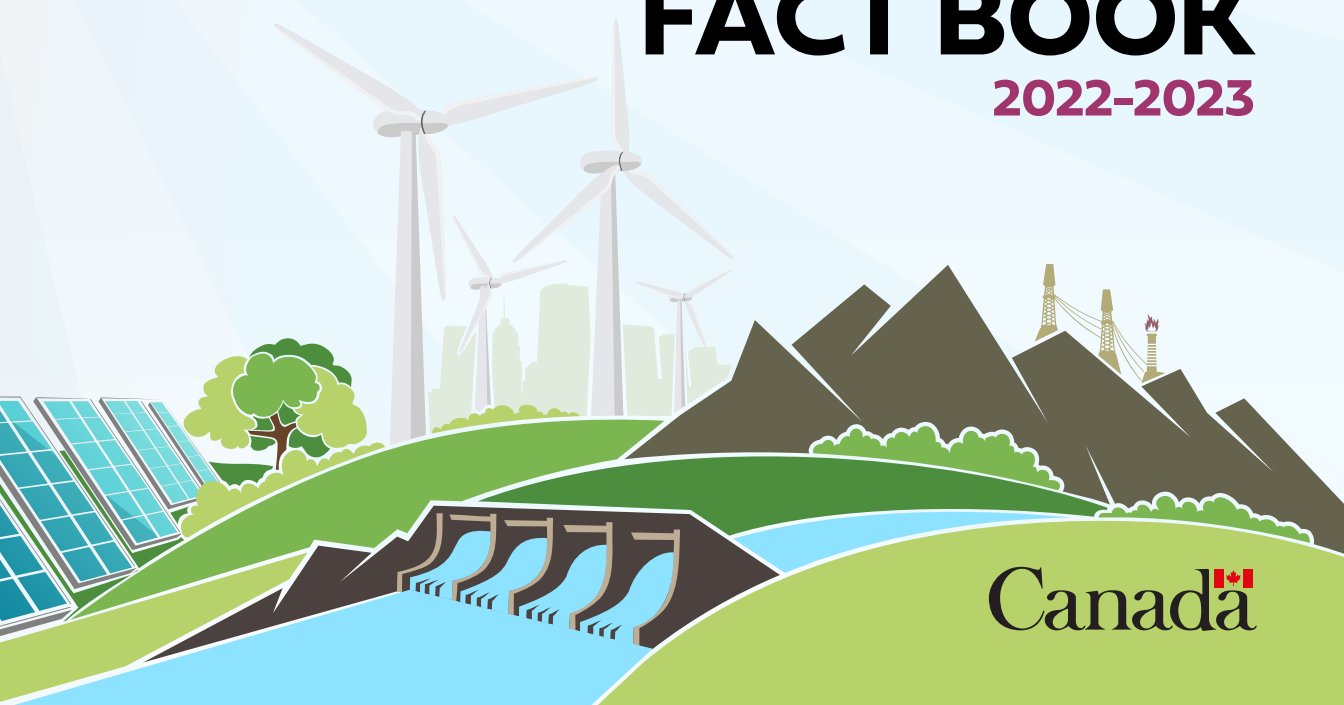
Natural Resources Canada

Ressources naturelles Canada

ENERGY FACT BOOK

2022–2023



Canada

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ENERGY FACT BOOK 2022–2023

Canada

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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 and International Affairs Branch with the help of subject experts from across Natural Resources Canada (NRCan).

For questions or comments, contact NRCan at **nrcan.energyfacts-faitsenergetiques.rncan@canada.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

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 4:
Energy Efficiency

Energy use

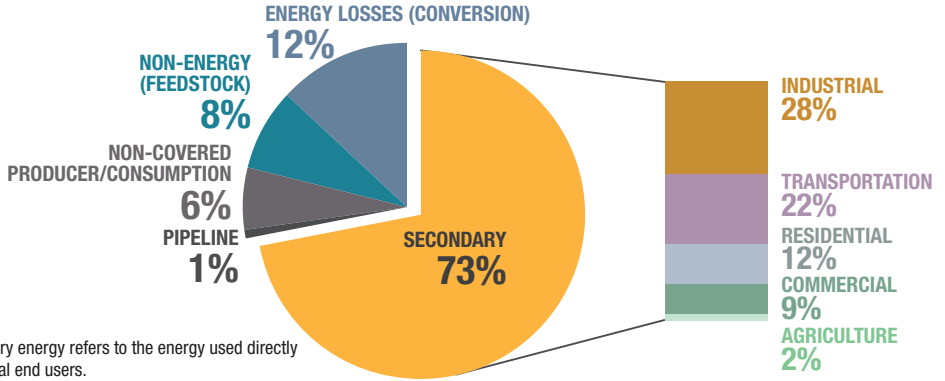
Efficiency trends

ENERGY USE

PRIMARY AND SECONDARY ENERGY USE BY SECTOR (2019)

- Primary energy use measures the total energy requirements of all energy users.
- Secondary energy use accounts for the energy used by final consumers in the economy.
- Primary energy use includes secondary energy use. Additionally, primary energy use includes the energy required to transform one form of energy into another (e.g. coal to electricity); the energy used to bring energy supplies to the consumer (e.g. pipeline); and the energy used to feed industrial production processes (e.g. the natural gas used as feedstock by the chemical industries).
- Not every fuel is consumed as energy. For example, hydrocarbon gas liquids in Canada are also used as a non-energy feedstock in the petrochemical industry.
- Canada's primary energy consumed was estimated at **13,276 PJ.**

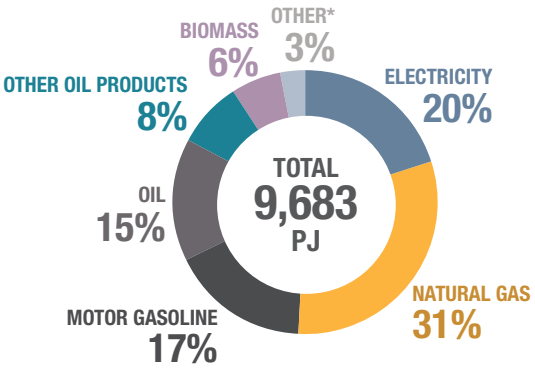
PRIMARY AND SECONDARY ENERGY USE BY SECTOR, 2019



*Secondary energy refers to the energy used directly by the final end users.

- Secondary energy use includes the energy used to run vehicles; the energy used to heat and cool buildings; and the energy required to run machinery.
- Canada's secondary energy use in 2019 was **9,683 PJ**.
- Total secondary energy use **increased 20%** from 2000 to 2019. Natural gas usage grew by **40%** while electricity usage increased 15%, during the same period.

CANADA'S SECONDARY ENERGY USE BY FUEL TYPE, 2019



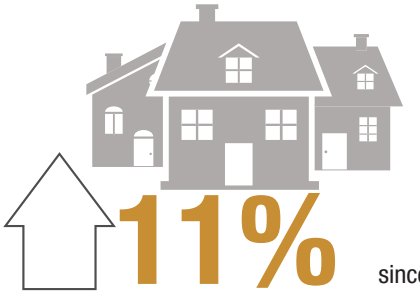
* "Other" includes coal, coke, coke oven gas, NGLs and steam and waste.

ENERGY IN OUR DAILY LIVES

Canadian households use energy every day – to power lights and appliances, heat or cool spaces, run personal vehicles, recharge electronics and more.

- **81%** of residential energy consumption is used for space and water heating.
- Residential energy efficiency improved by **32%** between 2000 and 2019, **saving 440 PJ** of energy and **$8.5 billion in energy costs**.

Residential energy use increased



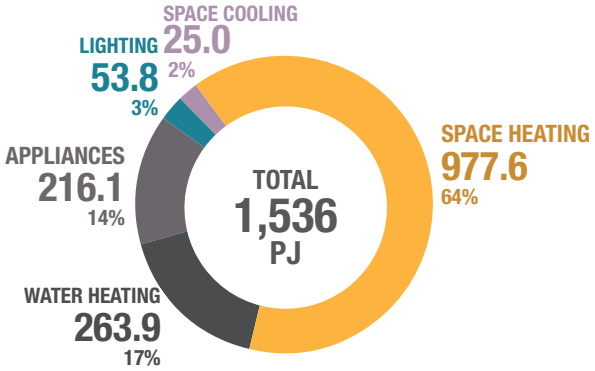
11% since 2000,

but would have increased by

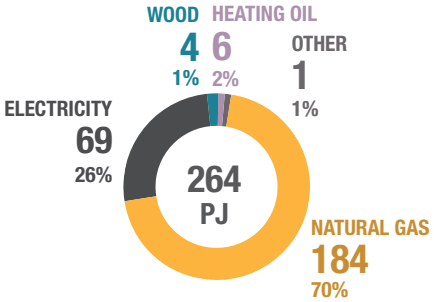
43%

without energy efficiency improvements.

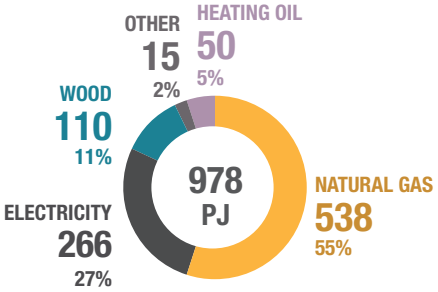
RESIDENTIAL ENERGY USE, BY TYPE (PJ), 2019



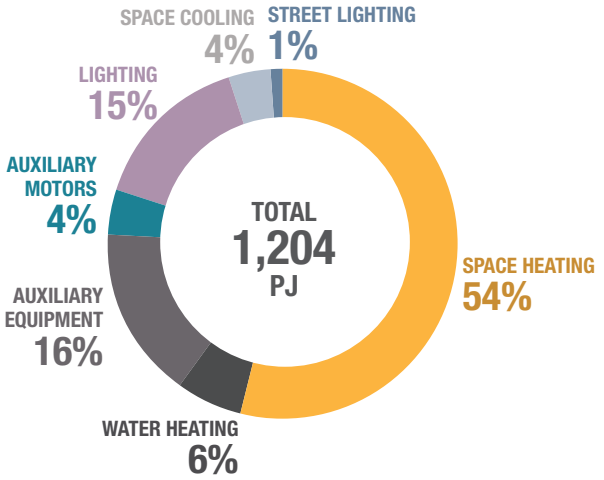
WATER-HEATING ENERGY USE (PJ), 2019



SPACE-HEATING ENERGY USE (PJ), 2019



COMMERCIAL AND INSTITUTIONAL ENERGY USE BY END USE, 2019



Commercial and institutional energy use increased between 2000 and 2019

22%

but would have increased

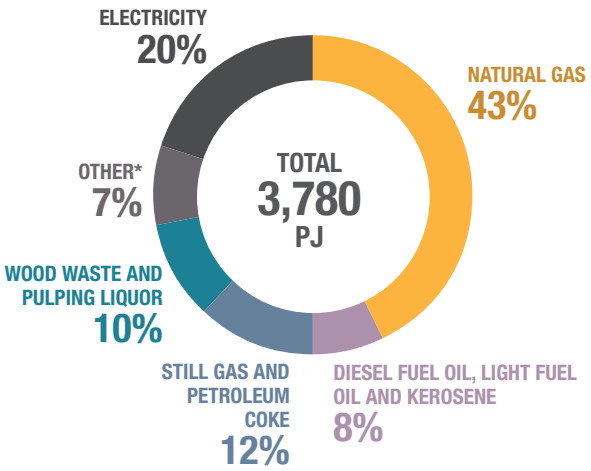
34% **without energy efficiency improvements.**

Energy intensity (GJ/m²) decreased

4%.

Since 2000, energy efficiency in the commercial and institutional sector has **improved 13%**, saving 124 PJ of energy and **$3.2 billion** in energy costs in 2019.

INDUSTRIAL SECTOR ENERGY USE BY FUEL TYPE, 2019



- The **industrial sector** includes all manufacturing, mining (including oil and gas extraction), forestry and construction activities.
- From 2000 to 2019, **industrial energy use increased 19%**. Energy use in resource extraction industries increased nearly threefold over the same period.
- Excluding resource extraction industries, **energy efficiency improvements of 5%** in the industrial sector resulted in **savings of 137 PJ** and **$1.6 billion** in energy costs in 2019.

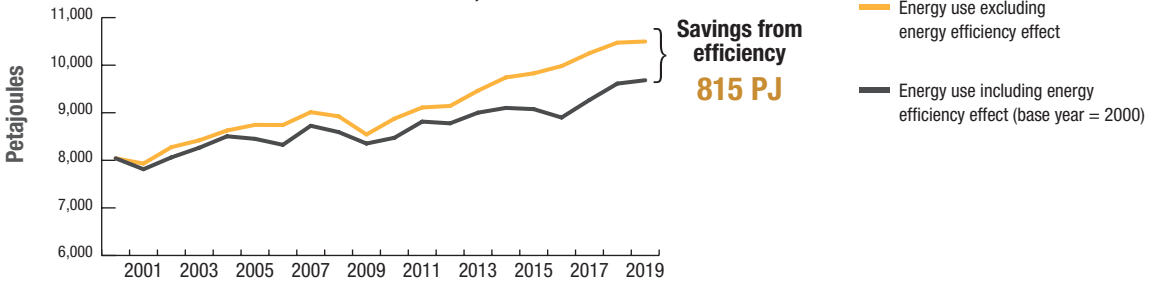
* "Other" includes HFO, coke and coke oven gas, coal, LPGs, NGLs, steam and waste.

EFFICIENCY TRENDS

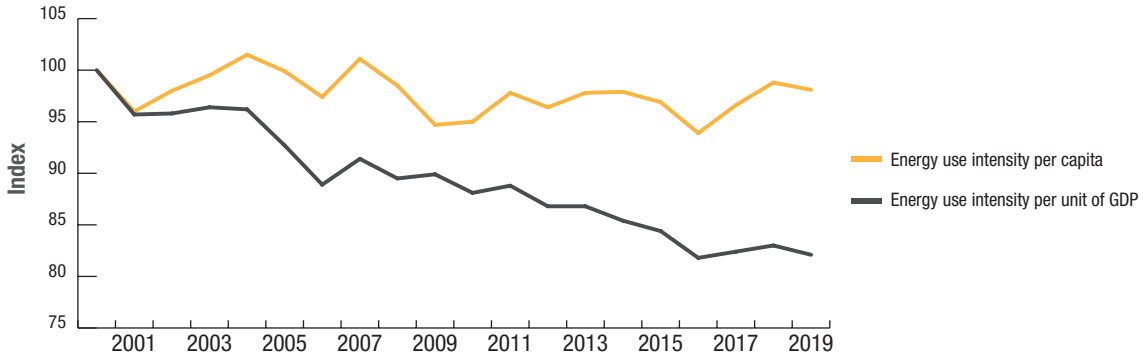
HISTORICAL ENERGY EFFICIENCY

- **Energy efficiency** is a measure of how effectively energy is used for a given purpose and is an important path toward decarbonization.
- **Energy intensity** is the ratio of energy use per unit of activity (such as floor space and GDP).
- **Efficiency improvements** slow the rate of growth in energy use.
- **Energy efficiency** in Canada **improved by 10%** between 2000 and 2019.
- **Energy use grew by 20%** between 2000 and 2019. Without energy efficiency improvements, energy use would have **grown by 31%**.
- **Energy efficiency savings** of **815 PJ** in 2019 were equivalent to end-user savings of **$23 billion**.

SECONDARY ENERGY USE WITH AND WITHOUT ENERGY EFFICIENCY EFFECT, 2000-2019



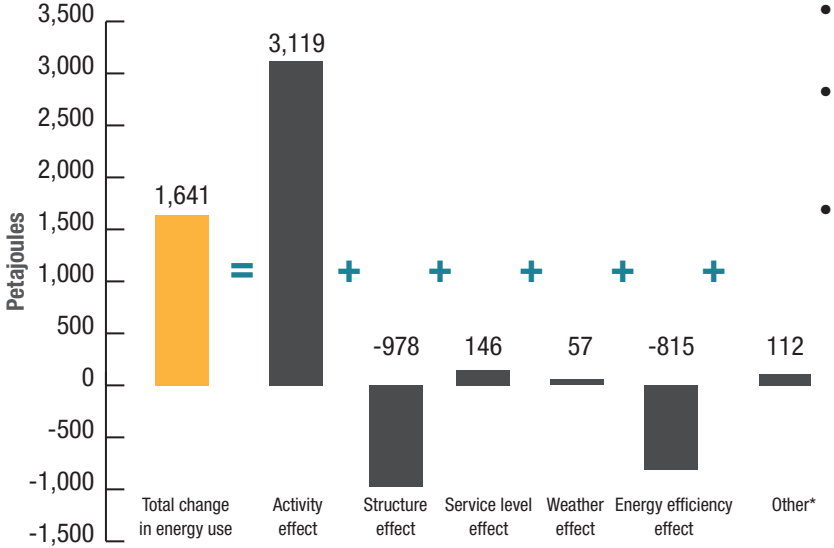
INDEXED TOTAL SECONDARY ENERGY USE INTENSITY PER CAPITA AND PER UNIT OF GDP, 2000–2019 (2000=100)



Per capita energy consumption was 2% lower in 2019 than in 2000.

Canada used 18% less energy per dollar of GDP in 2019 than in 2000.

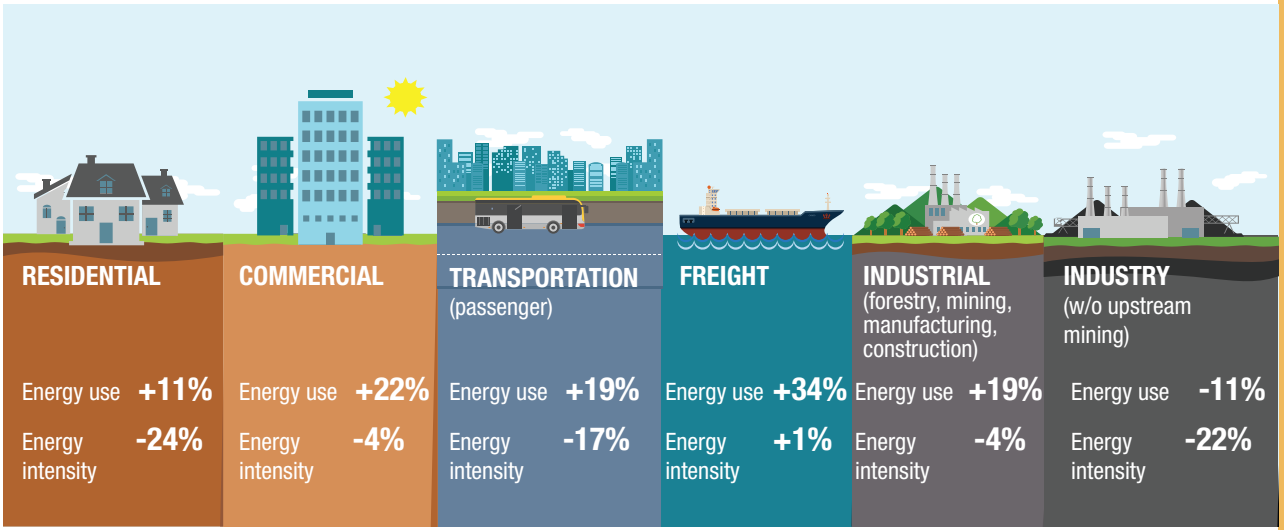
SUMMARY OF FACTORS INFLUENCING THE CHANGE IN ENERGY USE, 2000-2019



* "Other" refers to street lighting, non-commercial airline aviation, off-road transportation and agriculture, which are included in the "Total change in energy use" column but are excluded from the factorization analysis.

- **Activity:** major drivers of energy use in a sector (e.g. floor space area in the commercial/institutional sector)
- **Structure:** refers to change in the makeup of each sector
- **Service level:** increased penetration of auxiliary equipment in commercial/institutional buildings
- **Energy efficiency:** how effectively energy is being used for a given purpose. For example, providing a similar (or better) level of service with less energy consumption on a per unit basis is considered an improvement in energy efficiency.

TRENDS IN ENERGY USE AND INTENSITY BY SECTOR, 2000-2019



ANNEXES

ANNEX 1: UNITS AND CONVERSION FACTORS

PREFIXES AND EQUIVALENTS

Prefix SI/Metric		Imperial	Equivalent	
k	kilo	M	thousand	10^3
M	mega	MM	million	10^6
G	giga	B	billion	10^9
T	tera	T	trillion	10^{12}
P	peta	-	quadrillion	10^{15}

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 (¢/m^3) (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_3O_8)
- 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 MW × 24 hr × 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^3 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

AECO	Alberta Energy Company
B	billion
b/d	barrels per day
Bcf/d	billion cubic feet per day
Bcm/d	billion cubic metres per day
CANDU	Canada deuterium uranium
CCS	carbon capture and storage
CCUS	carbon capture, utilization and storage
CDIA	Canadian direct investment abroad
CEA	Canadian energy assets
CER	Canada Energy Regulator
CO_2 equivalent	carbon dioxide equivalent
CPI	consumer price index
CPL	cents per litre
ECTPEA	Environmental and Clean Technology Products Economic Account
EIA	Energy Information Administration (U.S.)
EU	European Union
FDI	foreign direct investment
G7	seven wealthiest major developed nations: Canada, France, Germany, Italy, Japan, U.K. and U.S.
GDP	gross domestic product
GHG	greenhouse gas
GJ	gigajoule
GST	Goods and Services tax
GWh	gigawatt hours
HGL	hydrocarbon gas liquids
HST	Harmonized sales tax
IEA	International Energy Agency
kg	kilogram
km	kilometre
km^2	square kilometre
kt	kilotonne
kWh	kilowatt hour
lb.	pound
L	litre
LCOE	levelized cost of electricity
LNG	liquefied natural gas
LPG	liquefied petroleum gases
LWR	light water reactor
m	metre
m^2	square metre
m^3	cubic metre
Mb/d	thousand barrels per day
MJ	megajoule
MMb/d	million barrels per day
MMcf/d	million cubic feet per day
MMbtu	million British thermal units
Mt	million tonnes; megatonne
Mtoe	million tons of oil equivalent
MW	megawatt
NGL	natural gas liquids

NRCan	Natural Resources Canada
NRSA	Natural Resources Satellite Account
NSERC	National Science and Engineering Research Council of Canada
OECD	Organisation for Economic Co-operation and Development
PHWR	pressurized heavy water reactor
PJ	petajoule
Pkm	passenger-kilometre
Provinces	Alta. – Alberta
	B.C. – British Columbia
	Man. – Manitoba
	N.B. – New Brunswick
	N.L. – Newfoundland and Labrador
	N.S. – Nova Scotia
	N.W.T. – Northwest Territories
	Ont. – Ontario
	P.E.I. – Prince Edward Island
	Que. – Quebec
	Sask. – Saskatchewan
	Y.T. – Yukon
	Atl. – Atlantic provinces
	Terr. – Territories
P/T	provincial/territorial
PV	photovoltaic
RD&D	research, development and demonstration
R&D	research and development
RPP	refined petroleum products
SDTC	Sustainable Development Technology Canada
Tcf	trillion cubic feet
Tcm	trillion cubic metres
Tkm	tonne-kilometre
t	tonnes
TPES	total primary energy supply
TWh	terawatt-hour
U.K.	United Kingdom
U.S.	United States
US$	United States dollars
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
  - **Primary Energy Production by Region & Source:** Statistics Canada tables 25-10-0020-01, 25-10-0029-01 and 25-10-0007-01 and NRCan estimates
  - **Total primary energy supply:** IEA Annual Database, World Energy Balances and IEA Standing Group on Long-Term Co-operation questionnaire
  - **Primary and secondary energy use:** Natural Resources Canada's National Energy Use Database
- **ECONOMIC CONTRIBUTION**
  - **GDP:** Statistics Canada tables 38-10-0285-01, 36-10-0221-01, 36-10-0103-01 and 36-10-0400-01 and NRCan estimates
  - **Employment:** Statistics Canada tables 38-10-0285-01, 36-10-0214-01, 36-10-0489-01, 36-10-0480-01, 36-10-0221-01, 36-10-0400-01, 14-10-0023-01, Provincial NRSA and Statistics Canada special tabulations
  - **Energy Trade:** Statistics Canada International Merchandise Trade Database, IEA Annual Database and United States EIA (U.S. Imports by Country of Origin)
  - **Canada-U.S. Energy Trade:** Statistics Canada International Merchandise Trade Database and United States EIA (U.S. Imports by Country of Origin)
  - **Government Revenues:** Statistics Canada Table 33-10-0006-01, Statistics Canada special tabulation (royalties) and Canadian Association of Petroleum Producers, Statistical Handbook, Table 01-01C (Crown land sales Western Canada and Canada lands)
- **ENERGY AND GHG EMISSIONS**
  - **GHG Emissions by Sector:** Environment and Climate Change Canada (National Inventory Report)

SECTION 2: INVESTMENT

- **Capital expenditures:** Statistics Canada tables 34-10-0035-01, 34-10-0036-01, and 34-10-0040-01
- **Canada's Energy Infrastructure:** StatCan Table: 36-10-0608-01: Infrastructure Economic Accounts, investment and net stock by asset, industry, and asset function
- **Canada's Major Energy Projects:** NRCan Major Project Inventory
- **Foreign Direct Investment and Canadian Direct Investment Abroad:** Statistics Canada Table 36-10-0009-01
- **Foreign Control of Canadian Assets:** Statistics Canada 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**
- **Environmental Protection Expenditures:** StatCan Environmental protection expenditures by businesses, 2018 (Tables 38-10-0130-01, 38-10-0132-01)

SECTION 3: SKILLS, DIVERSITY AND COMMUNITY

- **Energy Sector Demographics:** Statistics Canada Natural Resources Account, special release tables.
- **Household Expenditures on Energy:** Statistics Canada Table 11-10-0222-01
- **Energy Retail Prices:** Statistics Canada tables 18-10-0004-01 and 18-10-0001-01
- **Energy Reliant Communities:** NRCan analysis based on Statistics Canada 2016 Census Data

SECTION 4: ENERGY EFFICIENCY

- **ENERGY USE**
  - **Primary and secondary energy use:** Natural Resources Canada's National Energy Use Database
  - **Energy efficiency:** Natural Resources Canada's National Energy Use Database and Natural Resources Canada Energy Efficiency Trends in Canada 2000-2018
  - **Energy intensity:** Natural Resources Canada's National Energy Use Database
  - **Energy in our daily lives:** Natural Resources Canada's Energy Efficiency Trends in Canada 2000-2018
  - **Residential Energy Use, water heating and space heating** Natural Resources Canada's National Energy Use Database and NRCan estimates
  - **Residential, commercial, institutional and industrial sectors:** Natural Resources Canada's National Energy Use Database
- **ENERGY TRENDS**
  - **Trends in Energy use and intensity:** Natural Resources Canada's National Energy Use Database

SECTION 5. CLEAN POWER AND LOW CARBON FUELS

- **CLEAN TECHNOLOGY AND THE ECONOMY**
  - **Environmental and clean technology:** compiled by NRCan from Statistics Canada data and other public sources (Toronto Stock Exchange)
- **ELECTRICITY**
  - **World production and exports:** IEA database (Electricity Information [note: IEA production/generation data is expressed on a "gross" basis, i.e. before generating station use])
  - **Trade:** CER Table (Electricity Exports and Imports Statistics), and Statistics Canada.
  - **Canadian and provincial supply:** compiled by Statistics Canada and NRCan's Electricity Division from various sources
  - **Prices:** Hydro-Québec (Comparison of Electricity Prices in Major North American Cities)
  - **Electricity energy use:** Office of Energy Efficiency Comprehensive Energy Use Database.
  - **Levelized cost of electricity:** CER (Canada's Adoption of Renewable Power Sources – Energy Market Analysis)
- **RENEWABLES**
  - **International context – Production:** IEA (Renewables Information)
  - **International context – share of energy supply:** IEA (Electricity Information, Energy Balances of OECD Countries, and Energy Balances of Non-OECD Countries) and United States EIA
  - **Domestic production:** IEA (Renewables Information) and NRCan data based on Statistics Canada
  - **Hydro – international generation:** IEA (Electricity Information, Energy Balances of OECD Countries, and Energy Balances of Non-OECD Countries)

- **Hydro – capacity in Canada:** Statistics Canada Table 25-10-0022-01 and compiled by NRCan
- **Hydro – facilities and projects:** compiled by NRCan from Statistics Canada and other public sources
- **Biomass – Renewable balance:** IEA database (Renewables balances)
- **Biomass – production:** Statistics Canada Table 25-10-0031-01, Statistics Canada International Merchandise Trade Database and NRCan
- **Biomass – wood fuel use by sector: I**EA (Renewables Information)
- **Wind – international context:** Global Wind Energy Council (Global Wind Report)
- **Wind – capacity in Canada:** compiled by NRCan from multiple sources (Canadian Wind Energy Association, Statistics Canada and NRCan)
- **Wind generation in Canada:** Statistics Canada Table 25-10-0020-01
- **Wind – wind farms:** compiled by NRCan from Statistics Canada data and other public sources (including Canadian Wind Energy Association)
- **Solar PV – international context:** Renewable Energy Policy Network for the 21st Century (Renewables 2020 Global Status Report)
- **Solar PV – capacity in Canada:** IEA and compiled by NRCan
- **Solar PV – generation in Canada:** Statistics Canada Table 25-10-0020-01
- **Solar PV – solar PV farms:** compiled by NRCan from Statistics Canada data and various public sources

- **URANIUM AND NUCLEAR**
  - **Biofuels – regulations:** compiled by Office of Energy Efficiency from various public sources
  - **World uranium production and exports:** World Nuclear Association (World Uranium Mining) and NRCan estimates based on World Nuclear Association production dat**a**
  - **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, 2020 Ed.)
  - **Canadian supply and demand:** World Nuclear Association (Uranium in Canada), Cameco Annual report and estimates compiled by NRCan from company information
  - **Nuclear in Canada infographic:** NRCan website (Nuclear Energy and Uranium)
  - **Purchases by U.S. nuclear reactors:** United States EIA (Uranium Marketing Annual Report) Table 3 (Uranium purchased by owners and operators of U.S. civilian nuclear power reactors by origin country and delivery year**)**
  - **CANDU nuclear reactors:** Based on figures compiled by NRCan
  - **Nuclear power plants in Canada:** Compiled by NRCan from Statistics Canada Table 57-206, International Atomic Energy Agency Power Reactor Information System and other public sources
  - **Spot prices:** United States EIA Annual Uranium Market Report
- **BIOFUELS AND TRANSPORTATION**
  - **Biofuels – regulations:** compiled by Office of Energy Efficiency from various public sources

- **Biofuels – international context:** IEA (Renewables Information)
- **Biofuels – production, supply and demand :** Compiled by NRCan from a variety of sources
- **Transportation – Electric vehicle sales:** Statistics Canada Table: 20-10-0021-01
- **Transportation – GHG emissions:** Environment and Climate Change Canada
- **Hydrogen – Hydrogen Strategy For Canada,** https://www.nrcan.gc.ca/climate-change/canadas-green-future/the-hydrogen-strategy/23080

SECTION 6: PETROLEUM, GAS AND COAL

- **CRUDE OIL**
  - **World production and exports:** IEA Online Data Services (Crude Oil Information)
  - **World proved reserves:** Oil and Gas Journal (Worldwide Look at Reserves and Production)
  - **Canadian Resources:** Canadian Association of Petroleum Producers Statistical Handbook tables 2.6 (Crude Oil Remaining Established Reserves) and 2.1a (Crude Reserves) Alberta Energy Regulator ST98 (Alberta's Energy Reserves and Supply/Demand Outlook), tables R4.5 (Conventional crude oil reserves as of each year-end), R4.1 (Reserve and production change highlights) and 1 (Resources, reserves and production summary)
  - **Wells completed and metres drilled in western Canada:** Canadian Association of Petroleum Producers, Statistical Handbook, Wells and Metres Drilled in Western Canada (2020 Drilling Activity)
  - **Canadian and provincial production:** Statistics Canada Table 25-10-0063-01 and NRCan analysis
  - **Canadian Supply and Demand:** Statistics Canada Table 25-10-0063-01 and Statistics Canada International Merchandise Trade Database, United States EIA (Imports by Country of Origin, Refining and Processing, total crude oil and products, consumption/sales)
  - **Trade:** Statistics Canada table 25-10-0063-01 and Statistics Canada International Merchandise Trade Database, U.S. EIA (Imports by Country of Origin, Refining and Processing, total crude oil and products, consumption/sales)
  - **Oil Sands:** Canadian Association of Petroleum Producers, Statistical Handbook, Table 04-14 (Canada Oil Sands Expenditures), Statistics Canada tables 34-10-0036-01 and 25-10-0063-01, Alberta Energy Regulator ST98 (Alberta's Energy Reserves and Supply/Demand Outlook) table S3.1 (Crude bitumen production), Canada's Oil Sands Innovation Alliance, CanOils Database and NRCan analysis
  - **Prices:** United States EIA tables (Spot Prices for Crude Oil) and Sproule
  - **Pipelines:** compiled by NRCan
  - **Transportation by Rail:** CER (Canadian Crude Oil Exports by Rail – Quarterly Data) , Statistics Canada table 23-10-0062-01 and various sources
  - **Oil Sands Environmental Considerations:** NRCan compiled using Environment and Climate Change Canada (National Inventory Report 1990 to 2020: Greenhouse Gas Sources and Sinks in Canada), World Resources Institute (CAIT - Country Greenhouse Gas Emissions Data), Alberta Government (Oil Sands Information Portal), Alberta Energy Regulator, Statistics

Canada, NRCan Boreal forest website, Alberta Government Lower Athabasca Regional Plan and Canadian Association of Petroleum Producers (Frequently used statistics)

- **NATURAL GAS**
  - **World production and exports:** IEA (Natural Gas Information)
  - **World proved reserves:** U.S. EIA, International Data Browser
  - **World unproved technically recoverable shale resources:** U.S. EIA, World Shale Resource Assessments
  - **World resources and technically recoverable resources:** IEA (World Energy Outlook 2017, 2014 and 2013) tables 5.3 (Remaining technically recoverable natural gas resources by type and region), 8.2 (Remaining technically recoverable natural gas resources by type) and 3.3 (Remaining technically recoverable natural gas resources by type and region) and Oil and Gas Journal (Worldwide Look at Reserves and Production)
  - **Canada and US proved reserves:** U.S. EIA and O&G Journal, extracted from EIA International Data Browser
  - **Marketable and technically recoverable resources:** CER Energy Future Report, EIA Annual Energy Outlook, Assumptions to AEO - Oil and Gas Supply Module, EIA Shale gas proved reserves, IEA World Energy Outlook
  - **Canadian production and share of conventional versus unconventional production:** StatCan Table: 25-10-0055-01 Natural gas supply and disposition and CER Energy Futures, Natural Gas Production by Type
  - **US production and share of conventional versus unconventional production:** U.S. EIA, Dry Natural Gas Production, Annual and US EIA Annual Energy Outlook
  - **LNG Imports of North American countries:** CER LNG Imports and Exports, U.S. EIA Liquefied Natural Gas Imports and Exports, Annual, and IGU World LNG Report
  - **Natural gas wells completed and average metres drilled:** CAPP, Statistical Handbook
  - **Canadian trade of natural gas:** CER Exports and Imports of Natural Gas
  - **Marketable Production by Province:** StatCan Table: 25-10-0055-01 Natural gas supply and disposition
  - **Prices:** Sproule Price Forecast
  - **Pipelines:** Canada Energy Regulator
  - **Natural gas energy use:** NRCan Office of Energy Efficiency, National Energy Use Database
  - **Consumption:** Statistics Canada Table 25-10-0030-01 and IEA Annual Mini-Questionnaire
- **HGLs**
  - **Processing plant production:** StatCan Table 25-10-0036-01 - Supply of natural gas liquids and sulphur products from processing plants
  - **Refinery production:** Gross production of HGLs from StatCan Monthly Refined Petroleum Product Survey
  - **Shares of NGL Production by province:** CAPP Statistical Handbook
  - **NGLs end use:** NRCan Office of Energy Efficiency, National Energy Use Database
- **RPPs**
  - **Canadian refineries:** compiled by NRCan (from company information, Conference Board of Canada, Canada's Petroleum Refining Sector Canadian Fuels Association, Canadian Association of Petroleum Producers, Oil Sands magazine and CanOils Database)
  - **Supply and Demand:** Statistics Canada Tables, 25-10-0063-01 and 25-10-0081-01 and NRCan Analysis

- **Crude oil shipped to domestic refineries:** Statistics Canada table 25-10-0063-01
- **Domestic consumption by product:** Statistics Canada table 25-10-0081-01 and analysis by NRCan
- **Trade:** Statistics Canada Table 25-10-0081-01, United States EIA (U.S. Imports by Country of Origin for Petroleum and Other Liquids) and Statistics Canada International Merchandise Trade Database
- **Gasoline prices:** Kalibrate Technologies Ltd (average retail prices for regular gasoline and diesel fuel) and data compiled by NRCan
- **Refinery capacity:** Oil sands magazine and estimates compiled by NRCan

- **COAL**
  - **World proved reserved:** World Energy Council (BP Statistical Review of World Energy)
  - **World production and exports:** IEA (Coal Information)
  - **Canadian supply and demand:** Public provincial data sources, Statistics Canada table 25-10-0017-01, Statistics Canada International Merchandise Trade Database, public sources and NRCan estimations

- **GHG EMISSIONS FROM PETROLEUM**
  - **GHG Emissions by Sector:** Environment and Climate Change Canada (National Inventory Report)

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