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# ENERGY FACT BOOK 2024-2025

Canada



Natural Resources Canada Ressources naturelles Canada

## ENERGY FACT BOOK 2024-2025



Aussi disponible en français sous le titre : Cahier d'information sur l'énergie, 2024-2025

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### PREFACE

The purpose of the *Energy Fact Book* is to provide key information on energy markets in Canada in a format that is easy to consult. Resources including a summary of units and conversion factors, abbreviations, and data sources used throughout this publication are available in the annexes.

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.

This publication was assembled by the Energy and Economic Analysis Division of the Energy Policy Branch with the help of subject experts from across Natural Resources Canada (NRCan).

For questions or comments, contact NRCan at energyfacts-faitsenergetiques@nrcan-rncan.gc.ca.

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.

## CONTENTS

Introduction	vi
SECTION 1	1
Key Energy, Economic and Environmental Indicators	
SECTION 2	21
Investment	
SECTION 3	37
Skills, Diversity and Community	
SECTION 4	45
Energy Efficiency	
SECTION 5	57
Clean Power and Low Carbon Fuels	
SECTION 6	101
Oil, Natural Gas and Coal	
Annex 1 Units and conversion factors	144
Annex 2 Abbreviations	147
Annex 3 Sources	150

Energy Fact Book  $\, {\bf V}$ 

## INTRODUCTION

From an energy perspective, Canada is very fortunate. We have a large land mass, small population and one of the largest and most diverse supplies of energy in the world. Our rivers discharge close to 7% of the world's renewable water – a tremendous source of hydroelectric power. We have the fourth-largest proven oil reserves and third-largest reserves of uranium; our energy resources are a source of strength that continues to shape our economy and society.

Canada is at the forefront of innovative technologies for how we produce and use energy. For example, low- or non-emitting forms of energy are growing in significance as part of our evolving electricity mix. In fact, wind and solar photovoltaic (PV) energy are the fastest-growing sources of electricity generation in Canada. In addition, technological advancements, such as co-generation, have resulted in an increase in energy-efficient practices and a reduction in greenhouse gas (GHG) emissions in areas such as the oil sands. Ongoing developments in areas such as grid-scale electricity storage, carbon capture and storage, hydrogen, and electric and alternative fuel vehicles have the potential to further transform the energy system.

For over ten years, the *Energy Fact Book* has provided a solid foundation for Canadians to understand and discuss important developments across the energy sector. A significant milestone in Canadian energy information was achieved in 2019 with the launch of the Canadian Center for Energy Information (CCEI). Housed at Statistics Canada, the CCEI brings together Canada's existing energy information in one place, facilitating access to products like the Energy Fact Book.

## Section 3: Skills, Diversity and Community

Energy sector demographics

**Energy affordability** 

n II n

**Energy reliant communities** 

## **ENERGY SECTOR DEMOGRAPHICS (2021)**

Women held 24% of energy sector jobs.

**6%** of energy sector employees identified as **Indigenous**.

**Nearly three-quarters (74%)** of employees in the energy sector had more than a high school education and **56%** of workers had a **college diploma or university degree**.

The workforce in the energy sector has been **aging over time**. In 2021 the proportion of employees aged 55 and older stood at 22%, **up from 17%** in 2009. Since 2009, the workforce in the energy sector has become **increasingly diverse**. In 2021, **20%** of the workforce identified as members of a visible minority group, up from **17%** in 2009.

#### **Immigrant workers**

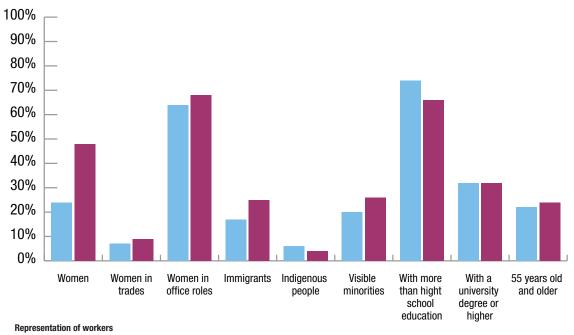
represented **17%** of energy sector employees compared to 25% in the total economy.

- Energy sector jobs paid an average of **\$121,435** per year, while the average Canadian job paid **\$62,459**.
- The **gender wage gap** closed slightly in the energy sector in 2021, with women earning on average **85%** of the hourly wage earned by men. In contrast, in 2009, women earned on average **76%** of the hourly wages earned by men.



- Jobs requiring a university degree had the highest average compensation, reaching \$150,541.
- Among occupation types, women in the energy sector are highly represented in office roles (administrative, general office worker, and auditor accountants and investment professionals) at 64% of these occupations. Men are highly represented in trades (holding 93% of these occupations).
- Women in the trades earn on average **91%** of the hourly wage earned by men, while those working in administrative occupations earn on average **74%** of the hourly wage earned by men.

#### Representation of demographic groups in the energy sector compared to all industries





All industries

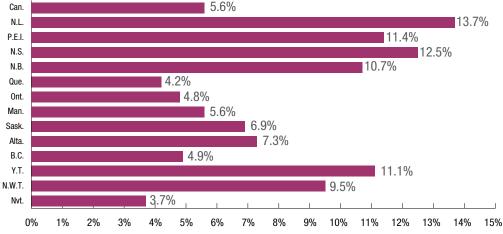
#### 40 Energy Fact Book

## **ENERGY AFFORDABILITY**

In 2021, in-home energy expenditure by Canadian households averaged **\$2,225**. This represented 3% of the average disposable income.

When households spend 10% or more of their income on energy needs, this is referred to as energy poverty.

Overall, 5.6% of Canadian households spent 10% or more of their income on energy. This share varies considerably across regions and income levels.



#### **Energy Poverty Rates, by Geography**

Energy poverty rates are based on the number of energy poor households divided by total households.

Energy, in this context, includes what is needed inside the home (i.e. space heating, appliances), and excludes transportation.

Energy Fact Book 41

### HOUSEHOLD EXPENDITURES ON ENERGY



- Canadian households spent \$4,305 on average on energy in 2021.
- Residential expenditures, including for heating/cooling spaces, lighting and operating appliances, averaged **\$2,225**.
- Expenditures on fuels for vehicles and tools averaged \$2,080.
- Energy accounted for **6.4%** of current household consumption. Lower-income households spend a larger share of their disposable income on energy.

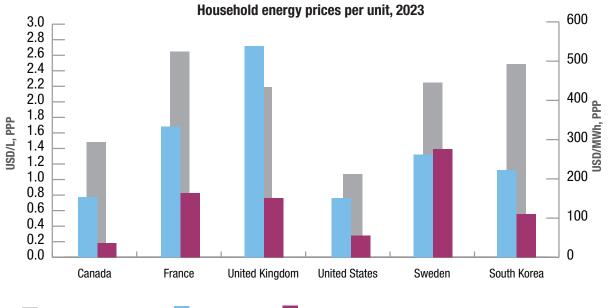
#### **ENERGY RETAIL PRICES**

- The "energy" component of the consumer price index (CPI) has been volatile in recent years and has grown much faster than the non-energy component.
- This volatility reflects mostly the variations of upstream oil and gas prices and their impact on consumer products such as gasoline.



#### **CONSUMER PRICE INDEX (2002=100)**

## IN COMPARISON WITH OTHER DEVELOPED ECONOMIES, CANADA'S ENERGY PRICES ARE RELATIVELY LOW.



Mid-grade motor gasoline (left axis)

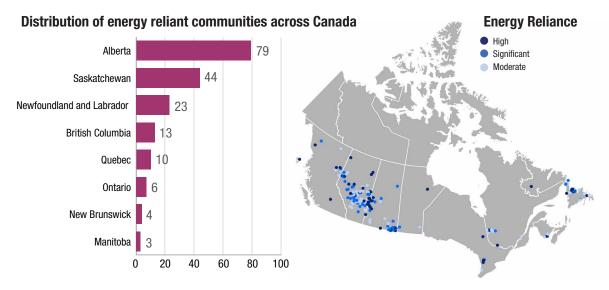
Electricity (right axis)

Natural gas (right axis)

## **ENERGY RELIANT COMMUNITIES**

A community that has a higher share of employment from a specific sector, a relatively high share of total income from that sector, and relatively low sectoral diversity in their economy compared to the average Canadian community can be described as reliant on that sector.

There are **182 communities across Canada that are at least moderately reliant** on the energy sector. Of these communities, **80% are rural or remote**.



ANNEXES

#### **ANNEX 1: UNITS AND CONVERSION FACTORS**

#### **PREFIXES AND EQUIVALENTS**

Prefix				
SI/Metric		Imperial	Equivalent	
k	kilo	М	thousand	10 <sup>3</sup>
М	mega	MM	million	10 <sup>6</sup>
G	giga	В	billion	10 <sup>9</sup>
Т	tera	Т	trillion	<b>10</b> <sup>12</sup>
Р	peta	-	quadrillion	<b>10</b> <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>0<sub>8</sub>)
- 1 lb.  $U_{3}O_{8} = 0.84802$  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 MW  $\times$  24 hr  $\times$  365 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, petajoules or PJ)
- U.S.: 1 British thermal unit (BTU) = 1,055.06 joules
- IEA: energy balances expressed in oil equivalent: :
  - thousand tonnes of oil equivalent (ktoe)
  - million tonnes of oil equivalent (Mtoe)

#### **Typical values**

- 1  $m^3$  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

#### **ANNEX 2: ABBREVIATIONS**

AC	alternating current	EIA	Energy Information Administration (U.S.)
AECO	Alberta Energy Company	EU	European Union
AESO	Alberta Electric System Operator	EV	electric vehicle
AER	Alberta Energy Regulator	FDI	foreign direct investment
В	billion	G7	seven wealthiest major developed nations: Canada,
b/d	barrels per day		France, Germany, Italy, Japan, U.K. and U.S.
Bcf/d	billion cubic feet per day	GDP	gross domestic product
Bcm/d	billion cubic metres per day	GHG	greenhouse gas
BEV	battery electric vehicle	GJ	gigajoule
CANDU	Canada deuterium uranium	GST	Goods and Services tax
CAPP	Canadian Association of Petroleum Producers	GWh	gigawatt hours
CanREA	Canadian Renewable Energy Association	HGL	hydrocarbon gas liquids
CCS	carbon capture and storage	HST	Harmonized sales tax
CCUS	carbon capture, utilization and storage	IEA	International Energy Agency
CDIA	Canadian direct investment abroad	IHA	International Hydropower Association
CEA	Canadian energy assets	kg	kilogram
CER	Canada Energy Regulator	km	kilometre
CFS	Canadian Forest Service	km²	square kilometre
CO <sub>2</sub> equivalent	carbon dioxide equivalent	kt	kilotonne
CPI	consumer price index	kWh	kilowatt hour
CPL	cents per litre	lb.	pound
DC	direct current	L	litre
ECCC	Environment and Climate Change Canada	LCOE	levelized cost of electricity
ECTPEA	Environmental and Clean Technology Products	LNG	liquefied natural gas
	Economic Account	LPG	liquefied petroleum gases
EGS	enhanced geothermal system	LWR	light water reactor

m	metre	Provinces	
m²	square metre		Alta. – Alberta
m <sup>3</sup>	cubic metre		B.C. – British Columbia
Mb/d	thousand barrels per day		Man. – Manitoba
MJ	megajoule		N.B. – New Brunswick
MMb/d	million barrels per day		N.L. – Newfoundland and Labrador
MMcf/d	million cubic feet per day		N.S. – Nova Scotia
MMbtu	million British thermal units		N.W.T. – Northwest Territories
Mt	million tonnes; megatonne		Ont. – Ontario
Mtoe	million tons of oil equivalent		P.E.I. – Prince Edward Island
MW	megawatt		Que. – Quebec
NGCC	natural gas combined cycle		Sask. – Saskatchewan
NGL	natural gas liquids		Y.T. – Yukon
NRCan	Natural Resources Canada		Atl. – Atlantic provinces
OEE	NRCan Office of Energy Efficiency		Terr. – Territories
NRSA	Natural Resources Satellite Account	P/T	provincial/territorial
NSERC	National Science and Engineering Research	PV	photovoltaic
	Council of Canada	RD&D	research, development and demonstration
NYMEX	New York Mercantile Exchange	R&D	research and development
OECD	Organisation for Economic Co-operation and	RPP	refined petroleum products
	Development	SDTC	Sustainable Development Technology Canada
PHEV	plug-in hybrid electric vehicle	StatCan	Statistics Canada
PHWR	pressurized heavy water reactor	States	
PJ	petajoule		Ala.– Alabama
Pkm	passenger-kilometre		Ariz. – Arizona
			Ark.– Arkansas

Calif. – California

#### 148 Energy Fact Book

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

#### **ANNEX 3: 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 Hydropower Outlook
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#### 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
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- 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

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• GHG Emissions by Sector: ECCC. National Inventory Report

Energy Fact Book 155

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