



JOINING THE FUTURE: WHY MANITOBA SHOULD SIGN ON TO THE PAN- CANADIAN FRAMEWORK ON CLEAN GROWTH AND CLIMATE CHANGE AND ITS CARBON PRICE

Abstract

In March 2016, Canada's First Ministers, including Manitoba, issued the Vancouver Declaration on Clean Growth and Climate Change. But further action has stalled. Manitoba did not join the later Pan-Canadian Framework on Clean Growth and Climate Change and has not yet produced a climate plan of its own. The cost of entry, the federal benchmark carbon price, is deemed too high.

Manitoba Carbon Pricing Coalition responds to government concerns and arguments, shows how the carbon price can be an engine of transformation, and proposes an informed, collaborative way forward.

NOTE: This document was written on behalf of the Manitoba Carbon Pricing Coalition. It contains information that is based upon researched and published fact. Points of view among our members may be more nuanced or diverge somewhat, but all members are united in their call to put a price on carbon.

By Peter Miller and Harvey Stevens + contributions from Alana Lajoie-O'Malley
for Manitoba Carbon Pricing Coalition (MCPC)
p.miller@mymts.net

Contents

- I. Introduction 2
- II. Common ground – the *Vancouver Declaration* 4
 - 1. Are the measures effective and sufficient to meet or exceed reduction targets of the *Paris Accord* and Canada’s commitments? 5
 - 2. Does Manitoba’s plan effectively target all its emission sources, especially the largest? 6
 - 3. Does Manitoba’s plan address economic vulnerabilities without subsidizing carbon pollution? 6
 - 4. How well does Manitoba’s climate plan promote a transition to a thriving green economy in all sectors? 6
 - 5. Does Manitoba’s plan strengthen Canada’s ability to achieve the above results consistently and fairly countrywide and contribute to global efforts for the same? 7
- III. Does Manitoba make its case for exemption from the federal carbon pollution pricing Benchmark?8
 - 1. Is Manitoba “*Canada’s greenest province*” as claimed by the Premier last December?..... 8
 - 2. Would it have been a “less costly option to burn fossil fuels for electricity generation” as claimed in *Manitoba’s Response*? 8
 - 3. Does a heavy investment in clean power differentiate Manitoba from other provinces? 10
 - 4. Is there any reason not to give complete flexibility to provinces and territories to set their own carbon prices (or not) rather than create a federally imposed benchmark? 10
 - 5. What reasons are there for imposing a price on carbon pollution?..... 11
 - Polluter pays/remove the fossil fuel subsidy..... 11
 - Level the field for innovation..... 12
 - Climate and social reinvestment..... 12
 - 6. Is “the proposed \$50 per tonne carbon price of the federal government ... too extreme for Manitoba’s circumstances”? 13
 - 7. Won’t a carbon price destroy the competitiveness of Manitoba businesses? 14
 - 8. Conclusion..... 15
- IV. “Green energy futures.” 16
 - 1. Transportation 16
 - 2. Agriculture and land use..... 18
 - 3. Heating buildings and managing waste..... 19
 - 4. Conclusions and a way forward..... 20
 - What lessons can we draw from the foregoing discussion and examples? 20
 - A way forward – structured collaborative Round Tables..... 22
- Appendix – Comparing Manitoba with other provinces..... 23

Joining the Future: Why Manitoba Should Sign on to the Pan-Canadian Framework on Clean Growth and Climate Change and its Carbon Price

**by Peter Miller and Harvey Stevens for
Manitoba Carbon Pricing Coalition (MCPC)¹**

I. Introduction

On March 3, 2016, all of Canada's First Ministers issued the Vancouver Declaration on clean growth and climate change.² The Declaration signaled an historic economic transformation.

Canada stands at the threshold of building our clean growth economy. This transition will create a strong and diverse economy, create new jobs and improve our quality of life, as innovations in steam power, electricity and computing have done before. We will grow our economy while reducing emissions.

The Declaration identified objectives to increase the level of ambition over time; promote clean economic growth to create jobs; mitigate carbon pollution by various measures including carbon pricing; work on adaptation and climate resilience; and enhance collaboration. Finally, the Declaration created four Working Groups to propose ways forward.

The federal government and provincial and territorial ministers reviewed Working Group reports and crafted results into the Pan-Canadian Framework on Clean Growth and Climate Change,³ signed December 9, 2016 by all First Ministers except Manitoba and Saskatchewan.

The Pan-Canadian Framework contains numerous measures to achieve Vancouver Declaration objectives, including a federal benchmark⁴ for carbon pollution pricing, and identifies actions

¹ The Manitoba Carbon Pricing Coalition (MCPC) is a group of organizations and individuals dedicated to educating the public about the need for and potential benefits of putting a visible price on carbon pollution. We support the carbon pricing schedule in the Pan-Canadian Framework on Clean Growth and Climate Change. It is well-defined, is based on extensive consultation and buy-in from premiers and others, and has technical studies to support it.

The authors thank Alana Lajoie-O'Malley for her contributions to this brief.

² <http://www.scics.ca/en/product-produit/vancouver-declaration-on-clean-growth-and-climate-change/>.

³ <https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework.html>.

⁴ <https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework/guidance-carbon-pollution-pricing-benchmark.html> & <https://www.canada.ca/content/dam/eccc/documents/pdf/20170518-2-en.pdf>.

planned or undertaken by each jurisdiction, many with federal support. No measures are listed for non-signatories Manitoba and Saskatchewan.

Premier Pallister stated at the time he was not ready to sign, not because of any shortcoming of the Framework, but because of a lack of comparable focus on health care. He further claimed

*Manitoba is Canada's greenest province and we have been, and remain, consistent in our commitment to addressing climate change. Our government continues to develop our Made in Manitoba plan, which will reflect our specific environmental circumstances and meet our province's economic needs. We will continue to punch above our weight on addressing climate change.*⁵

Then on June 29, 2017 the Province issued Manitoba's Response to the Proposed Federal Benchmark and Backstop for Carbon Pricing (henceforth Manitoba's Response or MR).⁶ In it, for the first time, Manitoba publicly rejects the federal benchmark announced last October 2016 and says it seeks a constitutional legal opinion on whether the federal government can impose it on Manitoba through backstop legislation.

This brief, prepared for the Manitoba Carbon Pricing Coalition (MCPC), takes no position on the constitutional question. But it does take issue with the argument that Manitoba's situation is so special that it need not align itself with the federal benchmark and backstop. We propose that it is in the interests of Manitoba, Canada and the planet for Manitoba to join the Pan-Canadian Framework on Clean Growth and Climate Change and create a made-in-Manitoba climate, carbon-pricing and clean economy plan that complies with the federal benchmark and secures a bright green future for Manitobans.

Section II. develops a positive case for the Pan-Canadian Framework as an outcome of the process initiated by the Vancouver Declaration.

Section III., in Q and A format, rebuts claims in Manitoba's Response that Manitoba's unique circumstances should excuse it from meeting the national benchmark carbon price.

Section IV. identifies prospects for a bright green future for Manitoba as a thriving, low-emission province if it commits to the transformative Pan-Canadian Framework.

An **Appendix** provides supporting information comparing Manitoba with other provinces on GHG metrics and electricity rates for reference.

⁵ <http://news.gov.mb.ca/news/index.html?item=40132&posted=2016-12-09>.

⁶ http://www.gov.mb.ca/sd/climate/pdf/proposed_federal_backstop.pdf.

II. Common ground – the Vancouver Declaration

Manitoba found common cause with other first ministers in signing the Vancouver Declaration. In this section we draw implications from that commitment by identifying criteria for an acceptable Manitoba climate plan. Excerpts from Manitoba's Response to the Proposed Federal Benchmark and Backstop for Carbon Pricing are identified as MR and quoted in italics.

MR - On March 3, 2016, Canada's First Ministers signed the Vancouver Declaration on Clean Growth and Climate Change. The document sets out the principles for a common approach to responding to climate change and building a low-carbon, clean growth economy. It recognizes the Paris Accord, sets a national target to reduce greenhouse gas emissions by 30% below 2005 levels by 2030, and clearly acknowledges that climate change is a potentially serious threat for Canada and the world. Manitoba signed this declaration, and remains supportive of its spirit and intent.

MCPC Comment

Climate change is a **tragedy of the commons**, in which a common resource (in this case the earth's atmosphere) is degraded so as to harm everyone when individual users act independently guided only by their own self-interest and contrary to the common good of all.⁷ A Canadian example is the collapse of the cod fishery because of a social failure to curtail the catch to sustainable levels. And so it is when we hop in the car to get to work or run an errand.

The moral of this story is that we can't accept the excuse that personal or provincial *emissions* are a tiny part of the totality. Taken together with all the others they add up to a global crisis.

Manitoba's Response affirms that the Vancouver Declaration is common ground for mutual action across Canada to address this crisis, meet Canada's international commitments under the Paris Accord, and build a prosperous low-carbon economy.

Recognizing that climate change is a shared problem to which all contribute (although some more than others), the next question is, what constitutes an adequate response? The response to declining cod stocks was clearly insufficient. On the other hand, the Montreal Protocol on Substances that Deplete the Ozone Layer, negotiated in 1987, has been called "one of the most

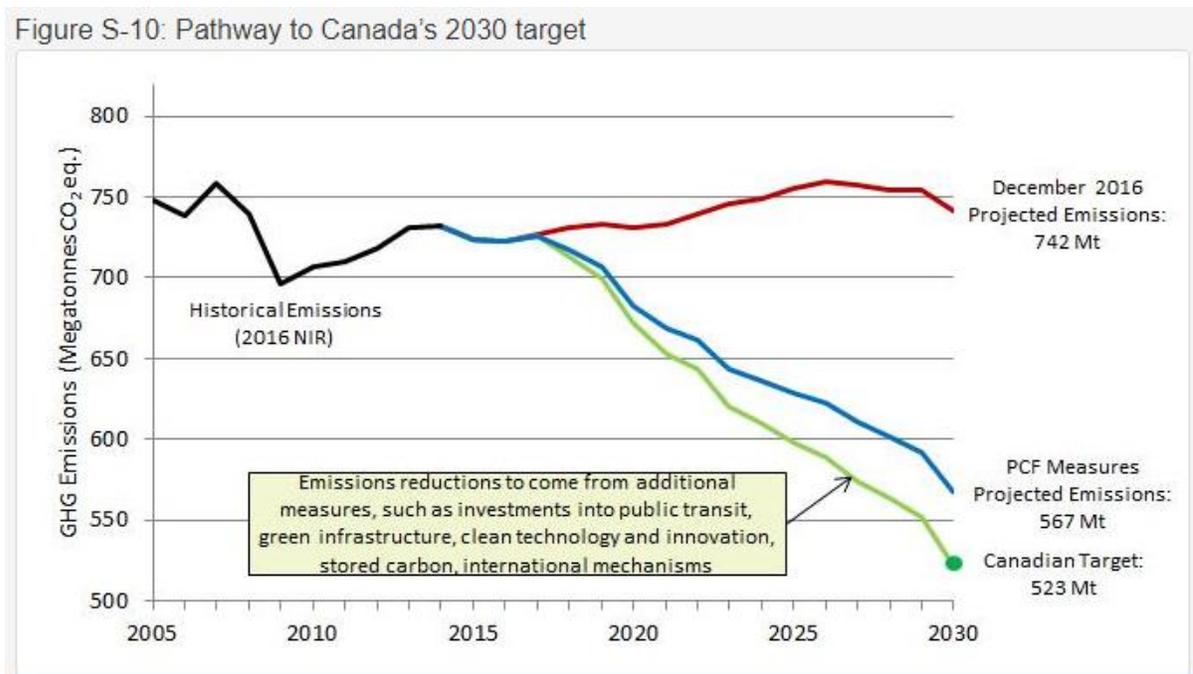
⁷ https://en.wikipedia.org/wiki/Tragedy_of_the_commons. The classic illustration of the tragedy is farmers sharing a common pasture. Each calculates that he personally will benefit from one more sheep since the ensuing slight deterioration of the pasture from his one more sheep will cost him less than he will gain from the additional sheep. But if all the farmers who share the pasture act in the same way, livestock will be added without limit until the pasture's carrying capacity is so degraded that everyone loses.

successful and effective environmental treaties ever negotiated and implemented.”⁸ We need to learn from both and strive for the success of the latter.

How can we assess the adequacy of Manitoba’s Response and Manitoba’s climate plan to follow? We propose that measures must be effective, sufficient, comprehensive, attentive to economic vulnerabilities, transformative as foreseen in the Vancouver Declaration, and support national and global efforts to limit increases in global average temperature to 1.5⁰ C.

1. **Are the measures effective and sufficient to meet or exceed reduction targets of the Paris Accord and Canada’s commitments?**

Figure S-10 below from the Executive Summary of Canada’s National Inventory Report (NIR) 1990-2015⁹ represents the sharp departure from business as usual that is required. Manitoba needs to model proposed actions and develop a plausible case for success that shows we will fall on the blue or green trajectory below, not the red one. Both Manitoba and Canada have failed to meet climate targets in the past. Robust comprehensive action is needed.



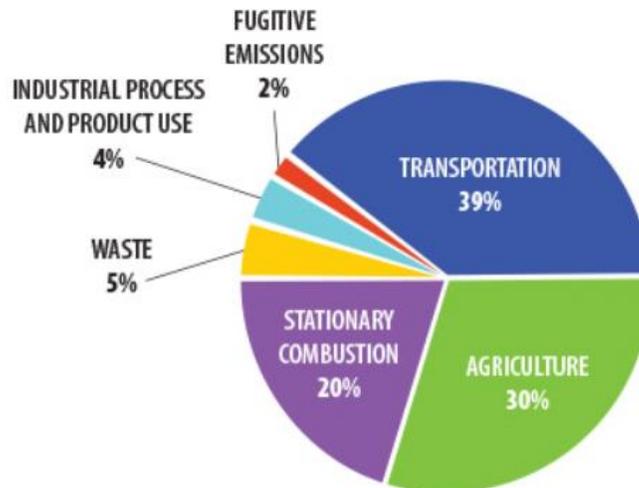
⁸ <https://theconversation.com/saving-the-ozone-layer-why-the-montreal-protocol-worked-9249>.

⁹ <http://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=662F9C56-1#es-6>

2. Does Manitoba's plan effectively target all its emission sources, especially the largest?

Looking at Manitoba's emissions pie below, this means developing effective strategies for transportation (39%), agriculture (30%), stationary combustion (20%), waste (5%) and the others.

Manitoba's Carbon Emissions (Kt of CO₂ eq) 2014¹⁰



3. Does Manitoba's plan address economic vulnerabilities without subsidizing carbon pollution?

Two of the federal carbon-pricing principles are particularly relevant.

- Carbon pricing policies should minimize competitiveness impacts and carbon leakage, particularly for trade-exposed sectors.
- Carbon pricing policies should include revenue recycling to avoid a disproportionate burden on vulnerable groups and Indigenous peoples.

4. How well does Manitoba's climate plan promote a transition to a thriving green economy in all sectors?

Does it (a) effectively and sufficiently reduce emissions, (b) protect low-income and other disadvantaged people, (c) create a culture and economy that encourage and enable Manitoba individuals, households, businesses, organizations and governments to take responsibility for their climate impacts and find ways to reduce them, (d) establish an environment and incentives that promote the development and deployment of green

¹⁰ <http://www.gov.mb.ca/climateandgreenplan/climatechange.html>

innovation, and (e) promote a good life for all Manitobans, including economic sufficiency or prosperity compatible with a low-emission economy?

5. **Does Manitoba’s plan strengthen Canada’s ability to achieve the above results consistently and fairly countrywide and contribute to global efforts for the same?**

The *Pan-Canadian Framework on Clean Growth and Climate Change* was designed with criteria like these in mind. The benchmark carbon price and complementary measures added to prior policies and commitments of Canada’s governments were designed to achieve Canada’s 2030 commitment, as confirmed by modeling. This assumes that Manitoba and Saskatchewan are doing their part within the framework.

We do not yet have a climate plan from Manitoba, but advance indications suggest that Manitoba will not pull its weight, much less “*punch above our weight*” as the Premier promised last December. Some indications of weakness are (1) the Premier’s assumption that Manitoba’s green leadership is not just an aspiration but a present reality (“*Manitoba is Canada’s greenest province*”), when comparisons with other provinces indicate otherwise; (2) the failure to sign the *Pan-Canadian Framework* and adopt a benchmark-compliant carbon price; and (3) in *Manitoba’s Response*, skipping over Manitoba’s emission elephant in the room, transportation at 39%, to focus on the hippopotamus, agriculture at 30%. The latter is necessary, but a robust plan requires a serious innovative strategy for our largest emissions source and the others as well.

One root of these weaknesses is the view in *Manitoba’s Response* that Manitoba faces unique circumstances that justify taking exception to the federal carbon pricing requirement. In **Section III.**, we examine some of these claims and find them unconvincing. In the absence of good reasons to make an exception of Manitoba and the extensive careful work, analysis, collaboration and support that are embedded in the *Pan Canadian Framework*, we argue that Manitoba should join the *Framework* and produce a climate plan that prices carbon pollution consistently with other jurisdictions and benefits from federal support and collaboration.

III. Does Manitoba make its case for exemption from the federal carbon pollution pricing Benchmark?

Manitoba's Response shares common ground, through the *Vancouver Declaration*, with other Canadian jurisdictions but balks at accepting the federal benchmark for pricing carbon pollution, which is embedded in the *Pan-Canadian Framework on Clean Growth and Climate Change*. How sound are its reasons? In this section we review Manitoba's claims.

1. Is Manitoba "Canada's greenest province" as claimed by the Premier last December?¹¹

One green metric is the percentage of GHG emissions decrease since the base years 1990 and 2005. Five provinces have decreased their emissions since 1990 and six since 2005. Manitoba is 7th lowest (4th highest) for each time period, increasing in both cases.

Another metric for climate performance is emissions intensity. How does Manitoba compare with other provinces in tonnes of CO₂e per person and per dollar of GDP?

By intensity measures, Manitoba is barely in the top half of the provinces at 5th lowest in GHG intensity for both population and GDP, i.e. 4 provinces are lower and 5 are higher. Of course fossil dependent Saskatchewan and Alberta have much higher emissions per person and per dollar of GDP - four times higher. Next to those two, everyone else looks good. On the other hand, Canada's per person emissions are over three times global per person emissions.¹²

Measured by emissions performance, Manitoba is far from being "Canada's greenest province." It is rather in the middle of the pack and has a long way to go to catch up with Quebec, which is in first place. Quebec has only 3/5 of Manitoba's emissions per person and 2/3 of Manitoba's emissions per billion dollars of GDP.¹³

2. Would it have been a "less costly option to burn fossil fuels for electricity generation" as claimed in *Manitoba's Response*?

(Note: *MR* indicates a quote from *Manitoba's Response*.)¹⁴

MR - In Manitoba, 98% of our electricity is generated from clean, renewable hydro. If Manitoba had chosen instead the less costly option to burn fossil fuels for electricity

¹¹ <http://news.gov.mb.ca/news/index.html?item=40132&posted=2016-12-09>.

¹² <https://data.worldbank.org/indicator/EN.ATM.CO2E.PC>.

¹³ See tables in the Appendix for inter-provincial comparative data.

¹⁴ Section III. is adapted from a companion MCPC paper prepared for elected officials, *A Reply by the Manitoba Carbon Pricing Coalition to Manitoba's Response to the Federal Benchmark and Backstop Carbon Pricing Proposal*.

generation, our overall carbon emissions would be double current levels from 21 megatonnes per year to about 42 megatonnes. This is an important consideration that needs to be recognized; because it has already come at a significant cost to Manitoba taxpayers and ratepayers.

MCPC Comment

The statement above reflects a fundamental misunderstanding of energy economics. The cost of electricity is the rates customers pay, which must be high enough to cover interest and depreciation on capital investments plus operating costs plus fuel costs. Hydroelectricity has high upfront capital costs from the construction of dams, but very low fuel costs (a small water rental fee paid to the Province). A gas turbine has a lower initial capital cost but higher and more volatile fuel costs. Moreover, in the course of 100 years of generation by a dam, the gas turbine would have to be replaced two more times. It is thus incorrect to say that it would have been a “less costly option to burn fossil fuels for electricity” just because a gas turbine has a lower initial capital cost than a hydroelectric dam.

Alberta and Saskatchewan rates show the cost of fossil alternatives. Last year Manitoba Hydro compared electric bills across Canada.¹⁵ Only Quebec had lower rates than Manitoba. Edmonton residents paid 25% more; Calgary residents a third more; and Saskatchewan residents 73% more. Note that Alberta has yet to incur the costs of retiring coal generation early and creating gas and renewable substitutes (a \$25 billion investment¹⁶). Ontario has already undergone that conversion and Ottawa’s rates are nearly double Manitoba’s. It is true these rates do not reflect the ~50% rate increase in store for Manitoba over the next 5 to 10 years. But utilities on coal and gas will experience the cost of renewable conversions plus carbon pricing until then and on residual fossil fuels in their mix.

Manitoba invested in hydroelectricity long before the need to reduce GHG emissions was known for the sole purpose of producing inexpensive electricity. We have benefited from the lowest prices in North America for decades and will continue to benefit from relatively low rates for years to come despite a near term bump to accommodate new capital investments.¹⁷

¹⁵ https://www.hydro.mb.ca/regulatory_affairs/pdf/electric/general_rate_application_2017/09.13_appendix_9.13_survey_canadian_electricity_bills_may_2016.pdf. The Appendix excerpts residential rate comparisons.

¹⁶ <http://www.energy.alberta.ca/OurBusiness/electricity.asp>.

¹⁷ In speaking of Hydro benefits to most Manitobans, we acknowledge the historic and continuing impacts of altered waterways on the lives and livelihoods of a number of northern First Nation and Métis communities and the continued need for mitigation, compensation and reconciliation.

Moreover, we shall soon enjoy an additional benefit. We won't pay a carbon price on our clean electricity that we would otherwise pay if, under MR's hypothetical scenario, our power came from gas or coal. That benefit will extend further as electricity displaces other fossil fuels, e.g. by electrifying transportation. Manitoba's clean power is a winner for the climate AND for our economy and a keystone of our ability to transition to the thriving low-emission economy envisaged in the Vancouver Declaration.

3. Does a heavy investment in clean power differentiate Manitoba from other provinces?

As noted above, the size of an initial investment in clean power is only one component of electricity costs, which are better reflected in the rates customers pay. Manitoba still has, and will continue to have, among the lowest costs of power in North America.

Manitoba is not the only jurisdiction to have invested heavily in clean electricity production and the other jurisdictions that have done so are not claiming special treatment.

All jurisdictions have made investments in reducing GHG emissions but only Manitoba and Saskatchewan are objecting to the federal benchmark and backstop carbon pricing proposal. There is nothing unique and special that Manitoba has done that warrants it being treated differently than other provinces like B.C., Quebec and Ontario that also have invested large sums in clean energy production. Alberta's costs lie ahead. "Alberta will need up to \$25 billion of new investment in electricity generation by 2030 to support the transition toward cleaner sources of energy and meet the needs of electricity consumers" (Alberta Energy).¹⁸

4. Is there any reason not to give complete flexibility to provinces and territories to set their own carbon prices (or not) rather than create a federally imposed benchmark?

MR - Provinces and territories face unique challenges in addressing climate change, and each has invested considerable time and effort in refining approaches that reflect their respective circumstances. Without adequate flexibility and recognition of this fact, the federal 'benchmark' for carbon pricing will impede the efforts of jurisdictions to innovate and develop strategies that are efficient, effective and tailored. Imposing a federal 'backstop' carbon price without prior consideration for a more tailored approach is not the least-cost pathway to achieving emissions reductions in Manitoba.

¹⁸ <http://www.energy.alberta.ca/OurBusiness/electricity.asp>

MCPC Comment

'Adequate flexibility' is a code word for inter-provincial differences in the effective price of carbon resulting in the unfair and inconsistent application of a carbon pricing regime in Canada.

The *Working Group on Carbon Pricing Mechanisms Final Report*¹⁹ evaluates an option like the one Manitoba proposes, in which each jurisdiction commits to do its part in attaining Canada's target but is totally free to choose the means and prices. The *Final Report* concludes that the one benefit is the greater flexibility that Manitoba seeks, but at a cost in efficiency and added complexity for both the private and public sectors, less predictability, less revenue raised to address vulnerable groups, and negative impacts on both interprovincial and international competitiveness. For example, "To abide by international trade obligations, BTAs [Border Tax Adjustments] on imports would not be possible if one province or territory does not assign an explicit carbon price to a given good" (47).

5. What reasons are there for imposing a price on carbon pollution?

MR - It is acknowledged that putting a price of carbon pollution can be an effective, market-based way to reduce fossil-fuel emissions. As a policy instrument, it is relatively simple – increasing the price of fuel encourages consumers to reduce their usage and/or seek alternatives. But for certain businesses and families, particularly those working in regions or sectors that are exposed to international competition or where suitable energy alternatives are not readily available, a carbon price may just raise costs, jeopardizing business competitiveness here and outside the province. The Manitoba government understands this and is designing its policies to ensure that businesses remain competitive and workers remain employed.

MCPC Comment

The above rationale for a carbon price is true but incomplete. Here are others.²⁰

- **Polluter pays/remove the fossil fuel subsidy.**

Economist Nicholas Stern noted, "Climate change is a result of the greatest market failure the world has seen. ... [T]hose who damage others by emitting greenhouse gases generally

¹⁹ https://www.canada.ca/content/dam/eccc/migration/cc/content/6/4/7/64778dd5-e2d9-4930-be59-d6db7db5cbc0/wg_report_carbon-20pricing_e_v4.pdf.

²⁰ https://www.canada.ca/en/environment-climate-change/news/2017/05/pricing_carbon_pollutionincanadahowitwillwork.html

do not pay."²¹ Absence of a price on carbon pollution (or one below the social cost of carbon²²) is in effect a perverse subsidy for using fossil fuels. Emissions costly to victims and governments are made free to the emitter. A carbon price lowers that subsidy. "Axe the tax" really means "Keep the subsidy." Instead our cry should be "Axe the subsidy!" or "Make polluters, not victims, pay!"

- **Level the field for innovation.**

Too low a carbon price (or no price) creates unfair competition with lower-emission alternatives (including efficiency and demand reduction) by not charging for social costs. This creates a headwind for the rollout of green innovation, such as electric vehicles, contrary to the green economy objective of the *Vancouver Declaration*. It continues dependence on fossil fuels by subsidizing the old economy, based on fossil fuel imports from Alberta, instead of the new, based on Manitoba clean energy. Ironically, Alberta offers a much stronger incentive to replace fossil fuels, with a \$20/tonne carbon levy this year and \$30/tonne in 2018, yielding \$5.4 billion over 3 years to reinvest in the new economy.²³

- **Climate and social reinvestment.**

A carbon price, by itself, may have a small effect at first in some sectors ("just raise costs"). But if polluters pay, they generate revenue for alternatives that can make a difference in a variety of ways. Whatever is collected from carbon pricing is returned to the economy on some other basis than a fossil fuel subsidy.

- **GHG reduction.** If truckers are unable to reduce emissions themselves, the carbon price collected can be invested in sequestration practices by farmers for an indirect reduction.
- **Efficiency.** It can also be invested in the GrEEEner trucking initiative to increase efficiency, reduce emissions and promote competitiveness.
- **Green innovation.** Getting our transit system off diesel and onto electricity will require capital investments in charging infrastructure, for example. City and

²¹ Alison Benjamin (29 November 2007). "Stern: Climate change a 'market failure'". London: Guardian. Retrieved 29 October 2013.

²² <http://ec.gc.ca/cc/default.asp?lang=En&n=BE705779-1#SCC-Sec8>. The 2022 Canada central tendency Social Cost of Carbon is estimated at ~\$47/tonne CO₂e in 2012 dollars or well over \$50/tonne in 2022 dollars. For further explanation, see <https://www.carbonbrief.org/qa-social-cost-carbon>.

²³ <https://www.alberta.ca/climate-carbon-pricing.aspx>

provincial budgets are strapped for cash but carbon revenue provides an investment pool for green infrastructure that will lower fuel and operating costs.

- **Rebates to families.** In the short run, as observed by *MR*, a carbon levy adds costs to families. Alberta provides an excellent example of how to alleviate household impacts without subsidizing fossil fuel consumption by providing an income-tested rebate.²³ Modifications are possible by, for example, increasing rebates for residents of remote communities.

6. Is “the proposed \$50 per tonne carbon price of the federal government ... too extreme for Manitoba’s circumstances”?

MR - The proposed \$50 per tonne carbon price of the federal government is too extreme for Manitoba’s circumstances. Every \$10 per tonne in carbon price would yield approximately \$100 million in revenue each year. At \$50 per tonne, that is about \$500 million. The average household impact of the federal \$50 per tonne carbon levy would be \$335 dollars in that year. Over the five-year period of the federal carbon pricing ‘backstop’ that would amount to over \$1000 paid by the average Manitoba household.

MCPC Comment

How can we assess the claim that the federal backstop price of \$10/tonne in 2018 rising to \$50/tonne in 2022 “is too extreme for Manitoba’s circumstances”?

First note that the calculated cost per household apparently assumes a total lack of success in enabling lower-emission household choices, contrary to the intent and design of a climate plan. It also appears to ignore ways in which households may be beneficiaries of recycled revenues as in the Alberta rebate plan. In the absence of an after-rebate net impact calculation, it appears that Manitoba’s strategy for lowering household impacts is to continue a partial fossil fuel subsidy by insisting on a lower carbon price than the benchmark.

This in turn raises questions about the plan’s sufficiency. *Manitoba’s Response* has no alternative analysis of how we can get to the targets subscribed to in the *Vancouver Declaration* at less than the backstop price.

We should distinguish earned from unearned carbon tax avoidance. Carbon pricing offers the prospect of earning a carbon tax reduction by reducing the taxed emissions. It thus distributes responsibility to all citizens and sectors of society to seek out opportunities to lower their emissions. At the same time, governments can explore the most effective ways to enable those opportunities through reinvestment of collected revenues. Businesses and institutions can join in that effort on behalf of their employees, customers, clients and the planet. And innovators

and entrepreneurs can develop and market green goods and services that enable others to live and work with lower emissions. This creates an economic dynamic and culture of climate responsibility that drives the creation of a low-emission economy and society. On the other hand, unearned carbon price avoidance (i.e. a carbon price that is too small or none at all) undermines this dynamic and favors fossil-fueled business as usual.

Manitoba has earned carbon price avoidance in the electricity sector. Now we need to work on transportation, agriculture, heating and waste (and diesel generation in off-grid communities).

According to the latest National Inventory Report, only 57 per cent of Manitoba's GHG emissions will be subject to the federal carbon levy. Emissions from agriculture, solid waste disposal and manufacturing will be exempt. This is the lowest coverage of all provinces. The national average coverage is 73 per cent of GHG emissions, with provinces like Alberta and Ontario facing 75 per cent or more and Nova Scotia and New Brunswick over 86 per cent.

7. Won't a carbon price destroy the competitiveness of Manitoba businesses?

While we need to consider potential competitive impacts of carbon pricing, the Ecofiscal Commission found that less than 5% of Manitoba business is emissions intensive and trade exposed, e.g. cement and fertilizer production.²⁴ Alberta is far more trade exposed (20%) yet is co-operating fully with the federal plan. Under the federal benchmark and backstop, emissions-intensive industries will be protected by an output-based pricing system.²⁵ For exports to the US or other countries without a carbon price, emissions intensive producers can receive a border tax credit for exported product to help offset carbon-pricing costs while lower emission alternatives are developed.

Most Manitoba manufacturers, on the other hand, powered by clean electricity at low prices, have a distinct competitive advantage in a growing green economy where suppliers are increasingly screened for their sustainability credentials.

²⁴ <https://ecofiscal.ca/reports/provincial-carbon-pricing-competitiveness-pressures/>.

²⁵ See <https://www.canada.ca/content/dam/eccc/documents/pdf/20170518-2-en.pdf> (17). An output-based pricing system minimizes competitiveness and carbon leakage risks while retaining the incentives to reduce emissions created by the carbon pricing signal. It does this by setting an emissions-intensity standard for each type of activity (e.g. production of 1 tonne of cement or 1 MWh of electricity). The carbon pollution price is then applied only to the portion of a covered source's emissions that exceed those allowed by the emissions-intensity standard for the type of activity. Facilities that emit less than the limit receive "surplus credits" from the Government of Canada that they can bank for future use or trade to another participant in the output-based pricing system. Facilities whose emissions exceed their limit must submit compliance units (surplus credits or offset credits) or pay the carbon price to make up the difference. Thus only a portion of the facilities' emissions are subject to a direct price obligation, but the price incentive applies to all emissions, as facilities can earn surplus credits that they can sell if they emit less than their regulatory limit.

8. Conclusion.

Manitoba's Response rests its case for exemption from the federal carbon pollution pricing benchmark and backstop on a number of false or unconvincing considerations. 1. As measured by climate metrics, Manitoba is not "Canada's greenest province." Quebec is by a long shot. 2. Manitoba's clean power is a winner for both climate AND the economy. We would be worse off, not better off, on both counts had we emulated Alberta and Saskatchewan, built our electrical system on fossil fuels, and failed to take advantage of our hydroelectric potential from the convergence of major watersheds. 3. Nor are we unique in making large scale investments in clean energy.

Furthermore, 4. Manitoba's proposal for each province to create its own policy without national constraints was found by the Working Group on Carbon Pricing Mechanisms to lead to a less efficient, more complex system with less revenue raised to address vulnerable groups and negative impacts on interprovincial and international competitiveness. 5. Manitoba's understanding of carbon pricing as just a negative pressure to reduce fossil fuel usage ignores polluter pays and perverse subsidy issues, leveling the playing field for green innovation, and the complementary dynamic of climate and social reinvestment. 6./7. It also ignores available protections for businesses and households from carbon price impacts during the transition and provides no alternative analysis or modeling to show we can reach national targets with a lower carbon price that is inconsistent with the price in other jurisdictions.

We need a made-in-Manitoba climate and green plan, yes, but it must rest on better information and analysis than we have seen in Manitoba's Response. Manitoba can benefit from as yet untapped local and national capacity and resources working collaboratively with Manitobans to achieve ambitious targets for each sector. MCPC concludes it is in the interests of Manitoba, Canada and the planet for Manitoba to join the Pan-Canadian Framework on Clean Growth and Climate Change and produce a climate plan that prices carbon pollution consistently with other jurisdictions, benefits from federal support and collaboration, and secures a bright green future for Manitobans.

Canada's First Ministers foresaw a new economic era for Canada in the Vancouver Declaration. Unless Manitobans can see that prospect, a carbon price will be viewed, not as an engine of transformation, but as just an added cost to living our lives and doing business in the same old ways.

Section IV. identifies prospects for a bright green future for Manitoba as a thriving, low-emission province if it commits to the Vancouver Declaration's transformative project spelled out in the Pan-Canadian Framework on Clean Growth and Climate Change.

IV. “Green energy futures.”²⁶

Manitoba is ripe for transition to a thriving low-emission economy. If we view our hydro-electric endowment as a foundation for that transformation rather than an excuse for weak action in sectors like transportation and buildings with too low a carbon price, we will stand a better chance of “our province [becoming] Canada’s clean, green leader” or at least “making Manitoba the most improved province in all of Canada.”²⁷

What Manitobans need is inspiration, education and examples of the transition that led Canada’s First Ministers to see, not only the necessity, but the attractive prospect of shifting to the low-emission economy subscribed to in the *Vancouver Declaration* and the *Pan-Canadian Framework* and the importance of not being left behind. In this section we offer examples of what could happen in several sectors.

1. Transportation

Let’s not create policy where the tail wags the dog, such as a low carbon price for all of Manitoba because a higher price is a challenge for, say, long-haul trucking or remote communities.²⁸ Those problems can be addressed directly without subsidizing fossil fuel use with too low a carbon price. Here are examples.

Low- and middle-income households: A carbon price can cause household expenses to rise from higher freight costs for goods, heating costs from natural gas, and gasoline prices until cleaner, lower-cost alternatives are adopted. **Solution:** See Alberta’s household dividend.²⁹

Remote communities: Cost increases are higher than for other households and alternatives may be fewer. **Solutions:** (a) Increase the household subsidy for qualified communities and/or (b) follow the Nutrition North Canada food subsidy model, which subsidizes food delivered by weight, not by fuel consumed.³⁰

Money in the pockets of Manitoba citizens can be spent on local goods and services if they are able to find ways to reduce fossil fuel spending. Replacing fossil fuel expenditures with local

²⁶ See <http://www.greenenergyfutures.ca/> for a video series on inspiring examples of green energy alternatives.

²⁷ <http://www.gov.mb.ca/thronespeech/>.

²⁸ Continuing a partial fossil fuel subsidy with a lower carbon price appears to be the strategy of *Manitoba’s Response*: “But for certain businesses and families, particularly those working in regions or sectors that are exposed to international competition or where suitable energy alternatives are not readily available, a carbon price may just raise costs, jeopardizing business competitiveness here and outside the province.”

²⁹ <https://www.alberta.ca/climate-carbon-pricing.aspx>

³⁰ <http://www.nutritionnorthcanada.gc.ca/eng/1415538638170/1415538670874>.

spending stimulates Manitoba's economy.

Long-haul trucking: Trucking is both a major source of emissions growth and a core component of the economy. Diesel fuel is a third of the industry's costs. A carbon tax will have a cost impact on the industry and, if passed through, on the goods they deliver. **Solution:** The Manitoba Trucking Association (MTA) offered a solution in 2015 well before the federal benchmark price.³¹ MTA proposed a 3.5% carbon tax on diesel to subsidize efficiency retrofits on trucks for an estimated 22% fuel- (and thus emission-) savings. Truckers would benefit from lower fuel costs and become more competitive while lowering GHGs – a win/win solution. Even at the 2022 price of \$50/tonne (or 13.69 cents/litre), this is still a win for truckers.³² By 2022, new technologies will permit even greater savings.

The future of trucking: Increased efficiency through truck retrofits and improved logistics are best practices for trucking firms. But more is needed. Emterra, Winnipeg's waste and recycling collector for the past five years, fueled its garbage trucks with compressed natural gas, which produces significantly lower emissions than diesel. Many courier and delivery trucks operating in Manitoba are owned by international firms like Pepsico or DHL that employ electric and CNG trucks in other jurisdictions.³³ Why aren't more truckers in the Capital Region doing likewise? Could a higher carbon price or provision of fueling and charging stations tip the balance?

Soon even long-haul trucks will be electric. Tesla, Mack, BYD, Nikola Motors and Cummins are all unveiling large electric trucks this year. Mercedes-Benz has an urban e-truck in production.³⁴

Cities and urban commutersheds: This is where most Manitobans live, most emissions are produced, and many solutions to climate change lie. By 2015, Vancouver had already met its 2020 target to make over 50% of trips by foot, bicycle, and public transit.³⁵ Manitoba needs to support and enhance sustainable transportation in the Capital Region, Brandon and Thompson, including transit, active transportation, and more efficient and low-emission delivery services.

Ridesharing and carsharing: *GoManitoba*³⁶ is a province-wide online system to coordinate ridesharing. *Peg City Car Co-op* is a substitute for individual car ownership. Vehicles parked in

³¹ <http://www.mansea.org/s/Man-Trucking-Association-Pres.pptx>.

³² Assuming diesel costs \$1/litre, the benchmark carbon price is ~14% or four times MTA's 3.5% proposal, but it still permits a net cost saving of 8% in 2022 (and more in earlier years) using only today's efficiency technologies.

³³ <https://www.greenbiz.com/article/pepsico-drivers-and-data-play-key-roles-fuel-efficiency> and <https://www.greenbiz.com/article/worlds-biggest-logistics-company-races-towards-net-zero-emissions>.

³⁴ <https://www.trucks.com/2017/05/10/tesla-electric-truck-easy/>.

³⁵ <http://vancouver.ca/green-vancouver/green-transportation.aspx>.

³⁶ <https://www.gomanitoba.ca/>.

the neighborhood are booked for members' use when needed. *"Bike. Walk. Bus. And sometimes drive"* is their slogan.³⁷ Sharing rides or cars can reduce costs and emissions.

Electrifying transportation: This is a potential big winner for reducing Manitoba emissions and keeping in Manitoba a large portion of the \$2 to 3 billion we send to Alberta each year for fossil fuels.³⁸ Right now we are on the cusp of a revolution to electrify transportation and Manitoba is poised to participate. University of Manitoba Professor Nazim Cicek makes the case for converting Winnipeg Transit's fleet to electric buses over the next 12 years (a lifetime for a bus) to the economic benefit of Winnipeg Transit, New Flyer Industries and Manitoba Hydro as well as health benefits to Winnipeggers and the planet.³⁹ Note that Edmonton plans to buy only electric buses beginning in 2020.⁴⁰

Professor Cicek also builds a persuasive case of mutual benefits all around for Manitoba to emulate Norway's rollout of electric vehicles, now composing 42% of car sales. And Volvo will produce only all-electric or hybrid vehicles beginning in 2019 and other makers are rapidly ramping up EV production and number of models.⁴¹

Carbon pricing adds to the benefits, accelerates the payback and enhances the uptake of electric vehicles leading to an earlier transition to a thriving, low-emission economy based on Manitoba's energy.

2. **Agriculture and land use.**

Manitoba's agricultural and forest lands and their use are important for climate action for at least five reasons – (1) agriculture is responsible for 30% of Manitoba's emissions arising from fuels, fertilizers, soils, and livestock and their manure. But also (2) agricultural and forest lands are able to sequester carbon from the atmosphere and (3) they both produce biofuel resources. In addition, (4) agricultural and forest lands both bear and contribute to climate impacts (e.g. frequencies of fire and flooding), (5) some of which can be mitigated by alternative land-use practices. Research, planning and implementation must address all five.

³⁷ <https://pegcitycarcoop.ca/>.

³⁸ http://www.gov.mb.ca/jec/energy/pubs/energy_strategy_2012.pdf. p. 7.

³⁹ <https://www.winnipegfreepress.com/opinion/analysis/twelve-years-to-transform-transit-441358583.html>.

⁴⁰ <http://www.cbc.ca/news/canada/edmonton/edmonton-transit-bus-electric-diesel-robar-1.4276453>.

⁴¹ <https://www.winnipegfreepress.com/opinion/analysis/electric-cars-are-manitobas-road-forward-442077243.html>, <https://www.winnipegfreepress.com/business/renault-nissan-promises-12-new-electric-vehicles-by-2022-444600233.html>, and <https://www.winnipegfreepress.com/business/leading-the-charge-444767343.html>.

It is encouraging to see the attention Manitoba is directing to agriculture and land use in *Manitoba's Response*, in the conservation district and watershed discussion documents, and in the recently announced federal and provincial investments in ecological services, including water and nutrient management and carbon sequestration. No specific agricultural emission reduction strategies are mentioned in these documents other than sequestration but we can hope that some will be forthcoming when the climate and green plan is released.

One addition to consider is the substitution of Manitoba biofuels for Alberta propane or natural gas used in space heating for homes, barns and greenhouses and for grain drying using made-in-Manitoba equipment.⁴² Manitoba has more than 5 biomass heating system manufacturers and more than 10 commercial biomass suppliers (although many farms have their own biomass supply). Biogas from anaerobic digestion of manure is another potential substitute.⁴³

As a subsidized fossil fuel (no carbon pricing + other subsidies⁴⁴), natural gas is currently so cheap that the economics of biofuel substitution is marginal. That can change with adequate carbon pricing, not only by raising the price of natural gas to reflect true cost but also by creating a revenue stream for reinvestment in greener alternatives. Note that this two-sided dynamic for agricultural solutions is ignored in *Manitoba's Response* (pp. 6-7), which uses the example of agricultural emissions as a reason NOT to assess a higher carbon tax, forgetting the reinvestment potential for green alternatives and relying instead on precarious matched federal dollars for such agricultural investments. This is the traditional “governments (i.e. taxpayers) pay” model rather than a more sustainable and equitable “polluter pays” model represented by carbon pricing.

3. Heating buildings and managing waste.

The next largest source of Manitoba emissions is standing combustion at 20%, most of which is for space heating by natural gas or other fossil fuels. A high-efficiency gas furnace heating a well-insulated, well-sealed home is about as emission-efficient as fossil fuel usage can get. Hopefully Efficiency Manitoba can get all of Manitoba's buildings to that standard and building codes can ensure that all new builds meet net-zero-ready standards. But what about the residual amounts of gas used?

FortisBC sells a premium product, renewable natural gas, made possible by BC's carbon tax and customer premiums. The supply comes from landfills, sewage treatment facilities and livestock

⁴² <http://greenairheat.com/>.

⁴³ <http://www.mansea.org/s/Agriculture-and-Renewable-Energy-Domitruk.pptx>.

⁴⁴ <http://www.cbc.ca/news/politics/auditor-general-spring-report-1.4116346>

operations, all of which produce methane from anaerobic decomposition of organic matter.⁴⁵ This in turn must be purified⁴⁶ and then injected into FortisBC's gas mains. For a premium on the gas bill, customers can claim credit for the supply of this non-fossil gas. Note that customers receive an offsetting reduction in BC's carbon tax for this supply. Residential and commercial customers wishing to reduce their carbon footprint use this program, which provides a cost-effective way of reducing BC's methane emissions from waste.

FortisBC's renewable natural gas provides another example of the carbon pricing dynamic at work on both the tax and reinvestment side. Back home, Brady landfill and various livestock operations could be prime candidates for similar treatment. Note that, with the reinstatement of carbon tax increases over the next several years in BC, FortisBC is once again looking for new renewable natural gas suppliers. Let's not underprice Manitoba's GHG emissions and forego the prospect of this kind of solution for both agricultural and waste emissions. If we do underprice, we will also lose the Manitoba reinvestments to make it happen and spend our money instead on continuing to import fossil natural gas from Alberta.

A final example of what can be done with buildings is the University of Winnipeg, which is working towards zero emissions by 2035.⁴⁷ Remarkably, in 2015, U of W had already managed to reduce its emissions by 32% since 1990 while growing its space by 38%. They have made the economics work this far even in a subsidized fossil fuel environment in which emissions are free. But to go the final distance they need a level playing field with carbon pricing and reinvestment in renewable alternatives.

4. Conclusions and a way forward.

What lessons can we draw from the foregoing discussion and examples?

- a. Transition to a much lower-emission economy is not only possible but tangible – Manitobans and others provide examples of how it is done.
- b. The replacement of fossil fuels with Manitoba renewable energy from solar, wind and hydro-electric power, waste, local biomass and geothermal also replaces the export of dollars to Alberta with new investments in Manitoba's economy.

⁴⁵ <https://fortisbc.com/NaturalGas/RenewableNaturalGas/>. See also <https://www.winnipegfreepress.com/opinion/analysis/household-waste-can-heat-our-homes-449176063.html>.

⁴⁶ <https://www.airliquideadvancedseparations.com/biogas-campaign>.

⁴⁷ <https://www.winnipegfreepress.com/opinion/analysis/economic-investments-drive-carbon-tax-benefits-437310903.html>.

- c. But there is a thumb on the scale in favor of GHG emitting fossil fuels that produce huge social costs without the emitter facing any immediate cost consequences.
- d. Putting a price on carbon removes that thumb and supports investment in cleaner alternatives. This provides an additional economic dynamic to enable other households, enterprises and organizations to follow the green economy leaders, thereby creating new markets, greener jobs and market incentives for further green innovation.
- e. But the transition will not be instantaneous. This is not magic. There is not sufficient capital, resources or capacity to immediately change or replace existing vehicles, buildings, infrastructure and processes. Many alternatives will still be cost-prohibitive until prices come down. And so a carbon price will continue to be paid for covered emissions that we cannot see a way to avoid (at present). That payment is entirely appropriate to reflect the real cost of those emissions even if “suitable energy alternatives are not readily available” (MR p. 5).

A carbon price does not operate in a vacuum. Nor is it a punishment or a useless cost. Rather a carbon price levels the playing field for the next innovator or entrepreneur wanting to bring cleaner tech to market. And carbon price payments create resources to protect the vulnerable and invest in change. They also signal a social cost of our activities and the need for all of us to look for solutions in our own sphere of action.

- f. Finally, a carbon price works best in a culture of climate responsibility with a variety of talents brought to bear, such as:
 - i. Leadership that recognizes a problem and sets a course to create solutions. For example, BC’s Premier Gordon Campbell led when he initiated BC’s carbon tax in 2008 and showed the world that the economy could thrive while emissions go down.
 - ii. Entrepreneurship that is capable of producing and bringing to market goods and services like the designers and fabricators of biomass heat equipment in rural Manitoba.
 - iii. Sustainability officers and corporate and institutional leaders, like Alana Lajoie-O'Malley and President Trimbee at University of Winnipeg, who are able to drive institutional commitments, culture and achievements.
 - iv. Research and analytical talents like the folks at Prairie Climate Centre and the Ecofiscal Commission, who can diagnose problems and propose and evaluate solutions.
 - v. Conscientious citizens looking for viable means to lower their carbon footprint and ready to adopt them when they become available.

A way forward – structured collaborative Round Tables.

MCPC advocates well-informed and balanced discussion amongst a broad spectrum of stakeholders. But that discussion can't begin with a blank slate that ignores wider commitments and progress already made, as represented in the *Pan-Canadian Framework on Clean Growth and Climate Change* and its benchmark carbon pricing. Productive discussion, including ways to protect vulnerable households, communities or industries while seizing the opportunities offered, should begin from that starting point.

One way to do this is to adopt an idea put forward by the Manitoba Trucking Association. They propose a GrEEEner Trucking Council composed of industry, academia and the green community to identify and evaluate new initiatives. Their approach could extend to other sectoral councils or Round Tables for, say, buildings, personal transportation, agriculture and land-use, waste management, and the like, which identify effective paths to climate goals, given national and international commitments and targets and a stipulated level of carbon taxation and revenue. The Round Tables would examine best ways to meet or exceed targets and find the most productive reinvestments of carbon revenues. Research support to help identify and evaluate problems and opportunities would be critical for each sectoral Round Table.⁴⁸

It is time to refocus everyone's energy on developing collaborative made-in-Manitoba solutions within the *Pan-Canadian Framework* rather than spend it resisting coordination with other jurisdictions in Canada. We have much to offer, but also much to learn. For example, both British Columbia and Alberta developed robust, well-researched recommendations for their provincial plans by establishing climate leadership advisory bodies that understood the issues from a variety of perspectives and consulted widely.⁴⁹ Likewise, lying behind the *Pan-Canadian Framework* were four expert working groups, comprised of federal, provincial and territorial officials, that were established to develop options. They too consulted widely.⁵⁰ Manitoba has yet to create any independent body or bodies to combine expertise with stakeholder views. Step one for Manitoba's plan could be to announce one or more Round Tables with the right mix of expertise and stakeholder perspectives to recommend climate actions within the *Pan-Canadian Framework on Clean Growth and Climate Change*.

⁴⁸ We note that David McLaughlin, climate advisor to the Manitoba government and former Chair of the National Round Table on Environment and Economy, is well versed in this type of organization and could advise on their construction.

⁴⁹ <https://engage.gov.bc.ca/climateleadership/> and <https://www.alberta.ca/climate-leadership-plan.aspx>.

⁵⁰ <https://www.canada.ca/en/environment-climate-change/services/climate-change/canada-priorities/clean-growth-working-group-reports.html>.

Appendix – Comparing Manitoba with other provinces

GHG EMISSIONS AND CHANGE BY PROVINCE (ktCO₂ eq.)

| PROVINCE | 1990 | 2005 | 2015 | % | Rank | % | Rank |
|-----------|---------------|---------------|---------------|---------------|--------------------|--------------|--------------------|
| | | | | CHANGE | 1990-2015 | CHANGE | 2005-2015 |
| | | | | 1990-2015 | (1=most reduction) | 2005-2015 | (1=most reduction) |
| NF | 9,510 | 10,100 | 10,300 | 8.31% | 6 | 1.94% | 8 |
| PE | 1,950 | 2,060 | 1,770 | -9.23% | 4 | -16.38% | 4 |
| NS | 19,800 | 23,200 | 16,200 | -18.18% | 1 | -43.21% | 2 |
| NB | 16,300 | 20,300 | 14,100 | -13.50% | 2 | -43.97% | 1 |
| QC | 89,000 | 88,900 | 80,100 | -10.00% | 3 | -10.99% | 5 |
| ON | 181,000 | 204,000 | 166,000 | -8.29% | 5 | -22.89% | 3 |
| MB | 18,600 | 20,600 | 20,800 | 11.83% | 7 | 0.96% | 7 |
| SK | 45,200 | 69,500 | 75,000 | 65.93% | 10 | 7.33% | 9 |
| AB | 175,000 | 233,000 | 274,000 | 56.57% | 9 | 14.96% | 10 |
| BC | 51,900 | 63,900 | 60,900 | 17.34% | 8 | -4.93% | 6 |
| CANADA | 608,260 | 735,560 | 719,170 | 18.23% | | -2.28% | |

Source: Environment and Climate Change Canada, National Inventory Report. 1990-2015. Part 3

GHG ROAD TRANSPORT EMISSIONS AND CHANGE BY PROVINCE (ktCO₂ eq.)

| PROVINCE | 1990 | 2015 | % | Rank |
|-----------|--------------|--------------|---------------|--------------------|
| | | | CHANGE | 1990-2015 |
| | | | 1990-2015 | (1=least increase) |
| NF | 389 | 2,110 | 442.42% | 10 |
| PE | 307 | 602 | 96.09% | 6 |
| NS | 3,590 | 3,760 | 4.74% | 2 |
| NB | 3,210 | 3,240 | 0.93% | 1 |
| QC | 19,700 | 26,800 | 36.04% | 3 |
| ON | 34,400 | 48,300 | 40.41% | 4 |
| MB | 2,550 | 5,090 | 99.61% | 7 |
| SK | 3,410 | 8,510 | 149.56% | 9 |
| AB | 12,500 | 26,500 | 112.00% | 8 |
| BC | 11,700 | 18,200 | 55.56% | 5 |
| CANADA | 92,000 | 144,000 | 56.52% | |

GHG AGRICULTURE EMISSIONS AND CHANGE BY PROVINCE (ktCO₂ eq.)

| PROVINCE | 1990 | 2015 | % | Rank |
|-----------|--------------|--------------|---------------|--------------------|
| | | | CHANGE | 1990-2015 |
| | | | 1990-2015 | (1=least increase) |
| NF | 51 | 91 | 78.43% | 10 |
| PE | 400 | 360 | -10.00% | 3 |
| NS | 540 | 460 | -14.81% | 1 |
| NB | 520 | 520 | 0.00% | 4 |
| QC | 7,600 | 8,000 | 5.26% | 6 |
| ON | 11,000 | 9,700 | -11.82% | 2 |
| MB | 4,800 | 6,500 | 35.42% | 8 |
| SK | 7,800 | 13,000 | 66.67% | 9 |
| AB | 14,000 | 18,000 | 28.57% | 7 |
| BC | 2,300 | 2,300 | 0.00% | 4 |
| CANADA | 49,000 | 59,000 | 20.41% | |

GHG INTENSITY MEASURES BY PROVINCE - 2015

| PROVINCE | TOT. GHGs (ktCO ₂ eq.) | TOT. POP. (000'S) | REAL GDP (\$Billions) | GHGs per 1000 POP. | Rank Order (lowest=1) | GHGs per \$BGDP | Rank Order (Lowest=1) |
|-----------|-----------------------------------|-------------------|-----------------------|--------------------|-----------------------|-----------------|-----------------------|
| NFL | 10,300 | 528.7 | \$20.9 | 19.5 | 8 | 492.9 | 7 |
| PEI | 1,770 | 146.7 | \$5.4 | 12.1 | 3 | 330.5 | 4 |
| NS | 16,200 | 943.4 | \$37.9 | 17.2 | 6 | 427.3 | 6 |
| NB | 14,100 | 754.3 | \$28.5 | 18.7 | 7 | 494.0 | 8 |
| QC | 80,100 | 8,259.5 | \$283.0 | 9.7 | 1 | 283.0 | 1 |
| ON | 166,000 | 13,797.0 | \$526.4 | 12.0 | 2 | 315.4 | 2 |
| MB | 20,800 | 1,296.0 | \$48.8 | 16.0 | 5 | 426.6 | 5 |
| SK | 75,000 | 1,132.3 | \$43.3 | 66.2 | 10 | 1,734.1 | 10 |
| AB | 274,000 | 4,179.7 | \$177.7 | 65.6 | 9 | 1,542.2 | 9 |
| BC | 60,900 | 4,693.0 | \$188.3 | 13.0 | 4 | 323.4 | 3 |

CANADA 722,000 35,848.6 \$1,368.5 20.1 527.6

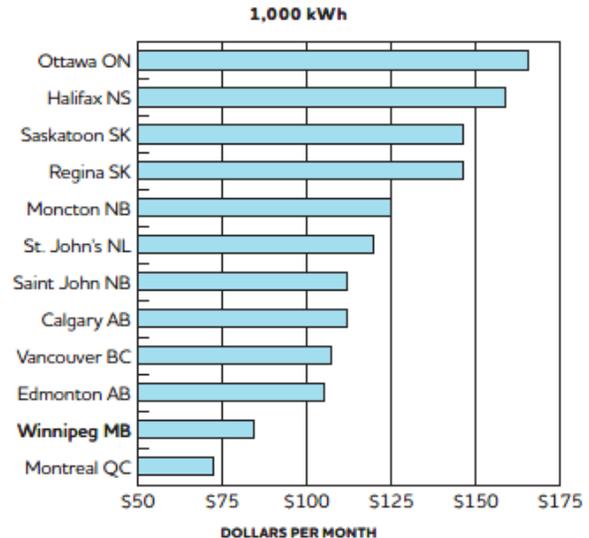
Sources: 2017 National Inventory Report, Part 3; CANSIM Tables 51-0001 & 384-0038

Comparison of one-month residential electricity bills for 1,000 kWh across Canada May 2016.⁵¹

Residential

One Month Bill For:

| | 1,000 kWh | ¢/kWh |
|--------------------|-----------------|--------------|
| Ottawa ON | \$ 165.37 | 16.537 |
| Halifax NS | \$ 158.83 | 15.883 |
| Saskatoon SK | \$ 146.49 | 14.649 |
| Regina SK | \$ 146.45 | 14.645 |
| Moncton NB | \$ 124.98 | 12.498 |
| St. John's NL | \$ 119.64 | 11.964 |
| Saint John NB | \$ 111.71 | 11.171 |
| Calgary AB | \$ 111.70 | 11.170 |
| Vancouver BC | \$ 107.03 | 10.703 |
| Edmonton AB | \$ 105.08 | 10.508 |
| Winnipeg MB | \$ 84.29 | 8.429 |
| Montreal QC | \$ 72.26 | 7.226 |



⁵¹ https://www.hydro.mb.ca/regulatory_affairs/pdf/electric/general_rate_application_2017/09.13_appendix_9.13_survey_canadian_electricity_bills_may_2016.pdf.