Unanswered Questions: The Kinder Morgan Decision and Canada's Climate Commitments

A LETTER TO MY MEMBER OF PARLIAMENT

David Gooderham
May 29, 2017

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INTRODUCTION

This letter is prompted by the Liberal Government's decision announced on November 29, 2016 approving two pipeline expansion projects. The two projects will provide enough new shipping capacity to move an additional 980,000 barrels per day (bpd) of bitumen from Alberta to West Coast ports and to the U.S. The question I ask is whether the planned expansion of oil sands production in Canada (which will cause further growth of oil sands emissions) is consistent with our carbon-reduction commitments.

In Canada, we are committed to two major national policies:

A. A plan to expand Canada's oil and gas industry, and specifically to increase oil sands production from 2.3 million barrels per day (bpd) in 2014 to 4.3 million bpd in 2040. The Government of Canada's most recent projections, published in December 2016, show that emissions from oil sands production in Alberta are going to continue increasing until 2030 at least.[1]

B. A commitment to cut the annual level of Canada's total emissions 30% by 2030 below the 2005 level. The target is 523 million tonnes (Mt) of CO_2eq.

The core question is whether these two major policy pathways are consistent, or compatible. The question can be put this way:

> *Can we achieve a 30% cut in Canada's total emissions by 2030, down to 523 Mt (as promised in Paris in December 2015), if emissions from expanding oil sands production keep rising?*

Astonishingly, that question has never been answered by any government inquiry process. It is a question of pressing urgency.

More than a year ago, on January 27, 2016, the Ministers of the Environment and Natural Resources issued a joint statement assuring Canadians that *"upstream greenhouse gas emissions associated with the [pipeline] projects will be assessed."*

But when the new Liberal Government made that bold promise, it included a caveat: it declared that in the case of the major pipeline applications already under way – the proposed Energy East pipeline and the Kinder Morgan expansion – *"project reviews will continue within the current legislative framework."* That meant that the National Energy Board's (NEB) environmental inquiry process would be allowed to exclude all evidence about greenhouse gas emissions – and exclude all scientific evidence about the impact of emissions on the climate system. The NEB panel had already decided (in a ruling on July 24, 2014 in the Kinder Morgan case) to exclude all evidence of that kind. The new government backed the NEB on that refusal. Therefore, when the NEB recommended approval of the Kinder Morgan project in May 2016, not one sentence in the report discussed emissions or climate.

Instead, on January 27, 2016, the government declared that it would create a separate "upstream emissions assessment" procedure for the Kinder Morgan project. Details of the new procedure were published on March 19, 2016. But it was not a public inquiry process. It was not an inquiry at all. It did not hold hearings. The only party allowed to participate was the pipeline company. No public interveners could attend or ask questions. The initial draft version ("Draft for Public Comments") of the Kinder Morgan emissions report was publicly released on May 19, 2016.

The Kinder Morgan report adopted the NEB's long-term forecast which projects a near doubling of oil sands production over the next twenty-five years – an additional 2.0 million bpd above the 2014 level. The expanded pipeline will have the capacity to transport an additional 590,000 bpd, sufficient to handle 25% of the total projected production increase up to 2040. The report found that the share of the expanded output carried by Kinder Morgan would add 13 Mt to 15 Mt of new emissions to Canada's total.[2] It did not answer the question of whether this growth can be reconciled with our commitment to reduce emissions to 523 Mt by 2030. It didn't even ask the question.

There was a third process. The Ministerial Panel on the Trans Mountain Pipeline was an unusual kind of public consultation, appointed in May 2016. Unfortunately, it did not have powers to answer questions, or make findings or draw conclusions – and it was not allowed to make any recommendations. The Ministerial Panel's only mandate was to listen to members of the public – including some of Canada's leading experts on emissions who volunteered to make submissions – who were allowed to attend a series of public meetings in Alberta and British Columbia to express their concerns about what issues and evidence had been overlooked, or inadequately dealt with, during the previous two processes. The Ministerial Panel released its report on November 1, 2016. In an unexpected and courageous expression of dissent, the three-person panel unanimously concluded that the core question "remains unanswered". The panel confirmed that the two previous inquiries, the NEB's and the Kinder Morgan assessment, had failed to address the most consequential question we will ever face.

Four weeks after the panel's report was released, the government approved the two pipelines. The government offered no public comment on the Ministerial Panel's warning that the fundamental question has not been answered.

On November 30, the day after the pipeline decision was announced, Mr. Trudeau declared in a speech that the Kinder Morgan project "fits within our national climate plan". A week later, on December 9, 2016, a new document – called the *Pan-Canadian Framework* – was uploaded onto the Government of Canada's website. A media strategy unrolled. Just before Christmas, three Liberal MPs from B.C. repeated Trudeau's claim in an op-ed piece published in the *Vancouver Sun* on December 18: "greenhouse gas emissions associated with upstream oil development are accounted for and fit within our government's climate action plan, the Pan-Canadian Framework for Climate change and Clean Growth."

My letter examines the content of the *Framework* document and the claims based on it.

A LETTER TO MY MEMBER OF PARLIAMENT

May 29, 2017

Joyce Murray
Member of Parliament for Vancouver Quadra
206 – 2112 West Broadway
Vancouver, B.C.
V6K 2C8

Dear Ms. Murray,

RE: The Kinder Morgan decision and Canada's climate commitments

I am writing in response to your January 2017 Newsletter.[3] Under the image of four smokestacks belching dark clouds, you make this statement:

> *Prime Minister Justin Trudeau's decision to phase out coal-fired power in Canada by 2030 is a concrete step forward in reducing harmful pollutants and meeting Canada's international climate commitment*. (emphasis added)

That is a hopeful statement. But is it accurate?

The missing information: January 2017 Newsletter

The Government of Canada's most recent emissions projections to 2030 are found in the December 22, 2016 *Greenhouse Gas Emissions Reference Case* data. Those numbers provide us with the expected annual emissions for all seven economic sectors over the next fourteen years. Figure A reproduces the projections for the electricity sector and the oil and gas sector:

Figure A: Electricity and oil and gas sector emissions (Mt CO_2eq)

	2005	2014	2020	2030	change 2014-2030
Electricity	118	78	64	34	**-44 Mt**
Oil and Gas	159	192	201	233	**+41 Mt**

Source: *Canada's 2016 Greenhouse Gas Emissions Reference Case*, Environment and Climate Change Canada, December 22, 2016, Table A5.

Yes, the marked decline in electricity sector emissions is substantial, and it is due to the shutdown of coal-fired electricity generation. But if we look at the emissions data as a whole, and especially at the projections showing the changes in other sectors between 2014 and 2030, it is clear that virtually *all emissions reductions accomplished by eliminating coal-fired electricity are being replaced by an equivalent increase in oil and gas emissions*. That is exactly what happened under the Harper Conservatives: between 2005 and 2014, electricity emissions declined by 40 Mt, while oil and gas emissions increased by 33 Mt.

The December 22, 2016 data provides a detailed breakdown of oil and gas sector emissions. The projected increase in oil sands production to 2030 is driving virtually all of the increase in oil and gas sector emissions:

Figure B: Oil sands emissions and production

	2005	**2014**	**2020**	**2030**	**change 2014-2030**
Emissions	34	68	87	108	**+40 Mt CO_2eq**
Production	1.066	2.306	3.220	3.967	**+1.661 million bpd**

Source: *Canada's 2016 Greenhouse Gas Emissions Reference Case*, Environment and Climate Change Canada, December 22, 2016, Table A7.

The projected rise in oil sands emissions between 2014 and 2030 will almost exactly offset the decline in electricity emissions.

An accurate description of the emissions outlook under the Liberal Government's current policies would be bound to explain that as a result of the planned expansion of oil sands production (which is the economic case that justifies the two new pipelines) *all of the reduction of coal-burning emissions in the electricity sector will be offset by rising emissions from expanding oil sands production.*

The electricity sector is by far Canada's largest source of emissions reductions. Apart from the projected cut in the electricity sector emissions and a very modest expected cut in transportation sector emissions (14 Mt), *no other economic sector in Canada* is projected to show any meaningful reduction between 2014 and 2030: see Figure M at p. 42 below. The rise of oil sands emissions will therefore not only offset all the gains from eliminating coal-fired power plants, it will offset all the expected reductions from the only economic sector in Canada that, under the *Reference Case*, promises any certainty of deep reductions during the next fourteen years.

It is disheartening that, in your Newsletter, you do not mention anything about the wider picture. You are absolutely silent about the rising trend of oil sands emissions.

If we take into account the missing information, we can see that Canada's total emissions are currently projected to show no reduction below the 2014 level over the next fourteen years. They are going up, not down.

Here are the official numbers:

Figure C: Canada's total emissions (Mt CO_2eq)

	2005	2014	2020	2030
Total emissions	747	732	731	742

Source: *Canada's 2016 Greenhouse Gas Emissions Reference Case*, Environment and Climate Change Canada, December 22, 2016, Table A5.

Your Newsletter talks of "meeting Canada's international climate commitment." But Canada's promised target for 2030 is 523 Mt. The fundamental question is whether our plan to expand oil and gas sector activities is consistent with those commitments.

Pipelines: the economic case and the unanswered questions

The Liberal Government approved two pipeline projects on November 29. The Kinder Morgan expansion will replace an older line along the same route, expanding the existing capacity by 590,000 barrels per day. The second project, known as "Line 3," will provide 390,000 bpd of additional capacity between Alberta and Superior, Wisconsin.

The economic benefits of the Kinder Morgan pipeline have been much discussed by the National Energy Board (NEB) and in the media. The foundations of the economic case are set out in the NEB's January 27, 2016 report, *Canada's Energy Future 2016*: *Energy Supply and Demand Projections to 2040*. The NEB concluded in its analysis that growth in global oil consumption, especially in Asia, will remain strong for another twenty-five years. Based on that projection of increasing oil demand worldwide for several more decades, the NEB forecast that Canada's oil sands production would increase from the 2014 level of 2.4 million bpd to 4.8 million bpd by 2040 – a doubling of production. More recently, in October 2016, the NEB published an update (titled *Canada's Energy Future 2016 Update*) which lowered the NEB's projections due to uncertainty about future oil prices. The *Update* projects that oil sands production will reach 4.3 million bpd (instead of 4.8) by 2040.

To deliver that expansion of oil sands production by 2040, about 2 million bpd of new pipeline capacity will have to be built in Canada to move the bitumen to market. The two projects now approved (Kinder Morgan and Line 3) will add enough new capacity to transport an additional 980,000 bpd, which will accommodate almost 50% of the industry's total planned expansion to 2040. The third proposed pipeline, Energy East, will provide another 1.1 million bpd of capacity.

The economic viability of this plan – building new pipelines and a near doubling of oil sands production by 2040 – is based on the expectation that *the global appetite for oil will continue to grow for at least another twenty-five years.* That is the key assumption underlying the economic case.

There remain, however, two unanswered questions of fundamental importance:

1. Can we successfully achieve a 30% cut in Canada's total emissions by 2030, down to 523 Mt (as promised in Paris in December, 2015) if emissions from expanding oil sands production keep rising? Canada's total emissions in 2015 were 722 Mt (see the government's most recent April 13, 2017 *National Inventory Report*, Figure N at page 42). The government's *Reference Case* projections released on December 22, 2016 show that total emission by 2030 will likely be 742 Mt – which indicates no reduction over the next fourteen years.

2. Is Canada's ambition to continue expanding the level of our oil sands production up to 2040 consistent with keeping the increase in global average temperature to well below 2°C above pre-industrial levels? The economic case for oil sands expansion (which drives the rationale for building the two new pipelines) is that global oil consumption will continue to grow for another twenty-five years. Is that growth consistent with a 2°C world?

Can we meet the 523 Mt target?

The Kinder Morgan emissions report published on May 19, 2016, did not answer how continued oil sands emissions growth up to 2030 can be reconciled with our commitment to reduce Canada's total emissions to 523 Mt by 2030. It was silent about whether we can make large enough reductions from other economic sectors to obtain the deep cuts we need – and to offset the continued increases in oil sands emissions.

When the report (described as a "Draft for Public Comments") was released on May 19, 2016, the most up-to-date emissions projections then available from the government were found in the *Second Biennial Report*, published in February 2016. It showed that Canada's total emissions would rise to 815 Mt by 2030, taking into account the benefit of all carbon-reduction policies already implemented as of September 2015.

The only answer the Kinder Morgan report provided was to claim that *"recently announced provincial government policies"* would be able to improve the outcome by 2030: the report stated that new provincial government policies "*will have an impact* on Canadian GHG emissions" (i.e., will lower the projected number below 815 Mt). But it did not say how much the impact would be. The report explained that the impact of these new provincial polices was "not reflected in *Canada's Second Biennial Report* because the details of these policies were not available at the time of publication" (*Report*, B.2.1.1, p 16-17). The May 19, 2016 report offered no analysis to substantiate its claim that the recently announced provincial policies will be able to significantly reduce emissions below the 815 Mt level by 2030. We may expect that new policies will eventually reduce future emissions to some degree. But the obvious question is, by how much?

On November 25, 2016, the government released its final version of the Kinder Morgan emissions assessment: http://www.ceaa-acee.gc.ca/050/document-

eng.cfm?document=116526 . The final report repeated the claim that recently announced policies *"will have an impact"*, and that *"future improved practices will mitigate emissions"*, but again omitted any discussion or analysis of whether we can meet the 523 Mt target: section A.6 *"GHG Forecast Approach"*, p.15.

The government's own Ministerial Panel report on November 1, 2016 confirmed that the question has not been answered (see *Ministerial Panel Report*, "Unanswered Question", at p. 47).

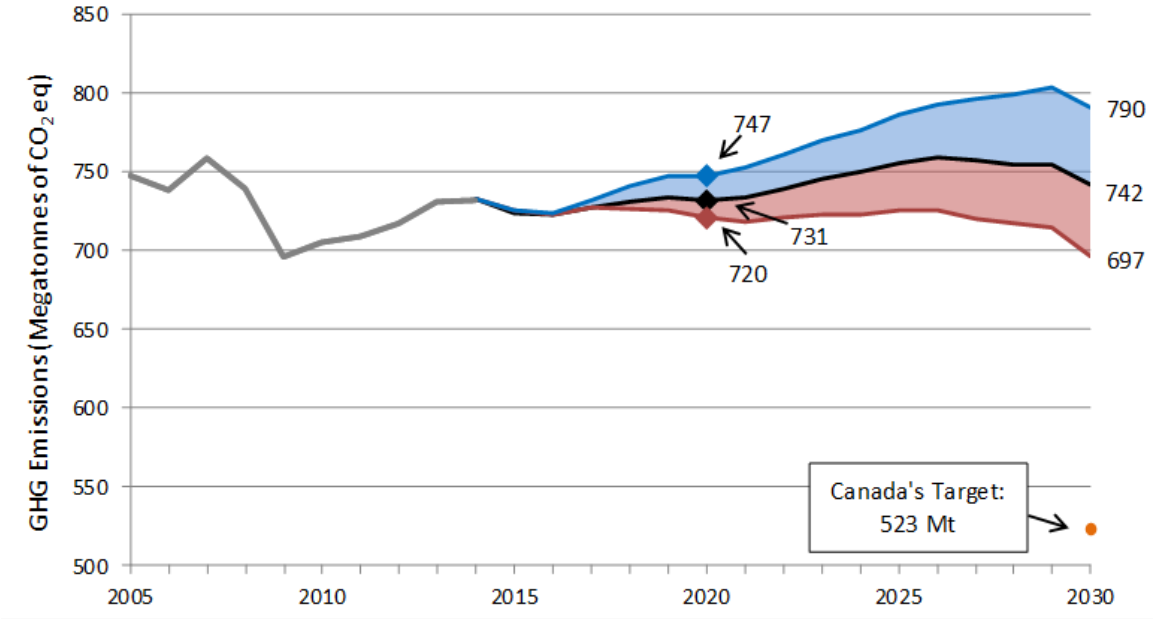
The outlook for meeting our emissions reduction target is not promising. The new emissions projections published on December 22, 2016 show that total emissions by 2030 will be 742 Mt – which indicates no reduction over the next fourteen years, and no significant cut below the 2005 level: see *Canada's 2016 Greenhouse Gas Emissions Reference Case* https://ec.gc.ca/ges-ghg/default.asp?lang=En&n=1F24D9EE-1. The new *Reference Case* data takes into account the benefits of most of the new carbon-reduction policies and measures announced by provincial governments and Ottawa up to *November 1, 2016*, including major new measures adopted in the Province of Alberta (i.e., Alberta's decision to shut down all coal-fired electrical generating plants by 2030, a new $30 carbon levy, and its 100 Mt cap on oil sands emissions) and Ontario's adoption of cap-and-trade.

What should concern us is that *even with the benefit of all these new policies including Alberta's acclaimed 100 Mt cap on oil sands emissions*, they still do not enable Canada to achieve any absolute reduction of its total emissions by 2030. They get us down to 742 Mt. That provides no absolute reduction at all below the 2014 level.

Furthermore, the "impact" of the recently announced policies is not as great as it seems. Although the new *Reference Case* data tells us that by 2030 our total emissions are expected to be 73 Mt lower than expected a year ago (down to a projected 742 Mt from 815 Mt), approximately 30 Mt of that estimated reduction is unrelated to the effects of any of the government's promised new emissions policies. The new December 2016 projections are based on the assumption that there will be *slightly lower economic growth* between now and 2030, which will slow down the growth of emissions from all economic activities to some degree. The new data also assumes slightly lower long-term world oil prices, which slows the expected growth of oil and gas production in Canada up to 2030 – and therefore slows emissions growth from those activities, all of which is reflected in the new *Reference Case*. The impact of lower GDP growth and lower oil prices accounts for about 30 Mt of the total 73 Mt cut in the projected 2030 emissions level: see *Reference Case*, "Introduction", p.1. A return to more rapid economic growth in the next few years – or to higher long-term world oil prices – would restore some, or all, of that portion of the reduction.

The Liberal Government has not provided Canadians any quantified analysis showing that the required emissions cuts can be achieved by 2030, based on policy measures that have so far been developed and adopted by governments, or measures we know with a high degree of certainty will be adopted. Figure D, reproduced from the *Reference Case* report, provides a convenient picture of our current situation:

Figure D: Canada's domestic emissions projections in 2020 and 2030 (Mt CO_2eq)



Source: *Canada's 2016 Greenhouse Gas Emissions Reference Case*, 1. Introduction, Table 2.

The middle line is the "reference case" projection of Canada's total emissions to 2030, and the other two tracks indicate two other possible emissions paths, depending on the future rate of economic growth, long-term oil prices, etc. Strong growth could push the projected level up to 790 Mt. The 523 Mt target is shown in the lower right corner.

The economic case, standing alone, cannot justify the pipeline decision announced on November 29. In the absence of a convincing affirmative answer to the first question, the Liberal Government's decision to pursue the economic benefits of continued oil sands expansion is ethically wrong. It puts all the risk and burden of a failed outcome on young children and on the unborn – on those who will grow into young adulthood by 2030 and in the decades that follow.

The time frame is unforgiving. I refer here to *IPCC, 2014, Summary for Policymakers*, SPM 3. You are no doubt aware that baseline studies ("business-as-usual" scenarios) show that if the leading advanced industrial counties do not dramatically cut emissions and do so very quickly, the atmospheric concentration of carbon dioxide, methane, and nitrous oxide will likely exceed the 450 CO_2eq level by 2030.

Staying within the 2°C threshold

None of Canada's inquiry processes have answered the second question.

The International Energy Agency (IEA) has developed a series of scenarios, each of which provides us with a different view of the expected level of future global oil production up to 2040. The first is the "Current Policies Scenario". It is a business-as-usual scenario. It calculates the future path of global oil consumption assuming no

significant new carbon reduction policies (measures designed to curb the future use of crude oil) are going to be adopted by the world's major industrial economies over the next few decades, beyond existing measures already in place. The Current Policies Scenario represents the expected trend of crude oil production if the world economy continues its current pattern of oil use. It is a pessimistic scenario, from the perspective of climate. It is not compatible with a 2°C world. With oil demand unconstrained by carbon-reduction policies, the Current Policies Scenario projects that global oil production will increase to 117.1 million bpd by 2040, up from 90.6 million in 2014.

Figure E: IEA oil production scenarios: projections (in millions bpd)

	2014	**2020**	**2040**
Current Policies Scenario	90.6	97.5	117.1
New Policies Scenario	90.6	95.9	103.5
450 Scenario		93.7	74.1

Source: *World Energy Outlook 2015*, Table 3.1, p. 114 and Annex A pp.582-583.

Under the Current Policies projection, global oil consumption continues to grow because of expected future economic growth and population growth, and the absence of additional carbon reduction policies that reduce oil use.

A second IEA scenario, the "New Policies Scenario", is also a business-as-usual projection, but slightly more optimistic. It incorporates carbon reduction measures already adopted as of mid-2015 in countries around the world – but it also takes into account *"other relevant intentions that have been announced, even when the precise implementation measures have yet to be fully defined"* (*World Energy Outlook* 2015, p. 34). The New Policies Scenario therefore projects a more substantial curbing of future oil consumption, with global consumption rising to only 103.5 million bpd by 2040. But even the New Policies Scenario is not consistent with keeping average global warming below 2°C, as the IEA has made absolutely clear.

The IEA's "450 Scenario" is a mitigation scenario. It is based on the assumption that countries will soon adopt carbon-reduction policies that will achieve significant reductions of global oil consumption – absolute reductions starting by 2020 – that are large enough to bring about gradually declining GHG emissions from the energy sector consistent with the goal of limiting the long-term rise of average global temperature to 2°C. One of the essential strategies under the 450 Scenario is to gradually reduce global oil production and consumption, starting in 2020 – in order to achieve a total reduction of about 20% between 2020 and 2040.

If global oil production must begin to decline by 2020, what are the implications for Canada? We hold the world's second largest reserves of crude oil, some 170 billion

barrels, second only to Saudi Arabia (third largest if we count Venezuela's heavy oil deposits).

According to the IEA's projections (under its business-as-usual New Policies Scenario), Canada will see its oil sands output rise from 2.2 million bpd in 2014 to 4.5 million bpd in 2040: see *World Energy Outlook 2015*, Table 3.6 at p. 135. The magnitude of that increase is more or less identical to the projection developed by Canada's own NEB, which forecasts (in *Canada's Energy Future 2016 Update*) that Canada's oil sands output by 2040 will increase 2.0 million bpd above the 2014 level. Both of these estimates are business-as-usual projections.

Canada's projected net increase of oil production over the next twenty-five years is the *third largest in the world*, after Iraq (4.5 million) and Brazil (3.0 million). According to the IEA, six major oil producing countries have large enough oil reserves to substantially increase their own production levels over that period – the other three are Iran (1.9 million), Saudi Arabia (1.8 million) and Venezuela (1.1 million): see *World Energy Outlook 2015*, Chapter 3, Tables 3.6, 3.7, and 3.12. Combined, these six countries under the New Policies Scenario are projected to add 14.7 million bpd of new production by 2040, more than enough to satisfy all of the expected 12.9 million bpd net increase in global consumption – and enough extra new production to offset declining oil production in some other countries where the oil fields are gradually depleting.

The problem is that the IEA has clearly stated that any *increase* in total global oil consumption after 2020 is not consistent with keeping the increase in global average temperature below 2°C. Indeed, the 450 Scenario calls for a *decline* in global production after 2020.

Yet Canada's plan to continue increasing oil sands production provides the economic rationale for the Liberal Government's pipeline approval decisions on November 29, 2016. We are embarking on a bold path of expanding crude oil production that, if followed by the other five big suppliers, would take the world above the 2°C threshold.

Astonishingly, none of the inquiry processes completed by the Liberal Government during 2016 have provided a satisfactory explanation of how our current plan to increase Canada's oil sands production over the next twenty-five years can be consistent with the 2°C commitment.

First process: National Energy Board (NEB) inquiry

The NEB inquiry process refused to admit or consider any evidence about the magnitude of emissions caused by planned future growth of oil sands production in Canada. It excluded all scientific evidence about the impact of emissions on the climate system, and it tells us nothing about how our planned near-doubling of oil sands production between 2014 and 2040 can be reconciled with a need to start reducing global crude oil production after 2020.

During the federal election campaign in the fall of 2015, the Liberal Party made a promise that it would "include an analysis of upstream impacts and greenhouse gas emissions" for planned pipeline projects.

But after the election, the new Liberal Government reneged on its promise to make changes to the NEB inquiry process. As a result, when the NEB issued its final report on recommending approval of the Kinder Morgan pipeline, it was silent about emissions. The NEB report weighed the *economic benefits* of the project, but said nothing about the implications of the rising emissions that would accompany the planned expansion of oil sands production between 2014 and 2040. It did not touch at all on the IEA's studies linking global oil consumption and the rising atmospheric concentration of CO_2, and omitted any discussion about the evidence that the world is facing an upper limit on global oil consumption.

Second process: Kinder Morgan emissions assessment (May 19, 2016)

The Trudeau government announced on January 27, 2016 that it would create a separate "upstream emissions assessment" procedure. It promised that the new procedure would examine *"the potential impact [of the pipeline projects] on Canadian and global emissions"*: see "Estimating upstream GHG emissions", *Canada Gazette*, March 19, 2016. It assured Canadians that the new procedure would be an "interim measure" until a full reform of the existing NEB process could be completed.

The so-called "upstream emissions assessment" for the Kinder Morgan pipeline was publicly released on May 19, 2016 (the report was officially titled the *Review of Related Greenhouse Gas Emissions Estimates for the Trans Mountain Expansion Project*).

The report explicitly adopted the NEB's long-term forecast that global oil consumption will continue to increase at least for another twenty-five years. Based on that forecast of growing global oil demand, the final version of the report released on November 25, 2016 adopted the NEB's forecast that oil sands production will increase from the 2014 level of 2.3 million bpd to 4.3 million bpd by 2040: see *Report*, November 25, 2016, section B.2.1 at p. 21, "Canadian Oil Supply Growth."

The NEB's long-term forecast, like the IEA's *New Policies Scenario*, is a business-as-usual projection. The Kinder Morgan assessment is therefore based on an assumption that global oil consumption will continue to grow to 2040. Unfortunately, for that to occur we must also accept that the world's major oil consuming countries *will not adopt carbon reduction policies that substantially reduce oil use*, at least not during the next few decades.

The Kinder Morgan report avoided providing any direct answer to the question of whether the continued growth of Canada's oil sands production up to an annual production level of 4.8 million bpd by 2040 can be compatible with a 2°C world. It merely stated that the evidence is "not clear" whether the two goals are compatible: see Kinder Morgan report, Section B.2.6 at page 28-29.

The Kinder Morgan report did briefly refer to the IEA's 450 Scenario:

> *In the IEA's 450 Scenario, in which the world has a 50% chance of limiting the long-term increase in average global temperature to no more than 2°C, global oil demand peaks by 2020 at 93.7 MMbbl/d and declines 18% from 2014 levels to 74.1 MMbbl/d in 2040.*
>
> — *Report*, section B.2.2 "Global Crude Oil Outlook", p. 17 (emphasis added)

But having mentioned the 450 Scenario, the assessment report does not expressly agree – or disagree – with the IEA's conclusion that a decline in global oil consumption is required after 2020. The Kinder Morgan report is noncommittal. It endorses the NEB's plan that Canada's oil sands production will continue to expand until 2040.

If the evidence is "not clear", a decision to adopt the NEB's 2040 growth projection as the economic rationale to justify the approval of the new pipeline was extraordinarily reckless. Canadians are being invited to acquiesce in a path of oil sands expansion that promises only a chance – and maybe no chance at all – that it will turn out to be compatible with our long-term 2°C goal.

Even worse, having claimed that the evidence is "not clear", the Kinder Morgan report declared that if Canada does not expand its own oil production, "other jurisdictions" (i.e., the other big oil-producing countries) will increase their output – so that, in the final outcome, it will make no difference whether Canada increases its production or not:

> *Given the many competitors to an investment in Canadian oil production, it is likely that if oil sands production were not to occur in Canada, investment would be made in other jurisdictions and global oil consumption would be materially unchanged in the long term in the absence of Canadian production growth.*
>
> — *Report*, section B.4.3.4 "Global Oil Consumption and Upstream GHGs", p. 33

That answer does not address the problem of how global oil consumption can be curbed after 2020, or how Canada's rising oil production can be reconciled with our serious commitments to keep global temperature increase below the 2°C threshold. It avoids the question.[*]

The Kinder Morgan report offered Canadians no guidance or warning at all about the grave implications for the global climate system if the major oil producing countries (including Canada) continue to increase their annual production levels after 2020. The report did not consider, or explain to Canadians, the narrowing time frame we have to arrest the rising accumulation of CO_2 and other greenhouse gases in the atmosphere.

[*] The report includes no other discussion about the need to halt the growth of world oil production – except for a single sentence that appears immediately after the claim that the evidence is "not clear": *"However, a common result of modelling efforts to analyze a 2°C world is that overall global crude oil consumption declines relative to the status quo."* (Report: section B.2.6, page 28).

The inadequacy of the May 19, 2016 emissions assessment report on the Kinder Morgan project can be traced to the design of that process. The assessment procedure was entirely a creation of the current Liberal Government.

The government published a notice in the *Canada Gazette* on March 19, 2016, specifying what kind of evidence could be relied on in the new procedure: it stated that *"publicly available data provided by the proponent will be used"* in the assessment. The "proponent" is the owner of the Trans Mountain pipeline (Kinder Morgan). No representatives of the public were present to demand the right to call evidence, or to question the evidence. There was no public access. It was a closed process.

There were no hearings, no cross-examination, no record of proceedings, and no media access.

It was not a process that enjoyed any degree of judicial independence, or any independence at all. A group of unknown people wrote the Kinder Morgan assessment report based on a selection of documents and data chosen by the pipeline company and the government.

A proper inquiry process must be *public*, because that is our guarantee that the evidence will not be pre-selected or "cherry-picked". There must be a chance for opponents to cross-examine the experts, and an opportunity to call other expert witnesses who may disagree with those who have been selected by the pipeline owner and the government. The process must be able to test and challenge the experience and skills of those who are selected as expert witnesses, and scrutinize their affiliations and independence. The integrity of the process must also be protected by the basic principles of judicial independence, so we can be confident that the panel and decision makers are not being influenced by pressures, discussions, or other sources of information that have not been tested in the hearing room, in public view.

The Kinder Morgan assessment failed to meet any of these standards. The assessment quietly decided behind closed doors what evidence it would look at, and what lines of inquiry it would ignore.

The government suborned the process – to limit the scope of the inquiry, to control what evidence was looked at, and to deny the public access. It succeeded in those objectives.

Third process: The Ministerial Panel Report (November 1, 2016)

On May 17, 2016, the government created another process (a third process) to look at the Kinder Morgan pipeline project. The Minister of Natural Resources appointed a three-member body, called the "Ministerial Panel".

From the beginning, the Ministerial Panel lacked any power or capacity to make "findings" or draw any conclusions, and it was not allowed to make any recommendations. Members of the public were invited to come to a series of meetings held by the panel in British Columbia and Alberta to object to (or express support for) the

Kinder Morgan pipeline project – and speak about what they felt had been overlooked, or inadequately dealt with, during the previous two processes.

After two months of public meetings, the panel released its report on November 1, 2016.

The report quotes several leading climate researchers who, in their submissions to the panel, explained the grave consequences of allowing Canadian oil and gas production to grow as presently planned. They explained that our present energy resource expansion plans (which will be accompanied by significant emissions increases) are incompatible with our overriding commitment to keep warming below 2°C.

The panel quotes political scientist Kathryn Harrison, who has researched and published widely on energy policy and the efficacy of Canada's emissions reduction efforts:

> *To embrace the economic viability of this project is to self-consciously make an economic bet on a world of catastrophic climate change that the Government of Canada itself explicitly committed to avoid.*
>
> — *Ministerial Panel Report,* November 1, 2016, p. 32

Harrison's point is that the future economic viability of the Kinder Morgan project depends on the world experiencing continued growth of global oil demand over the next twenty-five years, to 2040. Canada's oil sands industry is a high-cost producer, compared to other major suppliers of conventional crude oil around the world. The industry requires relatively high long-term oil prices to cover its comparatively high production costs. The NEB's forecast expansion of oil sands production from 2.3 million in 2014 to 4.3 million in 2040 – which is the economic rationale for the Kinder Morgan project – is based on the assumption that we will see *two or three more decades of increasing global oil consumption*.

But continued growth of global oil consumption for twenty-five more years is incompatible with keeping warming within the 2°C limit.

In a 2015 report, Harrison explained her basic analysis:

> *The International Energy Agency (IEA) has modeled national and global emissions consistent with limiting climate change to the internationally agreed target of 2C, which would entail peaking CO_2 concentration in the atmosphere at 450ppm. Underscoring the potential impacts of international action on Canada's exports, this "450 Scenario" finds that global oil consumption would need to peak as early as 2020 and decline thereafter, with projected demand in 2035 13% lower than in 2011.*
>
> — Kathryn Harrison, *Review of Destination Country Policies with Potential to Impact Demand for Canadian Oil Exports,* May 2015 (emphasis added)

On that point, it is directly relevant to recall that the atmospheric CO_2 concentration level is currently on track to exceed 450 ppm by about 2030, based on existing trends of global emissions.

U.B.C. climate scientist Simon Donner, in his submission to the Ministerial Panel, addressed the same concern. He focused on the assumption (accepted by the Kinder Morgan report) that global oil production will continue to increase up to 2040. He specifically criticized the conclusion in the Kinder Morgan report that even if Canada were to curb the expansion of its oil sands production, "*investment would be made in other jurisdictions and global oil consumption would be materially unchanged in the long term"* (Kinder Morgan report, section B.4.3.4, p. 33, cited above).

I quote here the Ministerial Panel's summary of Simon Donner's answer:

> *Donner described this as typical of the tragedy-of-the-commons analysis in which, if everyone in the world decides that the impact of their contribution is irrelevant in a global context, then everyone will continue to expand. As Donner says, "In sum, the analysis in the Environment and Climate Change Canada review [the Kinder Morgan emissions assessment report of May 19, 2016] is mathematically inconsistent if applied broadly".*
>
> — *Ministerial Panel Report*, November 1, 2016, page 33 (emphasis added)

If all of the world's major oil producing countries that have large enough oil reserves to substantially increase their production levels during the next twenty-five years decide to do so (there are about six big producers, including Canada, that have the capability to do that), the world will have no chance of keeping the increase in global temperature below the 2°C threshold.

But, unfortunately, the Ministerial Panel had no power to make findings of fact or to draw any conclusions based on scientific evidence. It had no authority to agree (or disagree) with Simon Donner's criticism of the Kinder Morgan report, or accept or reject Kathryn Harrison's analysis. All it could do was make a list of what Harrison and other people told the panel, and transmit their concerns to Ottawa. It was without authority to make recommendations.

The Ministerial Panel appeared to have been designed solely to produce a public display of "consultation", without substance. It could easily have ended with an entirely useless report. It was rushed. It was a hopelessly inadequate process – not because of any lack of capability in the three appointed members, but because of the way the government from the beginning deprived them of any effective powers. They were effectively prohibited from offering any opinion about whether Canada's current plan to double oil sands production is compatible with our climate change commitments.

But something unexpected happened. The panel appears to have apprehended (as few people in responsible positions in government have yet done) the terrible magnitude of the problems exposed, problems that were revealed in the testimony of an extraordinary range of people, some experts and many not. A public hearing process, however limited

in its power to do justice, can sometimes lead to surprising results, when the importance of truthfulness, the strong current of emotion, and the rituals of listening and deliberation can move people out of their everyday poses.

The panel was not allowed to make "recommendations". But it found a way to make what are, in effect, a series of highly significant findings – findings that identify crucial questions that have not yet been answered. It says at page 46:

> *Our role was not to propose solutions, but to identify important questions that, in the circumstances, remain unanswered.*

The first "high-level question" that "remains unanswered", according to the three panel members, is whether the growth of emissions that will result from building the Kinder Morgan pipeline can be reconciled with Canada's climate change commitment, which includes our 2030 emissions reduction target. The panel states the question this way:

> *Can construction of a new Trans Mountain Pipeline be reconciled with Canada's climate change commitments?*
>
> — *Ministerial Panel Report*, November 1, 2016, p. 46

Until the Ministerial Panel released its report, no Federal Government inquiry process or report had ever publicly acknowledged that this key question remains unanswered – or even a question that ought to be answered.

It is, of course, the very question that the NEB repeatedly refused to ask.

The Ministerial Panel's report was delivered to the government on November 1, 2016. The government did not respond. Four weeks later the cabinet announced its decision approving the two pipelines – without any public comment on the unanswered question.

November 30, 2016 announcement: "I have said many times…"

The Liberal Government has invited Canadians to give "social license" to pipeline projects, but it has consistently refused or failed to disclose the essential information required so that we can make informed decisions – to ensure Canadians fully understand the consequences of project approvals now that are going to increase the annual level of CO_2 emissions during the next fourteen years.

The government originally claimed that the Kinder Morgan emissions procedure was an "interim measure", meaning a temporary process that would operate until a fully renovated NEB could eventually take over the task of examining the impact of future emissions growth from oil sands expansion. That assurance was a palliative to gain the acquiescence of Canadians – giving people the impression that nothing much was going to happen until the promised reform of the NEB process could be completed.

It is not an "interim" process. It governs the approval process for three pipeline projects. The second is Line 3, which will add an additional 370,000 bpd of capacity across the border into the United States. An assessment report was quietly released for the Line 3 project on April 27, 2016, almost identical in content to the Kinder Morgan report. Line 3 was given final approval on November 29. Ministers McKenna and Carr also confirmed in their January 27, 2016 announcement that the same "interim" procedure is going to be used to assess the Energy East pipeline, which has a capacity of 1.1 million bpd. The unreformed NEB process (still permitted to exclude all consideration of emissions and climate science) is now proceeding with its review of the Energy East project.

These three projects together will expand Canada's total pipeline capacity by over 2.0 million bpd, which will accommodate the entire planned expansion of oil sands production between 2014 and 2040. There is nothing "interim" about that. This temporary and inadequate assessment scheme will enshrine the growth of oil sands production (and oil sands emissions) for the next twenty-five years.

At the National Press Theatre in Ottawa on November 30, 2016, Trudeau confirmed the government's intentions with regard to the pipelines, and gave his justification:

> *I have said many times that there isn't a country in the world that would find billions of barrels of oil and leave it in the ground while there is a market for it.*
>
> — Justin Trudeau, *Pipeline Announcement*, November 30, 2016.

These words show monumental indifference to all the concerns raised by Canada's leading climate scientists – and to the concerns of many of your own constituents who attended your December 16 town hall meeting in Vancouver, who had been led to believe that you shared their concerns. The statement was supremely cynical, claiming as it does that motives of economic gain will inevitably overcome all other values.

Cynicism is the acid of our democracy. It feeds despair, distrust of government institutions, and apathy.

If we accept Trudeau's view of what other countries will inevitably do (and his view of what Canada *should* do), then Iraq, Brazil, Iran, Saudi Arabia, Venezuela, and Canada will increase their combined oil production between now and 2040 by some 14 million additional bpd above current production levels (in line with to the IEA's New Policies Scenario). Canada's projected share of the future production increase is about 2.0 million bpd. Canada will provide the third largest net increase to global oil supply, under that pessimistic scenario. That is the path we are on. It is not consistent with keeping the rise in the atmospheric concentration level of CO_2 below 450 ppm.

Untenable claims

In his November 30 announcement justifying the pipeline decision, Trudeau added this surprising claim:

> *Aside from the many and obvious economic benefits, we approved the project because it meets the strictest of environmental standards, and fits within our national climate plan.*

What national climate plan is Mr. Trudeau talking about? How can we know that the project fits within the plan?

Let us keep in mind the record of the past year:

Up until November 29, 2016, the Liberal Government had not disclosed any "climate plan" that might show we can reconcile these two national policies. The government ensured that any questioning on that issue was excluded from the inquiry processes.

No climate plan of any kind was considered by the NEB during its lengthy inquiry through 2014 and 2015, which completely refused to discuss oil sands emissions or climate commitments. It was a public hearing process and it had full powers to call evidence, but it refused to hear any testimony at all about the growth of oil sands emissions and their compatibility with climate commitments.

The second process, the Kinder Morgan emissions procedure, was supposed to assess *"the project's potential impact on Canadian and global emissions"*. But it declined to pursue the fundamental question of whether the planned expansion of our oil sands production is consistent with meeting our 523 Mt emission target for 2030. It was a closed process, so no members of the public had any chance to raise that question. Trudeau's government controlled every detail of the process. The May 19, 2016 report did not decide, one way or the other, if the project "fits within our national climate plan."

The third process was the Ministerial Panel. In its November 1, 2016 report, the panel told the government that the question remains "unanswered".

Yet on November 30, Trudeau pronounced that the Kinder Morgan project "fits within our national climate plan". Three of your Liberal MP colleagues echoed his claim in a *Vancouver Sun* op-ed piece defending the pipeline decision:

> *In addition, greenhouse gas emissions associated with upstream oil development are accounted for and fit within our government's climate action plan, the Pan Canadian Framework for Climate Change and Clean Growth.*
>
> — Pam Goldsmith-Jones, Terry Beech, Jonathan Wilkinson, Vancouver Sun, December 18, 2016 (emphasis added)

The question has suddenly been answered, so we are told. The putative answer is found in a 75-page brochure uploaded by the Liberal Government on December 9, 2016, entitled the *Pan-Canadian Framework on Climate Change*.

Pan Canadian Framework on Climate Change, December 9, 2016

In fact, between December 9 and December 22 the government unrolled two new documents about our future emissions. They are starkly different in their conclusions, and in their methods.

The first, the *Pan-Canadian Framework*, is a statement of future intentions about reducing emissions, cast in the format of a promotional media release: (https://www.canada.ca/content/dam/themes/environment/documents/weather1/20170125-en.pdf) . It appeared a little more than a week after the pipeline decision. The *Framework* document consists of a long list of promises and generic strategies about future measures that provincial governments and the federal government say they will implement to reduce emissions. The *Framework* says that based on these future policies, not yet implemented and mostly highly uncertain – *many of them not identified or developed at all* – Canada can cut its total emissions down to 567 Mt by 2030, and that other unspecified future measures (e.g., "green infrastructure") can get us to the 523 Mt target. It is a sensational claim.

The second document is *Canada's 2016 Greenhouse Gas Emissions Reference Case*, released on December 22, 2016 – which I have already mentioned. It finds that *our total emissions will likely increase to 742 Mt by 2030*, taking into account all new federal and provincial carbon-reduction policies adopted as of November 1, 2016. It counts all policies that have been announced and already implemented, or that have sufficient certainty of future implementation and effectiveness to be included in the reference case. It calculates that by 2020 annual missions will be 731 Mt (they were 727 Mt in 2014) – so no significant cuts are expected within the next four years.

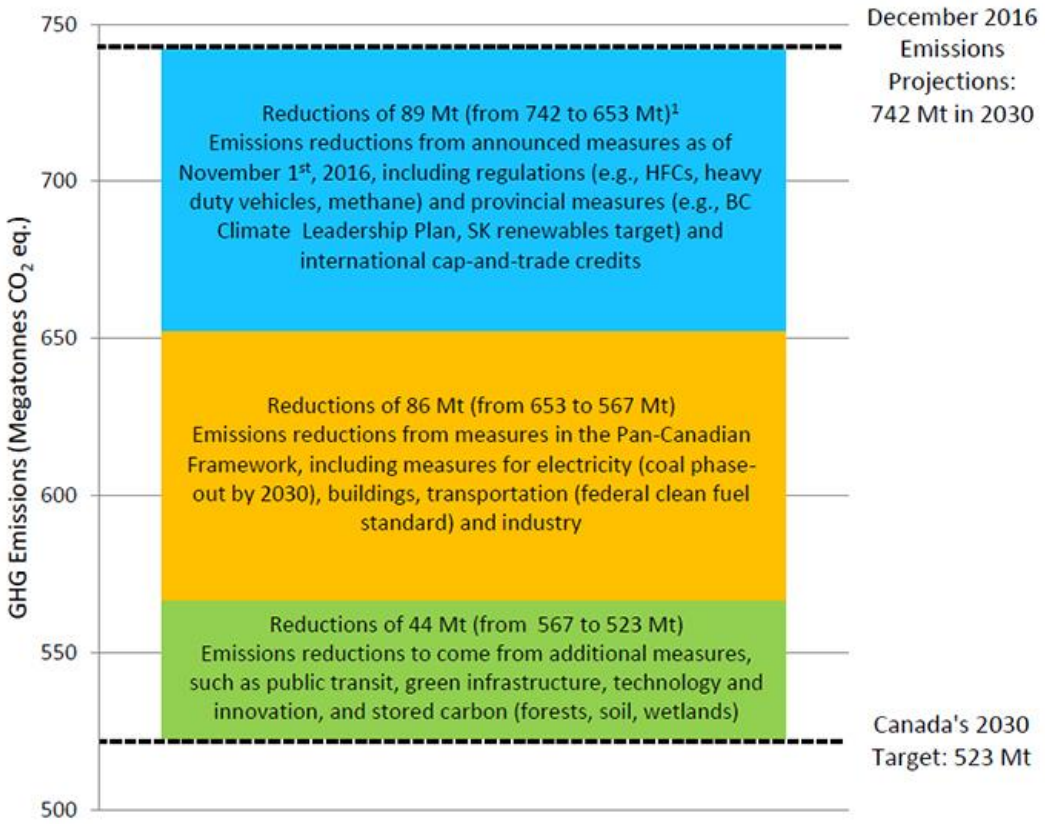
The *Reference Case* analysis employs the same kind of quantified methods used by the Government of Canada's previous reports that calculated the expected trend of our emissions up to 2020 and to 2030: see *Canada's Second Biennial Report on Climate Change*, April 2016, and *Canada's Sixth National Report on Climate Change*, published in December 2013. Analyses of this kind provide detailed emissions projections for each of the seven economic sectors, giving us specific numerical outcomes for each sector, taking into account the impact of future economic growth, the expected rate of technological innovation, and the future benefits of emissions-reduction policies in each sector. That kind of careful analysis allows us to see exactly which economic sectors (i.e., transportation, or heavy industry, or electricity generation) are expected to show significant future reductions by 2030. With that degree of detail, we can scrutinize the plausibility of claims about future emissions reductions.

According to the *Reference Case* projections, we would need to reduce our emissions level by more than 200 Mt in the following decade, starting in 2020, to meet the 523 Mt target by 2030. The *Reference Case* does not provide any "plan" explaining how cuts of that magnitude might be achieved within such a short time.

Against that background, I wish to comment on the approach taken by the *Pan-Canadian Framework* document, released on December 9, 2016.

With the exception of a single graph on page 44 (designated "Pathway to Meeting Canada's 2030 Target", reproduced in Figure F), the *Pan-Canadian Framework* does not provide us with any quantified analysis about future emissions reductions. The graph shows a horizontal baseline representing the most recent projection of Canada's total emissions for 2030 – indicating an annual level of 742 Mt (the *Reference Case* number). From that total, the scheme deducts three broad categories of future emissions reductions, grouped in tranches of 89, 86, and 44 Mt – optimistically indicating by these aggregate numbers that additional deep cuts will be achieved below the *Reference Case* projection by 2030. The promised cuts total 219 Mt. But those large numbers are not broken down or attributed to any specific policy, or to any specific sector.

Figure F: *Pan-Canadian Framework* – the promised reductions



Note: Reductions from carbon pricing are built into the different elements depending on whether they are implemented, announced, or included in the Pan-Canadian Framework. The path forward on pricing will be determined by the review to be completed by early 2022.

[1] Estimates assume purchase of carbon allowances (credits) from California by regulated entities under Quebec and Ontario's cap-and-trade system that are or will be linked through the Western Climate Initiative.

Source: *Pan-Canadian Framework on Clean Growth and Climate Change*, page 44

The first category promises 89 Mt of future reductions. We are told this category comprises measures already announced by all levels of government as of November 1,

2016, *"but which do not yet have sufficient certainty to be included in the reference case"*: Government of Canada, "Modeling of greenhouse gas emissions," December 12, 2016 https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/modelling-ghg-projections.html. So while the promised reductions do not have "sufficient certainty" to be counted in the *Reference Case*, we are led to believe that they are so close to being implemented that we can count on them.

A closer look at the graph, however, reveals that this category of 89 Mt future reductions includes *international cap-and-trade credits*. That means a substantial share of these claimed "reductions" are not going to occur in Canada at all. Instead, emissions credits to offset our continuing emissions will be purchased from foreign jurisdictions, so that offshore (or U.S.) emitters will reduce their own emissions in return for payments by us – when we purchase cap-and-trade credits. In fact, *55 Mt of these promised reductions* (out of the entire 89 Mt in the first category) will be obtained by the purchase of credits. Canadian industrial producers, who are unwilling or unable to cut their own emissions in Canada, will instead purchase credits.

The theory is that even if the emission reductions are made outside Canada, our purchase of credits will contribute to lowering global emissions, which is the ultimate goal.

In Canada, we are told that we should continue to expand oil sands production up to 2040 in order to get the economic benefits. We know that between 2014 and 2030 we will increase the annual level of oil sands emissions by about 40 Mt, as a result of that expansion. If we are going to meet our climate target by 2030, we will have to reduce emissions in other sectors of the Canadian economy by an equivalent amount of 40 Mt, just to offset the expected growth of oil sands emissions (in addition to that we must achieve a further 30% reduction in the other sectors to meet our climate target). But, according to the *Pan-Canadian Framework*, we do not have the capability to make all the additional reductions needed in Canada by 2030 – if we are going to meet the 523 Mt target. So instead we are going to purchase 55 Mt worth of emissions credits from outside Canada. Canadian businesses and consumers will pay for these credits.

Canadians therefore will be paying a huge economic price over the next fourteen years for the purchase of emissions credits to offset the rise in our emissions. Most of the rise in our emissions is from the oil sands industry. As a result of the way the emissions credits scheme works, *55 Mt out of the promised 89 Mt of reductions in the first category will not actually happen in Canada.* They will happen in California – or perhaps in other foreign jurisdictions depending on future carbon-credit schemes negotiated by Canada and other countries that allow rich countries to "out-source" the task of cutting emissions, by paying money to other countries.

Industries in Canada that purchase credits will be able to continue to emit CO_2 and other GHGs into the atmosphere unabated using their existing emissions-intensive technologies. They will be able to delay the kinds of technological innovation needed to reduce emissions. Let us recall, Ms. Murray, that in your January 2016 Newsletter to Vancouver Quadra residents you praise the Liberal Government's planned phase out of coal-fired power generation in Canada and you explain the benefits:

That in turn will accelerate Canada's transition to an innovative clean growth economy with new, clean-energy jobs for the middle class.

Under the *Pan-Canadian Framework* plan, 55 Mt out of 89 Mt of the promised emissions reductions in the first category will contribute nothing to develop an "innovative clean growth economy" in Canada. Money used by Canadian businesses to purchase carbon credits (also called "carbon allowances") will go to develop new industries and clean-energy jobs in California, or in other places outside Canada.

The second category, which promises an additional 86 Mt of future reductions by 2030, claims that substantial cuts will come from *"measures in the Pan-Canadian Framework … including measures for … buildings, transportation … and industry".* But the "measures" identified in the *Pan-Canadian Framework* document are so lacking specifics that it is impossible to assess whether the proposed future carbon-reductions are viable, whether they will be funded, whether they will be politically acceptable in the various provinces, or if they will be implemented at all.

The third category is so vague as to be meaningless. It promises 44 Mt of future reductions, but says only that they will come from "additional measures" – which are simply identified as "green technology" and "technology and innovation". This tells Canadians nothing about the feasibility of achieving future reductions on that scale.

Let me summarize the relationship between the two documents published by the Liberal Government in December, and how they can be read together:

The *Reference Case* released on December 22, 2016 is a conventional type of emissions projection based on policies and measures in place as of November 1, 2016. It concludes that Canada's total emissions by 2030 will be 742 Mt, assuming no significant new emissions-reduction policies are adopted, beyond those already in place. It offers no analysis or opinion about whether additional carbon-reduction policies adopted in future will be able to reduce that number enough to meet our climate commitment by 2030. In contrast, the *Pan-Canadian Framework* assures us that the 2030 number can be reduced another 219 Mt by future emissions reduction policies, enough to meet the 523 Mt target. But we have to understand that 25% the total promised reduction, namely 55 Mt, will not involve emissions reductions in Canada at all. That portion will be accounted for by purchasing emissions credits so that the actual emissions reductions will happen outside Canada. We will pay for them. Another 44 Mt of the promised reductions, the third category, are so vaguely described that it is impossible to say whether they are anything more than conjecture.

One additional source of information is relevant to whether we can safely rely on the *Pan-Canadian Framework*. In a five-page document released on the government's website on December 22, 2016, entitled *Modelling of Greenhouse Gas Emissions,* the government provided a more detailed breakdown of 120 Mt of the promised reductions (out of the total 219 Mt) that it claims will be achieved by 2030. This breakdown, set out in a table called "Sectoral Reductions," purports to show how the cuts will be divided between the seven economic sectors. It also confirms that 55 Mt of the other claimed

"reductions" will be accounted for by carbon credits. It does not account for, or mention at all, the remaining 44 Mt of the promised cuts, which is the amount shown in the third category on page 44 of the *Framework* document.

I reproduce the table here in full because it is the best information available to help us understand the plausibility of the government claims. An unusual feature of the "Sectoral Reductions" table is that it combines two of Canada's major economic activities, heavy industry and the oil and gas sector, treating them as if they are one large "Industry" sector. As a result, it avoids showing any separate emissions data for oil and gas sector.

Figure G: Sectoral reductions information published December 22, 2016

Sectoral Reductions [1]

Sector [2]	Reductions from December 2016 Reference Case to Pan-Canadian Framework (742 Mt to 567 Mt in 2030)
Electricity	17 Mt (from 34 to 17 Mt)
Buildings	28 Mt (from 94 to 66 Mt)
Transportation	15 Mt (from 157 to 142 Mt)
Heavy Industry (including oil and gas)	56 Mt (from 330 to 274 Mt)
Agriculture, Waste and Others	4 Mt (from 127 to 123 Mt)
Purchase of WCI Allowances (Ontario and Quebec)	55 Mt

[1] Reductions in this table correspond to federal, provincial and territorial announced measures as of November 1, 2016 (blue bar) and measures contained in the Pan-Canadian Framework on Clean Growth and Climate Change (yellow bar).

[2] Sectors as defined in Canada's 2016 Greenhouse Gas Emissions Reference Case

Source: *Modelling of Greenhouse Gas Projections*, Government of Canada, December 22, 2016 (https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/modelling-ghg-projections.html)

The "Industry" section: obscuring the oil sands

Now we return to the fundamental question: can we achieve a 30% cut in Canada's total emissions by 2030, down to 523 Mt, if emissions from expanding oil sands production keep rising? None of the review processes conducted by the Liberal Government before the announcement of the pipeline decisions on November 29, 2016, answered that question. Does the *Pan-Canadian Framework* provide Canadians with an honest and well-founded answer?

We should keep in mind that the *Framework* document was not the result of any kind of inquiry process. There were no public hearings. None of the claims in the document were questioned or tested in public view.

In the *Framework* document, the "Industry" section (Section 3.4) discusses both the heavy industry sector and the entire oil and gas industry as if they are one large sector. The brochure acknowledges that the combined sectors represents 36% of Canada's total emissions. This combined treatment of the two sectors is highly unusual. In all previous reports issued annually since at least 2011 under the Harper Government and in the recent *Reference Case*, the oil and gas sector has always been treated as a separate sector for the purpose of reporting emissions. It is Canada's largest emitting sector and is responsible for the largest annual increases. It accounts for 26% of Canada's annual emissions.

Using the government's own data, I have prepared Figure H to show details of the emissions for the two sectors that are combined in the "Industry" section. None of this data is disclosed in the *Framework* document, with the exception of the 330 Mt total for both sectors and the promised 56 Mt cut, down to 274 Mt:

Figure H: Combined heavy industry and oil and gas sector emissions (Mt CO_2eq)

	2005	**2014**	**2020**	**2030**	**change 2014-2030**
Heavy Industry	88	76	85	97	**+21 Mt**
Oil and Gas	159	192	201	233	**+41 Mt**
Total	247	268	286	330	**+62 Mt**
Promised *Pan-Canadian Framework* reduction by 2030				-56 Mt	
Combined emissions in 2030 after promised reduction				274 Mt	

Sources: *Canada's 2016 Greenhouse Gas Emissions Reference Case,* Environment and Climate Change Canada, December 22, 2016, Table A5. The 56 Mt reduction is from *Modelling of Greenhouse Gas Projections*, "Sectoral Reductions", Government of Canada, December 22, 2016

The *Pan-Canadian Framework* brochure summarizes Canada's proposed emission reduction strategy for this newly-invented "industry" category (which includes oil sands emissions) in this way:

> *Industrial emissions are expected to grow between now and 2030 as demand grows for Canadian produced goods, at home and abroad.*
>
> *A low-carbon industrial sector will rely heavily on clean electricity and lower-carbon fuels, will make more efficient use of energy, and will seize opportunities unlocked by innovative technologies. The Province of Alberta has legislated an*

> *absolute cap of 100 Mt a year on emissions from the oil sands sector. There are a number of near-term opportunities to reduce industrial emissions while maintaining the competitive position of Canadian firms.*
>
> *This approach to the industrial sector will include three main area of action: (1) regulations to reduce methane and hydrofluorocarbon (HFC) emissions; (2) improving industrial efficiency; and (3) investing in new technologies to reduce emissions.*
>
> — *Pan-Canadian Framework*, p. 19 (emphasis added)

To begin, the document admits that this large category of emissions ("industrial emissions") will continue to grow to 2030. Indeed, even after taking into account the 56 Mt reduction promised by the *Pan-Canadian Framework*, between 2014 and 2030 the total emissions for combined sectors are projected to grow from 268 Mt to 274 Mt. The *Framework* document attributes that increase to growing demand for "Canadian produced goods". But that is disingenuous. If we look at the data published twelve days later in the *Reference Case*, the projected net emissions increase from heavy industry between 2014 and 2030 is 21 Mt. The increase of emissions from oil sands production is 40 Mt. We do not usually speak of crude oil exports as "Canadian produced goods". In truth, these so-called "industrial emissions" will grow between now and 2030 mainly because of growing production of Canadian bitumen.

The expansion of oil sands production (and the resulting growth of oil sands emissions) is in fact the main driver of what the *Framework* document calls our "industrial emissions". They are our gravest and most intractable emissions challenge, because under our current energy policy they are bound to keep growing to 2030.

The *Pan-Canadian Framework* has astutely buried the discussion of oil sand emissions under the generic label "industrial emissions". Except for the reference to the 100 Mt "absolute cap" to limit oil sands emission, the *Framework* includes no detail or quantitative information at all about oil sands emissions that would assist Canadians to understand the significance of expanding oil sands production.

The above-quoted paragraph envisions a future *"low-carbon industrial sector"* and blandishes us with the promise of *"near-term opportunities to reduce industrial emissions"*. That optimistic language gives us a false picture of what is going to happen to emissions in the oil sands industry during the next fourteen-years. There will be no "near-term opportunities" to reduce oil sands emissions if oil sands production continues to expand in line with the government's current projections: see Figure B on page 5.

The "Industry" section makes only two brief references to oil sands emissions, both of which imply that new policies and future technologies will curb their growth.

First, the *Framework* document highlights Alberta's "absolute cap of 100 Mt a year" to limit emissions from the oil sands sector. But the "cap" is set so high – providing an upper limit of 100 Mt for the annual level of oil sands emissions – that it will have no impact at all on limiting the growth of oil sands emissions before 2030. In other words,

notwithstanding the cap, oil sands emissions will continue to increase in Alberta over the next fourteen years exactly as projected in the *Reference Case*.[4]

The "Industry section" includes a second upbeat message about the oil sands industry, displayed in a prominent box with an attractive headline, "Oil Sands Innovation":

> *COSIA (Canada's Oil Sands Innovation Alliance) is an alliance of 13 oil sands producers, representing 90% of production from the Canadian oil sands, who are working together to develop technologies that help reduce the environmental impact of the oil sands, including reducing GHG emissions. Member companies have shared 936 distinct environmental technologies, costing $1.33 billion, since coming together in 2012.*
>
> — *Pan-Canadian Framework*, p. 20 (emphasis added)

Oil sands emissions are not reducing at all, despite technological innovation. The annual level of oil sands emissions has been increasing about 4 Mt on average every year since 2005 – doubling from 35 Mt in 2005 to 71 Mt in 2015 (see Figure O at page 43). The *Reference Case* data projects that they will grow to 87 Mt by 2020 (increases averaging 3 Mt per year between 2014 and 2020), and that they will rise again to 108 Mt by 2030.

What then does this claim mean, indicating that technological innovation is "reducing GHG emissions"? It is important to draw a distinction here between claims about "absolute reductions" in the annual level of emissions in an industry, and reducing *the carbon intensity of production*. The distinction is crucial to understanding the difficulties of our situation. A frequently claimed success is that carbon intensity of production has decreased in Canada, or that it has decreased in specific industries in Canada. *Canada's Emissions Trends 2014* made this claim:

> *Between 1990 and 2012, the emissions intensity of the Canadian economy decreased by 29% ...*
>
> — *Canada's Emissions Trends 2014* (emphasis added)

The claim is accurate. Over a period of time, advances in technology and improved efficiencies have allowed most industries to use less fossil fuel energy to produce the same amount of output. Economists call that "declining carbon intensity of production". *Less CO_2 is released for each unit of output*. Carbon intensity in Canada declined by slightly more than 1% per year over two decades. But in the same period, Canada's total emissions increased – rising from 613 Mt in 1990 to 729 Mt in 2013. While the amount of emissions for each unit of production declined, the total volume of emissions still increased – and it grew substantially – because total production was expanding.

Similarly, between 1990 and 2014, in Alberta's oil sands industry, carbon intensity improved (declined) by about 31%. As the extraction process became more efficient, *less fossil fuel was burned per barrel extracted* – therefore reducing emissions per barrel. The problem is that the "gain" in the reduction in the amount of CO_2 per barrel (a reported 31% in that industry over twenty-four years) was more than offset by the huge increase in

the number of barrels produced over the same period, as the industry expanded. Between 1990 and 2014 production of bitumen more than quadrupled, from less than 400,000 barrels per day to 2.3 million per day. Total emissions increased from 15 Mt to 68 Mt per year. Carbon-intensity improvement in the oil sands industry has not been sufficient to stop the steady rise of emissions, because of continued expansion of production.

Looking ahead to 2030, there is no realistic prospect that future technological innovation will be able to reduce carbon intensity per barrel substantially enough and fast enough (within the next 10 to 15 years) to allow us to continue to expand bitumen production and simultaneously achieve any absolute reduction of oil sands emissions.[5] Growing future production will mean increasing emissions, which is exactly what the most recent projections tell us: see the December 22, 2016 *Reference Case* data. Between 2014 and 2030, production is expected to grow from 2.306 million bpd to 3.967 million bpd, and emissions will increase from 68 Mt to 108 Mt.

If the *Framework* is suggesting that between now and 2030 we can reduce emissions in the oil sands industry, it is misleading. The evidence does not support that claim.

The *Framework* lists three "short-term opportunities" to reduce industry emissions. The first mentioned is "implementing regulations *to reduce methane … emissions"*. Methane emissions are an important share of oil and gas sector emissions, especially in natural gas production and processing. Although the *Framework* document provides no specific numbers, other sources indicate that, if fully implemented, strong methane regulations could possibly cut Canada's total annual emissions level by as much as 20-25 Mt in the next decade – a significant contribution to meeting the 2030 target. In June 2016, Canada, the U.S., and Mexico announced a joint strategy to reduce methane emissions 40-45% by 2025. Canada promised that its final regulations would be published by late 2017. But in April 2017, our government announced that development of the regulations would be delayed three years – until 2019. The plan remains uncertain.[6]

The other two "short-term opportunities" are so hopelessly generic that they provide Canadians with no guidance at all on what might be achieved between now and 2030. *Improving energy efficiency* and *investing in new technologies* are two universally recognized strategies to reduce emissions. But in the absence of specifics, reciting these truisms tells us nothing. Success will depend entirely on the crucial details: the timing and stringency of future regulatory schemes that fix mandatory emissions standards; the level and rate of increase of carbon taxes over the next decade, aimed to give industries an incentive to improve energy efficiency and to invest in new technologies; the economic viability of new technologies; the impact of potentially lengthy delays before new technologies can be widely enough adopted to start appreciably reducing emissions; and the willingness of political leaders to actually implement carbon pricing or other policies that may be unpopular and will be strongly resisted by some industries.[7]

Despite all the bright promises that we will "seize opportunities unlocked by technological innovation", the *Framework* concedes that there will be no absolute reduction of "Industry" emissions by 2030 below the 2014 level. We might slow down emissions growth in some specific parts of Canada's heavy industry – and even achieve

absolute cuts in selected industries. Methane regulations may reduce the share of natural gas emissions. But none of that reduction will come from the oil sands. The total will continue to grow. Based on our current policy, the main driver of our emissions growth, the oil sands industry, will continue on its present path.

What then is really promised about the industry sector under the *Pan-Canadian Framework* plan? It tells us that "heavy industry (including oil and gas)*"* will achieve a reduction of 56 Mt by 2030, below the combined level of 330 Mt projected by the *Reference Case*. But if we look carefully at the data, we see that the promised reduction by 2030 is only 12 Mt below the 2020 level. To achieve that modest cut, the plan requires that emissions in the traditional heavy industry sector, currently projected to increase by another 11 Mt between 2020 and 2030, will instead – all within ten years – abruptly cease that carbon intensive pattern of growth and decline substantially *below* their 2020 level, by an undefined amount. The document provides no detail about which of our major industries will provide the promised cuts, or what policies will achieve that result.

The "Industry" section is further discredited by an inexplicable omission of key evidence about B.C.'s proposed LNG industry. The *Framework* document (at page 52) lavishly praises B.C. LNG as "the cleanest in the world." LNG plants in B.C., it says, will transition "the world economy off of high carbon fuel". But it omits any evidence about the significant *emissions growth* in B.C. that will result if just two or three large LNG plants are built – a contingency that could raise Canada's oil and gas emissions by another 20 Mt to 30 Mt above the currently projected 2030 level.[8]

If we follow our ambitious plans to expand oil sands production, the burden of achieving deep emissions cuts in Canada will have to be shifted to the other six economic sectors. Development of B.C.'s LNG industry will increase that burden.

The *Pan-Canadian Framework* has not provided Canadians with any compelling evidence that we can obtain the needed deep emissions cuts from those parts of the economy.

Meeting the 2030 target

If we want to cut Canada's total emissions between 2020 and 2030 (to get to our 523 Mt target) without impeding the currently planned growth of the oil sands industry, *virtually all of the emissions cuts will have to come from the non-oil and gas sectors* (i.e., from transportation, electricity generation, buildings, industry, agriculture, and waste).

Figure I explains the problem we face. The top line shows the government's current projection for the growth of emissions from the oil and gas sector, taken from the December 22, 2016 *Reference Case*. Between 2020 and 2030, emissions will increase by 32 Mt – of which the expansion of oil sands emissions in that decade will accounts for 21 Mt. For details of oil and gas sector emissions growth, see Figure L at p. 41.

The second line shows that the balance of our emissions (from the other six economic sectors) will need to decline from their currently expected combined 530 Mt in 2020

down to about 290 Mt by 2030 – if we want to ensure that our total emissions by 2030 do not exceed 523 Mt:

Figure I: Cuts needed to meet the 30% reduction target (Mt CO_2eq)

	2020	2030	Change 2020-2030
Oil and gas sector emissions	201	233	**+32 Mt**
Other six economic sectors	530	290	**-240 Mt**
Total emissions in 2020	**731**		
Total emissions in 2030 (if target achieved)		**523 Mt**	

Source: All of the emissions projections shown in Figure I for 2020 and 2030 are taken from *Canada's 2016 Greenhouse Gas Emissions Reference Case*, with the exception of the 290 Mt number in the second line, which represents the notional upper limit in 2030 for the combined emissions from the other six economic sectors (i.e., transportation, electricity, buildings, heavy industry, agriculture, and waste) if Canada's total emissions by 2030 do not exceed the 523 Mt target.

A successful outcome would require an approximate 45% reduction of emissions from the other six sectors, all within about ten years, if oil and gas sector emissions continue to grow as projected in the *Reference Case*.

Even if regulations to reduce methane emissions in the oil and gas sector were successfully implemented during the next decade as promised in the *Framework* – so lowering the annual level of oil and gas emissions by about 20 Mt below the currently projected 233 Mt – the other six sectors would still have to collectively reduce their emissions by about 41%, within ten years, to meet the 523 Mt target.

Agriculture and Waste

The available evidence, however, tells us that two of the six sectors – Agriculture and Waste and Others – will make no contribution at all to the needed reductions. The *Reference Case* (Figure M at p. 42) shows that the combined emissions for these two sectors are expected to grow from 123 Mt in 2020 to 127 Mt by 2030. The more optimistic numbers labeled "Sectoral Reductions" in support of the *Pan-Canadian Framework* claim that the projected 127 Mt will be cut by a miniscule 4 Mt, down to 123 Mt by 2030: see Figure G at p. 24. Either way, the two sectors offer no expected reduction below the 2020 level.

Therefore, the entire burden of deep cuts between 2020 and 2030 will rest on just four sectors – Transportation, Buildings, Heavy Industry, and Electricity. To meet the 523 Mt target, these four sectors would have to achieve very deep cuts, about 50% below their

2020 levels. And that assumes the promised methane regulations will eventually be enacted, to provide their contribution to the needed reductions.

Transportation

The scale of that challenge is evident if we consider the case of the Transportation sector, which is the second largest source of emissions in the Canadian economy (23% of total emission). Transportation comprises all passenger vehicles, freight transport, rail, bus systems, and also domestic aviation and marine emissions.

The plan outlined in the *Pan-Canadian Framework* estimates that Transportation emissions will decline from an expected annual level of 168 Mt in 2020 down to 142 Mt by 2030, an total cut of only 26 Mt – less than 16% below the 2020 level. Of that amount, the first 11 Mt is expected under the *Reference Case* projections. The other 15 Mt depends on additional cuts promised by the *Framework* (Figure G at page 24).

In comparison, a 45% emissions reduction if applied *pro rata* to the Transportation sector would mean a cut of about 74 Mt over the next decade, reducing total transportation emissions from 168 Mt in 2020 down to about 94 Mt by 2030 – representing average cuts of *about 7 Mt every year*. That would be a stunning achievement.

But the available emissions data indicates the difficulties we face in achieving any deep cuts to transportation emissions. Over the entire ten years between 2005 and 2015, there was no absolute reduction in transportation emissions at all. Based on the *Reference Case*, between 2014 and 2020 the reduction is expected to be 3 Mt in total, over six years. Canada has so far demonstrated no capacity to achieve significant reductions in the transportation sector. Looking further ahead, the *Reference Case* shows that, taking into account all new policies adopted up to November 1, 2016, total transportation sector emissions are currently expected to decline from 168 Mt to 157 Mt in the next decade, a reduction of only 11 Mt over ten years, a little more than 1 Mt per year on average.

To achieve the additional cuts required in transportation to meet the 523 Mt target, we would need a massive and abrupt transformation of urban mass transit, in vehicle technology, and in methods of freight transport, starting by 2020.

In its brief discussion of transportation emissions (section 3.3 at pp. 17-18), the *Pan-Canadian Framework* contains no specifics or quantified information to show that kind of change is possible. It does not provide Canadians with any reasoned basis to believe we have the ability to achieve rapid and deep cuts in transportation emissions between 2020 and 2030 – at least not in the range of 40% to 50%, or anything approaching that. The 16% cut offered in the *Framework* suggests a puzzling lack of ambition – or perhaps it is an admission that we are going to have extreme difficulty in making cuts any deeper than that. The *Framework* simply recites a list of long-standing generic policies – a "wish list" that reiterates the kinds of claims and aspirations that have been familiar in Canada for the past ten years: we will have better "emissions standards", more "fuel efficient" cars and trucks, "cleaner fuels", more public transit, and so on.

> *The approach to transportation will include (1) setting and updating vehicle emissions standards and improving the efficiency of transportation systems; (2) expanding the number of zero emissions vehicles on Canadian roads; (3) supporting the shift from higher to lower-emitting types of transportation, including through investing in infrastructure; and (4) using cleaner fuels.*
>
> — *Pan-Canadian Framework,* December 9, 2016, page 17 (emphasis added)

In fact, for the past seven years in Canada we have had in place major federal policies aimed at containing transportation emissions – in particular, the *Passenger Automobile and Light Truck Greenhouse Gas Emission Regulation*, introduced in 2010. That regulation imposed emissions standards (more or less identical to the equivalent U.S. standards) on passenger vehicles for model years 2011 to 2016. A new set of standards was developed to apply to model years 2017 to 2025. In addition to the regulations, we have had for many years the benefit of general improvements in vehicle fuel efficiency.

All of that ought to be reducing our emissions.

But total transportation emissions since 2005 have not declined. Between 2005 and 2015 the annual level of emissions from "cars, trucks and motorcycles" (which covers about 90% of all emissions from passenger transportation in Canada, excluding only aviation, rail, and bus) declined a modest 2 Mt - from 85 Mt down to 83 Mt. That result indicates improved "fuel efficiency" and other related measures have had some positive effect, but the gains have been very limited – in part because at the same time we have had a growing population in Canada with rising numbers of vehicles on the road, and expanding cities with more commuters. In the same period, emissions from freight transport (which includes rail and heavy trucks) increased 12 Mt: see *National Inventory Report 1990-2015* (April 13, 2017) which provides the most recent data up to 2015. Looking ahead, for the period 2020 to 2030 the *Reference Case* shows a decline of 16 Mt for passenger transport, but freight transport increases 3 Mt. Other small changes result in a net reduction of 11 Mt over the next decade. Persisting emissions growth in freight transport is cancelling out some of the improvements in passenger transport. The overall gains are small.

Reversing the growth of emissions in freight transport, which is linked so closely to the flow of economic activity in a growing economy, will require massive changes in infrastructure. Once we decide to make those changes, it will take time. The *Pan-Canadian Framework*, by promising only a 16% cut in transportation sector emissions between 2020 and 2030, acknowledges the extreme difficulties we face in making emissions cuts in the Transportation sector that are any deeper than that.

But rather than making standards more stringent in Canada, we may soon see political and industry pressure to relax the existing regulations. President Trump announced on March 15, 2017 that he will roll back the Obama administration's regulations that impose stringent fuel-economy standards on U.S. carmakers for the 2022-2025 period, meant to cut carbon emissions: *Globe and Mail*, March 16, 2017, "Trump targets fuel-efficiency standards", Shawn McCarthy and Greg Keenan, http://www.theglobeandmail.com/report-

on-business/in-victory-for-auto-makers-trump-orders-review-of-vehicle-emissions-rules/article34312126/. Due to the integrated continental vehicle market, there are calls that Ottawa should loosen fuel-efficiency standards in Canada to protect our industry.

We are deluding ourselves if we take it from the *Pan-Canadian Framework* that we can count on large additional emissions cuts from sectors like transportation to compensate for continued growth of emissions in the oil and gas sector. In the specific case of the transportation sector, there is no evidence in the *Framework* to support that optimistic belief.

Heavy Industry

As we have seen, the *Pan-Canadian Framework* combined the industry sector and the oil and gas sector, treating them as one big group. It is useful to look at the industry sector alone.

The *Reference Case* projections tell us that based on current policy, heavy industry emissions will increase from 85 Mt in 2020 to an annual level of 97 Mt by 2030 (Figure M). A 45% reduction would mean cutting heavy industry emissions from 85 Mt in 2020 down to about 47 Mt by 2030.

The difference between 97 Mt and 47 Mt would require an extraordinary transformation of Canada's industry sector. The *Framework* provides us with no analysis to support the proposition that Canada's most emissions-intensive industries (which include chemicals and fertilizers, iron and steel, and cement) – all of which are heavily invested in plant and equipment that takes years to upgrade or replace – are going to turn on a dime and suddenly move aggressively to halt the very substantial growth of their emissions currently projected up to 2030 and, on top of that, achieve anything like a 45% reduction below the 2020 level.

We must therefore carefully scrutinize the claims made by the *Pan-Canadian Framework* about the future reduction of industry emissions. The December 22, 2016 document (see Figure G) tells us that *combined* heavy industry and oil and gas sector emissions will be reduced from a currently expected annual level of 330 Mt by 2030 (as projected in the *Reference Case*) down to 274 Mt – a substantial 56 Mt reduction. If that 56 Mt cut were obtained solely from the traditional industry sector, it would have to reduce its emissions from a projected 85 Mt in 2020 (and 97 Mt by 2030) down to 41 Mt by 2030.

The *Pan-Canadian Framework* suggests that a share of the 56 Mt cut can be achieved by a reduction of methane gas emissions in the oil and gas sector, but offers no specifics. Other studies indicate that proposed methane gas regulations, if fully implemented over the next ten years, could reduce the annual level of emissions – mainly in natural gas production and processing – by as much as 20 Mt to 25 Mt (see Note 6). If so, the remaining 30 Mt to 35 Mt of the promised cut will have be obtained from the heavy industry sector – reducing its total emissions from the currently projected 97 Mt down to about 61 Mt by 2030 (about 28% below their 2020 level).

But is even that possible? The *Framework* provides no detail about the sources or trend of emissions in the industry sector. Take the example of chemicals and fertilizers. According to the *Reference Case,* emissions in the chemicals and fertilizers sub-sector are projected to rise from 24 Mt in 2014 to 27 Mt by 2020, and rise again to 31 Mt by 2030. A 28% cut below the 2020 level would require a reduction to about 21 Mt by 2030. That would be a major transition. The *Framework* document warns that *"carbon pricing policies must minimize competitive impacts"* on these industries, which are described as "emissions intensive" and "trade-exposed." If stringent carbon pricing is not a realistic option, how do we drive the required changes – all within ten years? No policy measures are disclosed in the *Framework* document that explain what combination of regulations, carbon prices, and new technologies could bring about that kind of accelerated change. The claim that by 2030 there will be significant cuts in the industry sector below the currently projected 97 Mt is conjectural. It may happen. But the case has not been made.

Buildings

Buildings emissions under the *Reference Case* are projected to increase up to 2030. Residential buildings are stable (but not declining). The growth is driven by commercial buildings.

Figure J: Buildings emissions (Mt CO_2eq)

	2005	2014	2020	2030	change 2014-2030
Residential	46	46	45	46	**0 Mt**
Commercial	40	41	44	49	**+8 Mt**
Total	**85**	**87**	**89**	**94**	**+7 Mt**

Source: *Canada's 2016 Greenhouse Gas Emissions Reference Case*, Environment and Climate Change Canada, December 22, 2016, Table A13. Numbers may not sum to the total due to rounding.

If we are counting on the buildings sector to contribute something like a 45% reduction of its emissions over the next decade, the annual level would need to decline to about 49 Mt by 2030, including both commercial and residential – an absolute cut of about 40 Mt within ten years, assuming the reductions do not start until 2020.

The *Pan-Canadian Framework* plan, however, which is supposed to show how we can meet the 523 Mt target by 2030, proposes that buildings sector emissions will decline to only 66 Mt by 2030, an absolute cut of 23 Mt below the 2020 level.

New technologies and improved design (insulation, heating systems, and densification of cities) are already available to dramatically increase energy efficiency in buildings. In the case of new buildings, the impetus to incorporate these improvements is reinforced by more stringent building codes and municipal standards. But we cannot easily, or rapidly,

obtain the benefits of new low-emissions systems in all our buildings because the upgrading or replacement of older structures is painfully slow.

Also, in a growing economy, the amount of commercial floor space expands. Expanding commercial floor space (which increases the demand for heating and air conditioning) is the principal driver of emissions in this sector. Continued efficiency improvements in building technology has so far not been enough to bring about any actual cut in the emissions level. The reason is that while emissions per square foot are declining (at least for new buildings), the growing area of new commercial floor space is expanding the total volume of emissions, and outpacing the efficiency gains.

We therefore cannot assume that deeper cuts in the buildings sector will be available to compensate for the continued growth of emissions in the oil and gas sector.

Electricity

Electricity is the only economic sector that, according to the *Reference Case* projection, is expected to cut its emissions by 45% or more between 2020 and 2030. It already has a track record of successful reductions. Figure K gives a breakdown of electricity emissions according to the different fuel types used, reproduced from the *Reference Case*:

Figure K: Electricity generation emissions by fuel type (Mt CO_2eq)

	2005	2014	2020	2030	Change 2005-2020	Change 2020-2030
Coal	97	62	52	8	-45	**-44 Mt**
Refined Petroleum Products	11	5	3	2	-9	**-1 Mt**
Natural Gas	9	12	9	24	0	**+15 Mt**
Biomass	<1	<1	<1	<1	0	**0 Mt**
Total	**118**	**78**	**64**	**34**	**-53**	**-30 Mt**

Source: *Canada's 2016 Greenhouse gas Emissions Reference Case* Environment and Climate Change Canada (December 2016), Table A9.

In the *Reference Case*, electricity emissions are expected to decline from 64 Mt in 2020 to 34 Mt by 2030. That is a major contribution to meeting out target. The *Pan-Canadian Framework* suggests that even deeper cuts can be achieved, down to 17 Mt by 2030: see Figure G on page 24 above. The *Framework* plan proposes to eliminate all remaining

coal-fired electricity by 2030. If so, that would cut the 8 Mt of coal-related emissions shown in Figure K. That is feasible. But some of that may be replaced by natural gas.

A large proportion of Canada's coal-fired electricity generating plants have already been closed down. Between 2005 and 2014 Ontario completed the shutdown of all of its plants, which explains the sharp fall of coal-related emissions over that nine-year period (Ontario's actions accounted for about 32 Mt of that decline). The Province of Alberta is now committed to close all of its coal-based plants by 2030. Alberta's plan is included in the *Reference Case* projection, which estimates that by 2030 the few remaining coal-fired plants in Canada will be emitting only 8 Mt. As coal-fired plants are closed, some or all the "lost" electricity supply will be replaced by natural gas-fired plants – which explains the expected 15 Mt rise of emissions from natural gas use between 2020 and 2030 shown in Figure K. As a result, some of the gains from shutting the remaining coal-fired plants in Canada will be offset by additional emissions from natural gas. If all the "lost" coal-fired electricity supply is replaced by renewable sources (i.e., wind or solar), the emissions savings are greater.

To successfully achieve the full 17 Mt cut promised under the *Framework*, we would need to achieve an accelerated shift to renewables in the electricity sector over the next decade. Most of the large emissions reductions that can be obtained from eliminating coal-fired power in Canada are already accounted for in the *Reference Case* projection.

Summary

In total, the *Framework* identifies 120 Mt of reductions among the seven sectors of the Canadian economy that it claims will be achieved by 2030, below the 742 Mt level projected by the *Reference Case*. But to meet the 523 Mt target, we require cuts of 219 Mt below the 742 Mt level. The shortfall is about 100 Mt – almost half of what we need.

The *Framework* explains away the missing 100 Mt. It says 55 Mt will be covered by the purchase of emissions credits – which are not reductions that will occur in Canada at all. The other 44 Mt will be obtained, we are told, from future unspecified "additional measures" – which means by policies and solutions that have not yet been identified, and do not yet exist.

But even a substantial portion of the 120 Mt of identified cuts from specific sectors is conjectural. Let us assume, exactly as the *Framework* promises, that the transportation sector can deliver an additional 15 Mt cut over the next fourteen years, below the current *Reference Case* projection; that the buildings sector is capable of delivering an additional 28 Mt cut; and that the electricity sector can find an additional 17 Mt cut. Those account for only 60 Mt out of the promised 120 Mt. The *Framework* concedes that agriculture and waste together offer only 4 Mt. All five sectors promise 64 Mt over the next decade.

To achieve more than 64 Mt of reductions, under this plan we will be entirely dependent on obtaining deep cuts in the so-called "industrial" sector (which includes oil and gas). The plan promises cuts of 56 Mt in that sector (Figure G, p. 24), but none of that will come from the oil sands industry. Instead, this scheme requires that, within the next ten

years, we successfully reverse the currently projected rise of emissions in Canada's largest traditional industries, and move rapidly to deep reductions in chemicals and fertilizers, cement, iron and steel, etc. The document talks about non-specific solutions – "improving industrial efficiency" and "new technologies" – but offers no evidence that identifies committed measures (i.e. new regulatory standards for particular industries) that could drive such a massive transition. Carbon pricing is expected to play a central role in curbing industrial emissions, but the crucial question about the future stringency of carbon pricing will not even be decided until 2023, as the document confirms.

We cannot say by any standard of probity that this plan accounts for 219 Mt of emissions reductions. The claim that "greenhouse gas emissions associated with upstream oil development" (an expected 40 Mt rise in the annual level of oil sands emissions between 2014 and 2030) *"are accounted for and fit within our government's climate action plan"* is not supported by the evidence disclosed in the *Framework* document.

Twenty years ago, the Liberal Government of Jean Chretien made an ambitious commitment under the Kyoto Protocol (signed in 1997 and solemnly ratified in 2002) to reduce Canada's emissions 6% below the 1990 level by 2012. That would have required cuts to an annual total of 580 Mt. The Liberals left office in 2006. By that time, the Kyoto target was beyond reach. In 2005, Canada's total emissions were 738 Mt, rising to a peak of 750 Mt in 2007. The Liberal Government of the time set the oil sands industry on its path of rapid expansion, but did nothing to implement effective carbon reduction polices that had a chance of making the Kyoto target achievable. The Conservative Government of Stephen Harper formally abandoned the Kyoto target. In December 2009, the Conservatives made their own commitment to achieve, by 2020, a 17% reduction below the 2005 level, which would be 613 Mt. The *Reference Case* now tells us that by 2020 they will be about 731 Mt – less than 1% below the 2005 level.

We have had twenty years of assurances and promises. We are running out of time.

Time frame for cutting emissions: rising atmospheric CO_2 concentration

The *Pan-Canadian Framework* does not consider, or explain to Canadians, the narrowing time frame that remains to arrest the accumulation of carbon dioxide (CO_2) and other greenhouse gases in the atmosphere. It is helpful to re-state here why the next fifteen years are crucial.

The accumulating concentration of CO_2 is measured in parts per million (ppm), indicating the number of CO_2 molecules per million molecules of other gases in the atmosphere. An atmospheric carbon concentration level of 450 ppm is broadly equivalent to a 2°C increase in global average temperature (hence the name given by the IEA to its "450 Scenario"). That conclusion is based on the correlation, supported by the scientific evidence, between increases in the CO_2 concentration level and warming of the earth.

An unusual characteristic of CO_2, unlike methane for example, is that once the gas is released into the upper atmosphere it does not break down. It is only removed from the atmosphere when it is absorbed by the earth's surface – by dissolving into the upper

ocean (and slowly into the deep ocean) or by biological uptake into forests and plants. The problem is that we keep releasing more CO_2 into the atmosphere every year. Once we ultimately stop massive fossil fuel burning, the incremental increases in the atmospheric concentration will cease. It will decline slowly – but only over decades and centuries – so that from the perspective of the time frame that concerns us, the accumulated level by 2030 will be irreversible.

A comprehensive review of the long-term record of atmospheric carbon levels is found in *Climate Change 2013: The Physical Science Basis*, which is the first part of the Fifth Assessment Report (AR5) prepared by the Intergovernmental Panel on Climate Change (IPCC). See chapter 6, "Carbon and Other Biochemical Cycles", for a discussion of the long-term evidence (in particular pp. 465 – 472). The study was prepared by a group of scientists who assessed the most recent available findings about physical changes in the global climate system, including measurements of atmospheric gases.

> *The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. Carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil-fuel emissions and secondarily from net land use change emissions. The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification.*
>
> — *IPCC, 2013*: *Summary for Policymakers*, B.5 at page 11 (# 3)

Since before the beginning of human life on earth and up to the start of industrialization in about 1780, the CO_2 concentration level was never *higher* than 300 ppm. During the past 12,000 years, from the end of the last Ice Age until the advent of the industrial age, it was stable at about 280 ppm. In our lifetime the rate of increase has been accelerating. Since 1958 the level has risen by 84 ppm. Half of all human-caused carbon emissions have occurred since 1970: IPCC, 2014, *Summary for Policymakers*, SPM.3, p.7.

The carbon concentration level was 399.4 ppm in 2015. Each year the atmospheric measurements follow a cycle. April and May are the high point of the cycle, September the low. *But the annual average is moving up every year*. The annual mean global rise in 2015 was 2.92 ppm. The rise in the past four years has averaged about 2.5 ppm. In May 2015 the high, measured at the Mauna Loa Observatory in Hawaii, was 403.96. The monthly average in April 2017 was 409.01 ppm: see National Oceanic Atmospheric Administration (NOAA), Earth System Research Laboratory, Global Monitoring Division website, http://www.esrl.noaa.gov/gmd/ccgg/trends/global.html.

The third part of the IPCC's Fifth Assessment Report, *Mitigation of Climate Change* (published in 2014), includes an examination of the most recent research about the expected increase of atmospheric carbon levels over the next few decades and up to 2100. If we are thinking about the short-term goals to manage climate disruption, the paramount question is *how long do we have* before the atmospheric concentration of carbon dioxide and other GHGs drive warming above the 2°C threshold.

In examining that issue, scientists add together the warming effect of all the GHGs, principally carbon dioxide, methane, and nitrous oxide. The combined concentration is measured as "CO_2 equivalent" (CO_2eq). The most recent comprehensive studies indicate that if we do nothing the combined concentration level will exceed 450 ppm CO_2eq by 2030:

> *Baseline scenarios (scenarios without explicit additional efforts to constrain emissions) exceed 450 parts per million (ppm) CO_2eq by 2030 and reach CO_2eq concentrations between 750 and more than 1300 ppm CO_2eq in 2100.*
>
> — IPCC, 2014, *Summary for Policymakers*, SPM 3, p. 8 (emphasis added)

Baseline scenarios ("business-as-usual" scenarios) are studies that calculate future levels of accumulated GHGs in the atmosphere, based on the assumption that countries around the world *do not act to substantially reduce current patterns of coal, oil, and natural gas consumption.* If we continue on the present path, we will likely exceed the 450 CO_2eq level by 2030.

The above quotes are taken from the *Summary for Policymakers* that is included in each volume of the IPCC report. The Government of Canada approved the language of both documents, in late 2013 and April 2014, respectively. The above statements therefore summarize the key findings of science that have already been acknowledged by our government – and they indicate the nature of the scientific evidence that we would expect to see addressed in any proper environmental assessment that concerns the proposed expansion of oil sands production over decades.

No honest discussion about Canada's options for oil and gas development can take place without acknowledging the scientific evidence on this issue. It is an essential part of understanding the implications of what we decide to do. It sets the time frame.

What we do in the next fifteen years is of enormous importance. We have to move very quickly to diminish those incremental increases in the atmospheric concentration of CO_2 and other GHGs.

Conclusion

Apart from its omissions and evasions, and its lack of cogency and specifics, we cannot rely on the *Pan-Canadian Framework* because it has not been subjected to any kind of scrutiny by a public inquiry process. If Canadians are going to be told that the expected growth of emissions from Canada's expanding oil sands industry "fits within our national climate plan," the evidence and analysis relied on to support that claim must be disclosed and tested by an open inquiry.

A proper inquiry process must be *public* – because that is our guarantee that the evidence will not be pre-selected, or exaggerated, and that contrary evidence will not be brushed aside. The integrity of the process must also be protected by the basic principles of judicial independence, so we can be confident that the authors of the report, whoever they

may be, are not being influenced by pressures, discussions, or other sources of information that have not been tested in the hearing room, in public view.

The curse of a closed-door process, like the production of the new *Pan-Canadian Framework* document, is that government can quietly decide what issues will not even be discussed.

The *Pan-Canadian Framework* begins with a short statement about our commitments under the December 2015 Paris Agreement:

> *The Paris Agreement is a commitment to accelerate and intensify the actions and investments needed for a sustainable low-carbon future, to limit global average temperature rise to well below 2°C above pre-industrial levels, and to pursue efforts to limit the increase to 1.5°C.*
>
> — *Pan-Canadian Framework*, Introduction, p. 2

Canada's declared energy plan is to increase oil sands production from 2.3 million bpd in 2014 to 4.3 million by 2040 (it is expected to reach 3.9 million bpd by 2030: see Figure B). The economic case to justify the Kinder Morgan project is based on the assumption that global oil consumption will continue to grow for another twenty-five years. But we know that global oil production must begin to decline by about 2020 if we are going to have a fair chance to stay within the 2°C threshold. The *Framework* document is absolutely silent about that fundamental contradiction.

In April 2017, the monthly average atmospheric CO_2 concentration level reached 409.01 ppm. Ten years ago, the level was 382.67 ppm.

I repeat Kathryn Harrison's submission to the Ministerial Panel:

> *To embrace the economic viability of this project is to self-consciously make an economic bet on a world of catastrophic climate change.*

The public places great trust in you. We desperately need an informed public discussion. My request, as one of your constituents, is that you speak openly with the residents of Vancouver Quadra and address the unanswered questions.

We have very little time to find a safe path.

Yours truly,

David Gooderham
dagooderham@gmail.com

NOTES

1. The Government of Canada's emissions projections to 2030

In December 2016, the Government of Canada published *Canada's 2016 Greenhouse Gas Emissions Reference Case*, which provides emissions projections up to 2020 and 2030. The *Reference Case* report is based on actual emissions data up to 2014 (emissions results for 2015 did not become publicly available until April 2017). Emissions are divided into seven main economic sectors, with detailed breakdowns for specific industries and types of activity in each sector. Figure L, based on Table A6 in the *Reference Case*, shows the projections for the sub-sectors of the oil and gas industry. Oil and Gas is Canada's largest emitting sector, accounting for 26% of total emissions.

Figure L: Oil and gas sector emissions by production type (Mt CO_2eq)

	2005	2014	2020	2030	Change 2005-2030	Change 2014-2030
Natural Gas Production and Processing	58	57	50	56	-3	**-1 Mt**
Conventional Production	31	36	31	32	+1	**-4 Mt**
Oil Sands	34	68	87	108	+74	**+40 Mt**
Oil and Natural Gas Transmission	12	10	9	10	-3	**0 Mt**
Downstream Oil and Gas	23	23	23	23	0	**0 Mt**
Liquid Natural Gas Production	0	0	0	3	+3	**+3 Mt**
Total	**159**	**192**	**201**	**233**	**+73**	**+41 Mt**

Source: *Canada's 2016 Greenhouse gas Emissions Reference Case* Environment and Climate Change Canada (December 2016), Table A6. Environment Canada notes that numbers may not sum due to rounding. I have added the column on the far right, showing the projected change from 2014 to 2030.

The *Reference Case* projections for all seven sectors are shown in Figure M. Note that the oil and gas sector and the heavy industry sector, which are discussed as one single "Industry" section in the *Pan-Canadian Framework* document, comprise the two largest sources of expected emissions growth.

Figure M: Emissions projections to 2020 and 2030 (Mt CO_2eq)

	2005	2014	2020	2030	Change 2020-2030	Change 2014-2030
Electricity	118	78	64	34	-30	**-44 Mt**
Transportation	171	171	168	157	-11	**-14 Mt**
Oil and Gas	159	192	201	233	+32	**+41 Mt**
Heavy Industry	88	76	85	97	+12	**+21 Mt**
Buildings	85	87	89	94	+5	**+7 Mt**
Agriculture	70	73	72	74	+2	**+1 Mt**
Waste and Others	56	54	51	53	+2	**-1 Mt**
Total	**747**	**732**	**731**	**742**	**+12**	**+10 Mt**

Source: *Canada's 2016 Greenhouse Gas Emissions Reference Case* Environment and Climate Change Canada (December, 2016), Table A5. Environment Canada notes that numbers may not sum due to rounding. I have added the two columns on the right showing the projected changes for each sector.

On April 13, 2017, the government published a new report covering emissions data up to 2015: the *National Inventory Report 1990-2015: Greenhouse Gas Sources and Sinks in Canada*. The *Executive Summary* is available at https://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=662F9C56-1. The *National Inventory Report* does not include projections to 2020 or 2030. It is limited to providing reported emissions up to 2015, and includes some adjustments or revisions to previously reported results for 2014 and earlier years. Figure N shows the updated emissions for all sectors:

Figure N: Canada's GHG emissions by economic sector 2005-2015 (Mt CO_2eq)

	2005	2009	2010	2011	2012	2013	2014	2015
Oil and Gas	158	158	160	161	174	185	190	189
Electricity	117	95	96	89	85	82	80	79
Transportation	163	163	171	171	173	176	173	173
Emissions Intensive & Trade Exposed Industries	86	71	73	80	79	77	77	75

Buildings	85	84	81	87	85	85	88	86
Agriculture	74	70	70	70	71	74	72	73
Waste & Others	54	49	50	50	49	49	48	48
National GHG Total	**738**	**689**	**701**	**707**	**716**	**729**	**727**	**722**

Source: *National Inventory Report 1990-2015, April 13, 2017* Table S-3 p. 13.

The April 2017 report (Figure N) contains adjusted emissions results for the year 2014, and in some cases for the preceding years, which differ slightly from the 2014 emissions numbers used in the December 2016 *Reference Case*. These revisions reduce the overall total for 2014 down to 727 Mt, from the previously reported total of 732 Mt. But a close look at these adjustments indicates that, for six out of the seven sectors, the main trend of emissions over the period 2005-2014 remains basically unchanged. Transportation emissions for the year 2014 are now reported as 173 Mt, up from the 171 Mt given in the *Reference Case*. Electricity is also adjusted up by 2 Mt. For the oil and gas sector, the 2014 figure is now reported as 190 Mt, down from 192. The industry and the buildings emissions have been adjusted upwards by 1 Mt each, Agriculture down by 1 Mt.

The only *substantial* revision is a 6 Mt reduction to the Waste sector, which for the year 2014 is now reduced to 48 Mt, down from 54 Mt – a relatively large adjustment that applies to all previous years for the Waste sector, going back to 2010 (indicating a pattern of consistent over-reporting of Waste sector emissions, which has now been corrected). Mainly as a result of that correction, the annual totals going back a number of years have been revised downwards (i.e., the 2013 total is now given as 729 Mt, compared to 731 Mt in the *Reference Case*). But for the purpose of understanding the future outlook, that adjustment does not indicate any sudden downtrend of emissions in the other six sectors. The new April 2017 report confirms the persisting trend: electricity is the only sector showing a substantial decline in emissions. Oil and gas shows steady emissions growth, interrupted only in 2015. All the other sectors are more or less flat.

The April 2017 report confirms that in 2015 emissions from the oil sands sub-sector continued to increase:

Figure O: Oil sands emissions 2005 to 2015 (Mt CO_2eq)

	2005	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**
Oil sands	35	53	55	60	64	68	71

Source: *National Inventory Report 1990-2015: Greenhouse Gas Sources and Sinks in Canada*, Environment and Climate Change Canada (April 13, 2017), Table 2-12.

The 3 Mt rise in oil sands emissions in 2015 was offset by a 4 Mt drop of emissions in natural gas production and processing (-1 Mt), conventional oil production (-2 Mt), and refining (-1 Mt). The explanation for those reductions is that the massive decline in global oil prices that started in July 2014 had, by 2015, begun to slow the level of conventional oil and gas activity in Alberta and other provinces, reducing emissions in those sub-sectors. There was also a reduction in the volume of upgrading in the oil sands industry in response to the collapse of oil prices.

However, the flattening out of emissions growth in the oil and gas sector in 2015 was unrelated to any advances in Canada's emissions policy, or to any technological improvements in production methods. It was due to low oil prices.

2. Calculating the impact of new pipelines on Canada's total emissions

The original promise made by the Liberal Government to Canadians was that an emissions assessment for both Kinder Morgan and Line 3 would examine the pipeline's *"potential impact on Canadian and global emissions"*: see the notice published in the *Canada Gazette* on March 19, 2016, "Estimating upstream GHG emissions" (http://www.gazette.gc.ca/rp-pr/p1/2016/2016-03-19/html/notice-avis-eng.php).

In the case of the Kinder Morgan expansion project (planned to provide 590,000 bpd of new capacity), the emissions assessment report found that the share of expanded oil sands production carried by the added shipping capacity would add 13 Mt to 15 Mt of new emissions to Canada's annual total: *Report*, November 15, 2016, s. A.5 "Estimated Upstream Emissions" (http://ceaa-acee.gc.ca/050/documents/p80061/116524E.pdf).

Despite that, the report claims that the amount of additional emissions caused by the Kinder Morgan pipeline will be "minimal", provided long-term oil prices in 2020-2040 are above US$80: *Report*, s. B.4.4.1.3 and Table 8, pp. 38-39. The assessment uses a special formula (called the "methodology") to calculate the impact of a new pipeline on the level of Canada's total emissions. The methodology is explained in the notice published by the Liberal Government on March 19, 2016. It directs that the assessment should not count the increased amount of emissions that will be released during production of the expanded output that will be shipped by the new pipeline *if the increased production could be economically transported by "an alternate mode of transport"*.

If rail transport could be an economically viable alternative, then the assessment is obliged to decide that the increased production to be carried in the proposed pipeline *will be produced anyway, even if the pipeline were not built*. In that case, the new pipeline is deemed not to make emissions any worse – because the increased production would still occur even if the new pipeline were not approved.

The Kinder Morgan assessment calculated that as long as long-term oil prices (looking ahead to 2020-2040) are above US$80 per barrel, rail would be an economically viable way to ship bitumen. Shipping oil by rail costs US$10 more per barrel than by pipeline.

The NEB in January 2016 produced a forecast that long-term oil prices will increase to about US$78 per barrel by 2020 and will continue to rise gradually to US$102 by 2040.

Following this formula, the Kinder Morgan assessment decided that if long-term oil prices are about US$80 (as the NEB forecasts they will be) approval of the Kinder Morgan pipeline will only cause "minimal" increases in Canada's total emissions.

The rationale is that Canada's total GHG emissions will not increase if Kinder Morgan is built because *the same amount of oil would still be extracted (and shipped by rail) if the pipeline were not built*. By this reasoning, the pipeline is not "enabling" any increased oil production. The increased production would happen anyway.

In truth, the accumulating concentration of CO_2 emissions in the atmosphere is the problem we are trying to solve. If we are trying to solve that problem, the distinction between pipelines and rail transport is meaningless: the amount of emissions released into the atmosphere from expanding oil sands production in Alberta will be the same – whether the additional output is shipped by pipeline or shipped by rail. It is the rising level of production that we need to control.

The emissions assessment report for Line 3 (published on April 25, 2016) found that the additional emissions associated with the increased volume of production carried by Line 3 would be approximately 9.5 Mt to 13 Mt of CO_2eq per year. Applying the same "methodology", the Line 3 report concluded that the increased emissions caused by building Line 3 would be "minimal', based on same assumptions about long-term oil prices: http://www.ceaa.gc.ca/050/documents/p80091/114134E.pdf.

Accepting the findings in these two reports, the volume of additional production represented by the combined new capacity of both projects (980,000 bpd) will generate between 22 Mt and 28 Mt of additional GHG emissions. According to the *Reference Case*, the total projected increase in oil sands production between 2014 and 2030 – about 1.6 million bpd – will increase our annual emissions by 40 Mt: see Figure B on page 5. The two projects approved on November 29, 2016 will facilitate more than 50% of all oil sands production growth (and emissions growth) to 2030. That is hardly "minimal."

The proposed Energy East pipeline, with a capacity of 1.1 million bpd, is awaiting approval. In addition, the U.S. State Department granted a permit for the construction of Keystone XL on March 25, 2017, previously rejected by the Obama administration. Keystone offers 830,000 bpd of shipping capacity to U.S. refineries.

3. Newsletter to constituents from Joyce Murray, M.P. (January 2017)

Joyce Murray's January 2017 newsletter addressed to residents of the Vancouver Quadra constituency appeared a month after the government's decision approving the Kinder Morgan pipeline project and the Line 3 project. The newsletter did not mention the pipeline decision. Apart from a Lunar New Year greeting, the only message in the two-page letter was this:

BUILDING A SUSTAINABLE SOCIETY:

Phasing out coal-fired power generation

Prime Minister Justin Trudeau's decision to phase out coal-fired power in Canada by 2030 is a concrete step forward in reducing harmful pollutants and meeting Canada's international climate commitment. Importantly, it will improve the health of many Canadians, especially children and seniors who suffer from asthma.

Eliminating coal power will push the provinces to develop smart, integrated clean-energy systems to deliver reliable and affordable power where it is needed. That in turn will accelerate Canada's transition to an innovative clean growth economy with new, clean-energy jobs for the middle class.

Although BC already produces most of our power from non-emitting sources, primarily hydro, coal is a significant source elsewhere in Canada. Eliminating coal-fired electricity will achieve fully 10% of the Government of Canada's 2030 Paris climate target, and will support our government's goal of using only clean, renewable energy in federal buildings and facilities by 2030.

Vancouver Quadra residents are strongly committed to environmental sustainability and clean energy. I look forward to more opportunities to hear your views, and I will continue to ensure your voice is heard in Ottawa.

— Joyce Murray, M.P., January 2017 (emphasis added)

4. The 100 Mt cap

A note in *Canada's 2016 Greenhouse Gas Reference Case* explains that the 100 Mt cap, although it has been adopted by legislation in Alberta, will in fact do nothing to curb the projected rise of oil sands emissions up to 2030. The reason is that the 100 Mt upper limit is set too high to have any practical impact on the expected growth of production over the next fourteen years:

> *Based on the Alberta Government's announcement, Alberta's 100 Mt cap on oil sands emissions excludes emissions from cogeneration of electricity and new upgrading. When taking these into account, total emissions from oil sands is 93 Mt in 2030 under the reference case scenario, below the 100 Mt cap.*
>
> — *Reference Case*, section 2 "Emissions projections by sector", note 4, p. 7

Although it is not commonly understood, the 100 Mt cap does not apply to, or restrict, the growth of, *additional emissions* generated by the expansion of "new upgrading" in Alberta. Upgrading is a highly emission-intensive process that converts raw bitumen into a higher-value crude oil before it is shipped to foreign refineries for further processing. The cap also exempts additional emissions attributed to cogeneration. So under this

scheme, total oil sands emissions (including upgrading and cogeneration) will be allowed to rise to about 115 Mt, or somewhat higher than that, before they exceed the cap. The projected 108 Mt of oil sands emissions shown in Figure B is in fact within the cap limit, and represents only 93 Mt of oil sands emissions as defined by the cap.

5. Technology

Section B.2.6 is the only portion of the Kinder Morgan report that touches on the important question of whether *technology* might enable the oil sands industry to reduce emissions, even if production continues to expand. But the final version of the report released on November 25, 2016 tells us nothing, beyond this bare assertion:

> *Over time, new technologies and policies will be developed that will change the emissions intensity and economic feasibility of oil production in Canada and globally, as well as act to change the attractiveness of alternatives to oil.*
>
> —*Kinder Morgan Emissions Report,* section B.2.6, at p.29

The availability of these unspecified "new technologies" is conveniently set in the indefinite future. There is no discussion about *when,* or by how much, these technologies will be able to reduce the emissions intensity of oil sands production. The truth appears to be that the efficacy, cost, and timing of their availability on a commercial scale is so uncertain that the report is unable to offer Canadians – and does not provide - any estimate of when, or by what amount, they might in future reduce oil sands emissions.

Carbon capture and storage (CCS) is the only emissions reduction technology specifically referred to in the Kinder Morgan report, where it is mentioned in the discussion about whether continued growth of oil sands production level up to 2040 can be consistent with a 2°C world. The report summarizes four studies. Three of the scenarios assume there will be large-scale adoption of CCS by 2020 or 2025. One study (McGlade and Ekins 2015) found that even with widespread adoption of CCS technology starting by 2025, Canadian oil sands production would have to be seriously curtailed and that, *without CCS, all bitumen production in Canada would have to cease by 2040* (section B.2.6, p. 28). A second study (Bataille, C., Sawyer, D., Melton, N. *Pathways to deep decarbonization in Canada*, SDSN and IDDRI, 2015) found that continued long-term growth of production might be feasible with acceptable levels of emissions, but would require large-scale adoption of CCS technology and *"significant innovation of currently unknown technologies"*.

Based on these studies cited by the Kinder Morgan report, it is clear that large-scale deployment of CCS technology by 2020 or 2025 is an essential precondition for *any* prolongation of the oil sands industry at currently projected levels of production – *if* the industry is going to substantially reduce its emissions. Yet the report omitted any discussion about the *economic viability* of large-scale use of CCS technology in the oil sands industry. In actuality, the high cost of CCS is a major issue.

It is true that in 2008 the Province of Alberta under a plan called *Alberta's 2008 Climate Change Strategy* launched an ambitious scheme to deploy CCS technology on a very large scale. At the heart of Alberta's 2008 plan was the ambition to continue rapid oil sands production, with the declared expectation that as early as 2020 the installation of CCS would avoid any further increase in the absolute level of oil sands emissions. Indeed the plan promised that by 2020 new CCS technology installations *would already have reduced oil sands emissions 30 Mt below the baseline projection*.

In fact, only two CCS installations have been built in Alberta since 2008[†], paid for mainly by taxpayers, and no more are planned. In 2014, the government of Alberta quietly abandoned its entire CCS strategy. That is a fact not known to most Canadians, and hardly touched on in public discussion. By then, seven years had passed since the Alberta plan was unveiled. Four carbon capture projects in Alberta were originally announced. Two were later cancelled. No further government funding had ever been committed to support further projects. On July 18, 2014, *The Globe and Mail* published an article headlined "Alberta leadership hopeful Prentice lets carbon capture go". Jim Prentice, a former federal cabinet minister then campaigning to become the new leader of Alberta's governing Conservative Party, was quoted as follows:

> *"I don't believe carbon capture and storage is the panacea," he said. "It's not capable of achieving the reductions in emissions that are required, and it is expensive, and in certain contexts, it's quite unproven."*
>
> — *The Globe and Mail*, July 18, 2014 (emphasis added)

He described CCS as a "science experiment. The current NDP government in Alberta, elected in 2015, campaigned on a promise to end the "costly and ineffective carbon capture and storage experiment".

Not long after Alberta confirmed in 2014 that it was dropping support for carbon capture and storage (CCS), a panel of experts on technological innovation in the oil sands industry completed a major report called *Technological Prospects for reducing the Environmental Footprint of Canadian Oil Sands*: http://www.scienceadvice.ca/uploads/ENG/AssessmentsPublicationsNewsReleases/OilSands/OilSandsFullReportEn.pdf.

The study was originally commissioned by Natural Resources Canada, with the support of Environment Canada. A panel of twelve leading engineers and other experts, the majority of them from Alberta and all experienced in oil sands extraction and processing,

[†] The "Quest Project" is one of two completed CCS installations in Alberta, located at Shell Canada's Scotford upgrader near Edmonton. Designed to capture and inject underground 1.2 Mt of CO_2 every year, it became operational in November 2015. That represents 35% of the total CO_2 emitted annually from the upgrader's steam methane units, which produce hydrogen for upgrading bitumen. The capital cost was about $1.35 billion, two-thirds of which was paid for by the Canadian and Alberta governments. Between 2009 and 2014, the total volume of emissions from oil sands operations in Alberta increased by an additional 4 Mt every year, on average. To offset the growth in that period, the industry would need to have completed about 15 Quest-sized CCS installations.

were appointed to examine whether technological innovation has the potential to significantly reduce the environmental footprint of oil sands development. The resulting report, which was released on May 26, 2015, reviews the entire range of carbon reduction technologies currently available or under development, including technologies still at the experimental stage that may become commercially available within the next 15 years. The report deals specifically with CCS. It identifies *the high cost of carbon capture technology* as the principal barrier to any large-scale adoption of the technology in the near future: see sections 6.2.1 – 6.2.5 and 6.3, at pp.123-130.

The panel's overall conclusion is significant: the report explains that if oil sands production continues to expand in line with the industry's growth forecasts outlined in 2014, *it will not be possible to achieve any significant reductions in carbon emissions until sometime after 2025 or 2030*. In other words, if oil sands production levels continue to grow, so will emissions. According to the panel, none of the existing or emerging technologies (including CCS) have the capability to substantially lower CO_2 emissions per barrel in oil sands production, at least not for another ten or fifteen years.

In the specific case of CCS, the *Technological Prospects* report concludes it will have a very limited role in future efforts to reduce emissions in the oil sands. The panel's broad conclusion is that CCS is too expensive to be adopted during the next ten to fifteen years. Due to the huge capital investment needed for a single CCS installation, the technology is most promising for very large industrial sites (e.g., coal-fired electrical generating plants) that generate very high volumes of concentrated CO_2 at a single location. The report explains that in the oil sands the most likely future use of CCS will be in applications that capture emissions from *hydrogen production in upgraders* – a specialized high-emitting industrial activity connected to processing bitumen at open-pit mining operations. But upgraders are a relatively small part of the oil sands emissions problem in Alberta.

In comparison, the fastest expanding area of bitumen production – and therefore the fastest growing source of emissions – is in situ (underground extraction) operations, which are smaller in scale. The panel was not optimistic about the prospects that CCS can ever become an affordable technology at these smaller-scale in situ sites, because they do not offer the needed high volume of emissions to justify the cost:

> *More expensive would be the capture of CO_2 from in situ projects because these represent smaller and geographically dispersed sources of emissions.*
>
> — *Technological Prospects*, p. 130 (emphasis added)

Even after the expensive technology is installed, operating expenses are substantial. The "capture" stage, which involves compressing huge volumes of separated CO_2 gas, is a highly energy-intensive process; that process consumes a lot of natural gas, which adds to costs (and ironically it also adds to carbon emissions at the site).

The panel's report makes it clear that, mainly for reasons of cost, carbon capture technology is unlikely to have any significant impact on reducing oil sands emissions until after 2025-2030, and even then its future application may be limited to a relatively

small portion of the industry's future emissions. The panel also identifies another difficulty that will impede efforts in the future to adopt CCS technology:

> *... retrofitting an existing facility to capture CO_2 is generally more expensive per tonne of CO_2 sequestered than designing a new one to include CCS from the start ... This is important in a fast-growing industry such as the oil sands where the rapid pace of development may "lock in" existing capital equipment and processes.*
>
> — *Technological Prospects*, p. 128 (emphasis added)

Ten or fifteen years from now (by which time CCS may become an affordable technology), we will have already locked in a growing share of oil sands production that will be operating with older, more carbon-intensive methods.

6. Reduction of methane emissions

The Liberal Government announced a year ago that it would enact regulations to reduce methane gas emissions in the oil and gas industry by 40-45% below 2012 levels by 2025. That measure, which is listed in the first tranche of proposed reductions on page 44 of the *Pan-Canadian Framework*, if fully implemented, could account for as much as 20-25 Mt CO_2eq of reductions by 2025. A reduction on that scale would be a significant contribution, accounting for about 10% of the additional reductions needed to meet the 2030 target. For purposes of emissions reporting, methane (CH_4) is converted into an equivalent CO_2 value.

Based on the *Reference Case*, methane emissions from all sources in 2014 totalled 108 Mt CO_2eq (representing about 13% of all emissions in Canada). Of that amount, 48 Mt was generated by the oil and gas sector, mostly in Alberta and B.C., where it is associated mainly with natural gas extraction and processing activities. Of the remaining amount, 29 Mt CO_2eq of methane was released by the agricultural sector and 28 Mt by the waste and other sector: see *Reference Case*, Table A18. Methane emissions are not a significant factor in the oil sands industry. The proposed regulations – if enacted – will not significantly slow down the growth of oil sands emissions.

Methane emissions in the oil and gas sector are broadly acknowledged to be a compelling opportunity for reductions. A large proportion is caused by the *deliberate flaring or venting of natural gas into the atmosphere* and by "fugitive" leaks during natural gas production, transmission, storage, and processing. Technologies to monitor and reduce leaks are available and economically viable. For a detailed discussion, see *Economic Analysis of Methane Emission Reduction Opportunities in the Canadian Oil and Natural Gas Industries*, Environmental Defence Fund, October 2015, https://www.pembina.org/reports/edf-icf-methane-opportunities.pdf .

Originally, on June 29, 2016, Canada, the U.S., and Mexico announced a joint strategy to reduce methane emissions 40-45% by 2025. The Canadian government promised that its final regulation would be published by late 2017, with the first requirements coming into

force as early as 2018. On that basis, the methane plan was given some prominence in the *Framework* document when it as published on December 9, 2016.

The future of the regulations is now uncertain. After the inauguration of the Trump administration, the U.S. indicated that it was going to back away from the proposed scheme. On March 2, 2017, the U.S. Environmental Protection Agency (EPA) announced that it had rescinded a rule requiring that the U.S. oil and gas industry disclose information about methane emissions, which was to have been the first step in developing the U.S. regulations. Complaints then surfaced in Canada that the Canadian industry would become "uncompetitive" if it is forced to implement stringent methane reductions in Canada. On April 15, 2017, Canada's Environment Minister, Catherine McKenna, confirmed that the development of the proposed methane regulations will now be *delayed for three years* – until 2019, which is after the next federal election. If enacted, they will not take effect until 2020 at the earliest and won't be fully in place until 2023: *Energy Now*, April 21, 2017 (http://energynow.ca/canada-delays-methane-regulations-for-three-years-following-u-s-retreat/). The Minister explained the delay: "We need to listen to industry … make sure we are understanding the perspective of industry and understanding the science" (http://www.cbc.ca/news/politics/methane-emissions-regulations-changes-1.4078468).

7. Carbon pricing

In making its ambitious claims about future emissions reductions, the *Pan-Canadian Framework* relies heavily on the efficacy of carbon pricing as the key measure that will deliver deep emissions reductions by 2030. But the pricing scheme described in the *Framework* is incomplete. The most essential element of the scheme, the stringency of the future carbon price, has not been agreed. In the absence of that information, the supposed benefits of carbon pricing in Canada are conjectural.

According to the *Pan-Canadian Framework* document, carbon pricing (by means of a carbon tax, or a cap-and–trade system, or a carbon levy with a performance-based system) is one of the "four pillars" of what it calls a comprehensive plan: see section 1.2, "Pillars of the Framework", p. 2. An introductory section ("Pricing Carbon Pollution", p. 6) emphasizes that carbon pricing is "a central component of the Pan-Canadian Framework". The document makes clear that, in order to meet the promised emissions reductions, heavy reliance will be placed on the use of a gradually rising price on carbon to encourage producers and consumers to switch away from carbon-intensive systems and products, to encourage low-carbon innovation, and to support a transition to renewable energy sources. The report confirms the principle that carbon price increases *"should occur in a predictable and gradual way to limit economic impacts*". In the particular case of industry, the document cautions:

> *Carbon-pricing policies should minimize competitiveness impacts and carbon leakage, particularly for emissions-intensive, trade-exposed industries.*

And so, as the document acknowledges, there are limits on how high the carbon price can be. None of these points are new. It is widely understood that excessively rapid increases

in carbon prices could impose hardship on many individuals and businesses and could severely disrupt sections of the economy, especially emissions-intensive industries that are exposed to foreign competitors.

What do we know so far about the proposed carbon price in Canada? The Federal Government has announced a benchmark for carbon pricing requiring that the carbon price for all jurisdictions in Canada will start at a minimum of $10 per tonne in 2018 and rise by $10 per year, to $50 per tonne by 2022. The scheme, summarized in the *Framework* document, provides that any further increase in the carbon price will not be decided until "early 2022":

> *The overall approach will be reviewed by early 2022 to confirm the path forward, including continued increases in stringency. The review will account for progress and the actions of the countries in response to carbon pricing, as well as recognition of permits or credits imported from other countries.*
>
> — *Pan-Canadian Framework*, p. 49

That means the Federal Government and the provincial governments have agreed only that we will have a carbon price of $10 by 2018 and that it will rise to $50 by 2020. There does not yet exist any defined carbon pricing plan for Canada that ensures prices will rise above $50 after 2022. We do not know what the carbon price might be during the seven years after that, up to 2030 – or indeed whether it will increase at all.

The key factor in determining the effectiveness of any carbon pricing scheme is the *stringency* of the price: the cost of emitting CO_2 must be set high enough to ensure that businesses and consumers are motivated to switch away from carbon-intensive technology, products, and services – and to do that quickly enough to meet our emissions reduction target by 2030.

At present we have no idea at all what the stringency of the carbon price might be after 2022. Therefore, we cannot possibly know if the ambitious claims about emissions reductions made in the *Framework* (specifically in the "Sectoral Reductions" table) have any plausibility. If carbon pricing is the main policy we are going to rely on to achieve, for example, deep emissions cuts in the heavy industry sector, how can we possibly have any confidence that emissions in that sector, currently expected to reach 97 Mt by 2030 based on the *Reference Case* data, are going to be somehow reduced to 61 Mt or something of that kind (no actual estimate is even provided) if we do not know what the carbon price is going to be during the next decade?

While most of us are not experts in energy economics and carbon prices, there is ample information currently available from well-respected sources to indicate that a carbon price rising from $10 in 2018 to $50 by 2022 is not remotely stringent enough to deliver the reductions promised in the *Pan-Canadian Framework* – not unless it is supplemented by other regulatory schemes that stipulate maximum GHG emissions or emissions intensities for specific industries or activities.

On September 20, 2016, Marc Jaccard and research associates Mikela Hein and Tiffany Vass at the School of Resources and Environmental Management at Simon Fraser University published a study entitled *"Is Win-Win Possible?"*: http://rem-main.rem.sfu.ca/papers/jaccard/Jaccard-Hein-Vass%20CdnClimatePol%20EMRG-REM-SFU%20Sep%2020%202016.pdf. Jaccard is an energy-economist at Simon Fraser University. His focus is around energy economics and technology. He writes with refreshing realism about how quickly a major transition can take place in our energy system.

Jaccard discusses the feasibility of relying on carbon taxes as the principal policy to reduce emissions in Canada over the next fourteen years. He concludes that in order to achieve our reduction target by 2030, the carbon price (whether federal or imposed provincially) would have to eventually rise to about $200 per tonne of CO_2 – an extraordinarily high level compared to current proposals. His view is that public antipathy to carbon taxes and political unwillingness to impose robust prices (at least at the high level required to hit our 2030 target) is so deeply entrenched that if we count on carbon taxes, we will never get there.

As an alternative, he looks at solutions based on "flexible regulations" (not relying too much on carbon taxes) to achieve rapid transitions in all economic sectors. He discusses California's regulatory approach. He contends that if governments were to aggressively adopt regulations for specific industries – supplemented by a relatively low carbon tax – we could actually get to the 2030 target. His proposed regulatory measures, however, are far-reaching and would require a rapid (within fourteen years) and costly transition of energy use in many industries.

What is unusual about the Jaccard paper, amid all the mitigation scenarios and especially the government projections looking into the future, is the force of his comments about how much the outcome will depend on the uncertain direction of public attitudes, political willingness, and the response (or resistance) of specific industries – as much as it will depend on technology, or the carbon intensity of production, or growth rates.

The emission reductions claimed in the *Pan-Canadian Framework* have little or no probative value, because they depend on the stringency of a carbon-pricing scheme that is unknown for the crucial seven-year period after 2022. The future carbon price under this scheme, which delays the hard decisions until 2022, will be hostage during the next six years to economic conditions, the vagaries of developing public attitudes, the lobbying of affected industries, and elections.

8. British Columbia and its planned LNG industry

The impact of future emissions growth from B.C.'s planned LNG industry is completely excluded from the P*an-Canadian Framework* document.

If two or three LNG plants are built and start up production during the 2020s in B.C, they could add an additional 20 Mt to 30 Mt to Canada's annual emissions level during the next decade – enough to offset, for example, all of the promised emissions reductions in

Canada's transportation sector between now and 2030 under the *Pan-Canadian Framework*. The LNG industry would be the largest new source of emissions growth in Canada in the next decade.

Canada's December 22, 2016 *Reference Case* projections include only a nominal provision for a single small LNG plant in operation by 2030, releasing a total of 3 Mt of annual emissions by that year (see *Canada's Second Biennial Report*, Table A6). Anything more than a single small-scale plant will substantially add to Canada's total oil and gas sector emissions, currently projected to reach 233 Mt by 2030.

In fact, on September 27, 2016, the Federal Government gave conditional approval to a large proposed LNG operation known as Pacific NorthWest LNG – a $12 billion dollar facility for liquefaction of natural gas to be built on the coast near Prince Rupert. Six months earlier, on February 10, 2016, the Canadian Environmental Assessment Agency (CEAA) released its Draft Environmental Assessment Report on the Pacific NorthWest project, which found that this single plant, together with the associated emissions from processing the natural gas to supply the facility, would generate *11.4 Mt to 14.0 Mt of CO_2 every year for 30 years*: http://www.ceaa.gc.ca/050/document-eng.cfm?document=104785. Of that amount, 5.28 Mt would be released by the liquefaction facility itself and another 6.5 to 8.7 Mt would be generated by the upstream production and processing of the natural gas.

The Federal Government's final approval given to this project on September 27, 2016 includes conditions that, it says, will limit emissions *at the liquefaction facility* to 4.3 Mt. But the annual total, including associated upstream emissions, will still be in the order of 10 Mt. If built, it will rank among the largest emitting facilities in Canada. Multiple other proposed LNG projects are also waiting to proceed in B.C. Final investment decisions have been delayed due to currently low LNG prices in Asia. To encourage projects to proceed, the B.C. government has generously adapted provincial tax and royalty policies, and electricity pricing policies.

Notwithstanding the significant negative implications of LNG development on Canada's total emissions level, there is only one mention of LNG in the entire *Pan-Canadian Framework* document. It is found in a three-page section devoted to British Columbia, included in Annex II, which extols "provincial and territorial accomplishments in reducing greenhouse gas emissions and accelerating clean growth":

> *"B.C. has an abundance of natural gas, which is a lower carbon fuel that will play a critical role in transitioning the world economy off of high carbon fuels such as coal. B.C.is developing the resource responsibly, and provincial legislation will make the emerging LNG sector the cleanest in the world."*
>
> — *Pan-Canadian Framework*, p. 52

The document praises the B.C. government's efforts to develop the LNG industry. But it is completely silent about the growth of emissions that will result at the production and processing sites in B.C.

The document claims that LNG "will play a critical role in transitioning the world … off of high carbon fuels." It is true that once natural gas is delivered to an electricity generating plant located, for example, in China, power can be produced with about 50% less emissions than by coal-fired generation. Put another way, "if one looks at burner-tip emissions only (meaning GHG emissions at the point of combustion), natural gas has roughly half the CO_2 emissions of coal": J. David Hughes, *A Clear Look at BC LNG* (May 2015). But, as Hughes explains, that calculation does not take into account the energy-intensive LNG production process "upstream", before the fuel reaches its destination. Energy equivalent to 20% of the amount of natural gas shipped is consumed at the liquefaction facility, in transport across the Pacific, and in regasification – all of which generates emissions. Natural gas extraction and natural gas processing in B.C. also generate substantial emissions, as does domestic pipeline transport. Natural gas venting and other methane leakage adds to those emissions. Methane leakage is significant. See: https://www.policyalternatives.ca/sites/default/files/uploads/publications/BC%20Office/2015/05/CCPA-BC-Clear-Look-LNG-final_0_0.pdf.

Hughes' report summarizes recent evidence on this issue. In one study, which compares burning coal in China versus burning imported LNG, use of LNG would provide a 25% reduction in emissions over a 20-year time frame. But the outcomes vary depending on assumptions about (i) the volume of upstream *methane leakage during natural gas production and processing*, and (ii) the technology and efficiency of the coal plants. Hughes writes that "building in realistic upstream rates of methane emissions (3 per cent as estimated by US EPA) and assuming only best-technology coal plants will be built in China, burning imported BC LNG in China *would produce 27 per cent more GHG emissions* [compared to coal] … on a 20-year time frame and 7 per cent fewer on a 100-year time frame." (p. 40) The benefits of shipping LNG to Asia to replace coal-fired electricity are not as certain as the *Framework* claims. There may be no benefits at all.

The *Framework* report fails us in two ways. It makes exaggerated claims about the global benefits of LNG, entirely unsupported by evidence. It excludes any account of the emissions growth we will see in in B.C., if the development of the industry proceeds.

On August 19, 2016, the B.C. Government released its new *Climate Leadership Plan*, which does not show any net reduction of B.C.'s total emissions by 2030, measured against the 2014 level. In the most positive outcome, by 2030 total emissions in B.C. will be about the same as they are today, around 61 Mt to 63 Mt, with no absolute cuts beginning until after 2030. The plan lists a number of policies that will eventually cut the annual emissions level by 25 Mt, but those cuts are projected to occur only by 2050 (*B.C. Climate Leadership Plan*, Annex I, p. 47). The B.C. economy will contribute nothing to meeting Canada's 523 Mt target by 2030.