

# Context for climate action in Canada

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## At a Glance

This backgrounder provides an overview for U.S. audiences of the current context for addressing climate change in Canada. In light of the consideration of the Keystone XL pipeline proposal, it focuses on the role of the oil and gas sector in Canada's national greenhouse gas emission profile.

## Key conclusions

- While Canada has adopted an identical climate target to the United States' 2020 goal, Canada is currently on track to miss that target by a very significant margin — more than the total annual emissions from all passenger transportation in Canada today.
- Growth in greenhouse gas emissions from increasing oilsands production is a key reason why Canada is not on track for its 2020 climate goal.
  - According to Canadian government projections, the projected growth in oilsands emissions from 2005 to 2020 is so large that it would cancel out all emission reductions that other parts of Canada's economy are projected to make over the same period.
- New pipelines — notably the Keystone XL pipeline proposal — are a necessary precondition to allow the oilsands to grow its production at the pace and scale that the industry envisions.
  - Because the oilsands region is landlocked, producers' expansion plans are contingent on the availability of affordable transportation options to reach desirable markets. Indeed, all proposed pipeline projects currently on the table are still inadequate to meet producers' expansion plans.
- Despite numerous commitments and several missed deadlines, there are currently no federal regulations enacted or proposed to limit greenhouse gas emissions from Canada's oil and gas sector or from the oilsands in particular.
- Negotiating positions from consultations with industry to develop those regulations have been reported in the Canadian media. Though some are more stringent than others, none of the proposals reportedly on the table for those future regulations are strong enough to get Canada on track to meet its 2020 target.

## While Canada has adopted an identical climate target to the United States, Canada is currently on track to miss that target by a very significant margin

After a brief decline during the recession, Canada’s emissions — after accounting for the effects of all federal and provincial emission reduction policies — are projected to continue growing under current policies from a total of 702 million metric tonnes (Mt) in 2011 to 745 Mt in 2020.<sup>1</sup> In its most recent public emission projections, the federal government included a “preliminary” credit of 25 Mt for emission reductions from land-use, land-use change and forestry (LULUCF), reducing Canada’s 2020 national total to 720 Mt.

Canada has adopted a national emission target identical to the U.S. commitment of 17% below the 2005 emission level by 2020. Hitting the target would mean reducing Canada’s emissions to 607 Mt. Thus, Canada’s current trajectory would result in Canada missing the 2020 goal by 113 Mt after accounting for the LULUCF credit — more than the total annual emissions from all passenger transportation in Canada today.

The United States is projecting to make better progress toward its 2020 target. The State Department projects that U.S. GHGs will be 5% below the 2005 level in 2020 with current policies.<sup>2</sup> However, recent State Department analysis anticipates that the implementation of measures consistent with those in the President’s Climate Action Plan could get the U.S. on track to achieve its 2020 goal, projecting 2020 emissions in the range of 14 to 20% below the 2005 level once that plan is fully enacted.

As of today, Canada lacks any equivalent federal government initiative to close the gap towards its national 2020 target. The two countries’ different trajectories are illustrated in Figure 1 below.

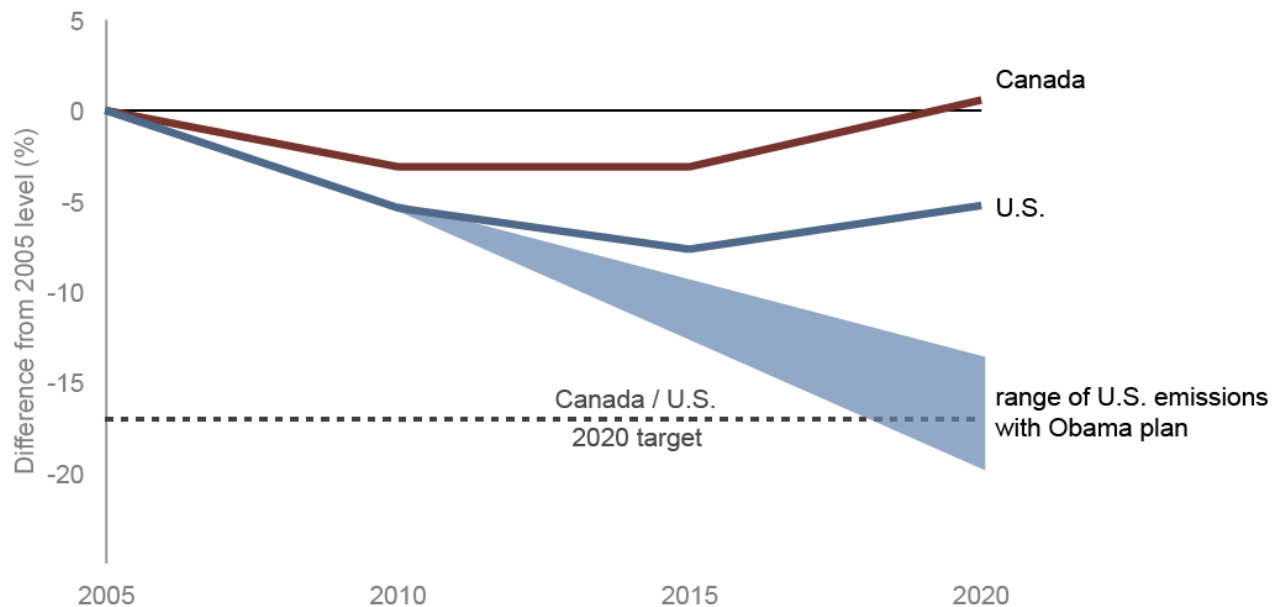


Figure 1. Progress towards climate targets, Canada and the U.S.

Data source: NRTEE<sup>3</sup> and U.S. Department of State<sup>4</sup>

The oil and gas sector is a much bigger piece of the puzzle in Canada than it is in the U.S.

Canada is the world’s tenth-largest emitter of greenhouse gases (GHGs) in absolute terms, and its per capita emission levels are also consistently among the world’s highest.<sup>5</sup> In 2011, Canada’s industrial sector accounted for the largest portion of national emissions at 38% (23% of the national total from oil and gas), followed by transportation at 24%.<sup>6</sup> Electricity generation accounts for a relatively smaller portion of national emissions (13%) in Canada than in the United States, since only a fifth of Canada’s total power generation is from combustion sources.<sup>7</sup> Canada’s emissions have grown 19% since 1990, as compared to an 8% increase in U.S. emissions over the same period. Figure 2 below compares emissions by sector in Canada in 2011 with those in the U.S.

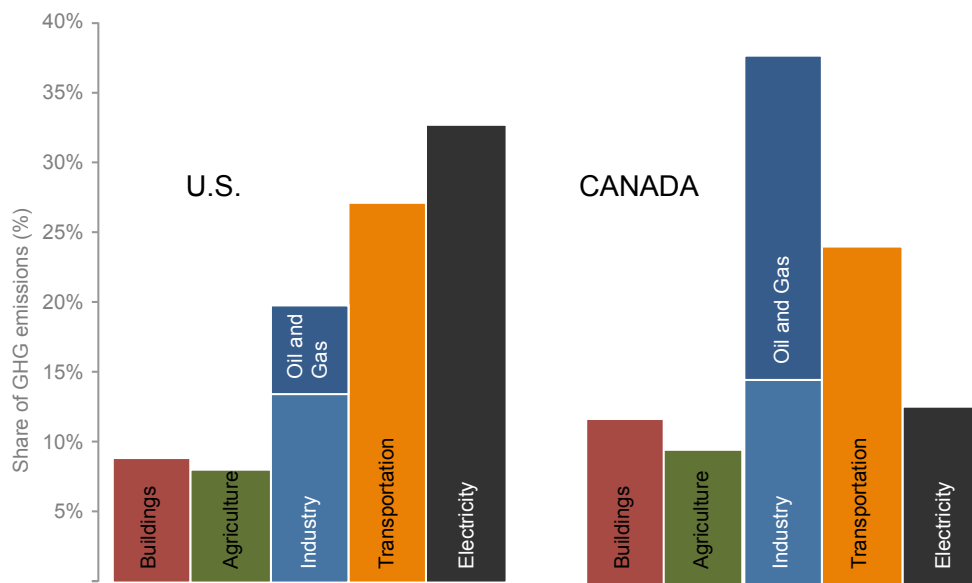


Figure 2. 2011 Emissions by sector, Canada and the U.S.

Data source: Environment Canada<sup>8</sup> and U.S. EPA<sup>9</sup>

In the U.S., the power sector accounts for one-third of emissions, so it’s easy to see why cleaner power and energy efficiency are central priorities in the President’s climate plan. In Canada, the oil and gas sector occupies a similar niche, accounting for nearly a quarter of national emissions. However, the two sectors have very different emissions trajectories: coal emissions in the U.S. are declining, while oilsands emissions are Canada’s fastest-growing source of greenhouse gas pollution.

## The projected expansion of the oilsands is the most important reason Canada is not on track to achieve its 2020 climate target

After factoring in the effects of current and announced federal and provincial climate policies, oilsands emissions are projected to more than triple between 2005 and 2020, a growth of 73 Mt in annual emissions over that period. In contrast, Canada’s total national emissions are projected

to grow by 5 Mt over the period.<sup>10</sup> In other words, the projected growth in oilsands emissions from 2005 to 2020 is so large that it cancels out all emission reductions that other parts of Canada’s economy are on track to make over the same period. The outsized role of this sector’s projected growth in Canada’s emissions picture is illustrated in Figure 3 below.

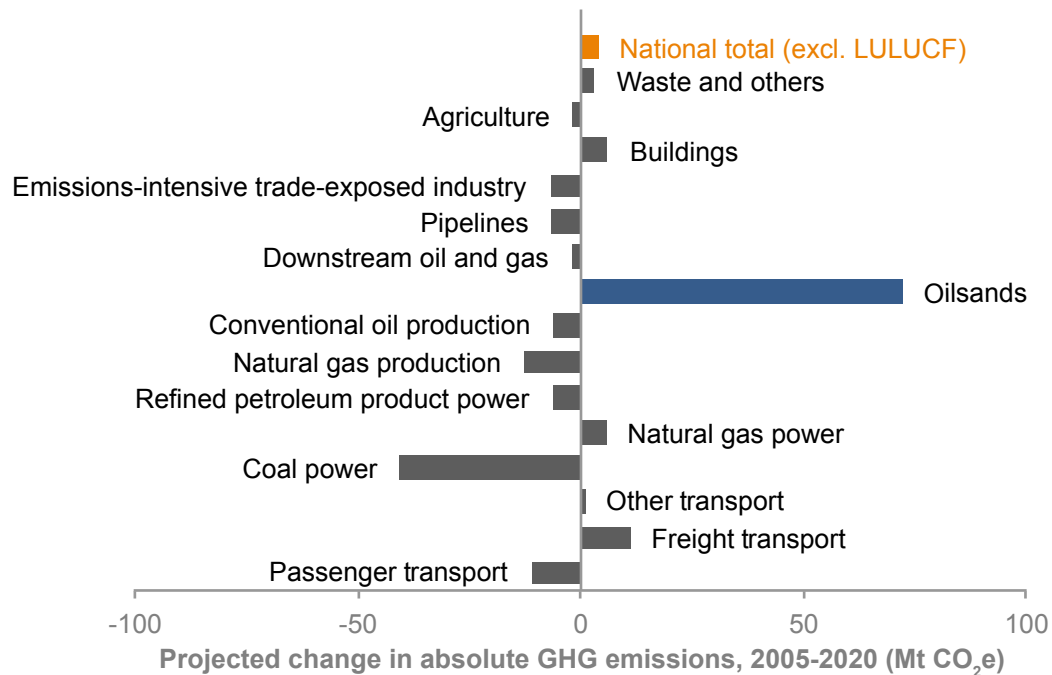


Figure 3. Projected change in GHG emissions by sector, 2005-2020

Data source: Environment Canada<sup>11</sup>

In the absence of adequate emission reduction policies to achieve the national target, the expectation of rapidly increasing production in the oilsands sector is the primary reason for the projected growth in Canada’s emissions to 2020.

Total GHG emissions from the oilsands are closely linked to the rate of development of the oilsands resource. Between 2005 and 2011, bitumen production increased 64%<sup>12</sup> and GHG emissions from the oilsands sector increased by 62%.<sup>13</sup> Production is forecast to reach double the 2011 level by 2020,<sup>14</sup> with emissions nearly doubling as well.<sup>15</sup> Industry projections foresee nearly a tripling of production by 2030, rising from the 2012 total of 1.8 million barrels per day to 5.2 million barrels per day by 2030.<sup>16</sup>

## New pipelines would open the door to increased production in the oilsands and the associated GHG emissions

The industry projections of growing oilsands production assumes that transportation capacity out of the oilsands region “can grow to accommodate the projected increase in supply.”<sup>17</sup> Because the oilsands region is landlocked, producers’ expansion plans are contingent on the availability of affordable transportation options to reach desirable markets. Indeed, as Figure 4 illustrates, all proposed pipeline projects currently on the table are still inadequate to meet producers’ expansion plans.

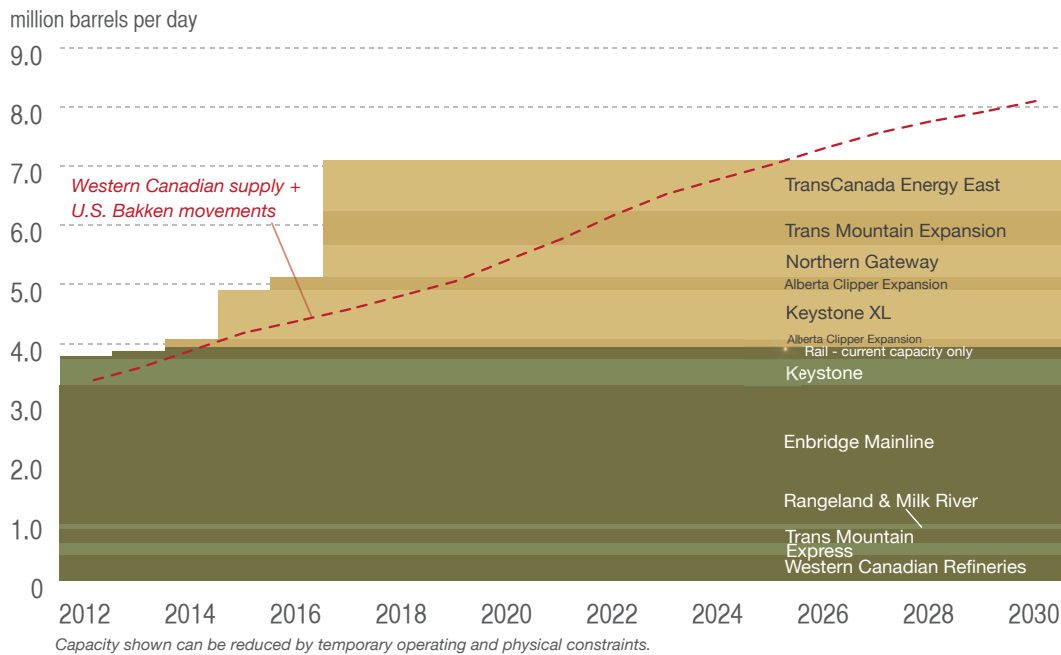


Figure 4. Supply forecast and pipeline capacity

Source: CAPP<sup>18</sup>

Government of Canada documents obtained through Access to Information legislation state clearly that pipelines are an essential ingredient to the expansion of oilsands production. In a briefing note prepared for Natural Resources Minister Joe Oliver in preparation for a March 2013 event, federal officials wrote that “in order for crude oil production to grow, the North American pipeline must be expanded through initiatives, such as the Keystone XL Pipeline project.”<sup>19</sup>

In our view, the Keystone XL proposal represents a particularly important enabler of increased oilsands development. It would provide oilsands producers with significant new access to Gulf Coast refineries configured to process heavy oil, at a fraction of the current cost of reaching the same destination by rail. Thus, the construction of the Keystone XL pipeline would have a significant impact on oilsands emissions. Filling the proposed pipeline’s capacity with oilsands would enable a 36% increase from current production levels, for which the upstream (production) emissions alone would be equivalent to the annual emissions from 6.3 coal-fired power plants or over 4.6 million cars.<sup>20</sup> This total would be higher if the additional emissions from upgrading and refining in the U.S. were factored in.<sup>21</sup>

In a U.S. context, it is important to note that oilsands is significantly more emissions-intensive than U.S. average crude. A 2009 study by the National Energy Technology Laboratory found that average life cycle GHG emissions from oilsands to be 81% higher on a well-to-tank basis than the 2005 average of crudes consumed in the United States, and 17% more GHG-intensive over the full life cycle of the fuel (well to wheels).<sup>22</sup>

While per-barrel emissions in the oilsands sector have fallen 26% since 1990 — a comparable rate to the overall GHG intensity improvement in Canada’s economy of 28% over the same period<sup>23</sup> — the rate of improvement has stalled in recent years. Now that an initial set of

technology changes have been made at oilsands facilities — for example, fuel-switching at many operations from petroleum coke to natural gas — the sector’s rate GHG intensity has largely plateaued. Over the same period, oilsands emissions more than tripled in absolute terms, rising from 15 Mt to 55 Mt.<sup>24</sup> Figure 5 below plots the change in oilsands emissions intensity against the growth in oilsands emissions over the 1990 to 2011 period.

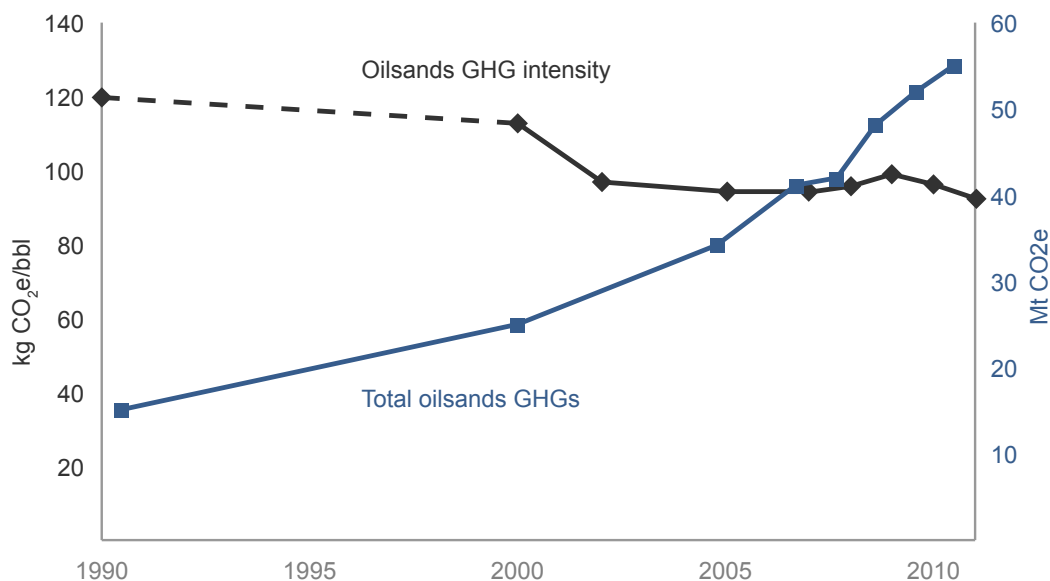


Figure 5. Oilsands GHG intensity and total GHGs

Note: Intensity data is not available for the period 1990–2000 (dashed line)

Data source: Environment Canada<sup>25</sup> and Statistics Canada<sup>26</sup>

In the absence of effective regulations, the emissions intensity of oilsands production is unlikely to improve significantly in the years ahead. Faster growth in in situ production — which is more GHG-intensive than mining — is now cancelling out the earlier gains from improved efficiency. Production from in situ projects is forecast to grow twice as fast as production from mining projects to 2020.<sup>27</sup> The oilsands’ GHG intensity will be further challenged as production expands to lower-quality deposits that require more energy for extraction.

## Meeting Canada’s climate target will require strong oil and gas sector regulations — but the federal government has not enacted or proposed any yet

Canada’s federal government has shelved an economy-wide approach to emission regulation in favour of sector-by-sector regulations. To date, Canada has adopted emission standards for light- and heavy-duty vehicles that are identical to those under the Environmental Protection Agency/National Highway Traffic Safety Administration (EPA/NHTSA) National Program and Heavy-Duty National Program.

The Canadian federal government has also finalized GHG standards for coal-fired electricity generation that are scheduled to take effect in 2015. The design of these regulations allows existing coal-fired power plants to operate as usual until the end of their economic lives, an

average of nearly 50 years. Thus, the policy is projected to have little short-term impact on Canada's emissions: government estimates quantify their 2020 impact as a reduction of just 0.4% in Canada's national emissions.<sup>28</sup>

As noted above, according to the most recent available government projections, Canada is expected to miss its 2020 target by a margin larger than its entire passenger transportation sector.<sup>29</sup> This projection accounts for all existing federal and provincial policies, including the two described above. Thus, the majority of the additional reductions needed to close the gap remaining to Canada's target will need to come from sectors that have yet to be regulated by the federal government.<sup>30</sup>

The oil and gas sector is by far the largest sector in that category. As a February 2012 briefing note to then-Environment Minister Peter Kent warned, the oil and gas sector's share of national emissions "is expected to increase to 25% in 2020, largely driven by growth in oil sands production. Oil and gas regulations will therefore be essential to attaining Canada's 607 Mt target."<sup>31</sup>

The federal government has long promised GHG limits in the oil and gas sector, and has made a variety of commitments to enact policies over the years. At present, however, there are no federal GHG limits of any kind on the oil and gas sector in Canada. Specific consultations with the oil and gas industry and the province of Alberta about a sectoral regulation began in 2011, but no announcements — of either political commitments or draft regulations — have been made. The federal government recently missed a commitment to publish information about its approach to limiting oil and gas regulations in the first half of 2013, and has yet to provide any updated information about the timing of enacting an oil and gas sector GHG regulation.

## Proposals currently being considered for the future oil and gas sector regulations are unlikely to be strong enough to get Canada on track for its climate target

As there is no public information about the federal government's plans, this section must be considered speculative. However, media reports and conversations with industry and government officials give us a fairly clear picture of what to expect from the design of future federal oil and gas sector regulations.<sup>32</sup>

The federal regulations are expected to adopt a design similar to Alberta's existing Specified Gas Emitters Regulation (SGER), an emission performance regulation that has been in effect for all of the province's heavy emitters since July 2007. Under Alberta's regulation, facilities are required to reduce their emissions per unit of production by up to 12% below a facility-specific baseline. Companies can comply by improving their emissions intensity; by purchasing credits from other facilities that have done better than their target levels; by purchasing offset credits from emission reduction projects in Alberta; or by paying into a technology fund at a fixed rate of \$15 per tonne.

The future federal regulations are expected to increase the stringency of two key parameters: the intensity target and the technology fund price level. According to media reports, the range of options under consideration range from the industry's proposal of a 20% target and a \$20 per

tonne price to Alberta's proposal of a 40% target and a \$40 per tonne price. The federal government's negotiating position has been reported as a 30% target and a two-tier technology fund price, with the lower tier at \$30 per tonne.<sup>33</sup>

Our own analysis found that an intensity target of 42% and a technology fund price on the order of \$100 per tonne by 2020 would be required to reduce oil and gas sector emissions sufficiently to get Canada on track for its 2020 target. (Due to the relatively high cost of emission reduction technologies applicable to oilsands operations, a price on the order of \$100 per tonne by 2020 is needed to spur significant reductions in oilsands GHG intensity.)<sup>34</sup>

Thus, even the most stringent proposal reportedly on the table would likely leave Canada well short of its national 2020 goal. Indeed, a scenario that falls halfway between the industry and Alberta proposals would likely see oil and gas sector emissions increase from today's levels by 2020, even if we assume firms meet their targets entirely through improvements to their operations (as discussed below, this is a very unrealistic assumption). While the Government of Canada could in theory ask other yet-to-be-regulated sectors to do more to make up for the oil and gas sector's projected growth, a more likely scenario under the current government's approach is that Canada would fail to attain its 2020 target.

Alberta's regulation is designed to give companies a very high degree of flexibility in attaining its targets. Emitters in Alberta have historically taken full advantage of that flexibility, with the majority of firms' compliance with the regulation coming from the purchase of offset credits and technology fund payments rather than physical emission reductions in their facilities. Economic modelling analysis found that the same result can be expected with a federal oil and gas sector regulation based on Alberta's model. In one study, in-sector reductions from a federal oil and gas sector regulation built on Alberta's approach were projected to be just 21% of total compliance.<sup>35</sup> Instead, firms met 47% of the target through offset credits and 28% through payments into a technology fund.

Unfortunately, both of those flexibility mechanisms raise further concerns about Canada's ability to attain its 2020 emissions target. If the federal proposal does include a technology fund structured and managed like Alberta's, it is entirely possible that the fund will not generate any significant reductions in time for Canada's 2020 target deadline. It is worth noting that Alberta does not currently claim technology fund payments as reductions in its annual reports on companies' compliance with the regulatory system.<sup>36</sup>

Offset credits in any emissions trading system need to be strictly regulated to ensure their environmental integrity, and this one would be no exception. A further complication would arise if the oil and gas sector hoped to purchase offset credits from sectors that have yet to be regulated, thus diminishing those sectors' remaining scope for cost-effective reductions. If the oil and gas sector receives a relatively weak target, the yet-to-be regulated sectors would need to "pick up the slack" to get Canada on track for its 2020 target as well as supplying offsets to oil and gas. This combination would create a very difficult GHG reduction challenge for sectors like agriculture or emission-intensive, trade-exposed industry.

A final piece of context for considering announcements of new regulations from Ottawa is the federal government's climate credibility. Unfortunately, the Government of Canada has established a track record of promising far more than it delivers on climate change. This pattern



has played out over years with respect to Canada’s overall climate goals, but it has also manifested itself in the government’s approach to individual sectors.

In 2008, Prime Minister Harper promised that “new oil sands operations will only be permitted if they can massively reduce their emissions” when proposing an emission performance standard equivalent to the application of carbon capture and storage for certain oilsands projects and upgraders.<sup>37</sup> This commitment, one part of a plan that the government projected would reduce oilsands emissions by 55% below business as usual,<sup>38</sup> was never implemented.

Ottawa’s approach to regulating emissions from coal-fired electricity provides another cautionary tale. The federal government’s initial announcement — a 2010 commitment to put an end to conventional coal power — grew successively weaker in the course of two years of consultations with the power sector. The final federal regulation will be only half as effective over its first ten years as the government’s original proposal.<sup>39</sup>

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<sup>1</sup> This equates to 1% above the 2005 level in 2020. Environment Canada, *Canada’s Emissions Trends 2012* (2012). [http://www.ec.gc.ca/Publications/253AE6E6-5E73-4AFC-81B7-9CF440D5D2C5/793-Canada's-Emissions-Trends-2012\\_e\\_01.pdf](http://www.ec.gc.ca/Publications/253AE6E6-5E73-4AFC-81B7-9CF440D5D2C5/793-Canada's-Emissions-Trends-2012_e_01.pdf). Note: This excludes land-use, land-use change and forestry (LULUCF). The Government of Canada’s preliminary estimate projects a small credit from the LULUCF sector under new international accounting rules, due to reduced timber harvest levels (see pp. 35-40 of *Emissions Trends* for additional background on the government’s LULUCF estimates). Projected 2020 emissions including the LULUCF credit are 720 Mt or 2% below the 2005 level.

<sup>2</sup> U.S. Department of State, *2014 Climate Change Report* (2013). <http://www.state.gov/e/oes/climate/ccreport2014/index.htm>.

<sup>3</sup> National Roundtable on the Environment and the Economy, *Reality Check: The State of Climate Progress in Canada* (2012), Figure 16.

<sup>4</sup> *2014 Climate Change Report*, Table 5-3.

<sup>5</sup> World Resources Institute, Climate Analysis Indicators Tool 2.0, <http://cait2.wri.org>.

<sup>6</sup> Environment Canada, *National Inventory Report: Greenhouse Gas Sources and Sinks in Canada 1990-2011* (2013), Table 2-13.

<sup>7</sup> *Ibid.*, Table A13-1. Canada’s largest sources of non-combustion electricity generation are hydro and nuclear, which accounted for 60% and 16%, respectively, of total generation in 2011.

<sup>8</sup> *Ibid.*, Table 2-13.

<sup>9</sup> U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2011* (2013), Table 2-12. U.S. oil and gas estimate derived in part from facility-reported data for refineries, available at <http://ghgdata.epa.gov/ghgp/main.do>.

<sup>10</sup> *Canada’s Emissions Trends 2012*, Tables 3 and 5. Note: This excludes the projected LULUCF credit (see footnote 6). If the credit is accounted for, Canada’s emissions are projected to drop by 20 Mt CO<sub>2</sub>e between 2005 and 2020.

<sup>11</sup> *Ibid.*

<sup>12</sup> Energy Resources Conservation Board, *ST98-2013: Alberta’s Energy Reserves 2012 and Supply/Demand Outlook 2013-2022* (2013). <http://www.aer.ca/documents/sts/ST98/ST98-2013.pdf>

<sup>13</sup> *National Inventory Report*, Table 2-13.

<sup>14</sup> *ST98-2013*.

<sup>15</sup> *Canada’s Emissions Trends 2012*, Table 5.

<sup>16</sup> Canadian Association of Petroleum Producers, *Crude Oil Forecast, Markets and Transportation 2013* (2013), i. <http://www.capp.ca/getdoc.aspx?DocId=227308&DT=NTV>.

<sup>17</sup> *Ibid.*, iv.

<sup>18</sup> *Ibid.*, Figure 4.6, 31.

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- <sup>19</sup> The documents are available at <http://www.pembina.org/pub/2472>. A New York Times news story summarizing the document's contents is available at [http://www.nytimes.com/2013/08/26/business/global/canadian-documents-suggest-shift-on-pipeline.html?\\_r=1&](http://www.nytimes.com/2013/08/26/business/global/canadian-documents-suggest-shift-on-pipeline.html?_r=1&).
- <sup>20</sup> Nathan Lemphers, *The climate implications of the proposed Keystone XL oilsands pipeline* (Pembina Institute, 2012). <http://www.pembina.org/pub/2407>
- <sup>21</sup> An estimate of those emission impacts is available in Natural Resources Defense Council (NRDC) White Paper: *Climate Impacts from the Proposed Keystone XL Tar Sands Pipeline*, July 2013, 3-5, [docs.nrdc.org/energy/files/ene\\_13072301b.pdf](https://docs.nrdc.org/energy/files/ene_13072301b.pdf)
- <sup>22</sup> U.S. Department of State, *Draft Supplementary Environmental Impact Statement, Appendix W: Life-Cycle Greenhouse Gas Emissions of Petroleum Products from WCSB Oil Sands Crudes Compared with Reference Crudes* (2013), Table 4-12.
- <sup>23</sup> *National Inventory Report*, Table S-4, 52.
- <sup>24</sup> *National Inventory Report*, Table 2-5, 51.
- <sup>25</sup> *National Inventory Report*, Table 2-5.
- <sup>26</sup> Statistics Canada, CANSIM Table 126-0001, Supply and disposition of crude oil and equivalent, monthly (cubic metres).
- <sup>27</sup> Energy Resources Conservation Board.
- <sup>28</sup> Environment Canada's Regulatory Impact Analysis Statement for the final regulations (Table 22, available at <http://www.gazette.gc.ca/rp-pr/p2/2012/2012-09-12/html/sor-dors167-eng.html>) projects they will result in a net GHG reduction of 3.1 Mt in 2020. Based on *Canada's Emissions Trends 2012*, Canada's emissions would be 723 Mt in 2020 without the regulations.
- <sup>29</sup> Ibid.
- <sup>30</sup> A national carbon price could enable additional reductions from the transportation and electricity sectors. However, this is a policy option that the current federal government now rejects.
- <sup>31</sup> Environment Canada, *Analysis of Nature Article: The Alberta Oil Sands and Climate*, memorandum to minister, February 27, 2012, 4. Available at <http://www.scribd.com/doc/103359584/ec-analysis-weaver-swart>. Environment Canada's most recent projection has the oil and gas sector rising instead to a 28% share of Canada's emissions in 2020.
- <sup>32</sup> For more detailed analysis and recommendations, see the Pembina Institute's publications *Getting on Track to 2020: Recommendations for Greenhouse Gas Regulations in Canada's Oil and Gas Sector* (<http://www.pembina.org/pub/2427>) and *Key Issues to Watch in Federal Oil and Gas Climate Regulations* (<http://www.pembina.org/pub/2456>).
- <sup>33</sup> A summary of reported negotiating positions is available in Dave Sawyer and Dale Beugin, *Oil and Gas Greenhouse Gas Regulations: the implications of alternative proposals* (International Institute for Sustainable Development, 2013). [http://www.iisd.org/pdf/2013/oil\\_and\\_gas\\_ggr.pdf](http://www.iisd.org/pdf/2013/oil_and_gas_ggr.pdf)
- <sup>34</sup> Richard Middleton and Adam Brandt, "Using Infrastructure Optimization to Reduce Greenhouse Gas Emissions from Oil Sands Extraction and Processing," *Environmental Science and Technology* 47; Jacobs Consultancy and Suncor Energy, *A Greenhouse Gas Reduction Roadmap for Oil Sands* (Climate Change and Emissions Management Corporation, 2012), 9-4.
- <sup>35</sup> *Oil and Gas Greenhouse Gas Regulations*, Table 2.
- <sup>36</sup> See, for example Government of Alberta, *2012 Greenhouse Gas Emission Reduction Program Results*. <http://environment.alberta.ca/04220.html>
- <sup>37</sup> Prime Minister Stephen Harper, "Prime Minister Harper addresses Canada-U.K. Chamber of Commerce in London," speech, May 29, 2008. <http://www.pm.gc.ca/eng/media.asp?category=2&featureId=6&pageId=46&id=2131>
- <sup>38</sup> Jennifer Kerr, Environment Canada, "Turning the Corner: Taking action to fight climate change," presentation to AIXG Seminar, May 5, 2008, 10. Available at <http://www.oecd.org/env/cc/40633555.pdf>
- <sup>39</sup> P.J. Partington, "Addressing 'misperceptions' about Canada's coal power regulations," *Pembina Institute*, September 7, 2012. <http://www.pembina.org/blog/647>