OILCHANGE INTERNATIONAL

CLIMATE ON THE LINE

WHY NEW TAR SANDS PIPELINES ARE INCOMPATIBLE WITH THE PARIS GOALS

JANUARY 2017

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Oil Change International is a research, communications, and advocacy organization focused on exposing the true costs of fossil fuels and facilitating the coming transition towards clean energy.

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EXECUTIVE SUMMARY

Since the election of Justin Trudeau in October, 2015, Canada has sought to regain an international leadership role in addressing climate change. At the Paris summit months later, Canada was a key advocate of the more ambitious goal of keeping temperature rise to 1.5°C. In September 2016, Canada ratified the Paris Agreement, which now has the force of law. A year later, the federal government released a framework climate strategy with the provinces with the aim of meeting Canada's emissions pledges.

However, just days before releasing their climate plan, Trudeau's government announced the approval of two major new pipelines to facilitate further expansion of the Alberta tar sands - Kinder Morgan's Trans Mountain Expansion and Enbridge's expansion of Line 3. Additional new pipelines still on the table are TransCanada's Energy East, a potentially revived Keystone XL, and Enbridge's Alberta Clipper, Line 2, Line 4 and Line 65 projects.

In his speech announcing the pipeline approvals, Prime Minister Trudeau said: 'We approved this project because it meets the strictest of environmental standards and fits within our national climate plan.'

The Prime Minister has suggested that he thinks Canada will be to be able to meet the Paris Agreement goals, while allowing the substantial expansion of tar sands extraction.[1] This report explores the contradiction between these two goals.

Our key findings are that if tar sands expansion proceeds:

- Canada would be on track to be amongst the highest contributors of new oil production globally over the next twenty years – production that would continue long after Canada is required to reduce its emissions to zero
- Emissions from Canadian oil would exhaust 16% of the world's total carbon budget for staying below 1.5°C, or 7% of the 2°C budget. Canada's population is currently less than one half of one percent (0.49%) of the global population.

There is no possible pathway to achieving the Paris goals while expanding fossil fuel production to that extent. Scientists have found that to have a likely (2 in 3) chance of keeping warming below 2°C, global emissions must be halved within little more than 20 years. To keep warming to 1.5°C, emissions must be halved in about 15 years. If Canada proceeds with its oil expansion plans, it could prevent the world from achieving these goals. Canada could become one of the world's worst climate offenders.

Furthermore, pipelines commonly have lifetimes of 40 years, and tar sands extraction projects often upwards of 50 years. The economics of capital-intensive infrastructure projects is such that they *lock in* production over their lifetimes – this could lead to Canadian tar sands still polluting in 2060 or 2070, when global emissions need to reach zero.

Pipelines are the keys that open up untapped reserves, by giving producers an affordable, reliable means to get oil to market. While there is ample pipeline capacity for oil from existing and under-construction tar sands projects, there is no room for new expansion – this is why the industry lobbies so hard for new pipelines, and is also an important reason (alongside low oil prices) that no new tar sands projects are being developed.

1 Elizabeth McSheffrey, "Trudeau Says Pipelines Will Pay for Canada's Tansition to a Green Economy", National Observer, March 2, 2016, http://www.nationalobserver.com/2016/03/02/news/trudeau-says-pipelines-will-pay-canadas-transition-green-economy

Figure ES-1: Projected Increase in Oil Production By Country Over the Next 20 Years (if unrestricted) Source: Rystad Energy

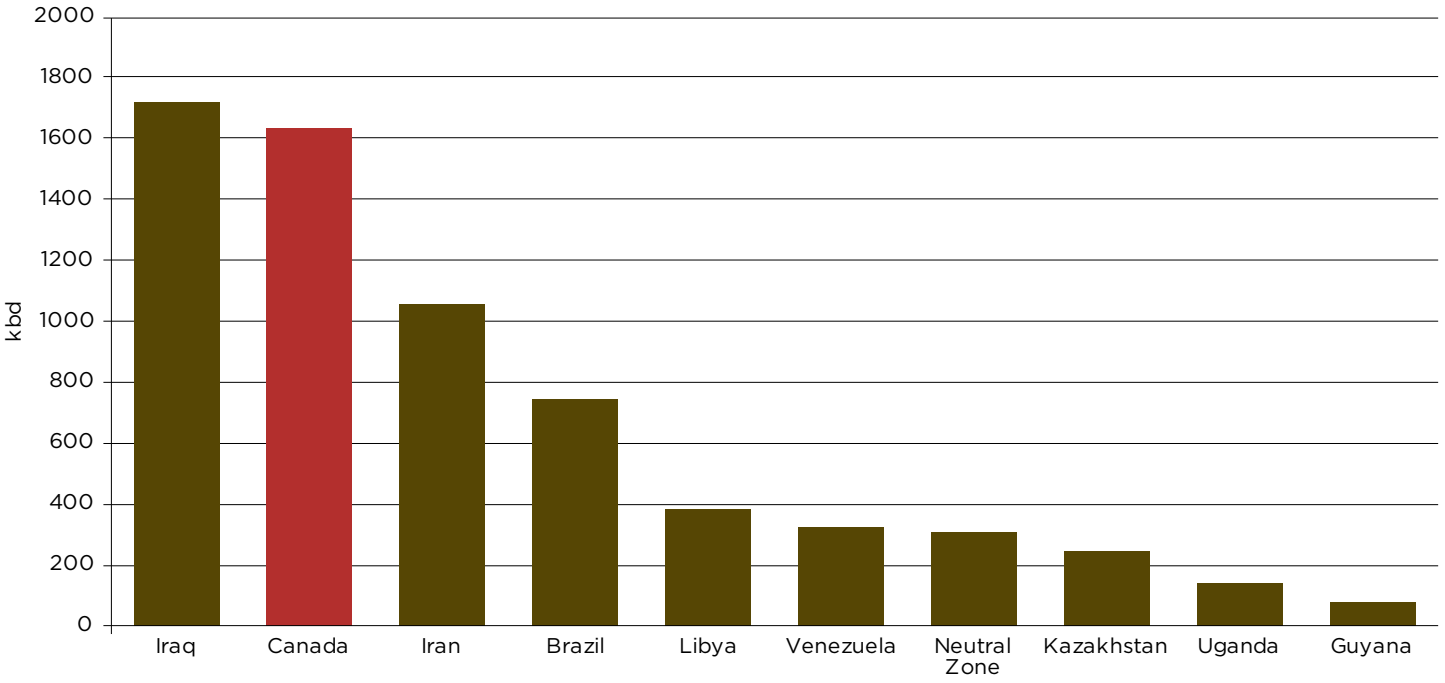
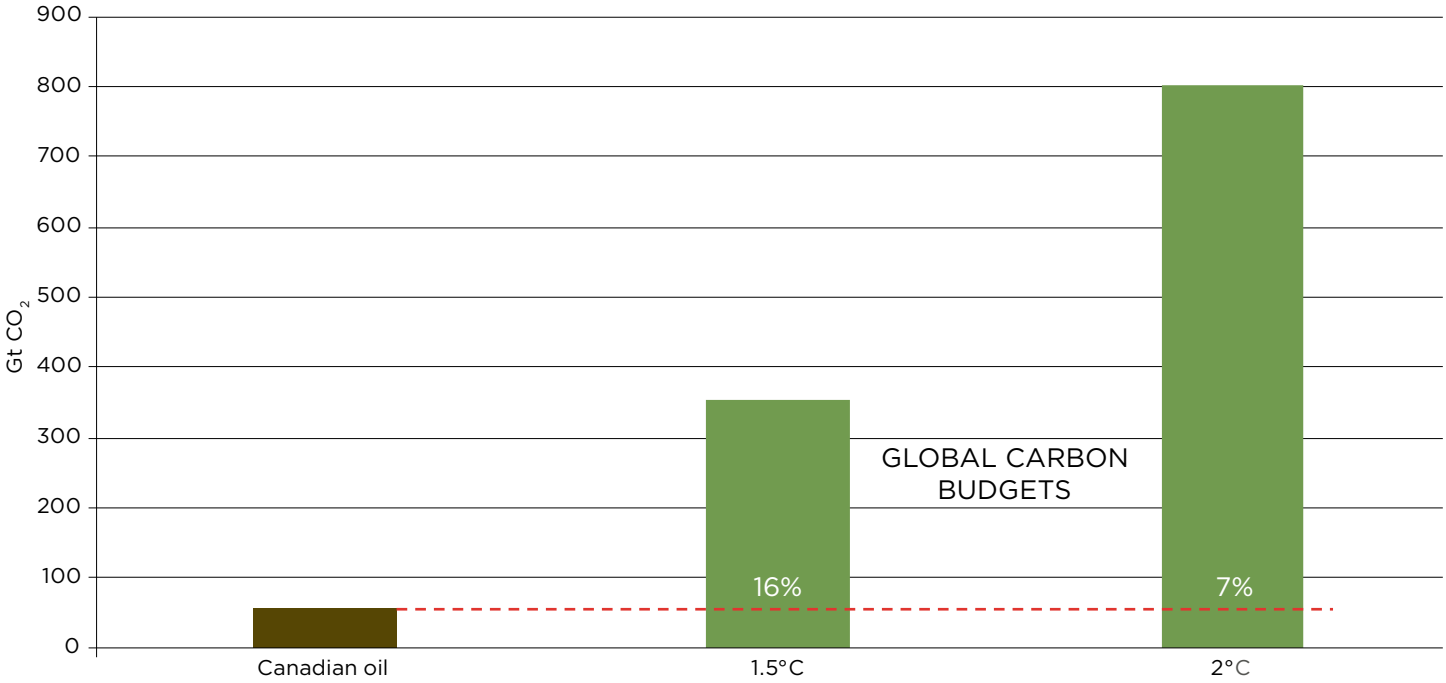


Figure ES-2: Projected Cumulative Canadian Oil Emissions Over this Century vs Global Carbon Budgets ($GtCO_2$) Sources: Rystad Energy, IPCC, Global Carbon Project



Much of the pipeline debate in Canada focuses on the question of "how many pipelines are needed to carry forecast oil production growth?" In fact, this question gets the causality the wrong way round. Since pipelines are vital to unlocking new reserves, the question should be "how much extra production will be created by pipeline growth?" In other words, approving pipelines means committing to increased production that will tip the atmosphere over the edge.

Ultimately, the carbon mathematics is such that the Canadian government simply cannot have it both ways. There is no scenario in which tar sands production increases and the world achieves the Paris goals. For all Prime Minister Trudeau's positive diplomacy in Paris, if he approves a pipeline, he will be the one to make the goals impossible to reach.

There is no future in expanding tar sands production. Instead, the government should begin serious efforts now to diversify the economy, supporting a just transition for workers and communities.

INTRODUCTION

THE CLIMATE THREAT

The burning of oil, gas and coal is driving a global climate crisis. Extreme weather events, rising oceans, and record setting temperatures are already wreaking havoc on hundreds of millions of lives and livelihoods around the world. In the absence of strong action to reduce emissions as quickly as possible, these impacts will get significantly worse throughout the course of the 21st Century:[2]

- A large proportion of the earth's species faces increased risk of extinction, as many cannot adapt or migrate as fast as the climate changes.
- Crop yields will be severely reduced, potentially causing hunger on a mass scale. The Intergovernmental Panel on Climate Change (IPCC) reports a one-in-five chance that yields of wheat, corn, rice and soy will decrease by more than 50% by 2100, and a further one-in-five chance that they will decrease by between 25% and 50%: in either case the consequences would be catastrophic.
- Water supplies, too, will become stressed, especially in dry and tropical regions.
- Cities will increasingly be hit by storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea level rise and storm surges.

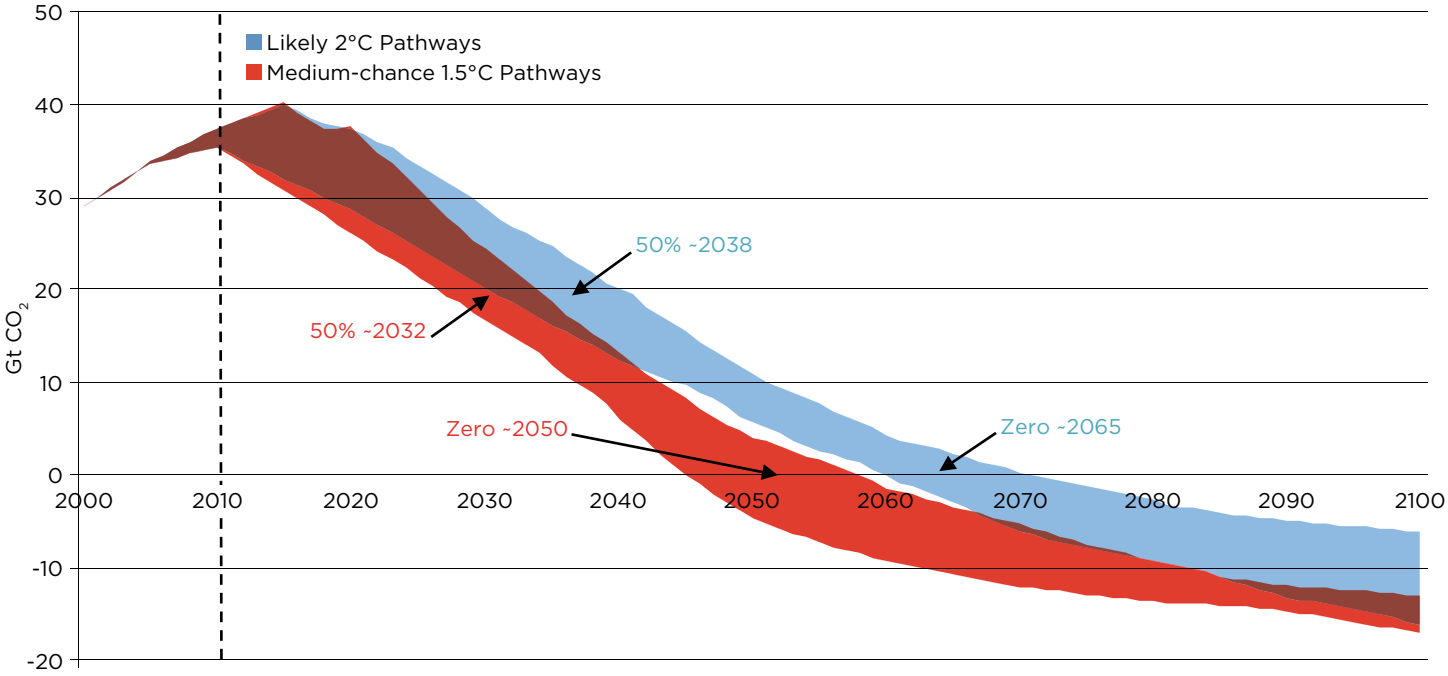
Canada carries significant responsibility for its contributions to the global climate crisis. In spite of Canada's relatively small population, climate pollution released within Canada's borders consistently ranks towards the top of global rankings for both per capita and absolute emissions. However, those statistics don't capture the full picture. Canada also ranks highly amongst the top countries in terms of its historical contribution to atmospheric greenhouse gas pollution since its industrialization. And now in an era where the consequences of burning fossil fuels are fully understood, Canada has continued to significantly increase its production and export of high-carbon fossil fuels to other countries. Without action, Canada could become one of the fastest growing extractors of new carbon pollution over the next 20 years through the expansion of long-lived tar sands production.

2 IPCC, Climate Change 2014, Synthesis Report, section 2.3, pp.13-16, http://ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf

©Akehurst / Greenpeace

Figure 1: Range of Global Emissions Pathways in Scenarios Consistent with Likely Chance of 2°C or Medium Chance of 1.5°C

Source: IPCC Scenarios Database; Joeri Rogelj et al



THE PARIS AGREEMENT

In an unprecedented global effort to address the climate crisis, 196 countries successfully negotiated an international agreement in 2015. The Paris Climate Agreement, which came into force in November 2016, established the goal of "holding the increase in global average temperature to well below 2°C above preindustrial levels and pursuing efforts to limit the temperature increase to 1.5°C above preindustrial levels."[3]

During the first decade of the twenty-first century, 2°C of warming above pre-industrial levels was often seen as a "guardrail" of a safe climate. Since then, new findings have indicated that view to be too optimistic. Runaway climate change – in which feedback loops drive ever-worsening climate change, regardless of human activities – is now seen as a risk even at 2°C of warming.[4,5]

A two-year review within the United Nations Framework Convention on Climate Change (UNFCCC), based on inputs from scientists and other experts, summarized the evolving understanding: "The 'guardrail' concept, in which up to 2°C of warming is considered safe, is inadequate and would therefore be better seen as an upper limit, a defense line that needs to be stringently defended, while less warming would be preferable."[6]

For these reasons – and due to the moral call from small island states and other vulnerable nations – governments meeting in Paris set more ambitious goals than at previous UNFCCC meetings. Canada, under the newly-elected Prime Minister Justin Trudeau, was one of the champions for including the new 1.5°C goal in Paris.

According to the IPCC Scenarios Database, even achieving a likely chance of staying below 2°C will require global emissions to be halved in little more than 20 years, as shown in Figure 1; for a chance at 1.5°C, they would need to be halved in the next roughly 15 years.[7]

3 UNFCCC, Adoption of the Paris Agreement, pg. 2 https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf
4 Examples include release of methane due to melting permafrost or accelerated dieback of Amazon rainforest.
5 Fred Pearce, "Paris COP21: An Unexpected Move Toward Global Target of 1.5 Degrees," Yale Environment 360, December 10, 2015, https://e360.yale.edu/digest/paris_cop21_an_unexpected_move_toward_global_target_of_15_degrees/4607/
6 UNFCCC Subsidiary Body for Scientific and Technological Advice, Forty-second session, Bonn, June 1–11, 2015, Report on the Structured Expert Dialogue on the 2013–2015 Review, http://unfccc.int/resource/docs/2015/sb/eng/inf01.pdf, p.18
7 Joeri Rogelj et al, "Energy System Transformations for Limiting End-of-Century Warming to Below 1.5°C," Nature Climate Change, Vol.5, June 2015, p.520

Trudeau Government Promises on climate change

"Together with our international partners, we agreed to strengthen the global response to limit global average temperature rise to well below 2 degrees Celsius as well as pursue efforts to limit the increase to 1.5 degrees."[8]

-Justin Trudeau on the successful conclusion of Paris Climate Conference, December, 2015.

"Together, we're creating a plan that will help us meet or exceed our emissions targets and encourage clean economic growth."[9]

-Justin Trudeau speaking to the UN General Assembly at the Signing Ceremony of the Paris Agreement, April, 2016.

"As the prime minister has emphasized, the only way to get resources to market in the 21st century is if it can be done sustainably and responsibly,"[10]

-Catherine McKenna, Minister of Environment and Climate Change. September 28, 2016.

8 Statement by the Prime Minister of Canada on successful conclusion of Paris Climate Conference, December 12, 2015, http://pm.gc.ca/eng/news/2015/12/12/statement-prime-minister-canada-successful-conclusion-paris-climate-conference

9 Opening Ceremony for the Signing Ceremony of the Paris Agreement, April 22, 2016, http://pm.gc.ca/eng/news/2016/04/22/opening-ceremony-signing-ceremony-paris-agreement

10 Aaron Wherry, "Trudeau government at pains to explain Pacific Northwest LNG", CBC News, October 2, 2016, http://www.cbc.ca/news/politics/wherry-pacific-northwest-1.3781396

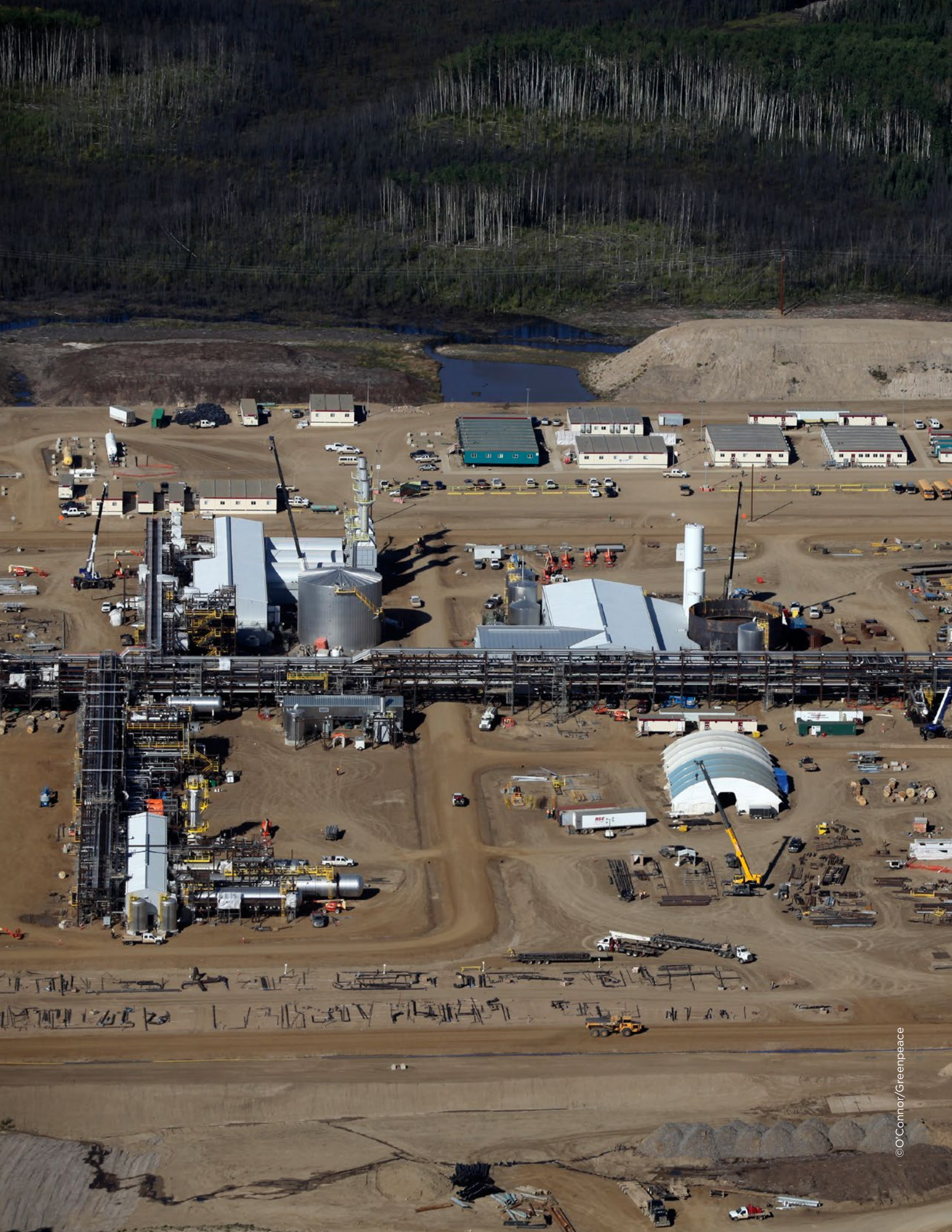


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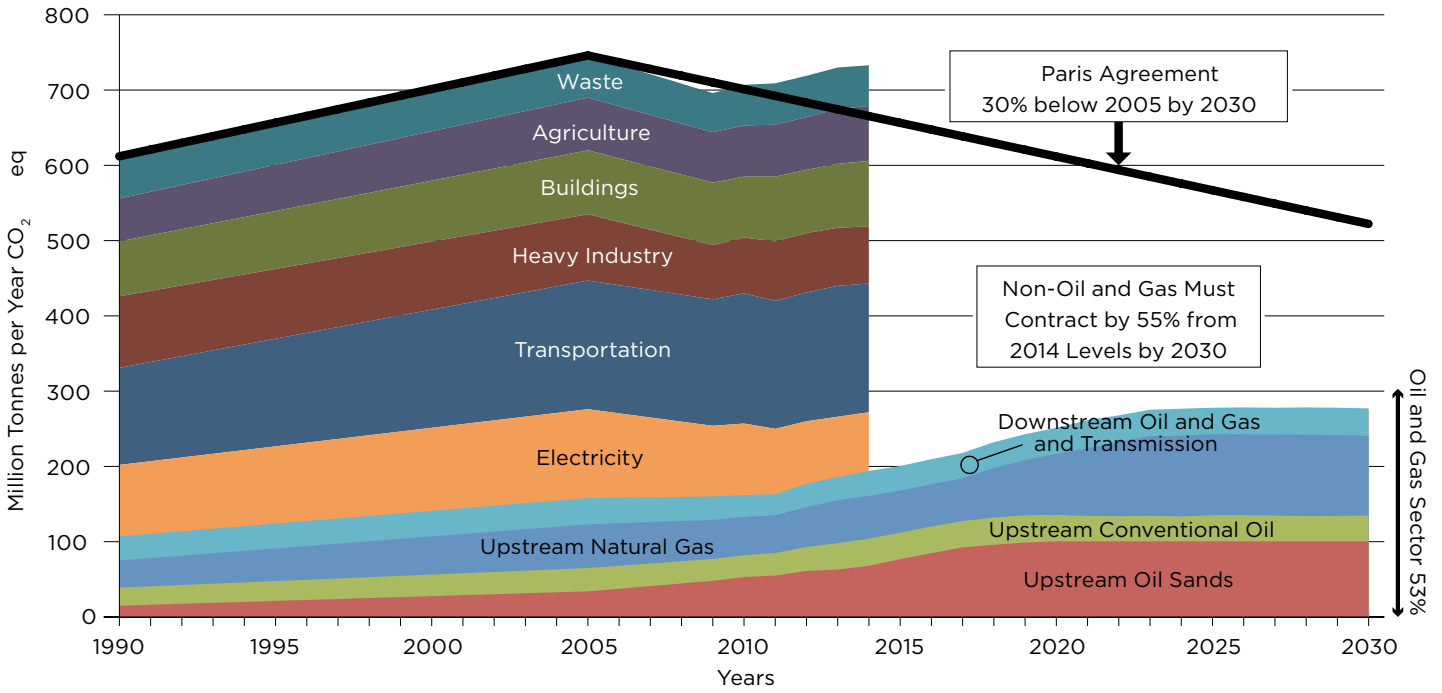
Figure 2. Canada's Domestic Greenhouse Gas Emissions by Sector from 1990 to 2014.

Oil and gas sector projections through 2030 based on the National Energy Board (2016) reference case, a 100 Mt/year emissions cap on the oil sands and a liquefied natural gas export industry in BC exporting 82 mtpa Source: David Hughes CCPA/Parkland, based on Environment Canada and National Energy Board



TAR SANDS OPERATIONAL EMISSIONS

Increases in tar sands production have already prevented Canada from doing its fair share and living up to international commitments to cut emissions domestically. Under the Kyoto protocol, Canada committed to reducing its emissions to 6% below 1990 levels by 2012, but instead saw domestic emissions levels increase by a third over that time period. As of the latest accounting, the oil and gas industry has accounted for 67% of Canada's pollution increase since 1990, with tar sands accounting for the vast majority of that increase.[11] This has undermined progress made from actions to cut pollution elsewhere across the country.

Canada has committed to reduce its emissions by 30% from 2005 to 2030 under its Nationally Determined Contribution (NDC) pledge at the UNFCCC climate conference in Paris. Alberta has also released a proposed climate Plan that would place an emissions cap of 100 Mt/y on the tar sands.[12] Even with this cap in place, over the 25-year period for Canada's commitments, tar sands emissions would triple from their 2005 level of 34 Mt/y.

Research by the Canadian Center for Policy Alternatives and the Parkland Institute has shown that even with the tar sands emissions cap, oil and gas is set to take up 53% of Canada's emissions by 2030 (see Figure 2). The balance would have to come from substantially deeper cuts by all other regions and sectors in Canada, in order to make room for such a large increase by oil companies. This raises serious questions of interprovincial and intersectoral fairness within Canada.[13]

Beyond 2030 it would get even more difficult, as there is little opportunity to reduce the emissions from long-lived tar sands projects: some proposed projects which have not yet started operation are designed to operate with constant capacity for 50 years or longer, such as the proposed Teck Frontier Mine.[14] Climate science tells us that global emissions must decrease rapidly over the next few decades, reaching zero by some time between 2050 and 2070, in order to meet the Paris goals. Further increases in tar sands emissions would likely make reaching this goal physically impossible.

However, the operational emissions regulated by Alberta's cap account for just a small portion of the total carbon involved. 80% of the climate impact of tar sands oil comes from releasing carbon wherever the fuel is burned – thus the most important impact of tar sands expansion is global. It is to this that we now turn.

11 Environment Canada, National Inventory Report 1990-2014. Part 1: (table S2) https://ec.gc.ca/ges-ghg/default.asp?lang=En&n=662F9C56-1#es-3

12 Climate Leadership Plan: Capping Oil Sands Emissions, http://www.alberta.ca/climate-oilsands-emissions.cfm. Canada's National Inventory Report 2015, compiled by Environment Canada, records Albertan tar sands emissions as 62 Mt in 2013 (table 2.14, p.63), www.ec.gc.ca/ges-ghg/

13 David Hughes, Can Canada Expand Oil and Gas Production, Build Pipelines and Keep Its Climate Change Commitments? Canadian Centre for Policy Alternatives and Parkland Instutute, June 2016, https://www.policyalternatives.ca/publications/reports/can-canada-expand-oil-and-gas-production-build-pipelines-and-keep-its-climate#sthash.uV7LdqU1.dpuf

14 Teck, Frontier Forward, February 2014, http://www.teck.com/media/2014_Operations_frontier_forward_Second_Edition_T1.10.pdf

NO ROOM FOR EXPANSION

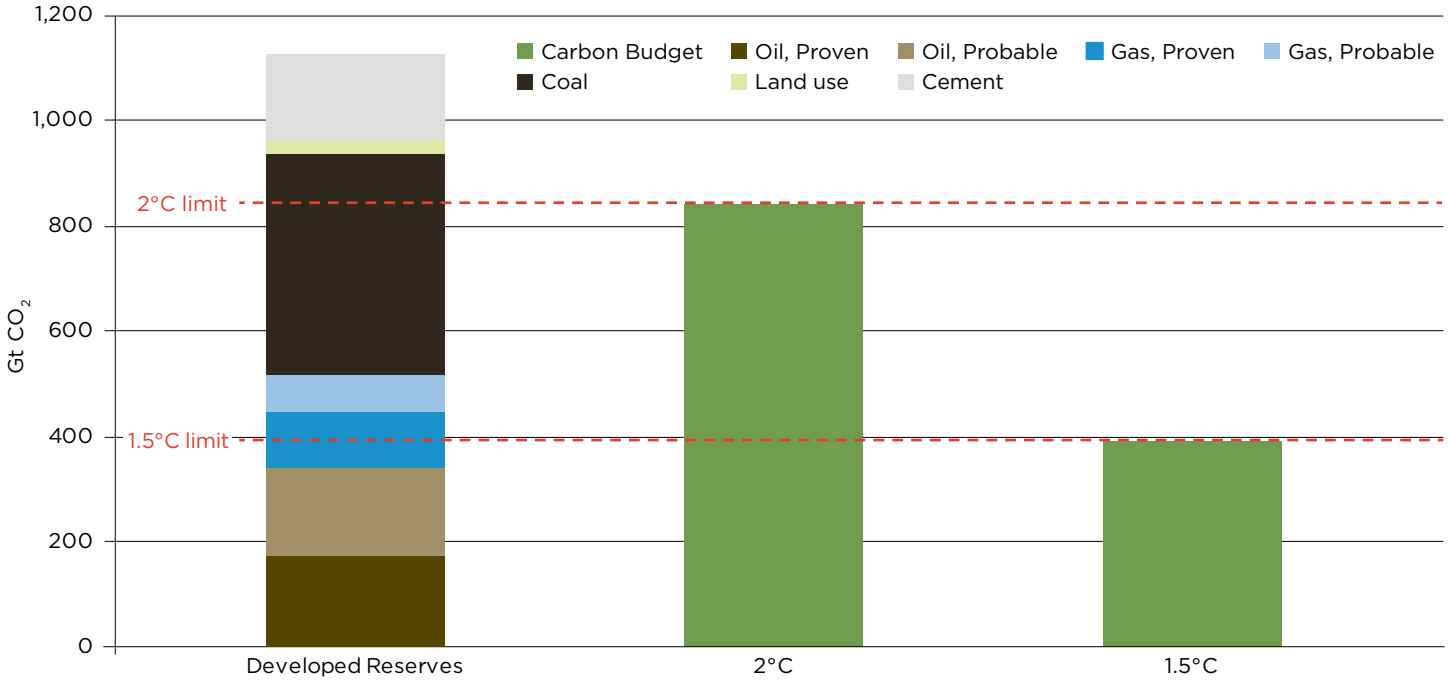
The Paris Agreement, now officially in force and ratified by Canada, sets a global temperature goal of staying well below 2°C while striving to limit the increase to 1.5°C. These goals were chosen to create a reasonable chance of avoiding the most dangerous impacts of climate change.[15]

Basic climate science shows us that the total cumulative carbon dioxide emissions (CO_2) over time determines how much global warming will occur. There is a set level of total cumulative emissions that can occur for each temperature limit we choose. By choosing the temperature limits in the Paris Agreement, we can determine the maximum amount of cumulative emissions we can release over time. This is our carbon budget.[16]

We used the carbon budgets, calculated by the Intergovernmental Panel on Climate

Figure 3: Emissions from Developed Fossil Fuel Reserves, plus Projected Land Use and Cement Manufacture, Compared to Carbon Budgets

Sources: Rystad Energy, International Energy Agency (IEA), World Energy Council, Intergovernmental Panel on Climate Change (IPCC)



15 UNFCCC, Adoption of the Paris Agreement, pg. 2 https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf

16 The carbon budgets approach does not apply to short-lived greenhouse gases such as methane, whose effects are factored into the calculation of carbon budgets in the form of assumptions about their future emissions.

Change, that would give a likely (66%) chance of limiting temperature increases below 2°C, and a medium (50%) chance of limiting temperature increases to below 1.5°C. We compared these budgets to the cumulative CO_2 that will be released over time from all existing and under-construction coal, gas and oil projects currently operating around the world.[17] The results show that existing oil and gas projects alone are enough to take the world beyond the 1.5 degree goal. The oil, gas and coal in already producing fields and mines are more than we can afford to burn while keeping likely warming below 2°C.

Logically, these findings tell us there are three possible futures.

1. We succeed in restricting new fossil fuel supply projects and carefully managing the decline of the fossil industry over time, while planning for a just transition for workers and communities. This path gives us a likely chance of achieving the goals of the Paris Agreement and avoiding the worst impacts of climate change.

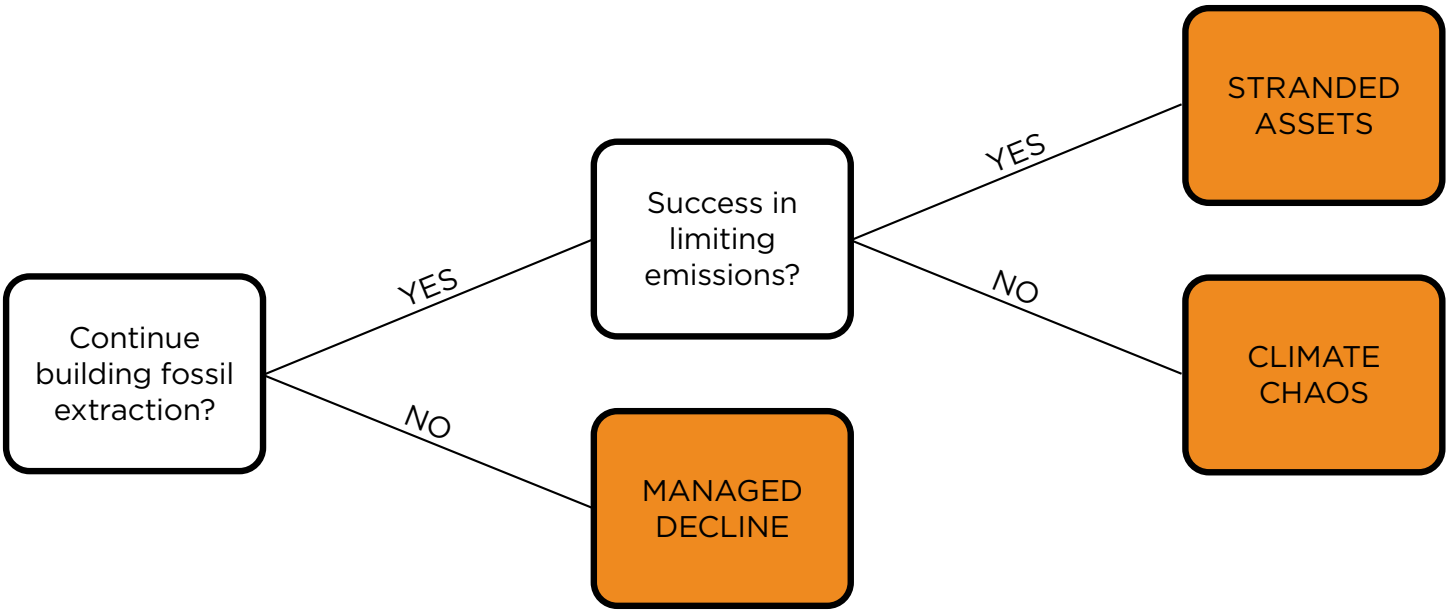
2. We allow further fossil fuel development to continue, but eventually realize this was a mistake and decide to take action at a later date. Meeting the Paris Goals would become much harder and would require a sudden and dramatic shutdown of fossil fuel production, stranding assets, damaging economies and harming workers and communities reliant on the energy sector.

3. We fail to restrict new fossil fuel projects. New long-lived fossil fuel infrastructure locks us into a high-carbon future that puts climate safety out of reach. Climate change reaches dangerous levels, causing compounding, irreparable harm for people and ecosystems around the world.

Clearly, the first option is the safest and most efficient path. By stopping new fossil fuel developments and beginning a carefully managed decline of the fossil fuel industry towards an economy powered by clean energy, we have the brightest future.

The carbon math shows that there can be no new development of oil, gas and coal if we hope to have a reasonable chance of meeting the goals of the Paris Agreement. It also reveals that we must plan for the early closure of some currently operating fossil fuel projects. Decisions on which projects must close and where international cooperation will be required to accelerate the shift to clean energy must reflect the different responsibilities and capacity of countries with respect to climate change established by international conventions.

Figure 4: Logic Tree of Fossil Fuel Supply vs Climate Change Source: Oil Change International



17 For detailed methodology see Greg Muttitt, The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of the Fossil Fuel Industry. Oil Change International. September 2016. http://priceofoil.org/content/uploads/2016/09/OCI_the_skys_limit_2016_FINAL_2.pdf

CANADIAN OIL ONE OF THE BIGGEST CLIMATE CULPRITS

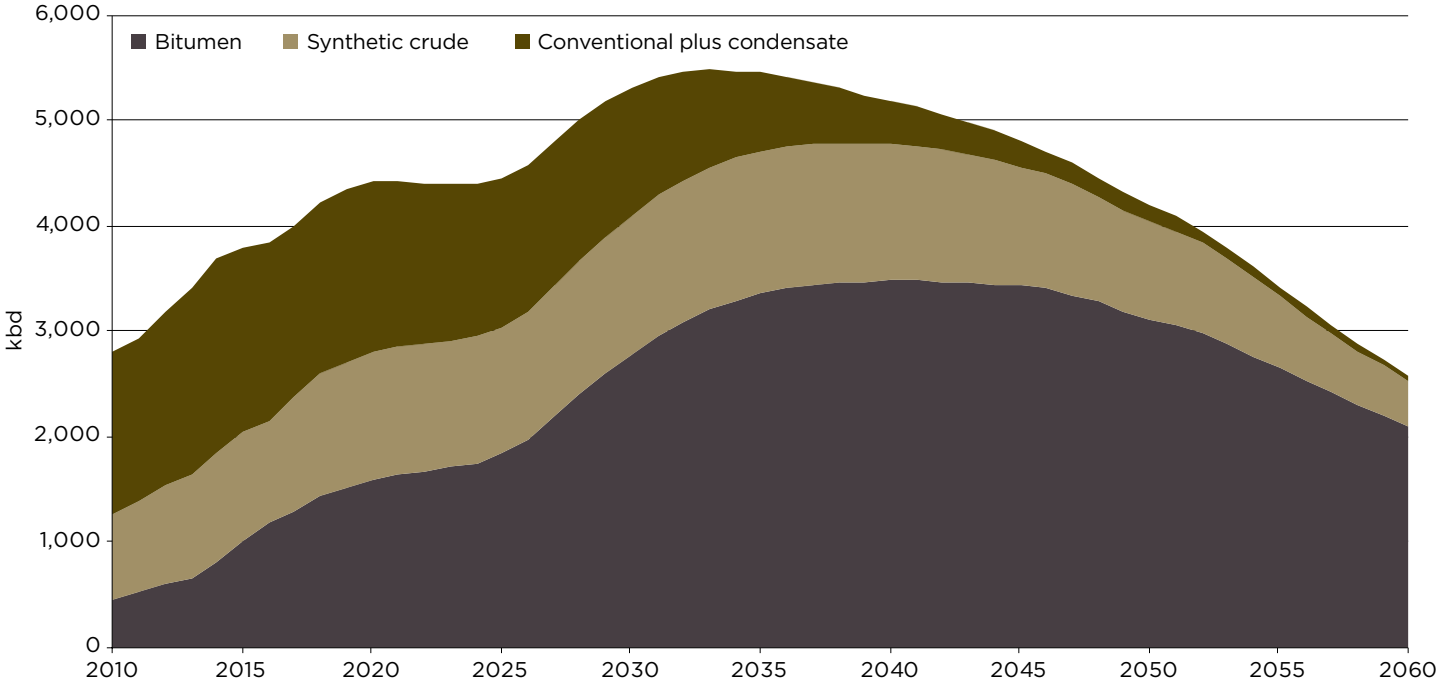
THE OIL INDUSTRY'S TAR SANDS EXPANSION PLANS

According to the BP Statistical Review of World Energy, Canada has the world's third largest oil reserves,[18] only a fraction of which have so far been developed. The oil industry has ambitious plans for opening up new tar sands projects

To examine the impact of these proposals, we used data from Rystad Energy's UCube, a database of upstream oil and gas projects. Rystad, an oil and gas consultancy, creates this data using a combination of company reports, regulatory information, and modeling. Figure 5 shows Rystad's forecast of Canadian oil production in its price base case, assuming all pipelines get built and no climate restrictions are applied.

In Figure 6, we compare the industry's expansion plans in Canada with that in other countries. We see that over the next twenty years, the industry is set to expand oil production by more in Canada than in any other country. If it continues on this course, Canada could become one of the world's largest extractors of the new carbon that would drive the atmosphere over the edge.

Figure 5: Canadian Oil Production Forecast Source: Rystad Energy



18 BP, Statistical Review of World Energy 2016, https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2016/bp-statistical-review-of-world-energy-2016-full-report.pdf

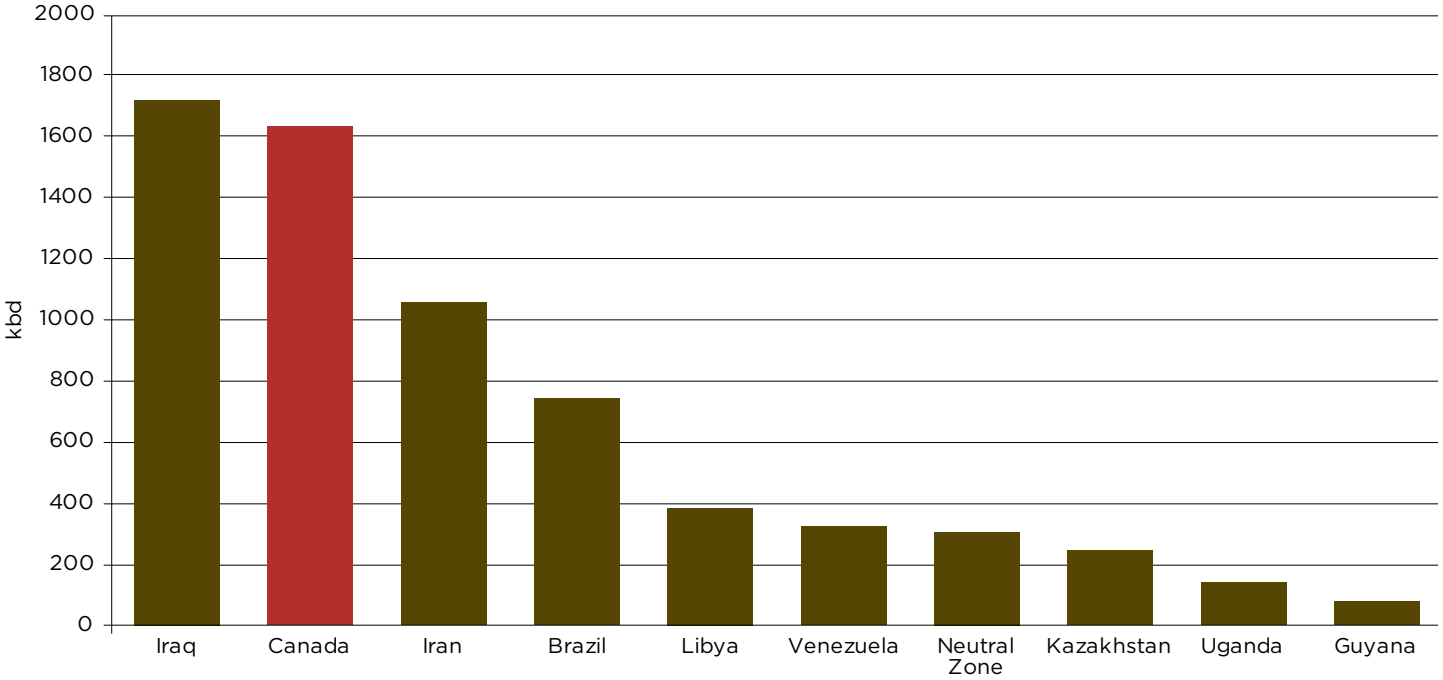
CLIMATE IMPACT OF OIL GROWTH

Using emissions factors calculated by the Carnegie Endowment, we can estimate the life-cycle emissions of expanded Canadian oil production: the emissions from extracting, processing, transporting and burning the oil. The lifecycle emissions over the course of the century from Canadian oil would be 57 $GtCO_2$,[19] as shown in Figure 7.

Comparing this amount with carbon budgets calculated by the IPCC, Canadian oil would account for 16% of the total emissions the whole world can afford (Figure 8) while staying below 1.5°C, or 7% of the emissions for 2°C.

Such a massively disproportionate share could not be politically agreeable to other countries: the likely result would be a failure to keep within those climate limits, with Canadian oil production a major culprit.

Figure 6: Projected Increase in Oil Production by Country, 2016-2036 (if unrestricted)* Source: Rystad Energy



**We have excluded forecasts and estimates of oil that is as yet undiscovered, however if we were to include Rystad's projections of what is still to be found, Canada would in fact become the largest contributor in Fig 6 due to likely increases to conventional exploration.*

19 By reference to comparable grades and blends, from the Carnegie Endowment for International Peace Oil Climate Index, http://oci.carnegieendowment.org, we used the following lifecycle emissions factors: Bitumen: 680 kg CO_2e/bbl, Diluted bitumen: 630 kg CO_2e/bbl, Synthetic crude: 730 kg CO_2e/bbl, Western Canada heavy: 580 kg CO_2e/bbl, Western Canada conventional: 510 kg CO_2e/bbl, Western Canada condensate: 490 kg CO_2e/bbl, Eastern Canada: 510 kg CO_2e/bbl

Figure 7. Cumulative Lifecycle Emissions from Canadian Oil (if unrestricted)[20]

Sources: Rystad Energy; Oil Change International Integrated North American Pipeline model

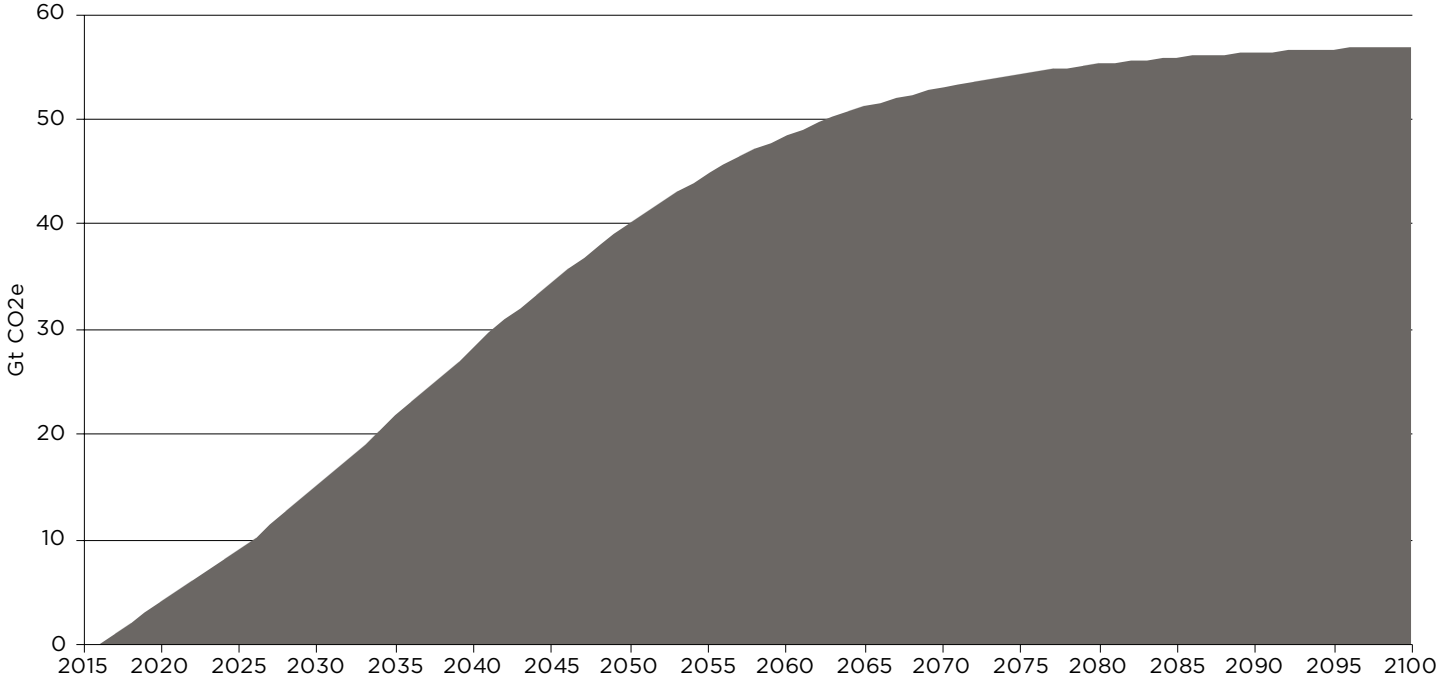
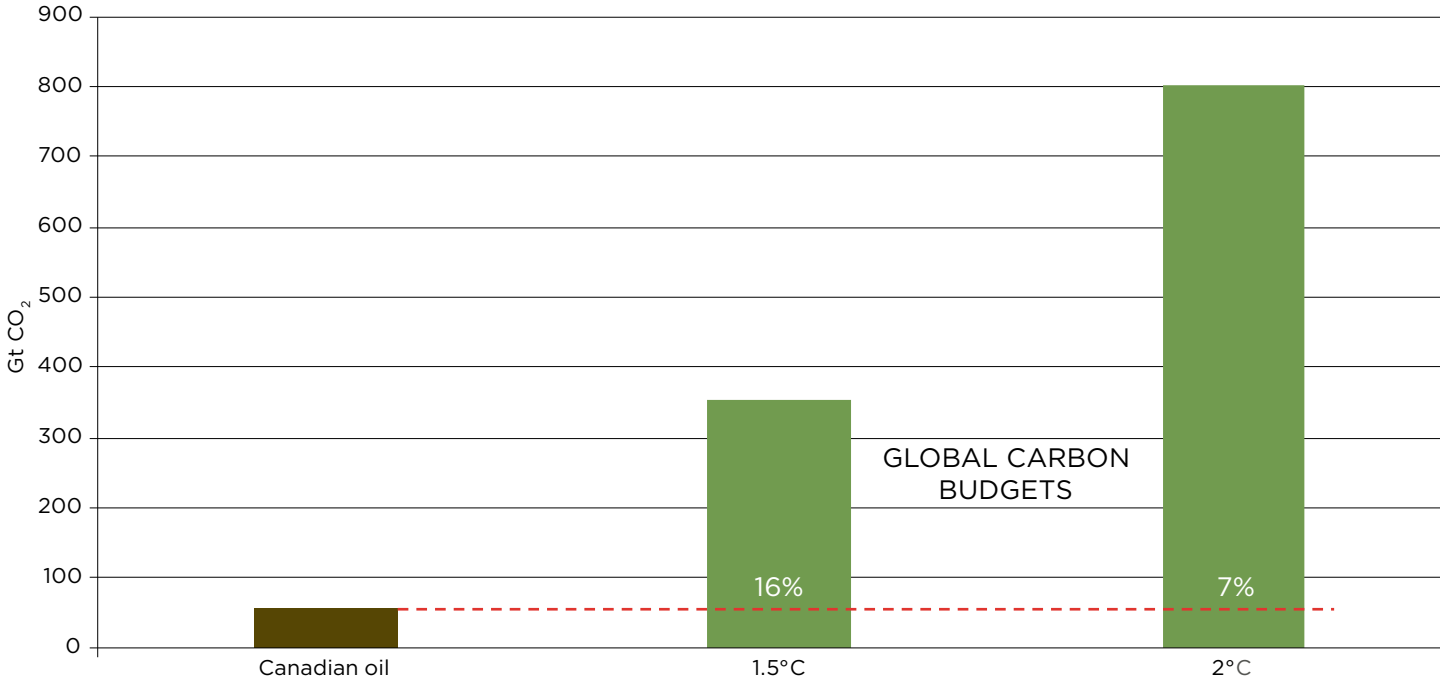


Figure 8. Projected Cumulative Canadian Oil Emissions, 2017-2100, vs Global Carbon Budgets ($GtCO_2$)

Sources: Rystad Energy, IPCC, Global Carbon Project



20 This chart estimated the lifecycle emissions of the enabled production. For this, we use Rystad's forecast, assuming that Line 3 (and downstream debottlenecking on the Enbridge System), Kinder Morgan and either Keystone XL or Energy East are built, and that existing pipelines are replaced at the end of their life, as required. The lifecycle emissions count all greenhouse gases, and the carbon budgets only CO_2; however, the non-CO_2 portion of lifecycle emissions (largely methane venting) is in these cases negligible.


W Broadway
W 8th Ave
W 7th Ave.
BREAK FREE

PIPELINES DRIVE EXPANSION OF TAR SANDS EXTRACTION

To enable this expansion described in the previous section, the oil industry has lobbied hard for new pipelines in Canada, resulting in Prime Minister Trudeau's approval of two pipeline projects in December. Recent debates in Canada have focused on how many pipelines are needed to export the oil that is planned to be produced. This arguably gets the question the wrong way around: without pipelines, production of tar sands cannot expand.

The ability to reliably deliver crude to distant refining markets remains a key requirement for companies looking to invest in new tar sands projects. Long before oil prices collapsed in late 2014, large tar sands expansion projects were being shelved, with companies and analysts citing a long-term lack of market access as a factor.[21] Successful public opposition to new pipeline projects like Keystone XL and Northern Gateway has already had a material impact on planned tar sands expansion projects.[22] There is currently no shortage of pipeline capacity to ship oil from existing or under construction projects. However, new and additional investment in tar sands production projects (which would block Canada's path to meeting its climate commitments) could not take place without new pipelines. Canada's oil industry lobby group, the Canadian Association of Petroleum producers (CAPP), continues to call for new pipeline capacity to facilitate unchecked expansion of the tar sands.[23]

Rail is not a viable alternative to pipelines. Substantially higher marginal shipment costs, lack of reliability, and capacity constraints means that shipping crude by rail is viable only as a stopgap measure. Economic analysis shows that new tar sands investments would not be viable if forced to rely on costly rail transportation, as they would not achieve threshold 10% rates of return required for investment.[24] Oil companies are unlikely to make multi-billion dollar investment decisions to build new tar sands expansion projects without adequate lower-cost, reliable pipeline projects in place. In recent years as oil prices have dropped, companies can no longer afford the substantially higher costs of shipping oil by rail, resulting in North American rail shipments slowing dramatically.[25]

Assuming other market conditions are right, building new pipeline infrastructure is the only way that future tar sands expansion projects would achieve rates of return high enough to get a green light from investors. This fact makes it possible to make accurate estimates for both the upstream and downstream greenhouse gas pollution potential for new proposed pipeline projects, based on their capacity and the liquids they would carry.[26]

Oil Change International's Integrated North American Pipeline model (INAP) shows that the system of pipelines and refineries to take oil from Western Canada to markets is currently 88% full. Tar sands already under construction will take that to 95% in the next few years.[27]

While Figure 9 shows how new pipelines would be needed to enable the industry's expansion plans, it also shows that there is plenty of pipeline capacity for the production from existing and under-construction projects.

Building pipelines would therefore do nothing to improve the profitability of *existing* tar sands production. Many people

21 Total Joslyn North, Shell Pierre River, and Statoil Corner were shelved at prices above $90 USD/barrel
22 Statoil, "Statoil postpones Corner project", September 25, 2014, http://www.statoil.com/en/newsandmedia/news/2014/pages/25sept_cornerpostponement.aspx
23 CAPP, "CAPP annual oil forecast shows Canada needs new major oil pipelines", June 23, 2016, http://www.capp.ca/media/news-releases/capp-annual-oil-forecast-shows-canada-needs-new-major-oil-pipelines
24 Hannah McKinnon et al, Lock Down: The End of Growth in the Tar Sands, Oil Change International, October 2015, http://priceofoil.org/2015/10/27/lockdownthe-end-of-growth-in-the-tar-sands/
25 EIA, U.S. Movements of Crude Oil By Rail, February 2016, http://www.eia.gov/petroleum/transportation/#tabs-summary-3
26 Erin Flanagan and Clare Demerse, February 6, 2014 Climate Implications of the Proposed Energy East Pipeline: A Preliminary Assessment. https://www.pembina.org/pub/2519
27 Hannah McKinnon et al, Lock Down: The End of Growth in the Tar Sands, Oil Change International, October 2015, http://priceofoil.org/2015/10/27/lockdownthe-end-of-growth-in-the-tar-sands/

Figure 9: Crude Oil Takeaway Capacity vs Production for Western Canadian Sedimentary Basin

Source: Oil Change International Integrated North American Pipeline Model - INAP, Rystad Energy

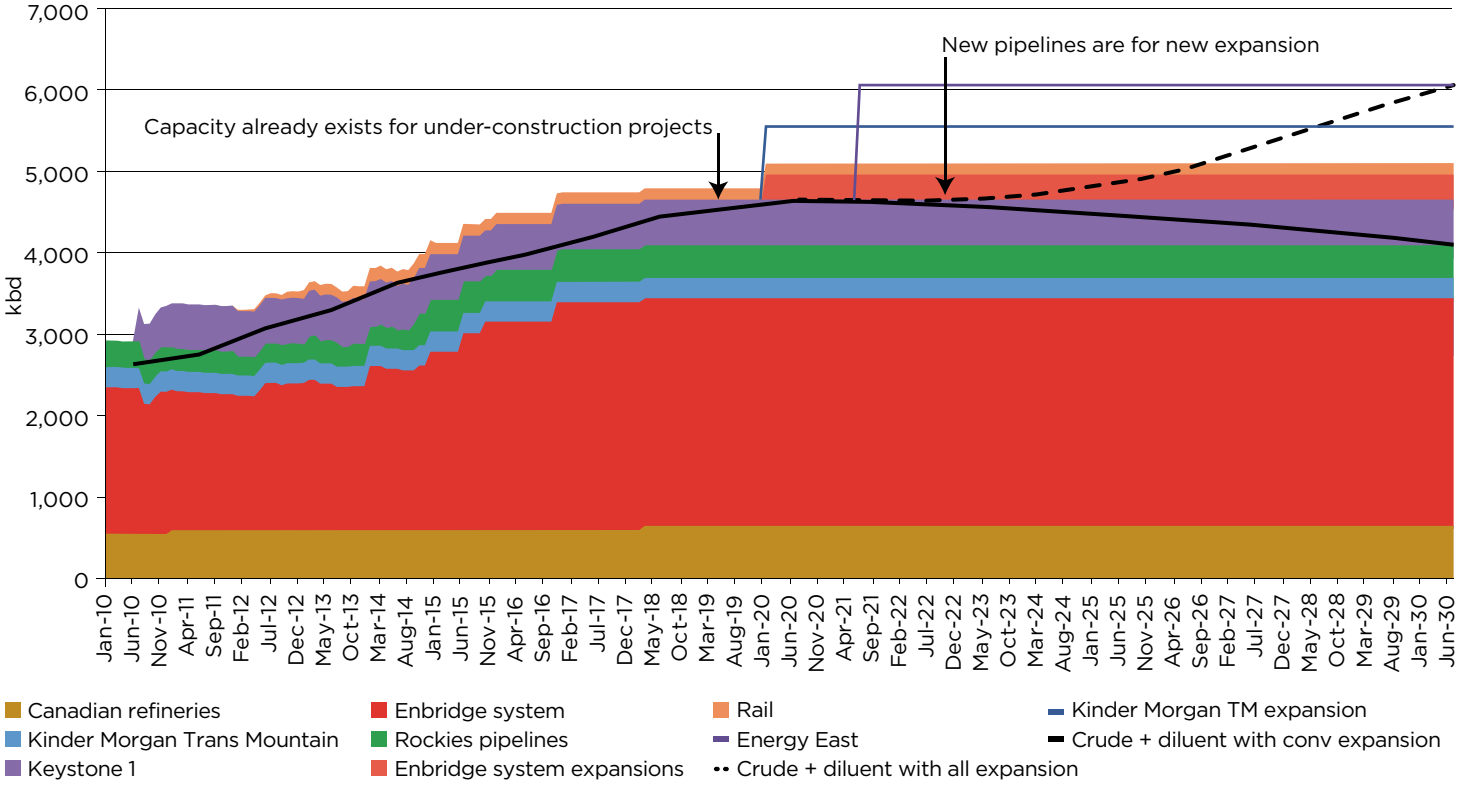
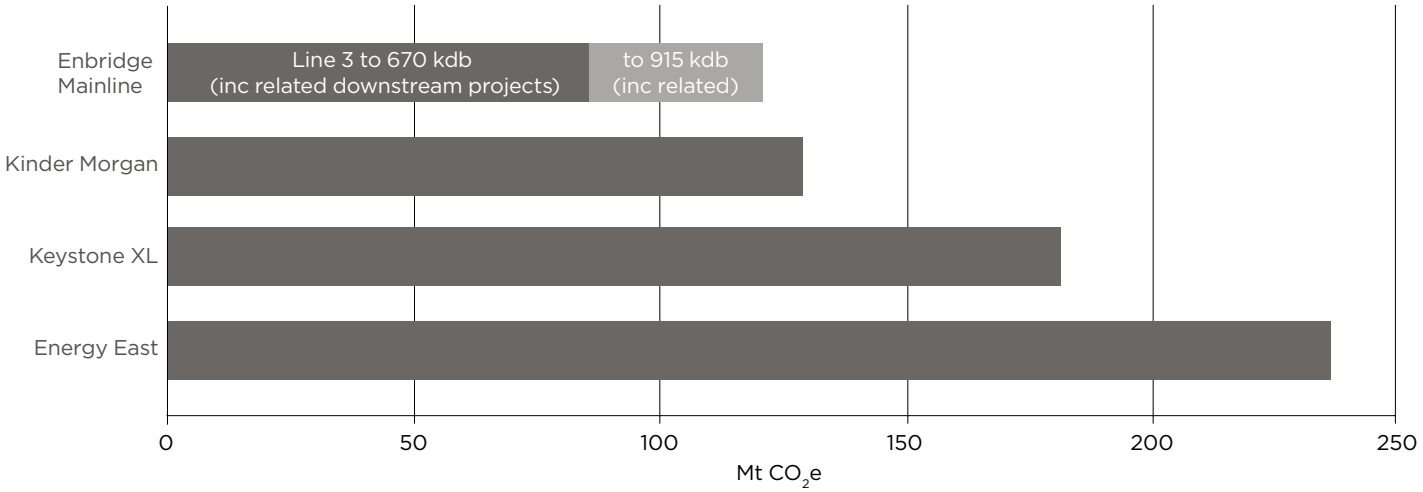


Figure 10: Estimated additional greenhouse gas emissions per year resulting from proposed tar sands pipelines (MT CO_2e)*



**Assumes all pipelines carry 100% diluted bitumen (dilbit), except Energy East which carries 1,000 kbd of dilbit and 100 kbd of Bakken light tight oil.*

in industry and government continue to claim that new pipelines are needed for producers to maximize profit on existing tar sands production, however market conditions do not support this view. The recent removal of bottlenecks in the U.S. pipeline system, the lifting of the U.S. crude oil export ban and a slowdown in tar sands growth has nearly eliminated the discounts placed on western crude compared with international prices. The primary reason that tar sands bitumen continues to be worth less than other types of oil is its poor quality, something no amount of pipeline capacity can change.[28] The effect of pipelines is not on current economics, but on new expansion.

Noting the role of pipelines in unlocking new expansions in tar sands production, we can estimate the cumulative emissions impact of each pipeline.

28 Oil Prices and Value. Alberta Energy. Accessed May 2016. http://www.energy.alberta.ca/Oil/760.asp

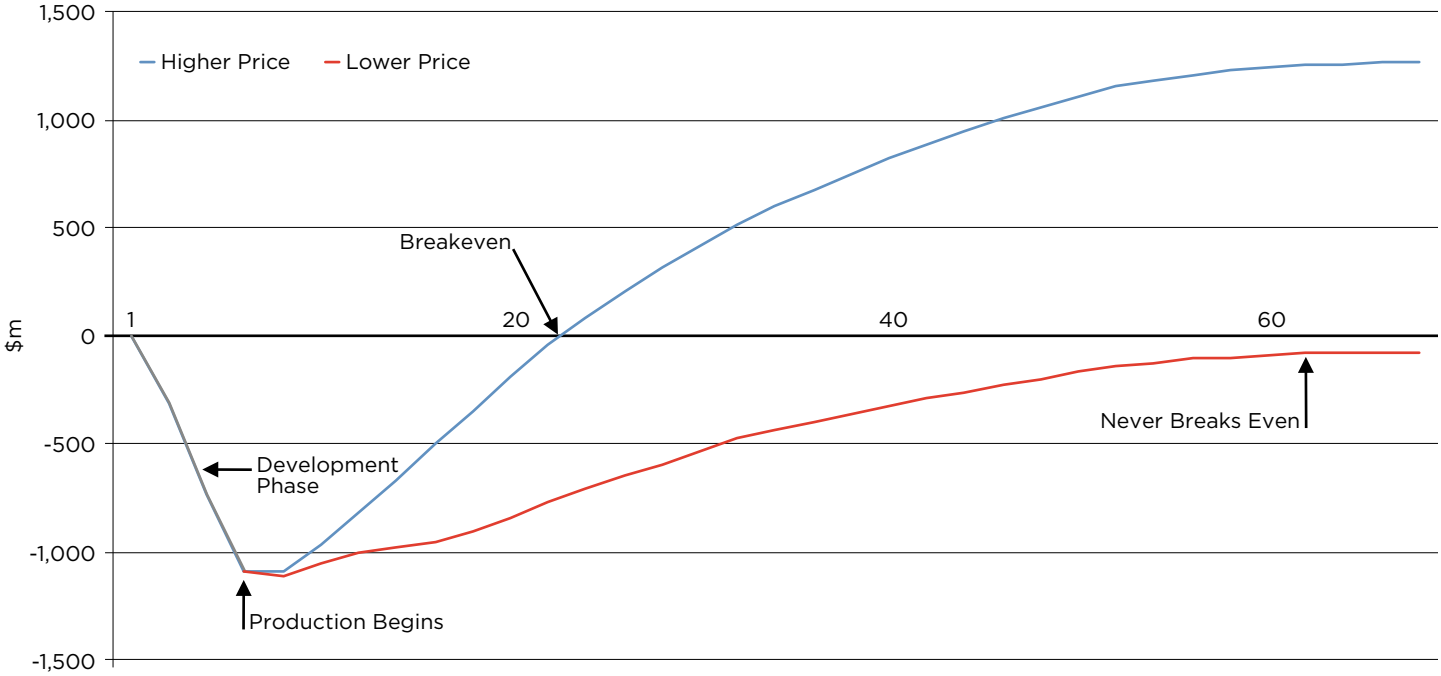
CARBON LOCK-IN

Tar sands projects pose a unique challenge when it comes to reducing emissions. They are notoriously long-lived. Unlike conventional oil projects that rapidly peak and decline, tar sands mines and in-situ projects are expected to sustain relatively stable production levels for decades to come. For example, Suncor's Fort Hills tar sands mine, expected to come online in 2017, is expected to produce 180,000 barrels of bitumen per day and last at least 40 years. The pipelines that serve these projects are expected to last just as long. Long production life means that oil companies intend to keep individual projects producing high levels of emissions and high-carbon fuels after the rest of the world has cut emissions to near zero.[29]

The problem for the climate is that once a pipeline is built, it *locks in* the oil production.

Once a tar sands project has been developed, there is considerable incentive for it continue operating. This is because once capital has been expended to construct the project, an investor has strong incentives to avoid letting the asset become stranded. This is illustrated in Figure 11. Cash flow is negative in the early phase as capital is invested. The project only receives income once oil production begins, after six years. In the higher-

Figure 11: Tar Sands Project Cumulative Discounted Cash Flow Source: Oil Change International



29 eg Suncor, Fort Hills project overview, http://forthills.suncor.com/en/project_overview.aspx

price scenario, it takes a further eighteen years to pay back the invested capital, and the project finally begins making a profit around Year 24. In the lower-price scenario, the project never breaks even. If the company knew beforehand – in Year Zero – that the price would follow the lower path, it would not move ahead with the project. But once the project has been developed, the economic incentives push for continued production even if it means a long-term loss on the capital invested, since closing down would lead to an even greater loss. As long as the red curve is rising in Figure 11, continued production reduces the ultimate loss. It is only if the price received is less than the marginal operating cost (the curve bends downward) that it is better to stop before losses increase.

This means that, *at best*, new tar sands extraction projects and pipelines will have to be shut down long before they have reached their intended lifespans, wasting billions of dollars of investment capital and jeopardising the economy. These decisions would also be politically difficult to achieve. At worst the projects might continue to drive the world into ever worse degrees of climate change, causing vast human suffering and economic damage both within Canada and beyond.

CONCLUSION

Allowing the construction of new pipelines and tar sands expansion is neither responsible or sustainable. The latest science shows that any further expansion in the tar sands is incompatible with international and Canadian climate goals and would only serve to magnify the serious challenge already faced in reducing emissions fast enough to avoid catastrophic climate change. It is time to end the conversation in Canada about how to build new fossil fuel infrastructure that supports future tar sands growth. Such arguments fail to grasp the seriousness of the climate crisis and our collective challenges in solving it.

Building new pipelines would either drive global warming to a devastating degree, and/or necessitate an abrupt energy transition at a later date, stranding billions of dollars of assets, and leading to massive loss of jobs. The only reasonable course forward is to begin a managed decline of oil production: to diversify the Canadian and Albertan economies, to reduce their reliance on oil exports, and to ensure a just transition for workers and communities.

A Just Transition to a Clean Energy Economy

Clean energy industries employ many more people per dollar invested and per GWh generated than fossil fuel industries. A study by the United Nations Industrial Development Organization found that $1 million creates twice as many jobs if invested in renewable energy and energy efficiency as it would if invested in fossil fuels.[30] Research commissioned by Greenpeace found that Alberta has the potential to create over one hundred and forty-five thousand new jobs through addressing climate change — 46,780 jobs in renewable energy, 68,400 jobs in energy efficiency, and 30,000-40,000 jobs in mass transit.[31]

Governments must ensure the transition to clean energy occurs in a way that maximizes the benefits of climate action while minimizing hardships for workers and their communities. Trade unions and others have developed a framework for a just transition in relation to climate change, the importance of which is recognized in the preamble of the Paris Agreement. Key elements of a just transition include:[32]

- Sound investments in low-emission and job-rich sectors and technologies.
- Social dialogue and democratic consultation of social partners (trade unions and employers) and other stakeholders (such as communities).
- Research and early assessment of the social and employment impacts of climate policies.
- Training and skills development to support the deployment of new technologies and foster industrial change.
- Social protection alongside active labor markets policies.
- Local economic diversification plans that support decent work and provide community stability in the transition.

31 David Thompson and Allison Thompson, 100,000+ Jobs: Getting Albertans back to work by building a low-carbon future, Greenpeace, April 2016, http://www.greenpeace.org/canada/Global/canada/report/2016/04/GP-GreenJobsReport2016.pdf

32 International Trade Union Confederation, Climate Justice: There Are No Jobs on a Dead Planet, March 2015, http://www.ituc-csi.org/IMG/pdf/ituc_frontlines_climate_change_report_en.pdf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