72 Facts

About Oil and Gas:

A Summary Research Brief

CEC Research Brief Twenty Lennie Kaplan, Ven Venkatachalam and Mark Milke DECEMBER 2021

Canadian Energy Centre

A NOTE FROM THE AUTHORS

The following summary facts and data are drawn from 23 Fact Sheets and 11 Research Briefs released in 2021 by the Canadian Energy Centre. For sources and methodology, as well as additional data and information, the 34 original reports are available at the research portal on the Canadian Energy Centre website at <u>canadianenergycentre.ca</u>

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REVENUES TO GOVERNMENTS

1.

Canada's energy industry paid over <u>\$701 billion</u> in federal, provincial and local taxes, royalties, and fees since 2000. That is:

- Nearly twice the latest forecast of the federal budget deficit of \$354 billion for 2020/21;
- More than the \$679 billion paid out in Old Age Security (OAS) benefits between 2005/06 and 2019/20; and
- More than the \$685 billion in Employment Insurance (EI) benefits paid out between 1987/88 and 2019/20.

2.

Since 2000, Canada's oil and gas sector alone paid nearly <u>\$505 billion</u> to federal, provincial, and local governments.

- This is almost the same as the real estate and construction sectors combined (at \$510 billion); and
- This is more than the \$499 billion in Family Allowance and children's benefits paid out between 1969/70 and 2019/20.





*Excludes personal income taxes from 2000 to 2006.

Sources: Statistics Canada and CAPP.

Alberta taxpayers made a \$272 billion net contribution to federal government finances between 2007 and 2019.

 The direct share from Alberta's oil and gas extraction sector was, at a minimum, nearly <u>\$53 billion</u>, about 9 percent of gross Alberta contributions and 19 percent of Alberta's total net fiscal contribution over the period.



Sources: Derived from Statistics Canada, Table 36-10-0450-01; Alberta Finance, Albertan's Net Contribution to Con-federation for 2011; and Statistics Canada, Table 17-10-0005-01.

CONTRIBUTION TO NATIONAL

AND REGIONAL ECONOMIES

4.

The oil and gas sector makes an outsized contribution to the Canadian economy, when healthy or when enduring a slump.

 Average weekly earnings are highest in oil and gas extraction at <u>\$2,740</u> weekly in 2019 compared with \$1,534 in aerospace, \$1.427 in motor vehicle manufacturing, and \$1,029 for the average of all industries.



*Extraction only, i.e., excluding pipelines and other oil and gas activity. Source: Statistics Canada, Table 14-10-0204-01.

5.

In 2017, the oil and gas sector was responsible for adding <u>\$7.7 billion</u> in nominal GDP to the Ontario economy. Oil and gas:

- Generated \$15.3 billion in outputs, consisting primarily of the value of goods and services produced by sectors in the Ontario economy;
- Supported over 71,000 jobs in Ontario, directly and indirectly; and
- Paid \$2.1 billion in wages and salaries to workers in Ontario.

The oil and gas sector's impact on Ontario's economy 2017 2017 Output GDP Number of Jobs

	(in \$ billions)	(in \$ billions)	of Jobs
Direct impact	1.3	0.3	1,686
Indirect impact	14.0	7.4	69,389
Total impact	15.3	7.7	71,076

Source: Derived from Statistics Canada, Supply and Use Tables, custom tabulation.

In 2017, the oil and gas sector was responsible for adding nearly <u>\$9.5 billion</u> in nominal GDP to the B.C. economy. Oil and gas:

- Generated nearly \$18.0 billion in outputs, consisting primarily of the value of goods and services produced by various sectors in the B.C. economy;
- Supported nearly 62,000 jobs in B.C., directly and indirectly; and
- Paid over \$3.1 billion in wages and salaries to workers in B.C.

The oil and gas sector's impact on BC's economy 2017							
Output GDP Number (in \$ billions) (in \$ billions) of Jot							
Direct impact	11.3	5.7	26,496				
Indirect impact	6.7	3.8	36,106				
Total impact	18.0	9.5	62,602				

Source: Derived from Statistics Canada, Supply and Use tables, custom tabulation.

7.

In 2017, the oil and gas sector was responsible for adding nearly <u>\$6.9 billion</u> in nominal GDP to Atlantic Canada economy. Oil and gas:

- Generated nearly \$11.4 billion in outputs, consisting primarily of the value of goods and services produced by various sectors in the Atlantic economy;
- Supported over 20,000 jobs in Atlantic Canada, directly and indirectly; and
- Paid over \$1.36 billion in wages and salaries to workers in Atlantic Canada

The oil and gas sector's impact on Atlantic Canada's economy 2017						
Output GDP (in \$ billions) (in \$ billions)						
Direct impact	8.4	5.5	7,519			
Indirect impact	2.9	1.4	12,579			
Total impact	11.4	6.9	20,098			

Source: Derived from Statistics Canada, Supply and Use Tables, custom tabulation. Totals may not add exactly due to rounding.

In 2017, the GDP associated with the Canadian oil and gas sector totalled <u>\$128 billion</u>, or 6.4% of the total Canadian economy. In 2017, there were 216,285 direct jobs and 395,077 indirect jobs associated with the Canadian oil and gas sector, or <u>611,362</u> in total, representing about 3.2% of all jobs across Canada.



Source: Derived from Statistics Canada, Custom Tabulation of the Supply and Use Tables, 2017.



Source: Derived from Statistics Canada, Custom Tabulation of the Supply and Use Tables, 2017.

9.

11. In 2017, Canada's oil and gas industry GDP was three times the size of the country's automotive industry and nearly seven times the size of its aerospace industry.

- In 2017, oil and gas extraction was worth <u>\$46.6 billion</u> of Canada's nominal GDP;
- In 2017, the motor vehicle and parts manufacturing sector accounted for \$16.5 billion of Canada's nominal GDP; and
- In 2017, the aerospace product and parts manufacturing sector accounted for \$5.9 billion of Canada's nominal GDP.



^{*}Extraction only, i.e., excluding pipelines and other oil and gas activity Source: Statistics Canada, Table 36-10-0401-01.

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2019 \$, billions

VALUE OF CANADIAN OIL AND GAS EXPORTS

10.

The cumulative real value of Canada's oil and natural gas product exports was over <u>\$1.94 trillion</u> between 1988 and 2019.

11.

The \$1.94 trillion value of Canadian oil and natural gas product exports between 1988 and 2019 compares favourably to other key Canadian export products. Between 1988 and 2019, the cumulative real value of various exports included:

- electricity exports (\$207 billion);
- aircraft and other transportation equipment (\$552 million); and
- consumer goods exports (1.47 trillion).



Canada's exports: Selected examples, 1988-2019

Source: Statistics Canada. Table 12-10-0121-01.



Source: Statistics Canada. Table 12-10-0121-01.

CONTRIBUTION OF CANADIAN

OIL TO U.S. REFINERIES

12.

U.S. refineries are growing increasingly reliant on Canadian heavy oil, including oil from the oil sands. The total percentage of heavy crude oil that the U.S. imports from Canada as a share of all of its imports of Canadian oil has risen from 25.1 percent in 2000 to <u>55.8 percent</u> in 2019, an increase of 122 percent over the past two decades.

13.

7

The percent of Canadian crude in U.S. refinery feedstock (i.e., the raw materials and intermediate materials processed at refineries to produce finished petroleum products, otherwise known as refinery inputs) has steadily risen from nearly 9 percent in 2000 to over <u>21 percent</u> by the end of 2019.



Source: US Energy Information Administration, 2021a.



Sources: U.S. Energy Information Administration, 2020b and 2021b.

CANADA AND LNG

14.

Worldwide imports of natural gas, in the form of Liquefied Natural Gas (LNG), rose from 144 billion cubic metres (bcm) in 2000 to <u>470 bcm</u> in 2019, an increase of 326 Bcm and 226 percent during the period. The sharpest rise in LNG imports by volume occurred in Asia (up 237 Bcm). The Asia-Pacific region, with LNG imports of 346 Bcm in 2019, constituted 74 percent of the world share of all LNG imports.

15.

Relative to Western Canada and the Asia-Pacific market for natural gas (in the form of LNG), the price difference between Canada and Asia provides an opportunity for Canadian natural gas producers to export to Asia-Pacific markets. Since 2009, Asian natural gas prices have been higher than Canadian natural gas by triple percentages, i.e., selling for between 122 and <u>775 percent</u> more in Asia than in Canada, depending on the year.



Source: Authors' calculations from IEA (2020b), World Energy Statistics (database).



*LNG Asia average and AECO-C natural gas prices for Canada.

Sources: BP Statistical Review (2020) and International Monetary Fund (2021).

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ENERGY TRADE FLOWS

BETWEEN CANADA AND THE U.S.

16.

Over the past two decades, the cumulative aggregate value of energy products trade between Canada and the United States was <u>\$1.96 trillion</u>, including \$138 billion in 2019.

17.

Crude oil (including bitumen) has been the largest commodity in the Canada-United States energy products trade flow; a total of <u>\$1.12 trillion</u> in crude oil and bitumen has flowed between the two countries from 2000 to 2019, including \$101.5 billion in 2019. The second largest commodity in the Canada-United States energy products trade flow over the past two decades is natural gas; a cumulative total trade value of \$426.3 billion of that product has passed between the two countries, including \$12.1 billion in 2019.

Total Canada-US energy trade flows

By product, 2000-2019

Product	CDN\$ billions (nominal)
Crude oil and bitumen	1,120.3
Natural gas	426.3
Refined petroleum energy products (including liquid biofuels)	253.7
Electricity	69.0
Natural gas liquids (including condensate) and related products	54.4
Coal	20.3
Nuclear fuel and other energy products	18.6
Total	1,962.6

Source: Statistics Canada, Table 12-10-0133-01.



Source: Statistics Canada, Table 12-10-0133-01

Enbridge Line 5, the pipeline that winds its way between Superior, Wisconsin, and Sarnia, Ontario. carries products that fuel the region's industries and communities: light oil, synthetic light oil, and natural gas liquids (NGLs), much of which is refined into propane. In 2019, the total value of energy product trade flows between Canada and Michigan was over CA\$5.8 billion or US\$4.4 billion.

> Canada-Michigan Energy Products* Trade Flows in 2019

	(\$ millions)
Crude oil	3,037
Natural gas	1,918
Natural gas liquids	209
Motor gasoline	38
Fuel wood and solid fuel products	36
Hard coal	86
Coke and other coke oven products	87
Diesel and biodiesel fuels	85
Electricity	244
Light fuel oils	9
Heavy fuel oils	54
Total	5,804

Source: Statistics Canada, International Accounts and Trade Division (2021a and 20201b).

*Energy products include conventional crude oil, natural gas, hard coal, brown coal, fuel wood, and solid fuel products, coke and other coke oven products, motor gasoline (including blending components and ethanol fuels), electricity, nuclear fuel, aviation fuel, diesel and biodiesel fuels, light fuel oils, heavy fuel oils, and natural gas liquids (including condensate) and related products.

19.

Enbridge's Line 3 Replacement Project is bringing employment and safer, more reliable energy to communities in Minnesota. In 2019, the total value of the trade flows of energy products between Minnesota and Canada was nearly <u>CA\$8.3 billion</u>, or about US\$6.4 billion.

Canada-Minnesota energy trade flows in 2019 \$ millions					
Crude oil	7,000.0				
Natural gas	485.5				
Electricity	437.5				
Natural gas liquids	129.1				
Gasoline	91.3				
Fuel wood and solid fuel products	12.8				
Coke and other coke oven products	9.0				
Hard coal	5.6				
Nuclear fuel	4.0				
Other	125.2				
Total	8,300				

Source: Statistics Canada, International Accounts and Trade Division (2021a and 20201b).

CANADA-U.S.

PIPELINE NETWORK

20.

The Canada-United States (U.S.) pipeline network is a critical component of North American energy security. Pipelines carry crude oil, natural gas, and refined petroleum products within and between the two countries. Combined, the Canada-U.S. energy pipeline network is over <u>453,000 kilometres</u> long, 11 times the earth's circumference.

21.

The economic benefits of the Canada-U.S. pipeline network are nearly <u>\$60 billion</u> in GDP and more than 63,400 jobs in the industry, with an average annual salary of over \$80,000.

Economic Benefits of the Canada-US Pipeline Transportation Network

	Canada	U.S.
GDP, in \$ billions*	9.2	50.5
Employment**	13,434	49,970
Annual mean wages, in \$*	80,155	77,340

*Dollar figures in local currency, i.e., \$CA for Canada and \$US for the United States.

**Full-time equivalents (FTE)

Sources: Alberta Labour Information Service, 2020; Canadian Energy Pipeline Association, 2020; Statistics Canada 2021b; US Bureau of Economic Analysis 2020; US Bureau of Labor Statistics, 2020 and 2021.

22.

As of May 2019, the annual mean wage for an employee in the pipeline transportation industry in the United States was <u>\$77,340</u>, nearly 45 percent higher than the annual mean wage for all occupations.

Canada-US Pipeline Network

2020 estimates | In kilometres

Type of pipeline	Canada	U.S.	
Crude oil, natural gas, refined petroleum products*	117,000		
Crude oil		122,300	
Natural gas		114,045	
Refined petroleum products		99,780	
Total by country	117,000	336, 125	
Total length of US-Canada pipeline network	453,125		

*Natural Resources Canada does not break down the Canadian numbers by shipped product.

Sources: Natural Resources Canada, undated; American Fuel and Petrochemical Manufacturers, undated.



The 45% "Pipeline Premium":

Source: US Bureau of Labor Statistics, 2020.

A strong American oil and gas industry is a critical element of economic prosperity for the North American energy security network between Canada, the United States and Mexico. This includes pipeline infrastructure such as the Line 3 Replacement Project in Minnesota. The pipeline transportation industry plays a significant role in the Minnesota economy, employing 1,169 people, providing nearly \$134 million in employee compensation, contributing nearly \$444 million to value-added/GDP, and generating nearly \$128 million in taxes for federal, state and county governments.



Source: IMPLAN 2021

*Total output equals the value of value of goods and services produced by an industry.

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ECONOMIC IMPACTS OF THE

U.S. OIL AND GAS INDUSTRY

24.

A strong American oil and gas industry is a critical element of economic prosperity and the North American energy security network linking Canada, the United States, and Mexico. The direct and indirect economic impacts of the U.S. oil and gas industry in 2019 included two million direct jobs, three million indirect jobs, \$356 billion in employee compensation, over \$238 billion in direct and indirect federal, state, and county taxes, <u>\$985 billion</u> in direct and indirect value-added/GDP, and \$2.1 trillion in what is known as "outputs," i.e., the value of goods and services produced by an industry.

Direct and Indirect Impacts of the U.S. Oil and Gas Industry: Summary Figures

(III)

	2019 data
Employment (jobs)	5 million
Employee compensation	\$356 billion
Taxes	\$238 billion
Value-added/GDP	\$985 billion
Output	\$2.1 trillion

Source: IMPLAN, 2021.

NEW CANADIANS

IN CANADA'S

RESOURCE SECTOR

25.

The number of landed immigrants employed in the oil and gas sector has increased from 8,800 in 2006 to 15,600 in 2020.



Source: Derived from Statistics Canada, Labour Force Survey, custom tabulation.

26.

Landed immigrants employed in the oil and gas extraction sector are paid more than those working in other goods-producing industries and more than the average for all industries for landed immigrants. In 2020, the average weekly wage ranged from \$1,082 for landed immigrants employed in agriculture, forestry, fishing, and hunting to <u>\$2,161</u> in the oil and gas extraction sector. By comparison, the all-industry average weekly wage for landed immigrants was \$1,264.



Derived from Statistics Canada, Labour Force Survey, custom tabulation.

The average weekly wage for landed immigrants in the oil and gas sector was higher than for those in selected other sectors and the all-industry average. Immigrants in agriculture, forestry, fishing, and hunting earned 17 percent less than the all-industry average; those in manufacturing earned virtually the same as that average; those in construction earned 6 percent more; and immigrants working in the utilities sector earned 42 percent more. Meanwhile, those working in oil and gas earned <u>71 percent</u> more than the all-industry average.

28.

Between 2006 and 2020, average weekly wages for landed immigrants employed in the oil and gas extraction sector grew from \$1,450 to <u>\$2,161</u>, an increase of nearly 49 percent, or \$711 more. This compares with a range of 17 percent higher for those in the utilities sector and 36 percent more for those in construction. The all-industry average growth was 37 percent between 2006 and 2020, or in dollar terms, an increase of \$340.



Derived from Statistics Canada, Labour Force Survey, custom tabulation.





Derived from Statistics Canada, Labour Force Survey, custom tabulation.

Derived from Statistics Canada, Labour Force Survey, custom tabulation.

ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG)

29.

Canada's oil and gas sector is estimated to account for just <u>0.4 percent</u> of global GHG emissions, while the oil sands sub-sector itself is estimated to account for just 0.2 percent of global GHG emissions.

30.

On environmental spending, when capital and operating expenses on environmental protection in Canada are combined, out of \$67.7 billion spent between 2006 and 2018, the oil and gas sector spent <u>\$28.1 billion</u> or 41.5 percent.



Sources: BMO Capital Markets (2020) and Climate Watch (2021).



Source: Statistics Canada Table 38-10-0042-01 and Table: 38-10-0130-01

^{*}Statistics Canada surveys companies only every second year, i.e., 2006, 2008 and so forth. This leads to an underestimate of environmental spending by companies, possibly by as much as 50%, given that data on every second year is absent.

The oil and gas sector was responsible for 51 percent (<u>\$15.2 billion</u>) of all capital spending for environmental protection compared with 49 percent for all other industries together (\$14.7 billion).

32.

The oil and gas sector was responsible for 34 percent (<u>\$12.9 billion</u>) of all operating expenditures for environmental protection compared with 66 percent for all other industries together (\$24.9 billion).

33.

Canada's greenhouse gas emissions intensity has fallen by <u>30 percent</u> since 2000. Between 2000 and 2019, GHG emissions intensity in Canada has fallen from 0.5 megatonnes of carbon dioxide equivalent (Mt of CO2e) per billion dollars of GDP to 0.35 Mt.



Source: Statistics Canada Table 38-10-0042-01 and Table: 38-10-0130-01 *See the explanation for partial estimates under Figure 1.



*GDP in 2012 US dollars. Source: Environment and Climate Change Canada (2021b).

Between 2000 and 2018, Canada's GHG emissions intensity fell from 996 tonnes of CO2e per million dollars of GDP to 445 tonnes, a decline of over <u>55 percent</u>.

35.

As of 2018, Canada's GHG emissions intensity of <u>445 tonnes</u> of CO2e per million dollars of GDP was lower than many other energy-producing and energyconsuming countries, such as China, India, Brazil, Oman, Russia, Saudi Arabia, Mexico, and the United Arab Emirates.



Source: Climate Watch (2021).



Source: Climate Watch (2021).

Over the past decade, there has been a marked improvement in GHG emissions intensities (i.e. upstream GHG emissions associated with oil sands extraction and primary processing) for Canadian oil sands crudes.

 Between 2011 and 2019, the crude production GHG emissions intensity of overall Alberta oil sands commonly exported to the United States fell from 0.53 tonnes of CO2e per cubic metre to <u>0.42 tonnes</u>, a decline of about 22 percent.

37.

There has been a <u>49 percent</u> reduction in emissions from oil and gas flaring in Canada in 2019 relative to 2014, even though oil production rose by 25 percent.



Source: Government of Alberta

		Globa	l Gas Fla bcm	ring, 2019 vs. Percent change	2014		
Syria							140%
Libya					77%		
United States				5	3%		
Rep of the Congo				33%			
Iraq				28%			
Argentina				28%			
Russia				27%			
Australia				22%			
Cameroon			1	6%			
Iran			13	%			
Saudi Arabia			8%				
Algeria			7%				
Qatar			7%				
Oman			1%				
Gabon		-1%					
China		-4%					
Venezuela		-4%					
Nigeria		-7%					
Mexico		-8%					
Ecuador		-8%					
Egypt	-10	6%					
United Kingdom	-18	%					
Brazil	-26%						
Malaysia	-30%						
India	-30%						
Turkmenistan	-33%						
Angola	-33%						
Indonesia	-35%						
Canada	-49%						
Kazakhstan	-60%						
	-75% -2	25%	0 2	25%	75%	125%	175

Source: World Bank.

Canada ranks the fifth lowest out of 30 countries for natural gas flaring, despite being the fourth-largest oil and gas producer. Canada's flaring emissions were <u>1.1 bcm</u> in 2019, while Russia was the highest at 23.2 bcm, followed by Iraq at 17.9 bcm, the United States at 17.3 bcm, and Iran at 13.8 bcm.

Gas Flaring Volumes from 2014 to 2019 (billion cubic meters) in the 30 Countries with the Highest Volume of Flaring (as of 2019)

		2014	2019	2014 to 2019 change	2014 to 2019 change
		(bill	(percent)		
1	Russia	18.3	23.2	4.9	27%
2	Iraq	14.0	17.9	3.9	28 %
3	United States	11.3	17.3	6.0	53%
4	Iran	12.2	13.8	1.6	13%
5	Venezuela	10.0	9.5	-0.4	-4%
6	Algeria	8.7	9.3	0.6	7%
7	Nigeria	8.4	7.8	-0.6	-7%
8	Libya	2.9	5.1	2.2	77%
9	Mexico	4.9	4.5	-0.4	-8%
10	Oman	2.6	2.6	0.0	1%
11	Malaysia	3.4	2.4	-1.0	-30%
12	Egypt	2.8	2.3	-0.4	-16%
13	Angola	3.5	2.3	-1.2	-33%
14	Saudi Arabia	1.9	2.1	0.2	8%
15	China	2.1	2.0	-0.1	-4 %
16	Indonesia	3.1	2.0	-1.1	-35%
17	Rep of the Congo	1.3	1.7	0.4	33%
18	Kazakhstan	3.9	1.6	-2.4	-60%
19	Gabon	1.5	1.5	0.0	-1%
20	Australia	1.1	1.4	0.3	22 %
21	Qatar	1.3	1.3	0.1	7%
22	Turkmenistan	2.0	1.3	-0.7	-33%
23	India	1.9	1.3	-0.6	-30%
24	Brazil	1.5	1.1	-0.4	- 26 %
25	United Kingdom	1.4	1.1	-0.2	-18%
26	Canada	2.1	1.1	-1.0	- 49 %
27	Cameroon	0.9	1.0	0.1	16%
28	Argentina	0.7	0.9	0.2	28 %
29	Syria	0.4	0.9	0.5	1 40 %
30	Ecuador	1.0	0.9	-0.1	-8%
	Rest of world	11.7	8.5	-3.2	-27%
	Global total	142.7	150.0	7.4	5%

Source: World Bank.

Canada also showed the second-largest decrease in flaring between 2014 and 2019 – a <u>49 per-cent</u> decrease, second only to Kazakhstan, which reduced flaring by 60 percent. This decrease occurred while petroleum liquids production in Canada rose by 25 percent and dry natural gas production rose by 5 percent.

Sources: World Bank, US Energy Information Administration.

*Ranking based on increase (decrease) in petroleum and other liquids. Data description depends on source agency with petroleum data in Mb/d; gas data in bcm, and flaring data in bcm. The relevant comparison is the percentage increase (or decrease) in volumes.

Comparing Countries on Production* and Flaring, 2014 vs. 2019 (percent change)

		Production increase (decrease) of petroleum and other liquids	Production increase (decrease) of natural gas	Increase (decrease) in gas flaring
Rank	Country			
1	Libya	107%	-30 %	77%
2	Iraq	43 %	50 %	28 %
3	Rep of the Congo	39 %	- 7 %	33%
4	United States	38%	31%	53%
5	United Kingdom	27%	5 %	-18%
6	Canada	25%	5 %	- 49 %
7	Brazil	24%	8 %	- 26 %
8	Kazakhstan	14%	28 %	-60%
9	Australia	9 %	133 %	22%
10	Syria	9 %	-28 %	1 40 %
11	Russia	6 %	12 %	27 %
12	Malaysia	5%	12 %	-30%
13	Oman	3%	16 %	1%
14	Indonesia	1%	-2 %	-35%
15	Saudi Arabia	0 %	12 %	8%
16	China	-2 %	41%	-4%
17	Qatar	-3%	5 %	7%
18	Argentina	-4%	28 %	28 %
19	India	-4%	- 3 %	-30%
20	Ecuador	-4%	-34 %	-8%
21	Iran	-6%	32%	13%
22	Cameroon	-7%	308%	16%
23	Gabon	-8 %	-34 %	-1%
24	Algeria	-9 %	5%	7%
25	Egypt	-10%	32 %	-16%
26	Turkmenistan	-11%	7%	-33%
27	Angola	-14%	826 %	-33%
28	Nigeria	-16%	6 %	-7%
29	Mexico	- 32 %	- 39 %	-8%
30	Venezuela	-65%	22 %	-4%

TYRANNY OIL

40.

In 2020, <u>49 percent</u> of the world's oil production (an annual average of 46.6 million barrels per barrel) occurred in countries that Freedom House ranked as Not Free, compared with 33 percent in Free countries and 10 percent in Partly Free countries.

41.

In 2018, <u>48 percent</u> of the world's natural gas production (an annual average of 56.6 billion cubic feet) occurred in countries that Freedom House ranked as Not Free, compared with 38 percent in Free countries and 10 percent in Partly Free countries.



Sources: Freedom House (2021). Countries and Territory Ratings and Statuses, 1973-2021. U.S. Energy Information Administration (2021).

*Illustration percentages are rounded. Actual percentages with decimals are 6.9%, 33.3%, 10.3% and 49.5%.

Natural gas Freedom classification 2018 Share of world production by country type* **48**% **50**% 38% **40**% 30% 20% 10% 4% 10% **n**% Not Free Partly Not Free measured Free

Sources: Freedom House (2021). Countries and Territory Ratings and Statuses, 1973-2021. U.S. Energy Information Administration, International Statistics.

*Illustration percentages are rounded. Actual percentages with decimals are 3.7%, 38.6%, 10.1% and 47.6%.

By 2020, Not Free nations, including Saudi Arabia, Russia, China, the United Arab Emirates, Iran, Iraq, and others, produced <u>49 percent</u> of the world's 94.2 million barrels of oil per day.

43.

Between 1980 and 2019, the proportion of the world's natural gas production coming from Not Free nations increased from 36 percent to <u>48 percent</u>, while the proportion from Partly Free nations increased from 5 percent to 10 percent

Oil production 1980 to 2020						
	1980	1990	2000	2010	2019	2020
			Share of world p	production, in %		
Countries not measured	4 %	4 %	6 %	6 %	5%	7 %
Free	31%	31%	31%	30 %	33%	33%
Partly Free	16 %	32 %	25 %	15%	11%	10 %
Not Free	49 %	33%	38 %	49 %	51%	49 %
Total	100%	100%	100%	100%	100%	100%
	1980	1990	2000	2010	2019	2020
		Millior	ns of barrels of o	il daily, annual av	verage	
Countries not measured	2.3	2.9	4.8	5.6	4.7	6.5
Free	20.1	20.7	23.8	26.6	32.7	31.4
Partly Free	10.3	20.9	19.5	12.9	11.5	9.7
Not Free	31.3	21.9	29.6	43.5	51.7	46.6
Total	64.0	66.4	77.7	88.6	100.7	94.2

Sources: Freedom House (2021). Countries and Territory Ratings and Statuses, 1973-2021. U.S. Energy Information Administration (2021). Petroleum and other liquids production.

Natural gas production 1980 to 2018						
	1980	1990	2000	2010	2017	2018
			Share of world p	production, in %		
Countries not measured	3%	3 %	3 %	4 %	4 %	4 %
Free	55%	42 %	48 %	41%	38 %	38 %
Partly Free	5%	47 %	30 %	9 %	10 %	10%
Not Free	36 %	8 %	19 %	45 %	49 %	48 %
Total	100%	100%	100%	100%	100%	100%
	1980	1990	2000	2010	2019	2020
			Billions cubic fe	eet (bcf) annual		
Countries not measured	1,816	2,132	2,452	4,204	4,854	5,129
Free	29,479	30,893	41,527	46,886	49,650	53,215
Partly Free	2,710	34,841	26,213	10,670	12,719	13,850
Not Free	19,373	5,521	16,578	51,325	63,528	65,591
Total	53,378	73,387	86,770	113,085	130,751	137,785

Sources: Freedom House (2021). Countries and Territory Ratings and Statuses, 1973-2021. U.S. Energy Information Administration, International Statistics.

FOREIGN OIL IMPORTS

44.

Despite its vast oil and gas resources, Canada does import foreign oil. Between 1988 and 2020, Canada spent <u>\$488 billion</u> (\$604 billion in 2020 dollars) importing crude oil from such countries as Saudi Arabia, Iraq, Russia, Azerbaijan, Nigeria, Algeria, Angola, Venezuela, and Kazakhstan, as well as the United Kingdom, Norway and, more recently, the United States.

45.

Between 1988 and 2020, the five largest exporters of foreign crude oil to Canada were the United States (\$94.6 billion), followed by Norway (\$79.0 billion), the United Kingdom (\$62.6 billion), Algeria (\$58.4 billion), and Saudi Arabia (\$44.4 billion).

Canada's Crude Oil* Imports by Country



*Petroleum oils and oils obtained from bituminous minerals. Source: Derived from Statistics Canada, Canadian International Merchandise Trade Database.



*Petroleum oils and oils obtained from bituminous minerals.

Source: Derived from Statistics Canada, Canadian International Merchandise Trade Database.

Quebec imported <u>\$228.4 billion</u> in foreign oil between 2000 and 2020, more than any other province.

47.

Between 2010 and 2020, Canada's oil imports were worth a total of \$231.1 billion. U.S. oil imports accounted for nearly \$84.2 billion, followed by imports from Saudi Arabia at <u>\$26.3 billion</u>. That is over \$110 billion in foreign oil imported to Canada from those two countries alone in that decade.



*Petroleum oils and oils obtained from bituminous minerals.



*Petroleum oils and oils obtained from bituminous minerals.

Derived from Statistics Canada, Canadian International Merchandise Trade Database.

Source: Derived from Statistics Canada, Canadian International Merchandise Trade Database.

Canada spent nearly <u>\$238 billion</u> on crude oil imports between 2010 and 2020. This is:

- Higher than the almost \$192 billion Canada spent on farm, fishing, and intermediate food products imports;
- Higher than the nearly \$205 billion Canada spent on aircraft and other transportation equipment and parts imports; and
- Just below the \$256 billion Canada spent on forestry products and building and packaging materials imports.



49.

Between 2010 and 2020, Canada spent over <u>\$26.3</u> <u>billion</u> on crude oil imported from Saudi Arabia. This \$26.3 billion expenditure is larger than the:

- \$1.7 billion Canada spent importing coffee from Brazil;
- \$2.5 billion Canada spent importing coffee from Colombia;
- \$7.8 billion Canada spent importing fruits, nuts, citrus fruits, and melons from Mexico;
- \$9.2 billion Canada spent importing edible vegetables and certain roots and tubers from Mexico;
- \$16.4 billion Canada spent importing footwear from China; and
- \$19.9 billion Canada spent importing pharmaceutical products from Germany

*Petroleum oils and oils obtained from bituminous minerals.

Source: Derived from Statistics Canada, Canadian International Merchandise Trade Database



*Petroleum oils and oils obtained from bituminous minerals.

Source: Derived from Statistics Canada, Canadian International Merchandise Trade Database

In nearly three decades (1993-2019), the U.S. has imported over <u>84 billion</u> barrels of foreign crude oil, an average of over 3.1 billion barrels per year.

51.

U.S. foreign crude oil imports between 1993 and 2019 were highest from Canada (19.6 billion barrels or 23.3 percent of the total), followed by Saudi Arabia (<u>12.6 billion barrels or 15 per-cent</u>), and Mexico (11 billion barrels or 13.1 percent).

52.

Of all U.S. foreign crude oil imports, 29.3 percent came from countries designated as Free, with 29.2 percent from Partly Free countries and <u>41.5 percent</u> from Not Free countries.

53.

In almost three decades (1993-2020), the U.S. has imported nearly $\frac{4.2 \text{ trillion}}{4.2 \text{ trillion}}$ of foreign crude oil, an average of over \$148 billion per year.

54.

U.S. foreign crude oil imports between 1993 and 2020 were highest from Canada (\$956 billion or 23 percent of the total), followed by Saudi Arabia (<u>\$607 billion</u> <u>or 14.6 percent</u>), and Mexico (\$487 billion or 11.7 percent).

US oil imports 1993 to 2019, by volume Top 10 source countries

	Billions of barrels	Freedom ranking*
Canada	19.6	Free
Saudi Arabia	12.6	Not Free
Mexico	11.0	Partly Free
Venezuela	9.9	Not Free
Nigeria	6.2	Partly Free
Iraq	4.0	Not Free
Angola	3.1	Not Free
Colombia	2.7	Partly Free
Kuwait	2.2	Partly Free
Ecuador	1.7	Partly Free

Sources: US Energy Information Administration and Freedom House *As of 2019

55.

U.S. foreign crude oil imports from Not Free countries were nearly <u>\$1.8 trillion or 43 percent</u> of total U.S. foreign crude oil imports between 1993 and 2020.

56.

Just under <u>\$1.2 trillion</u> of U.S. foreign oil came from Partly Free countries (28.4 percent) with just over \$1.2 trillion (28.6 percent) from Free countries.

U.S. foreign oil imports 1993 to 2020, *by value* Top 10 source countries

	In \$ billions	Freedom ranking*
Canada	956	Free
Saudi Arabia	607	Not Free
Mexico	487	Partly Free
Venezuela	462	Not Free
Nigeria	328	Partly Free
Iraq	213	Not Free
Angola	151	Not Free
Colombia	146	Partly Free
Kuwait	105	Partly Free
Algeria	100	Not Free

Sources: US Energy Information Administration and Freedom House *As of 2019



Sources: US Census Bureau and Freedom House



Sources: US Census Bureau and Freedom House

57.

In the past 15 years (2005-2019), the EU has imported 61.5 billion barrels of foreign crude oil, an average of over 4 billion barrels a year, which is worth over €4.6 trillion on an extra- and intra-EU basis, or nearly CAD\$6.9 trillion.

Year	Volume (billions of barrels)	Total Value (in € billions)
2005	4.5	233
2006	4.5	281
2007	4.4	312
2008	4.4	429
2009	4.1	247
2010	4.0	319
2011	3.9	428
2012	4.0	450
2013	3.8	414
2014	3.8	380
2015	4.0	208
2016	4.0	167
2017	4.0	215
2018	4.0	283
2019	4.0	258
Totals	61.5	4,622

Over <u>41.3 billion barrels, or 68 percent</u> of the oil imported into the EU, has been imported from Not Free countries, with an additional 5.3 billion barrels, or 9 percent, coming from Partly Free countries. Meanwhile, 11.8 billion barrels, or 19 percent, was sourced from Free countries.

59.

Of the more than 41.3 billion barrels of oil that the EU imported from Not Free countries between 2005 and 2019:

- a. Over <u>17.2 billion barrels, or about 42 percent</u>, came from Russia;
- b. Nearly 4.6 billion barrels, or 11 percent, came from Saudi Arabia;
- c. Nearly 4 billion barrels, or 9.6 percent, came from Libya;
- d. Over 3.5 billion barrels, or 8.5 percent, came from Kazakhstan; and
- e. Nearly 2.9 billion barrels, or 6.9 percent, came from Iraq.

60.

Between 2005 and 2019, the EU imported over €4.6 trillion worth of foreign crude oil, an average of €308 billion worth each year. That's nearly CAD\$6.9 trillion in total, or an annual average of CAD\$458 billion in crude oil imports.



Types of Countries Exporting Oil to

Source: European Commission, 2021.



Source: European Commission, 2021.

Nearly €3.1 trillion worth (about CAD\$4.6 trillion), or 67 percent, was imported from Not Free countries, with an additional €411 billion or 9 percent coming from Partly Free countries. The EU sourced €901 billion, or nearly 20 percent, from Free countries.

62.

Of the nearly €3.1 trillion in oil that the EU imported from Not Free countries between 2005 and 2019, the top five sources were as follows:

- a. Nearly <u>€1.3 trillion, or about 42 percent</u>, came from Russia;
- b. Nearly €343 billion, or just over 11 percent, came from Saudi Arabia;
- c. Over €305 billion, or 9.9 percent, came from Libya;
- d. Nearly €267 billion, or 8.7 percent, came from Kazakhstan; and
- e. Nearly €192 billion, or 6.2 percent, came from Iraq;

63.

In the past 15 years, the EU has imported €838.3 billion in natural gas from foreign sources, an average of nearly €56 billion per year.



Source: European Commission, 2021.



Source: European Commission, 2021.

Natural gas valued at over €286 billion, or 34.1 percent, has been imported by the EU from Not Free countries, €519 billion or 62 percent from Free countries, with an additional €2 billion, or 0.2 percent, from Partly Free countries.



Sources: Eurostat, 2021, and Freedom House, 2020,						
	Sources: Eurostat	. 2021.	and	Freedom	House.	2020.

65.

Of the over €286 billion worth of natural gas imported by the EU from Not Free countries between 2005 and 2019:

- a. Almost <u>€165.3 billion worth</u>, or about 58 percent, came from Russia;
- b. over €89.1 billion worth, or 31.1 percent, came from Algeria; and
- c. nearly €17.5 billion worth, or 6.1 percent, came from Libya.

Total EU natural				
2	2005 to 2019 (in € billions)			
2005	49.3			
2006	63.5			
2007	57.6			
2008	51.3			
2009	48.4			
2010	53.0			
2011	64.4			
2012	74.7			
2013	78.1			
2014	60.0			
2015	52.2			
2016	39.4			
2017	48.4			
2018	58.0			
2019	40.1			
Totals	838.3			

Source: Eurostat, 2021.

The EU's Top Sources of Natural Gas from Not Free Countries

2005-2019, % Totals (Based on € Value of Imports)



Sources: Eurostat, 2021, and Freedom House, 2020.

OIL AND GAS AND

RENEWABLE SUBSIDIES

66.

Between 2010 and 2013, the IEA estimates that fossil fuel subsidies worldwide increased from US\$445.3 billion to US\$530.3 billion, before steadily declining to <u>US\$317.6 billion</u> in 2019. Iran led the way at US\$86.1 billion, followed by China at US\$30.5 billion, Saudi Arabia at US\$28.7 billion, Russia at US\$24.1 billion, India at US\$21.8 billion, Indonesia at US\$19.2 billion, and Egypt at US\$15.8 billion.

67.

According to the International Renewable Energy Agency (IRENA), as fossil fuel subsidies fall and the deployment of renewable energy accelerates, the total subsidies for renewables will grow. Looking towards 2050, as the demand for fossil fuel declines, direct subsidies for those fuels are expected to fall from US\$447 billion in 2017 to US\$165 billion in 2030 and to US\$139 billion in 2050

IRENA Estimate of Energy Sector Subsidies by Source In 2018 US\$ Billions						
2017 2030 2050						
Fossil fuels	447	165	139			
Nuclear	21	27	21			
Electric vehicles		34				
Efficiency		47	106			
Renewables	166	192	209			
Totals	634	465	475			

Source: IRENA, 2020a.



Source: International Energy Agency, Fossil Fuel Subsidies Database, 2020. *Includes oil, natural gas, gasoline, and electricity.

In 2018, the IEA examined the trends and calculated renewable subsidies out to 2040 under its New Policies Scenario (NPS). NPS reflects the impact of existing policy frameworks and announced policy intentions. Under the NPS, global support provided to renewable-based electricity will peak at just under US\$305 billion in 2035 and then decline to about US\$283 billion by 2040. Of the total cumulative support from 2017 to 2040, more than 75 percent is earmarked for solar PV and wind power, and more than 15 percent for bioenergy. Cumulative support for renewables between 2020 and 2040 is estimated at over US\$5.4 trillion.



Source: IEA, World Energy Outlook, 2018. *In 2017 dollars.

IMPACT OF CARBON TAXES

ON VEHICLE FUEL COSTS IN CANADA

69.

Between 2021 and 2030, gasoline costs associated with the federal carbon tax are expected to rise from 8.8 cents per litre to 39.6 cents per litre, an increase of <u>350 percent</u> over those nine years This will have significant impact on the estimated annual fuel costs for the top five vehicles sold in Canada, based on 2019 sales. In 2030, the carbon tax portion will comprise between \$723 and \$1,158, or about 24 percent, of the total fill-up costs, assuming that the remaining components of the gasoline cost structure stay the same:

- Ford 150: \$4,832 in annual fuel costs, with the federal carbon tax comprising \$1,158 of that cost, an increase of \$901, or 350 percent, from 2021.
- Dodge Ram 1500: \$4,832 in annual fuel costs, with the federal carbon tax comprising \$1,158 of that cost, an increase of \$901, or 350 percent, from 2021.
- Toyota RAV4: \$3,263 in annual fuel costs, with the federal carbon tax comprising \$782 of that cost, an increase of \$608, or 350 percent, from 2021.
- Honda Civic: \$3,015 in annual fuel costs, with the federal carbon tax comprising \$723 of that cost, an increase of \$562, or 350 percent, from 2021.
- Honda CR-V: \$3,180 in annual fuel costs, with the federal carbon tax comprising \$762 of that cost, an increase of \$593, or 350 percent, from 2021.



Source: Authors' calculations from Canada Revenue Agency, 2021.



Source: Authors' calculations from Canada Revenue Agency, 2021.

Canadian Energy Centre

ENERGY POVERTY IN THE E.U.

70.

In United Kingdom and Ireland, electricity prices soared by <u>51 percent and 48 percent</u>, respectively while household median income rose by just 14 percent and 11 percent. The split between significantly higher power bills and an almost statusquo reality on median household incomes helps explain why some European (or United Kingdom) households have found it increasingly difficult to pay their utility bills.

71.

In Spain, electricity prices soared by <u>68 percent</u> between 2008 and 2020 with median household income rising by just eight percent (by 2019).



Source: Authors' calculation from Eurostat database.

According to the European Commission: An average household in the EU27 paid €25 /MWh in renewable taxes in 2019. This figure equals 29 percent of the taxes and levies component and 12 percent of the total average EU price. The average amount of renewable taxes paid by households in the EU27 rose by 153 percent since 2010.

Electricity Prices for household consumer, second half of 2020

Euro/MWh

Germany	300.6
Denmark	281.9
Belgium	270.2
Ireland	261.6
Spain	229.8
United Kingdom	220.3
Austria	216.7
Italy	215.3
European Union - 27 countries (from 2020)	213.4
Portugal	213.3
Luxembourg	198.5
France	195.8
Czech Republic	179.5
Finland	177.3
Slovakia	172.4
Sweden	171.8
Cyprus	169.8
Slovenia	169.4
Greece	164.1
Poland	151
Romania	144.9
Latvia	143.2
Netherlands	136.1
Norway	132.2
Lithuania	132.1
Croatia	130.7
Malta	129.8
Estonia	129.1
Hungary	100.9
Bulgaria	98.2

Source: Eurostat Database (2021).

About the **Canadian Energy Centre**

The Canadian Energy Centre's mandate is to promote Canada as the supplier of choice for the world's growing demand for responsibly produced energy. It is an independent provincial corporation that is primarily supported by the Government of Alberta's industry-funded Technology, Innovation and Emissions Reduction (TIER) fund. www.canadianenergycentre.ca.

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About the authors

This CEC Research Brief was compiled by Lennie Kaplan, former Chief Research Analyst and current Executive Director of Research; Ven Venkatachalam, former Senior Research Analyst and current Chief Research Analyst; and Mark Milke, former Executive Director of Research.

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