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WHAT IS THE FUTURE OF CANADA'S ENERGY SECTOR? EMERGING THEMES OF AN OPTIMAL PATHWAY

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ALBERTA FUTURES PROJECT PRE-PUBLICATION SERIES

Alberta has a long history of facing serious challenges to its economy, including shocks in the form of resource price instability, market access constraints, and federal energy policies. However, the recent and current challenges seem more threatening. It seems that this time is truly different.

The collapse of oil and gas prices in 2014 combined with the rapid growth of U.S. oil production, difficulties in obtaining approval for infrastructure to reach new markets and uncertainty regarding the impacts of climate change policies world-wide have proven to be strong headwinds for the province's key energy sector. Together, the negative effects on employment, incomes and provincial government revenues have been substantial. To make matters worse, in early 2020 the COVID-19 pandemic struck a major blow to the lives and health of segments of the population and to livelihoods in many sectors. The result has been further employment and income losses, more reductions in government revenues and huge increases in government expenditures and debt. These events, combined with lagging productivity, rapid technological shifts, significant climate policy impacts and demographic trends, call for great wisdom, innovation, collective action and leadership to put the province on the path of sustainable prosperity.

It is in this context that we commissioned a series of papers from a wide range of authors to discuss Alberta's economic future, its fiscal future and the future of health care. The plan is that these papers will ultimately be chapters in three e-books published by the School of Public Policy. However, in the interest of timeliness and encouraging discussion, we are releasing selected chapters as pre-publications.

INTRODUCTION

Canada's predominantly Alberta-based energy sector is in an era of massive change and transition. This is best understood as a set of macro-forces that are largely beyond our control. The challenge is to adapt and collaborate to find our own way; to discover and pursue an Optimal Path forward within these macro-forces, for the benefit of Albertans, all Canadians and people of the world. The focus of this paper is to describe certain understandings and fundamentals critical to the Optimal Path and to creating a desired beneficial future for all stakeholders.

A NEW ERA FOR ENERGY IN CANADA

There are multiple macro-forces of change that are having a deep impact on the Canadian energy sector and Canadian society. Each of these is important to see and understand as part of the context for how the future will unfold. The combination of these macro-forces can be thought of as creating a new era for the Canadian energy sector, and can be described as follows:

1. A new era of abundance of oil and gas, and substitutes, versus the prior era of shortages.
2. A new era of innovation and accelerated technological change creating efficiencies, "disruption" and advancement.
3. A new era of extreme concern about emissions, climate change, environmental impacts and mobilized "social media" driven activism against oil and gas.
4. A new era of international government policy coordination to decarbonize and reduce climate risk.
5. A new era of Environment, Social and Governance (ESG) expectations within global markets and investment decision making.
6. A new era of reconciliation and the creation of economic opportunities for Indigenous Peoples.
7. A new era of global disintegration and reduced trust in traditional loyalties, with increasing conflict, fragmentation, nationalism and protectionism.
8. A new era of increasing divisiveness and polarization within Canada and increasing alienation in Western Canada.
9. A new era for Canada of relatively stagnant productivity and economic underperformance.
10. A new era of massive increases in government debt, and extreme levels of indebtedness across all sectors of the Canadian economy.

These macro-factors, combined with evolving multiple essential interests within Canada, create extraordinary complexity and challenges. This explains why the idea of

an Optimal Path based on balance, intelligent trade-offs and the capture of strategic synergies is critical to produce the best possible result for all stakeholders.

OPTIMAL PATH: SOLVING FOR MULTIPLE ESSENTIAL OUTCOMES

One of the most powerful emerging understandings, whether we like it or not, is that the desired outcomes of energy policy are not singular. They are multiple, overlap, are often in conflict, and can potentially operate synergistically. This reality points to the need for clear frameworks within which to hold multiple objectives, interests and often opposing positions, and to support the process of identifying mutually reinforcing "synergistic" strategies.

The essential priority of reducing emissions must be considered alongside our economic and social aspirations, and our need for governance integrity including, at the highest level, the functionality of our nation. These realities can be seen throughout the world where specific countries are assessing their own essential aspirations differently and shaping their energy pathways accordingly.

One emerging understanding is that mainstream thinking on ESG is insufficient and must be expanded to explicitly include Economics. Strategies and pathways must in fact solve for four essential desired outcomes:

- Economic aspirations, to create and sustain income for Canadian workers and to contribute to the prosperity of all Canadians;
- Environmental aspirations, to transition to a low-carbon future and to protect all critical aspects of our environment;
- Social aspirations, to create value through public services, education, health, safety, public infrastructure, diversity and the inclusion and well-being of Indigenous Peoples; and
- Governance aspirations, which include regulatory effectiveness, fairness and governance integrity, which underpin the functionality of our institutions and the unity of our nation.

There is no one variable or desired outcome to pursue with singular focus. This understanding is emerging as a theme that will be part of what shapes the future of energy in Canada, and indeed corporate governance and the economy in different ways.

The relevance and applicability of ESG as it is now understood and applied is limited by the exclusion of the always important reality of economics. Nowhere is this more clear than in energy policy, as economics has relevance to all stakeholders.

- Consumers are concerned with costs and affordability.
- Employees within the energy sector need opportunities and income.
- Indigenous Peoples aspire for resource ownership as a path to economic autonomy.

- Investors are concerned about appropriate returns on dollars at risk.
- Lenders worry about getting loans fully serviced and repaid.
- Corporate leaders are required to responsibly allocate capital under their authority.
- Government needs tax revenues to sustain public services and to fund public debt.

Economics is of fundamental importance in many ways to all stakeholders. It is not simply about profit for the corporate sector.

Economics should be an integral part of ESG, not an afterthought; accordingly, the new construct that is emerging is Economics and ESG, or E-ESG.

The idea is that we do not talk about ESG without integrating economic perspectives and we do not talk about Economics without integrating ESG. The direction this takes is consistent with the idea of stakeholder capitalism and corporate stakeholder governance.

The E-ESG construct has more usefulness within the corporate sector, which has a fiduciary responsibility for the management of society's private and public capital (or accumulated savings).

It also conforms better with the fiduciary responsibilities of institutional asset managers where the maximization of returns is a critical part of stewardship. It also places consumer and household needs for affordability right up front; again, not as an afterthought.

The inclusion of economics also serves as a powerful framework to support policy and government decision making, as a means to capture all essential interests within Canadian society, and as a new way to think about our national interests.

The expanded E-ESG framework supports clarity in the understanding of conflicts and trade-offs, and the possible capture of critically important synergies in strategy, policy and decision making, for all corporations, organizations and institutions.

Leadership must think broadly about all that is important. Canada's energy sector cuts across "all that is important" in different ways for all Canadians. "All that is important" is captured within the E-ESG construct.

OPTIMAL PATH: THE ENERGY TRANSITION AS EVOLUTION

The idea of a "quick" transition off hydrocarbons, within 10 or 15 years, has been controversial but is increasingly giving way to the reality that the transition will be multi-decadal, even multi-generational, and is best described as an energy evolution. To quote author Vaclav Smil, "[A]ll energy transitions have one thing in common: They are prolonged affairs that take decades to accomplish, and the greater the scale of prevailing uses and conversions, the longer the substitution will take" (Smil 2010). This is a critical understanding that invites more pragmatic thinking and more grounded, concrete planning.

It is a fact that oil demand in most developed countries plateaued many years ago, corresponding with a decoupling of economic growth and energy usage. For example, oil demand in most of the larger European countries — France, Germany, Italy, Netherlands, Spain and the UK — peaked in the early or mid 2000s. OECD oil demand peaked in 2005 (Looney 2020).

The forces and evidence of peak oil demand have been in front of us for a long time. Now with momentum building to decarbonize and with advancing technologies, notably the electrification of transportation, the plateau and decline of oil consumption will become more pronounced and obvious. However, emerging and developing countries now represent 60 per cent of global energy demand and account for 90 per cent of oil demand growth over the 10-year period to 2019 (Looney 2020). Continued high rates of growth in developing countries is a key reason why the decarbonization transition will be long-term.

A second reason for the extended time frame to decarbonize relates to Smil's reference to scale; the size and pervasiveness of the hydrocarbon complex in modern society. An illustrative example is the scale of the existing global stock of internal combustion engine vehicles.

On a global basis, electric vehicles (EVs) represent only 2.6 per cent of new vehicle sales and less than one per cent of the global stock (International Energy Agency 2020a).

In Canada in 2019, new EV[1] registrations were 2.9 per cent (Statistics Canada 2021a), which is just above the world average of 2.5 per cent (McKinsey and Company 2020).

EVs are the future of the automotive industry for many reasons, not the least of which is to enhance air quality in large cities. But if you look at the growth of EV sales in isolation it can create a false impression on the timing of a roll-over of stock. It is hard to grasp the size of the global fleet, which is over one billion vehicles.

A realistic picture, whether we like it or not, is that the plateauing and decline of oil demand will occur over a very long time frame. Further, most major institutional forecasters see a more stable, if not robust, long-term outlook for natural gas demand as it is abundant, relatively inexpensive and offers environmental advantages, certainly compared to coal.

Demand will eventually peak, plateau and decline, just as the world population will, but there is a problem if we interpret this as some sort of marker for the death of the Canadian oil industry. This leads to thinking on energy policy in the wrong direction, and it is a shallow generalization that distracts from a broader, more complex reality.

This more complex reality is reflected in an adaptive, strategic mindset, where Canadian expertise could just as easily make us leaders, not victims of transitioning global energy systems. It could be applied to advance the long march to reduce emissions, lessen

[1] EV's include battery electric vehicles and plug-in hybrid electric vehicles. Hybrid electric vehicles with a rechargeable battery pack in addition to having an internal combustion engine were not included in this analysis.

costs, increase efficiencies, maintain our reliability and "win as much of the available market as possible." The idea is to extend the life of our resource and capture critical synergies. An example of this thinking is reflected in the words of David Dodge, former Bank of Canada governor: "The lifespan of oil needs to be stretched out — adjusting for the negative effects of emissions — until we have developed replacements for the lost export revenues. … These earnings are needed to pay for the greening of our energy supplies" (Dodge 2020). The full story is even larger than the synergistic funding of green energy; it is funding support for Canada's heavy social costs, growing debt service costs and more generally to support Canada's post-COVID recovery.

These synergies and the interconnected realities of Economics and ESG point to an increasingly pragmatic mindset taking hold among most decision makers within industry and government. Vague and sometimes emotion-laden aspirations are being replaced with rigorous analysis, an in-depth understanding of trade-offs, an embrace of multiple technologies and solutions, and an understanding that our existing energy resources, technologies and systems offer opportunity and advantage in the context of the long path to decarbonization.

Canada's oil production is arguably the most reliable source of oil in the world. We have the world's third largest oil supply; about 97 per cent of which is contained within the oil sands (Natural Resources Canada 2020a) and represents about 75 per cent of North America's total oil reserves (Oil Sands Magazine 2020). Critically important, and often overlooked, the oil sands have essentially no natural decline versus traditional wells. Additionally, the oil sands do not consume capital in the same way as conventional production, which is another feature of its reliability. Production from oil sands can be maintained with minimal capital outlays even through a severe downturn year such as 2020. All of this exists within a country that has a high level of political and social stability, unlike many other global suppliers.

The lengthy time frame of decarbonization and Canada's long-term world-scale energy resource is integral to an Optimal Path where the Canadian energy sector competes on carbon, ESG, reliability and other fundamental criteria to extend the life of this strategic asset.

The critical questions for Canada are strategic in nature, and this is where we are now focused. How can we become more competitive in a likely multi-decadal, declining market? How can we develop synergistic opportunities for clean, low-emission technologies and products, using our resources, established expertise and technology? How can we lever our advantages, meet emissions targets, and enhance our Economic and ESG performance, to serve Canadians and all people of the world? The future of Canada's energy sector will be heavily influenced by how we respond to these questions.

OPTIMAL PATH: CANADA AS AN ADAPTIVE ENERGY AND RESOURCE ESG ACHIEVER

The job of industry has changed; customer preferences have changed. The public, investors, lenders and stakeholders are no longer preoccupied with the perception of a limited resource. But not long ago, the public was preoccupied with and even alarmed about the risk of shortages.

As an example, the title of a report published in 2011 stated, "The Peak Oil Catastrophe-in-Waiting." The first sentence reads, "The United States continues to slumber while a catastrophe lies in wait" (Hunt 2011).

When this report was written, the U.S. and Canada were on the verge of a supply-side revolution. The industry responded, adapted and ultimately disrupted itself through technological advancement. We are now in an era of supply abundance for oil and gas, at least in North America, and renewables as substitutes for hydrocarbons are now commercially viable. This is a positive change, as there are more supply choices at reduced costs.

Customer focus has now shifted to environmental impact, specifically managing a low-carbon future, with high ESG standards and performance. Industry is clearly making a parallel, responsive shift to reflect the preferences and needs of its customers and stakeholders.

The response could be encapsulated as:

"Our customers want low-carbon energy products and high ESG standards and, as leaders in business, we will deliver."

Canada's energy sector now has the highest ESG rankings amongst the top 10 oil and gas producers in the world (see Table 1). First in the Sustainable Development Index (Sustainable Development Report 2020). First in the Environmental Performance Index (Environmental Performance Index 2020). First in the Global Peace Index (Institute for Economics & Peace 2020). First in the World Happiness Index (Helliwell, Layard and Sachs 2019). First in the Social Progress Index (Social Progress Imperative 2019). First in the Women Peace Security Index (Georgetown 2019). First in the Human Freedom Index (CATO 2020). First in the Human Development Index (Human Development Reports 2020). First in the Democracy Index (Economist Intelligence Unit 2020). First in the Corruption Perception Index (Transparency International 2020). First in the Rule of Law Index (World Justice Project 2020). First in the World Press Freedom Index (Reporters Without Borders 2019). First in the Resource Governance Index (Resource Governance Index 2017).

When compared to other major global energy suppliers, Canada's ESG performance is the best in the world.

Table 1: ESG Rankings: Top 10 Oil Producers

	Average Score (1-10)	Producer Ranking by Size*	ECONOMIC	ECONOMIC	ENVIRONMENT	ENVIRONMENT	SOCIAL	SOCIAL	SOCIAL	SOCIAL	SOCIAL	SOCIAL	GOVERNANCE	GOVERNANCE	GOVERNANCE	GOVERNANCE	GOVERNANCE	GOVERNANCE	GOVERNANCE	GOVERNANCE	GOVERNANCE
			Economic Freedom Index 2020	Most Competitive Economies 2020	Sustainable Development Index 2020	Environmental Performance Index 2020	Global Peace Index 2020	World Happiness Index 2020	Social Progress Index 2020	Women Peace Security Index 2020	Human Freedom Index 2020	Human Development Index 2019	Democracy Index 2019	Corruption Perceptions Index 2020	Global Entrepreneurial Index 2020	Rule of Law Index 2020	World Press Freedom Index 2020	Resource Governance Index 2017	Ease of Doing Business 2020	Enforcing Contracts 2020**	Trading Across Borders 2020
Canada	**1.6**	4	**FIRST**	**FIRST**	**FIRST**	**FIRST**	**FIRST**	**FIRST**	**FIRST**	**FIRST**	**FIRST**	**FIRST**	**FIRST**	**FIRST**	2	**FIRST**	**FIRST**	**FIRST**	**3**	9	2
U.S.	**2.2**	1	2	3	2	2	5	2	2	2	2	2	2	3	**FIRST**	2	2	2	**FIRST**	3	**FIRST**
U.A.E.	**3.9**	7	3	2	7	3	3	3	6	3	6	3	7	2	3	3	5	7	2	2	5
Kuwait	**5.4**	10	4	-	9	4	2	6	3	6	4	6	4	6	6	-	4	5	7	7	9
Brazil	**5.6**	8	8	7	4	5	6	5	4	7	3	8	3	7	9	4	3	3	8	6	7
China	**5.8**	5	7	4	3	10	4	8	8	5	7	9	9	5	4	5	10	4	5	**FIRST**	3
Russia	**5.9**	3	6	6	5	6	9	7	5	4	5	5	6	8	8	6	6	6	4	4	6
Saudi Arabia	**6.6**	2	5	5	8	8	7	4	9	9	8	4	10	4	5	-	8	10	6	5	4
Iran	**8.1**	9	9	-	6	7	8	10	7	8	10	7	8	9	7	7	9	9	9	8	8
Iraq	**9.1**	6	-	-	10	9	10	9	10	10	9	10	5	10	-	-	7	8	10	10	10

** U.S. Energy Information Administration (EIA), https://www.eia.gov/tools/faqs/faq.php?id=709&t=6.*

*** The enforcing contracts indicator measures the time and cost for resolving a commercial disupute through a local first-instance court, and the quality of judicial processes index, evaluating whether each economy has adopted a series of good practices that promote quality and efficiency in the court system (1).*

One explanation for Canada's low score on this index is that of the index's three components (cost, quality and time) we do worst on time: 910 days from start to final payment. That puts us 177th out of 190 countries (2). Compare this to China, whose Hainan High People's Court is now employing big data and AI technologies, in a bid to increase efficiency and advance standardization in judicial services (3).

1. Doing Business. Enforcing Contracts. https://www.doingbusiness.org/en/data/exploretopics/enforcing-contracts/what-measured

2. Financial Post. https://financialpost.com/opinion/william-watson-canadas-lousy-ranking-on-upholding-contract-rights-could-be-the-rule-of-too-much-law

3. China Daily. AI-assisted sentencing speeds up cases in judicial system. http://www.chinadaily.com.cn/cndy/2019-04/18/content_37459601.htm

Certain specifics pertaining to Canada's energy sector and ESG performance are noteworthy, and ultimately will contribute to new understandings that will shape our future.

- Our electricity sector is amongst the greenest in the world. In 2018, 82 per cent of electricity in Canada came from non-GHG emitting sources (Natural Resources Canada 2020b), almost twice the 44 per cent average for countries part of the Organization for Economic Cooperation and Development (OECD) (International Energy Agency 2020b).
- Canada is the second-largest producer of non-emitting hydroelectric power globally, after China (Canada Energy Regulator 2021).
- Canada was the first country in the world to commit to national methane emission regulations (Maljković 2018) and is recognized as a global leader in methane reductions from flaring and venting (CBC News 2018).
- Canada is a world leader in carbon capture and storage (Natural Resources Canada 2019).
- Canada has a proven world-class pipeline transportation system that is continuously getting safer. Over the past 10 years, liquids incidents have declined by 90 per cent and 99.3 per cent of oil spilled was recovered through clean up (National Energy Board 2019).

- Canada has a proven world-class marine safety system along the world's longest coastline. There are 20,000 tanker movements per year, and we have had no significant accidents or spills (ClearSeas 2019).
- Worker safety standards and outcomes are exemplary. Fatalities are down 90 per cent since 2001 (Energy Safety Canada 2018).
- The Canadian resources sector is the largest employer of Indigenous Peoples in the Canadian economy (Coates 2016; Statistics Canada 2021b), and new participation structures are evolving that will prove transformational for industry and Indigenous communities.[2]
- We are among the best in corporate governance in the world (BMO Capital Markets 2019). Virtually all global reports and independent rankings confirm this.
- The oil and gas sector is the largest investor in clean energy technology in Canada (Natural Resources Canada 2021).

Across the energy and technology sectors, there are many new technologies being developed which will improve environmental performance, for example:

- The use of solvents versus steam in oil sands recovery with a substantial reduction in emissions.
- Recycling of water in hydraulic fracturing operations, resulting in reduced freshwater consumption and less trucking.
- Proliferation of multi-well pad drilling, dramatically lowering the surface impact in steam-assisted gravity drainage (SAGD) for both oil sands and conventional production.
- Increasing usage of natural gas for drilling and hydraulic fracturing fleets displacing high emission diesel fuel.
- Microseismic monitoring and advanced modeling to mitigate the risk of induced seismicity.
- Production of green electricity from crude oil via microbial transformations.
- Fugitive methane emission detection through advanced cameras and sensing devices.

Additionally, extensive research and entrepreneurial initiatives relating to the emerging circular economy are underway; these offer high potential, strategic and "game-changing" impacts. The circular economy looks to reduce, recycle or return emissions and rethinks carbon as a valuable feedstock, not a waste product. Examples of the circular economy and other innovation themes are (Alberta Innovates 2020):

- New ways to use carbon, such as carbon fiber as a building material and in consumer products.
- New ways to use, store, and remove carbon to serve a burgeoning hydrogen market.

[2] National Occupational Classification includes trades, transport and equipment operators; natural resources, agriculture and related production; manufacturing and utilities.

- New ways to use bitumen beyond combustion.
- New ways to use oil and gas technology in geo-thermal projects to extract heat for energy.
- New ways to support electrification, hydrogen and materials transport through infrastructure corridors.[3,4]

One noteworthy example of adaptation is that Alberta is expected to lead Canadian growth of renewable energy capacity between 2018 and 2023 (Williams 2021). Another example is the recent announcement by Suncor and ATCO of a world scale "multibillion-dollar" project to produce over 300,000 tonnes annually of hydrogen. This project will help Canada reach its 2050 net-zero greenhouse gas emissions target by capturing and storing over 90 per cent of the carbon dioxide produced from the energy required to make the hydrogen (CBC News 2021).

The main point is that an adaptable, innovation driven mindset exists in Canada's energy sector, and it is deepening and evolving. Responsiveness, innovation and adaptation has happened and is happening.

More broadly, Canada looks like an ESG super-achiever in the context of all countries that are engaged in meaningful resource development (those that generate a level of resource rent equal to or greater than that of Canada, which is 2.5 per cent) (Migiro 2018; Sawe 2019; Sauter 2020). On environmental factors we rank third of 180 countries meeting this resource rent criterion (Yale 2020); on sustainability factors we rank second of 180 countries (Sustainable Development Report 2018); and on governance factors we rank sixth of 180 countries (World Bank 2020). The fact that Canada is an energy and resource ESG super-achiever surprises many, given the opposite emphasis from many activist groups and some political leaders. The world will continue to consume resources, particularly with its growing population. Our comparative global ESG rating points to the opportunity for Canada to embrace a vision to be the world's leading responsible resource developer.

The issue of emissions and climate risk is hugely important and deserves special focus. In the context of Canada as an ESG achiever, it can now be observed that the energy sector in Canada has turned the corner in its commitment to reduce emissions.

The commitment and progress of Canada's energy industry is demonstrable.

- A number of leading Canadian companies, which together represent over 50 per cent of our production, are committing to ambitious reductions or net zero by 2050 (Canadian Natural Resources 2018; Bakx 2019).

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3 The Canadian Vitality Pathway (CVP) is an industry agnostic, non-partisan, non-governmental proposal to create a ribbon of economic pathways for future trade and conveyance. They have envisaged commercial connections between trade centers that are needed today and for generations into a zero-emissions future. They establish rights of way that respect Indigenous rights and directly involve Indigenous and non-Indigenous Canadians in prosperity. https://www.vitalitypathway.ca/

4 The Canadian Northern Corridor is a conceptual network of physical corridors connecting Canada from 'coast to coast to coast.' The School of Public Policy's research program will provide the information and analysis necessary to establish the feasibility of the Canadian Northern Corridor. See https://www.canadiancorridor.ca/

- Canada is a global leader in methane regulations and reductions (Masnadi et al. 2018). This is especially true when looking at the 30 countries with the most natural gas flaring; Canada is close to the best (The World Bank 2020). Between 2014 and 2018, Canada reduced emissions from flaring by 38 per cent, compared to an average of around five per cent for 29 other energy producing countries. Over this same period, the U.S. increased its flaring emissions by 25 per cent (Canadian Energy Centre 2020).
- The natural gas sector in Canada is probably the greenest in the world, and LNG Canada will be the greenest, lowest-carbon Liquid Natural Gas (LNG) in the world relative to existing suppliers (Pierce 2019; Canadian Association of Petroleum Producers 2020).
- Canada is also a global leader in carbon capture and storage (Natural Resources Canada 2019): The Alberta Carbon Trunk Line, the world's largest carbon capture and utilization system, is now operational (Bakx 2020).
- Over the 20-year period 1998-2018 Canada's emissions per unit of GDP declined by 34 per cent (Canadian Association of Petroleum Producers 2021).
- From 1990-2016, in the industrial sector in Canada, which includes oil and gas extraction, energy intensity has decreased by 15 per cent (Natural Resources Canada 2020b).
- Total oil and gas industry emissions have increased overall because of rising oil sands production and exports; however, overall emission intensities have decreased by 28 per cent since 2000 (Natural Resources Canada 2019) and are set to decline a further 20 per cent through to 2030 (IHS Markit 2018).
- Emission intensities from new oil sands projects are close to, or below, the average of crude oil refined in the U.S. (Suncor Energy 2018; Cenovus Energy 2018).

The issue of energy intensity and emissions per unit of production seems to be a bit of a mystery to critical observers of the industry. It must be recognized that Canada is an exporting nation, which accounts for a significant part of our prosperity, and specific to oil and gas, 81 per cent of our oil (Natural Resources Canada 2020a) and 45 per cent of our natural gas was exported in 2019 (Natural Resources Canada 2020c).

What if we can demonstrate that our energy products will "do no harm" on the basis of emissions compared to comparable products in the markets we serve? What if each barrel or unit of natural gas exported not only competes on price and reliability, but also has the potential to reduce emissions in the market being served? The idea that Canada could compete on carbon offers a critical insight into the importance of emission intensities.

How does Canada then justify ceding market share to other suppliers who have less stringent emission and ESG standards? Who is benefiting by Canada not competing in these markets with superior products?

An important sub-theme on the issue of emissions is the growing understanding that this is an end-use consumption problem. An under-recognized reality is that 80 per

cent of emissions come from the end user's preferences and choices as to how oil and gas products are combusted (ARC Energy Research Institute 2016).

Emissions are an issue across the entire economy, which is an understanding that is emerging with clarity in response to a dramatically increasing carbon tax and many recently introduced incentives to reduce consumer and household emissions.

OPTIMAL PATH: "BEST BARREL" AS A CREDIBLE, ASPIRATIONAL PATH

A credible aspirational path for Canada's long-term transition to decarbonization, where oil and gas is phased out over 30, 50, or 100 years, whatever the timeframe, can be encapsulated in the following perspective:

"The last barrel to be phased out should be the best barrel, and the best barrel should be Canada's barrel."

This mantra for the future should be viewed figuratively, not literally. It acknowledges the transition to a low-carbon or net zero world; it is credible; it is doable; it is based on the concepts of excellence and competitiveness; it defines a strategic position with respect to stakeholder demands and pro-development Indigenous groups who recognize that resource development will benefit their future; and it positions Canada to serve the needs of a growing global population with clean, reliable and ethical energy.

The concept of "best barrel" is a metaphor that captures all energy products including liquids, hydrogen, natural gas and electricity. Arguably the implicit principle of low carbon (or no carbon) and high ESG should also apply to all resources (and manufactured products) as part of Canada's competitive brand.

A commitment to the "best barrel" changes the narrative on the challenge for the Canadian industry. It leads logically to the question, "what does the best barrel look like and how do we get there?"

What is the best barrel? It is a multidimensional, market and strategic-based question as to how we believe our energy sector can compete and meet its Economic, Environment, Social and Governance goals (E-ESG), including the priority of meeting Canada's national decarbonization targets.

Whichever way we define it, it needs to be real, well-evidenced, and we need to be prepared to present it to the world. The concept of the best barrel, or the best energy products, encompasses a set of essential factors. Each factor is a determinant of success, and each is an imperative in its own right.

For the public and society, these essential factors include carbon, costs, a set of ESG factors and innovation:

- Carbon levels and intensities
- Costs, affordability and reliability

- Environmental footprint including land, water and air
- Safety in product transportation systems
- Social impact including workplace safety of employees, the safety of communities, and the quality and stability of employee experience
- Unbiased inclusivity, respect and tolerance of all stakeholders
- Opportunities for Indigenous Peoples
- Confidence in an industry that is innovating to create solutions

For industry and the corporate sector, serving the underlying needs and solving many related issues and problems requires that certain conditions are satisfied. The essential factors are as follows:

- Access to markets and the full market price
- Cost competitiveness and reasonable levels of profitability
- Access to specialized workplace capabilities and expertise
- Government policy that is supportive of capital formation and investment, and supportive of the innovation necessary to meet societal needs
- Regulatory excellence that facilitates an ease of doing business, and that sustains and enhances Canada's competitiveness in global markets
- Reasonable, fair and competitive taxes

The Canadian energy sector is already implicitly committed to the "best barrel" path, but much more needs to be done, notably a further material reduction in emissions.

OPTIMAL PATH: ECONOMIC REALITIES NECESSITATE A RESET OF PRIORITIES

In post-COVID recovery, even when our economy goes back to "normal," our indebtedness will not go back to where it was for many years, if ever. The inevitable consequence is a loss of financial capacity and resiliency.

Prior to the COVID-19 lockdown, the economic fundamentals in Canada were weak:

- In 2019, growth in GDP per capita since 2013 was less than one-half that of the U.S., and Canada had the worst performance of all G7 countries (Business Council of Alberta 2019).
- In 2017, business investment was about 20 per cent below the peak levels of 2014. In 2020, it moved another 10 per cent, for a total of 30 per cent below the peak in 2014 (Statistics Canada 2020). Even outside the resource extraction sector, business investment remained below 2014 levels (Fraser Institute 2020).
- According to the 2018 World Investment Report, the stock of foreign direct investment in Canada has grown at half the global rate since 2015 (United Nations 2018).

- 2019 per worker investment placed Canada 15th among the 17 OECD countries. In Switzerland, businesses invested twice as much per worker as Canadian businesses (Fraser Institute 2017).
- Canada's labour productivity has significantly lagged behind the U.S., our main customer and competitor. In 2019, Canada generated $52.60 in output per hour of labour compared to $71.80 in the U.S.[5] (Organization for Economic Cooperation and Development 2021).

The general point is this: we were in a slow-moving crisis of a lack of investment, competitiveness, lagging productivity and economic underperformance before the pandemic-related collapse. Now, we can add excessive indebtedness to our list of challenges.

One thing that we have learned in the COVID-19 crisis is that we have only one economy, and it must be able to support all of Canada's debt at its various decision-making levels.

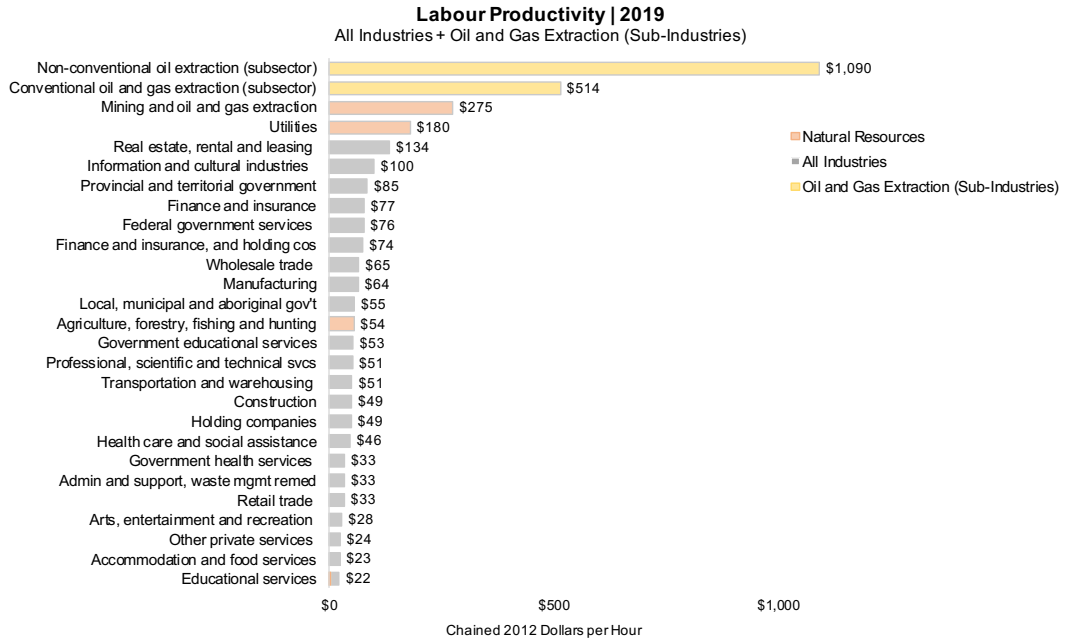
We have also learned that in an economic crisis, the national government is called upon to backstop the credit demands of all provinces, and to an extent, even corporate and household debt.

Total aggregate debt across all sectors is now approximately $7.2 trillion based on the most current available data.[6] This is 380 per cent against our $1.9 trillion economy (Statistics Canada 2021c). Canada's aggregate indebtedness on a per capita basis and relative to the size of our economy is now among the highest in the world. A major challenge for Canada is how we grow through our debt problem and rebuild much needed fiscal capacity and resiliency.

An important insight into the response needed to grow through our debt problem can be seen in the data on labour productivity; the value of economic output (GDP) per hours worked, across all sub-sectors of the Canadian economy. This can be viewed as a proxy for value creation or, if you run a business, this tells you which of your business lines are most profitable, i.e. "paying the bills."

5 NOTE: Canada's 2019 number is a Viewpoint Research internal estimate based on data from Study of Living Standards in Ottawa.

6 Aggregate debt calculated from the sum of Bloomberg indexes BDBT1BCA Index & BDBT1JCA Index for corporate debt; CNNWCDNB Index for household debt; GCSOTOTL Index for national debt; and the Government of Canada November 2020 Fiscal Reference Tables for subnational debt.



Viewpoint Group. Source: Statistics Canada. Table 36-10-0480-01. Labour productivity and related measures by business sector industry and by non-commercial activity consistent with the industry accounts. Chained (2012) dollars per hour.
Note: Non-profit institutions were excluded due to the distortion of very large revenues (grants) against a relatively small number of labour hours as the revenues are essentially passed through on relatively short time frames. Further, non-profit institutions rely heavily on volunteer workers. Additionally, a significant portion – 86 per cent – of charitable giving comes from Individuals and Corporations (Giving USA 2019).

This chart clearly shows that the highest productivity sectors in the Canadian economy are all linked with energy and resources. It also explains why Alberta's income and standard of living, and its fiscal contribution to Canada, have been so strong. Further, it points to the importance of "scaling up" to create prosperity. Accessing export markets for Canada's energy products allowed the industry to attract capital and create enormous scale relative to labour as an input. Historically, this is why resource development has been so important to Canada.

It is hard to imagine how Canada can regain its fiscal strength and resiliency without the engine of our energy and resource sectors, the highest value-add sectors of our economy. The opportunity is to meet our emission and environmental goals, and to extend the value and maximize the long-term economic benefits of our strategic resources as an integral part of our optimal path.

CONCLUSION

There are numerous powerful macro-forces that are shaping the future of Alberta and Canada's energy sector over which we have minimal direct control, but we can meet each with an appropriate mindset and response. The new era of energy abundance, first and foremost, has to be met with cost competitiveness. Accelerated technological change has to be met with entrepreneurialism and cohesion within industry and government to support innovation. The new era of extreme concern about emissions and climate risk must be met with material initiatives to reduce emissions and environmental impacts. International government policy coordination must be met with cooperation as well as assertiveness to represent our interests. The new era of ESG

expectations requires that we stand within that framework to develop our strategies. The new era of reconciliation with Indigenous Peoples requires bold new structures to support Indigenous ownership in resource development. The new era of reduced trust in traditional international loyalties necessitates a focus on supply chain security and the diversification of markets. The new era of increasing alienation in Western Canada begs for a nationally inclusive embrace of all interests within Canada; a mindset at the national level that must transcend regionalized polarization. The new era of stagnant productivity and extreme levels of indebtedness in Canada necessitate a reset of priorities towards growth and the rebuilding of fiscal capacity.

The other broad response to the complexity of change is an Optimal Path based on realities unique to Canada and developing strategies where we have some control. This involves trade-offs, balancing costs and benefits, and identifying and capturing strategic synergies relevant to Canada's essential aspirations. This is a reality that all countries of the world are facing, however intentional each may be, each attempting to find an optimal pathway based on unique circumstances and essential interests.

On the Optimal Path for Canada, the balance of economic priorities against other essential aspirations must be restored. Economics cuts across the interests of all stakeholders and should not be an afterthought or of secondary importance. Economics must be adjoined to the now mainstream ESG construct. The four quadrants of E-ESG then align with the emerging movement often referenced as stakeholder capitalism, with some groups describing these four anchoring priorities as Prosperity, Planet, People and Principles of Governance (World Economic Forum 2020). Whatever the nomenclature, these frameworks are all pointing to what is most important for all global citizens. Also critical to the Optimal Path is embracing realistic time frames for decarbonization. Canada must be careful in making medium term, i.e. 2030, commitments as our electricity sector is already one of the greenest in the world. We do not have the same potential for quick wins to eliminate emissions as other countries do (notably the U.S.) which rely on higher levels of coal to generate power. Decarbonization will also be more challenging in Canada as our export industries are relatively high emitters. Understanding that decarbonization will occur over a long time frame enables the development and phasing in of multiple technological solutions, notably carbon capture and utilization, direct air capture, small scale nuclear, nature-based solutions and climate risk mitigation.

All possible solutions must be seen as part of an integrated energy sector, collaborating with and building upon more traditional hydrocarbons, but also expanding to include wind and solar, hydrogen, nuclear and all related energy efficiency and environmental technologies.

Another theme for the Optimal Path unique to Canada is our comparative global advantage as an energy and resource supplier. Based on our resource abundance, expertise, technology, infrastructure and ESG standards and performance, Canada is the best, or certainly among the best, on all fundamental criteria; yet further major commitments are needed to reduce emissions. The fundamentals exist for Canada to credibly pursue a vision to be the world's leading responsible energy and resource supplier.

Canada's Optimal Path is also uniquely reflected by the opportunity to offer the "best barrel" in energy markets, or even all markets we serve with our resource products. Specific to energy, we need to "break the back" of our emission challenge and then, arguably, no other major energy developer in the world will compare to Canada.

Although the fundamentals of Canada's Optimal Path will evolve, at this time there is no question that Canada needs to reset its priorities towards economics, competitiveness, productivity and the rebuilding of a sound fiscal position. Canada has used up much of its spare fiscal capacity which would normally act to absorb the shock of unforeseen adverse events, the most obvious possibilities now being ongoing pandemic lockdowns, or rising interest rates and a contagion of debt distress among over-levered countries. The high value-add of Canada's energy and resource sectors must be an integral part of its economic and competitive strategies, otherwise Canada's excessive leverage and loss of fiscal capacity will stay unresolved.

Canada's traditional energy resource is no longer a growth industry in the way it has been, but it is nevertheless incredibly important. It has morphed into a technologically driven, innovative, high cash-generating value creator, increasingly focused on environmental solutions. The base traditional industry will be relatively stable, increasingly recognized as ESG responsible and will be an important partner in the commitment to meet reduced carbon emission goals. Growth in economic value will occur largely through cost and technology-driven efficiencies. The total energy sector, including synergistic technology spinoff opportunities and alternative energy, represents a powerful base for the economy of the energy producing region of Canada and is of great importance to maintaining Canada's prosperity. The key to this optimal future is adaptation, innovation, collaboration and the ability of the different regions and governments in Canada to work together for the best interests of all stakeholders.

REFERENCES

Alberta Innovates. 2020. "Clean Resources." Accessed May 12, 2021. https://albertainnovates.ca/focus-areas/clean-resources/

ARC Energy Research Institute. 2016. "Commentary – GHG Emissions: Focusing on the Consumer." https://www.arcenergyinstitute.com/ghg-emissions-focusing-on-the-consumer/

Bakx, K. 2019. "'It's Not a Pipe Dream': Oilsands Company Developing Project to Wipe Out Its Emissions." CBC News. https://www.cbc.ca/news/business/meg-energy-net-zero-oilsands-christina-lake-1.5303409

Bakx, K. 2020. "At Long Last, New Carbon Capture Project Launches in Alberta." https://www.cbc.ca/news/business/actl-enhance-energy-oil-ccs-co2-ccus-1.5593969

BMO Capital Markets. 2019. "ESG, Yeah You Know Me: Innovation and the Search for 'Friendly Oil.'"

Business Council of Alberta. 2019. "The Canadian Economy Is Doing Worse Than We Think and It's Impacting Our Shared Prosperity." Accessed May 12, 2021. https://www.businesscouncilab.com/work/canadian-economy-doing-worse-than-we-think/

Canada Energy Regulator. 2021. "Market Snapshot: Canada – 2nd in the World for Hydroelectric Production". Accessed May 14, 2021. https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2016/market-snapshot-canada-2nd-in-world-hydroelectric-production.html

Canadian Association of Petroleum Producers. 2020. "Context: Energy Examined - Canada: The World's Best Lng – Canadian Liquefied Natural Gas Could Lead the Way to Decreasing Global Greenhouse Gas Emissions." Accessed May 12, 2021. https://context.capp.ca/infographics/2020/infographic_the-worlds-best-lng

Canadian Association of Petroleum Producers. 2021. "Greenhouse Gas Emissions." Accessed May 12, 2021. https://www.capp.ca/explore/greenhouse-gas-emissions/

Canadian Energy Centre. 2020. "Canada's Flaring Emissions Down by 38%." Accessed May 12, 2021. https://www.canadianenergycentre.ca/canada-among-global-leaders-in-reducing-emissions-from-flaring-2/

Canadian Natural Resources. 2018. "Creating Value Through Technology and Innovation: Case Studies." Accessed May 12, 2021. https://www.cnrl.com/upload/media element/1234/01/1102-tech-and-innovaiton-case-study-booklet.pdf

CATO Institute. 2020. "Human Freedom Index." Accessed May 12, 2021. https://www.cato.org/human-freedom-index/2020

CBC News. 2021. "Oilsands Producer Suncor and Utility Atco to Pursue 'World-Class' Hydrogen Project." Accessed May 12, 2021. https://www.cbc.ca/amp/1.6021796

CBC News. 2018. "Canadian Oil Patch Rules Could Cut Global Emissions, Study Concludes." Accessed May 12, 2021. https://www.cbc.ca/news/canada/calgary/university-calgaryscience- greenhouse-gas-oilpatch-emissions-climate-change-regulations-1.4809956

Cenovus Energy. 2018. "Cenovus's Carbon Disclosure: Managing Climate-Related Risks." Accessed May 12, 2021. https://www.cenovus.com/responsibility/docs/cenovus-carbon-disclosure.pdf

ClearSeas. 2019. "Oil Tankers 101." Accessed April 2, 2019. https://clearseas.org/en/tankers/

Coates, K. 2016. "First Nations Engagement in the Energy Sector in Western Canada." Indian Resource Council. https://s3.amazonaws.com/rgi-documents/627a6a8c9486a7bbf5ce466e0cb29456ec042c0f.pdf

Dodge, D. 2020. "Two Mountains to Climb: Canada's Twin Deficits and How to Scale Them. In Public Policy Forum." https://ppforum.ca/publications/two-mountains-to-climb-canadas-twin-deficits-and-how-to-scale-them/

Economist Intelligence Unit. 2020. "Democracy Index 2019." https://www.eiu.com/public/topical_report.aspx?campaignid=democracyindex2019

Energy Safety Canada. 2018. "Preliminary Report: Occupational Fatalities in Upstream Oil and Gas Industry in Western Canada (AB, BC & SK): 2001 to 2017." Accessed May 12, 2021. https://www.energysafetycanada.com/EnergySafetyCanada/media/ESCFiles/Stats/Occupational-Fatalities-in-Western-Canada-(AB,-BC-SK).pdf

Environmental Performance Index. 2020. "Environmental Performance Index." Yale, 2020 EPI Results Overview. Accessed May 12, 2021. https://epi.yale.edu/epi-results/2020/component/epi

Fraser Institute. 2017. "Business Investment in Canada Falls Far Behind Other Industrialized Countries." Accessed May 12, 2021. https://www.fraserinstitute.org/sites/default/files/business-investment-in-canada-falls-far-behind-other-industrialized-countries.pdf

Fraser Institute. 2020. "Capital Investment in Canada's Provinces: A Provincial Report." Accessed May 12, 2021. https://www.fraserinstitute.org/studies/capital-investment-in-canadas-provinces-a-provincial-report

Frieden, J. 2019. "The Backlash Against Globalization and the Future of the International Economic Order." *The Crisis of Globalization: Democracy, Capitalism, and Inequality in the Twenty-First Century*, 43-52.

Georgetown Institute for Women, Peace and Security. 2019. "Women Peace and Security Index 2019/20." Accessed May 12, 2021. https://giwps.georgetown.edu/wp-content/uploads/2019/12/WPS-Index-2019-20-Report.pdf

Giving USA. 2019. "The Annual Report on Philanthropy for the Year 2018." Accessed May 12, 2021. https://lclsonline.org/wp-content/uploads/2019/09/GUSA-2019-AnnualReport.pdf

Government of Canada. 2019. Natural Resources Canada: "Carbon Capture and Storage: Canada's Technology Demonstration Leadership." Accessed May 12, 2021. https://www.nrcan.gc.ca/energy/publications/16226

Helliwell, J., Layard, R., & Sachs, J. 2019. "World Happiness Report 2019." New York: Sustainable Development Solutions Network." Accessed May 12, 2021. https://worldhappiness.report/ed/2019/#read

Human Development Reports. 2020. "United Nations Development Programme, Latest Human Development Index Ranking." Accessed May 12, 2021. http://hdr.undp.org/en/content/latest-human-development-index-ranking

Hunt, T. 2011. "The Peak Oil Catastrophe-in-Waiting." Renewable Energy World. Accessed May 12, 2021. https://www.renewableenergyworld.com/baseload/the-peak-oil-catastrophe-in-waiting/#gref

Institute for Economics & Peace. 2020. "Global Peace Index 2020: Measuring Peace in a Complex World", Sydney. Accessed June 1, 2021. https://visionofhumanity.org/wp-content/uploads/2020/10/GPI_2020_web.pdf

International Energy Agency. 2020a. "Global EV Outlook 2020, IEA, Paris" Accessed May 12, 2021. https://www.iea.org/reports/global-ev-outlook-2020

International Energy Agency. 2020b. "Electricity Generation by Source, OECD, 1990-2019." Accessed May 12, 2021. https://www.iea.org/data-and-statistics/charts/electricity-generation-by-source-oecd-1990-2019

IHS Markit. 2018. "The Greenhouse Gas Intensity of Oil Sands Production: Today and in the Future." Accessed May 12, 2021. https://ihsmarkit.com/products/energy-industry-oil-sands-dialogue.html

JWN Energy. 2019. "Canada Poised to Be a Leader in Cleantech Oil and Gas Innovation." Accessed May 12, 2021. https://www.jwnenergy.com/article/2019/8/canada-poised-be-leader-cleantech-oil-and-gas-innovation/

Looney, B. 2020. "Statistical Review of World Energy", Bp, 69, p. 66. Accessed May 19, 2021. https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2020-full-report.pdf

Maljković, F. 2018. "New Federal Methane Regulations a Vital Step in Implementing Canada's Climate Plan." Pembina. Accessed May 12, 2021. https://www.pembina.org/media-release/new-federal-methane-regulations-vital-step-implementing-canadas-climate-plan

Masnadi, M. S., El-Houjeiri, H.M., Schunack, D., Li, Y., Englander, J. G., Badahdah, A., & Gordon, D. 2018. "Global Carbon Intensity of Crude Oil Production." Science, 361 (6405).

McKinsey and Company. 2020. "McKinsey Electric Vehicle Index: Europe Cushions a Global Plunge in EV Sales." Accessed May 12, 2021. https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/mckinsey-electric-vehicle-index-europe-cushions-a-global-plunge-in-ev-sales

Migiro, G. 2018. "Countries with the Most Natural Resources". *World Atlas.* Accessed May 21, 2021. https://www.worldatlas.com/articles/countries-with-the-most-natural-resources.html

National Energy Board. 2019. "Canadian Liquids Spilled: Incidents at NEB-Regulated Pipelines and Facilities." Accessed May 12, 2021. https://apps2.neb-one.gc.ca/pipeline-incidents/

Natural Resources Canada. 2021. "Energy Fact Book." Accessed May 12, 2021. https://www.nrcan.gc.ca/sites/nrcan/files/energy/energy_fact/energy-factbook-2020-2021-English.pdf

Natural Resources Canada. 2013. "Carbon Capture and Storage: Canada's Technology Demonstration Leadership." Accessed May 12, 2021. https://www.nrcan.gc.ca/energy/publications/16226

Natural Resources Canada. 2020a. "Crude Oil Facts." Government of Canada. Accessed May 12, 2021. https://www.nrcan.gc.ca/energy/facts/crude-oil/20064

Natural Resources Canada. 2020b. "GHG Spotlight on Oil and Gas." Accessed May 12, 2021. https://www.nrcan.gc.ca/science-data/data-analysis/energy-data-analysis/energy-facts/energy-and-greenhouse-gas-emissions-ghgs/20063

Natural Resources Canada. 2020c. "Natural Gas Facts." Government of Canada. Accessed May 13, 2021. https://www.nrcan.gc.ca/science-data/data-analysis/energy-data-analysis/energy-facts/natural-gas-facts/20067

Organization for Economic Cooperation and Development. 2021. "GDP per Hour Worked (indicator)." Figures are in U.S. dollars. doi: 10.1787/1439e590-en. Accessed May 13, 2021. https://data.oecd.org/lprdty/gdp-per-hour-worked.htm#indicator-chart

Oil Sands Magazine. 2020. "Oil Sands Geology and the Properties of Bitumen." Accessed May 12, 2021. https://www.oilsandsmagazine.com/technical/properties

Organization of the Petroleum Exporting Countries. 2017. "World Oil Outlook 2040." https://www.opec.org/opec_web/static_files_project/media/downloads/publications/WOO%20%202017.pdf

Pierce, S. 2019. LNG Canada. "Global Energy Monitor – Another Great Example Where Media and the Public Need to 'Lean in' and Not Buy Into 'Fake News.'" https://www.lngcanada.ca/news/global-energy-monitor-another-great-example-where-media-and-the-public-need-to-lean-in-and-not-buy-into-fake-news/

Reporters Without Borders. 2019. "2019 World Press Freedom Index." Accessed May 12, 2021. https://rsf.org/en/ranking/2019

Resource Governance Index. 2017. "2017 Resource Governance Global Report." Accessed May 12, 2021. https://resourcegovernanceindex.org/about/global-report

Sauter, Michael. 2020. "The World's Most Resource-Rich Countries." *24/7 Wall Street.* Accessed May 21, 2021. https://247wallst.com/special-report/2012/04/18/the-worlds-most-resource-rich-countries/

Sawe, Benjamin. 2019. "What Are Canada's Natural Resources?" *World Atlas.* Accessed May 21, 2021. https://www.worldatlas.com/articles/canada-natural-resources.html

Smil, V. 2010. "Energy Myths and Realities." Washington, DC: AEI Press.

Social Progress Imperative. 2019. "2019 Social Progress Index, Executive Summary." Accessed May 12, 2021. https://www.socialprogress.org/static/9d3cd3204599ff2cdf87248edc2b1242/2019-social-progress-index-executive-summary-v2.0.pdf

Statistics Canada. 2020. CANSIM Table 380-0064; calculations by author.

Statistics Canada. 2021a. "New Motor Vehicle Registrations Data Visualization Tool." Accessed May 12, 2021. https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2019028-eng.htm

Statistics Canada. 2021b. Table 14-10-0363-01 "Employment by Indigenous Group and Occupation, Selected Provinces and Regions (x 1,000)." Accessed May 14, 2021. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1410036301

Statistics Canada. 2021c. Table 36-10-0434-01. "Gross Domestic Product (GDP) At Basic Prices, by Industry, Monthly (x 1,000,000)." Accessed May 21, 2021.

Suncor Energy. 2018. "GHG Performance and Mitigating Emissions." Accessed May 12, 2021. https://sustainability.suncor.com/en/climate-change/ghg-performance

Sustainable Development Report. 2018. "Global Responsibilities: Implementing the Goals." Accessed May 21, 2021. https://s3.amazonaws.com/sustainabledevelopment.report/2018/2018_sdg_index_and_dashboards_report.pdf

Sustainable Development Report. 2020. Accessed May 12, 2021. https://dashboards.sdgindex.org/rankings

The World Bank. 2020. "Global Gas Flaring Tracker Report." https://pubdocs.worldbank.org/en/503141595343850009/WB-GGFR-Report-July2020.pdf

Transparency International. 2020. "Corruption Perceptions Index." Accessed May 12, 2021. https://www.transparency.org/en/countries/canada

United Nations Conference on Trade and Development. 2018. "World Investment Report 2018." Accessed May 12, 2021. https://unctad.org/en/PublicationsLibrary/wir2018_en.pdf

Williams, N. 2021. "Alberta Predicted to Lead Growth in Renewable Energy." The Globe and Mail. https://www.theglobeandmail.com/canada/alberta/article-alberta-predicted-to-lead-growth-in-renewable-energy/

World Bank. 2020. "Doing Business 2020." Washington, DC: World Bank. DOI:10.1596/978-1-4648-1440-2. License: Creative Commons Attribution CC BY 3.0 IGO. Accessed May 21, 2021. http://documents1.worldbank.org/curated/en/688761571934946384/pdf/Doing-Business-2020-Comparing-Business-Regulation-in-190-Economies.pdf

World Economic Forum. 2020. “Measuring Stakeholder Capitalism: Top Global Companies Take Action on Universal ESG Reporting.” Accessed May 12, 2021. https://www.weforum.org/press/2020/09/measuring-stakeholder-capitalism-top-global-companies-take-action-on-universal-esg-reporting/

World Justice Project. 2020. “Rule of Law Index.” Accessed May 12, 2021. https://worldjusticeproject.org/rule-of-law-index/country/Canada

Yale. 2020. “Environmental Performance Index.” 2020 EPI Results. Accessed May 21, 2021. https://epi.yale.edu/epi-results/2020/component/epi

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