Energy scenario disclosures in Canadian and global oil & gas capital markets

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Any errors or omissions are solely the responsibility of the author.

About Analytica Advisors

Analytica Advisors is a boutique consulting firm engaged in building global capital markets for sustainability leaders among both long-term investors and companies. It focuses on financial and technical innovation for its clients the world over. We deliver insights into how markets are evolving to address the opportunities and risks posed by the net zero-carbon economy. Our mission is to build, in a sustainable and ethical manner, a research and advisory firm that drives economic growth in a sustainable way.

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Céline Bak is a global leader on the business impacts of climate change. She has been honoured by France as a Chevalier of the National Order of Merit for her work to mobilize the private sector in the run-up to the Paris Agreement.

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She is a senior associate at the International Institute for Sustainable Development (IISD) where she leads research on sustainable finance. As a past senior fellow at the Centre for International Governance Innovation she conducted research on innovation, infrastructure and served as co-chair of the Think Tank 20 (T20) Climate Policy and Finance Task Force under the German G20 presidency.

As the President of Analytica Advisors, in 2007 she recognized that innovation-based industries to protect the environment were poorly represented through existing primary economic research. In order to change this, she authored and published seven annual evidence-based national reports that have catalyzed the growth of Canada's emerging energy and water technology industry. Her research changed the investment and policy landscape, and has formed the basis of tens of billions of dollars in public and private investment.

Acronyms and Abbreviations

bbl	barrels
BOE	barrels of oil equivalent
CCS	carbon capture and storage
CDR	carbon dioxide removal
CO_2	carbon dioxide
ESG	Environment, Social and Governance
EIA	US Energy Information Administration
GHG	greenhouse gas
IEC	International Energy Company
IEA	International Energy Agency
IOC	International Oil Company
IPCC	International Panel on Climate Change
NDC	Nationally Determined Contribution
NETS	negative emissions technologies
NPS	New Policies Scenario
OSFI	Office of the Superintendent of financial institutions
P/E	Price earnings ratio
PRA	Prudential Regulation Authority
S&P	Standard and Poor's
SDS	Sustainable Development Scenario
TCFD	Task force on Climate-related Financial Disclosures
UNFCCC	United Nations Framework Convention on Climate Change
WEO	World Energy Outlook

Observations

What can be said of the oil & gas industry as it relates to the recommendations of the Taskforce on Climate-related Financial Disclosure (TCFD)[1]? Through a benchmark of 17 Canadian companies within a domestic cohort, and against an international cohort of 15 publically traded companies, it is possible to make the following observations for the 2016–18 period in regards to disclosures of climate-related risks and investments in oil & gas firms.

The overall industry context is one of transition.

- The global oil & gas industry is restructuring and companies are establishing and pursuing a wide range of strategies for the energy transition. Between 2016 and 2018, the industry has experienced a significant decline in the price/earnings (P/E) ratios for all but a very few companies. Industry investment was up between 2016 and 2018, with Canada's share of global industry investment rising from 6 to 7 percent.

With the industry in transition, company strategies vary widely.

- Within this restructuring context, the corporate strategies of oil & gas firms vary from large-scale net investment in oil & gas assets to large-scale net divestment from oil & gas assets.
- There were also significant geographical differences during the 2016–18 period suggestion capital markets are not harmonized globally with non-North American firms as net sellers and North America-based firms as net buyers. Whereas on average US and Canadian companies made net investments of $2.4 billion and $1.2 billion, respectively, companies with head offices outside of the US and Canada made average net divestments of $292 million.

Among companies that reference the Paris Agreement in their financial statements, some oil & gas companies have emphasized the need for enhanced policy, including carbon pricing, aimed at accelerating the energy transition. Other firms have proposed that business take the lead to rapidly decarbonize current fossil fuel-based energy supply across sectors.

- Whether in Canada or globally, oil & gas companies continue to press governments to lead through enhanced policy, including through carbon pricing measures.
- One newly emerging thrust focuses on business-led strategies aligned with the Paris Agreement on a global rather than a regional scale. As an example, one International Oil Company (IOC) recently called for a business-led initiative through industrial collaboration on sector-by-sector decarbonization leading to net zero emissions by 2050 to 2070.

[1] *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures*, available at: https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-2017-TCFD-Report-11052018.pdf.

Disclosures on climate-related risks by Canadian oil & gas firms are qualitatively and quantitatively lower than their peers.

- Among Canadian companies, only Suncor included reference to climate-change-related global energy scenarios in its financial filings. An additional five firms included a reference to the Paris Agreement in their financial filings but no reference to energy scenarios or their alignment with the Paris Agreement. Ten out of 15 firms' financial filings included neither disclosure of strategies to address climate-related risks nor mention of the Paris Agreement and its commitment to limiting warming to between 2°C and 1.5°C. These companies represent 24 percent of the market capitalization of the TSX Oil & Gas Index (which includes pipeline and service providers) or 39 percent of the index when focusing on extractive companies. There is clearly an opportunity to build up Canadian firms' capacity to disclose to shareholders their strategies for addressing climate-related transition, physical and litigation risks.

During this same period, capital markets have looked on Canadian oil & gas firms somewhat less favourably than their peers.

- Canadian firms are trading at an industry median P/E ratio of 25x. But this follows a period of steep decline internationally and domestically. Between 2016 and 2018, the P/E ratios of nine IOCs declined by 57 percent, and this decline accelerated in 2018 with the median P/E ratio reaching 23x for the 23 firms for which data was available – well below the 2017 median P/E ratio of 41x. For Canadian firms, the decline in industry P/E ratio was 65 percent over the same period.

Companies making TCFD disclosures to shareholders and whose head-offices are outside of North America are trading at a discount to those who have not.

- Notwithstanding industry-wide declines in P/E ratios, capital markets have not attributed a positive value to adoption of TCFD recommendations as an indicator of firm-level risk reduction. Companies that are early adopters of TCFD recommendations through disclosures in mainstream financial reports are trading at a discount of 57 percent compared to companies that have not adopted TCFD recommendations. The median P/E ratio for TCFD signatory companies is 15x – this is compared to the median of 27x for the other firms.

Firms included in this research
This report began with a cohort of 31 firms, to which five US firms were added for partial analysis. Please see Annex A for the names of these firms.

International firms: 15 publically traded international companies were identified. These companies represent more than half of global oil production. They also meet the following criteria:

- company-level bond rating
- financial statements for the 2016–18 period
- disclose proved reserves on the basis of barrels of oil equivalent (BOE)

Mainstream financial disclosures were used to profile each of these companies and to calculate their position in relation to their peers. Five of the 15 companies in the international cohort are TCFD signatories, with nine being rated A or better by S&P for local currency long-term bonds.

Canadian firms: 17 publically traded Canadian companies were identified. All of the companies in this cohort meet the following criteria:

- financial statements for the 2016–18 period
- disclose proved reserves on the basis of BOE

One of the 17 companies in the domestic cohort is a TCFD signatory and two are rated A or better in by S&P for local currency long-term bonds. Six of the 17 did not have an S&P local currency long-term bond rating.

US firms: Five publically traded, mid-sized companies were added and were included in some of the analysis.

The business context – an industry in transition

On June 11, 2019, BP's Bob Dudley addressed the launch of the 2019 BP Statistical Review of World Energy – the company's 68th annual edition. Mr. Dudley presented the following "three big takeaways":

> The world needs carbon emissions to fall dramatically, but they continue to grow. Energy-related emissions are not just growing – they accelerated in 2018, increasing at their fastest rate for seven years. This rising trend in emissions coupled with the biggest growth in energy consumption for nearly a decade – driven by China and India, but also by demand for growth in the US as well.…The second remarkable development last year is the ongoing energy revolution in the US … with the US delivering the largest ever annual increases in both oil and gas production in 2018.… The third big take-away … is the continued electrification of the world.… Renewables accounted for a third of the growth, [and] natural gas had its biggest growth since the early 1980's … but coal also took a share of the growth in power, with the overall consumption of coal increasing for a second year in a row.… When it comes to cutting emission, electrification without decarbonization is of little use.[2]

This past year, BP supported a shareholder resolution proposed by the Climate Action 100+[3] as being in the best interests of the company and its shareholders. This resolution commits BP to reporting on the company's strategy, which the Board considers, in good faith, to be consistent with the goals of Articles 2.1 (a) and 4.1 of the Paris Agreement.[4] BP also participated in talks on the energy transition convened by the Vatican and was a signatory to joint statements covering carbon pricing and transparent investments.[5]

A day earlier, Shell's Ben van Beurden gave a speech at the *Times* of London's CEO Summit in which he proposed a business-led approach to make progress toward Paris Agreement targets. He asked that his CEO peers work together to achieve the goals of the Paris Agreement. Mr. van Beurden's opening remarks are also worth quoting:

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[2] https://www.bp.com/en/global/corporate/news-and-insights/speeches/bp-stats-review-2019-bob-dudley-speech.html (retrieved July 2, 2019).

[3] Climate Action 100+ is a five-year initiative led by investors to engage systemically important greenhouse gas emitters and other companies across the global economy that have significant opportunities to drive the clean energy transition and help achieve the goals of the Paris Agreement. To date, 310 investors with more than USD $32 trillion in assets under management have signed on to the initiative.

[4] The shareholder resolution is reproduced in Annex B.

[5] https://uk.reuters.com/article/us-oil-vatican-conference-pope/pope-warns-energy-bosses-of-global-destruction-without-fuel-shift-idUKKCN1J50BD (retrieved July 2, 2019).

> It is said only two things can stop a person from asking for help. An excess of pride. Or an excess of humility. I am here to ask for your help. And I wish I could say that it was an excess of humility that has delayed this request.…
>
> I do not believe the world is moving fast enough to tackle climate change. But I do believe that action taken by businesses, working together, has the potential to change that.… And making sure our businesses are in harmony with the Paris Agreement is the best way of doing that. It is an essential investment.… The whole world must stop adding to the stock of greenhouse gases in the atmosphere. It must reach net zero emissions. Some say by 2070, others 2050. Some countries can go faster than others, and Shell has supported a letter calling for the UK to reach net zero emissions by 2050.[6]

In 2019, Shell made a commitment to investors to report on and *reduce total CO_2 emissions from its operations and the products it sells* (Scope 1, 2 and 3 emissions). Shell's is one of five IOCs to sign on to the TCFD. A shareholder resolution requesting that Shell set and publish Paris-aligned targets of limiting global warming to well below 2°C was withdrawn by its proponents from the agenda of Shell's Annual General Meeting.[7]

So what can oil & gas companies learn from international peers during the energy transition? Bob Dudley's remarks clearly describe unsustainable trends. Ben van Beurden's remarks may be viewed as a request for a mandate for Shell's management to be stewards of invested capital as an "International Energy Company" or I**E**C at the same scale as its current business model as an IOC. Should this mandate be given by investors, and customers be willing to work with oil & gas firms, the resulting corporate transformation would be at an unprecedented scale.

There can be no doubt that the industry is in a period of significant change. Indeed, this is reflected in capital markets. Between 2016 and 2018, the P/E ratios of nine IOCs declined by 57 percent (see Figure 1). This decline appears to be accelerating with the 2018 median P/E ratio reaching 23x for the 23 firms for which data was available – well below the 2017 median P/E ratio of 41x.

But the research for this report confirms that global capital markets are not yet in sync with the strategic direction of TCFD signatory companies like Shell, Total, Eni and Equinor. Shell, whose P/E ratio declined by 80 percent over the period, had a 2018 P/E ratio of 19x – higher than other TCFD signatories Total (14x), Eni (16x), Equinor (11x) and Repsol (11x), but lower than Suncor's 2018 P/E ratio of 23x.[8]

During this same period, capital markets have looked on Canadian oil & gas firms overall less favourably than their peers. For most Canadian firms, the decline in industry P/E ratio was 65

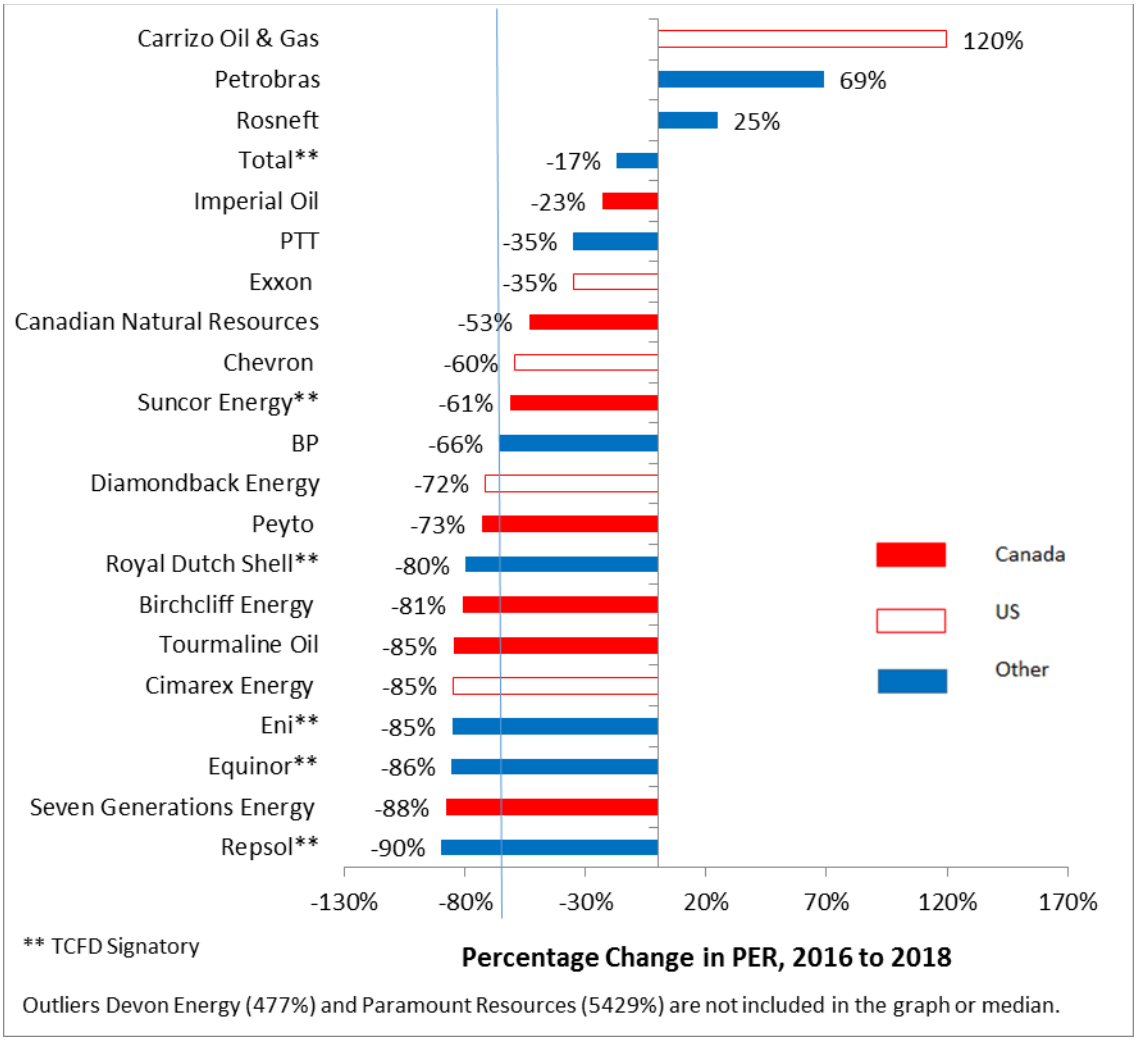
[6] https://www.shell.com/media/speeches-and-articles/2019/climate-change-the-difference-business-can-make.html (retrieved June 20, 2919).

[7] Shell directors' response to this proposed resolution is reproduced in Annex B.

[8] Further research looking into regional P/E ratios may be fruitful.

percent over the period. Exxon and Canadian Natural Resources were among firms who experienced a decline that was lower than the average of their peers. To date, capital markets have favoured companies such as Devon, Imperial Oil, ConocoPhillips and Chevron whose 2018 P/E ratio stood at 137x, 67x 39x and 38x respectively.

Figure 1 – 2016–18 percent change in P/E ratios



Source: Capital IQ, Analytica Advisors

In addition to the significant shifts in capital market valuations, the research for this report also confirms that the oil & gas industry is in a period of transition in terms of the scope and focus of investment. Some oil & gas companies have prepared for this shift by divesting themselves of assets that do not meet required business hurdle rates for their future business. These hurdle rates may be impacted by a number of factors, including absolute emissions-reduction targets. For example, the following is disclosed in Shell's 2018 annual report:

> Our direct GHG [greenhouse gas] emissions decreased from 73 million tonnes of CO2 equivalent in 2017 to 71 million tonnes of CO2 equivalent in 2018. The main contributors to this decrease were divestments (for example in Argentina, Canada, Gabon, Iraq, Malaysia and the UK).[9]

Divestments from Canadian oil & gas assets have been widely reported. Starting in December 2016, seven oil & gas companies sold Canadian assets. These were Koch Industries (December 2016), Equinor (December 2016), Imperial Oil (January 2017), ConocoPhillips (February 2017), ExxonMobil (February 2017), Shell (March 2017) and Devon (May 2018).[10]

In regards to the disposal of its Canadian assets, Devon made the following disclosure to shareholders in its 2018 annual report:

> We own a portfolio of assets located in the United States and Alberta, Canada. We strive to own premier assets capable of generating cash flows in excess of our capital and operating requirements, as well as competitive rates of return. We also desire to own a portfolio of assets that can provide a production growth platform extending many years into the future. Because of the strength of oil prices relative to natural gas, we have been positioning our portfolio to be more heavily weighted to U.S. oil assets in recent years….
>
> In February 2019, we announced our intent to separate our Canadian business and our Barnett Shale assets from the Company. After these separations, we expect our oil production growth, price realizations and field-level margins will all improve."[11]

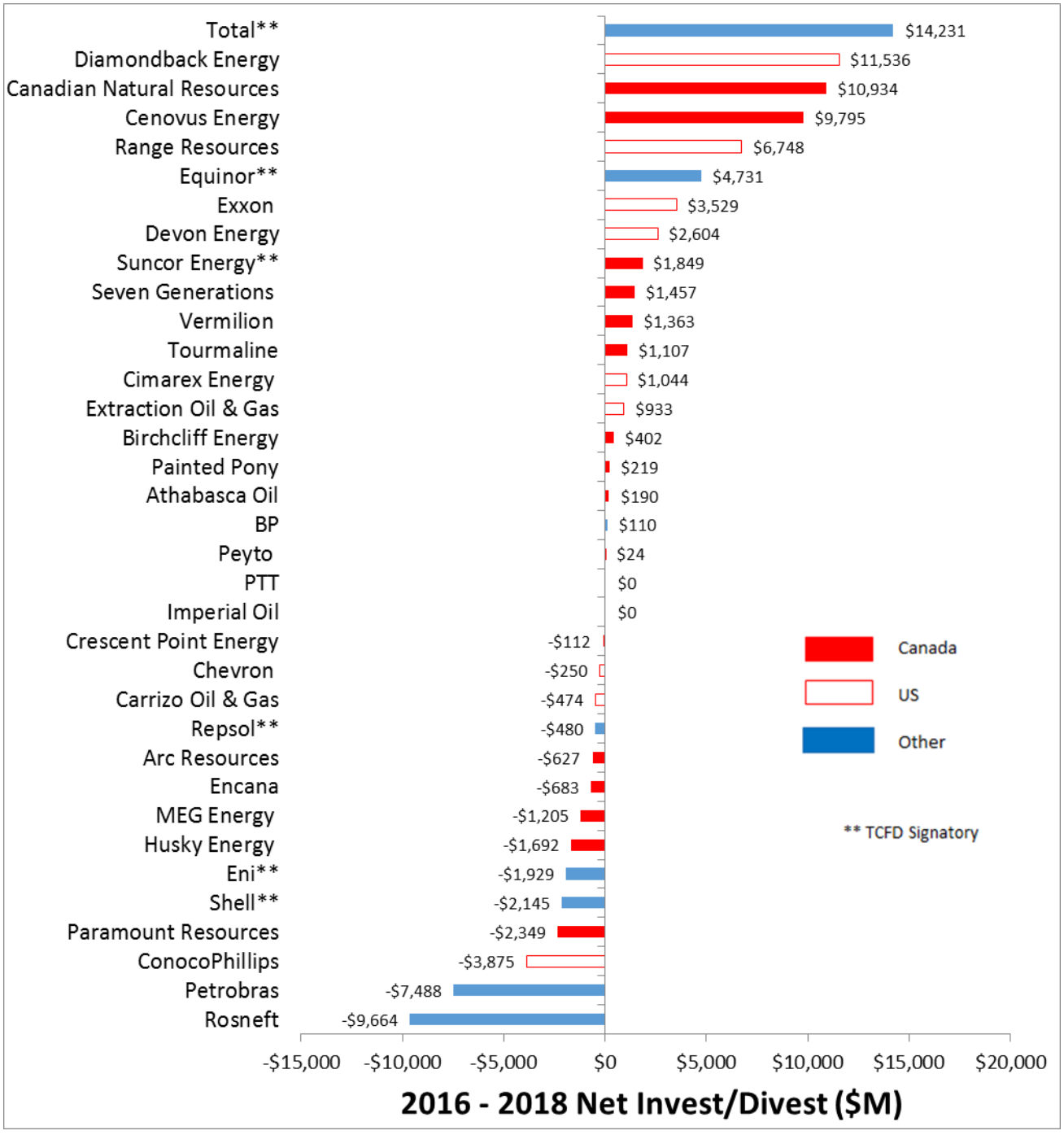
Figure 2 below summarizes firm-level net divestments/investments by this report's cohort of oil & gas companies (2016–18). Divestments/investments were included that were aimed specifically at the acquisition or sale of energy assets. The regional differences are striking. Whereas on average US and Canadian companies made net *investments* of $2.4 billion and $1.2 billion, respectively, over the period, global companies made average net *divestments* of $292 million. Two Canadian firms, Canadian Natural Resources and Cenovus, at close to $11 billion and $10 billion, respectively, were among the top five firms in terms of investment. They were behind Total, the world's most active IOC in terms of investment. The divestments made by Rosneft and Petrobras coincide with the rise in their P/E ratios (as shown in Figure 1 above) and may be associated with the pursuit of strategic alternatives for these firms.

[9] https://reports.shell.com/annual-report/2018/ (retrieved May 10, 2019).

[10] Céline Bak, *Leveraging Sustainable Finance in Canada* (January 2019), p. 46

[11] https://s2.q4cdn.com/462548525/files/doc_financials/Annual/2018/DVN-2018-10-K.pdf (retrieved May 10, 2019).

Figure 2 – 2016–18 firm-level net invest/divest ($M)

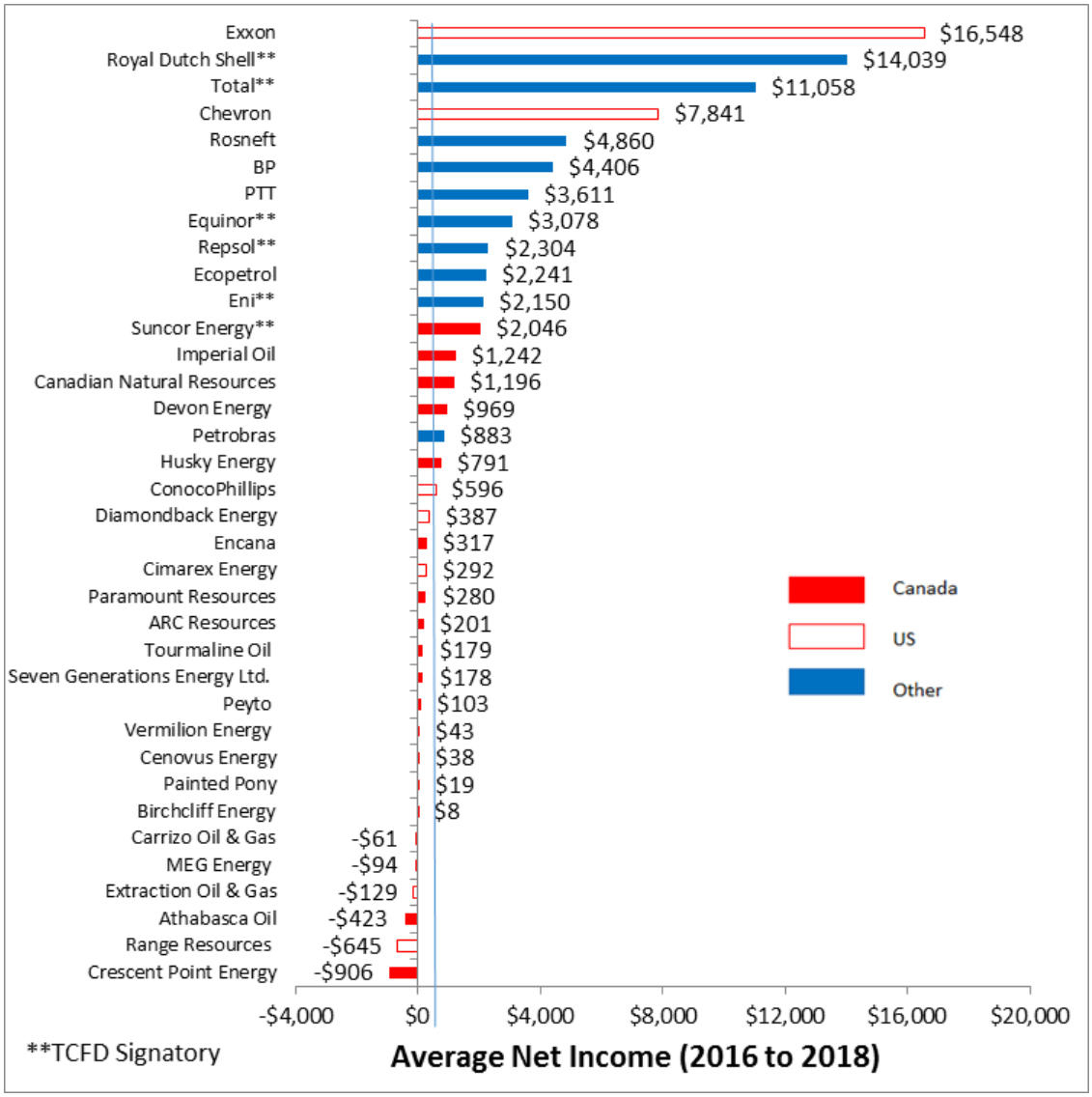


Source: Capital IQ, Analytica Advisors

For all but six companies in this study's cohort, firm-level investment and divestment programs have been undertaken while delivering net income over the 2016–18 period. At the firm level, and reflecting the fact that Canada's oil & gas industry is made up of many firms that are smaller than their IOC peers, profitability levels for the Canadian industry vary widely. Over the

2016–18 period, slightly more than half of domestic companies delivered net income as a percent of revenue that was higher than the median of the combined global and domestic cohort. Three companies delivered negative returns and the remaining companies delivered less than the median. If the results of the Canadian firms are aggregated to treat the domestic cohort of 17 firms as a single company, the weighted average net income as a percent of revenue was 5 percent over the 2016–18 period, representing aggregate net income over revenue *that is the same as the global median of 5 percent*.

Figure 3 – Average 2016–18 net income ($M)



Source: Firm financial statements, Analytica Advisors

How may climate-related financial disclosure have underpinned oil & gas company investment and divestment strategies?

Oil & gas companies are economically important at a global scale – their profits play a vital role in generating returns for investors and taxes for governments. In Canada, oil & gas companies facilitate wealth creation through the provision of energy to businesses and households, fuel for the transport of individuals and goods, and the creation of a multitude of products that individuals use in their daily lives. As discussed above, some of these firms may attempt to make the transition to International Energy Companies (IECs) from International Oil Companies (IOCs) within a net zero carbon emissions context with public recognition of the need to do so to avoid the consequences of economic risks brought about by extreme weather events and risks from biodiversity loss associated with global heating.[12]

As discussed above, some firms in the global oil & gas industry is engaged in a discussion with shareholders about the risks presented by the global transition to a net zero emissions economy. While only a handful of oil & gas companies are signatories to the TCFD,[13] *nine out of 10* investment-grade-rated IOCs refer to global energy scenarios in relation to climate change and the Paris Agreement in the management discussion section of their annual reports to shareholders. These scenarios include two published by the International Energy Agency (IEA) in the World Energy Outlook (WEO):

- The New Policies Scenario (NPS) associated with 2.7°C to 3°C of warming and which reflects the current country-level commitments under the Paris Agreement.
- The Sustainable Development Scenario (SDS), which addresses three UN Sustainable Development Goals (access to energy, pollution and climate change). The SDS appears to align with published scenarios that rely on "high overshoot" of GHG concentrations associated with the Paris Agreement targets of 2°C to 1.5°C. Excess GHG's would later be removed through negative emissions technologies (NETS) at a global scale to return to lower emissions concentrations.[14]

These discussions reflect the impact of investors' engagement with the world's highest-emitting companies through the Climate Action 100+ initiative. They may also reflect the growing importance for some investors of Environment, Social and Governance (ESG) factors. In a 2018 report, the US Forum for Sustainable and Responsible Investment estimated that the funds managed by asset managers who consider ESG criteria grew by 44 percent between

[12] Refer to the box below for definitions of key terms: net zero emissions and related policies, as well as extreme weather events.

[13] *Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures*, available at: https://www.fsb-tcfd.org/wp-content/uploads/2017/06/FINAL-2017-TCFD-Report-11052018.pdf.

[14] On April 8, 2019, Shell announced a $300 million investment over three years to invest in natural ecosystems as part of its strategy to act on global climate change, including addressing CO_2 emissions generated by customers when using its products. This is an example of Negative Emissions Technologies. While the IPCC Special Report 1.5°C (SR15) contemplates Biological Emissions Carbon Capture and Storage (BECCS), energy policy makers may wish to be attentive to new Integrative Assessment Models that may consider other types of NETs in future IPCC reports.

2016 and 2017, from $8.1 trillion to $11.6 trillion – or about one in four dollars of the $46.6 trillion in total assets under professional management in the United States.[15]

These disclosures of risks to shareholders are also based on proprietary global energy scenarios, such as BP's *Evolving and Rapid Transition Scenarios*, Equinor's *Renewal, Reform and Rivalry*, Shell's *Sky, Oceans and Mountains* and Suncor's *Autonomy, Rivalry and Vertigo*. Notably, both Italy's Eni and Shell also refer to the International Panel on Climate Change Special Report on 1.5°C (IPCC SR15) (see Table 1 – Investment-grade companies' disclosure of global energy scenarios in mainstream reports).

Among companies with debt rated below investment grade (BBB+ to C), half referred to the Paris Agreement or to climate change in their discussion of risks to the company's business model, through, for example, regulatory costs or increased cost of capital. In an indication of the varying levels of discussion today, of the remaining six companies without a debt rating, only one firm included in its mainstream financial report a reference to the Paris Agreement or the risk presented by climate change (see Table 2 – Below-investment-grade companies' disclosure of climate-related risks in mainstream reports).

Among Canadian firms, the level of discussion of management strategies to address climate-related risks is lower compared to their international peers, with 10 out of 15 firms including no discussion in mainstream financial filings of climate-related risks or mention of the Paris Agreement. A single Canadian company, Suncor, included reference to climate scenarios in its filings. The remaining five (Cenovus Energy, Seven Generations, MEG Energy, Athabasca Oil and Arc Resources) included a reference to the Paris Agreement in their financial filings.

In summary, of the 31 companies whose reports were reviewed for this study – including 16 Canadian companies for which management discussion of results were available – 17 include in their mainstream financial statements a discussion of one or more global energy scenarios associated with climate change impacts. These scenarios were presented as informing capital allocation and business planning and/or management of risk to the business.

[15] https://www.businesswire.com/news/home/20181031005229/en/Sustainable-investing-assets-reach-12-trillion-reported Retrieved July 2nd, 2019.

Key terms:

Net zero carbon emissions: Stabilizing the earth's temperature at any level will require global emissions to fall to zero overall because more GHG emissions lead to more warming. The Special Report on 1.5C from the International Panel on Climate Change said that to stop the temperature from rising by more than 1.5°C, advanced economies will need to cut carbon emissions to net zero by 2050.

Policies for net zero carbon emissions: Phasing out GHGs over the next three decades will require changes in all areas of the economy – including more low-carbon power, electric vehicles, tackling emissions from aviation and industry, and changes to how land is used and how buildings are heated.

Extreme weather events: Temperature increases of more than 1.5°C are expected to lead to an increase in extreme weather events such as heatwaves and flooding, greater losses in crop yields and numbers of wildlife, and increased risks of large-scale irreversible impacts such as melting ice sheets, which will cause sea levels to rise.

Negative Emissions Technologies: Over the last 10 years, to balance accumulated atmospheric GHGs with the goal of limiting global heating to 1.5°C to 2°C, global climate/energy scenarios have increasingly relied on negative emissions technologies (NETs) or carbon dioxide removal (CDR). CO_2 can be removed from the atmosphere either biologically (through photosynthesis) or chemically. It can be stored in biomass, soil or ocean, or geologically through carbon capture and storage (CCS).

Examples of disclosures to shareholders and public statements about energy scenarios by oil & gas firms and stakeholders:

Total (2018 Financial and Operating Review): New Policies Scenario and Sustainable Development Scenario

"The NPS sees a significant increase in oil and gas demand until 2025 and then a slower growth until 2040 (despite a significant penetration of electric vehicles and, above all, significant efficiency gains). The SDS sees a decline in demand for the first half of the 2020s for oil and a stabilization after 2030 for gas due to the substitution efforts and an accelerated diffusion of efficiency gains."

Equinor (News release, April 24, 2019):

"Equinor will continue to report on climate related risks and opportunities in line with the TCFD recommendations. From 2019 Equinor will assess its portfolio, including new material capital expenditure investments, towards a well below 2°C scenario. If and when a relevant well below 2°C scenario is available, with necessary price assumption, Equinor will include this in its overall stress testing."

Exxon (2018 Financial and Operating Review): New Policies Scenario

"The International Energy Agency's (IEA) New Policies Scenario estimates approximately $21 trillion of cumulative oil and natural gas investment is needed from 2018 to 2040. In the upstream sector alone, it estimates about $685 billion of annual investment is needed to meet global demand for oil and natural gas."

The Canadian Association of Petroleum Producers:

*"According to the latest data from the International Energy Agency (**World Energy Outlook 2018**, New Policies Scenario), global energy demand will increase 27 per cent by 2040, due mainly to rising standards of living and population growth in the developing world."*

Table 1 – Investment-grade companies' disclosure of global energy scenarios in mainstream reports

		Carbon-constrained global energy scenario and publication			
Company	**S&P Bond Rating**	**IEA New Policies Scenario**	**IEA Sustainable Development Scenario**	**IPCC Special Report on 1.5°C**	**Other**
Exxon	AA+	2018 Financial and Operating Review & Outlook for Energy			
Imperial Oil CA	AA+	2018 Financial Statements (Exxon Outlook for Energy)			
Chevron	AA	2018 Climate Change Resilience Report	2018 Climate Change Resilience Report		
Royal Dutch Shell*	AA-	2018 Shell Energy Transitions	2018 Shell Energy Transitions	2018 Annual Report and Form 20-F	2018 Shell Energy Transitions Scenarios (Sky, Oceans, Mountains)
Equinor*	AA-				2018 Energy Perspectives: Scenarios (Renewal, Reform, Rivalry)
Total*	A+	2018 Consolidated Financial Statement	2018 Consolidated Financial Statement		
ConocoPhillips	A				2018 Annual Report refers to Paris Agreement
BP	A-		2018 Annual Report and Form 20-F (Rapid Transition)		
Eni*	A-		2018 Annual Report	2018 Annual Report	
Suncor Energy* CA	A-				2018 Risk and Resilience Report: Scenarios (Autonomy, Rivalry, Vertigo)

*TCFD Signatory
** Local Currency Long-Term S&P Bond Rating

Source: Firm financial statements, Analytica Advisors

Table 2 – Below-investment-grade companies' disclosure of climate-related risks in mainstream reports

		References to IEA Current Policy Scenario, Paris Agreement, climate change-related business risk		
Company	**S&P Bond Rating**	**Paris Agreement******	**Climate-Change-Related Financial Regulation Increasing Cost of Capital or Diminishing Access to Capital**	**Climate Change as a Risk to the Value of Reserves**
Canadian Natural Resources CA	BBB+			
Repsol*	BBB	2018 Annual Report (2°C)		
Devon Energy	BBB			2018 Annual Report
Cenovus Energy CA	BBB	2018 Annual Report		
Husky Energy CA	BBB			
Encana CA	BBB			
Rosneft	BBB-			
PTT	BBB-			
Seven Generations Energy CA	BB	2018 Annual Report (2°C–1.5°C)		
Petrobras	BB-	2018 Annual Report (2°C)	2018 Form 20-F	
Vermilion Energy CA	BB-			
MEG Energy CA	B+	2018 Annual Report (2°C–1.5°C)	2018 Annual Report	2018 Annual Report
Paramount Resources CA	B+			
Athabasca Oil CA	CCC+		2018 Annual Information Form (2°C–1.5°C)	2018 Annual Information Form
ARC Resources CA	***		2018 Annual Report (2°C–1.5°C)	
Tourmaline Oil CA	***			
Crescent Point CA	***			
Peyto CA	***			
Birchcliff Energy CA	***			
Painted Pony CA	***			

** Local Currency Long-Term S&P Bond Rating
*** Rating not available
**** Where companies make specific reference in their mainstream financial reports to the goals of the Paris Agreement in terms of limiting warming to 2°C or to between 2°C and 1.5°C this is referred to as follows: 2°C or 2°C–1.5°C

Source: Firm financial statements, Analytica Advisors

The global political context – an industry in transition

What can be said of the Canadian oil & gas industry in terms of its readiness to discuss climate-related disclosure in mainstream financial reports for shareholders? One Canadian oil & gas company has embraced the challenge of disclosing to shareholders in a way that is consistent with TCFD recommendations.[16] In June 2018, *Report on Business Magazine* quoted Suncor CEO Steve Williams on the TCFD recommendations:

> Leaders don't shy away from challenges. They face them. So last year, Suncor released our first Climate Report, building on our Report on Sustainability, which we've produced since the early 1990s.
>
> Sharing this information helps create greater certainty for investors, which means greater stability for our business. Disclosure also sends a strong signal to future investors that we are ready to compete in a low-carbon world. I believe transparent reporting will push us to challenge our own thinking, ultimately making us more innovative and better prepared for the future.[17]

As climate volatility continues to intensify, the research for this report confirms that oil & gas companies have deployed very different strategies both to manage the risks defined by the TCFD (i.e., material physical, transition and litigation risks) and to prepare for opportunities. Evidence of investor engagement with IOC's suggest that interest in these disclosures will likely continue to grow in the international context.

The Paris Agreement provides for national plans (e.g., Nationally Determined Contributions, or NDC to be communicated or updated by 2020[18] and collectively reviewed in terms of their progress against national targets. The first reviews are to begin in 2023. For this reason, we can expect the emphasis on both limiting GHG emissions *and* preparing for the disruptions of extreme weather events from global heating to come into sharper focus with each passing year.

At the same time, institutions are already moving to align capital flows with the goals laid out in the Paris Agreement. For example, in 2017 the World Bank announced that it would stop all lending to upstream oil & gas.[19] We are seeing similar direction, for example, in engagement

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[16] In a 2018 *Science* article, an analysis of global oil & gas carbon intensity at the field level ranked Canada 47th in terms of carbon-intensive reserves globally, ahead of Cameroon (48), Venezuela (49) and Algeria (50), but behind Iran (46), Turkmenistan (45) and Indonesia (44). The least carbon-intensive reserves in the world were Denmark (1), Saudi Arabia (2), Bahrain (3), Thailand (4), Ghana (5), Norway (6) and Brunei (7). The US was ranked the 17th most-carbon-intensive nation, with slightly above the global average carbon intensity of 10.3 g CO2eq./MJ. See Masnadi El-Houjeiri et al., (2018, August), Global carbon intensity of crude oil production. Retrieved from http://science.sciencemag.org/content/361/6405/851.

[17] https://www.theglobeandmail.com/business/rob-magazine/article-adapt-or-die-are-canadian-companies-ready-for-climate-change/.

[18] The UK has proposed that it host COP26 in 2020.

[19] https://www.worldbank.org/en/news/press-release/2017/12/12/world-bank-group-announcements-at-one-planet-summit.

by investors, scientists and other stakeholders with the IEA on the degree to which the energy scenarios published in the WEO are aligned with the goals of the Paris Agreement.[20]

The Paris Agreement's Article 2.1.c calls on capital flows to be aligned with its goals. It therefore follows that the countries that have ratified the Agreement are bound by this commitment. In this regard, we note that the TCFD's recommendations are among the points discussed in the final report of Canada's Expert Panel on Sustainable Finance (henceforth "the Panel"). The Panel recommended that a first-phase implementation of TCFD recommendations be undertaken on a "comply or explain basis" before 2022 by companies with a market capitalization of greater than $8 billion or companies with a market capitalization of greater than $2 billion and revenues greater than $1 billion. A second phase, which would be undertaken by 2025, would include reference to strategy, including describing the resilience of the organization's strategy, and taking into consideration different climate-related scenarios (described above), including a 2°C or lower scenario.[21] The companies that were part of this study but would be excluded from the comply-or-explain requirements by 2022 are the following: MEG Energy, Paramount Resources, Athabasca Oil, Peyto, Painted Pony and Birchcliff Energy. On July 1, the UK announced that it will explore introducing a mandatory requirement for listed companies and pension funds to disclose climate-related risks from 2022.[22] This move is akin to France's Article 173, which was legislated in 2015.

As mentioned above, a number of advanced economies have agreed to set targets for net zero emissions by 2050. Nine EU member states – Belgium, Denmark, France, Luxembourg, the Netherlands, Portugal, Spain, Sweden and it would appear Germany as well – have agreed to a target of net zero emissions by 2050. The UK has legislated this target and France is expected to follow suit this year.[23] Japan is also expected to make a commitment to carbon neutrality.[24]

Why are these country-level commitments occurring in such quick succession? As a result of the cumulative effects of carbon emissions, the earth's average temperature has already risen by 1.0°C. Stabilizing the earth's temperature at any level will require global emissions to fall to zero overall because more GHG emissions lead to more heating and extreme weather. We see evidence of the changes brought about by 1.0°C of warming in Eastern Canada, which recently suffered its second once-in-a-century flood in just three years. The Special Report on 1.5°C from the International Panel on Climate Change shows that if we are to stop the temperature from rising by more than 1.5°C, countries – particularly those with advanced economies – will need to cut carbon emissions by 40 to 50 percent by 2030 and to net zero by 2050.[25]

[20] https://www.ft.com/content/5c80f102-5535-11e9-91f9-b6515a54c5b1.
[21] http://publications.gc.ca/collections/collection_2019/eccc/En4-350-2-2019-eng.pdf.
[22] https://www.ft.com/content/59086538-9c24-11e9-b8ce-8b459ed04726 (retrieved July 2, 2019).
[23] https://www.ft.com/content/acc09db6-8ea1-11e9-a1c1-51bf8f989972 (retrieved July, 2019).
[24] https://www.reuters.com/article/us-japan-environment/japan-adopts-long-term-emissions-strategy-under-paris-agreement-idUSKCN1TC1AJ (retrieved July 2, 2019).
[25] Intergovernmental Panel on Climate Change (2018), Global warming of 1.5°C: Summary for policymakers. Retrieved from https://www.ipcc.ch/site/assets/uploads/sites/2/2018/07/SR15_SPM_High_Res.pdf.

This call was echoed on April 17, 2019 in an article published by the governors of the central banks of France and England. In their words, "carbon emissions have to decline by 45 percent from 2010 levels over the next decade in order to reach net zero by 2050."[26]

The monetary policy context – an industry in transition

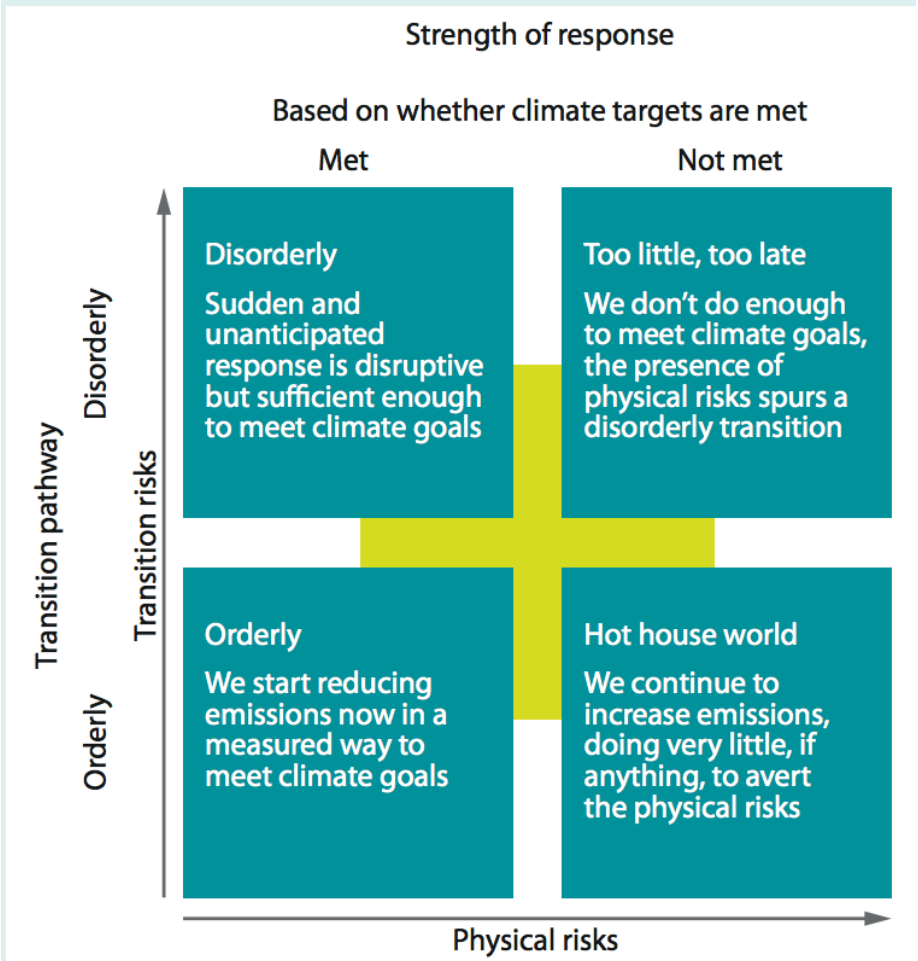
While financial stability depends on transparency, including discussion in mainstream reports of strategies to address transition and physical risks posed by extreme weather events caused by climate heating, economic stability depends on a smooth and orderly energy transition and the continued investment in oil & gas companies as they make the energy transition.[27]

In their analysis of the risks of climate change, central banks and financial supervisory authorities identified two dimensions that must be considered when assessing the risks to the economy and the financial system associated with climate heating:

- The total level of mitigation – or, in other words, how much action is taken to reduce GHG emissions (leading to a particular climate outcome).
- And, whether the transition occurs in an orderly or disorderly fashion – in other words, how smoothly or foreseeably these actions are implemented.

[26] https://www.theguardian.com/commentisfree/2019/apr/17/the-financial-sector-must-be-at-the-heart-of-tackling-climate-change.
[27] https://www.banque-france.fr/sites/default/files/media/2019/04/17/ngfs_first_comprehensive_report_-_17042019_0.pdf (retrieved May 10, 2019).

Figure 4: Network for Greening the Financial System high-level scenarios



Source: A Call to Action: First Report of the Network for Greening the Financial System

Also important is "A Call to Action," the first comprehensive report of the Central Banks and Supervisors' Network for Greening the Financial Sector (NGFS), of which the Bank of Canada – which has endorsed the NGFS's report – is a member. In its 2019 Financial Systems Review, the Bank of Canada referred fragile corporate debt funding emerging as a vulnerability with increases in outstanding corporate bonds over the past four years having been driven by firms with lower bond ratings.[28]

The Bank of England is home to the Prudential Regulation Authority (PRA). The PRA published the General Insurance Stress Test 2019 (GIST 2019) to inform its view of sector risks and assist in the supervision of individual insurance firms. The climate scenarios in the GIST 2019 refer to both a disorderly transition scenario and an orderly transition scenario. The Canadian equivalent of the PRA is the Office of the Superintendent of financial institutions (OSFI).

[28] https://www.bankofcanada.ca/2019/05/financial-system-review-2019/ (retrieved May 10, 2019).

More recently, on June 24, Robert Kaplan, president of the Dallas Federal Reserve, released a paper that predicted an increase in severe weather events. The following is extracted from his report, which states that climate-related economic impacts are now a core part of his research team's work:

> The Eleventh District is home to approximately 50 of the Fortune 500 companies. It is also a major infrastructure hub for the nation's energy production, transmission and refining capability. The seaports along the Gulf Coast as well as the inland ports in our major metro areas and along the U.S.–Mexico border play a critical role for the U.S. in trade and immigration.
>
> In this context, my Dallas Fed research team is focused on the extent that severe weather events such as hurricanes, droughts, flooding and tornadoes are increasingly likely to impact our people, cities, critical energy infrastructure and key industries. While our district has historically exhibited great resilience in response to the effects of severe weather, the latest National Climate Assessment, a comprehensive report on climate change and its impacts, indicates that the severity and damage caused by extreme weather events are likely to intensify in the years ahead.[29]

Clearly the Canadian oil and gas industry can expect greater attention to transparent disclosure of climate-related risks to resource firms, their lenders and the asset owners and managers that invest in them.

[29] https://www.dallasfed.org/news/speeches/kaplan/2019/rsk190624.aspx (retrieved July 2, 2019).

Quantitative research

True or false hypothesis: As an indication of capacity to undertake financial disclosures per the TCFD recommendations, global and domestic companies refer to carbon-constrained energy scenarios in their mainstream financial disclosures today.

True internationally and false domestically, based on the following observations.

1. All but a few investment-grade companies disclose IEA scenarios and/or their own scenarios in their financial reports.

These disclosures refer to projected demand for oil & gas and to the capital required to replace reserves and explore to meet demand. Shell and Equinor publish a separate report that refers to proprietary scenarios, including carbon-constrained scenarios, in relation to IEA scenarios. Both companies refer to absolute carbon constraints. BP publishes three scenarios, including the Rapid transition scenario, which it states is aligned with the International Energy Agency's SDS. Conversely, Suncor refers to carbon-intensity-reduction goals. Notably, ConocoPhilips is the only investment-grade company that includes no reference to global energy scenarios. ConocoPhilips does, however, include a reference to the Paris Agreement in its management discussion, albeit without reference to the degrees-of-warming limits of the Paris Agreement.

2. As an indication of the potential to build disclosure capacity through the TCFD framework, for companies that are below investment grade, an analysis was performed of climate-related disclosures through references to climate change rather than to carbon-constrained scenarios (IEA or proprietary).

Forty percent, or eight out of 20 companies, include a reference to the Paris Agreement and/or the following two climate-related financial risks:

- Climate-change-related financial regulation may increase the cost of capital and/or diminish access to capital
- Climate change presents a risk to the value of reserves

3. For companies that are below investment grade, and which make reference to the Paris Agreement, a further analysis was performed on the interpretation of the relevance of Paris Agreement goals to the company's business model. This was done by identifying the companies that disclosed the degrees of warming limits of the Paris Agreement.

Of the 20 companies below investment grade, four specified the range of temperature warming of 2°C to 1.5°C as being the goal of the Paris Agreement. Two companies include a reference to 2°C of warming as being the goal of the Paris Agreement.

Companies with Canadian operations whose financial disclosures refer neither to carbon-constrained global energy scenarios nor the Paris Agreement are the following:

1. Canadian Natural Resources
2. Husky Energy
3. Encana
4. Vermillion Energy
5. Paramount Energy
6. Tourmaline
7. Crescent Point
8. Peyto
9. Birchcliff Energy
10. Painted Pony Energy

These companies represent 24 percent of the market capitalization of the TSX Oil & Gas Index (which includes pipeline and service providers), or 39 percent of the index when focusing on extractive companies. It bears noting that some of these firms are investing in innovation to reduce carbon intensity of production and disclosure of the impact of scaled-up investment in innovation may be of interest to investors.

True or false hypothesis: Climate disclosures by global oil & gas companies bring about no negative impacts on P/E ratios

For a cohort of 21 international, Canadian and American companies, including IOCs: Inconclusive

To date, oil & gas companies making climate disclosures have generally experienced greater declines in P/E ratios than peers not making climate disclosures. Firms making no scenario-related disclosures (e.g., Canadian Natural Resources) or making scenario-related disclosures that are aligned with higher total emissions energy scenarios such as the IEA New Policy Scenario (e.g., Exxon and Imperial Oil) have sustained more modest declines in P/E ratios than their peers. However, two companies making reference to absolute carbon constraints – for example, in the case of the IEA's SDS – sustained more modest P/E declines than their peers (e.g., Total, Chevron).

P/E ratios may be subject to confounding factors such as size of company, regulatory changes or market access. In the case of Canadian firms, three companies suffered declines in P/E ratio that were less than the average of the cohort and four small firms suffered declines that were greater than the average.

Please refer to Figure 1 – 2016–18 percent change in P/E ratio.

True or false hypothesis: Climate disclosures by oil & gas companies are not associated with reduced firm-level investments

For a cohort of 35 international, Canadian and American companies, including IOCs: True.

There is a wide range of investment strategies employed by TCFD signatory firms. Whereas Total, Equinor and Suncor made net total investments in oil & gas assets between 2016 and 2018, Repsol, Eni and Shell made net total divestments over the period. There are, however, important regional differences in investments and divestments by location of head office.

Whereas on average US and Canadian companies made net *investments* of $2.4 billion and $1.2 billion, respectively, over the same period global companies with head offices located in other countries made average net *divestments* of $292 million. Two Canadian firms, Canadian Natural Resources and Cenovus, were among the top five firms in terms of investment, at close to $11 billion and $10 billion, respectively; they were behind only Total, the world's most active IOC in terms of investment. The divestments made by Rosneft and Petrobras coincide with corporate restructurings and the rise in their P/E ratios shown in Figure 1.

Please refer to Figure 2 – 2016–18 firm-level net invest/divest ($M)

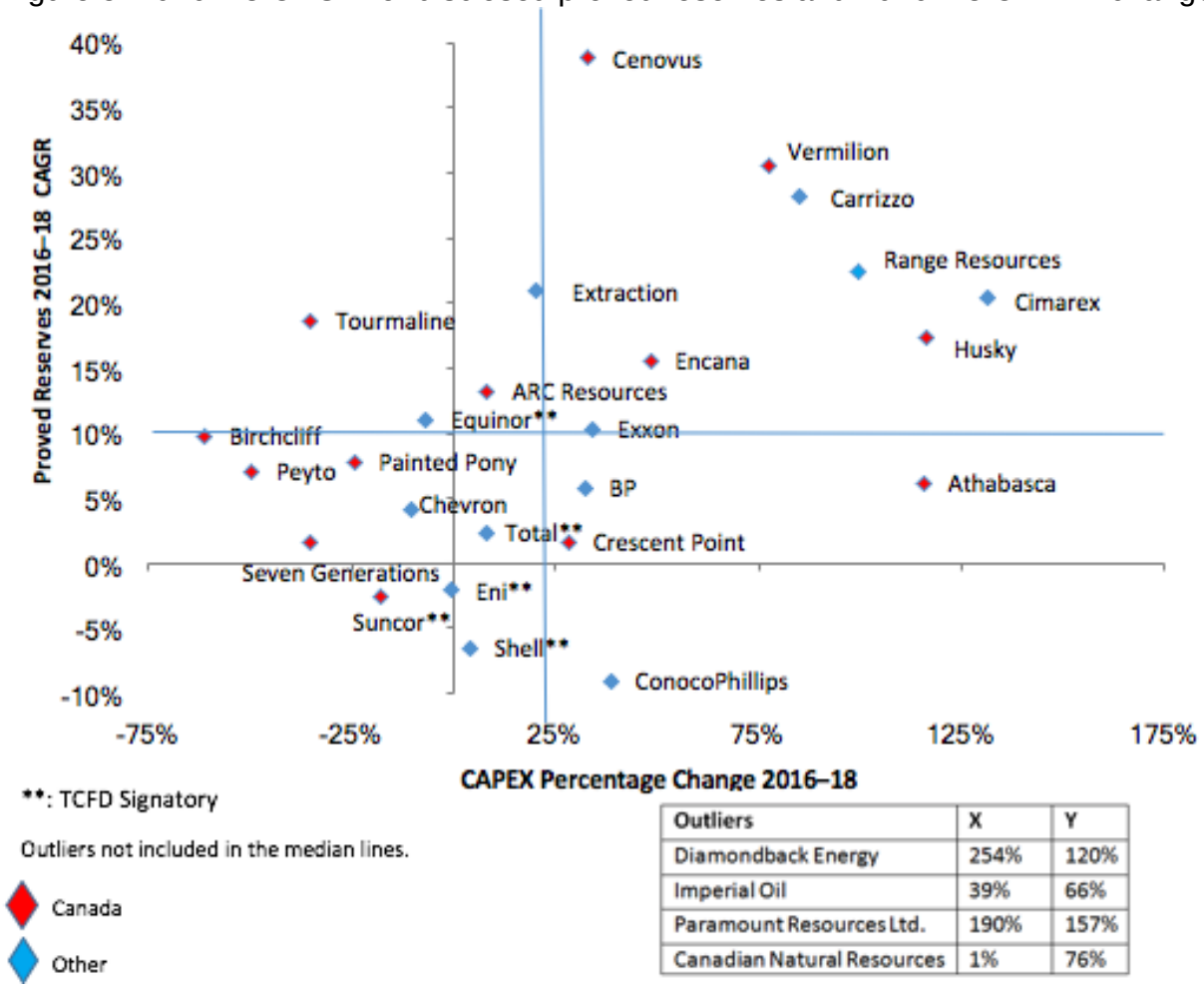
True or false hypothesis: There is higher variability in the growth of reported proved reserves by Canadian and US firms than their global peers.

True: There is a wide variation in percentage change in proved reserves over the period reflecting the variation in firm-level assets. Two Canadian firms and two US firms are among the outliers of the cohort. The rise in proved reserves is consistent with the Financial Review of the Global Oil and Natural Gas Industry: 2018 published by the US Energy Information Administration (EIA) in May 2019, whereby proved reserves additions in 2018 approached their highest levels in the 2009–18 period, with over 10.3 billion BOE having been added to global proved reserves after net purchases and production.[30] The Securities Exchange Commission requires its listed companies to value proved reserves based on an average of the prices of oil & gas on the first day of each month and the EIA found that that the Brent 2018 first day of month average was $72.08 per bbl and the Brent 2017 first day of month average was $53.98 per bbl. As a sample, Shell's financial statements refer to an assumed price of oil of $65 per BOE for 2019 and 2020. BP's financial statements refer to an assumed price of oil of $55 for 2021. For comparison purposes, the federal budget 2019 included an assumed price of oil of $61 for 2021 up from $59 for 2021 in federal budget 2018.[31]

[30] https://www.eia.gov/finance/review/pdf/financial_2018.pdf The EIA is based on a study of 116 companies that publish publicly available financial statements (retrieved July 2, 2019).

[31] https://www.budget.gc.ca/2019/docs/plan/budget-2019-en.pdf (retrieved July 2, 2019).

Figure 5: 2016–18 CAGR for disclosed proved reserves and 2016–18 CAPEX change



Outliers	X	Y
Diamondback Energy	254%	120%
Imperial Oil	39%	66%
Paramount Resources Ltd.	190%	157%
Canadian Natural Resources	1%	76%

Source: Firm financial statements, Analytica Advisors

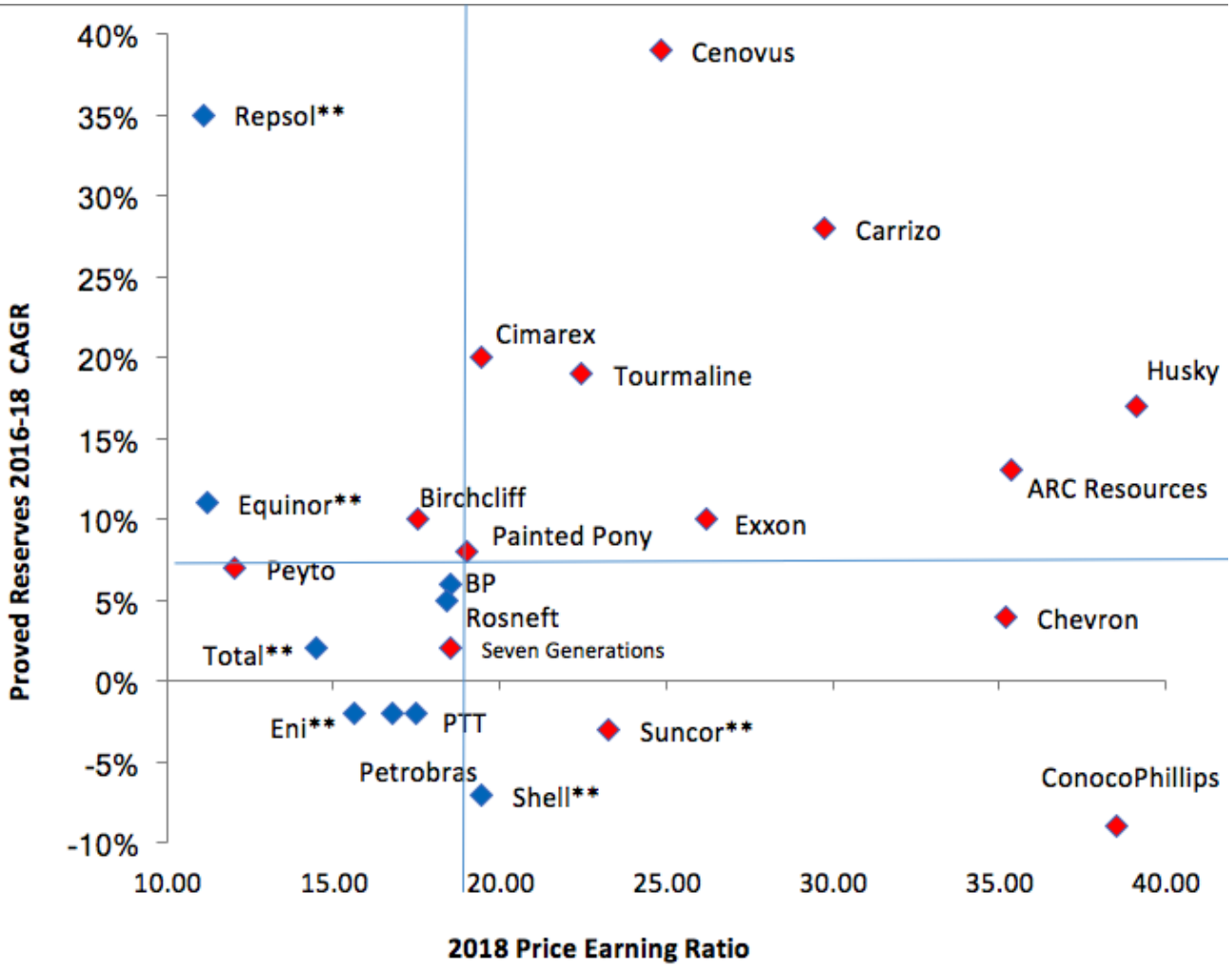
True or false hypothesis: There is a higher degree of variability in Price Earnings ratios among North American Companies than among international companies

For a cohort of 31 companies: True. Of the 31 firms for which comparable data is available, there were 18 North American companies whose 2018 P/E ratios were above the median P/E ratio of 19x and four North American companies whose ratios were below the median.

All but three of these firms also reported above the median growth in proved reserves of 7 percent CAGR over the period 2016-18

All Canadian firms reported using the International Financial Reporting Standard (IFRS) with the exception Imperial Oil, which reports using the US-based standard (Generally Accepted Accounting Principles, or GAPP).

Figure 6: 2018 P/E ratio versus 2016-18 growth in proved reserves



**TCFD Signatory
Red: North America

Outliers presented in the table to the right are NOT included in the median lines.

	PER	1P CAGR
Paramount Resources	285.86x	157%
Devon Energy	137.44x	-5%
Vermilion Energy	111.40x	30%
Imperial Oil	67.09x	66%
Range Resources	60.27x	22%
Encana	52.58x	16%
Diamondback Energy	39.06x	120%
Canadian Natural Resources	27.68x	76%

Source: Firm financial statements, Capital IQ, Analytica Advisors

Field or Company-level carbon intensity

True or false hypothesis: Some Canadian oil & gas companies have some assets whose carbon intensity are on par with some of their peers.

Incomplete: Neither international nor domestic companies report field-level carbon intensity in a way that is comparable. It is therefore not possible for investors to ascertain where a given company's field level assets are placed on the curve depicted in Figure 7 below.

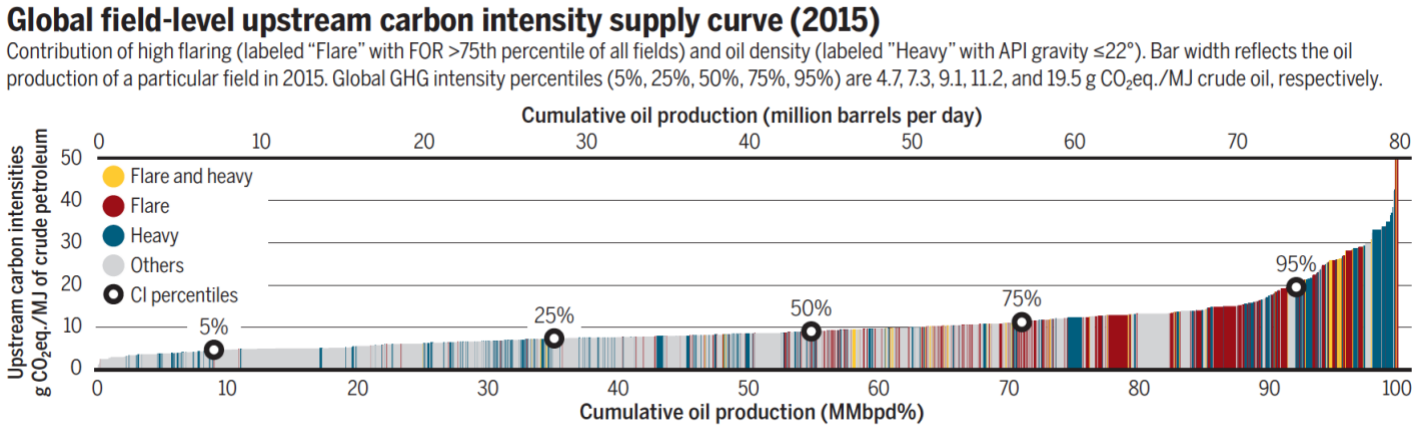
However, recent decisions by global financial institutions suggest that comparable disclosure on carbon intensity by Canadian firms would be beneficial.

According to an article in the *Globe and Mail*, Zurich Insurance "is the latest institutional money manager to target the oil sands for divestment. Others include British bank HSBC Holdings PLC; France's BNP Paribas SA and France's giant AXA Equitable Financial Service LLC, as well as several state pension funds in the U.S."

The Swiss insurer cited a peer-reviewed 2015 paper "Unconventional Heavy Oil Growth and Global Greenhouse Gas Emissions" as the basis of its decision. Canadian researcher Ian Gates is one of two authors of this paper.

Given that Canadian oil & gas firms are investing in innovation to reduce the carbon intensity of extraction from different field-level reserves, this is an area where more current peer-reviewed research could be enormously beneficial to Canadian interests.

Figure 7: Global field-level upstream carbon intensity supply curve (2015)



Source: Masnadi et al., Global carbon intensity of crude oil production, *Science*, August 2018

Conclusion

This research suggests that the global oil & gas industry is in a period of transition and there is a wide range of approaches to disclosing and/or discussing management's strategy to address climate-related risks to shareholders per the TCFD recommendations. While the capacity for such disclosure and/or discussion among some firms lags that of some peers, there are a number of resources that could be used to build up industry capacity for disclosure and/discussion with a view to securing continued investment via both equity and bonds. The shareholder resolutions from two IOC 2018 AGMs may provide an indication of future investor engagement with oil & gas firms and are reproduced for reference in Annex B.

In addition, through further research, it may be beneficial to:

- Monitor company forecasts on the oil and gas prices. Among the output variables of energy scenarios under various carbon constraints are commodity prices.
- Evaluate the evolution of the depth and breadth of climate-related disclosures by Canadian companies and their international peers, including how references to energy supply scenarios can be aligned with the Paris Agreement and the implications for oi prices.
- Establish trend lines for regional differences in investments and divestments in oil & gas assets. This could be done through benchmarking of firms' investment/divestment strategies, including for example, investment in carbon abatement CAPEX, zero-emissions energy assets as well as other innovations to reduce carbon intensity.
- Establish trend lines for regional differences in the market for ESG-linked investments. This could be done by monitoring ESG assets under management, their evolution by region and as well as policy shifts that might accelerate any trends.
- Establish stable funding programs for peer-reviewed research on global field-level carbon intensity, including real methane emissions and the potential impact of investments in innovation on the cost competitiveness of Canadian oil & gas with a focus on both legacy and new assets.
- Conduct further research on field-level carbon intensity of Canadian proved reserves and the business cases and policy support required, beyond that currently planned, to scale-up innovations that improve the carbon and cost competitiveness of Canadian firms.
- As an indication of the cost of capital for Canadian oil & gas firms, and the ability to attract investments during a period of industry transition, monitor bond ratings for publicly traded companies.

As discussed above, oil & gas companies are economically important at a global scale – their profits play a vital role in generating returns for investors and taxes for governments. Some of these firms may make the transition to National or International Energy Companies (IECs) within a net zero carbon emissions context. Those that do will be part of one of the greatest industrial transformations since the middle of the 20th century when the war effort that shaped the global rules-based economic order that investors and companies rely on.

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Annex A: Cohort benchmarking methodology

This paper employs the following methodology:

1. Establish a cohort of international companies that is representative.

Fifteen publically traded international companies were identified. These companies represent more than half of global oil production. They also meet the following criteria:

- company-level bond rating
- financial statements for the 2016–18 period
- disclose proved reserves on the basis of barrels of oil equivalent (BOE)

Mainstream financial disclosures were used to profile each of these companies and to calculate their position in relation to their peers. Five of the 15 companies in the international cohort are TCFD signatories, with nine being rated A or better by S&P for local currency long-term bonds (see Figure I below).

Figure I: International company cohort

Company	Country	TCFD	Local Currency Long Term S&P Bond Rating	Credit Watch	Credit Watch/ Outlook Date
BP	UK		A-	Stable	22/02/2016
Chevron	US		AA	Stable	17/12/2018
ConocoPhillips	US		A	Stable	19/11/2018
Devon Energy	US		BBB	Negative	27/02/2019
Ecopetrol	Colombia		EE	Stable	11/12/2017
Eni	Italy	yes	A-	Stable	30/08/2018
Equinor	Norway	yes	AA-	Stable	18/05/2018
Exxon	US		AA+	Negative	24/05/2016
Pemex	Mexico		A-	Negative	04/03/2019
Petrobras	Brasil		BB-	Stable	10/02/2017
PTT	Thailand		BBB-	Positive	30/04/2018
Repsol	Spain	yes	BBB	Positive	18/12/2018
Rosneft	Russia		BBB-	Stable	05/02/2019
Royal Dutch Shell	Anglo Dutch	yes	AA-	Stable	01/11/2018
Total	France	yes	A+	Positive	26/02/2019

2. Establish a cohort of domestic companies that is representative.

Seventeen publically traded Canadian companies were identified. All of the companies in this cohort meet the following criteria:

- financial statements for the 2016–18 period
- disclose proved reserves on the basis of BOE

One of the companies in the domestic cohort is a TCFD signatory (Suncor), with two being rated A or better by S&P for local currency long-term bonds. Six of the 17 did not have an S&P local currency long-term bond rating. The companies without bond ratings at the time of writing

were Arc Resources, Crescent Point, Birchcliff Energy, Painted Pony, Peyto Exploration and Development and Tourmaline Oil. Three companies – Imperial Oil, MEG Energy and Paramount Resources – were on negative credit watch at the time of writing. (see Figure II below.)

Figure II: Domestic company cohort

Company	Country	TCFD	Local Currency Long Term S&P Bond Rating	Credit Watch	Credit Watch/ Outlook Date
ARC Resources	Canada			not available	
Athabasca Oil	Canada		CCC+	Stable	26/02/2019
Birchcliff Energy	Canada			not available	
Canadian Natural Resources	Canada		BBB+	Stable	26/06/2018
Cenovus Energy	Canada		BBB	Stable	29/11/2018
Crescent Point Energy	Canada			not available	
Encana	Canada		BBB	Stable	11/03/2019
Husky Energy	Canada		BBB	Stable	13/02/2019
Imperial Oil	Canada		AA+	Negative	24/05/2017
MEG Energy	Canada		B+	Negative	14/02/2019
Painted Pony	Canada			not available	
Paramount Resources	Canada		B+	Negative	27/02/2019
Peyto Exploration & Development	Canada			not available	
Seven Generations Energy Ltd.	Canada		BB	Stable	20/06/2018
Suncor Energy	Canada	yes	A-	Stable	01/06/2017
Tourmaline Oil	Canada			not available	
Vermilion Energy	Canada		BB-	Stable	22/02/2019

When combined, the 32 companies in the domestic and international cohorts include a mix of both investment-grade and below-investment-grade companies. Domestically, these companies represent more than 60 percent of the TSX Oil & Gas Index in total. When companies that are engaged in the provision of energy infrastructure, such as pipelines, or in product marketing are excluded from the index, the cohort of domestic companies analyzed for this study represent more than 80 percent of the index (see Figure III below).

In regards to share price and the P/E ratio of each company, the firms that are signatories to the TCFD are trading at a discount compared to those that are not. The median P/E ratio for TCFD companies of 9.5 is 27 percent lower than the median of 13 for the other firms. Canadian firms that trade above the median P/E ratio of the cohort of firms that are not TCFD signatories include: Painted Pony, ARC Resources, MEG Energy and Vermillion Energy. With

a P/E ratio of 13, Imperial Oil and Tourmaline Oil are situated at the median. Notably, TCFD signatory Suncor's P/E ratio of 17 is well above that of its peers as a signatory to the TCFD.[32]

Figure III: International and domestic cohort sorted by bond rating

Company	Country	Local Currency Long Term S&P Bond Rating	TCFD Signatory	Current Market Cap[1] (USD $Bil.)	% of TSX Oil and Gas Index [2 3]
Exxon	US	AA+		$326.34	
Imperial Oil	Canada	AA+		$22.28	8.66%
Chevron Corporation	US	AA		$225.54	
Royal Dutch Shell	Anglo Dutch	AA-	Yes	$283.42	
Equinor	Norway	AA-	Yes	$72.72	
Total	France	A+	Yes	$141.12	
ConocoPhillips	US	A		$69.94	
BP	UK	A-		$144.85	
Eni	Italy	A-	Yes	$60.47	
Suncor Energy	Canada	A-	Yes	$50.68	19.70%
Canadian Natural Resources	Canada	BBB+		$33.78	13.13%
Repsol	Spain	BBB	Yes	$24.64	
Devon Energy	US	BBB		$13.08	
Cenovus Energy	Canada	BBB		$11.28	4.38%
Husky Energy	Canada	BBB		$10.47	4.07%
Encana	Canada	BBB		$9.67	3.76%
Rosneft	Russia	BBB-		$68.78	
PTT	Thailand	BBB-		$44.00	
Seven Generations Energy Ltd.	Canada	BB		$2.43	0.95%
Petrobras	Brasil	BB-		$93.29	
Vermilion Energy Inc.	Canada	BB-		$3.71	1.44%
MEG Energy Corp	Canada	B+		$1.29	0.50%
Paramount Resources Ltd.	Canada	B+		$0.90	0.35%
Athabasca Oil	Canada	CCC+		$0.36	0.14%
Tourmaline Oil Corp.	Canada	Not Available		$3.94	1.53%
Arc Resources	Canada	Not Available		$2.10	0.81%
Crescent Point Energy	Canada	Not Available		$2.06	0.80%
Peyto Exploration & Dev. Corp.	Canada	Not Available		$0.72	0.28%
Birchcliff Energy Ltd.	Canada	Not Available		$0.67	0.26%
Painted Pony	Canada	Not Available		$0.18	0.07%

1: *Market Cap data current as of May 6, 2019.*

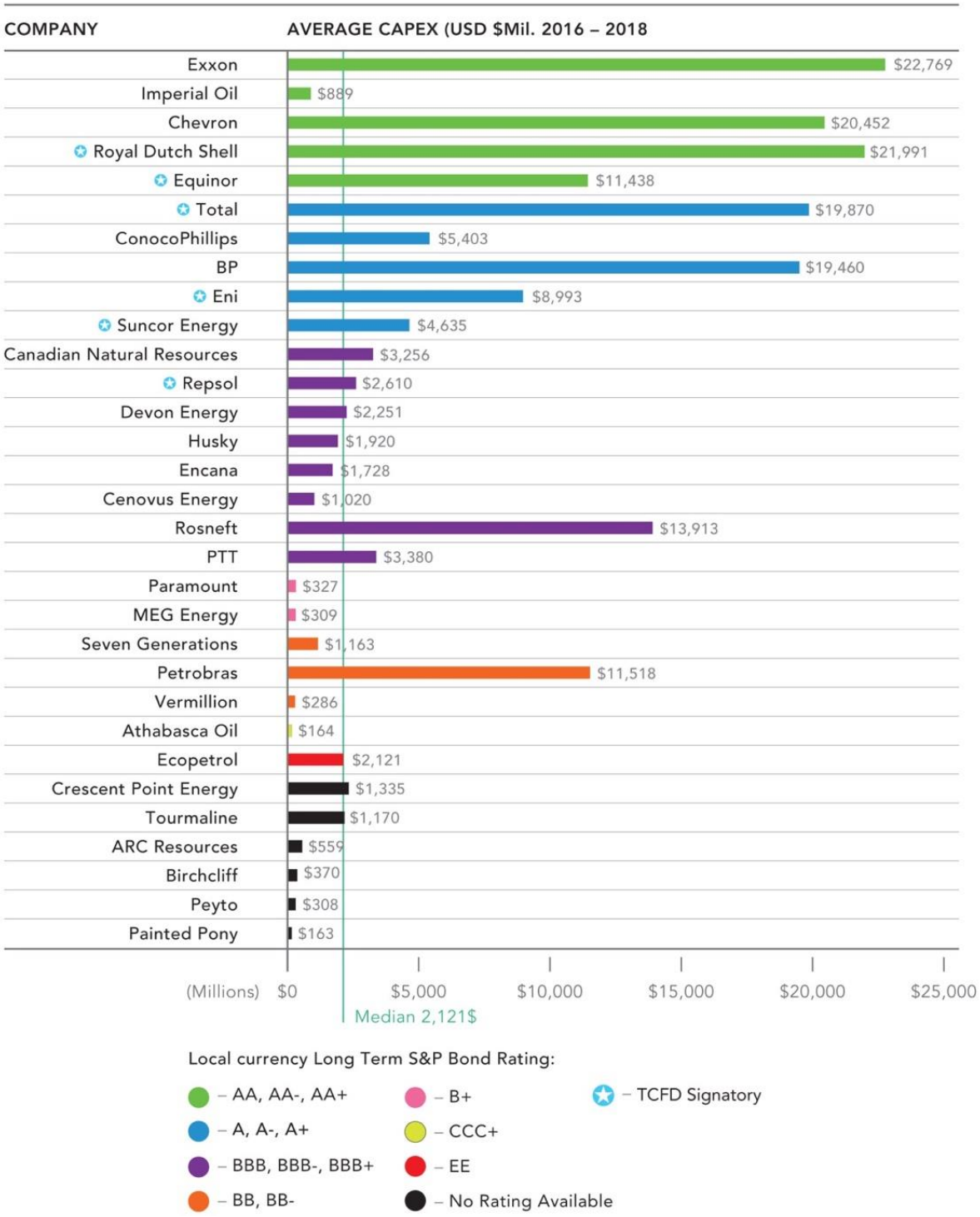
2: *Percentage of total market cap of the TSX Oil & Gas index, as of May 6, 2019.*

3: *The domestic cohort of companies covers over 60% of the market cap for the TSX Oil & Gas index, as of May 6th, 2019.*

[32] Following an initial review, five US-based firms were added after the original company cohort was developed. These firms are Range Resources Corporation, Carrizo Oil & Gas, Inc., Extraction Oil & Gas, Inc., Cimarex Energy Co. and Diamondback Energy, Inc.

The following table summarized each company's relative position in terms of average CAPEX for the period 2016-18.

Figure IV: International and domestic cohort sorted by bond rating with CAPEX



For each company, trend lines for the 2016–18 period were established for the following indicators related to investment and transition risk as described by the TCFD:

- Capital expenditure (CAPEX) as an indicator of investment
- CAPEX as a percent of revenue
- Net income as a percent of revenue or profit
- Ratio of 2018 proved reserves (BOE) to 2018 production (BOE)

Five companies maintaining their head office in the US were added to this study to provide comparators of firms of a similar size to many of the firms that make up the Canadian oil & gas industry. The following five firms were selected using this method.

· Range Resources Corporation
· Carrizo Oil & Gas, Inc.
· Extraction Oil & Gas, Inc.
· Cimarex Energy Co.
· Diamondback Energy, Inc.

The maximum market capitalization was limited to that of Suncor. In addition, production by the firms was restricted to a range from 10,000 to 100,000 bbl/day. Twenty-three firms were identified through these two criteria. The firms were then ranked by quintile according to their production range. Within each of the five quintiles, a firm was randomly selected

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Annex B: BP Special Shareholder Resolution 22 (accepted) and Directors' response to Shell Special Shareholder Resolutions 22 (withdrawn)

BP Resolution 22 (Accepted) - 2019 Annual General Meeting

Resolution 22 has been requisitioned by a group of shareholders, coordinated by Climate Action 100+.

Set out below is the statement in support of the resolution submitted by the shareholders and the response of the BP board.

Climate Action 100+ Investor supporting statement

This special resolution has been prepared by a group of investors, many of whom are supporters of the Climate Action 100+ investor engagement initiative, launched in December 2017, which has the support of 310 investors representing more than US$32 trillion of assets under management.[33] Through the initiative, investors aim to engage with the world's biggest companies, many of whom have significant opportunities to drive the clean energy transition and help achieve the goals of Articles 2.1(a)[34] and 4.1[35] of the Paris Agreement (the "Paris Goals")[36].

This resolution, prepared with support from environmental law organisation Client Earth,[37] builds on the special resolution prepared by the "Aiming for A" coalition of investors which requested further disclosures of the Company's management of climate change-related risks and opportunities and was passed overwhelmingly by shareholders at the Company's 2015 AGM.

Strategy consistent with the Paris Goals

Many investors will recognise the Company's leadership on climate change in a number of important areas. This includes helping to form the Oil & Gas Climate Initiative;[38] the evolution of the BP Energy Outlook to include a range of low carbon scenarios; and a range of climate-related targets, including best-in-class management of fugitive methane emissions.[39]

Nonetheless, investors remain concerned that the Company has not yet demonstrated that its strategy, which includes growth in oil and gas as well as pursuing low carbon businesses, is consistent with the Paris Goals. It also presents a potential inconsistency between the Company's actions and its stated

[33] http://www.climateaction100.org/.
[34] Article 2.1(a) of The Paris Agreement states the goal of "Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change."
[35] Article 4.1 of The Paris Agreement: "In order to achieve the long-term temperature goal set out in Article 2, Parties aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty."
[36] U.N. Framework Convention on Climate Change Conference of Parties, Twenty-First Session, Adoption of the Paris Agreement, U.N. Doc. FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015).
[37] https://clientearth.org.
[38] https://oilandgasclimateinitiative.com.
[39] https://www.bp.com/energytransition.

corporate purpose “to power economic growth and lift people out of poverty,” given climate vulnerabilities in many developing countries. In accordance with investors’ fiduciary duties, and to promote the long-term success of the Company, this resolution seeks clarity on the critical question of how the Company’s strategy is consistent with the Paris Goals.

Investor expectations of oil & gas companies

Investors’ expectations concerning climate-related risks have increased following ratification of the Paris Agreement in 2016, publication of the guidelines of the Taskforce on Climate-related Financial Disclosures (TCFD) in 2017[40] and the recent report from the UN’s Intergovernmental Panel on Climate Change on the impacts of global warming to 1.5°C.[41] The latter showed how the difference between a 1.5°C and 2°C rise in global temperatures can be expected to result in additional economic damages globally of between $8 trillion and $11 trillion before 2050. Investors’ expectations of oil & gas companies were recently summarised in an open letter to the industry, published in The Financial Times in May 2018,[42] which asked all oil and gas companies to clarify how they see their future in a low carbon world, and should involve:

• Making concrete commitments to substantially reduce carbon emissions;
• Assessing the impact of emissions from the use of their products; and
• Explaining how the investments they make today in energy sources and technologies are compatible with a pathway towards the Paris Goals.

This shareholder resolution formalises that public request, tailored to the specific circumstances of BP, while ensuring the Company retains control over its strategic decision-making.

Capital Expenditure consistent with Paris Goals

As demonstrated in BP’s Energy and Technology Outlook publications, future levels of oil and gas demand are uncertain. To contain temperature increases to well-below 2°C requires a considerable decrease in demand for, and investment in, fossil fuels.

Based on current disclosures, it is not possible to evaluate the extent to which the Company’s investments in fossil fuel reserves or resources are consistent with the Paris Goals. This limits investors’ ability to appraise the attractiveness of the Company as an investment proposition. Therefore, the resolution seeks disclosure of how the Company evaluates the consistency of new material capex investments with the Paris Goals, as well as annual reporting on that evaluation.

The Company should also explain how it separately evaluates consistency with other relevant outcomes, resulting in additional (not alternative) criteria for capex investment consistent with the Paris Goals. The Company should determine the methodology for this evaluation and evolve this over time. However, investors expect this to include consideration of the full life-cycle economics of individual projects, evaluation of the potential return on investment and consideration of their competitive positioning in the context of the Paris Goals. Research by Carbon Tracker[43] provides an example methodology for this type of analysis and indicative results of the extent to which the Company and others may already be consistent.

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[40] https://www.fsb-tcfd.org

[41] https://www.ipcc.ch/sr15

[42] https://www.ft.com/content/fda63c26-5906-11e8-b8b2-d6ceb45fa9d0

[43] https://www.carbontracker.org/reports/2-degrees-of-separation-update/ (noting that the scenarios used may not be consistent with the Paris Goals)

Metrics and Targets consistent with Paris Goals

To help investors evaluate progress against its strategy, it is vital to understand the Company's key goals and targets and other associated metrics. These should be set over as long a time frame as reasonably possible and reviewed regularly for continued consistency to the Paris Goals, in line with developments in the Company's portfolio, available measurement protocols and other relevant factors such as evolving science, technology and regulation.

To better appraise the long-term investment proposition, investors need to understand the consequences of the Company's strategy for its future business model. This should include the profile of anticipated levels of investment in different types of energy, including oil and gas and other lower carbon energy technologies and their strategic fit. Investors also want to understand the implications for both the carbon emissions associated with the Company's operations and the carbon intensity of its energy products over time. The Company should determine the methodology for estimating product carbon intensity. However, investors expect this to include the carbon content of energy products and the emissions associated with the value chain of their production.

Finally, investors request to understand how the Company's targets and metrics link to executive remuneration. Progress reporting Investors expect summaries of the strategy, the evaluation of each material capex investment and performance against key targets and metrics to be contained in the Strategic Report, to the extent appropriate, supported by other reporting.

Shell Resolution 22 (Withdrawn) – 2019 Annual General Meeting

Shareholders request the Company to set and publish targets that are aligned with the goal of the Paris Climate Agreement to limit global warming to well below 2°C.

These targets need at least to cover the greenhouse gas (GHG) emissions of the Company's operations and the use of its energy products (Scope 1, 2 and 3), and to be intermediate and long-term.

We request that the Company base these targets on quantitative metrics such as GHG intensity metrics (GHG emissions per unit of energy) or other quantitative metrics that the Company deems suitable to align their targets with a well-below -2°C pathway.

Shareholders request that annual reporting include information about plans and progress to achieve these targets (at reasonable cost and omitting proprietary information).

You have our support.

Supporting Statement

The oil and gas industry can make or break the goal of the Paris Climate Agreement. Therefore, oil and gas companies need the support of their shareholders to change course: first to align their targets with the Paris Climate Agreement, and second to invest accordingly in the energy transition to a net-zero-emission energy system.

Fiduciary duty

We, the shareholders, understand this support to be our fiduciary duty. A growing international consensus has emerged among financial institutions that achieving the goal of Paris is essential to risk management and responsible stewardship of the world economy disrupted by devastating climate change.

Net-zero emissions

The goal of the Paris Climate Agreement is to limit global warming to well below 2°C above pre-industrial levels, to aim for a global net-zero-emission energy system, and to pursue efforts to limit the temperature increase to 1.5°C. In 2018, the IPCC emphasized that to limit global warming to 1.5°C, CO2 emissions must reach to net zero by 2050.

Scope 3

Emissions from energy products (Scope 3) are crucial in the Paris Climate Agreement, and we therefore support you to include these in your targets. In 2017, Royal Dutch Shell plc set the example by including Scope 3 in their ambition to halve their carbon intensity by 2050. However, this ambition is not in line with a well-below -2°C pathway. This climate resolution reflects our belief that we need targets that are truly aligned with a well-below -2°C pathway across the whole energy sector.

We therefore encourage the Company to set targets that are inspirational for society, employees, and shareholders, allowing the Company to meet increasing demand for energy while reducing GHG emissions to levels compatible with the global intergovernmental consensus specified by the Paris Climate Agreement. You have our support.

Shell Resolution 22 (Response by Directors) - 2019 Annual General Meeting

Your Directors consider that Resolution 22 is not in the best interests of the Company and its shareholders, and unanimously recommend that you vote against it. Contrary to what Follow This asserts, it is both unnecessary and potentially counter-productive to Shell's industry-leading efforts and our commitment to play a leading and constructive role in the energy transition. It is therefore not in the best interests of the Company and its shareholders as a whole.

Shell agrees with the importance attached by its investors to the issue of climate change. Shell's future success depends on effectively navigating the risks, opportunities and uncertainties presented by the energy transition. In November 2017, Shell announced its ambition to reduce its Net Carbon Footprint (NCF) associated with the energy products it sells, in step with society's drive to meet the goals of the Paris Agreement. In a joint statement between the institutional investors on behalf of Climate Action 100+ and Shell (released on December 3, 2018), Shell announced that it will operationalize this ambition by setting NCF-specific short-term targets, and that it will incorporate a link between energy transition and the long-term remuneration of executives (the full Remuneration Policy is subject to a shareholder vote at the 2020 AGM). In 2019, it was decided to set an NCF target for 2021 of 2–3% lower than our 2016 NCF of 79 grams of CO2-equivalent per megajoule. While we have received third party limited assurance on our 2016 NCF, we are currently re-evaluating our assurance processes to ensure that we will be able to obtain third-party assurance in parallel with the projected timing of our future NCF disclosures.

Shell's NCF ambition, combined with the other actions it is taking, is consistent with the Paris Agreement and is the right approach for a supplier of energy products which is a fundamentally different position than one of an energy user. It recognizes that there is no "one" way to get to the desired outcomes and a range of scenarios need to be considered. As a result, the NCF ambition was developed, using data from the IEA's ETP 2°C scenario and Shell's own Sky scenario, both of which are consistent with the objectives of the Paris Agreement, and have been referenced in the IPCC's recent Special Report on Global Warming of 1.5°C. Depending on society's actions, this ambition is challenging but achievable.

Every five years, Shell will review the updated Nationally Determined Contributions (NDCs) in line with the Paris Agreement mechanism, the updated scenarios on decarbonization trajectories and any other developments to assess societal progress in the energy transition. The outcome of this review will be used to calibrate Shell's NCF ambition and pace of change in line with that of society. The first such review is currently anticipated to take place after 2022.

Shell believes its efforts represent an effective framework to play its part in the energy transition as a growing, successful, commercial company, providing the energy solutions that consumers will need and want through this period of uncertain change and reducing the carbon intensity of the energy products it supplies. Investing in assets that will remain financially resilient in the energy system of the future is key to delivering a world-class investment case to Shell's investors.

Shell is growing its business in areas that it expects to be important in the energy transition, while reducing costs and seeking to improve its GHG performance. Shell's NCF ambition will drive change across the portfolio, e.g. by growing its Integrated Gas, Chemicals, and New Energies businesses. These are the areas where Shell could see the highest increases in demand over the next decade. As the world transitions to lower-carbon energy, Shell also expects to continue to invest in finding and producing the oil and gas that the world will need for decades to come. This approach has been acknowledged and strongly supported by numerous institutional investors as sector-leading, setting the standard for the industry.

Considering the above, we recommend a vote against the resolution for the following reasons:

■ We have already established a recognized and sector-leading framework to thrive in the energy transition as a world class investment, and to be a constructive actor contributing to society through the energy transition. Setting specific (shorter-term) targets on NCF while maintaining our longer-term ambition, creates a measurable and manageable incentive for management to deliver on the ambition. This framework is consistent with the Paris goals and makes the proposed Follow This resolution unnecessary.

■ Crucially, our existing framework provides the flexibility to ensure Shell remains resilient in an uncertain energy transition and can react in a timely manner to market developments. For example, as it becomes clear which technologies our customers prefer and how local policy choices will play out in different countries, it will enable us to invest successfully at scale with confidence and stay in step with society, neither going too fast nor too slow. This will mean we stay in sync with our customers, which is essential for any commercial business. While apparently consistent with many of the key aspects of our framework, the insistence of the proposed Follow This resolution on long-term targets covering many decades could be counter-productive, imposing constraints on management decision-making that would undermine the flexibility we require.

Your Directors recommend that shareholders show their support for the existing framework Shell has created by voting against this resolution. Shell's management is already shaping the path for a successful transition of the company and working with a range of stakeholders to encourage necessary change right across the energy system.