 kilotonnes) for large emitters would result in the release of 21.6 Mt more emissions. The reductions associated with the Plan's proposed technology innovation programs and green home credits reduce that number by 12.5 Mt of emissions in 2022, yielding the net increase of 9.1 Mt.[3]

• **$3.8 billion increase in costs above the "additional measures" projection.** On a cost basis, repealing the federal measures now in place would save about $850 million in 2022. However, the Plan would add costs of $4.67 billion. The net cost would be an increase above current projected costs in the order of $3.8 billion ($2018) by 2022. [4]

3. Other measures outlined in the Plan are either vague or similar to those already included in the current "additional measures" projection.

4. Note we don't include the marginal cost of public funds, which the Fraser Institute has argued would double the economic costs of these subsidy programs contained in the Plan.

Figure 1: Net Change in GHGs and Costs of Measures Contained in the Plan, 2022

	Change in GHGs (Mt) *	Marginal Cost ($2018/tonne)	Total Cost * (Millions $2018)
Removal of measures that increase GHGs above ECCC projection			
Removal of the federal regulatory charge	13.46	-$46	-$310
Removal of Clean Fuel Standard	7.35	-$142	-$522
Revision to industrial emitters regulation	0.83	-$46	-$19
Measures that decrease GHGs (new and additional)			
Green Homes Tax Credit	-9.02	$439	$3,960
Green Technology and Innovation Fund	-2.48	$272	$675
Green construction options	-1.00	$46	$23
Net Change	**9.1**		**$3,808**

Measures with a negligible or no impact on GHGs (not incremental to GHG projection)	
Investment Standards for Industrial Emitters	Assume as announced in federal OBPS.
Green Patent Credit	Limited reduction potential, time delays.
Energy Savings Performance Contracting	No policy signal to catalyse investment.
Green Home Retrofit Code	Already in ECCC projection.
Net-Zero Ready Building Standard	Already in ECCC projection.
Supporting the Agriculture Sector	No commitment mentioned, vague.
Greening the Grid measures	Duplicates existing provincial and federal policies; already included in ECCC projection.

** Note: Net change is relative to baseline scenario of current measures from federal and provincial governments as outlined in "additional measures" projection by Environment and Climate Change Canada.*

Some choices will increase GHGs due to the removal of existing measures. The removal or unwinding of certain measures will result in an increase in emissions to the extent the measures are real, can be expected to bind, and are included in the ECCC 2018 "additional measures" projection. We have identified three sources of GHG increases contained in the Plan:

• **The removal of the federal regulatory charge (carbon tax) in benchmark jurisdictions.** The Plan proposed removing the consumer -and business- facing regulatory charge (carbon tax) that is currently applied to emissions that are outside the scope of the large industrial emitter program.[5] Currently, backstop jurisdictions and those with their own carbon prices to avoid the federal backstop include all provinces and territories except British Columbia, Quebec and Newfoundland and Labrador.[6] We estimate priced emissions in benchmark jurisdictions subject to the regulatory charge and outside of the large industrial emitter program to be in the order of 232 Mt in 2017.

To assess the GHG base from which to remove the carbon tax, we grow the emissions covered by the regulatory charge in buildings, transport, and other manufacturing (and construction) using growth rates from ECCC's 2018 "Reference Case". We know from past modelling that each sector has an unique marginal abatement cost curve, and we estimate the GHG reductions assuming the expected 2022 carbon price of $46/tCO2e ($50 nominal).[7] This approach

5. e.g. output-based pricing system.

6. While Alberta has not been listed as a backstop jurisdiction, the Minister of Environment and Climate Change has mentioned the backstop will apply.

7. All prices are expressed in real $2018. Therefore, the $50 carbon price in 2022 is falling at the rate of inflation relative to our base dollar year of 2018.

allows us to calculate that the Plan's proposed termination of the national carbon price will increase emissions by 13.5 Mt in 2022, with a total economic cost avoided of $310 million. The distributional impact of carbon payments under the regulatory charge are addressed in Section 3.

• **Removal of Clean Fuel Standard.** The Plan proposes increasing the availability and use of renewable fuels while decreasing the overall carbon intensity of Canada's fuel mix. That said, it is reasonable to assume the Plan proposes to remove the regulatory requirements of the Clean Fuel Standard (CFS) on transport fuels and the industrial use of solid and gaseous fuels, arguing that the standard proposes "unprecedented new rules on solid and gaseous fuels that go beyond what the current technology can achieve."[8]

The proposed CFS regulations require a 4% reduction in the GHG intensity of liquid fuels in 2022, while industrial gases and solid fuels are to be regulated starting in 2023 and therefore fall outside of our 2022 time frame (we address the 2030 impact on removing the CFS on transport and industrial fuels in Section 4 below).

Removing the CFS on liquid fuels only in 2022 would result in an increase in GHGs of 7.35 Mt in 2022[9] with a marginal cost avoided for the CFS of $142/tCO2e[10] and total costs avoided of $522 million.

• **Green Investment Standards for Industrial Emitters.** The Plan proposes lowering the inclusion threshold for large emitters from 50 kilotonnes (kt) per year under the current Output Based Pricing System (OBPS) to 40 kt. That said, the existing federal OBPS includes a voluntary participation provision that enables companies operating facilities with emissions higher than 10 kt to be subject to the regulations. The Plan excludes this opt-in clause; by setting a hard target for participation at 40 kt, as proposed it will cover fewer large-emitter GHGs. It is reasonable to assume that all firms would voluntarily opt-in to the OBPS to avoid paying the full carbon charge.

Using the latest 2017 facility-reported GHG data for the benchmark jurisdictions, we estimate that facilities in the 10 to 40 kt range contribute about 6 per cent of the total covered emissions. Based on forecast growth in emissions to 2022,[11] we estimate that 15.5 Mt of large-emitter GHGs would fall outside of Plan's coverage relative to the current federal OBPS. As these emissions would not be subject to a price under the proposed Plan, the Plan would not reduce them.

Relative to the "additional measures" projection, we estimate GHGs would rise 0.83 Mt, resulting in avoided compliance costs in the order of $19 million in 2022.

Some choices will decrease GHGs given they are new and additional. The Plan proposes measures that are likely to reduce emissions relative to the "additional measures" projection, including:

• **Green Technology and Innovation Fund.** This proposed venture capital fund would support early- to late-stage technology companies. The Plan proposes capitalizing the fund with $250 million, and aims to leverage significant private-sector funding. This measure may not fully drive incremental GHG reductions above the "additional measures" projection, as it would likely replace the current $450 million Low-Carbon Economy Challenge Fund. Still, we

8. ECCC, 2018. page 29.

9. Forecasting GHGs in transportation fuels to 2022 and reducing the carbon intensity by 4% (3.6 g CO2e/MJ carbon intensity reduction in 2022 on a reference carbon intensity for all liquid fuels of 89.9 g CO2e/MJ).

10. Ibid. and EnviroEconomics, 2019.

11. Total large emitter GHG's we forecast to be rising at about 1.48% annually between 2017 and 2022. Sectoral emissions are rising at different rates.

give the Plan the benefit of the doubt and include the measure as contributing to new and fully incremental GHG reductions.

To calculate this measure's anticipated GHG reduction, we estimate the cost per tonne reduced from innovation spending as well as the total leveraged spending that the government expenditure would likely yield:

• **Cost per tonne reduced of $272/tCO$_2$e.** Sustainable Development Technology Canada (SDTC) is an existing arm's-length foundation created and capitalized by the federal government to support commercialization of Canadian clean technology companies. Since 2001, SDTC has dispersed about $1 billion in funding for cleantech projects, matched by $2.74 billion of private- and public-sector investment for a leveraging ratio of 2.7. According to the foundation, these investments have averted the release of 13.8 Mt GHGs,[12] which pencils out to an average cost of $272/tCO2e reduced. This abatement cost is high relative to other policies; a recent comparison of the cost-effectiveness of various policy levers designed to incent innovation and technology diffusion ranks R&D subsidies low.[13] As it is notoriously difficult to assess GHG performance from innovation, we adopt the SDTC's average historical cost per tonne of reduced GHGs as a reasonable proxy.

• **Leveraged total of $675 million that leads to GHG reductions.** To estimate the total emissions reduction potential and cost for the innovation fund, we need to determine the extent to which the Plan's proposed government investment will attract innovation dollars. A review of the clean technology innovation literature suggests this innovation subsidy will attract new capital. As such, we can assume the $250 million in new federal money listed in the Plan will attract some new venture capital for clean technology. But how much? We assume the $250 million identified in the Plan is leveraged at the historical SDTC rate of 2.7 resulting in a total investment of $675 million by 2022.[14]

The Plan's proposed $250 million in innovation spending ($675 with leveraged investment) would therefore reduce 2.5 Mt of emissions in 2022, at a cost of $272/tCO2e. While these expenditures would be dispersed over time, we attribute all the costs and hence GHG reductions to 2022 to capture the cumulative impact of the proposed measure.

We suggest it is generous to credit GHG reductions in the short-term to innovation venture capital spending. In addition, we have not included the marginal cost of public funds (MCF). The Fraser Institute, a Canadian think tank focused on free markets, has argued that such funds double the costs of subsidy programs.[15]

This is not to say that innovation program should be solely judged on a cost-per-tonne basis. Indeed, there are valid reasons why Canada must continue to innovate and stay ahead of the low-carbon global trend, including driving down the costs and increasing GHG reduction potential of clean technologies.

• **Green Homes Tax Credit (GHTC).** This proposed two-year $1.8 billion program would provide homeowners with a refundable tax credit of 20% of the cost of renovations to improve energy performance. The Plan estimates the cost of this measure at $900 million annually, which we assume ends in fiscal year 2021-22. While these expenditures would be dispersed over time, we attribute all the costs and hence GHG reductions to 2022 to capture the cumulative impact of the proposed measure.

11. Sustainable Development Technology Canada. Annual Report 2017-2018. Published June 2018. Retrieved from https://www.sdtc.ca/wp-content/uploads/2018/08/ASCRIBE_18-207_AR_e_WEB.pdf

12. Popp (2016) observes that a policy using only the optimal R&D subsidy attains just 11 percent of the welfare gains of the combined policy of a carbon price and an R&D subsidy.

13. SDTC's rate is 2.7 and includes some additional public support.

14. A leverage ratio of 2 to 1 versus SDTC's rate of 2.7 and the Plan rate of 4.

15. Bev Dahlby. "The high cost of raising revenue through Canada's personal income tax." April 24, 2017. The Fraser Institute. Retrieved from https://www.fraserinstitute.org/blogs/the-high-cost-of-raising-revenue-through-canada-s-personal-income-tax

16. Nicolas Rivers and Leslie Shiel. 2014. Free-Riding on Energy Efficiency Subsidies: The Case of Natural Gas Furnaces in Canada. https://sciencessociales.uottawa.ca/economics/sites/socialsciences.uottawa.ca.economics/files/1404e.pdf .

A program evaluation conducted by Natural Resources Canada (NRCan) of the residential element of the now defunct ecoEnergy program, upon which the GHTC is loosely modeled, estimated that the $141 million (2018$) in spending delivered about 0.3 Mt of emission reductions at an average cost of $439 per tonne.

Differences in emissions reductions between carbon pricing and subsidies such as those proposed by the GHTC rest largely on the assumed free-rider rate, with NRCan's ecoEnergy Home Renovation Tax Credit estimated to have a free-rider rate of 70% and a cost range of $100/t CO2e to $800/t CO2e.[16] It is also worth noting that "a substantial majority of the grants were received by middle- and high-income households, such that the grant had a regressive effect on the distribution of income."[17]

The total abatement cost of the program is calculated at $3.96 billion by 2022; calculated as the program's proposed $1.8 billion expenditure leveraged at five to one (i.e. 20% tax credit) and with a free-rider rate of 70% (i.e. 30% incremental increase in investment). We adopt NRCan's estimate of the average cost per tonne of the ecoEnergy program of $439/t CO2e. We calculate this measure will reduce emissions by 9 Mt by 2022.

• **Green Construction Options.** This commitment seeks to promote more low-carbon building materials in construction. Canada's current federal government promotes the increased use of wood in buildings construction;[18] this is already included in the "additional measures" projection. The proposed measure in the Plan adds low-carbon cement to the class of low-emitting building materials. While the Plan is not clear on the policy approach to incent usage of low emitting cement, green public procurement or content standards could increase the use of lower emitting building materials.

Given that the "additional measures" projection includes the increased use of wood in building construction, the addition of low-carbon cement would be the only incremental reduction under this measure, estimated at 1 Mt annually.[19] We assume an opportunity cost of an emission reduction equal to the carbon price under the large emitter program of $46/t CO2e in 2022. We estimate total cost at $23 million in 2022.

Some of the Plan's proposed measures will have no incremental impact on reducing emissions. This is principally because the Plan includes a long list of measures that duplicate actions that are already underway or included in the "additional measures" scenario. In a few cases, we've given the Plan the benefit of the doubt and assumed the measure would be implemented with a stringency equal to a measure currently in the "additional measures" projection.

The Plan's proposed measures that are unlikely to reduce emissions include:

• **Investment Standards for Industrial Emitters.** We assume, perhaps generously, that the Plan would yield outcomes equivalent to federal output-based pricing system (i.e. the same product benchmarks and carbon price). This equivalency assumption is perhaps generous, especially given that the Province of Alberta has indicated it will set its large emitter carbon price at $20/t CO2e. Because the current government already includes an output-based pricing system (OBPS) for large emitters in the "additional measures" projection, the continuation of the measure under the Plan would have no impact on the projected GHG, with the exception of the opt-in provision discussed above.

17. Ibid

18. See ECCC, 2018. Table A10, p.71

19. Personal communication, Cement Association of Canada. June 24, 2019.

That said, if the Plan did reduce the carbon price for large emitters from a $50t/CO2e (nominal) carbon price to $20 t/CO2e (nominal) as proposed in Alberta, GHGs in 2022 would rise 8.3 Mt and yield avoided compliance costs of $265 million.

• **Green Patent Credit.** This proposed measure would provide subsidies related to new clean technology patents climbing from $20 million to $80 million annually. While this is interesting, at least in the short- to medium-term we conclude it will not likely deliver emission reductions, for several reasons:

• First, firms often choose to not submit patents due to long wait times and high associated opportunity costs. For example, the wait time for receiving a patent once submitted is about three years and is frequently longer. The patent must then move through the innovation cycle to be delivered as GHG reducing technology in the market.

• Second, the success rate of Canadian patents does not necessarily translate into innovations at home. A recent Smart Prosperity brief concludes that "while 3.4 per cent of the world's environmentally related patents were registered in Canada, just 1.6 per cent of the world's clean innovations were actually developed here— suggesting a significant breakdown between Canada's ability to generate new clean innovation ideas and our ability to get them to market."

• Finally, the scale of the program is small compared with technology need. According to recent estimate, to achieve its Paris target, Canada will need to mobilize $22 billion in low carbon technology investment each year between now and 2030

• **Energy Savings Performance Contracting (ESPC).** This measure aims to finance capital investments and provide a means to aggregate GHG reductions across multiple properties, thereby lowering technology financing costs. But without a policy signal such as a regulation or carbon price to incent energy-efficient and low-carbon investments, new incremental reductions would not likely occur beyond those driven by existing regulations or energy prices. We conclude this measure would yield negligible reductions.

• **Green Home Retrofit Code.** This voluntary measure is already included in the latest "additional measures" GHG projection to 2030.[20]

• **Net-Zero Ready Building Standard.** As the Plan indicates, the federal building codes are "model building codes"[21] and as per the reference cited in the Plan, "provinces and territories can choose to adopt those models as their mandatory codes." These codes are already included in the "additional measures" projection.[22]

• **Supporting the Agriculture Sector.** The Plan does not cite any commitments that will reduce GHGs; this appears to reference existing industry practices.

• **Greening the Grid measures** are not clearly defined, likely mirror existing provincial and federal policies or are reflected in the "additional measures" GHG projection:

• **First nations off diesel:** This measure is already included in the 2030 GHG projection.[23] Also, there is evidence all levels of government are moving ahead with reducing diesel use.

20. ECCC, 2018. Labelling and codes for existing buildings (retrofits), Table A10, p.71.

21. ECCC, 2018. Page 21 states "We will continue to strengthen Canada's model building codes…"

22. ECCC, 2018. Net-zero energy ready building codes (for new commercial and residential buildings) by 2030, Table A10, p.71.

23. ECCC, 2018. Off-diesel energy systems in remote communities, Table A10, p.71.

24. ECCC, 2018. Emerging renewables and smart grids, Table A10, p.71.

• **Foster the adoption of smart grid technology and strategic interconnection of electricity grids.** This measure has a good GHG reduction potential, and is widely supported in British Columbia, Quebec, and Manitoba; it also enjoys bipartisan federal support. It's included in the government's 2030 "additional measures" GHG projection.[24]

• **Foster the adoption of renewable power technologies.** There are many provincial policies working to do this, and it would be difficult to add incremental measures on top of existing efforts. As well, the "additional measures" 2030 projection includes a similar catch-all measure.[25]

• **Taking the Climate Change Fight Global.** The Plan identifies three approaches to using some form of new global GHG accounting to gain credits for Canada's "clean" exports. The accounting changes required to gain credit for these initiatives would require the reworking of international agreements and is viewed by experts as highly unlikely given the historical pushback from the international community.[26] Further, any federal government that thought it could gain reductions using these accounting methods would likely credit them against its 2030 target. Indeed, Canada's federal government has indicated it would seek clean-energy export credits for liquefied natural gas (LNG) and other technologies such as carbon capture and storage. Therefore, we do not count these potential reductions as incremental to the baseline "additional measures" projection.

25. Ibid.

26. In addition, this approach presents some potential challenging contradictions that must be addressed. For example, if Canada is to gain credit for clean aluminum exports or carbon capture and storage, do we then assign emission debits to China for imported energy-efficient equipment?

3. The Plan's net cost impact on households in 2022

In this section, we assess how the Plan's proposed measures will impact household costs. As above, we need to account for the Plan's proposed cancellation and alteration of three existing measures. Some of these measures will impact households in the benchmark jurisdictions only (all provinces and territories except Quebec, British Columbia, and Newfoundland and Labrador). For example, the Plan would cancel the federal regulatory charge (carbon tax) and household carbon-incentive rebate in regions where it now applies. The Plan also proposes a few subsidized measures. If elected, a government committed to new subsidies would need to allocate the costs of these programs from general revenue, and all Canadian households would pay for their share via personal income tax. Finally, we also account for the degree to which companies can pass on net changes in their carbon costs to households.

In Figure 2 we outline the Plan's estimated net household impacts in 2022.

In benchmark jurisdictions—again, all provinces and territories except Quebec, British Columbia and Newfoundland and Labrador—we find the Plan will increase household costs $295 per year relative to existing policy. This is largely due to two key changes: first, the proposed removal of the carbon incentive rebate which would cost households over $100 per year on average; and, second, the cost borne by households for the Green Home Tax Credit which would cost more than $200. In Quebec, British Columbia, and Newfoundland and Labrador—the non-benchmark—the Plan would increase household costs $187, reflecting their personal income tax costs for the subsidy programs.

Figure 2: Net Household Impact of the Plan, 2022*

	Total Net Cost (Million $2018)	Household Share (Million $2018)	Per Household Cost
Removal of existing measures that would increase emissions above 2030 ECCC Projection			
Removal of the federal regulatory charge and rebate	-$1,028	-$1,028	-$108.80
Removal of the Clean Fuel Standard	$887	$474	$20.20
Revision to industrial emitters regulations	$19	$6.56	$0.43
New and additional measures that would lower emissions			
Green Homes Tax Credit	-$3,960	-$3,069	-$202.63
Green Technology and Innovation Fund	-$250	-$126	-$8.34
Green construction options	-$23	-$12	-$0.77
Green Patent Credit	-$80	-$40	-$2.67
Net impact in benchmark jurisdictions (negative is worse off)			**-$295**
Net impact in Quebec, B.C., Newfounalnd and Labrador			**-$187**

* negative totals denote worse off, positive totals denote better off)

Below we assess the impacts of the Plan's proposed measures in 2022:

• **Removal of Federal Carbon Tax (regulatory charge) in Benchmark Provinces.** When compared with current policy, we conclude this proposed measure will increase household costs on average about $109 per year in each of the roughly 9.46 million households outside of Quebec, British Columbia, and Newfoundland and Labrador.[27] We conclude that households will benefit from lower abatement and cancelled carbon payments on energy use, and via fewer costs passed through by industry in supply chains. But under current policy, on average most households in these provinces receive more via rebates than they pay. As a result, we find that reversing the regulatory charge and associated rebate will yield a loss for most households relative to the "additional measures" projection.

• **Removal of Industrial Portion of the Clean Fuel Standard (CFS).** By repealing the Clean Fuel Standard, households avoid about 80% of the total cost of the Clean Fuel Standard: 100% of costs on their transport fuel; and, 60% of transportation fuels in the commercial and freight sectors passed on to households in supply chains. As of 2022, each of Canada's more than 15 million households will save about $27.50.

• **Industrial Emitters, No Opt-in Below 40 kt.** The Plan proposes lowering the number of industry facilities subject to the OBPS regulations, resulting in fewer costs passed on to households. Our forecast of the $19 million savings from altering the existing OBPS translates to a per-household savings of $0.43.

• **Green Homes Tax Credit.** The federal Budget Plan 2019 forecasts that personal income tax in 2022 will account for about 50.5 per cent of all government revenue. Pro-rating this to the $1.8 billion cost of this measure suggests that households will be responsible for $909 million in personal income tax, or about $60 per household. Added to this is the household abatement expenditure[28] of $2.16 billion or $143 per household.

• **Green Technology and Innovation Fund.** As with the above program, government would need to source the $250 million for this proposed fund from general revenue. This translates into a total cost of $126 million for all Canadian households, or $8.34 per household.

• **Green Construction Options.** With an opportunity cost of low-carbon cement calculated at $23 million in 2022, and assuming a household cost pass-through of 35 per cent, we calculate costs of this measure at $0.77 per Canadian household.

• **Green Patent Credit.** The proposed Green Patent Credit program will not reduce emissions, it does nevertheless represent a cost that must be recovered via taxation. The $80 million expenditure in the last year of the program, which we assume to be 2022, would cost each Canadian household $2.67 in personal income tax.

27. Given the differentiated federal carbon incentive rates, this number will vary significantly by province.

28.As discussed above, the household tax credit is at a rate of five to one (20% of allowable expenditures), but program evaluations of these type of subsidy programs in Canada have determined free rider rates of 70%.

28. We were unable to calculate the 2030 cost implications of the Plan, because it does not indicate whether funding will be continued beyond the short term.

4. Does the Plan have a reasonable chance of achieving Canada's 2030 Target of 513 Mt?

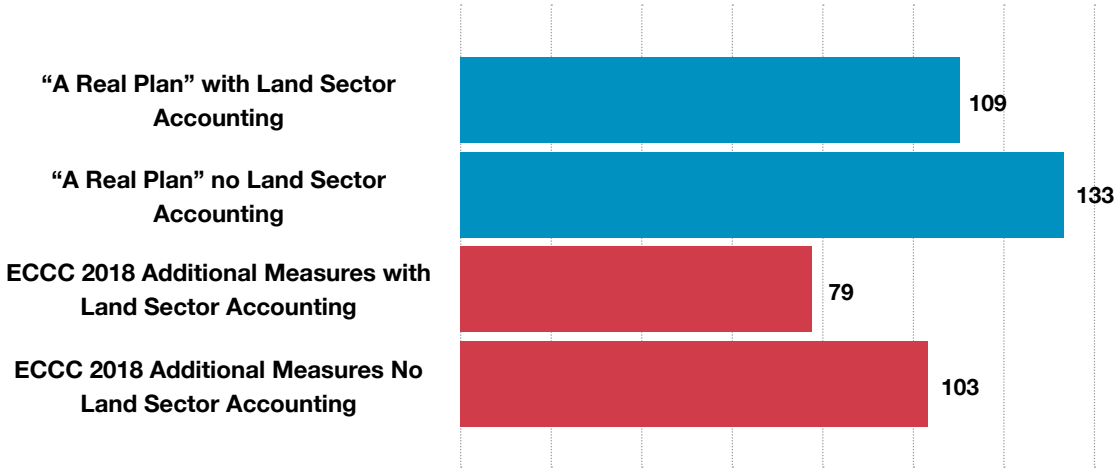
Our analysis of the emissions reductions potential of the Plan demonstrates that it does not have a reasonable chance of achieving Canada's 2030 target under the Paris Agreement. Compared to the baseline "additional measures" scenario, we calculate the Plan would result in a net increase in emissions of 29.8 Mt in 2030. This would widen Canada's existing gap to its 2030 target by 38 per cent.

While the Plan introduces a range of new measures that could reduce carbon emissions totalling 12.5 Mt, these reductions are smaller than the emissions reductions that would have been achieved from policies that are to be cancelled or altered - such as the economy-wide carbon-price backstop and the Clean Fuel Standard - and the changes to other policies such as the large industrial emitter program.

This projection includes an assumption that if the Plan did not explicitly mention a current measure, such as the vehicle and equipment efficiency standards, those measures will remain in the 2030 "additional measures" projection.[29]

In Figure 2, we summarize the emissions gap estimates published by ECCC comparing the projected GHG emissions in 2030 against the 513 Mt target, with and without the 24 Mt of land sector accounting estimated by ECCC.

Figure 3: Gap to Canada's 2030 Target, Megatonnes Co2-eq



29.This logic also results in potentially unintended consequences like the argument that Canada should be debited for producing items domestically that could have been produced abroad with fewer emissions.

How could the Plan close the 109 MT gap? Based on its current contents, there are 2 potential options: rely on global reductions or scale up the ambition of existing programs. Unfortunately, both options would face major challenges. We discuss each below.

Going Global. The Plan devotes one of its three main chapters to discussing global emissions reductions. Citing Article 6 of the Paris Accord, it outlines two types of reduction strategies:

1. Claim reductions by producing products domestically that can be made with lower carbon emissions in Canada than abroad,

2. Claim reductions by providing lower-carbon products to other countries.

The first option is likely a non-starter under the Paris Treaty, in part because of how difficult it would be to validate that producing aluminum in Canada, for example, actually reduced emissions relative to theoretical aluminum that may have otherwise been produced in another country.[30] The second approach – claiming reductions abroad – is allowed under Article 6 but is problematic for a number of reasons. First, this clause was intended to be used to "increase ambition" meaning that it should help countries achieve reductions over and above what they had already committed to do as part of the Paris treaty, rather than substituting for domestic action. Furthermore, any emissions credits that Canada hopes to achieve would have to also be agreed to by the receiving country. It is highly unlikely a country that has reduced its emissions would transfer these emissions reductions to Canada. Instead, they would need to be compensated for providing these reductions.

We illustrate the challenges with this approach using one of the main examples that the Plan contemplates – exporting LNG. There are at least two reasons why Canada would likely not be able to use LNG credits to close the gap:

- **LNG credits would almost certainly need to be bought.** LNG GHG credits are an asset with value as regulatory compliance units in the importing countries. For illustrative purposes, let's assume the Canadian Association of Petroleum Producers estimate that 50% of LNG exports could generate GHG credits. Let's also assume, as does the ECCC 2018 Reference Case projection,[31] that 16 million tonnes of LNG will be available for export in 2030. Now, let's hypothetically ship all that LNG to China, to displace coal-fired power generation.

  All Chinese coal power plants will have regulatory compliance obligations under a domestic emissions trading system in 2030, with allowance prices forecast to be in the order of USD $25/t CO2e in 2030. Based on a lifecycle GHG analysis of Chinese coal plants versus LNG power plants, we calculate that LNG could displace about 0.374 kg per kilowatt hour of coal emissions.[32] Under this highly optimistic scenario, Canada would claim 18.6 Mt of emissions credits from its LNG exports. The asset value of compliance units in China from 16 million tonnes of Canadian LNG exports (18.6 megatonnes of GHG credits) would be USD$457 million in 2030, or 5 per cent of value of the fuel's forecast price.

  Given China's commitment to regulatory compliance[33] and the significant asset value involved, we doubt that nation would freely allocate those credits to Canada—or even make them available at all.

30. See section 1.3.7.1.4, page 22-3. ECCC, 2018. Canada's GHG and Air Pollutant Emissions Projections. http://publications.gc.ca/collections/collection_2018/eccc/En1-78-2018-eng.pdf

31. Note, Chinese emission standards for coal fired power generation will decrease this gap as low performing power plants will be shuttered. This estimate therefore looks like a maximum.

32. "The performance of China's ETS pilots is characterized by… high compliance rates." Zhang, L., Zeng, Y., Li, D. (2019). China's Emissions Trading Scheme: First Evidence on Pilot Stage. Polish Journal of Environmental Studies, 28(2), 543-551. https://doi.org/10.15244/pjoes/84871

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• **The projected volumes are insufficient to close the 2030 gap.** The projected 16 million tonnes of LNG exports in 2030, assuming the crediting rate of 50% and life cycle GHG coal displacement rate discussed above, could deliver 18.6 megatonnes of GHG credits. While significant, this is far lower than the 109 Mt needed to hit gap to the Paris target. To close the 2030 gap under the Plan, LNG exports would have to expand almost six times the current projection to 2030. To put this into perspective, seven LNG Canada facilities would need to be built and operating by 2030, starting from zero LNG exports today.

Increasing ambition of existing policy: large emitter program. If the Plan were to increase the ambition of its existing policies, the most obvious tool to leverage would be the large emitter program, since it is lower cost than any of the other measures in the Plan.

Could the large emitter program (Investment Standards for Industrial Emitters) be scaled to close the gap? The simple answer is no, not without creating serious competitiveness harm. To estimate the carbon price needed to close the 109 Mt gap using the large emitter program alone, we use an abatement cost model of the industrial sectors located in the benchmark jurisdictions. Using the latest 2017 facility level GHG data, we identify the facilities and sectoral emissions in the benchmark jurisdictions. For facilities emitting more than 40,000 Mt annually, the 2017 GHGs are 236 Mt of priced emissions. We then sort these facilities into 18 economic sectors for which we have developed marginal abatement cost curves used in regulatory analysis.

We then grow, to 2030, the covered GHGs by sector based on the ECCC 2018 Reference Case projection supplemented with sectoral detail from our own analysis and modelling. In 2030, we estimate about 300 Mt of emissions would be covered by the large emitter program with a threshold greater than 40,000 tonnes, which is an average annual growth rate in GHGs of just under 2 per cent.

To achieve the 109 Mt reduction needed to close the gap to the 2030 target under the Plan, we calculate the large-emitters carbon price would need to be over $315/tCO2e, with a total cost of $17 billion. If we ran this analysis using an integrated economy-wide model, we would see large trade and sector output declines and associated GHG leakage. Such a scaling of the large emitter program does not seem politically or economically feasible.

5. Conclusion

Relative to the baseline "additional measures" scenario, the Plan would result in a net increase of 9.1 Mt of carbon emissions in 2022. The measures contained in the Plan would cost $3.8 billion by 2022, after considering the avoided costs achieved by cancelling or altering some existing programs. The cost to households in that same year would be $295 in all provinces and territories with a federal carbon tax backstop or with carbon pricing implemented to avoid the backstop. Those in other provinces (B.C., Quebec, and Newfoundland and Labrador) would face lower costs of $187 per household.

The Plan would increase the gap to the 2030 Paris targets by 30 Mt, resulting in a total gap of 109 Mt total (including land sector accounting). Unfortunately, the Going Global portion of the Plan would not be able to close this gap under any practical scenario.