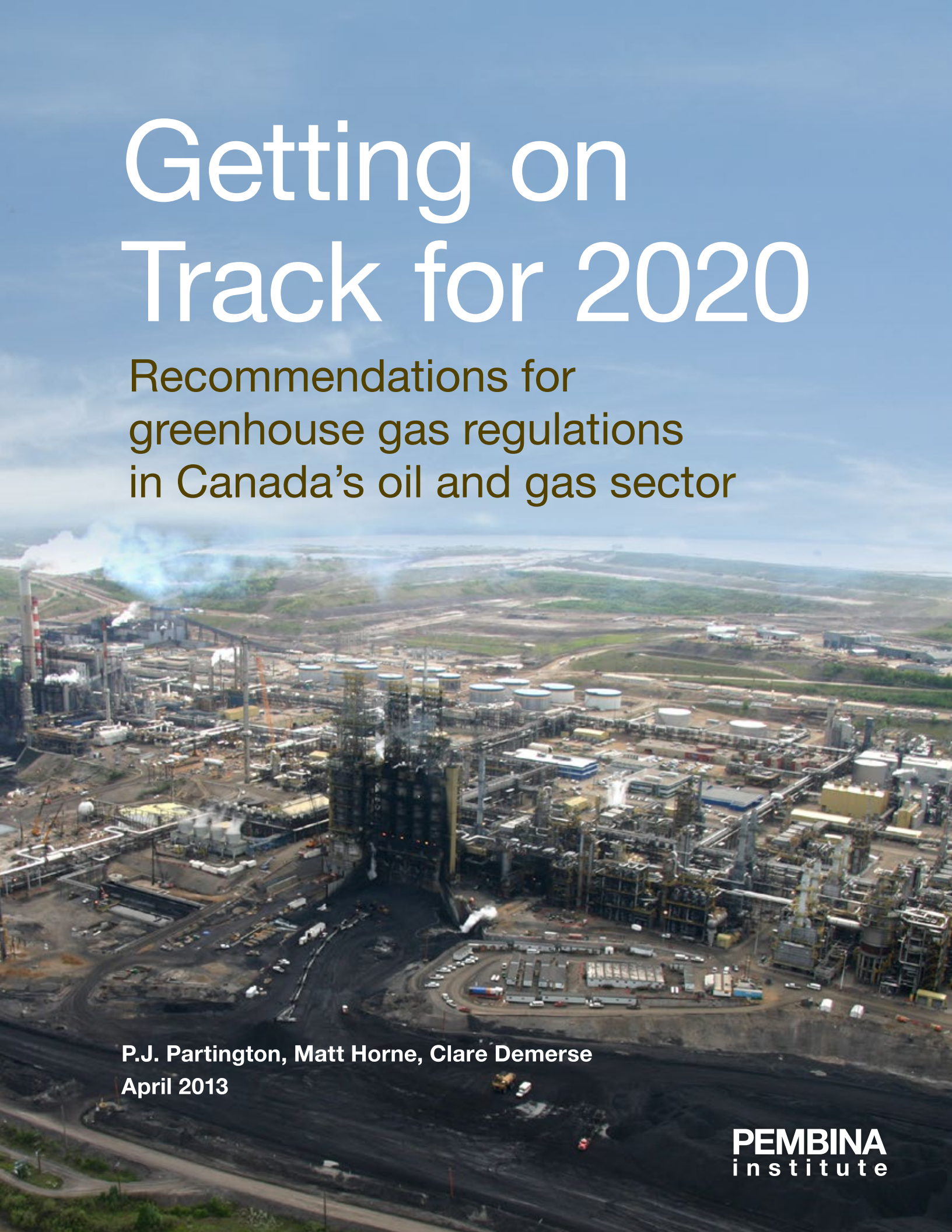
Getting on Track for 2020

Recommendations for greenhouse gas regulations in Canada's oil and gas sector



P.J. Partington, Matt Horne, Clare Demerse

April 2013

PEMBINA institute

Getting on Track for 2020

Recommendations for Greenhouse Gas Regulations in Canada's Oil and Gas Sector

P.J. Partington • Matt Horne • Clare Demerse

April 2013

PEMBINA institute

Getting on Track for 2020: Recommendations for Greenhouse Gas Regulations in Canada's Oil and Gas Sector
P.J. Partington, Matt Horne, Clare Demerse
April 2013

Production management: Kevin Sauvé
Editor: Roberta Franchuk
Cover design: Steven Cretney
Cover photo: David Dodge, The Pembina Institute

Recommended citation: Partington, P.J., Matt Horne, Clare Demerse, *Getting on Track for 2020: Recommendations for Greenhouse Gas Regulations in Canada's Oil and Gas Sector*. The Pembina Institute and the Pembina Foundation, 2013.

This report was prepared by the Pembina Institute for the Pembina Foundation for Environmental Research and Education. The Pembina Foundation is a national registered charitable organization that enters into agreements with environmental research and education experts, such as the Pembina Institute, to deliver on its work.

The Pembina Institute
Box 7558
Drayton Valley, Alberta
Canada T7A 1S7
Phone: 780-542-6272

Additional copies of this publication may be downloaded from the Pembina Institute website, www.pembina.org, and from the Pembina Foundation website, www.pembinafoundation.org.

About the Pembina Institute

Leading Canada's transition to a clean energy future.

The Pembina Institute is a national non-profit think tank that advances clean energy solutions through research, education, consulting and advocacy. It promotes environmental, social and economic sustainability in the public interest by developing practical solutions for communities, individuals, governments and businesses. The Pembina Institute provides policy research leadership and education on climate change, energy issues, green economics, energy efficiency and conservation, renewable energy, and environmental governance. For more information about the Pembina Institute, visit www.pembina.org.

Acknowledgements

The Pembina Foundation wishes to thank the McConnell Foundation for their generous support which enabled the preparation of this publication.

The authors would like to thank Nic Rivers for his valuable contribution to our analysis.

Getting on Track for 2020

Recommendations for Greenhouse Gas Regulations in Canada's Oil and Gas Sector

Contents

Executive Summary

The federal government has committed to adopt regulations to reduce greenhouse gas (GHG) pollution from the production and processing of oil and gas in Canada. This report outlines some of the features we believe are required for such regulations to be effective.

Two considerations shaped our analysis. First, our recommendations fit within the government's preferred approach of sector-by-sector regulation. Second, we took as our starting point the premise that the regulations should be strong enough to get Canada on track to achieve its national greenhouse gas emission reduction target for 2020.

At present, Environment Canada estimates that Canada's emissions will grow from now to 2020, with the result that the country will miss its 2020 target by well over 100 million tonnes (Mt), a gap larger than the current emissions from Canada's entire electricity sector.

Oil and gas accounted for 22 per cent of Canada's national emissions in 2010. Because of the sector's size, and given the very significant emissions consequences of the projected expansion in the oilsands (and potentially liquefied natural gas), it is no exaggeration to say that the level of ambition reflected in the federal government's oil and gas regulations will be the determining factor in whether Canada achieves its 2020 target.

To determine the level of ambition needed from the oil and gas sector, we estimated the emission reductions that other parts of Canada's economy could reasonably be anticipated to make under future federal regulations. We subtracted those reductions from Canada's projected emissions in 2020. This reduced the gap by a quarter, leaving the oil and gas sector — by far the largest remaining "piece of the pie" in the federal government's sector-by-sector regulatory approach — to close the remaining 86 Mt of the target gap. This would mean a significant cut to the sector's net emissions, reducing them to a total of 118 Mt in 2020. (By way of comparison, oil and gas emissions in Canada totalled 154 Mt in 2010, and they are projected to grow to 204 Mt by 2020.)

Achieving the level we recommend would mean a 42 per cent reduction from the oil and gas sector's projected 2020 emission level. If production grows as projected, this target would thus imply a 42 per cent improvement in the sector's projected emissions intensity.

We understand that Alberta's intensity-based GHG regulation is under serious consideration as a model for the federal approach. If Ottawa uses Alberta's architecture but wants the approach to be stringent enough to get on track to hit Canada's 2020 target, it would need to:

- set a sector-wide target that reaches at least the 42 per cent intensity improvement that is needed to help get Canada on track to hit its 2020 target
- charge a technology fund of at least $100 per tonne by 2020, and invest the revenue collected by the system in climate solutions. A price on the order of $150 per tonne would offer a much better likelihood of closing the gap to 2020 target
- limit companies' access to offset credits.

Our full recommendations are listed in the Summary of Recommendations below.

While the target recommended here may sound ambitious, it is in fact very consistent with what the federal government proposed in its "Turning the Corner" plan, which was introduced in 2007 by then-Environment Minister John Baird. Environment Canada estimated that this proposal would reduce the oil and gas sector's projected 2020 emissions by 37 per cent, totaling 83 Mt of reductions from the sector by 2020 (very close to the 86 Mt proposed here).

Alberta's approach allows companies access to two options for meeting their targets that do not directly improve the emissions performance of the regulated companies — namely, making payments into a technology fund and purchasing "offset" credits from projects outside of heavy industry.[1] These flexibility measures lower the cost of meeting the regulations, but also make the environmental outcome less certain.

The approach recommended in this report would increase average costs for a typical in situ oilsands project by an estimated $2.87 per barrel in 2020, after accounting for interactions with royalty and corporate tax rates. A barrel of oilsands crude regularly sells for about $70.

For illustrative purposes, we also compared our proposal with estimates of the cost per barrel that existing climate policy approaches would produce if they were applied to a typical oilsands facility. We found that our recommended approach falls between the cost that B.C.'s current carbon tax would impose ($1.37 per barrel) and the cost of Norway's current carbon tax, which would add an average of $3.37 per barrel if it were applied to Canada's oilsands. (These cost calculations also account for the interaction with royalty and corporate tax rates.)

Getting these regulations right would signal that Canada is serious about tackling climate change and ensuring responsible resource development. Strong regulations would unleash investment in cleaner technologies in the oil and gas sector. Improved GHG emissions performance in the oilsands, a sector under intense public scrutiny, would give oilsands companies better answers to their critics and help provide the "social license" they need to operate successfully.

Strong GHG regulations would also help the oilsands sector maintain access to markets that adopt low-carbon fuel policies. For example, reducing the oilsands' "upstream" emissions intensity by 42 per cent — as we recommend in this report — would more than halve the gap between the proposed default values for oilsands and conventional crudes under the European Union's Fuel Quality Directive, a clean fuels policy.

[1] The two other allowed options, actual emission performance improvement and buying credits from other facilities that have improved their emission performance more than required, do correspond to real and immediate improvements within the regulated companies' operations.

Summary of recommendations

Overall recommendation

The federal government's oil and gas sector regulations should put Canada on track to hit its 2020 target. This will require limiting net oil and gas emissions in Canada to 118 million tonnes in 2020, a 42 per cent reduction from the sector's projected emissions for that year.

General regulatory design recommendations

No matter what architecture the federal government chooses for the sector, its oil and gas regulations should:

- apply to the vast majority of accurately measurable emissions from the oil and gas sector, including combustion and non-combustion emissions
- cover both new and existing facilities
- send a clear signal that the stringency of the regulations will increase after 2020.

Adapting the "Alberta Model"

If the Government of Canada draws on Alberta's approach to design its oil and gas sector regulations, the federal regulations should:

- set a sector-wide target that reaches at least the 42 per cent improvement that is needed to help get Canada on track to hit its 2020 target
- charge a technology fund price of at least $100 per tonne by 2020, and invest any revenue collected by the system in climate solutions. A price on the order of $150 per tonne would offer a much better likelihood of closing the gap to 2020 target.
- take a proactive approach to manage the risk that some offset credits will not represent real emission reductions. That includes:
    - placing a cap on companies' access to offset credits
    - offering access to offsets at a fixed price
    - building a "reserve" of extra offsets to account for the likelihood that some credits will prove to be non-additional or non-permanent
- allow unlimited trading between facilities within a given compliance period
- adopt a more stringent approach to the treatment of new facilities, and
- build in a periodic review of the system.

1. Scope of this analysis

The federal government has committed to adopt regulations to reduce greenhouse gas (GHG) pollution from the production and processing of oil and gas in Canada.

In testimony before the House of Commons Standing Committee on the Environment and Sustainable Development in March, Environment Minister Peter Kent stated that the government is "in the final stages now of setting the stringency levels" and expects to be ready to "share" the regulations by mid-year.[2]

This report outlines some of the features we believe are required for the effective regulation of GHG emissions from Canada's oil and gas sector.

Two considerations shaped our analysis. First, our recommendations fit within the government's preferred approach of sector-by-sector regulations.[3] Second, we took as our starting point the premise that the regulations should at least be strong enough to help get Canada on track to achieve its national greenhouse gas emission reduction target for 2020.

This report starts with an outline of the benefits of effective GHG regulations and the current emissions context for oil and gas in Canada. Next, we examine the level of ambition needed to get Canada on track for its 2020 target and what that means for the oil and gas sector. Sections 5 and 6 outline our regulatory design recommendations. The final section puts our recommendations in context and estimates their average price tag for oilsands producers in per-barrel terms. Appendix B provides a list of key questions to ask when considering oil and gas regulatory proposals.

[2] House of Commons Standing Committee on Environment and Sustainable Development, Evidence, March 5, 2013. http://www.parl.gc.ca/HousePublications/Publication.aspx?Language=E&Mode=1&Parl=41&Ses=1&DocId=6022248&File=0

[3] Despite our decision to work within the boundaries of the federal government's sector-by-sector approach in this analysis, we continue to believe that economy-wide carbon pricing is a better policy option due to its greater flexibility and economic efficiency.

2. Benefits of effective regulations

Reducing GHG pollution helps tackle climate change, which is good news both for Canadians and for the international effort to avoid dangerous global warming. We also believe that strong regulations are in the best interest of the oil and gas industry. That is because:

- Ambitious and effective regulations will give producers more information about the "rules of the game," allowing them to make investments with greater confidence.
- New environmental requirements spur innovation: companies find cleaner ways to operate once there is an incentive and the flexibility to do so.
- With the U.S. decision on the proposed Keystone XL pipeline heading into its final phases,[4] and with President Obama committing to make climate change a priority in his second term,[5] the environmental track record of Canada's oil and gas sector faces intense public scrutiny. Improved GHG emissions performance would give the sector better answers to its critics and help provide companies with the "social license" they need to operate successfully.
- Improved emissions performance for the oilsands in particular would also help the sector maintain access to markets that adopt low-carbon fuel policies.

Estimating the benefits of acting

Environment Canada uses a value called the "social cost of carbon" to estimate the global damage that climate change could cause, now and in the future. By avoiding those costs, GHG regulations provide a benefit to Canadians and the world. Environment Canada uses the social cost of carbon as part of its assessment of the costs and benefits of action each time it publishes a GHG regulation. In previous impact statements for GHG regulations, Environment Canada used an estimate in the range of $25/tonne.[6] However, in more recent regulatory statements, Environment Canada has also included a higher-end estimate that each tonne of GHG pollution could cost the world $112.37,[7] which reflects the possibility of very costly climate damages.

A triple-digit estimate of the damage that each tonne of GHG pollution could produce helps to put the economic costs of action in context. For example, the Government of Canada's projection that Canada will miss its 2020 target by over 100 million tonnes in 2020 (as discussed below) suggests a cost to the world of well over $12 billion from that year's extra emissions alone.

[4] See http://www.keystonepipeline-xl.state.gov/ for a summary of the Keystone XL pipeline proposal consideration process.

[5] In his second Inaugural Address in January 2013, U.S. President Barack Obama stated that "We will respond to the threat of climate change, knowing that the failure to do so would betray our children and future generations." A transcript of his address is available at http://www.whitehouse.gov/the-press-office/2013/01/21/inaugural-address-president-barack-obama.

[6] See, for example, the Regulatory Impact Analysis Statement for draft coal-fired electricity regulations (published on August 27, 2011 and available at http://www.gazette.gc.ca/rp-pr/p1/2011/2011-08-27/html/reg1-eng.html), which used a social cost of carbon estimate of $25/tonne, increasing at two per cent per year.

[7] See, for example, the Regulatory Impact Analysis Statements for passenger vehicle regulations covering model years 2017 to 2025, available at http://www.gazette.gc.ca/rp-pr/p1/2012/2012-12-08/html/reg1-eng.html and for heavy duty vehicle regulations at http://canadagazette.gc.ca/rp-pr/p2/2013/2013-03-13/html/sor-dors24-eng.html.

Strong regulations could present a short-term challenge to companies in the oil and gas sector, but we believe the sector is more than capable of rising to that challenge. Companies design oil and gas projects to be economically viable under a range of policy scenarios. The sector has been anticipating and planning for climate policy for many years — including under the government's 2007 "Turning the Corner" proposal[8] — and many companies already apply an internal carbon price in their operations when making project decisions.[9] Many of the larger companies active in Canada's oil and gas sector are global operators that already comply with climate policies in other jurisdictions. They also have years of experience complying with provincial GHG policies inside Canada, including B.C.'s carbon tax and Alberta's Specified Gas Emitters Regulation.

[8] The government estimated that the price of credits in its carbon market would reach $65/tonne by 2018 under the Turning the Corner proposal. [Jennifer Kerr, "Turning the Corner: Taking Action to Fight Climate Change" (Environment Canada, 2008), slide 12. Available at http://www.oecd.org/env/cc/40633555.pdf]

[9] For example, a recent survey of 10 energy sector companies operating in Canada found that seven of the 10 have adopted a formal "shadow," or hypothetical, carbon price to assist with corporate decision-making. [Sustainable Prosperity, *Shadow Carbon Pricing in the Canadian Energy Sector* (2013). http://www.sustainableprosperity.ca/dl976]

3. The 2020 gap

It might sound uncontroversial to say that oil and gas regulations should help get Canada on track to hit its 2020 target. Indeed, Environment Minister Peter Kent assured the House of Commons environment committee that he supports that goal, saying it is his "objective"[10] that the regulations should help close the gap.

But in fact, Peter Kent's words represent a strong commitment, because Canada is a very long way from being on track to hit its 2020 target.

Environment Canada's most recent projections[11] show a gap of 113 million tonnes (Mt) between Canada's 2020 target, which is to reduce emissions to 607 Mt, and our country's projected 2020 emission level of 720 Mt. Hitting the target requires a reduction from today's emission levels as well: in 2010, the most recent year for which we have data available, Canada's emissions totalled 692 Mt. The projection that emissions will grow from today's level to 720 Mt in 2020 already factors in the effects of all current federal and provincial climate policies, including the federal government's regulations on coal-fired electricity and on passenger and freight vehicles, as well as all provincial carbon pricing policies and other provincial-level climate policy initiatives.[12]

The size of the gap

The Government of Canada is currently on track to miss its 2020 target by 113 million tonnes (Mt). The gap is more than:

- The current emissions of the provinces of Saskatchewan, Manitoba and New Brunswick combined.
- The total current emissions from Canada's electricity sector.
- The total emissions from passenger transportation in Canada (from cars and light trucks to rail and domestic aviation).[13]

While the Government of Canada will sometimes say that Canada is "halfway" to hitting its 2020 target, that assessment is based on comparing Canada's projected 2020 emissions with government policies (720 Mt) to a projection of what Canada's emissions would be in the absence of any government action. Environment Canada estimated in 2011 that Canada's emissions would reach 850 Mt in 2020 without any kind of government action, so they conclude that federal and provincial actions to date have halved the gap. It is important to note that this analysis does not mean that Canada is already, in 2013, "halfway" to hitting its 2020 target. Instead, we are well above the target level today, and if current trends continue, we will be even farther from our target in 2020.

[10] House of Commons Standing Committee on Environment and Sustainable Development, Evidence, March 5, 2013.

[11] Environment Canada, *Canada's Emissions Trends 2012* (2012). http://www.ec.gc.ca/Publications/253AE6E6-5E73-4AFC-81B7-9CF440D5D2C5%5C793-Canada%27s-Emissions-Trends-2012_e_01.pdf

[12] The estimate that Canada's emissions will reach 720 Mt in 2020 also includes a projected reduction of 25 Mt from Land Use, Land Use Change and Forestry (LULUCF). Environment Canada included this estimate for the first time in 2012, and states that it is "preliminary in nature and will change." [Ibid., 3.]

[13] In 2010, Saskatchewan's emissions totalled 73 Mt, Manitoba's were 20 Mt and New Brunswick's 19 Mt, for a total of 112 Mt; emissions from electricity generation totalled 99 Mt; and emissions passenger transportation totalled 96 Mt. [Ibid., 21,27 and 33.]

From our perspective, the most important number is the 113 Mt gap between where we are headed in 2020 and where we need to be.

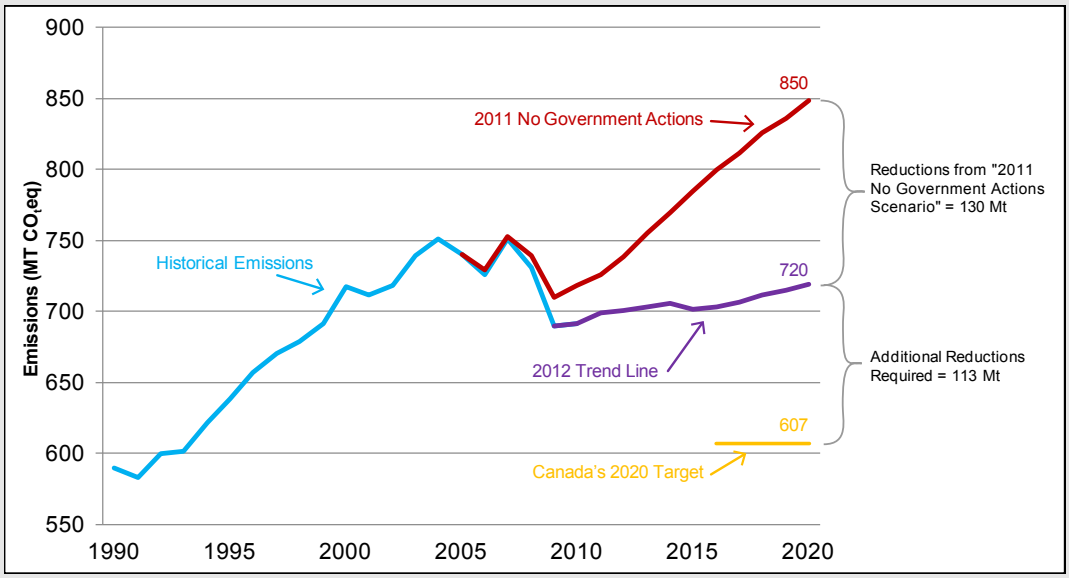


Figure 1. Environment Canada's "gap" diagram

Source: Environment Canada[14]

More than any other sector, Canada's oilsands explain why there is a significant gap between projected 2020 emissions and the 2020 target. From 2010 to 2020, the oilsands sector is expected to more than double its emissions, growing from 48 to 104 Mt.[15] This makes the oilsands Canada's fastest-growing source of GHG pollution; projected oilsands emissions growth is so significant that it is on track to cancel out the emission reductions that other parts of Canada's economy are expected to make over the same period.[16] This is illustrated in Figure 2 below.

[14] Environment Canada, "Reducing Canada's greenhouse gas emissions," Figure 2.2. http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=AD1B22FD-1

[15] *Canada's Emissions Trends 2012,* Table 5.

[16] Our assessment excludes the emissions change from Land Use, Land Use Change and Forestry, which are projected to total a reduction of 25 Mt in 2020, as the 25 Mt figure is a preliminary estimate under a new accounting methodology.

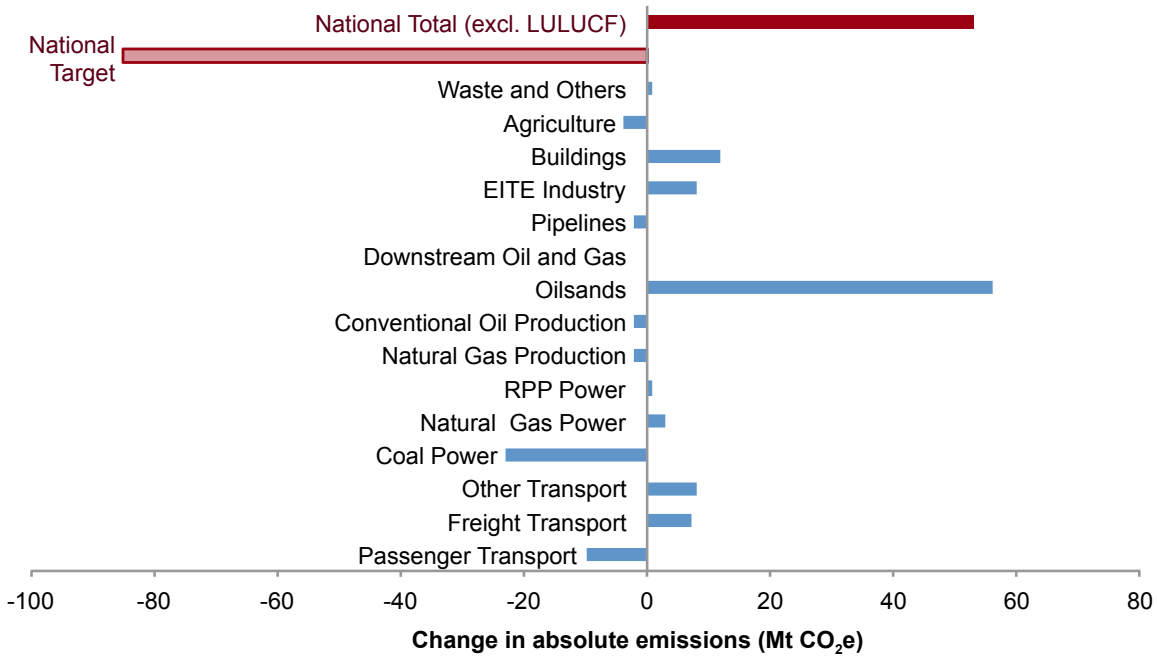


Figure 2. Projected change in absolute emissions under current policy, 2010-2020

Data source: Environment Canada[17]

Not included in Environment Canada's estimates is the potential development of liquefied natural gas (LNG) exports, which present a second significant challenge to the future federal effort to limit oil and gas emissions. Current proposals for LNG facilities in B.C. would enable a rapid expansion of the unconventional gas sector in the province. Recent Pembina Institute analysis[18] found that if two initial projects are built, the emissions associated with extracting, processing, transporting and liquefying the gas could result in an increase of 17 Mt by 2020.[19]

Oil and gas accounted for 22 per cent of Canada's national emissions in 2010.[20] Because of the sector's size, and given the very significant emissions consequences of the projected expansion in the oilsands and potentially LNG, it is no exaggeration to say that the level of ambition reflected in the federal government's oil and gas regulations will be the determining factor in whether Canada achieves its 2020 target.

[17] *Canada's Emissions Trends 2012.*

[18] See Matt Horne, "A climate reality check on British Columbia's LNG aspirations," *The Pembina Institute*, December, 2012. http://www.pembina.org/op-ed/2402

[19] Pembina's projections are based on 20 million tonnes of LNG being produced per year. However, the Government of British Columbia now projects that between 82 and 120 million tonnes of LNG could be produced per year. For more information on B.C. LNG projections, see the analysis from Ernst & Young and Grant Thornton available at http://www.empr.gov.bc.ca/OG/Pages/default.aspx.

[20] *Canada's Emissions Trends 2012*, Table 5. Oil and gas made up 154 Mt of Canada's 692 Mt total in 2010.

4. The oil and gas sector's role in meeting Canada's target

Under the federal government's sector-by-sector approach, regulations are now in place for most segments of the transportation and electricity sectors. The expected emission reductions from those regulations[21] have already been factored into the government's projections of a 113 Mt gap between Canada's 2020 emissions and our 2020 target.[22]

To determine the level of ambition needed from the oil and gas sector, we estimated the emission reductions that other parts of Canada's economy could reasonably be anticipated to make under future federal regulations (see Appendix A for more information on those assumptions). We subtracted those reductions from Canada's projected 2020 emissions of 720 Mt. This reduced the gap by a quarter, from 113 Mt to 86 Mt.

That leaves the oil and gas sector, by far the largest remaining "piece of the pie" in the federal government's sector-by-sector regulatory approach, to close the remaining gap of 86 Mt.[23] This is illustrated in Figure 3 below.

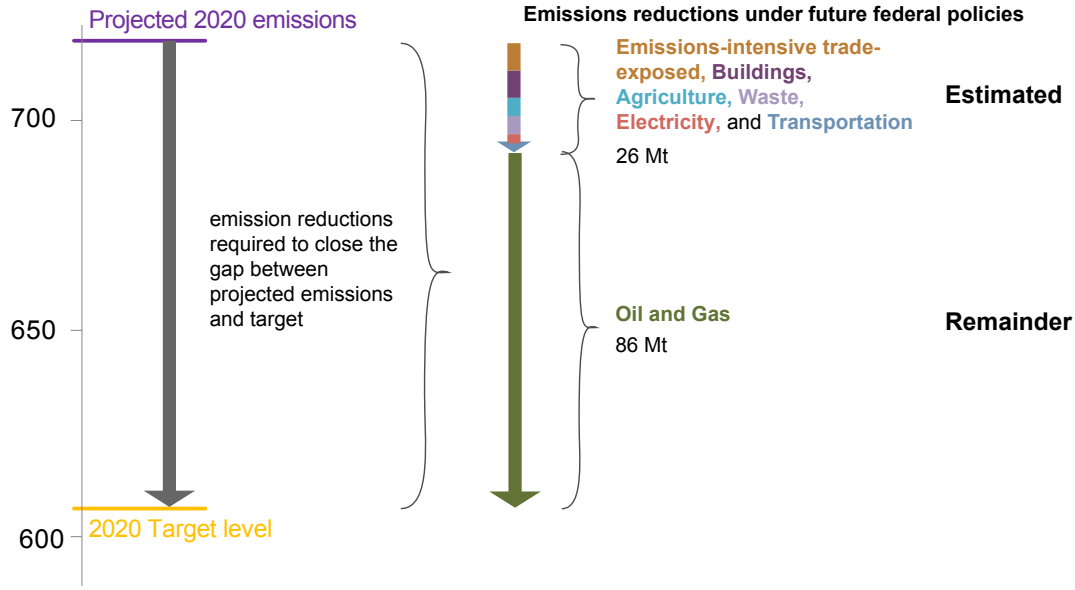


Figure 3. Estimated emission reductions needed from yet-to-be regulated sectors to achieve Canada's 2020 target

[21] It is important to note that, despite the completion of regulations for coal-fired electricity and transportation, the Government of Canada (or other governments in Canada) could generate additional emission reductions from those sectors through new policy initiatives. For example, increased investments in public transit could reduce transportation emissions more quickly than the regulations alone are projected to do.

[22] This assessment accepts Environment Canada's preliminary estimate of 25 Mt in emission reductions from Land Use, Land Use Change and Forestry (LULUCF). If that estimate were not included, Canada's projected 2020 emissions would be 745 Mt rather than 720 Mt.

[23] As Appendix A illustrates, the oil and gas sector's contribution needs to be very significant even if the remaining sectors achieve twice the emission reductions we have assumed.

Closing the 2020 target gap would mean a significant cut to the sector's emissions, reducing them to a total of 118 Mt in 2020. That is a 42 per cent reduction from the oil and gas sector's projected 2020 emission level of 204 Mt and a 23 per cent drop from today's (2010) emission level of 154 Mt. If production grows as projected, this target would also imply a 42 per cent improvement in the sector's projected emissions intensity. Figure 4 below depicts the trajectory we propose compared to the sector's current projected trendline.

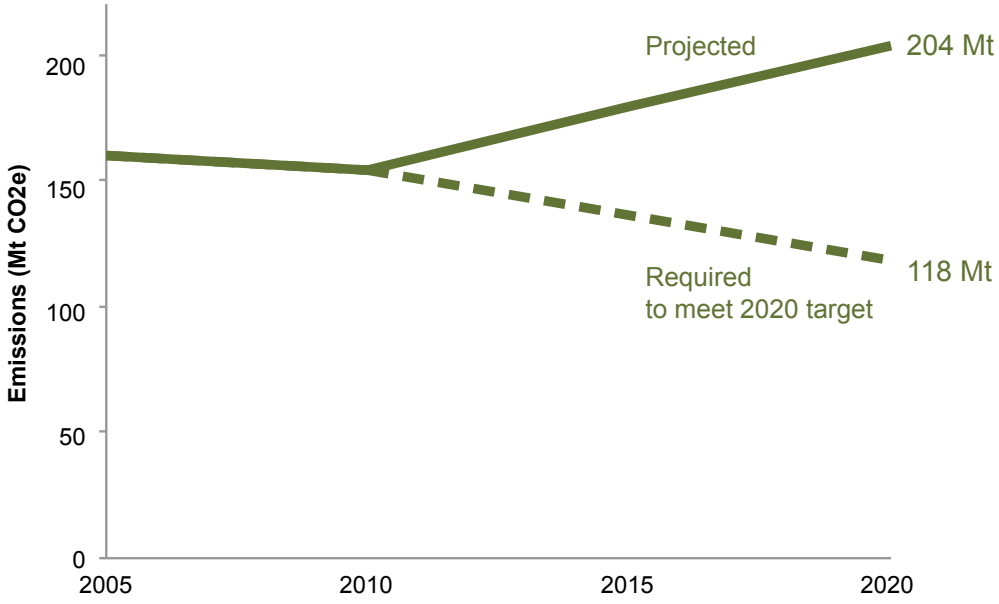


Figure 4. Oil and gas emission projections under current trends and under effective regulation

The reduction we are proposing might sound tough, and it is a safe bet that this is a more ambitious goal than most industry players have in mind today. However, it is very consistent with what the federal government proposed in its "Turning the Corner" plan, which was introduced in 2007 by then-Environment Minister John Baird.[24]

Environment Canada stated in 2008 that this proposal would reduce the oil and gas sector's projected 2020 emissions by 39 per cent,[25] or 82 Mt, by 2020 (in comparison, our proposal calls

[24] Environment Canada provided a more detailed proposal under the "Turning the Corner" heading in 2008, which is available at http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=C16DAFD9-E250-46DC-8B26-53F0DF2E7A75.

[25] The projected reductions for the oil and gas sector cited here do not include additional indirect reductions from the investment of technology fund revenues or action to reduce fugitive emissions, which together were projected to produce another 40 Mt of reductions across all sectors under the Turning the Corner plan.

for a 42 per cent emission reduction totaling 86 Mt by 2020).[26] Oilsands emissions were expected to be reduced by 55 per cent from their projected 2020 level under this proposal.[27]

The federal government later took that proposal off the table, aiming instead to align its emission policies with those of the United States after the election of President Obama. Nevertheless, the publication of the "Turning the Corner" proposal means that oil and gas companies have had more than five years of advance notice that the sector could be required to take responsibility for emission reductions on the scale we propose here.

Producing cleaner fuel

In recent years, the development of cleaner fuels policies in the U.S., the European Union and British Columbia has garnered significant attention in the oilsands sector. That's because Alberta's bitumen releases more GHG pollution in its production[28] than the vast majority of conventional crudes, so it would likely become harder to sell upgraded bitumen to markets that adopt low-carbon fuel standards.

However, if the Government of Canada adopts regulations that meet or beat the stringency we propose in this paper, the result would be a significant improvement in the life cycle emissions performance of oilsands crude relative to conventional crude. Better GHG performance could help the sector overcome the market access challenges that California's low-carbon fuel standard and the European Commission's Fuel Quality Directive are likely to pose to oilsands producers. For example, reducing upstream emissions intensity by 42 per cent would more than halve the gap between the proposed default values for oilsands and conventional crudes under the Fuel Quality Directive.[29]

Oil and gas companies will point out that making significant changes to their physical operations by 2020 is difficult. Capital investments take time, and 2020 is just around the corner in industry planning terms. That is a valid concern, and one that the federal government will need to consider. But it is by no means a barrier to an ambitious regulation.

---

[26] Kerr, "Turning the Corner," Slide 10. This assessment includes emissions from oilsands, petroleum refining, and upstream oil and gas, but not natural gas pipelines. In 2020, these emissions were projected to total 208 Mt under business as usual and 126 Mt under "Turning the Corner." The projected reductions for the oil and gas sector cited here do not include additional indirect reductions from the investment of technology fund revenues or action to reduce fugitive emissions, which together were expected to result in another 40 Mt of reductions across all sectors under the "Turning the Corner" plan.

[27] Kerr, "Turning the Corner," Slide 10. Oilsands emissions were projected to drop from a projected 108 Mt in 2020 under business as usual to 49 Mt in 2020 under "Turning the Corner."

[28] For example, the State Department's review of life cycle GHG emissions in the Supplemental Environmental Impact Statement of the Keystone XL pipeline proposal concluded that oilsands crudes "are on average more GHG-intensive than the crudes they would displace in the United States." [U.S. State Department, Appendix W, "Life-Cycle Greenhouse Gas Emissions of Petroleum Products from WCSB Oil Sands Crudes Compared with Reference Cases" (2013), 66 and Table 6-2. http://keystonepipeline-xl.state.gov/documents/organization/205563.pdf]

[29] A 42 per cent improvement in upstream emissions intensity would reduce the well-to-wheel emissions of petrol derived from natural bitumen from 107 to 96.6 g CO_2e/MJ, compared to 87.5 g CO_2e/MJ for conventional crude, reducing the gap between the two default values by 53 per cent. The current Fuel Quality Directive proposal also allows producers to submit their a specific number based on their actual performance instead of the sectoral default number, creating an incentive to further improve performance. [European Commission Fuel Quality Committee, "Draft directive... laying down calculation methods and reporting requirements pursuant to Directive 98/70/EC of the European Parliament and of the Council relating to the quality of petrol and diesel fuels," February 23, 2012. http://ec.europa.eu/transparency/regcomitology/index.cfm?do=search.documentdetail&XOvfOQKYHt67nl0gDR9EQ0pDU4MfDGIJHglKuEmrBsSBuE2177sL3dMBpRfefPrJ]

The federal government can help industry take responsibility for its emissions by giving companies access to emission reduction opportunities outside of the facilities themselves, such as credit trading within the oil and gas sector or payments that are invested in reductions outside of the oil and gas sector. Recent economic modelling shows that on a 2020 timeline, those "flexibility" options are likely to account for a significant part of the oil and gas sector's contribution to meeting Canada's target.[30]

With good regulatory design, limitations on feasible reductions within companies' facilities do not need to represent a ceiling on what the sector can do. We urge the Government of Canada to respond to industry's concerns by providing well-designed and effective compliance options, *not* by lowering the bar on the oil and gas sector's contribution.

[30] The International Institute for Sustainable Development found that with a 50 per cent intensity target, 59 per cent of the oil and gas sector's compliance in 2020 is likely to come from outside the sector when such compliance approaches are allowed. [David Sawyer and Dale Beugin, *Regulating Carbon in Canada — Flexibility and Federal Oil and Gas Greenhouse Gas Regulations: Containing costs while increasing ambition* (IISD, 2012), 11. http://www.iisd.org/publications/pub.aspx?pno=1689]

5. Building on Alberta's model

It is our understanding that the federal government is taking a close look at Alberta's Specified Gas Emitters Regulation (SGER) in designing its own oil and gas regulations.

This regulation, which took effect in July 2007, sets GHG intensity targets for all large industrial facilities in the province. Intensity targets require facilities to improve their emissions per unit of production — for example, the emissions generated from producing a barrel of oil — but do not set a limit on total emissions from a facility or sector. The target for existing facilities in Alberta's system (defined as those facilities that started operations before 1999) is 12 per cent below their average intensity in the 2003–05 period. Newer facilities are exempt for their first three years of operation and then face targets that gradually increase until the ninth year of operation, when they reach 12 per cent below the intensity measured in the third year.

Facilities have four options to reach their regulated targets:

- Improve emissions performance in their facility.
- Purchase credits from other facilities that have beat their targets.
- Make payments at a rate of $15 per tonne into an arms-length technology fund, the Climate Change and Emissions Management Fund.
- Purchase credits for emission reductions from projects in Alberta that take place outside of the regulated facilities (i.e. offset credits).[31]

These flexibility measures lower the cost of meeting the regulations, but also make the environmental outcome less certain. That's because while emitters can use these options interchangeably to meet their targets, only the first two (actual emission performance improvement and buying credits from other facilities that have improved their emission performance) are guaranteed to correspond to real and immediate emission performance improvements. In contrast:

- The technology fund invests in projects that may take years to produce results, and not all of its investments are likely to be successful. Even when they are, the development of innovative clean technologies usually costs far more than $15 per tonne, so the fund is very unlikely to generate a tonne of emission reductions for every $15 payment it receives.
- International experience shows that despite efforts to make sure that offset credits go beyond "business as usual," some credits will still be awarded for initiatives that would have happened anyway. The Pembina Institute's analysis has raised significant concerns about the environmental integrity of many of the offsets purchased under Alberta's system.[32]

In the Alberta model, the system's intensity target, the technology fund price, and the availability of offset credits work together to determine the model's environmental effectiveness.

---

[31] Government of Alberta, "Greenhouse Gas Reduction Program," http://environment.alberta.ca/01838.html

[32] Matthew Bramley et al., *Responsible Action? An assessment of Alberta's greenhouse gas policies* (Pembina Institute, 2011). http://www.pembina.org/pub/2295

Because there are no limits on companies' access to either the technology fund or to offset credits, Alberta's system gives companies little incentive to make significant investments in reducing their emissions. The technology fund contribution rate effectively sets a price cap on the system, with the result that industry will largely fail to invest in GHG reduction opportunities that cost more than $15 per tonne. The low rate also affects the quality and supply of offset credits. The system's design means that Alberta's offset projects will only find buyers if they cost less than $15 a tonne: it is difficult for a company to justify paying more than $15 per tonne for an offset when that company can pay into the technology fund at $15 per tonne instead.

This low price "cap," the system's unlimited access to offsets, and its non-stringent 12 per cent target add up to an approach that is projected to see Alberta's emissions grow by 37 Mt from the time that the system took effect in 2007 to 2020.[33]

The provisions of the Canadian Environmental Protection Act, the enabling legislation for the federal government's GHG regulations, give Ottawa the flexibility to adopt a system very similar to Alberta's if it chose to do so. (Even if the federal government does adopt the "Alberta model" for its oil and gas regulations, the system would still be different from Alberta's in a significant way: Stephen Harper's government has decided to implement sector-specific regulations, while Alberta's approach applies to facilities in any sector that emit more than 100,000 tonnes of GHG pollution per year.)

Section 4 outlined the level of emission reductions the oil and gas sector would need to make to help put Canada on track to hit its 2020 target. In the section below, we look at what it would mean for the federal government to achieve that level of emission reductions under the "Alberta model."[34]

5.1 Target

The sector-wide target should reach at least the 42 per cent intensity improvement that is needed to help get Canada on track to hit its 2020 target, as described in Section 4. But because Alberta's system gives companies access to compliance options that won't necessarily result in near-term reductions, a strong argument can be made for setting the target higher than 42 per cent. (The flexible design of Alberta's system means there is no functional reason why the target could not be set at 100 per cent.) A higher target sends a stronger signal to oil and gas companies that they need to reduce their emissions, and the funds they provide to a technology fund or to offset projects mean increased investment in projects that cut GHG pollution in other sectors as well.

[33] Alberta's emissions were 248 Mt in 2007, according to Table A14–18 of Canada's 2012 *National Inventory Report, Part 3* (available from http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php). In 2020, Environment Canada projects that Alberta's emissions will have grown to 285 Mt [*Canada's Emissions Trends 2012,* Table 17] despite the effects of the SGER policy.

[34] Again, the inclusion of these comments should not imply that this is our preferred approach. Our preferred approach is a policy package that establishes a robust economy-wide carbon price, supplemented where appropriate with complementary regulations, designed to achieve the government's commitments and drive the innovation required to achieve a long-term transformation of Canada's energy systems.

5.2 Technology fund price

As noted above, the design of Alberta's system means that the technology fund effectively caps the price that companies pay. For the federal government's oil and gas sector regulations, that cap needs to be high enough that it encourages the level of emission reduction investments that Canada needs to hit its 2020 target — and to make more ambitious reductions thereafter.

In the oil and gas sector, efforts to reduce GHG emissions often carry high capital costs. For example, carbon capture and storage technologies are likely to see wide deployment in the oilsands only when the carbon price exceeds $110 per tonne, according to a recent study.[35]

Recent modeling from the International Institute for Sustainable Development suggests that limiting oil and gas sector emissions to approximately the level we recommend here is possible with a $100 per tonne price cap in a system that, like Alberta's, gives companies flexibility in the way they choose to hit their targets.[36]

Under Alberta's system, funds paid into the Technology Fund are invested in a portfolio of emission reduction opportunities, some of which fall outside of the heavy industry sectors that contributed the funding. Thus, to determine an appropriate technology fund price for the federal oil and gas sector, we also looked at estimates of the carbon price levels needed for Canada to hit its 2020 target.

Economic modeling commissioned by the Pembina Institute and David Suzuki Foundation in 2009 found that all sectors would need to invest in opportunities to reduce emissions that cost up to $145 per tonne for Canada to meet a target very similar to the government's current 2020 target.[37] More recently, economic analysis from National Round Table on the Environment and the Economy concluded that Canada will need to take advantage of all emission reduction opportunities up to $150 per tonne to hit the government's 2020 target.[38]

All of these assessments suggest that **a technology fund price of at least $100 per tonne by 2020 would be appropriate for the oil and gas sector,** with a price on the order of $150/tonne offering a much better likelihood of closing the gap to Canada's 2020 target.

Alberta's system offers unlimited access to its technology fund, meaning that companies can use payments into the technology fund to meet 100 per cent of their target. If the federal government also allows companies unlimited access to a technology fund, it could build on Alberta's design

---

[35] Richard Middleton and Adam Brandt, "Using Infrastructure Optimization to Reduce Greenhouse Gas Emissions from Oil Sands Extraction and Processing," *Environmental Science and Technology* 47 (2013), 1735. http://pubs.acs.org/doi/abs/10.1021/es3035895

[36] Sawyer and Beugin, *Regulating Carbon in Canada.* Their higher-end policy scenario models a 50 per cent sector-wide intensity improvement relative to business as usual in 2020, reducing the sector's emissions by 84 Mt below their forecast 2020 level.

[37] Matthew Bramley and Pierre Sadik., *Climate Leadership, Economic Prosperity: Final report on an economic study of greenhouse gas targets and policies for Canada* (Pembina Institute and David Suzuki Foundation, 2009), 3. http://www.pembina.org/pub/1909. This scenario assumes no purchases of international emission reduction credits. (Making one-fifth of the required reductions through international purchases reduces the economy-wide carbon price to $100/tonne in 2020.)

[38] National Roundtable on the Environment and the Economy, *Reality Check: The State of Climate Progress in Canada* (2012). http://nrtee-trnee.ca/reality-check-the-state-of-climate-progress-in-canada.

by creating a two-tier fund structure, with a lower-cost tier that is capped (so that companies can only use it to meet a small fraction of their targets), and then an uncapped tier at a much higher price. This approach would lower overall compliance costs for companies, while still ensuring that adequate investment is available for higher-cost reduction opportunities and for research and development spending to support low-carbon solutions in the energy sector.

5.3 Offset credits

International experience shows that it is incredibly difficult to design an offset system with bulletproof environmental integrity. Questions will inevitably arise about whether the projects in any offset system are truly new, unique and verifiable and go beyond "business as usual." Alberta offers companies unlimited access to offset credits, and has faced critiques from its Auditor General about the integrity of the offset system.[39]

We recommend that if the Government of Canada does allow oil and gas companies access to offset credits, it should **take a proactive approach to manage the risk that some credits will not represent real emission reductions.** That includes:

- **Placing a cap on companies' access to offset credits**. If the government proposes a capped lower tier of the technology fund, as described in Section 5.2, access to offsets could be limited to the funds collected in that tier.
- **Offering access to offsets at a fixed price,** thus eliminating the incentive for companies to find low-cost (and potentially low-quality) offset credits. The Government of Canada could also opt to act as the purchaser of those offsets to give itself more tools to ensure that the credits represent real, additional and verifiable reductions.[40]
- **Building a "reserve" of extra offsets to account for the likelihood that some of the credits purchased will prove to be non-additional or non-permanent**. In other words, the federal government should require companies using offsets to top up their purchase by a fixed percentage in the expectation that some of the credits they buy will fail to represent real reductions. Québec's cap-and-trade regulation sets aside three per cent of all offsets for this purpose.[41]

5.4 Other issues

In addition to the "big three" of target, technology fund price and offsets, we recommend the following design choices if Canada adopts the "Alberta model":

---

[39] Auditor General of Alberta, *Report of the Auditor General of Alberta – November 2011* (2011). http://www.oag.ab.ca/files/oag/OAGNov2011report.pdf.

[40] The Government of British Columbia has established a Crown corporation, the Pacific Carbon Trust, to act as an offset credit purchaser for public sector operations in B.C. The offsets are offered at a fixed price of $25/tonne. See http://pacificcarbontrust.com/propose-a-project/carbon-offset-pricing-structure/ for more information.

[41] Government of Quebec, *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances*, Chapter IV, Sec. 70.20. http://www2.publicationsduquebec.gouv.qc.ca/dynamicSearch/telecharge.php?type=3&file=/Q_2/Q2R46_1_A.HTM.

- Alberta's system allows for unlimited credit trading between the facilities covered by the system. This increases its economic efficiency, allowing more GHG reductions to take place for a given cost. While the federal proposal will only cover the oil and gas sector, the federal government should **allow unlimited trading between facilities** in that sector within a given compliance period. The Government of Canada's vehicle fuel efficiency regulations already allow access to credit trading as a compliance mechanism.
- **Invest any revenue collected by the system in climate solutions.** In addition to the limited investment in offsets mentioned in Section 5.3, we recommend that any funds raised through a technology fund should be invested in tackling climate change. High-priority ways to do this include support for low-impact renewable energy, energy efficiency and energy conservation as well as research and development for low-carbon solutions. We also support the use of technology fund dollars to help fulfill Canada's obligations to support poorer countries' efforts to adapt to climate change and curb their own emissions.
- **Adopt a more stringent approach to the treatment of new facilities.** There is significant scope to reduce future emissions from projects that have not yet begun construction, as their design and equipment choices have not yet been locked in. We recommend that new projects proposed in Canada's oil and gas sector should be required to show that their design does not exceed the emission levels that the best available control technologies could achieve.[42] At a minimum, we expect the requirements for new facilities that the government proposed under the Turning the Corner plan to be maintained. That approach, outlined in 2008, would have required any facilities commissioned after 2004 (including major expansions) to make improvements relative to a "cleaner fuels standard."[43] In the oilsands, in situ and upgrading operations beginning in 2012 or later would have faced a "CCS [carbon capture and storage]-level" standard from 2018. As Prime Minister Harper stated in 2008, "these targets for the oil sands are not dependent on the actual deployment of the technology. We will require the equivalent reductions regardless."[44] Thus, at a minimum, any new in situ projects or upgraders should face a standard based on the emission reductions that CCS could generate by 2018.
- **Include a clause that requires a thorough review of the system**. Alberta's Specified Gas Emitters regulation expires in 2014 unless it is renewed, and will be reviewed this year. While we do not see a need for the federal regulations to expire, it would be prudent for Ottawa to build in a clause requiring periodic review of the regulations, with a view to improving their effectiveness and aligning with developments in North American and global climate policy.

[42] While the U.S. Environmental Protection Agency has the mandate to ensure something similar under its permitting process, Environment Canada may need to work with provincial governments to achieve this outcome in Canada.

[43] Environment Canada, *Turning the Corner: Regulatory Framework for Industrial Greenhouse Gas Emissions* (2008).

[44] Prime Minister Stephen Harper, "Prime Minister Harper addresses the Canada-U.K. Chamber of Commerce in London," speech, May 23, 2008. Available at http://www.pm.gc.ca/eng/media.asp?id=2131.

Determining Equivalency

Section 10 of the Canadian Environmental Protection Act 1999 allows a provincial or territorial government to replace a federal regulation with an existing policy of their own if the policy instrument in question achieves the same environmental outcome.[45]

Making use of this provision requires a formal agreement between the province or territory and the federal government. A number of provinces are likely to seek to make use of this equivalency provision to administer the oil and gas sector regulations, and the federal government has also signaled its intention to pursue such agreements with interested provincial or territorial governments.

The provincial or territorial law subject to the agreement must be in force and it must have the "same effect" as the federal regulation, meaning (among other things) that it achieves an equivalent level of emissions reductions to the federal proposal.

The province of Nova Scotia has already finalized an equivalency agreement for the regulation of GHG pollution from coal-fired electricity generation; the federal regulations in question will take effect in 2015.

If provincial and territorial governments pursue equivalency agreements for the oil and gas sector, Environment Canada must ensure that its regulations set a high bar that any provincial policies will have to meet or exceed. In addition, any equivalency agreements signed by the Government of Canada should provide clear provisions concerning enforcement and remedies, such as early termination, if the provincial / territorial instrument fails to deliver adequate and "equivalent" emission reductions.

[45] Government of Canada, *Canadian Environmental Protection Act, 1999*, c.33. https://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=24374285-1&offset=2&toc=show.

6. General recommendations

Whether or not the federal government adopts the "Alberta model" for the oil and gas sector, a well-designed regulation should include the following features.

1. The regulations should cover the vast majority of accurately measurable emissions from the oil and gas sector, including combustion and non-combustion emissions. The inclusion of emissions from industrial processes, venting, and fugitive emissions alongside combustion emissions would provide the broadest possible signal to the oil and gas industry to reduce its emissions.

Perhaps the simplest way for the federal government to do this would be to model its reporting and compliance thresholds for the oil and gas regulations on the approach adopted by the Western Climate Initiative (WCI), a system whose design has benefitted from the active involvement of several Canadian provinces.[46]

In cases where oil and gas emissions are difficult to measure, the regulations can be complemented with prescriptive requirements to ensure that companies follow best practices (this is the approach that the U.S. EPA is taking for well completions, for example).[47] The government should also work with industry to develop accurate measurement and quantification methodologies, with the goal of including these and other sources that are currently difficult to measure[48] in mandatory reporting and regulation as soon as possible.

2. The regulations should cover both new and existing facilities. Meeting the kind of target we have proposed here requires reductions from the entire oil and gas sector. In order to capture all available opportunities to reduce GHG pollution, the regulations should apply to emissions from both new and existing operations.

3. The government should send a clear signal that the stringency of the regulations will increase after 2020. The world's "budget" of GHG pollution we can emit without triggering catastrophic climate change is limited, and we are spending it too quickly right now. Recent research by global consulting giant PricewaterhouseCoopers[49] concluded that global carbon intensity will need to improve by an unprecedented 5.1 per cent each year, from now through 2050, in order to maintain an even chance of limiting global warming to 2˚C, a goal that the Government of Canada has supported at international negotiations under the G8 and the UN

[46] See, for example, Western Climate Initiative, *Final essential requirements for mandatory reporting: amendments to the Canadian harmonization version – Second update* (2011). http://www.westernclimateinitiative.org/news-and-updates/141-final-essential-requirements-for-mandatory-reporting-amendments-to-the-canadian-harmonization-version-second-update.

[47] See http://www.epa.gov/airquality/oilandgas/actions.html.

[48] In the oilsands sector, these include mine face and tailings pond fugitive emissions.

[49] PricewaterhouseCoopers, *Too late for two degrees? Low-carbon economy index 2012* (2012). http://www.pwc.com/en_GX/gx/low-carbon-economy-index/assets/pwc-low-carbon-economy-index-2012.pdf.

Framework Convention on Climate Change.[50] That study estimates that Canada's carbon intensity will need to improve at an average of 5.3 per cent annually — a significant improvement from Canada's average of 1.4 per cent annually over the past decade.

The need to accelerate action towards deep reductions was also recognized in H.R. 2454, the climate bill passed by the U.S. House of Representatives (but not the U.S. Senate) in 2009. That bill contained the 2020 target that Canada has adopted (a 17 per cent reduction below the 2005 level) but also a 2030 target of 42 per cent below the 2005 level.[51]

Right now, Canada is not on track for deeper reductions after 2020; the National Round Table on the Environment and the Economy projected that Canada's emissions will continue to grow through 2030 despite the effects of all current federal and provincial policies.[52]

It is clear that Canada's emissions challenge will only grow after 2020. In light of the urgent need to accelerate emissions reductions, Canada's oil and gas regulations should be structured to become increasingly stringent after 2020.

Climate Action in the U.S.

While cap-and-trade legislation failed to pass the U.S. Senate during President Obama's first term, the Obama Administration has taken steps towards its 2020 emission reduction target using the existing legal authority granted by the Clean Air Act.

In 2011, the Environmental Protection Agency (EPA) imposed permitting requirements based on the use of best achievable control technology that apply to new facilities that will emit significant GHG pollution and to large facilities that undergo major modifications. The EPA is also finalizing a performance standard that will cover new sources of GHG pollution in the fossil-fueled power sector. This action requires them to regulate existing fossil fuel power sources in the future as well, an important commitment given the heavy reliance on coal-fired electricity in the U.S.. The EPA is also required by a legal agreement to develop GHG performance standards for oil refineries.

The Obama Administration has also imposed fuel economy standards for passenger vehicles and heavy trucks; Canada has adopted the same regulations.

[50] G8 Leaders' Statement, *Responsible Leadership for a Sustainable Future*, July 8, 2009, http://www.g8italia2009.it/static/G8_Allegato/G8_Declaration_08_07_09_final%2c0.pdf ; and UNFCCC, Decision 1/CP.16, http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2

[51] U.S. House of Representatives, 111th Congress, H.R. 2454 PCS, Sec. 702. Available at http://thomas.loc.gov/cgi-bin/query/D?c111:4:./temp/~c111mUEMlz

[52] NRTEE, *Reality Check*.

The U.S. energy think tank Resources for the Future projects that continued progress on regulations under the Clean Air Act would put the U.S. on track to achieve its 2020 target.[53] In a similar study released in February, the World Resources Institute concluded that more effort is needed, but that the U.S. can hit the target if the Obama administration makes high-ambition policy choices using existing legislation.[54] Continued U.S. progress seems more likely in the wake of extreme weather events like Hurricane Sandy, which have brought climate issues to the fore, and in light of President Obama's clear commitment to stronger climate action in his second term.[55]

[53] Dallas Burtraw and Matthew Woerman, *U.S. Status on Climate Mitigation* (Resources for the Future, 2012). http://www.rff.org/Publications/Pages/PublicationDetails.aspx?PublicationID=22073

[54] Nicholas Bianco et al., *Can the U.S. get there from here? Using existing federal laws and state action to reduce greenhouse gas emissions* (World Resources Institute, 2013). http://www.wri.org/publication/can-us-get-there-from-here.

[55] "Text: Obama's 2013 State of the Union Address," *New York Times*, February 12, 2013, http://www.nytimes.com/2013/02/13/us/politics/obamas-2013-state-of-the-union-address.html?pagewanted=all&_r=0.

7. Our recommendations in context

Observers of energy and climate issues in Canada may have a couple of questions at this point about these recommendations, namely "Doesn't this single out the oil and gas sector?" and "What will this cost to energy companies?"

It is absolutely true that we are looking to the oil and gas sector to close most of the remaining gap to Canada's target. That is because oil and gas is by far the biggest remaining "piece of the pie" left under the government's sector-by-sector approach, so it does fall to that sector to do most of the work to close the gap. (The specific quantitative reasons for this approach are explained in Section 4 and in Appendix A.) In this analysis, we took the federal government's decisions on transportation and coal as givens and worked with the gap that remains.

As Section 3 explains, the size of the gap between Canada's current trajectory and its 2020 target reflects a very rapid projected expansion of oilsands production. However, it also reflects federal government decisions to date about the level of ambition in sectors that have already been regulated. While we support GHG performance standards in the passenger transportation sector, we have raised concerns that the U.S.-based approach the Canadian federal government adopted provides few near-term reductions in Canada, both because of specific regulatory design choices and because Canada's fleet was already was more efficient than the U.S. fleet.[56] Without changing the regulations, governments in Canada could adopt new complementary policies — such as road tolls or increased investments in public transit — that would further reduce emissions from transportation in Canada. The Pembina Institute has also consistently called on the federal government to adopt a tougher approach in its regulations of the coal-fired electricity sector.[57]

In a "sector-by-sector" approach, going easy on one sector means that another sector has to make up the difference. So the government's decisions in the sectors it has regulated to date have a clear impact on the sectors that remain to be regulated, including oil and gas.

It is not a surprise that auto manufacturers, the coal sector, or oil and gas companies are more concerned about their own sector than about Canada's national emissions. But it is the federal government's responsibility to keep the bigger picture in mind.

The Government of Canada maintains that it is harmonized with the U.S. on a 2020 target. In recent weeks, numerous federal cabinet ministers have cited Canada's commitment to that target as a selling point in the context of the U.S. consideration of the Keystone XL pipeline proposal.[58] Thus, it is appropriate to expect that any Government of Canada announcement of GHG regulations for the oil and gas sector should provide an estimate of the proposal's contribution

---

[56] Matthew Bramley and P.J. Partington, *Pembina Institute Comments on Canada's Proposed Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations* (Pembina Institute, 2010). http://www.pembina.org/pub/2055.

[57] See, for example, Pembina Institute "Pembina reacts to climate change regulations for coal-fired power," media release, September 5, 2012. http://www.pembina.org/media-release/2372

[58] Natural Resources Canada, "Readout from meeting between Minister Joe Oliver and Mayor Rahm Emmanuel," news release, March 5, 2013. http://www.nrcan.gc.ca/media-room/news-releases/2013/6927

towards closing the target gap, and thus how close it comes to bringing Canada into alignment with the 2020 target it shares with the U.S.

We also put our recommendations into context with respect to cost by comparing our results to the additional cost per barrel of production under existing climate policy scenarios for an established steam-assisted gravity drainage (SAGD) oilsands facility.[59] The policy scenarios we have chosen for comparison purposes are:

- Alberta's existing SGER system, with an intensity target of 12 per and compliance at $15/tonne
- B.C.'s existing carbon tax, which is equivalent to an intensity target of 100 per cent at $30/tonne
- Norway's existing carbon tax, which is equivalent to an intensity target of 100 per cent at $74/tonne in the oil and gas sector[60]
- The lower bound of our recommended approach, with facilities facing an intensity target of 42 per cent and compliance at $100/tonne
- The higher bound of our recommended approach, with facilities facing an intensity target of 42 per cent and compliance at $150/tonne.

A barrel of oilsands crude regularly sells for about $70.[61] As Table 1 illustrates, the approach recommended in this report would increase average costs per barrel by between $3.82 and $5.73 per barrel in 2020. However, royalty and corporate tax interactions reduce this by half in practice.[62] While this is more than the added cost of B.C.'s current carbon tax, it is less than the added cost that Norway's oil and gas sector already faces.

[59] Each of these scenarios assumes that the product is from an established facility, so that the target is fully phased in (i.e., operating at its baseline emissions intensity). We applied the carbon price to both combustion and non-combustion emissions, as per our recommended approach, even when the existing policies included for comparison purposes here do not price non-combustion emissions. We assumed that facilities were achieving 100 per cent compliance via contributions to a technology fund (at the highest rate, if multiple tiers apply), or else making reductions and/or purchasing credits at an equivalent cost. These assumptions are likely to overstate the costs, as facilities may well have access to lower-cost reductions inside their operations or through other compliance options.

[60] All prices are in Canadian dollars. For further details about these and other carbon pricing policies, see P.J. Partington and Matt Horne, *Carbon Pricing Approaches in Oil and Gas Producing Jurisdictions* (Pembina Institute, 2013). http://www.pembina.org/pub/2414

[61] See, for example, Cold Lake Blend (a bitumen blend), priced at $69.95/barrel on Mar 11. [Cenovus, *Current Crude Oil Prices* (March 11, 2013). http://www.cenovus.com/operations/docs/crudeoilpricing/Current_Price.pdf]

[62] Andre Plourde, *Carbon Taxes and Financial Incentives for Greenhouse Gas Emissions Reductions in Alberta's Oil Sands* (Carleton University, 2012). http://www.usaee.org/usaee2012/submissions/OnlineProceedings/USAEE%20plourde%2018august2012.pdf

Table 1. Costs to typical in situ oilsands facility under various GHG policy options

	Marginal price signal (cost per tonne)	Maximum compliance cost per barrel produced[63]	Effective average cost per barrel[64]
Alberta SGER	$15	$0.16	$0.08
B.C. carbon tax	$30	$2.73	$1.37
Norway carbon tax	$74	$6.73	$3.37
Recommended approach — lower and higher bounds	$100	$3.82	$1.91
	$150	$5.73	$2.87

[63] Assumes the project operates at the industry average GHG intensity of 91 kg CO_2 equivalent per barrel, as reported by Simon Dyer et al., *Drilling Deeper: The In Situ Oilsands Report Card* (Pembina Institute, 2010), 54. http://www.pembina.org/pub/1981. In the SGER model and our recommended approach, this also assumes an established facility operating at its baseline emissions intensity; a facility emitting more than its baseline intensity would pay more than the "maximum" cost.

[64] Due to interactions with the provincial royalty regime and the corporate income tax system, the average compliance cost borne by SAGD operations is reduced by roughly half. [Plourde, *Carbon Taxes and Financial Incentives for Greenhouse Gas Emissions Reductions in Alberta's Oil Sands*.]

Appendix A. Emission calculation

We assumed the following reductions relative to the 2020 levels projected in *Canada's Emissions Trends* for the sectors, other than oil and gas, which have yet to be regulated:

- Other Transport — 2 Mt (assuming 2005–20 reductions at the same rate as that forecast for passenger transportation)
- Refined Petroleum Products and Natural Gas Electricity — 2 Mt (together accounting for a reduction of 10 per cent below business as usual, compared to the 5 per cent reduction forecast from the federal coal regulations)
- Emissions-Intensive Trade-Exposed Industry — 8 Mt (stabilizing at the 2010 level, a reduction of 10 per cent from business as usual)
- Buildings — 6 Mt (returning to the 2005 level)
- Agriculture — 5 Mt (8 per cent reduction from business as usual)
- Waste and Others — 3 Mt (returning to the 2005 level).

These assumptions are based on precedents established by extant regulations and other qualitative assessments. Our analysis also accepts Environment Canada's preliminary estimate of a 25 Mt reduction from land use, land use change and forestry (LULUCF) in 2020.

After accounting for the 26 Mt of emission reductions described in the list above, other parts of the economy (i.e. all the remaining unregulated sectors except excluding oil and gas) have total emissions of **304 Mt.**

Environment Canada's projections show a total of **185 Mt** in 2020 from those portions of the transportation and electricity sectors that have already been regulated.[65]

This adds up to **489 Mt,** meaning that emissions from oil and gas must be limited to **118 Mt** to get Canada on track to a national total of 607 Mt in 2020. (607-489=118.)

Of course, the federal government could decide to be more ambitious in the other yet-to-be-regulated sectors than we have assumed here, which would lessen the required reductions from the oil and gas sector. Figure 5 below illustrates this via a sensitivity analysis that doubles the emission reductions from the other yet-to-be-regulated sectors. As the figure shows, even if we assume a much higher level of action in other sectors (whether through federal or provincial action), oil and gas must still make very significant efforts to limit emissions. When the reductions we assumed from each sector currently awaiting regulation are doubled, oil and gas still needs to achieve a 2020 emissions level of 144 Mt (a reduction of six per cent below the 2010 level).

[65] Additional policies in those areas — for example, increased support for public transit or new incentives for low-impact renewable energy — would cut down the amount of emission reductions that the "yet to be regulated" sectors need to deliver to get Canada on track to its 2020 target.

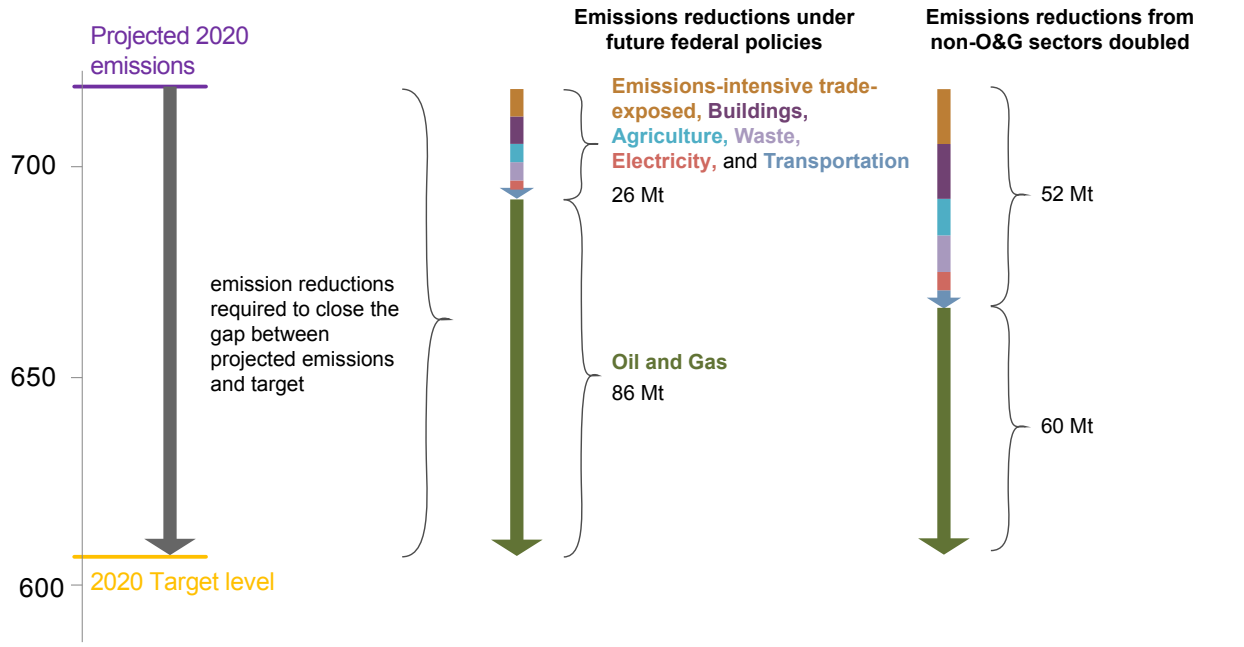


Figure 5. Projected emissions by economic sector under two assumptions about non-oil and gas policy stringency

Even if we assume that the yet-to-be regulated sectors achieve twice the emission reductions we projected, the oil and gas sector still needs to make a significant contribution to Canada's 2020 target. In this example, it means that the sector would need to reduce emissions by six per cent below the 2010 level.

The emissions projections for the oil and gas sector would also change if the industry moderates the current expected growth in production. Companies could choose to do this in response to changes in the global oil and gas landscape, local cost pressures, environmental regulations, market access constraints, or reduced global demand due to greater efficiency and conservation. Slowing the expected growth in oilsands production would mean that a smaller emissions intensity improvement would be needed to close the gap towards Canada's 2020 target, and would make it easier to limit the sector's net emissions to 118 Mt in 2020. Slowing the pace of oilsands expansion could still result in production levels higher than today's.

Appendix B. Key questions about oil and gas regulatory proposals

This appendix provides a list of key questions observers may wish to consider in assessing the federal government's greenhouse gas (GHG) regulations for the oil and gas sector, which are expected to be announced in the coming weeks.

Effect of the regulations

- Will this proposal get Canada on track to hit its 2020 target?
  - If not, how do you plan to close the gap?
- How much will the proposed regulations cost a typical oilsands facility in per barrel terms?
- Will the proposed regulations help companies close the gap between the GHG emissions from producing oilsands crude and conventional crudes? If so, by how much?

Design of the regulations

- What consultation process was used to arrive at this proposal?
  - How does it reflect the views of the oil and gas industry? How are views from other stakeholders reflected in the proposal?
- What options does industry have to take responsibility for its emissions?
  - Will companies have access to a technology fund? If so, what will the rate be for payments, and how will the funds raised be spent? Will access to the technology fund be capped or unlimited?
  - Can companies purchase credits from emission reduction activities outside of the sector (e.g. offsets)? If so, how will the government ensure that the reductions are real and verifiable? Will access to offset credits be capped or unlimited?
  - Will companies have access to credit trading between facilities in the sector, as the federal government's vehicle regulations allow?
- What fraction of the oil and gas sector's emissions will be covered by this regulation?
- Do the regulations cover both new and existing facilities?
- How will you ensure that new facilities build in the best available technology?
- Will the stringency of the proposal increase after 2020?
- Does the proposal include a review provision? If so, by when?

Next steps for the regulations

- Will the federal government take steps to allow provinces to administer the regulations themselves through "equivalency agreements"? If so, how will you ensure that reductions actually take place?
    - Could carbon pricing policies that the federal government has rejected (e.g. British Columbia's carbon tax) be considered "equivalent"?