



Natural Resources Canada Ressources naturelles Canada

## Energy Fact Book 2025–2026

Canadä



## **Energy Fact Book** 2025–2026



Aussi disponible en français sous le titre : Cahier d'information sur l'énergie, 2025-2026

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Cat. No. M136-1E (Print) M136-1E-PDF (online)

ISSN 2370-3105 ISSN 2370-5027

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#### **Preface**

The Energy Fact Book provides **reliable**, **up-to-date statistics and analysis** to support evidence-based dialogue on Canada's energy sector.

Designed for a wide audience—including government, industry, academia, educators, media and the public—this resource aims to bridge technical depth with broad accessibility.

The contents of this publication span a wide array of indicators including energy production and consumption, prices and trade; as well as economic contributions, technology trends and environmental impacts – curated to provide a holistic overview of Canada's energy system.

The Energy Fact Book draws on the expertise of Natural Resources Canada, Statistics Canada, the Canada Energy Regulator and Environment and Climate Change Canada, and **benefits from ongoing collaboration across federal and provincial agencies**, under the scope of the **Canadian Centre for Energy Information**.

Refer to the annexes for definitions, methodology, and notes on data availability and consistency. For questions and comments, contact **energyfacts-faitsenergetiques@nrcan-rncan.gc.ca.** 

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#### Introduction

Canada is an energy nation. From hydroelectricity to the oil sands to emerging renewables, our vast and varied natural resources have helped build a resilient economy, connect our communities, and support energy security at home and abroad.

Today, the energy landscape is evolving. Canada is innovating in how energy is produced, delivered, and used. Renewable electricity continues to grow, led by wind and solar. Oil and gas remain foundational to the mix, meeting energy needs at home and abroad, supported by efficiency gains and operational advancements in production and use. At the same time, clean fuels are emerging and technologies such as carbon capture, energy storage, and electrification are reshaping industrial processes and transportation.

These changes are part of a global energy transformation—driven by technological change, shifting demand, affordability needs, and the imperative to maintain international competitiveness. With its geography, skilled workforce, and commitment to research, Canada is positioned to lead in this transformation, —leveraging regional strengths, priorities, energy mixes, and economic pathways.

Reliable data are essential to understanding these developments and seizing the opportunities they create for innovation, investment, and long-term economic growth. By presenting key facts and indicators on Canada's energy system in a clear and accessible format, the Energy Fact Book has remained a trusted reference for over fifteen years.



## Section 6: Oil, Natural Gas and Coal

Crude oil

Natural gas

Hydrocarbon gas liquids (HGLs)

Refined petroleum products (RPPs)

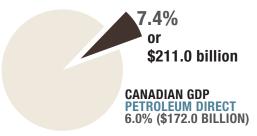
Coal

GHG emissions from petroleum

#### **Petroleum and the Economy**

#### **NOMINAL GDP CONTRIBUTION FOR CANADA, 2024**

NOMINAL GDP (% OF CURRENT DOLLARS)



PETROLEUM INDIRECT 1.4% (\$39.0 BILLION)

- Capital Expenditures (2024): \$57 billion
- Canada's oil and gas sector represents about **30%** of the country's GHG emissions.
- Exports (2024): \$188 billion (26% of total exports)

#### **EMPLOYMENT, 2024**

**DIRECT: 189,700 JOBS** 

Oil and gas extraction:	78,100
Support activities:	57,600
Exploration:	3,200
Natural gas transmission and distribution:	20,100
Crude oil and other pipeline transportation:	5,800
Other:	24.800

**INDIRECT: 313,400 JOBS** 

TOTAL: 503,100 JOBS

Approximately
11,300 Indigenous
people are employed in the oil and gas sector.

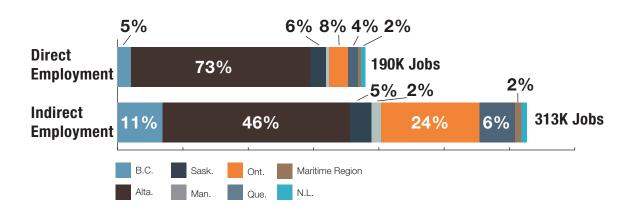


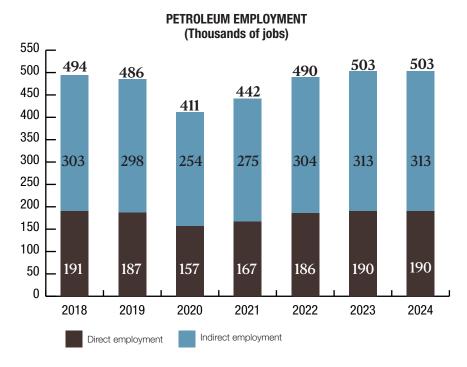
Parts may not sum to total due to rounding. The indirect contribution is not comparable to previously published estimates due to revisions and a change in estimation methodology by Statistics Canada. For more information on Statistics Canada's estimation methodology, please contact statcan.iadinfoddci-dciinfoiad.statcan@statcan.gc.ca.

While Canada's petroleum sector directly employed 190K people in 2024, the sector's use of inputs from other industries created an additional

#### 313K indirect jobs in the supply chain.

Alberta employed the largest share (46%) of the supply chain workers followed by Ontario (24%). BC (11%), Quebec (8%), and Saskatchewan (5%) also accounted for sizeable shares of supply chain jobs.





Parts may not sum to total due to rounding. The indirect contribution is not comparable to previously published estimates due to revisions and a change in estimation methodology by Statistics Canada. For more information on Statistics Canada's estimation methodology, please contact statcan.iadinfoddci-dciinfoiad.statcan@statcan.gc.ca.

#### PETROLEUM GDP (Billions of Canadian Dollars)



Parts may not sum to total due to rounding. The indirect contribution is not comparable to previously published estimates due to revisions and a change in estimation methodology by Statistics Canada. For more information on Statistics Canada's estimation methodology, please contact statcan.iadinfoddci-dciinfoiad.statcan@statcan.gc.ca.

#### **Crude Oil**

#### INTERNATIONAL CONTEXT

World production\* – 89.2 MMb/d (2024)

1 United States 19%
2 Russia 12%
3 Saudi Arabia 11%
4 Canada 7%
5 Iraq 5%

#### World exports\* - 45.3 MMb/d (2023)

1 Saudi Arabia	15%
2 Russia	12%
3 Canada	9%
4 United States	9%

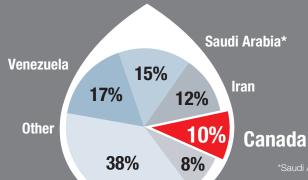
<sup>\*</sup> includes crude oil, NGLs, additives and other hydrocarbons (including the receipts of additives).

# World proved reserves 1,768 billion barrels (at the end of 2023)

Iraq

Proved reserves are those reserves expected to be recoverable with a high degree of certainty.





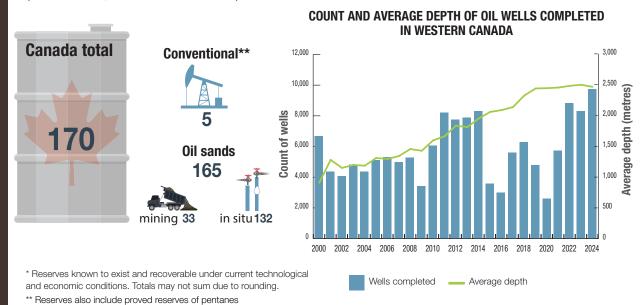
of Canada's proven oil reserves are located in the oil sands.

\*Saudi Arabia and Kuwait reserves include the Saudi-Kuwaiti "neutral zone," with total proved reserves of 5 billion barrels.

#### **CANADIAN RESOURCES**

#### REMAINING ESTABLISHED RESERVES\*

(billion barrels, as of December 2023)



plus (a crude-oil equivalent that is associated with oil production).

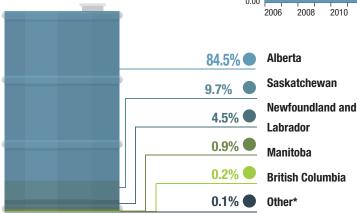
#### CANADIAN PRODUCTION

Oil sands production has exceeded conventional production since 2010.

In 2024, oil sands production was 3.4 MMb/d compared with 1.8 MMb/d of other oil production.

#### PRODUCTION BY TYPE 6.00 5.00 Milion barrels per day 4.00 3,00 Oil sands \* 2.00 1.00 Conventional, offshore and tight oil 0.00 2016 2006 2008 2010 2012 2014 2018 2022 2024

#### PRODUCTION BY PROVINCE, 2024



<sup>\*</sup>Other: Nova Scotia. Ontario and the Northwest Territories.

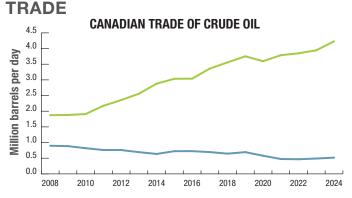
#### **CANADIAN SUPPLY AND DEMAND\* (2024)**







**CRUDE OIL INPUT TO DOMESTIC REFINERIES** 

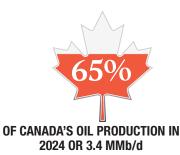


Exports Imports

#### OIL SANDS

An estimated \$379 billion of capital investment to date, including **\$13.3 billion** in 2024





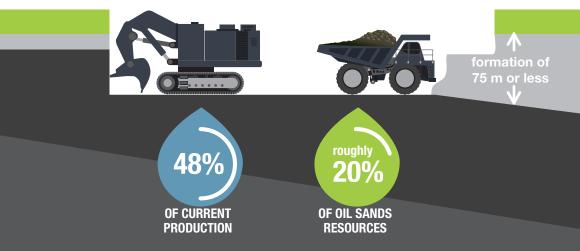
#### **BITUMEN UPGRADING**

- Crude bitumen from oil sands may be transported to upgraders for processing to make it lighter – "synthetic crude oil."
- In 2024, **41%** of the raw bitumen produced was sent for upgrading in Alberta.
- Major companies with upgrading capacity include Syncrude, Suncor, Shell, Canadian Natural Resources, Husky and Nexen-CNOOC.
- The total upgrading capacity in Canada is 1.3 MMb/d
- Bitumen may also be blended with diluent (e.g. condensates) and sold directly to refineries capable of processing heavier oils.

#### MINING METHOD

**Process:** Companies use trucks and shovels to scoop oil sands from the ground. The oil sands are then transported to extraction plants where bitumen is separated from the sand by using steam. Tailings are then pumped into settling basins.

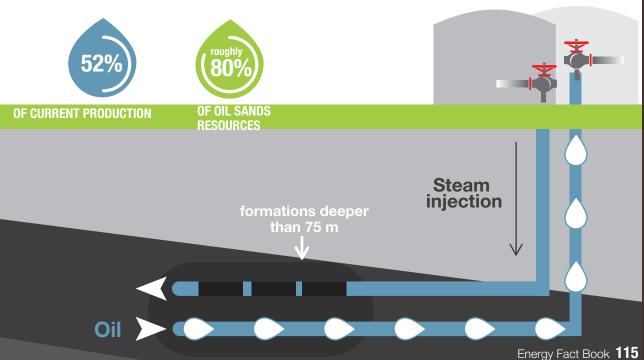
In 2024, seven projects in Alberta produced 1,715 Mb/d: Syncrude Mining Project (365 Mb/d), Suncor Base Mine (262 Mb/d), CNRL Horizon Mine (282 Mb/d), Athabasca Oil Sands Project – Muskeg River (188 Mb/d), Jackpine Mine (142 Mb/d), Imperial's Kearl Mine (300 Mb/d) and Fort Hills (176 Mb/d).



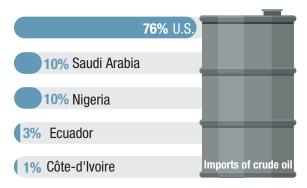
#### IN SITU METHOD

Process: Companies drill vertical and/or horizontal wells to inject steam to facilitate the flow of oil.

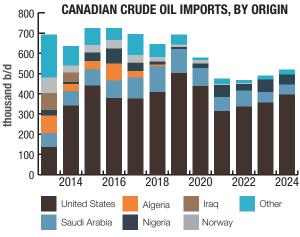
More than 20 projects in Alberta – The largest projects in 2024 were Firebag and MacKay River (Suncor) at 266 Mb/d, Christina Lake (Cenovus) at 234 Mb/d, Foster Creek (Cenovus) at 194 Mb/d and Cold Lake (Imperial Oil) at 150 Mb/d.



In 2024, imports of crude oil into Canada came from a range of countries including:



In 2024, Canada was the **largest foreign supplier of crude oil** to the U.S., accounting for

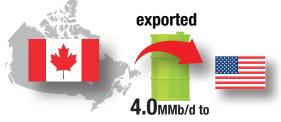


Over recent years, the U.S. has become Canada's

primary supplier of imported crude oil.







representing

96%
of all Canadian crude oil exports

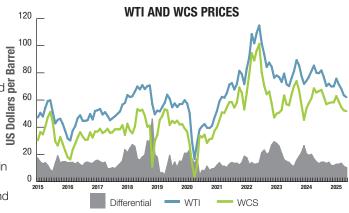
#### **PRICES**

#### WEST TEXAS INTERMIEDATE (WTI) AND WESTERN CANADIAN SELECT (WCS)

- WTI is a reference price for light crude oil delivered at Cushing, Oklahoma (a major pipeline hub) and is used as the benchmark price for North American crudes. WTI underlies oil futures contracts on the NYMEX.
- WCS is the main benchmark price for Canadian heavy crude, specifies delivery at Hardisty, Alberta and is representative of the price of oil from the oil sands.

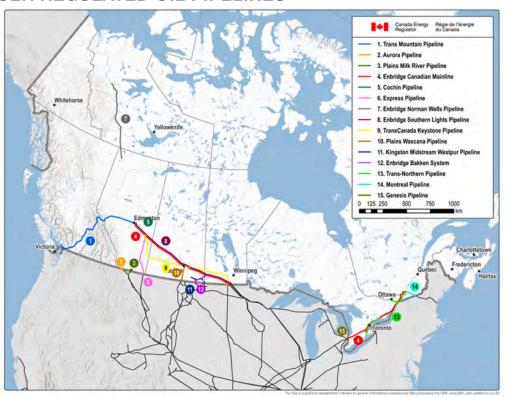
#### WTI-WCS DIFFERENTIAL

- WCS is typically sold at a discount to WTI due to differences in quality and transportation costs.
   Heavy crude is more difficult to process and requires specialized equipment at refineries.
- The WCS-WTI differential has historically averaged between US\$10-\$15 per barrel. However, during the fall of 2018, the differential reached a record high of over US\$50 per barrel due to insufficient pipeline capacity.
- In Q2 2020, oil prices collapsed due to the drop in demand resulting from the global pandemic. US refineries drastically reduced their refinery runs and purchases of Canadian heavy crude.



 Starting in Q3 2020, easing lockdown measures led to a demand recovery and a price rebound that lasted through 2021, accelerating in the first half of 2022 following the Russian invasion of Ukraine. After peaking in June 2022, prices trended downward due to increasing global inventories and concerns over slowing demand amid rising interest rates.

#### MAJOR CER REGULATED OIL PIPELINES

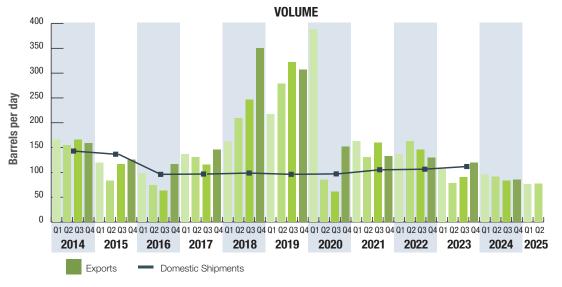


#### **OIL BY RAIL**

Oil shipments by rail have varied considerably over the past decade, driven by shifts in global oil prices and transportation capacity. Exports fell sharply in 2015-2016 amid declining prices, then surged in 2018 as pipeline constraints in Western Canada increased reliance on rail.

Exports reached a high of 412 Mb/d in February 2020, just before a pandemic-related price downturn triggered a steep decline. Although volumes briefly rebounded, they have since levelled off below prior peaks.

By contrast, domestic shipments of fuel oils and crude have remained relatively stable since 2016.

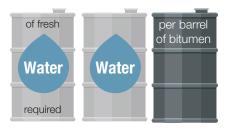


### OIL SANDS: ENVIRONMENTAL CONSIDERATIONS

**WATER** 

Mining method:

#### 2.1 barrels



Oil sands producers recycle about

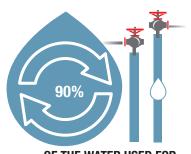


OF THE WATER USED FOR ESTABLISHED MINES

In situ method: an average of

#### 0.15 barrels





OF THE WATER USED FOR IN SITU PRODUCTION

#### **GREENHOUSE GASES**

13% of Canada's total GHG emissions in 2023 and 0.18%of global emissions in 2022

From 2000 to 2023, emissions intensity per barrel decreased by



as a result of technological and efficiency improvements, fewer venting emissions and reductions in the percentage of crude bitumen being upgraded to synthetic crude oil.

#### LAND

- area of oil sand resources 142,200 km²
- total mineable area 4,800 km<sup>2</sup>
- total area being mined 953 km² tailings ponds 257 km<sup>2</sup>

#### For comparison:

- Canada's area 10,000,000 km²
- Canada's boreal forest 2,700,000 km<sup>2</sup>

#### Natural gas

#### INTERNATIONAL CONTEXT

World production – 413 Bcf/d (11.7 Bcm/d) (2024, PRELIMINARY)

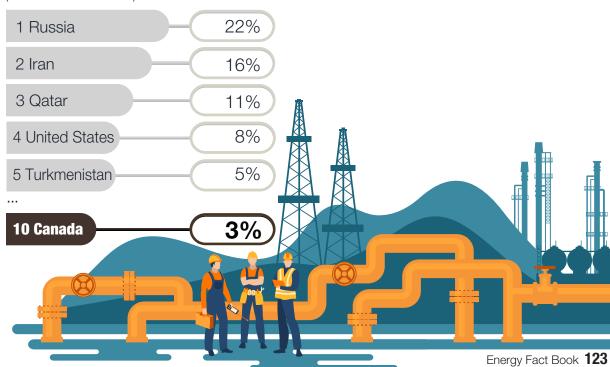
5 Canada	5%
4 China	6%
3 Iran	7%
2 Russia	16%
1 United States	25%

### World exports – 119 Bcf/d (3.4 Bcm/d) (2024, PRELIMINARY)

6 Canada	7%
5 Australia	9%
4 Qatar	10%
3 Noway	10%
2 Russia	13%
1 United States	18%

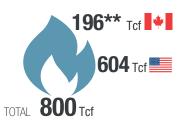
#### World proved reserves – 7,604 Tcf (215 Tcm)

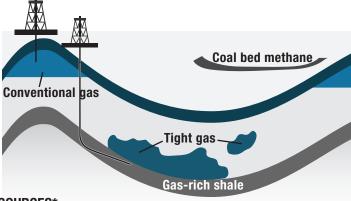
(BEGINNING OF 2024)



#### **CANADA-U.S. RESOURCES**

PROVED RESERVES\* (Beginning of 2024)





#### MARKETABLE/TECHNICALLY RECOVERABLE RESOURCES\*

Canada total, year-end 2023 1,368 Tcf

conventional
380 Tcf
unconventional
988 Tcf
(coal-bed methane, shale and tight gas)

World total (year-end 2022) 28,358 Tcf



U.S. total, year-end 2020 2,973 Tcf



portion that is shale and tight gas **2,172** Tcf portion that is other **801** Tcf

<sup>\*</sup> Please see Annex 2: Units and conversion factors for definitions of proved reserves and recoverable resources.

<sup>\*\*</sup> NRCan approximation based on data publicly available as of August 2025.

#### CANADA-U.S. MARKET (2024)

Canada's natural gas market is heavily integrated with that of the U.S. largely because of the location of supply basins, demand centres, and the availability of transportation infrastructure, as well as existing Canada-U.S. trade agreements. These factors allow for consumers and distributors on either side of the border to freely access natural gas from the lowest cost supplier.

#### **Canadian average marketable production**

**18.8** Bcf/d (0.53 Bcm/d)



#### U.S. average marketable production

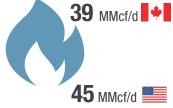
**103.2** Bcf/d (2.92 Bcm/d)



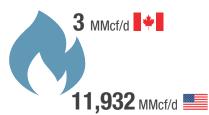
<sup>\*</sup> Unconventional gas includes tight gas, coal bed methane and shale gas.



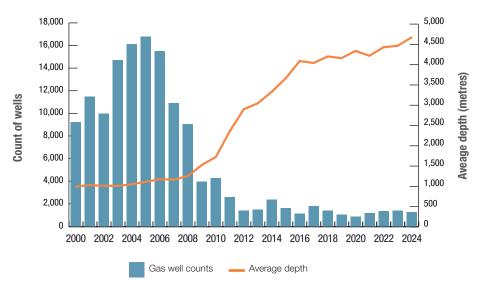




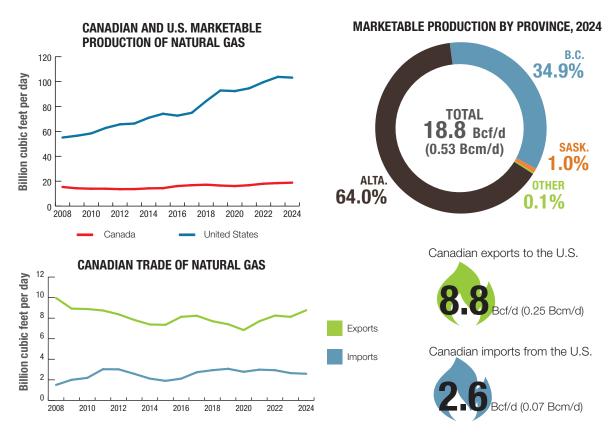
#### LNG exports



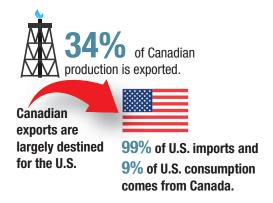
#### COUNT AND AVERAGE DEPTH OF NATURAL GAS WELLS COMPLETED IN WESTERN CANADA



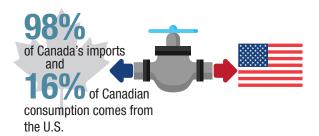
While Canadian natural gas production remained relatively flat and the number of wells drilled declined, the well productivity has increased over time. This reflects the increased use of horizontal drilling and increased well length.



- Natural gas imports from the U.S. into Eastern Canada are on the rise because of higher supplies in the U.S. Northeast and shorter transportation distances from these U.S. natural gas basins.
- Canadian natural gas exports to the western U.S. and U.S. Midwest remain significant.
- Since 2009, Canada has imported liquefied natural gas (LNG) from other countries via the Canaport LNG terminal in Saint John, N.B.
- Since 2017, Canada has also exported small quantities of LNG to other countries via the Port of Vancouver, B.C.



The value of Canadian net exports (exports minus imports) was **\$6.3 billion** in 2024.



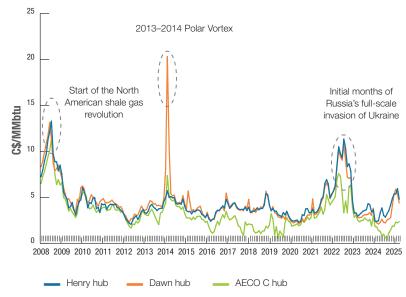
#### **UPSTREAM PRICES**

The AECO hub is Canada's largest natural gas trading hub, and the AECO price serves as a benchmark for Alberta wholesale natural gas transactions.

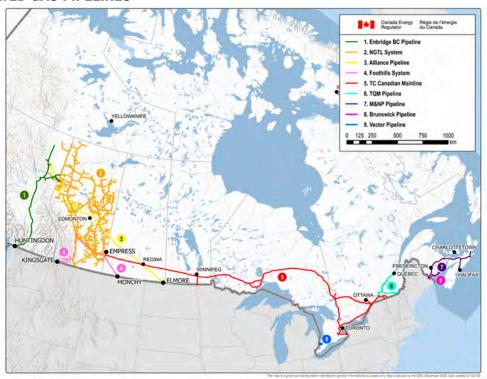
#### **AECO PRICE**

Average: 2009-2016	<b>\$3.38</b> /MMbtu
Average: 2017	<b>\$2.20</b> /MMbtu
Average: 2018	<b>\$1.53</b> /MMbtu
Average: 2019	<b>\$1.80</b> /MMbtu
Average: 2020	<b>\$2.24</b> /MMbtu
Average: 2021	<b>\$3.64</b> /MMbtu
Average: 2022	<b>\$5.43</b> /MMbtu
Average: 2023	<b>\$2.64</b> /MMbtu
Average: 2024	<b>\$1.39</b> /MMbtu

#### MONTHLY AVERAGE NATURAL GAS SPOT PRICES



#### **TRANSPORTATION CER REGULATED GAS PIPELINES**

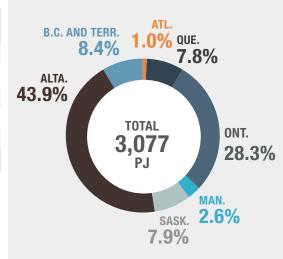


#### **NATURAL GAS ENERGY USE**

#### NATURAL GAS END USE BY SECTOR, 2022

Sector	Energy use (PJ)	Energy use (Bcf/d)	% of the total
Residential	673.3	1.75	21.9%
Commercial	608.6	1.58	19.8%
Industrial	1,740.6	4.52	56.6%
Transportation	4.8	0.01	0.2%
Agriculture	49.8	0.13	1.6%
Total	3,077.1	7.99	100%

#### **NATURAL GAS ENERGY USE BY PROVINCE, 2022**

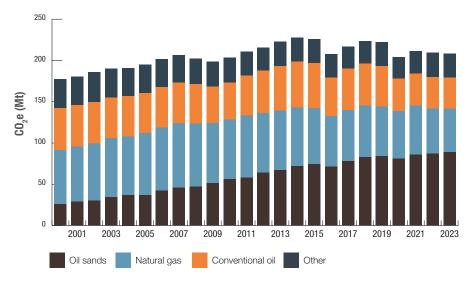


#### **GHG SPOTLIGHT: OIL AND GAS**

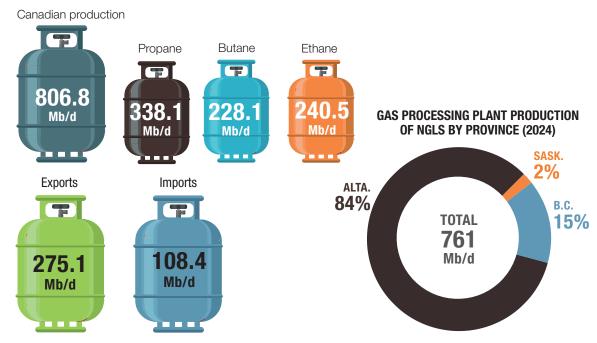
GHG emissions from oil and gas production have gone up 17% between 2000 and 2023, largely from increased oil sands production, particularly in situ extraction.

During this period, oil sands production emissions **more than tripled** while conventional oil and natural gas emissions **decreased by 23%**.

#### OIL AND GAS SECTOR GHG EMISSIONS FOR CANADA, 2000–2023



# HYDROCARBON GAS LIQUIDS (HGLs) SUPPLY AND DEMAND\* (2024)



<sup>\*</sup> excludes condensates and pentanes plus, which are induded as part of crude oil, and includes refinery-produced LPGs.

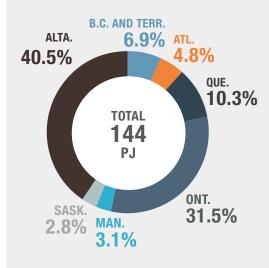
# NATURAL GAS LIQUIDS ENERGY USE

TOTAL NATURAL GAS LIQUIDS ENERGY USE WAS 144 PJ IN 2022.

Sector	Energy use* (PJ)	% of the total
Residential	16.7	11.6%
Commercial	38.0	26.4%
Industrial	67.4	46.9%
Transportation	11.9	8.3%
Agriculture	9.8	6.8%
Total	143.8	100%

<sup>\*</sup>secondary energy use

#### NATURAL GAS LIQUIDS ENERGY USE BY PROVINCE, 2022



#### REFINED PETROLEUM PRODUCTS (RPPs) PETROLEUM REFINERIES

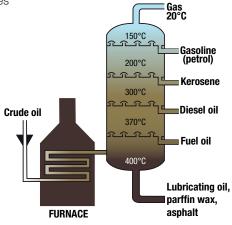
Petroleum refineries transform crude oil into a wide range of refined petroleum products (RPPs, e.g. gasoline, diesel). Other facilities such as asphalt plants, lubricant plants, upgraders and some petrochemical plants also process crude oil to produce a limited range of products.

#### REFINERY ACTIVITIES

- crude oil distillation: separating products from crude oil by heating
- additional processing: e.g. catalytic cracking, reforming, coking
- product blending: end-use RPPs are usually blended with additives or renewable fuels

#### REFINERY OUTPUTS

- transportation fuels: gasoline, diesel, aviation fuels, heavy fuel oil
- heating oil
- liquid petroleum gases: propane and butane from refineries
- petrochemical feedstock
- other products: e.g. kerosene, lubricating oils, greases, waxes, asphalt

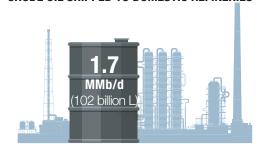


#### **SUPPLY AND DEMAND\* (2024)**

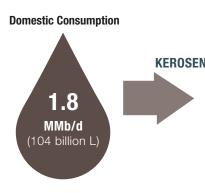
# Canadian net production Exports Imports 0.3 MMb/d (O billion L)

(20 billion L)

#### CRUDE OIL SHIPPED TO DOMESTIC REFINERIES



DOMESTIC CONSUMPTION BY PRODUCT, 2024\*



(9 billion L)

RESIDUAL FUEL OIL ASPHALT
PETROLEUM COKE 2% 3%

KEROSENE-TYPE JET FUEL5

8%

STILL GAS
9%

DISTILLATE
FUELS
31%

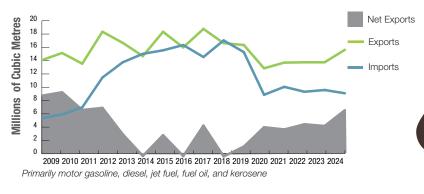
MMb/d

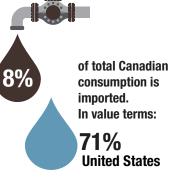
(115 billion L)

<sup>\*</sup>Some product shares are based on estimates from Natural Resources Canada.

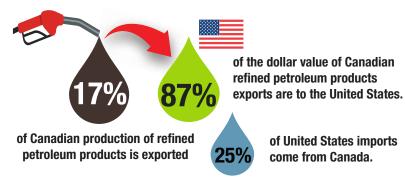
#### **TRADE**

#### CANADIAN TRADE OF MAJOR REFINED PETROLEUM PRODUCTS





8%

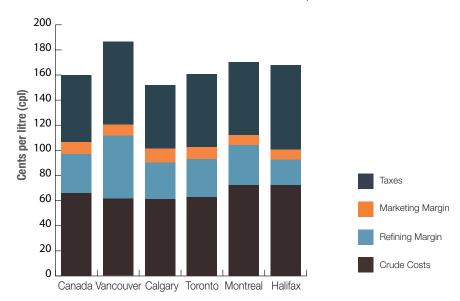






#### **RETAIL PRICES**

#### **AVERAGE CANADIAN REGULAR GASOLINE PRICES, 2024**



#### REFINERY CAPACITY

#### CANADIAN PETROLEUM REFINERIES BY COUNT AND CAPACITY\*, 2024

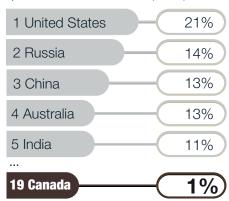
Province	Petrole refiner		Asphalt plants		Lubricant plants (using crude oil as feedstock)		Total	
	Count	Capacity	Count	Capacity	Count	Capacity	Count	Capacity
Alberta	4	530	-	-	-	-	4	530
British Columbia	2	67	-	-	-	-	2	67
New Brunswick	1	320	-	-	-	-	1	320
Ontario	4	393	-	-	1	16	5	409
Quebec	2	372	-	-	-	-	2	372
Saskatchewan	1	135	2	52	-	-	3	187
Total	14	1,817	2	52	1	16	17	1,885

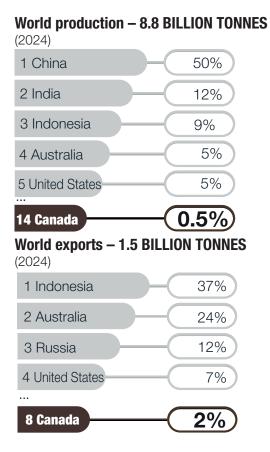
<sup>\*</sup>Capacities are in Mb/d. The Come by Chance Refinery in Newfoundland and Labrador is being converted into a biofuel refinery.

#### Coal

#### INTERNATIONAL CONTEXT

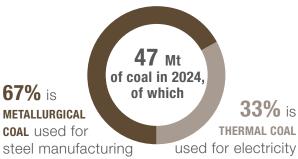
World proved reserves – 1,166 BILLION TONNES (2023)



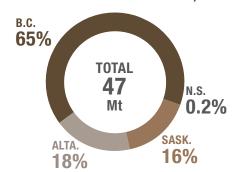


#### PRODUCTION AND USE

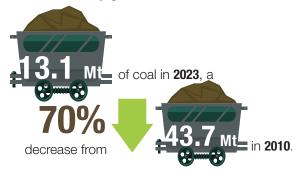




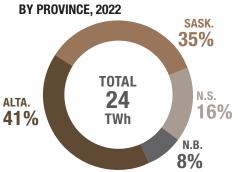
#### **COAL PRODUCTION BY PROVINCE, 2024**



#### **Electricity generation consumed**



### COAL-FIRED ELECTRICITY GENERATION BY PROVINCE 2022



# DOMESTIC DEMAND (2024)

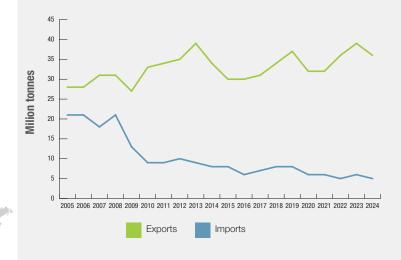


Mostly for electricity generation in Alberta and Saskatchewan



#### TRADE

#### **CANADIAN TRADE OF COAL**



Canada's exports are primarily metallurgical coal (81% in 2024).

#### **TRADE (2024)**

#### \$9.7 billion in coal exports

#### **EXPORTS**





28% South Korea **27%** China **25%** Japan

2% of Canadian exports are to the U.S.,



#### **IMPORTS**



#### \$1.1 billion in coal imports

of Canadian imports are from the U.S.

# ANNEXES

#### **Annex 1: Notes on methodology**

In this publication, energy industries are generally considered to include oil and gas extraction; coal mining; uranium mining; electric power generation, transmission and distribution; pipeline transportation; natural gas distribution; biofuels production; petroleum refineries; and support activities for oil and gas extraction. The petroleum sector is a subset of these industries, and in this publication consists of oil and gas extraction and support activities, pipeline transportation and distribution of oil and gas, and petroleum refineries.

Clean energy industries such as renewable and nuclear electricity generation, biofuels production and carbon capture and storage facilities are contained within the definition of energy industries. Some energy-related industries (e.g. petroleum product wholesaler-distributors and coal product manufacturing) are excluded because of a lack of data.

This publication represents data availability at the time of its preparation. All data is subject to revisions by statistical sources. In some instances, more than one source may be available and discrepancies in numbers may occur because of conceptual or methodological differences. In addition, some numbers may not add up precisely due to rounding.

#### **Annex 2: Units and conversion factors**

#### PREFIXES AND EQUIVALENTS

Prefix				
SI/Metric		Imperial	Equivalent	
k	kilo	М	thousand	10³
M	mega	MM	million	10 <sup>6</sup>
G	giga	В	billion	10 <sup>9</sup>
Т	tera	Т	trillion	1012
Р	peta	-	quadrillion	10 <sup>15</sup>

#### Notes

- Tonne may be abbreviated to "t" and is not to be confused with "T" for tera or trillion.
- Roman numerals are sometimes used with imperial units (this can create confusion with the metric "M").

#### **CRUDE OIL**

#### **Upstream**

- reserves usually in barrels or multiples (million barrels)
- production/capacity often in barrels per day or multiples (thousand barrels/day or Mb/d, million barrels/day or MMb/d)
- metric: 1 cubic metre = 6.2898 barrels
- International Energy Agency: uses weight (tonnes) rather than volume

#### **Downstream (petroleum products)**

- · volumes of refined products usually in litres
- 1,000 litres = 1 cubic metre
- U.S.: 1 U.S. gallon = 3.785 litres

#### **NATURAL GAS**

#### Volume

- reserves/production usually in cubic feet or multiples (billion cubic feet or Bcf, trillion cubic feet or Tcf)
- production/capacity often in cubic feet per day or multiples (Bcf/d, Tcf/d)
- metric: 1 cubic metre = 35.3147 cubic feet

#### Density

• 1 million t LNG = 48.0279 billion cubic feet **Pricing** 

Volume-based:

- cents per cubic metre (¢/m³) (customer level in Canada)
- \$ per hundred cubic feet (\$/CCF) (customer level in the U.S.)

#### Energy content-based:

- \$ per gigajoule (\$/GJ) (company level in Canada)
- \$ per million British thermal units (\$/MMbtu) (company level in the U.S., LNG)

#### **URANIUM**

- 1 metric tonne = 1,000 kilograms of uranium metal (U)
- U.S.: in pounds of uranium oxide (U<sub>3</sub>O<sub>8</sub>)
- 1 lb.  $U_3O_8 = 0.84802$  lb. U = 0.38465 kg U

#### COAL

- 1 metric tonne = 1,000 kilograms
- U.S.: 1 short ton = 2,000 pounds
- 1 metric tonne = 1.10231 short tons

#### **ELECTRICITY**

#### Capacity

 maximum rated output that can be supplied at an instant, commonly expressed in megawatts (MW)

#### **Total capacity**

• installed generator nameplate capacity

#### Generation/sales

- flow of electricity over time, expressed in watt-hours or multiples:
  - kilowatt-hours or kWh (e.g. customer level)
  - megawatt-hours or MWh (e.g. plant level)
  - gigawatt-hours or GWh (e.g. utility level)
  - terawatt-hours or TWh (e.g. country level)

#### From capacity to generation

- A 1-MW unit operating at full capacity over one hour generates 1 MWh of electricity
- Over one year, this unit could generate up to 8,760 MWh  $(1 \text{ MW} \times 24 \text{ hr} \times 365 \text{ days})$
- Units are rarely used at full capacity over time because of factors such as maintenance requirements, resource limitations and low demand
- "Capacity factor" is the ratio of actual generation to full capacity potential

#### **ENERGY CONTENT**

Rather than using "natural" units (e.g. volume, weight), energy sources can be measured according to their energy content this allows comparison between energy sources

- metric: joules or multiples (gigajoules or GJ, terajoules or TJ, petaioules or PJ)
- U.S.: 1 British thermal unit (BTU) = 1.055.06 ioules
- IEA: energy balances expressed in oil equivalent: :
  - thousand tonnes of oil equivalent (ktoe)
  - million tonnes of oil equivalent (Mtoe)

#### **Typical values**

- 1 m<sup>3</sup> of crude oil = 39.0 GJ
- 1.000 m<sup>3</sup> of natural gas = 38.3 GJ
- 1 MWh of electricity = 3.6 GJ
- 1 metric tonne of coal = 29.3 GJ
- 1 metric tonne of wood waste = 18.0 GJ
- 1 metric tonne of uranium = 420,000 GJ to 672,000 GJ

#### NATURAL GAS RESOURCES AND RESERVES

#### Proved reserves

Volumes of natural gas from known accumulations, of marketable quality, demonstrated with reasonable certainty to be recoverable, as of the estimate date, under current economic, technological, regulatory, and operating conditions. and suitable for delivery to market within a reasonable time frame.

#### Marketable/technically recoverable resources

Estimated volumes of natural gas - discovered or undiscovered – that exist in subsurface accumulations. Discovered resources are estimated quantities of gas in known drilled reservoirs, which are too remote to be connected to existing pipelines and markets. If pipelines were built, gas volumes would be recoverable under existing technological and economic conditions.

Undiscovered resources are an estimate, inferred from geological data, of gas volumes thought to be recoverable under current or anticipated economic and technological conditions, but not yet discovered by drilling. These resources may be near or remote from pipelines.

#### **Annex 3: Abbreviations**

AC	alternating current		Products Economic Account
AECO	Alberta Energy Company	EGS	enhanced geothermal system
AESO	Alberta Electric System Operator	EIA	Energy Information Administration (U.S.)
AER	Alberta Energy Regulator	EU	European Union
В	billion	EV	electric vehicle
b/d	barrels per day	FDI	foreign direct investment
Bcf/d	billion cubic feet per day	G7	seven wealthiest major developed nations:
Bcm/d	billion cubic metres per day		Canada, France, Germany, Italy, Japan,
BEV	battery electric vehicle		U.K. and U.S.
CANDU	Canada deuterium uranium	GDP	gross domestic product
CAPP	Canadian Association of Petroleum	GHG	greenhouse gas
	Producers	GJ	gigajoule
CanREA	Canadian Renewable Energy Association	GST	Goods and Services tax
CCEI	Canadian Centre for Energy Information	GWh	gigawatt hours
CCS	carbon capture and storage	HGL	hydrocarbon gas liquids
CCUS	carbon capture, utilization and storage	HST	Harmonized sales tax
CDIA	Canadian direct investment abroad	IEA	International Energy Agency
CEA	Canadian energy assets	IHA	International Hydropower Association
CER	Canada Energy Regulator	kg	kilogram
CFS	Canadian Forest Service	km	kilometre
CO, equivalent	carbon dioxide equivalent	km²	square kilometre
CPI	consumer price index	kt	kilotonne
CPL	cents per litre	kWh	kilowatt hour
DC	direct current	lb.	pound
ECCC	Environment and Climate Change Canada	L	litre
ECTPEA	Environmental and Clean Technology	LCOE	levelized cost of electricity

LNG liquefied natural gas Pkm passenger-kilometre I PG liquefied petroleum gases Provinces and territories I WR Alta. - Alberta light water reactor B.C. - British Columbia metre m  $m^2$ Man. - Manitoba sauare metre  $m^3$ cubic metre N.B. - New Brunswick Mb/d N.L. - Newfoundland and Labrador thousand barrels per day M. I N.S. - Nova Scotia megajoule MMb/d N.W.T. - Northwest Territories million barrels per day MMcf/d million cubic feet per day Ont. - Ontario MMbtu P.F.I. - Prince Edward Island million British thermal units Mt million tonnes; megatonne Que. - Quebec million tons of oil equivalent Sask. - Saskatchewan Mtoe MW Y.T. - Yukon megawatt NGCC natural gas combined cycle Atl. - Atlantic provinces NGL natural gas liquids Terr. - Territories NRCan Natural Resources Canada P/T provincial/territorial NRCan Office of Energy Efficiency OFF PV photovoltaic NRSA Natural Resources Satellite Account research, development and demonstration RD&D **NSFRC** R&D research and development National Science and Engineering Research Council of Canada **RPP** refined petroleum products NYMEX New York Mercantile Exchange SDTC Sustainable Development Technology OFCD Organisation for Economic Co-operation Canada and Development StatCan Statistics Canada **PHFV** plua-in hybrid electric vehicle States **PHWR** pressurized heavy water reactor Ala.- Alabama

PJ

petaioule

Ariz. - Arizona

Ark.- Arkansas N.D. - North Dakota Calif. - California Okla.- Oklahoma Colo. - Colorado Ore. - Oregon Conn. - Connecticut Penn. - Pennsylvania Del. - Delaware R.I. - Rhode Island D.C. - District of Columbia S.C. - South Carolina Fla. - Florida S.D. - South Dakota Tenn. - Tennessee Ga. - Georgia III. - Illinois Tex. - Texas Ind. - Indiana Vt.- Vermont Kans. - Kansas Va. - Virginia Ky. - Kentucky Wash. - Washington La. - Louisiana W.Va. - West Virginia Me. - Maine Wis. - Wisconsin Md. - Maryland Wyo. - Wyoming Mass. - Massachusetts Tcf trillion cubic feet Tcm trillion cubic metres Mich. - Michigan Minn. - Minnesota Tkm tonne-kilometre Miss. - Mississippi tonnes Mo. - Missouri **TPFS** total primary energy supply Mont. - Montana TWh terawatt-hour Nebr.- Nebraska TSX Toronto Stock Exchange Nev. - Nevada U.K. United Kingdom U.S. United States N.H. - New Hampshire N.J. - New Jersey US\$ United States dollars N.Mex. - New Mexico V volt Western Canadian Select N.Y.- New York **WCS** N.C.- North Carolina WTI West Texas Intermediate

#### **Annex 4: Sources**

#### **SECTION 1: KEY ENERGY, ECONOMIC AND ENVIRONMENTAL INDICATORS**

#### ENERGY PRODUCTION AND SUPPLY

- Global Primary Energy Production: IEA. Annual Database
- Global Energy Rankings: IEA. Annual Database; IHA. World Hvdropower Outlook
- Primary Energy Production by Region & Source: StatCan. Tables 25-10-0020-01, 25-10-0029-01, 25-10-0030-01, 25-10-0031-01, and 25-10-0082-01; NRCan OEE. National Energy Use Database; ECCC. Special tabulations
- Canada's energy supply: IEA. Annual Database
- Primary and secondary energy use: NRCan OEE. National Energy Use Database

#### ECONOMIC CONTRIBUTION

- **GDP:** StatCan. Tables 38-10-0285-01, 36-10-0221-01. 36-10-0103-01 and 36-10-0400-01; StatCan, Custom tabulations; NRCan estimates
- Employment: StatCan. Tables 38-10-0285-01, 36-10-0480-01 and 14-10-0023-01; StatCan. Custom tabulations: NRCan estimates
- Energy Trade: StatCan. International Merchandise Trade Database; IEA. Annual Database; U.S. EIA. U.S. Imports by Country of Origin
- Canada-U.S. Energy Trade: StatCan. International Merchandise Trade Database; U.S. EIA. U.S. Imports by Country of Origin; U.S. Bureau of Economic Analysis. Gross Domestic Product by State

- Canada's Global Energy Trade: StatCan. International Merchandise Trade Database: StatCan, Table: 12-10-0168-01; NRCan estimates
- Government Revenues: StatCan, Tables 33-10-0500-01 and 25-10-0065-01: CAPP. Statistical Handbook. Table 01-01: geoLOGIC Systems Ltd. Daily Oil Bulletin. Land sales data: Canada-Newfoundland and Labrador Offshore Energy Regulator (formerly Offshore Petroleum Board). Annual Report; Canada-Nova Scotia Offshore Energy Regulator (formerly Offshore Petroleum Board). Annual Report; Government of the Northwest Territories. Consolidated Financial Statements: Government of Yukon. Public Accounts; Crown-Indigenous Relations and Northern Affairs Canada, Northern Oil and Gas Annual Report

#### ENERGY AND GHG EMISSIONS

- Emissions by Sector: ECCC. National Inventory Report: Climate Watch. Data Explorer
- Indexed Trend in GHG Emissions: ECCC. National Inventory Report; StatCan. Tables 17-10-0005-01 and 36-10-0434-03

#### SECTION 2: INVESTMENT

- Capital expenditures: StatCan. Tables 34-10-0035-01. 34-10-0036-01 and 34-10-0040-01
- Canada's Energy Infrastructure: StatCan. Table 36-10-0608-01
- Canada's Major Energy Projects: NRCan. Major Projects Inventory

- Foreign Direct Investment and Canadian Direct Investment Abroad: StatCan. Table 36-10-0009-01
- Foreign Control of Canadian Assets: StatCan. Tables 33-10-0033-01, 33-10-0005-01 and 33-10-0006-01
- Canadian Energy Assets: Compiled by NRCan from S&P Global Market Intelligence and annual financial statements from publicly traded Canadian energy companies
- Research, Development and Demonstration: Compiled by NRCan from internal sources
- Environmental Protection Expenditures: StatCan. Tables 38-10-0130-01 and 38-10-0132-01

#### **SECTION 3: SKILLS, DIVERSITY AND COMMUNITY**

- Energy Sector Demographics: StatCan. NRSA Human Resources Module custom tables
- Energy Affordability: StatCan. Estimation of Energy Poverty Rates Using the 2021 Census of Population; StatCan. Table 11-10-0222-01
- Household Expenditures on Energy: StatCan. Table 11-10-0222-01
- Energy Retail Prices: StatCan. Table 18-10-0004-01 and 18-10-0001-01; IEA. Annual Database
- Energy Reliant Communities: NRCan analysis based on StatCan 2021 Census Data

#### **SECTION 4: ENERGY EFFICIENCY**

• Energy use, efficiency and trends: NRCan OEE. National Energy Use Database; NRCan estimates

## SECTION 5. CLEAN POWER AND LOW CARBON FUELS

#### CLEAN TECHNOLOGY AND THE ECONOMY

• Environmental and clean technology: NRCan. 2022 Cleantech Industry Survey; StatCan. Tables 14-10-0023-01, 36-10-0103-01, 36-10-0629-01 and 36-10-0632-01; Toronto Stock Exchange. TSX & TSXV Listed Companies

#### ELECTRICITY

- World production and exports: IEA. Electricity Information [note: IEA production/generation data is expressed on a "gross" basis, i.e. before generating station use]
- Trade: CER. Commodity Tracking System
- Canadian and provincial supply: Compiled by NRCan's Energy Systems Sector from various sources
- **Prices:** Hydro-Québec. Comparison of Electricity Prices in Major North American Cities
- Electricity energy use: NRCan OEE. National Energy Use Database

#### RENEWABLES

- **Electricity GHG emissions:** ECCC. *National Inventory Report*
- International context Production: IEA. Renewables Information
- International context share of energy supply: IEA. World renewables and waste energy supply
- Domestic production: IEA. Renewables Information
- Hydro international generation: IEA. Electricity

Information; IEA. Energy Balances of OECD Countries; IEA. Energy Balances of Non-OECD Countries

- Hydro capacity in Canada: WaterPower Canada. Hydropower Refurbishments and Redevelopments in Canada
- Hydro facilities and projects: WaterPower Canada. Hydropower Refurbishments and Redevelopments in Canada
- Biomass Renewable balance: IEA. Renewables balances

- Biomass production and facilities: StatCan. Table 25-10-0031-01; NRCan CFS data compiled from various sources
- Biomass wood fuel use by sector: StatCan. Tables 25-10-0025-01 and 25-10-0084-01; NRCan estimates
- Wind international context: Global Wind Energy Council. Global Wind Report
- Wind generation and capacity in Canada: CanREA. By the Numbers; NRCan analysis based on various sources
- Wind wind farms: AESO. Current Supply Demand Report; CanREA. By the Numbers; Government of Ontario. Renewable Energy Projects Listing; Hydro Québec. Electricity supply contracts in force in Québec; SaskPower. System Map
- Solar PV international context: IEA Photovoltaic Power Systems Programme. 2024 Snapshot of Global PV Markets
- Solar PV capacity in Canada: NRCan and CanREA.
   National Survey Report of PV Power Applications in Canada - 2022
- Solar PV generation in Canada: Compiled by NRCan from various sources
- Solar PV solar PV farms: CanREA. By the Numbers; AESO. Current Supply Demand Report; Government of Ontario. Renewable Energy Projects Listing; NRCan analysis based on various sources

#### URANIUM AND NUCLEAR

 World uranium production and exports: World Nuclear Association. World Uranium Mining; NRCan estimates

- World known recoverable resources of uranium: OECD Nuclear Energy Agency and International Atomic Energy Agency. Uranium: Resource, Production and Demand; World Nuclear Association. Supply of Uranium
- World generation of nuclear power: International Atomic Energy Agency. Nuclear Power Reactors in the World
- Canadian supply and demand: World Nuclear Association.
   Uranium in Canada; Cameco. Annual report; NRCan
   estimates
- Nuclear in Canada infographic: NRCan. Nuclear Energy and Uranium
- Purchases by U.S. nuclear reactors: U.S. EIA. Uranium Marketing Annual Report
- CANDU nuclear reactors and nuclear power plants in Canada: International Atomic Energy Agency. Power Reactor Information System; NRCan analysis based on various sources
- Spot prices: U.S. EIA. Annual Uranium Market Report

#### BIOFUELS AND TRANSPORTATION

- **Biofuels international context:** IEA. *Renewables Information*
- Biofuels production, supply and demand: StatCan. Tables 25-10-0081-01 and 25-10-0082-01
- Transportation Electric vehicle sales: StatCan. Tables 20-10-0021-01 and 20-10-0024-02
- Transportation Electric vehicle chargers: NRCan. Electric vehicle charging – EV charging basics; NRCan. Electric Charging and Alternative Fuelling Stations Locator
- Transportation GHG emissions: ECCC. National Inventory

#### Report

• Hydrogen: IEA. Global Hydrogen Review; NRCan. Hydrogen Strategy for Canada

#### SECTION 6: OIL. NATURAL GAS AND COAL

#### PETROLEUM AND THE ECONOMY

- GDP and employment: StatCan. Tables 38-10-0285-01 and 36-10-0480-01; StatCan. Special tabulations of the NRSA Human Resources Module
- Capital expenditures: StatCan. Table 34-10-0036-01 and special tabulations
- Exports: StatCan. International Merchandise Trade Database

#### CRUDE OIL

- World production and exports: IEA. Annual Database
- World proved reserves: Oil and Gas Journal. Worldwide Look at Reserves and Production
- Canadian resources remaining established reserves: AER. Alberta Energy Outlook (ST98); Government of Alberta. News release: "New gas reserves take Canada into global top 10" (March 12, 2025); CAPP. Conventional reserves special tabulation
- Oil wells in Western Canada: AER. ST59: Alberta Drilling Activity Monthly Statistics; BCER. Drilling Data for All Wells in BC [BCOGC-41984]: Petrinex, Saskatchewan Public Data: Province of Manitoba, Oil & Gas Statistics
- Canadian and provincial production: StatCan. Tables 25-10-0063-01 and 25-10-0014-01; NRCan analysis
- Canadian Supply and Demand: StatCan. Tables 25-10-0063-01 and 25-10-0014-01: StatCan.

International Merchandise Trade Database

- Trade: StatCan. Table 25-10-0063-01; StatCan. International Merchandise Trade Database: U.S. EIA. Imports by Country of Origin and Refining and Processing
- **Oil Sands:** CAPP. Statistical Handbook. Table 04-14: StatCan. Tables 34-10-0036-01 and 25-10-0063-01: AER. Alberta Energy Outlook (ST98)
- Prices: U.S. EIA. Table Cushing, OK WTI Spot Price FOB: Sproule. Price Forecast
- Pipelines: CER. Crude Oil Pipeline Transportation System
- Transportation by Rail: CER. Canadian Crude Oil Exports by Rail - Monthly Data; StatCan. Table 23-10-0062-01
- Oil Sands Environmental Considerations: FCCC, National Inventory Report; World Resources Institute. Country Greenhouse Gas Emissions Data: Alberta Government. Oil Sands Information Portal; Alberta Government. Oil Sands 101: Alberta Government, Lower Athabasca Regional Plan: AER. Oil Sands Mining Water Use: AER. Oil Sands In Situ Recovery Water Use; AER. Alberta Mineable Oil Sands Plant Statistics Monthly Supplement (ST39); AER. Alberta In Situ Oil Sands Production Summary (ST53); StatCan. Table 25-10-0063-01; NRCan. Boreal forest data

#### NATURAL GAS

- World production and exports: IEA. World natural gas statistics
- World proved reserves: Oil and Gas Journal. Worldwide look at reserves and production
- Canada and U.S. Proved reserves: U.S. EIA. U.S. Crude Oil and Natural Gas Proved Reserves. Yearend 2023: Oil and Gas Journal. Worldwide look at reserves and production: AER. Alberta Energy Outlook (ST98); Government of Alberta. News release: "New gas reserves take Canada into global top 10" (March 12, 2025); BC Energy Regulator. 2023 Gas Reserves Report; Saskatchewan Ministry of Energy and Resources. Five-Year Gas Reserve Summarv Report; Headwater Exploration Inc. Annual Information Form; CER. Provincial and Territorial Energy Profiles; Consultations with provincial and territorial governments and energy regulators, the CER, CAPP, and the Canada-Newfoundland and Labrador Offshore Energy Regulator (formerly Offshore Petroleum Board), and the Canada-Nova Scotia Offshore Energy Regulator (formerly Offshore Petroleum Board); NRCan estimates
- Canada and U.S. Marketable and technically recoverable resources: CER. Canada's Energy Future 2023, Macro Indicators; U.S. EIA. Annual Energy Outlook 2025; U.S. EIA. Shale Gas, Proved Reserves as of Dec. 31; NRCan analysis
- Canadian average marketable production: CER. Canada's Energy Future 2023, Figure Data (Excel); StatCan. Table 25-10-0055-01

- U.S. average marketable production: U.S. EIA. Annual Energy Outlook 2023; U.S. EIA. Dry Natural Gas Production. Annual
- LNG imports, Canada: StatCan. Canadian International Merchandise Trade Database
- LNG imports, U.S.: U.S. EIA. U.S. Liquefied Natural Gas Imports (IMMcf)
- LNG exports, Canada: CER. Commodity Tracking System
- LNG exports, U.S.: U.S. EIA. Liquefied U.S. Natural Gas Exports (MMcf)
- Natural gas wells in Western Canada: AER. ST59: Alberta Drilling Activity Monthly Statistics; BCER. Drilling Data for All Wells in BC [BCOGC-41984]; Petrinex. Saskatchewan Public Data; Province of Manitoba. Oil & Gas Statistics
- Canadian and U.S. marketable production of natural gas: StatCan. Table 25-10-0055-01; U.S. EIA. Dry Natural Gas Production, Annual
- Canadian trade of natural gas: CER. Commodity Tracking System; StatCan. Canadian International Merchandise Trade Database
- Marketable production by province: StatCan. Table 25-10-0055-01
- **Upstream prices:** Sproule. *Sproule Price Forecast*; StatCan. Table *33-10-0163-01*
- Pipelines: CER. Facilities we regulate
- Natural gas energy use: NRCan OEE. National Energy Use Database

#### HGLs

- Processing plant production: StatCan. Table 25-10-0036-01
- Refinery production: StatCan. Monthly Refined Petroleum Product Survey
- Shares of NGL Production by province: CAPP. Custom report for NRCan
- NGLs end use: NRCan OEE. National Energy Use Database
- Exports: CER. Commodity Tracking System
- Imports: StatCan. International Merchandise Trade Database

#### RPPs

- Canadian refineries: Compiled by NRCan from various sources
- Supply and Demand: StatCan. Table 25-10-0081-01
- Crude oil shipped to domestic refineries: StatCan. Table 25-10-0063-01
- Domestic consumption by product: StatCan. Table 25-10-0081-01: NRCan analysis
- Trade: StatCan. Table 25-10-0081-01: StatCan. International Merchandise Trade Database, U.S. EIA. U.S. Imports by Country of Origin for Petroleum and Other Liquids
- Gasoline prices: Kalibrate Technologies Ltd. Petroleum price data, Pricing analytics: Margin
- Refinery capacity: Oil Sands Magazine. List of Canadian Refineries; NRCan analysis

#### COAL

- World proved reserves: U.S. EIA. Coal Reserves
- World production and exports: IEA. Coal Information
- Canadian supply and demand: IEA. Coal Information; StatCan, International Merchandise Trade Database: NRCan analysis
- Canadian Production: StatCan. Table 25-10-0046-01; NRCan analysis
- Electricity Generation: StatCan. Tables 25-10-0017-01 and 25-10-0084-01; Data compiled by NRCan from StatCan and other public sources

#### GHG EMISSIONS FROM PETROLEUM

• GHG Emissions by Sector: ECCC. National Inventory Report

#### **CANADIAN CENTRE FOR ENERGY INFORMATION**

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