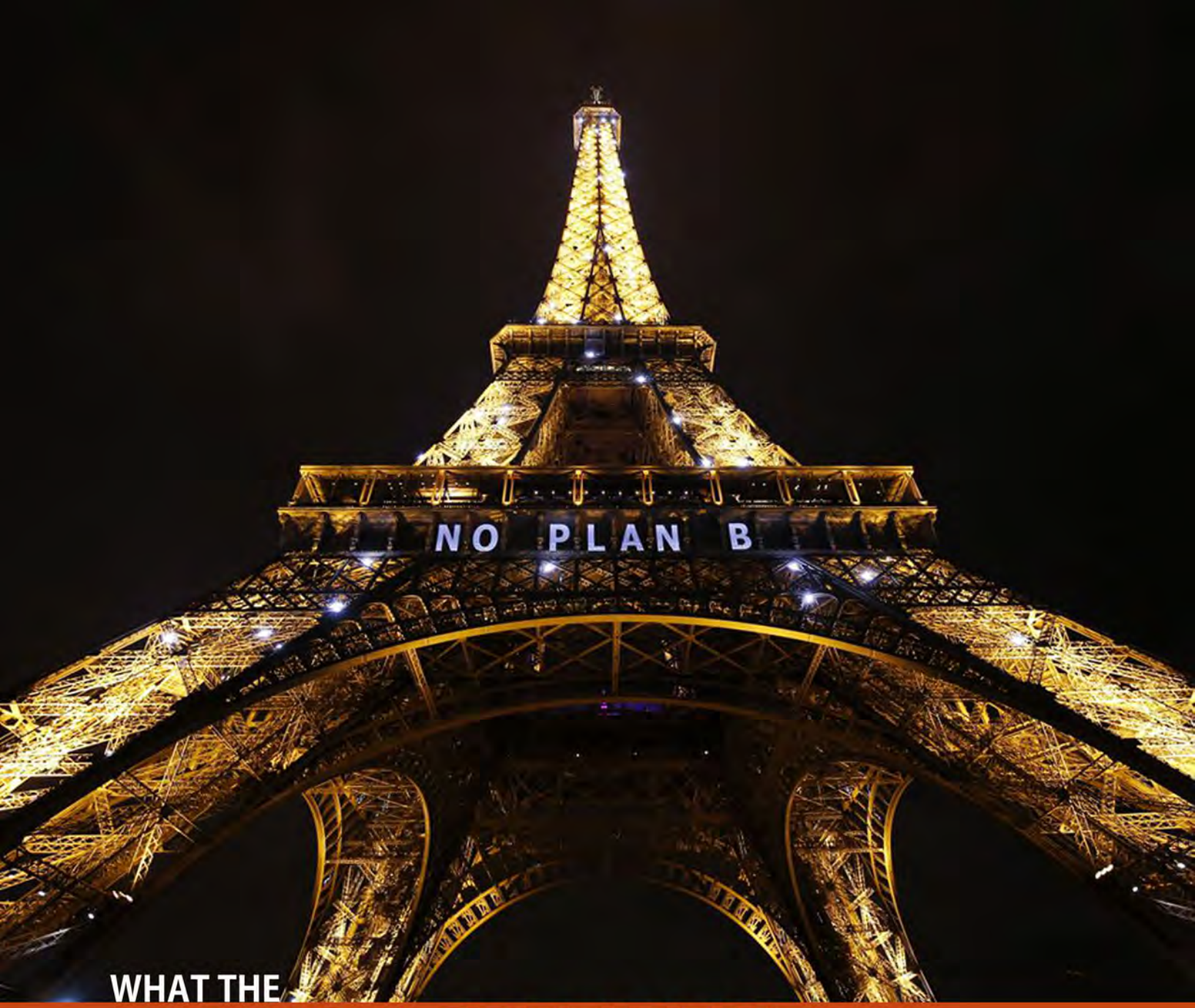

WHAT THE PARIS AGREEMENT MEANS FOR ALBERTA'S OIL SANDS MAJORS

PARKLAND INSTITUTE

CORPORATE MAPPING PROJECT

Ian Hussey and David W. Janzen

CONTENTS

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This report was published by Parkland Institute
January 2018

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ISBN: 978-1-894949-58-3

Acknowledgements

Many thanks to Emma Jackson for her work on the reserve data used in this report. We are grateful to two anonymous reviewers and our colleagues at Parkland Institute and the Corporate Mapping Project for their comments on an earlier version of this report.

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This report is part of the Corporate Mapping Project (CMP), a research and public engagement initiative investigating the power of the fossil fuel industry. The CMP is jointly led by the University of Victoria, the Canadian Centre for Policy Alternatives, and Parkland Institute. This research was supported by the Social Science and Humanities Research Council of Canada (SSHRC).

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Executive Summary

Context

The Paris Agreement was sealed on December 12, 2015 and came into force on November 4, 2016. The central target of the Paris Agreement—a global average temperature increase of less than 2°C above pre-industrial levels (about 200 years ago)—is agreed upon by scientists as the necessary limit for reducing the risk of the most dangerous effects of climate change.

If humanity is to achieve the 2°C target, then we will need an energy transition to a low-carbon economy in the next three decades. This is an extraordinarily abrupt time frame compared to such transitions historically, and will require substantial planning and actions by governments and businesses of various sizes around the world.

Science-based plans to meet the 2°C target should involve concrete details on how national and subnational governments will meet a carbon budget; that is, a limit on the maximum amount of carbon pollution that can be released before we breach the 2°C limit. Staying within a 2°C carbon budget will necessitate a reduction in total greenhouse gas (GHG) emissions, which will require a steady scaling down of oil and gas production and combustion in the next three decades.

To date, government and industry responses to the Paris Agreement have been split between, on one hand, recognition of the threats posed by climate change and the need for transition and, on the other hand, resistance to transition. While many international energy producers are shifting away from carbon-intensive resources, many are not.

This split is particularly evident in the Canadian context. Canada helped create and pass the Paris Agreement, yet its provincial and federal governments have made relatively little progress towards meeting the goals of the agreement. Moreover, our country's fossil fuel industries, particularly Alberta's oil sands industry, have so far ensured that Canada's emissions growth has at best flattened, rather than decreasing in line with our carbon budget implied by the Paris Agreement.

The Big Five's Carbon Liabilities

The majority of Alberta oil sands production is owned by the five companies that this report focuses on: Canadian Natural Resources Limited (CNRL), Suncor Energy, Cenovus Energy, Imperial Oil, and Husky Energy. This report evaluates what the Paris Agreement means for the "Big Five" by estimating the social cost of carbon (SCC) of the oil and gas reserves of these firms and by assessing the emissions-reduction disclosures and targets, climate change-related policies, and material actions of the Big Five.

As publicly traded corporations, the Big Five work hard to deliver dividends to their shareholders by increasing oil consumption and externalizing costs. Calculating the SCC or carbon liabilities of oil and gas firms is a method that economists use to estimate the social and economic damages from emitting a tonne of carbon and, conversely, the benefit of reducing carbon emissions.

We calculate the carbon liabilities of the Big Five's proved and probable oil and gas reserves based on three SCC estimates: the low estimate of $50 per tonne was used in previous economic research and is applied to the proved reserves only, while the middle and high estimates of $100 and $200 per tonne are used by the United Nations Global Compact and in previous economic studies respectively and are applied to both the proved and probable reserves.

The carbon liability estimates for the Big Five lead to a striking conclusion: even using the low estimate, the carbon liabilities of each firm far outweigh their total assets and market capitalization. When the low SCC estimates for the Big Five are added together, these carbon liabilities outweigh not only the value of these corporations, but also the Alberta economy as a whole; the lowest estimate of the total carbon liabilities of the Big Five ($320 billion) is substantially higher than Alberta's total gross domestic product ($309 billion).

The point of calculating the carbon liability estimates for the Big Five's reserves is to show the enormity of these costs should these reserves be combusted, and to stress that most of the profits accrued by the Big Five and their shareholders, who are mostly not Canadians (as of July 2017), are "paid" by the public and the environment through coastal damage, extreme weather events, decreased food production, and negative health effects.

The Big Five's Climate Change Targets, Policies, and Material Actions

Our assessment of the emissions-reduction disclosures and targets, climate change-related policies, and material actions of the Big Five builds on a 2017 report from Moody's Investors Service and is based on data from company annual reports, environmental and community reports, and climate disclosure reports.

There have been mildly positive emissions-disclosure and emissions-intensity trends in Alberta's oil patch in recent years. The Big Five have begun to disclose basic statistical data on the emissions intensity and total emissions attributable to their production of oil and gas, and Suncor, CNRL, and Cenovus have reduced the emissions intensity of their production as of late. However, all five oil sands majors forecast an increase in their total emissions in the future. All of the Big Five except for Imperial Oil

acknowledge the Paris Agreement, yet none of these companies have made science-based targets that align with the amount of decarbonization required to keep the global average temperature increase below 2°C. The Big Five need to start publicly disclosing their emissions modelling for the sake of transparency and accountability.

As with their reduction targets, none of the Big Five have implemented material actions that are in line with decarbonization required to meet the 2°C limit. The Big Five's hopes for future emissions decreases rely primarily on claims that new technologies will enable substantial reductions. However, technological advancements to date have not produced absolute emissions reductions, and there is no reason to believe they will. The only realistic way for the Big Five to reduce their total emissions is to reduce their oil and gas production. The Paris Agreement means that business as usual for the Big Five and other fossil fuel producers is not an option.

Conclusion

Getting to a low-carbon future entails subnational and national governments around the world placing immediate limits on fossil fuel extraction that will become increasingly stringent over time. Without added regulations and significantly higher carbon pricing laws, it seems unlikely that the global energy transition will develop quickly enough to keep global warming within the 2°C limit. The substantial gap between, on one hand, the Big Five's disclosures, targets and material actions and, on the other, the changes required to remain within the Paris Agreement's 2°C limit signals a need for concrete, long-term "wind-down" plans to address the challenges and changes resulting from global warming, including the fact that a significant portion of known fossil fuel reserves must remain underground.

1. Introduction

"Albertans were the ones who determined how to get the oil out of the sand and made-in-Alberta innovation is going to get the carbon out of the barrel."

- Margaret McCuaig-Boyd, Alberta Minister of Energy (quoted in Jaremko 2017)

"Carbon transition risk poses a substantial threat to the oil and gas industry in that carbon is the industry's product, not merely an undesirable byproduct. With clear commitments in the Paris Agreement to reduce emissions, it is inevitable that policy implementation will materially impact the sector as it is one of the most significant sources of emissions."

- John Thieroff, Vice President, Moody's Investors Service (quoted in Thieroff et al. 2017)

The Paris Climate Agreement was sealed on December 12, 2015 and came into force on November 4, 2016. Outlining its key aims, signatories agreed to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels," to increase "the ability to adapt to the adverse impacts of climate change," and to make "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development" (UNFCCC 2015, 2). The Paris Agreement signals that there is broad agreement around the globe regarding the risks of climate change. The central target of the Paris Agreement—a global average temperature increase of less than 2°C above pre-industrial levels (about 200 years ago)—is agreed upon by scientists as the necessary limit for reducing the risk of the most dangerous effects of climate change (Harvey 2016). Achieving the 2°C target does not ensure that we will avoid climate change risks.

If humanity is to achieve the 2°C target, then we will need an energy transition to a low-carbon economy in the next three decades.

If humanity is to achieve the 2°C target, then we will need an energy transition to a low-carbon economy in the next three decades. This is an extraordinarily abrupt time frame compared to such transitions historically, and will require substantial planning and actions by governments and businesses of various sizes around the world. Government and private sector plans and actions to date have been woefully inadequate.

Science-based plans to meet the 2°C target should involve concrete details on how national and subnational governments will meet a carbon budget; that is, a limit on the maximum amount of carbon pollution that can be released before we breach the 2°C limit. Staying within a 2°C carbon budget will necessitate a reduction in total greenhouse gas (GHG) emissions, which will require a steady scaling down of oil and gas production and combustion in the next three decades (Lee 2017).

In recognition of the Paris Agreement, the shareholders of some of the world's largest oil and gas producers, such as ExxonMobil in May 2017, are beginning to pass resolutions at annual general meetings that stipulate that the firm must begin reporting to shareholders on the implications to the business if the world is to meet the 2°C global warming limit (CTI 2017). Moreover, many extractive corporations are affirming that the costs of solar and wind energy are becoming increasingly competitive, particularly against higher-emissions fossil fuels like coal and oil sands.

In terms of public policy, governments at various levels are championing transition. Even in the United States, where the Trump administration plans to withdraw from the Paris Agreement (DiChristopher 2017), thousands of US cities remain committed (Boffey 2017), and more than 250 US mayors recently committed to 100% renewable energy by 2035 (UNFCCC 2017). In short, a cultural sea change is afoot that prioritizes and incentivizes transition to a low-carbon economy.

Still, this shift should not be mistaken for total consensus, nor is the often self-congratulatory language of the Paris Agreement entirely justified. Even as the agreement came into force, pledges to cut emissions were inadequate. As a United Nations Environment Programme report states, there would still be an estimated 3°C increase if all existing pledges are met (UNEP 2016). Government and industry response to the Paris Agreement is split between, on one hand, recognition of the threats posed by climate change and the need for transition and, on the other hand, resistance to transition. While many international energy producers are shifting away from carbon-intensive resources, many are not.

This shift should not be mistaken for total consensus, nor is the often self-congratulatory language of the Paris Agreement entirely justified. Even as the agreement came into force, pledges to cut emissions were inadequate.

This split is particularly evident in the Canadian context. Canada helped create and pass the Paris Agreement, yet its provincial and federal governments have made relatively little progress towards meeting the goals of the agreement. Moreover, our country's fossil fuel industries, particularly Alberta's oil sands industry, have so far ensured that Canada's emissions growth has at best flattened, rather than decreasing in line with our carbon budget implied by the Paris Agreement (see Lee 2017).

The majority of Alberta oil sands production is owned by the five corporations that this report focuses on: Canadian Natural Resources Limited (CNRL), Suncor Energy, Cenovus Energy, Imperial Oil, and Husky Energy. As publicly traded businesses, the "Big Five" work hard to deliver dividends to their shareholders by increasing oil consumption and externalizing costs. One way to internalize social and environmental costs that are mostly externalized at present is to calculate what economists call "the social cost of carbon" (SCC); what we also refer to in this report as the corporation's carbon liabilities (a term coined by Marc Lee in Lee and

Ellis 2013). In general terms, the SCC is a measurement for estimating the economic damages from emitting a tonne of carbon and, conversely, the benefit of reducing emissions by a tonne of carbon.

We more fully explain what "carbon liability" and the related concepts of the "carbon bubble" and "stranded assets" mean in the next section. We then calculate the carbon liabilities of the proven and probable oil and gas reserves of Alberta's Big Five producers in Section 3. In Section 4, we build on a 2017 report from Moody's Investors Services (Thieroff et al. 2017) to assess the emissions-reduction disclosures and targets, climate change-related policies, and material actions of the Big Five. We analyze whether the Big Five publicly acknowledge the Paris Agreement and its 2°C limit, and the degree to which the public commitments and material actions of the Big Five are in line with the goals of the Paris Agreement. Section 5 contains our conclusions based on our research results.

2. Carbon Liabilities, the Carbon Bubble, and Stranded Assets

By the end of 2016, 40 countries and over 20 cities, states, and provinces had introduced a price on carbon emissions (World Bank Group and ECOFYS 2016), and China released plans in December 2017 to launch its national emissions trading system in the coming months (Kynge, Clark, and Feng 2017; Bradsher and Friedman 2017). The social and environmental costs of carbon pollution are diverse and complex, and quantifying such costs requires a clear and measurable point of reference. The Paris Agreement's goal of containing global warming to below 2°C above pre-industrial levels is such a reference point.

The 2°C goal was, in fact, a reference point for many scientists and economists years before the Paris Agreement was drafted in late 2015. In 2009, for example, economist Mark Jaccard and associates estimated that the price on carbon in 2010 should be $50/tonne, increasing to $200/tonne by 2020, to help ensure the average global temperature increase stays below 2°C (Jaccard and Associates 2009). While some consider this a relatively low estimate,[1] it is far above the current carbon taxes of Alberta, British Columbia, Manitoba, and the Canadian federal government and the cap-and-trade system that Ontario and Quebec participate in. The carbon price range of $50–200 was also used in two recent reports to analyze the risks of the ongoing energy transition to Canadian financial markets, pension funds and fossil fuel producers (Lee and Ellis 2013), and to examine Canada's contributions to global warming through fossil fuel exports (Lee 2017). Our report builds on these three previous studies by using the $50-200 carbon price range in the next section to calculate the carbon liabilities of the Big Five oil sands producers.

Social cost of carbon estimates tend to be conservative (Lee and Ellis 2013). This is in part because they emphasize costs that can be measured and translated into monetary terms. Thus, SCC estimates do not measure the total social and environmental costs of carbon pollution. For example, SCC estimates do not account for the long-term costs of oil spills or the added political tensions with some Indigenous nations and various people that often arise with the proposal and development of new oil extraction and pipeline projects. Nevertheless, the concept of the SCC or carbon liabilities provides insight into social and environmental costs that arise from carbon pollution, including negative health effects, decreased food production, coastal damage, and the increased frequency of extreme weather events like floods and wildfires.[2] This type of analysis is particularly useful in Alberta, where the provincial government and private sector have invested heavily in oil and gas production, and Albertans have experienced at least two extreme

1 For comparison, Frank Ackerman and Elizabeth Stanton (2011) estimated that, for the year 2010, the SCC was between $118 and $893.

2 Another side of the carbon liabilities discussion is that it is possible in the future that oil and gas corporations may be found liable for damages related to climate change (see Gage and Byers 2014).

weather events in recent years (a large flood in Calgary in 2013 and a huge wildfire in and around Fort McMurray in 2016).

Credit rating agencies, such as Moody's Investors Service, are publishing reports that conclude that the oil and gas industry faces substantial credit risk because of global warming-related policy initiatives, new energy and transportation technologies, and changing consumer preferences (Thieroff et al. 2017). The Moody's report avers that hydrocarbon asset classes most at risk have one or more of the following traits: high operating costs or carbon-intensive production processes, large upfront capital costs and long investment lead times, and production with high carbon content. The oil sands have all of these features. In this context, crafting fiscal, energy, and climate policies to further the exploitation of the oil sands, as, for example, Branko Bošković and Andrew Leach (2017) suggest, would place Alberta and Canada on a policy trajectory that strengthens our ties to oil production during a period in which other countries are undergoing a deep transition away from hydrocarbons (Pineault and Hussey 2017).

After the boom of the early 2000s, Alberta's oil industry faces an apparent dilemma. On one hand, reserves contain a large amount of assets that, due to technological advancements, can be accessed with greater efficiency. On the other hand, many of these assets exist in the form of bitumen/oil sands. Bitumen is a carbon-intensive fossil fuel. Research shows that emissions attributable to the production and upgrading of Alberta's bitumen are much higher than those associated with oil produced in several areas of the US and Mexico (Israel 2017; Forrest and Rocque 2017, 19). Moreover, due to the complexities of extracting and processing bitumen, the oil sands industry is also capital intensive; the initial costs of development are very high, especially compared to other unconventional fossil fuels, such as US shale oil (Pineault and Hussey 2017).

As a carbon-intensive and capital-intensive fossil fuel industry in the era of the Paris Agreement, Alberta's oil sands industry is a carbon bubble—a petroleum-oriented economy that has a high risk of instability, crisis, and even collapse (Lee and Ellis 2013). The value of publicly traded oil corporations, including the Big Five, is based in large part on projected future production capability, and on the assumption that it will continue to be expedient to extract reserves. Markets have financed future oil development based on the assumption that what extractive corporations have convinced investors to finance can be burned or otherwise consumed. However, if the Paris Agreement's 2°C limit is to be met then upwards of 60–80% of global fossil fuel reserves, likely starting with the most capital- and carbon-intensive resources, must remain underground as stranded assets (IEA 2012; CTI and GRI 2013; Muttitt 2016; Lee 2017; Thieroff et al. 2017). Given that Alberta's oil sands are capital intensive and carbon intensive, it

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looks increasingly likely that some or most of the oil sands will become too financially and environmentally costly to extract. If this happens, the value of oil sands corporations will plummet and the Albertan/Canadian carbon bubble will pop.

As a seminal report recently published by Carbon Tracker Initiative asserts, many major oil and gas corporations have been overcapitalized (Leaton and Grant 2017). James Leaton and Andrew Grant's research focuses on 69 large, publicly traded oil and gas corporations, including Alberta's Big Five oil sands producers. The analysis uses the metric of the percentage of potential capital expenditure (capex) to 2025 outside of the 2°C carbon budget. The authors use this metric to assess each company's financial risk from the transition to a low-carbon economy.

The research shows that some corporations "would have to forego the majority of their options in a [2°C] future, significantly impacting growth plans" and that Alberta's Big Five "generally do not perform well" (Leaton and Grant 2017, 29). About one-third of the potential capex to 2025 of the 69 corporations "should not be deployed in a [2°C] scenario compared to business as usual expectations" (ibid, 5). The percentage of the Big Five's upstream capex outside the 2°C carbon budget is: Imperial Oil 50–60%, Husky Energy 40–50%, Suncor Energy 40–50%, CNRL 30–40%, Cenovus Energy 10–20% (ibid, 7–9). Cenovus' potential capex at risk is likely higher now because they recently bought ConocoPhillips' oil sands assets and subsequently sold some natural gas assets, resulting in a more carbon-intensive asset mix. A recent article on these transactions states, "[t]he Conoco deal doubled Cenovus' reserves and production but tied the company heavily to one of the costliest methods of producing oil" (Bloomberg 2017). Leaton and Grant draw a similar conclusion to that of the Moody's analysts in stating that "major projects with high initial capital investment and long payback periods such as greenfield oil sands projects or LNG plants are more difficult to wind down and expose developers to longer periods of risk" (2017, 30).

In the following section, we present a more detailed analysis of the carbon liabilities of Alberta's Big Five oil sands producers.

3. The Carbon Liabilities of Alberta's Big Five Oil Sands Producers

In this section we develop a clearer picture of the Big Five's carbon liabilities by examining the relationship between three categories of data: value (assets and market capitalization), the size of oil and gas reserves reported by each company, and the carbon liabilities represented by those reserves if they are combusted.

Table 1 outlines total assets and market capitalization of the Big Five producers. Compared with the overall economy of Alberta, which produces 80% of Canada's crude oil, these numbers provide insight into absolute and relative scale. For example, Alberta's total worth of exported goods for 2016 was $78.8 billion, including $51 billion in energy exports. The Big Five's total assets ($246.5 billion) are more than three times Alberta's total exported goods and almost five times Alberta's energy exports. This is a top-heavy and capital-intensive situation—particularly given the volatility of the industry's market.

Table 1. The Big Five's Assets and Market Capitalization (2016)[3]

Company	Total Assets $ Millions	Market Capitalization $ Millions (CAN-TSX)
Suncor	88,702	73,221
CNRL	58,648	47,538
Cenovus	25,258	16,916
Husky	32,260	16,379
Imperial	41,654	35,853
Total	**246,522**	**189,907**

Note that these numbers are as of the end of 2016. Since then, there have been shifts in asset ownership and in market prices. The first half of 2017 saw global producers fleeing the oil sands; between January 1 and May 24, foreign companies sold $22.5 billion worth of oil sands assets (Williams 2017). This helped drive down asset values and saturated the pool of potential buyers. This shift appears to be an outcome of short-term volatility in market prices, but it is noteworthy that the largest sell-offs were made by Shell and ConocoPhillips, both of which support the Paris Agreement. It may be that international companies are already preparing a permanent shift away from carbon-intensive resources, but it is just as likely, if not more likely, that the sell-offs had to do with the higher costs of oil sands production relative to other potential plays accessible to transnational corporations. Neither of these two rationales instills a sense of optimism for the future of Alberta's oil sands industry.

3 Total assets are as of December 31, 2016, and are drawn from each company's annual report. Market capitalization (outstanding shares x share price) is calculated for December 31, 2016, except for Imperial's figure, which is from February 8, 2017.

This exodus of international players means Canadian firms own more oil sands assets and are exposed to more risk. One of the most immediate risks is that some oil and gas reserves may become stranded. The Big Five's proven and probable oil and natural gas reserves are listed in Table 2.

Table 2. The Big Five's Proven and Probable Oil and Natural Gas Reserves (2016)

Company	Proved Oil[4] (MMbbls)	Proved Natural Gas (Bcf)	Total Proved (Mmboe)	Proved + Probable Oil (MMbbls)	Proved + Probable Natural Gas (Bcf)	Total Proved + Probable (Mmboe)
Suncor	4,871	27	4,875	7,951	43	7,957
CNRL	4,117	5,909	10,026	6,375	8,028	7,713
Cenovus	2,558	652	2,569[5]	3,653	953	3,821
Husky	860.3	2,185	1,224.4	2,337.3	2,865.6	2,814.9
Imperial	1,300	495	1,382	N/A	N/A[6]	N/A

Using the reserve totals in Table 2, Table 3 shows the carbon emissions that would be released by the combustion of these reserves.[7]

Table 3. The Emissions Embedded in the Big Five's Proven and Probable Reserves (2016)

Company	Proved (Mt Co2e)	Proved + Probable (Mt Co2e)
Suncor	2,096	3,421
CNRL	2,094	3,181
Cenovus	1,136	1,623
Husky	489	1,162
Imperial	586	N/A

The relationship between financial value (assets and market capitalization) and fossil fuel reserves (proved and probable) is clarified when viewed in relation to carbon liability. Table 4 shows the carbon liabilities of the Big Five based on three SCC estimates: the low estimate includes only proved reserves, while the middle and high estimates include proved plus probable reserves. The low and high estimates are based on the work of Mark Jaccard and associates (2009), and the middle estimate is from the United Nations Global Compact.

Translating carbon emissions into monetary terms is an expedient means of helping to shift firms' and investors' decisions. At present, carbon emissions remain a mostly externalized cost—this economic reality means most of the profits accrued by extractive corporations and their shareholders are "paid" by the public and the environment. Translating emissions into monetary

4 Includes bitumen, crude oil, and natural gas liquids.

5 Cenovus does not report sum totals for oil and gas. Totals were calculated by converting natural gas (Bcf) to millions of barrels of oil equivalent (MMboe) using the conversion factor listed by the Society of Petroleum Engineers.

6 Imperial Oil does not publish its probable reserves. Imperial's 2016 proved reserves were two-thirds less than their 2015 reserves because of a massive de-booking of reserves by Imperial's parent company, ExxonMobil. Most of the reserves that ExxonMobil de-booked are at the Kearl Oil Sands Project. Some of the de-booked reserves may be reclassified as proved reserves again in the future if the right combination of rising oil prices and declining production costs occurs (Crooks 2016).

7 Our calculations use the US Environmental Protection Agency's "Greenhouse Gases Equivalencies Calculator." This calculator sets emissions at 0.43 metric tons CO2/barrel of oil and 0.054717 metric tons CO2/Mcf of natural gas.

Table 4. The Carbon Liabilities of the Big Five (2016)

Company	Low (proved reserves at $50/ tonne) $ Millions	UN Global Compact (proved + probable reserves at $100/tonne) $ Millions	High (proved + probable reserves at $200/tonne) $ Millions
Suncor	104,800	342,128	684,257
CNRL	104,682	318,052	636,104
Cenovus	56,781	162,294	324,587
Husky	24,474	116,184	232,367
Imperial[8]	29,304	58,608	117,217
Total	**320,041**	**997,266**	**1,994,532**

terms also helps clarify how high the price on carbon must be for carbon pricing to positively contribute to emissions reductions in line with the 2°C target. It must be stressed, however, that we cannot assume that a carbon price alone is going to do the heavy lifting of shifting the world off of fossil fuels. The reality is that governments around the globe will need to ratchet up regulations in combination with increasing current carbon prices if we are to keep global warming below 2°C.

Even using the low estimate, the carbon liabilities of each firm far outweigh their total assets and market capitalization.

The SCC estimates in Table 4 lead to a striking conclusion: even using the low estimate, the carbon liabilities of each firm far outweigh their total assets and market capitalization. When the low SCC estimates for the Big Five are added together, these carbon liabilities outweigh not only the value of these corporations, but also the Alberta economy as a whole; the lowest estimate of the total carbon liabilities of the Big Five ($320 billion) is substantially higher than Alberta's total gross domestic product ($309 billion).

The contextualization here assumes that all of the SCC resulting from downstream use of the product (burning oil and gas) should accrue to the Big Five. Alberta's current carbon pricing policies apply costs to large industrial emitters and particular fossil fuel use by everyday consumers (see Hussey 2016). Our point is not that the Big Five should be responsible for the total carbon liabilities of their oil and gas products, although certainly Alberta's current carbon prices are very low ($30/tonne)[9] and large industrial emitters and everyday consumers should be paying much higher carbon prices. Rather, the point of calculating the SCC estimates for the Big Five's reserves is to show the enormity of these costs should these reserves be combusted and to stress that most of the profits accrued by the Big Five and their shareholders (and by other fossil fuel producers) are "paid" by the public and the environment through coastal damage, extreme weather events, decreased food production, and negative health effects.

Now that we've contextualized the Big Five's carbon liabilities, let's turn to an assessment of their climate change targets, policies, and material actions.

8 Imperial does not report probable reserves, so their medium and high estimates are based only on proved reserves.

9 In 2018, the Alberta carbon tax on transportation and heating fuels is $30/tonne. The Specified Gas Emitters Regulation (SGER), which was the Alberta carbon tax paid by large industrial emitters, was $30/tonne as of January 1, 2017. The SGER was phased out at the end of 2017 and replaced by the Carbon Competitiveness Incentive Regulation (see Read, Israel, and Hastings-Simon 2017).

4. The Big Five's Climate Change Targets, Policies, and Material Actions

In this section we analyze whether the Big Five are disclosing their GHG emissions, if they acknowledge the Paris Agreement, and the degree to which the Big Five's public commitments and material actions line up with the aims of the Paris Agreement. Because our research deals with public disclosure, our data were gathered primarily from public reports—i.e., annual reports, environmental reports, and reports related to stakeholders' interests (CNRL 2016, 2017; Cenovus 2017a, 2017b; Husky 2017a, 2017b; Imperial 2017a, 2017b, 2017c; Suncor 2017a, 2017b). We also examined each corporation's responses to the CDP's Climate Change Information Request (the CDP was formerly the Carbon Disclosure Project; see CDP 2017); these provide a consistent baseline, as all five companies responded to the information request.

Level of disclosure regarding GHG emissions

Overall, the Big Five's emissions disclosures to date have been insufficient.

Organizations such as the Carbon Tracker Initiative and CDP encourage corporations to publicly disclose their emissions and provide platforms that facilitate such disclosures. The United Nations-supported Principles for Responsible Investment (PRI 2017) and the Financial Stability Board's Task Force on Climate-related Financial Disclosures (TCFD 2017) contribute further information and place additional pressure on fossil fuel corporations to improve their transparency by publishing their own emissions modelling.

In response to these initiatives and others, and to the Paris Agreement coming into force, the Big Five have begun to disclose basic statistical data on emissions intensity (GHG emissions per volume of production) and total emissions. In addition, some oil sands majors are moving toward more comprehensive reporting and planning. For example, in March 2016 Suncor's shareholders pressed the corporation to provide ongoing disclosures and analysis of the firm's risk exposure in a carbon-constrained future (Krugel 2016). And, Husky reports that it "models various pricing scenarios possible under full implementation of the Pan-Canadian Framework"—but, significantly, this modelling does not seem open to shareholders or the public (2017b, 29).

Overall, the Big Five's emissions disclosures to date have been insufficient. In recognition of climate-related risks and to inform their investors, the public and various levels of government, the Big Five should begin to publicly disclose their own emissions modelling.

Creation and disclosure of GHG emissions-reduction targets

There are substantial differences among the five companies' emissions targets. Suncor and Cenovus have both made public commitments to reduce emissions intensity[10] by about one-third over the next decade (Suncor, 30% by 2030, and Cenovus, 33% by 2026). CNRL, Husky, and Imperial, on the other hand, have not made specific emissions targets. Suncor's and Cenovus' emission-intensity targets are good initial steps in acknowledging the risks of global warming, but they are insufficient. Reducing emissions intensity is important, but it is more significant that all five corporations project an increase in their total emissions.

None of these companies have made science-based targets; that is, none of the five have set targets that align with the amount of decarbonization required to keep the global average temperature increase below 2°C. Yet, all of the Big Five except for Imperial Oil acknowledge the Paris Agreement and the challenges it presents to the industry and to individual firms.

Material actions to reduce GHG emissions

Given the limitations of their emissions-reduction targets, it is unsurprising that the Big Five's number and type of material actions to reduce GHG emissions were limited in 2016 (the latest available data). All five corporations list material actions in line with mandatory measures. In their CDP responses, Imperial Oil does not list any material actions beyond small, mandatory changes to existing facilities, and Husky only reports two minor voluntary changes in addition to mandatory measures (Husky switched from diesel to natural gas for well completions, and installed internal floating roofs to reduce tank emissions). Suncor, CNRL, and Cenovus report reductions in emissions intensity in recent years. Past and ongoing improvements result largely from improving facilities and extraction procedures.

It seems that the Big Five are betting that governments will not take sufficient action fast enough to impact their business models.

It should be emphasized that, as with their reduction targets, none of the Big Five have implemented material actions that are in line with decarbonization required to meet the 2°C limit. It seems that the Big Five are betting that governments will not take sufficient action fast enough to impact their business models. While they may be right, they could also lose that bet, and that possibility needs to be explained to investors, not to mention the general public.

10 Please note that we are discussing emissions intensity of oil and gas production here (the amount of GHGs emitted to produce a barrel of oil or a barrel of oil equivalent), whereas earlier in our report we calculated the SCC estimates of the emissions embedded in the oil and gas reserves of the Big Five. The emissions-intensity figures disclosed by the Big Five would be much higher than reported were they to include downstream emissions from the use of the fossil fuels themselves.

Remaining below the 2°C limit requires continued improvements in emissions intensity, but it also necessitates material actions aimed at the reduction of total emissions. The Big Five's hopes for future emissions decreases primarily rely on claims that new technologies will enable substantial reductions. However, to date, technological advancements have not produced absolute emissions reductions, and there is no reason to believe they will. Thus, the only realistic way for the Big Five to reduce their total emissions is to reduce their oil and gas production. The Paris Agreement means that business as usual for the Big Five and other fossil fuel producers is not an option.

5. Conclusion

There have been mildly positive emissions-disclosure and emissions-intensity trends in Alberta's oil patch in recent years. The Big Five have begun to disclose basic statistical data on the emissions intensity and total emissions attributable to their production of oil and gas, and Suncor, CNRL, and Cenovus have reduced the emissions intensity of their production as of late. However, all five oil sands majors forecast an increase in their total emissions in the years to come. Overall, the Big Five's disclosures, targets, material actions to date, and their future plans are distressingly inadequate given the Paris Agreement's 2°C limit and the risks posed by climate change. For the Big Five, balancing the financial risks and social responsibilities associated with their contributions to global warming requires substantially more robust and ambitious public disclosures, emissions-reduction targets, material actions, and planning related to the ongoing global energy transition. Specifically, the Big Five need to start publicly disclosing their emissions modelling and their climate-related targets and actions need to be based on science and the Paris Agreement's 2°C limit.

Without added regulations and significantly higher carbon pricing laws, it seems unlikely that the global energy transition will develop quickly enough to keep global warming within the 2°C limit.

Getting to a low-carbon future entails subnational and national governments around the world placing immediate limits on fossil fuel extraction that will become increasingly stringent over time. Without added regulations and significantly higher carbon pricing laws, it seems unlikely that the global energy transition will develop quickly enough to keep global warming within the 2°C limit. The substantial gap between, on one hand, the Big Five's disclosures, targets, and material actions and, on the other, the changes required to remain within the Paris Agreement's 2°C limit signals a need for concrete, long-term "wind-down" plans to address the challenges and changes resulting from global warming, including the fact that a significant portion of known fossil fuel reserves must remain underground.

Understanding the risks of an oil-dependent economy, such as Alberta's, and the possibilities of clean energy requires an account of the costs and benefits that goes beyond short-term economic measurements. Consistent with other analyses of carbon costs, our report shows that fossil fuel companies are significantly overvalued by financial markets because their carbon liabilities have not been taken into account. When we account for the SCC, Alberta's oil sands industry looks like a carbon bubble that could pop sooner rather than later. Transitioning to clean energy is necessary to mitigate this economic and environmental risk and instability, but the energy transition is also a significant opportunity for Alberta and Canada.

A lot has changed since Alberta's first oil sands mine started producing bitumen 50 years ago (see Hussey 2017). Once seen as the key to long-lasting prosperity in Alberta, the oil sands are no longer such a sure bet, and the industry and province are at a crossroads. Amid uncertainty about the economic viability of the resource in the years ahead, increasing global recognition that we must begin to contemplate a future without fossil fuel extraction, and important questions about what it means to truly recognize the rights and title of Indigenous peoples, we in Alberta and Canada must decide which path to take in the coming decades.

We can continue to implement policies in Ottawa and Alberta that meet the approval of the oligopolistic bloc of eight corporations that produce and transport most of Alberta's oil (Pineault and Hussey 2017).[11] This path will mean we miss our Paris Agreement obligations and, over the next three decades, will strengthen Alberta's and Canada's ties to oil and gas production during a period in which other countries are undergoing a deep transition away from hydrocarbons. Or, we as Albertans and Canadians can choose a path of transitioning to a different kind of economy. We can make a just transition by developing policies that recognize and respect Indigenous rights and title, that put thousands of people to work cleaning up land that's been polluted by Alberta's oil and gas industry, and that minimize the impacts of such a transition on oil and gas workers by involving them in building our new economy (Cooling et al. 2015; Nikiforuk 2016).

Alberta is in transition, and we must start seriously planning for a different kind of economy.

11 The three big pipeline corporations operating in Alberta are TransCanada Corporation, Enbridge, and Kinder Morgan.

References

Ackerman, Frank and Elizabeth Stanton. 2011. "Climate Risks and Carbon Prices: Revising the Social Cost of Carbon." *Economics*. http://www.economics-ejournal.org/economics/discussionpapers/2011-40

Bloomberg. 19 October 2017. "Cenovus closes in on paying off Conoco deal with asset sale." JWN (JuneWarren Nickle's Energy Group). http://www.jwnenergy.com/article/2017/10/cenovus-closes-paying-conoco-deal-asset-sale/

Boffey, Daniel. 28 June 2017. "Mayors of 7,400 cities vow to meet Obama's climate commitments." The Guardian. https://www.theguardian.com/environment/2017/jun/28/global-covenant-mayors-cities-vow-to-meet-obama-climate-commitments

Bošković, Branko and Andrew Leach. 2017. "Leave it in the Ground? Incorporating the Social Cost of Carbon into Oil Sands Development." University of Alberta School of Business. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2920341

Bradsher, Keith and Lisa Friedman. 19 December 2017. "China Unveils an Ambitious Plan to Curb Climate Change Emissions." The New York Times. https://www.nytimes.com/2017/12/19/climate/china-carbon-market-climate-change-emissions.html?smid=fb-nytimes&smtyp=cur

Carbon Tracker Initiative (CTI) and Grantham Research Institute (GRI). 2013. "Wasted Capital and Stranded Assets." http://www.carbontracker.org/report/unburnable-carbon-wasted-capital-and-stranded-assets/

Canadian Natural Resources Limited (CNRL). 2016. "2015 Stewardship Report to Stakeholders." http://webadmin.cnrl.com/upload/media_element/1029/01/2015-report-to-stakeholders_web.pdf

Canadian Natural Resources Limited (CNRL). 2017. "2016 Annual Report." https://www.cnrl.com/upload/report/58/01/cnq-2016-annual-report.pdf

CDP (formerly the Carbon Disclosure Project). 2017. "Climate Change Information Request." https://www.cdp.net/en/companies-discloser

Cenovus Energy. 2017a. "2016 Annual Report." http://www.cenovus.com/invest/docs/2016-annual-report/annual-report-2016.pdf

Cenovus Energy. 2017b. "2016 Corporate Responsibility Report." http://www.cenovus.com/reports/2016/docs/2016-CR-report.pdf

Cooling, Karen et al. 2015. "Creating a green social contract for BC's resource workers." Canadian Centre for Policy Alternatives-BC. https://www.policyalternatives.ca/publications/reports/just-transition

Crooks, Ed. 28 October 2016. "ExxonMobil on course to cut reported proved oil reserves by 19%." Financial Times. https://www.ft.com/content/53f66878-9d13-11e6-a6e4-8b8e77dd083a

DiChristopher, Tom. 19 September 2017. "Trump is still pulling out of Paris Agreement, despite chatter of a reversal, experts say." CNBC. https://www.cnbc.com/2017/09/19/trump-is-not-reversing-on-paris-agreement-heres-why.html

Forrest, Jackie and Marcus Rocque. 2017. "Crude Oil Investing in a Carbon Constrained World: 2017 Update." ARC Energy Research Institute. https://www.arcenergyinstitute.com/crude-oil-investing-in-a-carbon-constrained-world-2017-update/

Gage, Andrew and Michael Byers. 2014. "Payback Time? What the Internationalization of Climate Litigation Could Mean for Canadian Oil and Gas Companies." Canadian Centre for Policy Alternatives and West Coast Environmental Law. https://www.policyalternatives.ca/publications/reports/payback-time

Harvey, Fiona. 4 November 2016. "Paris climate change agreement enters into force." The Guardian. https://www.theguardian.com/environment/2016/nov/04/paris-climate-change-agreement-enters-into-force

Husky Energy. 2017a. "Annual Report 2016." http://www.huskyenergy.com/downloads/abouthusky/publications/annualreports/HSE_Annual2016.pdf

Husky Energy. 2017b. "Community Report 2016." http://www.huskyenergy.com/downloads/abouthusky/publications/sustainabledevelopment/CommunityReport2016/Husky-Community-Report-2016.pdf

Hussey, Ian. 24 November 2016. "Ten things to know about carbon pricing in Alberta." Parkland Institute. http://www.parklandinstitute.ca/ten_things_to_know_about_carbon_pricing_in_alberta

Hussey, Ian. 27 September 2017. "Fifty years of Alberta's oil sands." Corporate Mapping Project. https://www.corporatemapping.ca/fifty-years-of-albertas-oil-sands/

Imperial Oil. 2017a. "2016 Annual financial statements and management discussion and analysis." http://cdn.imperialoil.ca/~/media/imperial/files/company/ir/2016_financial_statements.pdf

Imperial Oil. 2017b. "Performance Data." http://www.imperialoil.ca/en-ca/community/corporate-citizenship-highlights/performance-data/performance-data

Imperial Oil. 2017c. "Environment, Climate Change." http://www.imperialoil.ca/en-ca/company/environment/climate-change/climate-change

International Energy Agency. 2012. "World Energy Outlook 2012." http://www.iea.org/publications/freepublications/publication/English.pdf

Israel, Benjamin. 4 October 2017. "The real GHG trend: Oilsands among the most carbon intensive crudes in North America." Pembina Institute. http://www.pembina.org/blog/real-ghg-trend-oilsands

Jaccard, Mark and Associates. 2009. "Climate Leadership, Economic Prosperity: Final report on an economic study of greenhouse gas targets and policies for Canada." David Suzuki Foundation and the Pembina Institute. http://www.pembina.org/pub/1909

Jaremko, Deborah. 10 July 2017. "Emissions Reduction Alberta launches $50 million oilsands GHG challenge," JWN (JuneWarren Nickle's Energy Group). http://www.jwnenergy.com/article/2017/7/emissions-reduction-alberta-launches-50-million-oilsands-ghg-challenge/

Krugel, Lauren. 16 March 2016. "Suncor shareholders press company on climate policy risk, lobbying activity." CBC News Calgary. http://www.cbc.ca/news/canada/calgary/suncor-shareholders-climate-policy-risk-lobbying-1.3494046

Kynge, James, Pilita Clark, and Emily Feng. 5 November 2017. "China considers launch of carbon trading scheme." Financial Times. https://www.ft.com/content/dc840ba6-c0c0-11e7-b8a3-38a6e068f464

Leaton, James and Andrew Grant. 2017. "2 degrees of separation – Transition risk for oil and gas in a low carbon world." Carbon Tracker Initiative. http://2degreeseparation.com/

Lee, Marc and Brock Ellis. 2013. "Canada's Carbon Liabilities: The Implications of Stranded Fossil Fuel Assets for Financial Markets and Pension Funds." Canadian Centre for Policy Alternatives. https://www.policyalternatives.ca/sites/default/files/uploads/publications/National%20Office%2C%20BC%20Office/2013/03/Canadas%20Carbon%20Liabilities.pdf

Lee, Marc. 2017. "Re-examining Canada's Contribution to Climate Change through Fossil Fuel Exports." Corporate Mapping Project. https://www.corporatemapping.ca/extracted-carbon-re-examining-canadas-contribution-to-climate-change-through-fossil-fuel-exports/

Muttitt, Greg. 2016. "The Sky's Limit: Why the Paris Climate Goals Require a Managed Decline of Fossil Fuel Production." Oil Change International. http://priceofoil.org/content/uploads/2016/09/OCI_the_skys_limit_2016_FINAL_2.pdf

Nikiforuk, Andrew. 4 November 2016. "A Bold Clean-Up Plan for Alberta's Giant Oil Industry Pollution Liabilities." The Tyee. https://thetyee.ca/Opinion/2016/11/04/Clean-Up-Plan-for-Alberta-Oil-Pollution/

Pineault, Eric and Ian Hussey. 18 April 2017. "Restructuring in Alberta's oil industry: Internationals pull out, domestic majors double down." Corporate Mapping Project. https://www.corporatemapping.ca/restructuring-in-albertas-oil-industry-internationals-pull-out-domestic-majors-double-down/

Principles for Responsible Investment. 2017. https://www.unpri.org/

Read, Andrew, Benjamin Israel, and Sara Hastings-Simon. 20 December 2017. "Understanding the pros and cons of Alberta's new industrial carbon pricing rules." Pembina Institute. http://www.pembina.org/pub/understanding-pros-and-cons-of-alberta-s-new-industrial-carbon-pricing-rules

Suncor Energy. 2017a. "Annual Report 2016." https://sustainability.suncor.com/2017/pdf/Annual_Report_2016_EN.pdf

Suncor Energy. 2017b. "Suncor's Climate Report: Resilience through Strategy." https://sustainability.suncor.com/2017/pdf/Climate-Report-EN.pdf

Task Force on Climate-related Financial Disclosures (TCFD). 2017. "Recommendations of the Task Force on Climate-related Financial Disclosures." Financial Stability Board. http://www.fsb.org/2017/06/recommendations-of-the-task-force-on-climate-related-financial-disclosures-2/

Thieroff, John et al. 2017. "Significant credit risks arise for oil and gas industry from carbon transition." Moody's Investors Service. https://www.moodys.com/research/Moodys-Significant-credit-risks-arise-for-oil-and-gas-industry--PR_365728

United Nations Environment Programme (UNEP). 2016. "The Emissions Gap Report 2016: A UNEP Synthesis Report." https://europa.eu/capacity4dev/unep/document/emissions-gap-report-2016-unep-synthesis-report

United Nations Framework Convention on Climate Change (UNFCCC). 2015. "Paris Agreement." https://unfccc.int/files/meetings/paris_nov_2015/application/pdf/paris_agreement_english_.pdf

United Nations Framework Convention on Climate Change (UNFCCC). 28 June 2017. "More than 250 US Mayors Commit to 100% Renewable Energy by 2035." http://newsroom.unfccc.int/climate-action/more-than-250-us-mayors-aim-at-100-renewable-energy-by-2035/

Williams, Nia. 24 May 2017. "Shell, ConocoPhillips oil sands share selloff risks flooding market." Reuters. http://ca.reuters.com/article/businessNews/idCAKBN18L014-OCABS

World Bank Group and ECOFYS. 2016. "Carbon Pricing Watch 2016." https://openknowledge.worldbank.org/handle/10986/24288

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ISBN 978-1-894949-58-3