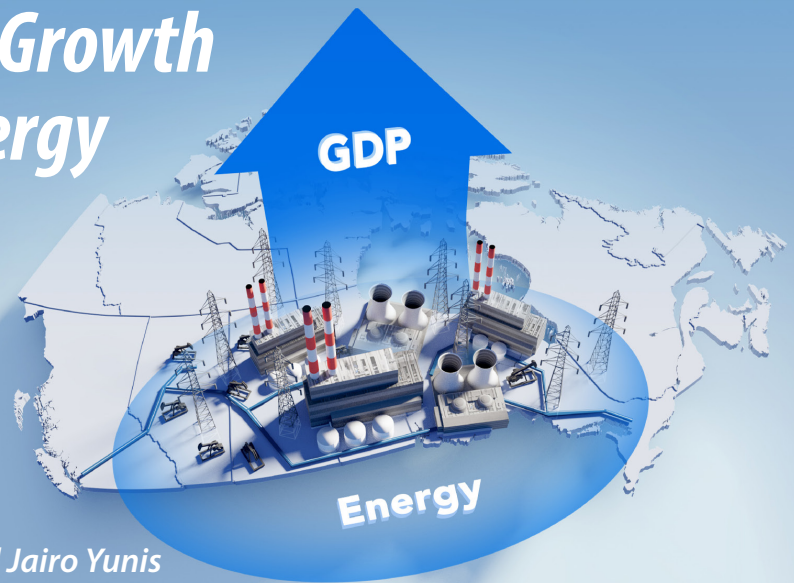


Stimulating Economic Growth through Abundant Energy



by Elmira Aliakbari, Ashley Stedman, and Jairo Yunis

MAIN CONCLUSIONS

■ The economic downturn from COVID-19 is proving to be one of the steepest since the Great Depression of the 1930s and Canada is already experiencing negative economic impacts. Canada's economy experienced a decline of 2.1% in the first quarter of 2020.

■ Canada's economy has seen sluggish economic growth in recent years, even prior to the onset of COVID-19. Between 2010 and 2019, real (inflation-adjusted) gross domestic product (GDP) in Canada grew at an average annual rate of 2.2% compared to 2.8% in the 2000s and 2.4% in the 1990s. In fact, Canada's economic growth over the past decade was weaker than several other developed countries including the United States, Germany and Japan.

■ Given Canada's slow economic growth over the past decade and the fact that this issue is only expected to worsen as a result of the COVID-19 pandemic, governments across Canada would be wise to adopt policies that support economic growth post-pandemic.

■ Empirical research has examined the relationship between energy consumption and real gross domestic product (GDP) in Canada and has shown that energy abundance is an essential input for Canadian economic growth. Therefore, policies designed to reduce energy consumption artificially and/or increase energy costs will likely limit future economic growth. Similarly, policies favouring the abundant availability of energy will likely have a positive impact on future economic growth.

■ Despite the important role that affordable energy plays in economic growth, federal and provincial governments in Canada have implemented policies that place artificial constraints on energy abundance. Ontario's Green Energy Act, British Columbia's conservation programs, and the federal government's renewable energy targets are some examples.

■ To promote economic growth and foster a robust economic recovery, a sound post-pandemic strategy would see governments abandon demand-side management programs and adopt policies that will foster abundant energy.

Introduction

The COVID-19 pandemic is having a devastating impact on economies around the world. Indeed, it seems like the world economy will experience its worst recession since the Great Depression of the 1930s. The International Monetary Fund (2020) calculates global economic growth falling to -4.9% in 2020 with a cumulative output loss of roughly US\$12 trillion. To put this into perspective, the losses from this crisis will equal the economies of Canada, Germany, India, and the United Kingdom combined. Canada is already experiencing the negative impact of this recession: 3.1 million Canadians were affected by either job loss or reduced hours in March. The unemployment rate increased by 2.2 percentage points to 7.8% in the same month, which is the largest one-month increase since 1976 (Statistics Canada, 2020b). In addition, Canada's economy saw an overall decline of approximately 9% in March, which is the largest one-month decline in Canada's gross domestic product (GDP) since records began being kept in 1961 (Statistics Canada, 2020a).

While addressing the immediate economic shocks from the COVID-19 pandemic is critical, discussions should begin to extend to what comes after the COVID-19 crisis passes. The first step towards economic recovery is the acknowledgement that Canada showed signs of economic weakness prior to the onset of Covid-19. As shown in the first section of this publication, Canada has had a sluggish economic growth over the past decade and the pandemic-induced recession will likely make

matters worse. Therefore, after the public-health crisis winds down, federal and provincial governments will need to adopt pro-growth policies that ignite the spark for a robust economic recovery.

As shown in section 2, cheap and reliable energy sources are one of the drivers of economic growth. Specifically, this section examines the relationship between energy consumption and real gross domestic product (GDP) in Canada and shows that, based on previous empirical research, energy abundance is a key driver of Canadian economic growth. Therefore, policies that restrict the availability of energy, increase the cost of energy, or both, will constrain Canada's economic growth.

Unfortunately, despite the important role that affordable energy plays in economic growth and prosperity, several Canadian governments, both at federal and provincial level, have implanted policies that have artificially constrained energy abundance and/or increased energy costs over the past decade. Examples of these policies which are documented in the third section of this publication, are Ontario's 2009 Green Energy Act and conservation and demand-side management programs.

Overall, placing roadblocks in front of energy consumption will only hinder our efforts to foster long-term economic growth. Going forward, governments must stop intervening in energy markets since energy abundance and/or low energy prices will provide the necessary stimulus the economy needs.

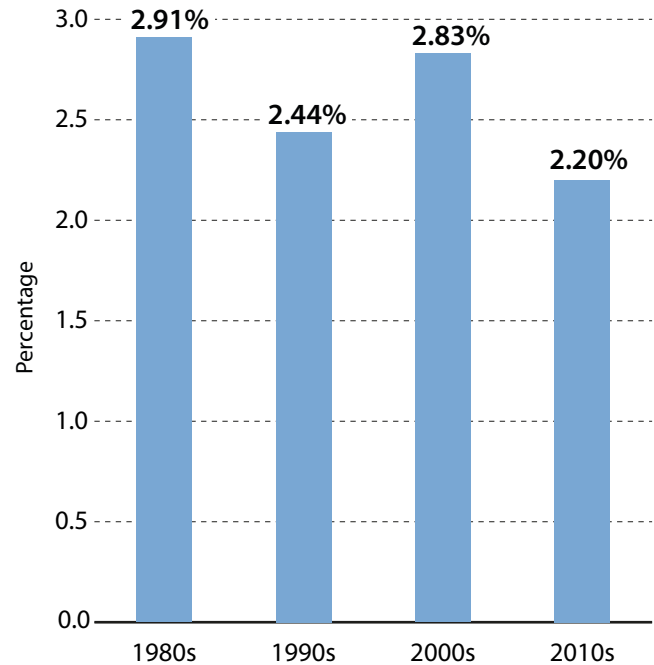
1. The recent slowdown in Canada's economic growth

Increased economic growth is the key to higher standards of living. Unfortunately, however, in recent years Canada has experienced a slowdown in its real economic growth. **Figure 1** highlights the relatively slower growth in Canada's real Gross Domestic Product (GDP)¹ over the past decade when compared to the 1980s, 1990s, and 2000s. The 1980s saw an average annual growth rate of almost 3%, followed by a slowdown in the 1990s to a 2.4% growth rate. Canada's economy bounced back to an average annual growth rate of 2.8% in the 2000s decade (excluding 2008 and 2009)² before performing sluggishly between 2010 and 2019 at an average annual growth rate of 2.2%. Overall, the 2010s was the worst performing decade, in terms of economic growth, of the past 40 years.

In addition, other recent reports have examined Canada's sluggish economic growth into 2019. The Conference Board of Canada found that the Canadian economy grew by just 0.3% in the fourth quarter of 2019, its weakest performance since the second quarter of 2016. The weak results in the fourth quarter are the result of declines in business investment and exports, which were only partially offset by continued strength in consumer spending (Conference Board of Canada, 2020).

Furthermore, Canada's economic growth was slower than that of other developed countries in recent years. **Figure 2** shows the average, real per-capita GDP of Canada, United States, Germany, Japan, United Kingdom and major advanced

Figure 1: Canada's average annual growth rate (%) of real GDP, selected decades



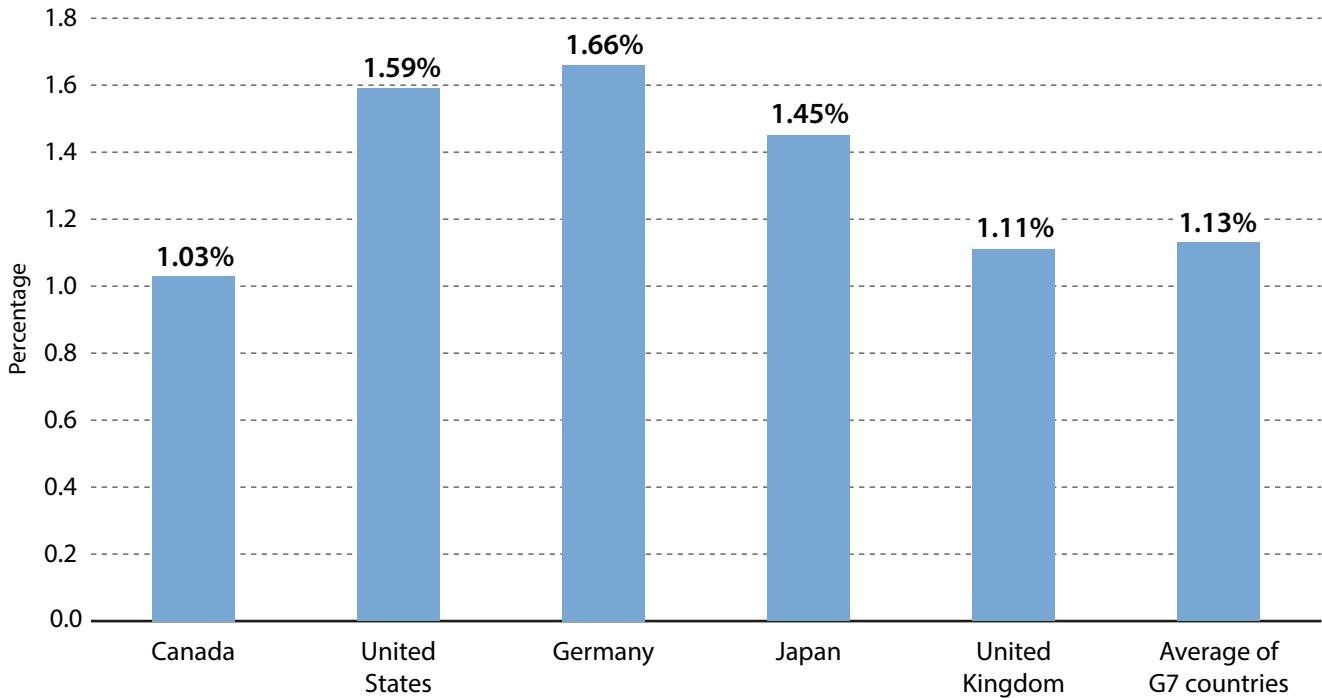
Note: Growth rates for the recessionary years, 2008–2009, were excluded when the average for the 2000s was calculated.
Source: Statistics Canada, 2020d.

economies—the Group of Seven—between 2010 and 2019. The Group of Seven countries (G7) belong to an international intergovernmental economic organization consisting of the seven largest advanced economies in the world, namely Canada, the United Kingdom, the United States, France, Germany, Italy, and Japan. Between 2010 and 2019, the average annual per-capita GDP growth rate for the United States was 1.6%, compared to Canada's 1.0% and an average of 1.1% for G7 countries as a whole. More specifically, over the same period, the average annual per-capita

¹ Real GDP is the inflation-adjusted value of all goods and services produced in the domestic economy.

² The annual growth rates of the recessionary years 2008 and 2009 were excluded from the calculation to avoid skewed results and to present a more accurate depiction of prevailing market forces.

Figure 2: Average annual growth rate (%) of real per-capita GDP, 2010–2019



Source: International Monetary Fund, 2019.

GDP growth rate for Germany was 1.7%, for Japan, 1.5%, and for the United Kingdom, 1.1%. Crucially, Canada's economic growth during this period was weaker than that of the United States and the G7 countries, on average.

Clearly Canada's rate of economic growth is not healthy and this situation is expected to deteriorate rapidly in the coming year as a result of the global COVID-19 pandemic and its severe impacts. According to Statistics Canada (2020a), economic disruptions from this health crisis have been both deep and widespread, and are therefore having a major impact on the Canadian economy. In particular, Statistics Canada data shows a drop in real GDP of 2.1% for the first

quarter of 2020, the sharpest decline since the first quarter of 2009 (2020e).

While the longer-term economic impact of the pandemic are unknown, Canada's largest banks predict that Canada's economy is likely to experience severe declines in the second quarter and will see negative growth in 2020 (Hagan, 2020). The Bank of Montreal (2020) predicts that real GDP growth will decline by 1.0% in 2020, and forecasts a second quarter annualized contraction of 10.0%. However, Toronto-Dominion (TD) Bank predicts that real GDP growth will decline by 4.4% in 2020, and forecasts a severe second quarter annualized contraction of 24.8% (Caranci, 2020).

2. The relationship between economic growth and energy use

Evidence suggests that the economic activity and energy consumption tend to have a similar trend over long run, although the economy grows faster than energy consumption. For example, from 1980 to 2010, global economic growth increased six-fold while energy consumption nearly doubled (McKittrick and Aliakbari, 2014). While there are correlations between energy use and overall economic activity, the key question is which variable drives the other. Does economic growth cause an increase in energy consumption, or does an increase in energy availability cause an increase in economic activity, or are both effects happening simultaneously?

Clearly this question has important policy implications. For instance, if economic growth causes increased energy consumption but is not dependent on it, then policy makers could restrict energy consumption without impinging on future economic growth. In this view, energy consumption is a luxury good, consumption of which increases with increased wealth. However, if energy is an essential input to economic growth, restricting energy consumption would constrain future economic growth and would therefore raise economic costs.

McKittrick & Aliakbari (2014) investigated the causal relationship between energy consumption and economic growth in Canada by applying

time-series econometric techniques to provincial data over the period from 1995 to 2010. They used annual provincial-level observations on real gross domestic product (GDP), real gross fixed capital formation, final energy consumption³ and employment for the period from 1995 to 2010.

After performing a series of econometric analysis, the authors found that there is a positive long-run relationship between energy use and real GDP in Canada. More specifically, a 10% increase in energy consumption or abundance is associated with a 1.16% increase in GDP. In addition, the authors found that the direction of causality between the two variables runs from energy consumption to GDP. In other words, the study found that increases in GDP do not cause⁴ increases in energy use, but increases in energy abundance do cause increases in GDP. Likewise, decreases in energy abundance are associated with subsequent decreases in GDP, but the causality does not function in the other direction. These findings are consistent with some previous studies in the literature for Canada that found evidence of causality either from energy to GDP or in both directions (Lee, 2006; Ghali and El-Sakka, 2004)

Overall, the findings suggest that policies that aim to cut or constrain energy use (or, equivalently, increase energy prices) limit the growth of income in Canada.

³ By energy consumption we mean total primary and secondary energy use. Primary energy use includes coal, oil, natural gas, gas-plant natural gas liquids, and primary electricity, hydroelectric, and nuclear. Secondary energy includes coke, coke-oven gas, total refined petroleum products, secondary electricity, and thermal.

⁴ When we refer to energy causing GDP growth or vice-versa, we specifically mean Granger causality, which is a statistical method to determine causality between two variables in a time series.

3. Increases in electricity prices and policies contributing to higher energy costs in Canada

Alongside declines in economic growth, electricity prices in several Canadian provinces have increased in recent years. Previous studies have shown increases in electricity prices across most of the country over the last decade, with the most drastic increase observed in Ontario (Taylor, Stedman, Aliakbari, and Green, 2017).

The reasons behind Ontario's drastic increase in electricity prices have been extensively examined in other studies.⁵ In general, research shows that policymakers in Ontario have made poor policy decisions in recent years, resulting in rising electricity costs in the province. Ontario's rising electricity costs have been, in part, blamed on the province's 2009 Green Energy Act (GEA). The centerpiece of the act included a schedule of subsidized contracts to purchase electricity called Feed-in-Tariffs (FITs). These provided long-term guarantees of above-market rates to generators of renewable sources (wind, solar, bioenergy, and some hydroelectric). To fund these commitments, as well as the cost of other non-market interventions such as conservation programs, Ontario levied a surcharge on electricity called the Global Adjustment (GA). Over the past decade, the GA has soared, resulting in a drastic increase in the price of electricity in Ontario (*figure 3*).⁶

Since the early 2000s, Ontarians have borne substantial costs from the government's conservation and demand-side management programs that aim to reduce electricity demand and increase efficiency.⁷ Many energy-efficiency programs are justified on the basis that they will save consumers money in the long-run by encouraging them to make up-front investments in energy-saving upgrades to their homes. Although many of Ontario's conservation programs have been repealed by the current government, the province still has various conservation programs in place that are delivered by the Independent Electricity System Operator (IESO). For example, the Retrofit Program provides incentives for businesses to update inefficient and old equipment, and the Small Business Lighting program provides an assessment as well as incentives for eligible lighting upgrades (Aliakbari and Yunis, 2019).

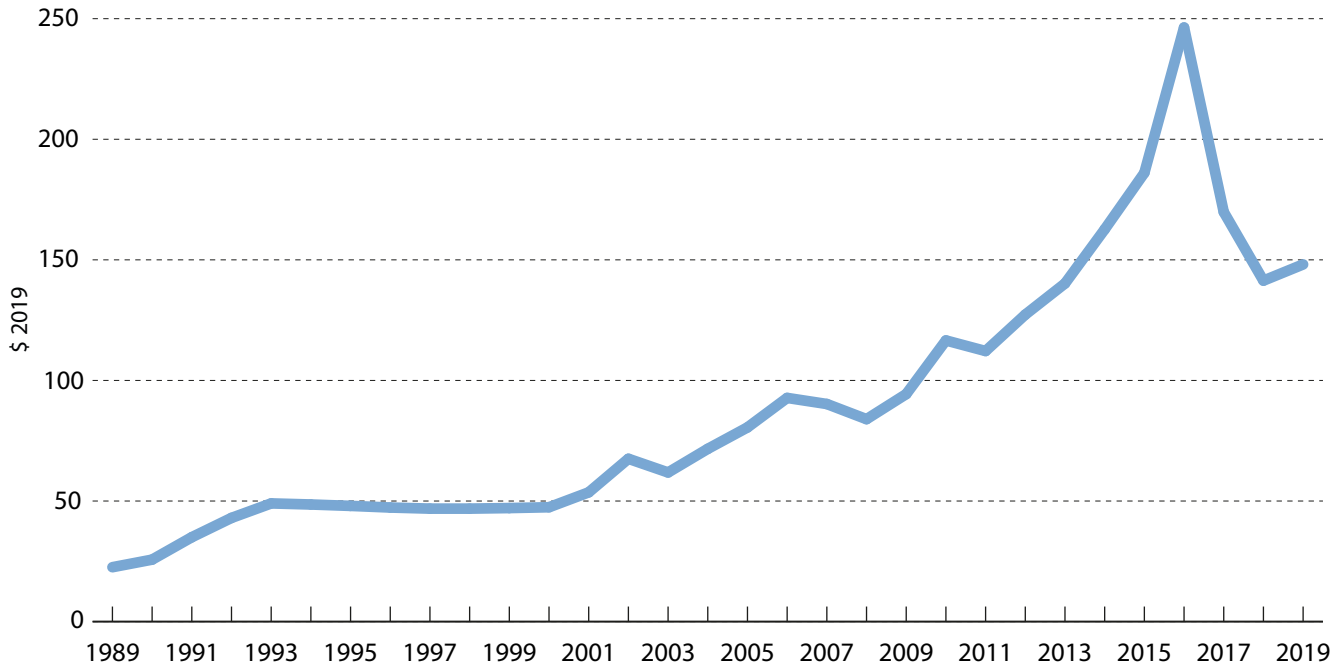
The federal government has implemented similar policies that are designed to reduce energy use. In 2019, the federal government announced the Energy Savings Rebate program, which provides funding to eligible retailers to support point-of-sale rebates for energy-efficiency products in Ontario. The program provides approximately \$200 million for retailers to provide rebates to

5 For additional information, see Aliakbari and Yunis, 2019; and Aliakbari, Green, McKittrick, and Stedman, 2018.

6 In response to Ontario's rising electricity prices, the new Ontario Government committed itself to lowering the cost of electricity in the province. Since 2018, the Ford government has implemented a series of measures including cancelling 758 renewable power contracts, repealing the Green Energy Act, eliminating a number of conservation programs, and reforming the administration of the Fair Hydro Plan in an attempt to reduce rates. However, as outlined in other studies, despite the several measures being implemented, the primary driver of rising electricity costs in the province—the Global Adjustment—continues to increase (Aliakbari and Yunis, 2019).

7 For additional information about Ontario's demand-side management programs, see Adams and McKittrick, 2016.

Figure 3: Growth in the price (\$ 2019) of electricity in Ontario, 1989–2019



Source: Statistics Canada, 2020c.

consumers for products such as dishwashers, refrigerators, and air conditioners certified by ENERGY STAR® (Environment and Climate Change Canada, 2019).⁸

In 2016, the federal government also implemented the Federal Energy Efficient Equipment and Appliances Program, which is designed to improve standards for equipment and appliances. This program updates or introduces minimum energy-efficiency standards for nearly 50 product categories. The program focuses on three equipment areas: windows, space heating, and water heating (Natural Resources Canada, 2020).

Other provinces, such as British Columbia, have pursued similar conservation programs

in partnership with the federal government. The province has a \$24 million program called EfficiencyBC, which offers rebates to households and businesses that switch to high-efficiency heating equipment and make improvements to the building envelope to save energy and reduce greenhouse-gas emissions.⁹ The program is co-funded with the federal government under the Low Carbon Economy Leadership Fund (Government of British Columbia, 2018).

Other regulatory measures have been implemented to achieve demand-side management. For example, in 2010 the Government of British Columbia amended the Greenhouse Gas Reduction (Clean Energy) Regulation to allow utilities to take demand-side measures to encourage

⁸ The Government of Manitoba also offers rebates on energy-efficient home products such as refrigerators and dishwashers, see Efficiency Manitoba for additional information (Efficiency Manitoba, 2020).

⁹ The Quebec government implemented a similar program in 2019, which provided tax credits for eco-friendly renovations, such as the replacement of a central air-conditioning system with an ENERGY-STAR® system (Revenu Québec, 2019).

customers to switch from higher-emission fuels to “clean” electricity. Based on the amendments, BC Hydro is required to meet 66% of its forecast incremental electricity demand through demand-side management. The amendments also allow utilities to double energy-efficiency programs for equipment fueled by natural gas (Government of British Columbia, 2012).

In addition, governments have pursued policies that extend beyond the electricity sector and are designed to limit the availability of energy more broadly. The federal government is currently developing a Clean Fuel Standard to reduce Canada’s emissions of greenhouse gases (GHG) through the increased use of lower-carbon fuels and alternative technologies. The intended purpose of this policy is to reduce GHG emissions from fuels used in transportation, buildings, and industry.

In Ontario, regulatory measures have been designed to reduce the environmental impact from diesel fuels. As of 2017, 4% of the total volume of diesel fuel must be bio-based. Biodiesel is considered bio-based as it is a renewable fuel

made from vegetable oils, recycled frying oils, and animal fats. The bio-based diesel component of this blend must have 70% lower greenhouse-gas emissions than standard petroleum diesel (Government of Ontario, 2020).

The federal government set a target to have 90% of Canada’s electricity coming from non-emitting sources by 2030 (Government of Canada, 2018). Other provinces have adopted renewable targets. Under the previous government, the province of Alberta set the target of using 30% renewable sources by 2030 (Stephenson, 2019). In 2015, the Government of Saskatchewan committed itself to increasing its target for renewable-energy generating capacity from 25% to 50% by 2030 (Canada Energy Regulator, 2016).

As discussed in section 2, access to cheap and reliable energy sources is a driver of economic growth and this is an important consideration for policymakers. Thus, government policies that are designed to reduce energy use and/or artificially increase the cost of energy need to be re-examined in light of Canada’s recent economic slowdown.

Conclusion

Canada has experienced sluggish economic growth over the past decade. Between 2010 and 2019, real (inflation-adjusted) gross domestic product (GDP) in Canada grew at an annual average of 2.2% compared to 2.8% in the 2000s (excluding recessionary years 2008-2009), 2.4% in the 1990s and 2.9% in the 1980s. In addition, Canada's economic growth during this time period was weaker than several other developed countries including the United States and the G7 group of advanced economies as a whole. Specifically, from 2010 to 2019, the United States' average annual per-person GDP growth rate was 1.6%, compared to 1.0% in Canada and 1.1% in G7 countries, on average.

Given that the COVID-19 pandemic is having a devastating impact on economies around the world, including Canada, the issue of slow economic growth is only expected to worsen in the near term. As reported by Statistics Canada, as a result of the economic downturn caused by the COVID-19 pandemic, the Canadian economy saw a dramatic decline of 2.1% in the first quarter of 2020. In addition, several reports predict that Canada's economy is likely to experience severe declines in the second quarter of 2020 and will

see negative economic growth in 2020. Therefore, governments should adopt and reform policies to promote economic growth.

As shown in this publication, energy abundance is one of the drivers of economic growth in Canada. Therefore, policies that restrict energy availability and/or increase energy costs will constrain Canada's economic growth. Similarly, policies that favoured the abundant availability of energy will have a positive impact on future economic growth.

Unfortunately, despite the important role that abundant and affordable energy plays in economic growth and prosperity, several Canadian governments have implemented policies that have artificially constrained energy abundance and/or increased energy costs. The Ontario Green Energy Act, British Columbia's conservation programs, and Ottawa's regulations mandating energy requirements are some examples of these policies. To promote economic growth and facilitate economic recovery, Canadian governments should re-examine policies that are designed to reduce energy use or artificially increase energy costs.

References

- Adams, Tom, and Ross McKittrick (2016). *Demand-Side Mismanagement: How Conservation Became Waste*. Fraser Institute. <<https://www.fraserinstitute.org/studies/demand-side-mismanagement-how-conservation-became-waste>>, as of May 22, 2020.
- Aliakbari, Elmira, Kenneth Green, Ross McKittrick, and Ashley Stedman (2018). *Understanding the Changes in Ontario's Electricity Markets and Their Effects*. Fraser Institute. <<https://www.fraserinstitute.org/studies/understanding-the-changes-in-ontarios-electricity-markets-and-their-effects>>, as of May 22, 2020.
- Aliakbari, Elmira, and Jairo Yunis (2019). *The Ontario Government's Electricity Policies 2018–2019: How They Are Failing and How to Fix Them*. Fraser Institute. <<https://www.fraserinstitute.org/studies/ontario-governments-electricity-policies-2018-2019>>, as of May 22, 2020.
- Bank of Montreal (2020). *Tracking the Pandemic's Economic Footprint*. BMO (March 20). <https://commercial.bmo.com/media/filer_public/5b/cf/5bcffa5f-46b8-44eb-9d8e-af44d3240815/tracking_the_pandemic_economic_footprint.pdf>, as of May 22, 2020.
- Canada Energy Regulator (2016). *Canada's Renewable Power Landscape: Energy Market Analysis 2016*. <<https://www.cer-rec.gc.ca/nrg/sttstc/lctrct/rprt/2016cndrnwblpwr/2016cndrnwblpwr-eng.pdf>>, as of May 22, 2020.
- Caranci, Beata (2020). *Forecast Update Stop-enomics: The Wildcard is Not Depth, But Duration*. TD Bank (March 25). <<https://newsroom.td.com/featured-news/td-economics-stop-enomics-the-wildcard-is-not-depth-but-duration>>, as of May 22, 2020.
- Conference Board of Canada (2020). *Canadian Outlook Summary: Spring 2020*. <<https://www.conferenceboard.ca/focus-areas/canadian-economics/10647>>, as of May 22, 2020.
- Efficiency Manitoba (2020). *Save More: Rebates on Energy-Efficient Products for Your Home*. <<https://efficiencymb.ca/offers/savemore/>>, as of May 22, 2020.
- Environment and Climate Change Canada (2019). *Energy Savings Rebate Program*. <<https://www.canada.ca/en/environment-climate-change/services/climate-change/low-carbon-economy-fund/energy-savings-rebate.html>>, as of July 8, 2020.
- Ghali, K.H., and M.I.T. EI-Sakka (2004). Energy Use and Output Growth in Canada: A Multivariate Cointegration Analysis. *Energy Economics* 26: 225–238.
- Government of British Columbia (2012). *Greenhouse Gas Reduction (Clean Energy) Regulation, BC Reg 102/2012*. <<https://www.canlii.org/en/bc/laws/regu/bc-reg-102-2012/latest/bc-reg-102-2012.html#document>>, as of July 8, 2020.
- Government of British Columbia (2018). *Energy Efficiency Programs*. <<https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/energy-efficiency-conservation/programs>>, as of May 22, 2020.
- Government of Canada (2018). *Powering Our Future with Clean Electricity*. <<https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/powering-future-clean-energy.html>>, as of May 22, 2020.

Government of Ontario (2020). *Greener Diesel Regulation*. <<https://www.ontario.ca/page/greener-diesel-regulation>>, as of May 22, 2020.

Hagan, Shelly (2020). Canadian Banks Predict Largest Contraction since 1960s. *BNN Bloomberg* (March 23). <<https://www.bnnbloomberg.ca/canadian-banks-predict-largest-contraction-since-1960s-1.1410941>>, as of May 22, 2020.

International Monetary Fund [IMF] (2019). *World Economic Outlook Database, October 2019*. <<https://www.imf.org/external/pubs/ft/weo/2019/02/weodata/weoselgr.aspx>>, as of May 22, 2020.

International Monetary Fund [IMF] (2020). *World Economic Outlook, June 2020: A Crisis Like No Other, An Uncertain Recovery*. <<https://www.imf.org/~media/Files/Publications/WEO/2020/Update/June/English/WEOENG202006.ashx?la=en>>, as of July 6, 2020.

Jackson, Taylor, Ashley Stedman, Elmira Aliakbari, and Kenneth P. Green (2017). *Evaluating Electricity Price Growth in Ontario*. Fraser Institute. <<https://www.fraserinstitute.org/sites/default/files/evaluating-electricity-price-growth-in-ontario.pdf>>, as of May 22, 2020.

Lee, C.C., C.P. Chang, and P.F. Chen (2008). Energy-Income Causality in OECD Countries Revisited: The Key Role of Capital Stock. *Energy Economics* 30: 2359–2373.

McKittrick, Ross, and Elmira Aliakbari (2014). *Energy Abundance & Economic Growth: International and Canadian Evidence*. Fraser Institute. <<https://www.fraserinstitute.org/sites/default/files/energy-abundance-and-economic-growth.pdf>>, as of May 22, 2020.

Natural Resources Canada (2020). *Guide to Canada's Energy Efficiency Regulations*. <<https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-regulations/guide-canadas-energy-efficiency-regulations/6861>>, as of July 8, 2020.

Revenu Québec (2019). *List of Recognized Eco-Friendly Renovation Work*. <<https://www.revenuquebec.ca/en/citizens/tax-credits/renovert-tax-credit/recognized-renovation-work/>>, as of May 22, 2020.

Statistics Canada (2020a). *Gross Domestic Product by Industry: Nowcast, March 2020*. *The Daily*. <<https://www150.statcan.gc.ca/n1/daily-quotidien/200415/dq200415a-eng.htm?HPA=1>>, as of May 22, 2020.

Statistics Canada (2020b). *Labour Force Survey, March 2020*. *The Daily*. <<https://www150.statcan.gc.ca/n1/daily-quotidien/200409/dq200409a-eng.htm>>, as of May 22, 2020.

Statistics Canada (2020c). Table 18-10-0005-01. *Consumer Price Index*. <<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000501>>, as of May 22, 2020.

Statistics Canada (2020d). *Gross Domestic Product, Income and Expenditure, First Quarter 2020*. <<https://www150.statcan.gc.ca/n1/daily-quotidien/200529/dq200529a-eng.htm>>, as of July 6, 2020.

Stephenson, Amanda (2019). Alberta Government Will Fall Short of Renewable Electricity Targets Set by NDP, says AESO Forecast. *Calgary Herald* (October 5). <<https://calgaryherald.com/business/local-business/renewable-electricity-target-downgraded-by-albertas-electric-system-operator/>>, as of May 22, 2020.

Acknowledgments

The authors would like to acknowledge the helpful comments and insights of several anonymous reviewers. The authors, however, are alone responsible for the report itself, its conclusions, and recommendations. Any remaining errors or oversights are the sole responsibility of the authors. As the researchers have worked independently, the views and conclusions expressed in this paper do not necessarily reflect those of the Board of Directors of the Fraser Institute, the staff, or supporters. This publication in no way implies that the Fraser Institute, its directors, or staff are in favour of, or oppose the passage of, any bill; or that they support or oppose any particular political party or candidate.

About this Publication

Copyright © 2020 by the Fraser Institute. All rights reserved. Without written permission, only brief passages may be quoted in critical articles and reviews.

ISSN 2291-8620

Media queries: call 604.714.4582 or e-mail: communications@fraserinstitute.org

Support the Institute: call 1.800.665.3558, ext. 586 or e-mail: development@fraserinstitute.org

Visit our website: www.fraserinstitute.org

Elmira Aliakbari

Elmira Aliakbari is Associate Director of the Centre for Natural Resource Studies at the Fraser Institute. She received a Ph.D. in Economics from the University of Guelph, and M.A. and B.S. degrees in Economics, both from the University of Tehran in Iran. She has studied public policy involving energy and the environment for nearly eight years. Prior to joining the Fraser Institute, Ms. Aliakbari was Director of Research, Energy, Ecology and Prosperity with the Frontier Center for Public Policy. She has presented her work at many academic conferences and has been published in the prestigious academic journal, *Energy Economics*. Ms. Aliakbari's research has been discussed in prominent media outlets including the *Wall Street Journal*, and her commentaries have appeared in major Canadian and American newspapers such as the *Globe and Mail*, *Washington Times*, *National Post*, and *Financial Post*.



of Public Policy from the University of Calgary. Ms. Stedman is the co-author of a number of Fraser Institute studies, including the annual *Global Petroleum Survey and Survey of Mining Companies*. Ms. Stedman's research has been covered by various prominent media outlets, including the *Wall Street Journal*, and her commentaries have appeared in major Canadian and American newspapers such as the *Globe and Mail*, *Washington Times*, *National Post*, and *Financial Post*.



Ashley Stedman

Ashley Stedman is a senior policy analyst working in the Centre for Natural Resource Studies. She holds a B.A. (Honours) from Carleton University and a Master

Jairo Yunis

Jairo Yunis is a Junior Policy Analyst at the Fraser Institute. He holds a Bachelor of Political Science and International Relations from the Pontifical Xaverian University of Colombia and a Master's degree in Public Policy from the University of Calgary. Mr Yunis has previously worked for government in Colombia on policy issues related to local economic development and competitiveness. He specializes in energy policy, with a focus on carbon pricing and electricity markets.

