

TABLE OF CONTENTS

INTRODUCING ENERGY IQ	2
OVERVIEW OF BRITISH COLUMBIA	3
RENEWABLE ENERGY	4
Hydroelectricity	
Wind	
Solar	
Biomass	
NATURAL GAS	10
OTHER ENERGY SOURCES	14
Coal	
Oil	
ENERGY TRANSMISSION	18
ENVIRONMENTAL IMPACTS	
Energy production contributes to climate change and has an effect on wildlife	20
ENERGY ECONOMY	
Energy plays a crucial role in the province's economy	22
ENERGY FUTURES	
What potential energy sources and projects are on the horizon for British Columbia	23
ENERGY QUIZ	
Ten questions to test your knowledge of British Columbia's energy story	24
WORD SEARCH PUZZLE	25
ANSWER KEY	26



INTRODUCING ENERGY IQ

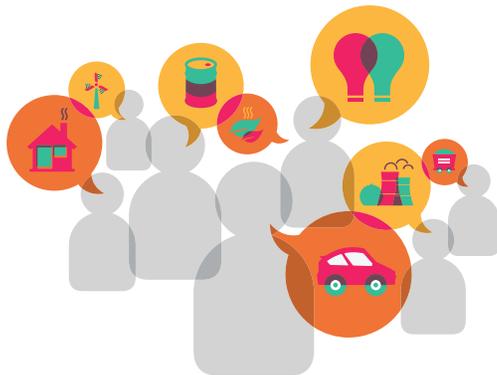
British Columbia may be better known for its natural beauty, but the province has more than mountains, glaciers and wild rivers.

British Columbia has vast deposits of natural gas and produces so much hydroelectricity it can meet almost all its electricity needs and still have some left over to sell to the United States. Its position on the Pacific Ocean makes it an ideal conduit for Canadian products heading to Asia-Pacific markets, and its pipelines and railroads carry Canadian oil, natural gas and coal to ports along its coast.

This factbook offers a snapshot of the energy sector in British Columbia. It covers topics such as where natural resources are found for energy production, the process through which energy is turned into electricity, the

role of energy exports and imports, how the energy industry impacts the environment, and much more.

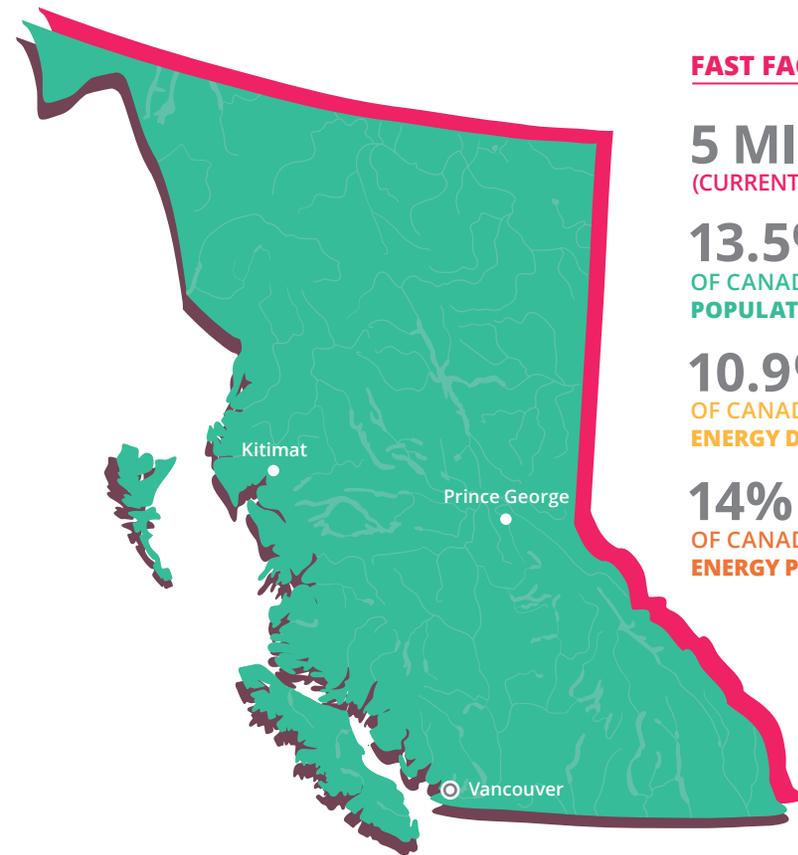
The British Columbia Energy Story was produced by Energy IQ, an educational program created and delivered by Canadian Geographic Education. Energy IQ focuses on the demand, production, and transmission of various energy sources in Canada today, with the goal of helping to improve energy literacy across the country among Canadian students and educators.



For more information and resources, visit energyiq.canadiangeographic.ca

OVERVIEW OF BRITISH COLUMBIA

British Columbia produces six main types of energy: hydroelectricity, natural gas, wind, solar, biomass, and crude oil.



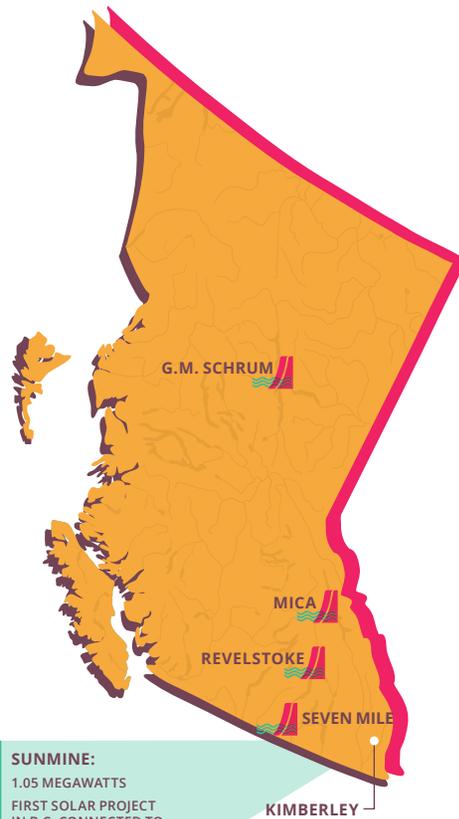
Learn more about how energy is produced in British Columbia and across the country at energyiq.canadiangeographic.ca/energy_mix

RENEWABLE ENERGY

RENEWABLE ENERGY SOURCES, such as wind, hydroelectricity, biomass and solar, can be found wherever the wind blows, rivers flow or sun shines.

HYDROELECTRICITY

Although British Columbia has an abundance of fossil fuels such as coal and natural gas, its real power, when it comes to energy, is from water. British Columbia has more than 100 dams scattered across the province and a total installed capacity of 15,000 megawatts, the second highest in Canada, after Quebec. British Columbia is continuing to build large hydroelectric projects, such as the Site C Dam, which will have about 1,100 megawatts (MW) of generating capacity once completed.



SUNMINE:
1.05 MEGAWATTS
FIRST SOLAR PROJECT
IN B.C. CONNECTED TO
THE ELECTRICITY GRID

SOLAR

Although more than 90 per cent of its electricity comes from hydro power, British Columbia is also becoming a leader in solar energy. Outside of Kimberley — on the site of an abandoned silver, zinc and lead mine — sits SunMine, British Columbia's largest solar project and Canada's largest tracking system (the solar panels automatically track the sun). With more than 300 days of sunshine a year, SunMine is able to generate enough electricity to power 200 homes.

As the sun's energy makes its way through the atmosphere, some of it is reflected back into space and the rest is filtered by oxygen, nitrogen, ozone, water vapour and other substances. Of the incredible 63 million watts per square metre of energy the sun emits, only about 547 watts per square metre actually reach the Earth's surface.

WIND

British Columbia is also home to abundant, world-class wind resources. Though it currently ranks fourth in Canada in terms of installed capacity, British Columbia still generates about 700 MW of wind energy, about two per cent of the province's needs.



BIOMASS

Biomass energy has been used since our ancestors learned the secret of fire. It is generated from organic materials, such as wood chips, agricultural byproducts and municipal waste that is burned or converted into biofuel. This accounts for more than 700 MW of British Columbia's energy, most of which is generated at large pulp and paper mills.

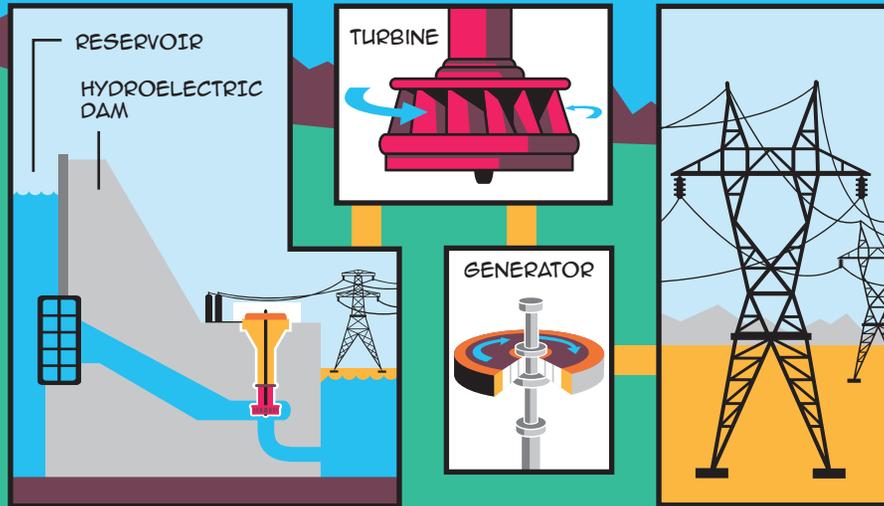


THE PRIMARY CHALLENGE FOR SOLAR AND WIND ENERGY is storage. Unlike hydro power, which is stored behind dams in the form of massive water reservoirs, and biomass, which can be converted into liquid or gas fuel, wind and solar cannot be stored, and the sun doesn't always shine, nor does the wind always blow when electricity is needed. Therefore, wind and solar energy must be converted into chemical energy in the form of batteries, a process that is expensive and loses significant quantities of energy as the energy is converted for storage and then recovered later.

IN B.C., BIOMASS AND THERMAL RECOVERY TECHNOLOGY (USING HEAT RECOVERED FROM INDUSTRIAL SOURCES) ACCOUNTS FOR ABOUT 5 PER CENT OF B.C.'S TOTAL ELECTRICITY, MOST OF WHICH IS USED TO POWER INDUSTRY.

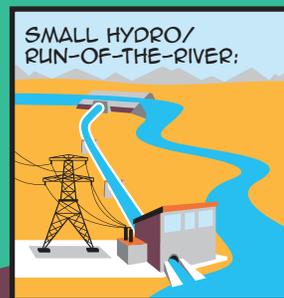
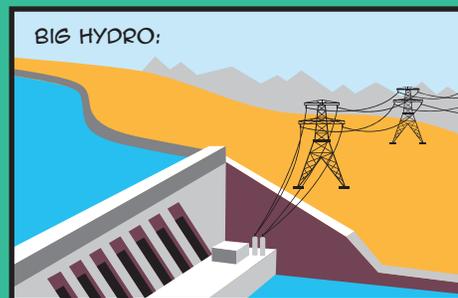
HYDROELECTRICITY

FOR BIG HYDRO PROJECTS, A DAM IS BUILT ON A RIVER TO STORE WATER IN A RESERVOIR. WHEN THE WATER IS RELEASED, ITS KINETIC ENERGY PASSES THROUGH A PENSTOCK (A SET OF CHANNELS OR PIPES). THE WATER TURNS THE BLADES OF A TURBINE, CREATING MECHANICAL ENERGY, WHICH IS THEN CONVERTED INTO ELECTRICITY BY A GENERATOR.



IN A PUMPED STORAGE SYSTEM, WATER IS RELEASED WHEN THERE IS PEAK DEMAND. WHEN DEMAND IS LOW, THE WATER IS PUMPED BACK UP TO THE RESERVOIR USING ELECTRICITY FROM OTHER ENERGY SOURCES. IN RUN-OF-THE-RIVER INSTALLATIONS, THE NATURAL FLOW OF THE RIVER PROVIDES THE NECESSARY KINETIC ENERGY.

HYDROELECTRICITY IS A RENEWABLE SOURCE OF ENERGY BECAUSE WATER IS NOT USED UP IN THE ENERGY PRODUCTION PROCESS.



WIND

A WIND TURBINE CATCHES THE KINETIC ENERGY FROM A BLOWING BREEZE, CAUSING THE PROPELLER BLADES TO TURN AND CREATE MECHANICAL ENERGY. THE TURBINE IS CONNECTED TO A GENERATOR, WHICH CONVERTS THE MECHANICAL ENERGY INTO ELECTRICITY.

The diagram shows a large wind turbine with three blades. Labels point to the 'ROTOR BLADE', 'GENERATOR', 'GEAR BOX', and 'NACELLE'. The nacelle is mounted on a tall tower. In the background, several other wind turbines are visible on a green hillside. In the foreground, a white car is driving on a road. To the right, a 'SUBSTATION' with a 'TRANSFORMER' is shown, connected to 'TRANSMISSION LINES' that lead away.

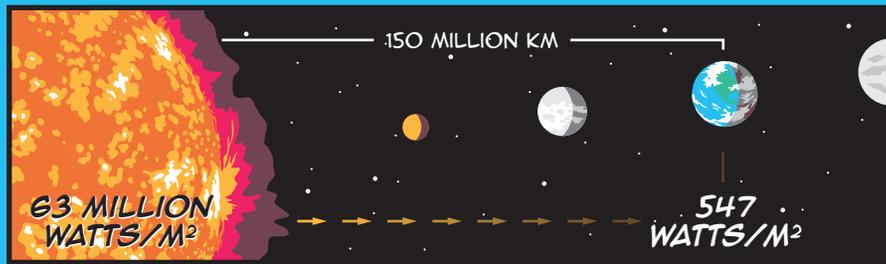
A TRANSFORMER INCREASES THE ELECTRICITY TO A HIGHER VOLTAGE, TRANSMITTING IT TO A SUBSTATION THAT INCREASES THE VOLTAGE AGAIN SO THAT IT CAN TRAVEL OVER LONGER DISTANCES THROUGH THE ELECTRICITY GRID.

WIND ENERGY IS RENEWABLE, BUT IT IS ALSO INTERMITTENT, MEANING THAT IT IS NOT ALWAYS AVAILABLE.

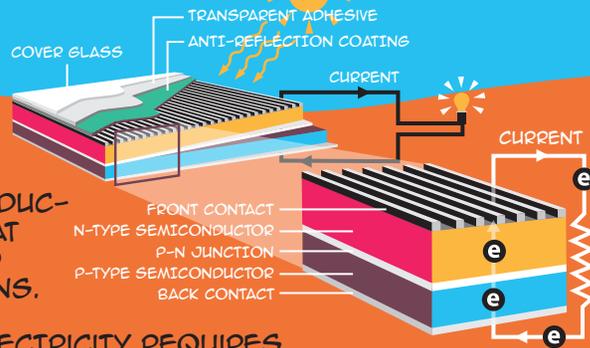
A small circular icon in the bottom right corner features a red electrical plug with a green leaf growing from its base, symbolizing clean or renewable energy.

SOLAR

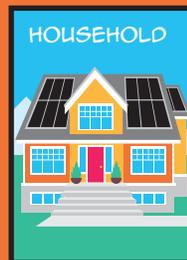
THE SUN CONSTANTLY EMITS AN INCREDIBLE 63,000,000 WATTS PER SQUARE METRE OF ENERGY, BUT MOST IS LOST ON THE 150 MILLION KILOMETRE JOURNEY TO EARTH.



ELECTRICITY IS GENERATED FROM SOLAR ENERGY THROUGH THE USE OF PHOTOVOLTAIC (PV) TECHNOLOGY, MADE OF SEMICONDUCTOR MATERIALS THAT ABSORB LIGHT AND RELEASE ELECTRONS.

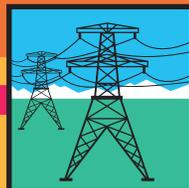


GENERATION OF ELECTRICITY REQUIRES CURRENT AND VOLTAGE. IN A SOLAR CELL, THE FLOW OF ELECTRONS CREATES THE CURRENT AND THE ELECTRIC FIELD CAUSES VOLTAGE.



THE ELECTRICITY PRODUCED IN A PV PANEL IS DIRECT CURRENT (DC).

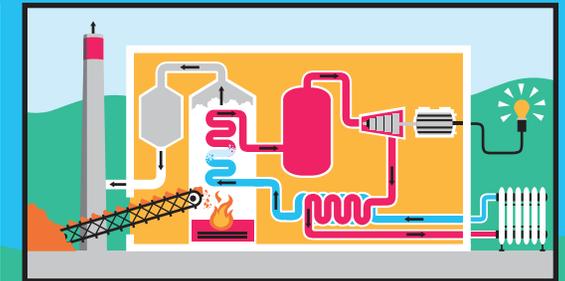
SINCE THE NORTH AMERICAN POWER GRID - AND MOST HOMES AND BUILDINGS - WORKS ON ALTERNATING CURRENT (AC), AN INVERTER IS REQUIRED TO CHANGE THE POWER FROM DC TO AC.



BIOMASS



BIOENERGY BEGINS WITH BIOMASS, WHICH IS ANY ORGANIC MATERIAL THAT HAS STORED ENERGY FROM THE SUN IN A CHEMICAL FORM, SUCH AS TREES, HAY, AND EVEN HOUSEHOLD GARBAGE.



ELECTRICITY: WOODCHIPS, SAWDUST OR OTHER ORGANIC MATERIALS ARE COLLECTED AND COMPRESSED INTO PELLETS. THE PELLETS FUEL A BOILER USED TO PRODUCE STEAM. IT TURNS TURBINES, WHICH SPIN MAGNETS IN A GENERATOR, CONVERTING MECHANICAL ENERGY INTO ELECTRICITY.



LANDFILL GAS CAPTURE: METHANE FROM CAPPED LANDFILLS IS COLLECTED, PROCESSED AND UPGRADED, THEN TRANSMITTED BY PIPELINE TO HOMES AND BUSINESSES.



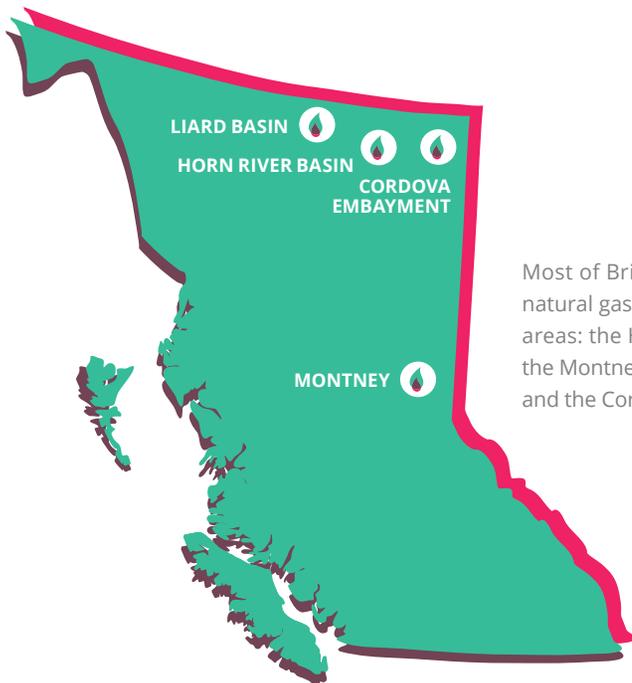
LIQUID BIOFUELS: BIOETHANOL IS CREATED BY FERMENTING AND DISTILLING BIOMASS SUCH AS STRAW, CORN OR GRAINS. BIODIESEL IS DERIVED FROM VEGETABLE AND ANIMAL FATS, INCLUDING USED OIL FROM RESTAURANTS.



NATURAL GAS

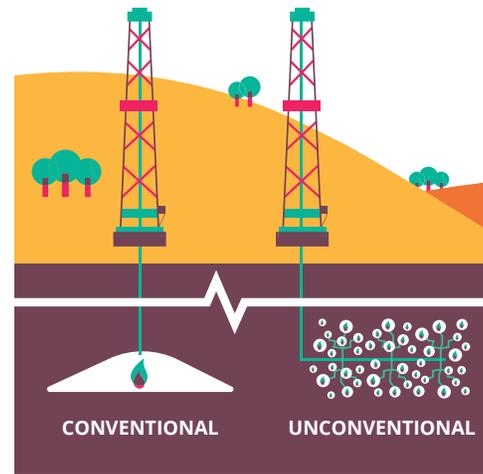
British Columbia is home to a huge amount of natural gas. There is more than 500 trillion cubic feet of natural gas in British Columbia, enough to support the energy needs in Canada for decades to come as well as to supply the growing demand in other countries.

In Canada, British Columbia is second only to Alberta in its natural gas production. British Columbia produces about 29 per cent of Canada's natural gas. In addition, British Columbia produces natural gas liquids (NGLs), which represent about 12 per cent of Canada's total NGL production. NGLs, such as ethane and propane, are hydrocarbons produced alongside natural gas under higher pressure and lower temperatures.



Most of British Columbia's natural gas is found in four areas: the Horn River Basin, the Montney, the Liard Basin and the Cordova Embayment.

NATURAL GAS IS THE CLEANEST FOSSIL FUEL AND EMITS LOW LEVELS OF GHGS

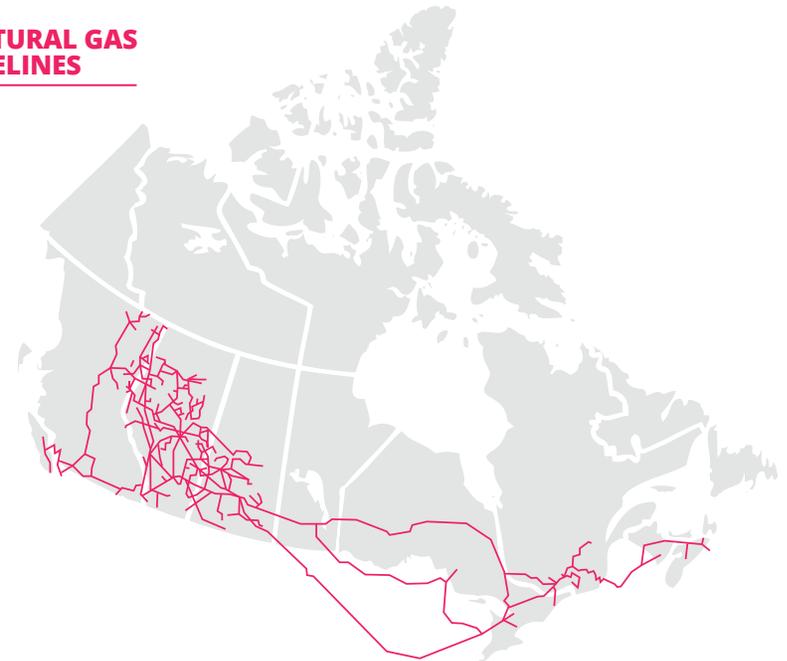


The majority of British Columbia's natural gas reservoirs are actually collections of tiny gas molecules trapped inside rocks two to three kilometres underground. This natural gas is harvested using hydraulic fracturing.

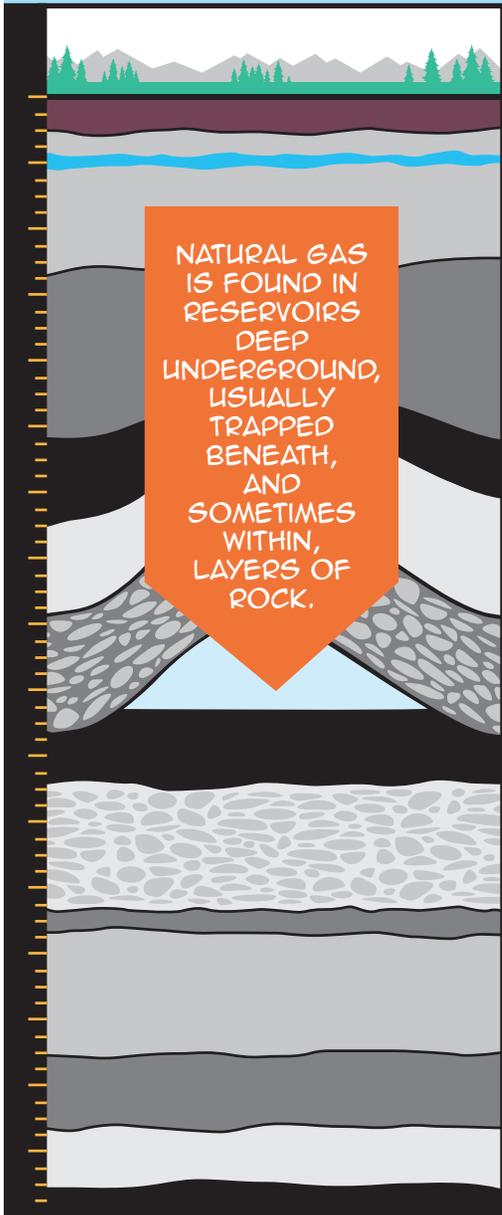
PIPELINES ARE THE SAFEST AND MOST EFFICIENT means to transport natural gas over land. Canada has infrastructure to transport natural gas to eastern Canada and the United States. And in British Columbia alone, there are more than 44,000 kilometres of pipeline running across the province and into the United States.

A new pipeline is being built to move natural gas from northeastern British Columbia to Kitimat, B.C., where Canada's first liquefied natural gas (LNG) plant will open in 2025. The natural gas will be cooled to -162°C , condensing it into a liquid that can be loaded onto ships and transported to overseas markets.

NATURAL GAS PIPELINES

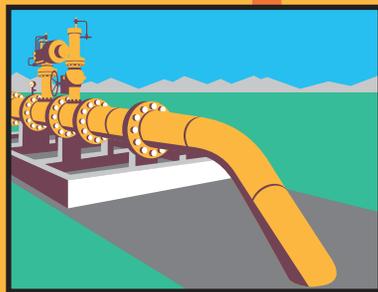
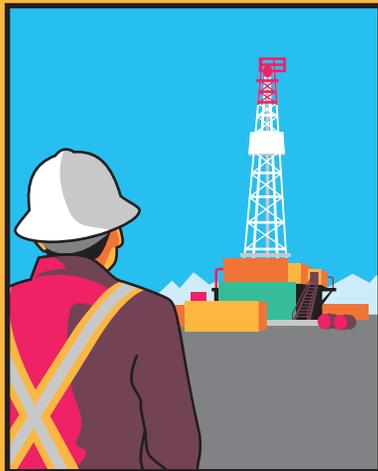


NATURAL GAS

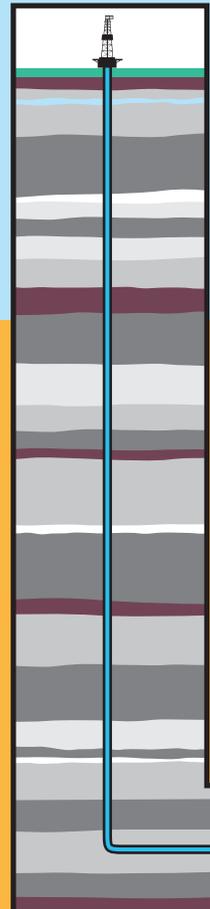


NATURAL GAS IS FOUND IN RESERVOIRS DEEP UNDERGROUND, USUALLY TRAPPED BENEATH, AND SOMETIMES WITHIN, LAYERS OF ROCK.

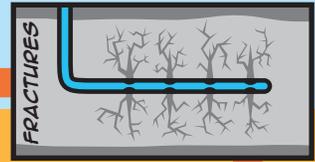
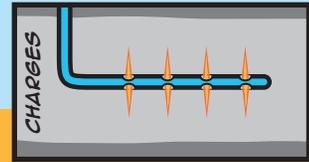
TO EXTRACT **CONVENTIONAL NATURAL GAS**—GAS TRAPPED IN POROUS SANDSTONE AND LIMESTONE FORMATIONS—WELLS ARE DRILLED INTO THE EARTH, AND THE GAS FLOWS TO THE SURFACE THROUGH THE WELL.



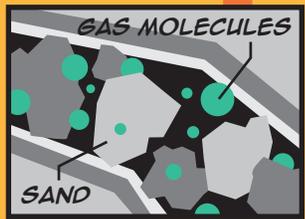
TO EXTRACT **UNCONVENTIONAL NATURAL GAS**—LOCKED WITHIN SHALE ROCK FORMATIONS—HORIZONTAL WELLS ARE DRILLED DEEP INTO THE EARTH AND A SERIES OF CHARGES ARE SENT DOWN THE WELL TO MAKE SMALL FRACTURES IN THE ROCK IN A PROCESS KNOWN AS HYDRAULIC FRACTURING.



2KM DEEP!



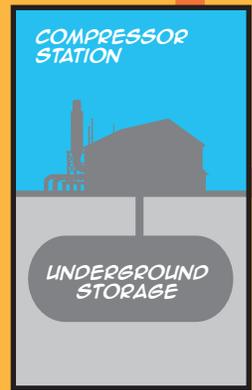
NEXT, A PRESSURIZED MIXTURE OF WATER, SAND AND CHEMICALS, IS SENT DOWN THE WELL TO HOLD OPEN THE CRACKS IN THE ROCK.



THEN THE GAS, WHICH IS LIGHTER THAN THE FLUID MIXTURE, RISES UP THROUGH THE WELL TO THE SURFACE.



EITHER WAY, NATURAL GAS CAN BE USED TO GENERATE ELECTRICITY, AND HEAT HOMES.



OTHER ENERGY RESOURCES

COAL

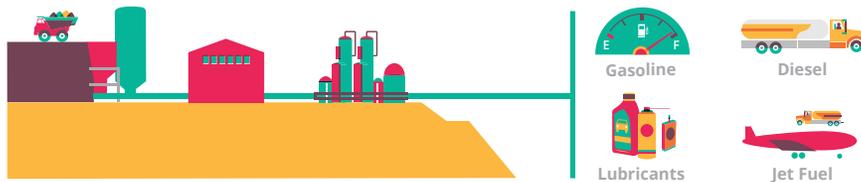
It is worth mentioning that British Columbia is a major producer and exporter of coal. Coal mining is an important part of British Columbia's economy, accounting for more than half the mineral production revenue in the province. There were about 30 million tonnes of coal produced in 2019. Up to 90 per cent of the coal mined in British Columbia is metallurgical coal, which is used for steel manufacturing, with the rest being thermal coal.

Thermal coal is produced in four mines in the Kootenay Mountains region and in three mines in the southeastern part of British Columbia. However, British Columbia doesn't derive any of its electricity or heating from coal. Most of the province's coal, both metallurgical and thermal, is exported to international markets, but some is sold to eastern Canada for steel production. Ships transport coal from B.C. ports near Vancouver and Prince Rupert to countries such as Japan, China, South Korea and India.

OIL

British Columbia produces a small amount of light crude oil in the northeastern part of the province, which represents less than two per cent of Canada's total production. This oil is produced through conventional exploration and production methods, such as using a drilling rig. In neighbouring Alberta, oil is produced conventionally and also has extensive oil sands deposits that are mined using in situ and truck and shovel. Although British Columbia doesn't have any oil sands, it sits between Alberta and the Pacific Ocean, which means a lot of oil sands products travel across British Columbia in pipelines and trains and are also shipped to overseas markets.

Refineries produce refined petroleum products (RPPs), such as gasoline, diesel fuel, jet fuel, heating oil and more. There are two refineries in British Columbia, one at Prince George that refines 12 thousand barrels per day of crude oil (Mb/d) and one in Burnaby that refines 55 Mb/d. British Columbia's refineries process mainly crude oil from Alberta to produce RPPs for the domestic market, which represents the fourth largest demand for RPPs in Canada.

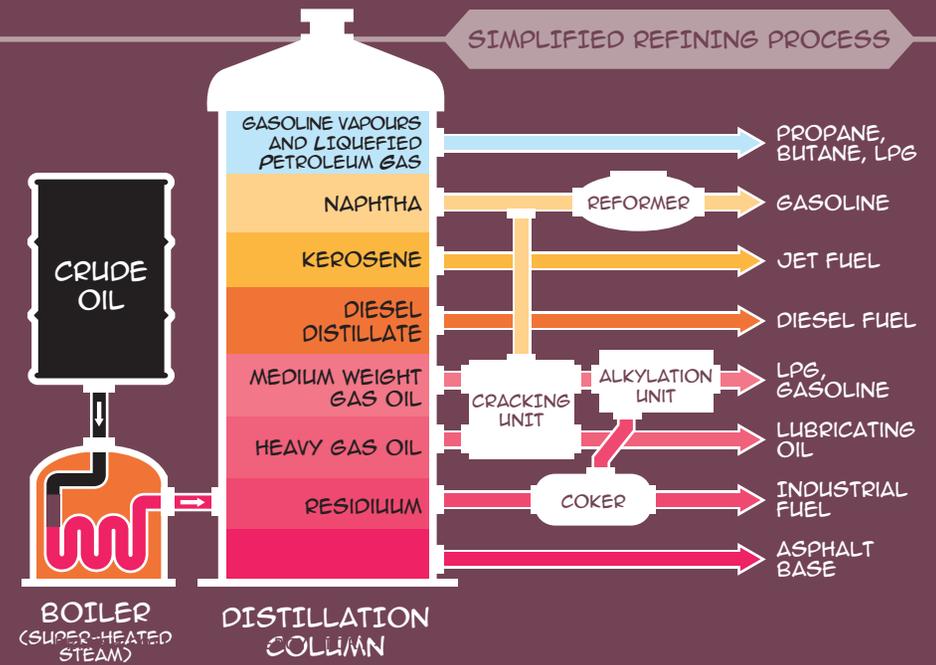


REFINING CRUDE OIL

CRUDE OIL IS TRANSFORMED INTO REFINED PETROLEUM PRODUCTS (RPPS), SUCH AS GASOLINE AND JET FUEL, THROUGH A PROCESS CALLED REFINEMENT. REFINERIES ARE LARGE AND COMPLEX INDUSTRIAL STRUCTURES COMPRISING MANY DIFFERENT PARTS AND PROCESSES THAT PRODUCE DIFFERENT RPPS.



THE COMPONENTS MAKING UP CRUDE OIL EVAPORATE AT DIFFERENT TEMPERATURES, ALLOWING THEM TO BE SEPARATED AND REFINED INTO VARIOUS END PRODUCTS.

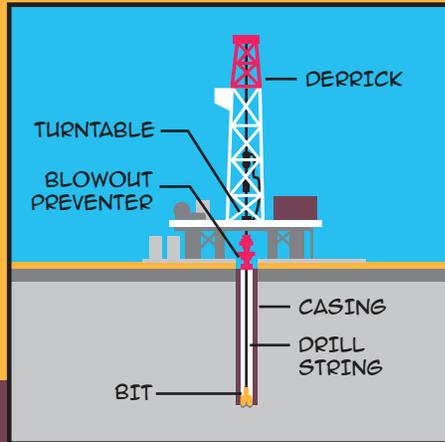


CRUDE OIL

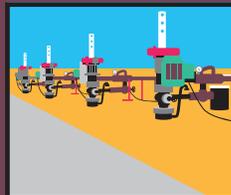
CRUDE OIL IS A YELLOW-TO-BLACK LIQUID, AND REFERS TO LIGHT, MEDIUM, AND HEAVY HYDROCARBONS. IT IS FOUND IN UNDERGROUND RESERVOIRS, OIL SANDS DEPOSITS, OR OFFSHORE RESOURCES.

CONVENTIONAL CRUDE OIL

ONCE OIL IS DISCOVERED IN AN UNDERGROUND RESERVOIR, THE SITE IS PREPARED FOR DRILLING. A DRILLING RIG IS USED TO HOUSE THE TOOLS AND PIPES NEEDED TO DRILL HOLES IN THE EARTH AND BRING OIL TO THE SURFACE.



AFTER THE RIG IS REMOVED, THE CREW PUTS A PUMP ON THE WELL HEAD, WHICH PULLS OIL UP THROUGH THE WELL. WHEN COMPLETED, THE WELL BRINGS A STEADY FLOW OF OIL TO THE SURFACE.



THE CRUDE OIL IS THEN KEPT IN STORAGE TANKS OR TAKEN TO REFINERIES TO BE PROCESSED INTO VARIOUS PETROLEUM PRODUCTS. DRILLING RIGS ARE FITTED WITH BLOWOUT PREVENTERS (BOP) TO HELP PREVENT ACCIDENTAL RELEASES OF OIL.

OIL IS PRIMARILY TRANSPORTED BY PIPELINES—CANADA HAS A PIPELINE NETWORK OF MORE THAN 840,000 KILOMETRES. IT IS ALSO TRANSPORTED BY RAIL, TRUCKS, OR TANKER SHIPS TO WHERE IT NEEDS TO GO.

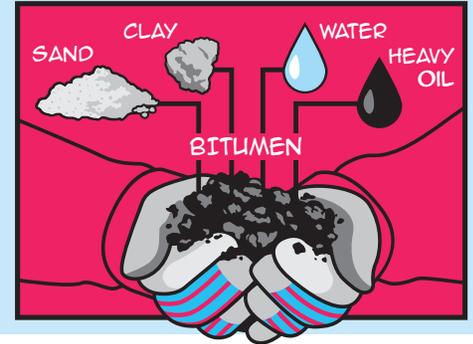


UNCONVENTIONAL CRUDE OIL

THIS HEAVY OIL MIXTURE IS **TOO THICK AND HEAVY TO FLOW** AND IS USUALLY EXTRACTED FROM THE GROUND USING EITHER **MINING** OR **IN SITU** METHODS.



MINING IS USED WHEN OIL SANDS ARE CLOSE ENOUGH TO THE SURFACE TO BE DUG UP USING EXCAVATORS, WHICH LOAD IT ONTO LARGE TRUCKS. THE **OIL SANDS** ARE TAKEN TO A PROCESSING PLANT WHERE IT IS MIXED WITH HOT WATER TO REMOVE THE SAND AND CLAY.



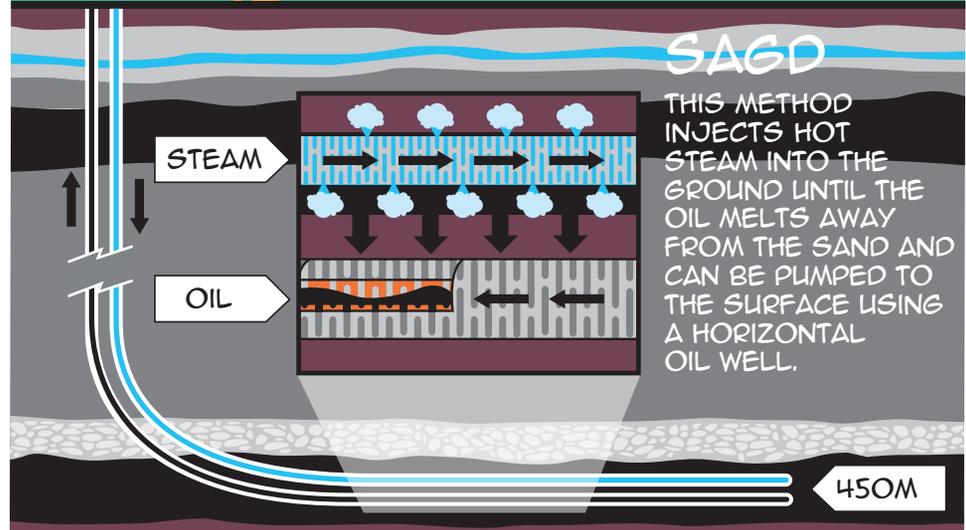
IN SITU

IF THE **HEAVY OIL** CANNOT BE MINED, THEN **IN SITU** METHODS ARE USED, INCLUDING **STEAM-ASSISTED GRAVITY DRAINAGE (SAGD)**.



SAGD

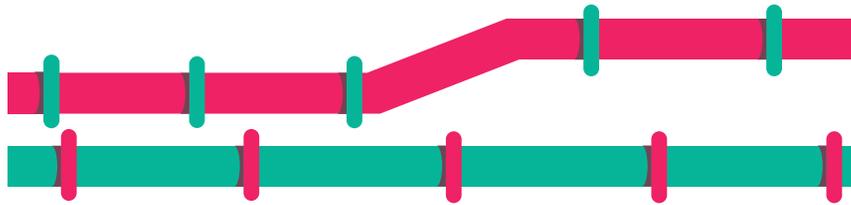
THIS METHOD **INJECTS HOT STEAM** INTO THE GROUND UNTIL THE OIL **MELTS AWAY** FROM THE SAND AND CAN BE **PUMPED TO THE SURFACE** USING A **HORIZONTAL OIL WELL**.



450M

ENERGY TRANSMISSION

Whether it's coal, oil, natural gas or biofuels, the sources of energy that heat our homes, fuel our vehicles and power our devices often travel huge distances. This means how we transport energy is almost as important as finding the sources of energy in the first place.



In Canada, most natural gas and petroleum products travel across the country in a vast network of pipelines. There are more than 44,000 kilometres of pipeline in British Columbia alone, transporting natural gas, oil, water and other liquids. Natural gas moves through those pipes at up to 40 kilometres an hour.

Trains have a long history of transporting all types of commodities, but coal is the number one dry good shipped by rail in Canada. About 80 per cent of coal in the country is shipped to ports in British Columbia because most coal in Canada is found in the west.

THERE ARE MORE THAN 44,000 KM OF PIPELINE IN B.C. ALONE



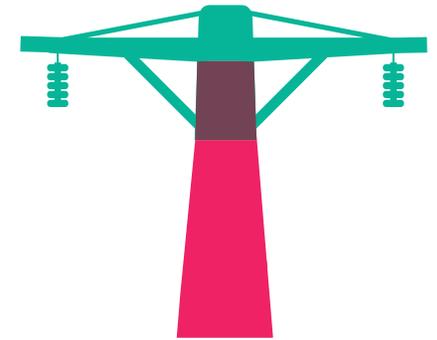
(NEARLY THE SAME AS THE EARTH'S CIRCUMFERENCE)



By far the smallest share of energy transport within Canada comes from ships and trucks. The most visible form of transporting energy is probably right outside your window. Yep, power lines.

Did you know there are different types of power lines?

High-voltage transmission lines bring electricity from power plants to substations in cities. There, the high-voltage electricity is converted into the low-voltage electricity we use and is sent along distribution lines to our homes, offices and schools. There are more than 18,000 kilometres of transmission lines and more than 55,000 kilometres of distribution lines in British Columbia.



HIGH VOLTAGE ELECTRICITY IS CONVERTED INTO THE LOW VOLTAGE ELECTRICITY WE USE IN OUR HOMES



ENVIRONMENTAL IMPACTS

All energy sources impact the environment. Fossil fuels — namely coal, oil and natural gas — emit greenhouse gases (GHGs) when burned (the kind of gases they emit and in what quantity differs for each).

Although renewable energy sources such as wind and hydroelectricity emit less GHGs when operating than fossil fuels, infrastructure for these renewable energy sources does use fossil fuels in their construction and maintenance.

Locating and developing energy resources also has an impact on the environment. Exploring for resources such as coal, oil and natural gas, then getting them out of the ground and refining them into usable fuel requires energy and therefore also emits GHGs into the atmosphere. In addition, both fossil fuels and renewable resources can have an impact on wildlife. For example, wind turbines can harm birds, which is why careful site selection is important in order to avoid areas with high bird movement or migration routes.



The following chart compares Canada's major energy sources and their effects on the environment (this also applies for British Columbia, which relies on most of the energy sources mentioned in the chart). It looks at four main criteria: average weight in kilograms of carbon dioxide (CO₂, the most commonly measured GHG) per million British thermal units (BTUs, a measure of energy) emitted when using the energy source for fuel, the infrastructure needed to produce the energy resource, the impact on the landscape of developing these resources, and how long it takes the land to return to its previous, or similar, productivity.



To learn more about how energy sources contribute to climate change, visit energyiq.canadiangeographic.ca/learning_centre

CANADA'S MAJOR ENERGY SOURCES AND THEIR IMPACTS ON THE ENVIRONMENT



COAL



OIL



NATURAL GAS



RENEWABLES

TYPE FOUND IN CANADA

Bituminous & sub-bituminous coal

Oil sands, conventional oil, offshore oil and tight oil (trapped within reservoir rocks)

Conventional and unconventional

Hydroelectric, wind, solar and biomass

AVERAGE KGS OF CO₂/MILLION BTU

95.35

ABOUT 71

53.07

VERY LOW GHGS

INFRASTRUCTURE NEEDED

Excavators, trucks, processors, coal-fired power plants, transmission lines

Excavators, trucks, drilling rigs, upgraders, refineries and pipelines

Drilling rigs, processors, natural gas-fired power plants, transmission lines

Wind turbines, biomass feedstocks and generating plants, hydroelectric dams, transformers, transmission lines

IMPACT ON LANDSCAPE

Vast areas of land are disturbed

For mining, areas of land are stripped and tailings ponds remain for several years. For conventional drilling, and in situ oil sands, very little land is used

Minimal clearing of trees around a well site, if necessary. Hydraulic fracturing requires significant quantities of water

Wind farms can harm bird populations. Hydroelectric dams can harm fish, plants and ecosystems. Biomass can include crops, and generating facilities can produce some GHGs. Solar uses farm land, and the panels can be hazardous to birds

TIME FOR LAND TO RETURN TO PREVIOUS PRODUCTIVITY

Many years, though often the landscape can be drastically changed

For oil sands mining, many years of reclamation are necessary. In the case of conventional oil, there is often no disruption to previous productivity

Reclamation of a natural gas well site takes about five years, includes: capping the well, removing the equipment, clean up, replacing soil and replanting vegetation

Immediately, though hydroelectric dams cause long-term changes to river ecosystems

ENERGY ECONOMY

In addition to a large service and tourism sector, British Columbia is also known for its rich natural resources. Its forestry products have been shipped around the world for centuries, and B.C. coal — which is about 44 per cent of Canada’s total coal production — is used widely in Asia.

British Columbia’s energy exports totalled \$11.8 billion in 2019. About 21,500 people work in the energy sector, and thousands more work in related jobs. British Columbia’s energy sector is responsible for 6.4 per cent of the province’s economy. British Columbia generates about 76.4 terawatt hours of electricity per year and produces about 4.5 billion cubic feet of natural gas a day and 75,500 barrels of crude oil per day.

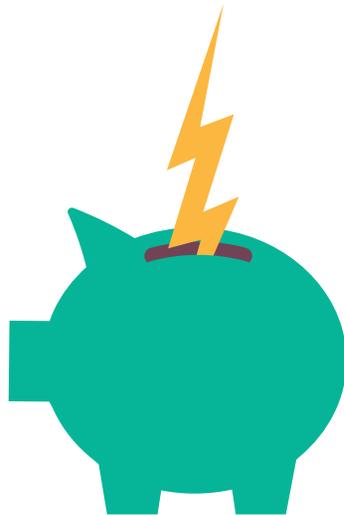
British Columbia energy economy is also important for the rest of Canada. In particular, pipelines and railways that cross British Columbia are important for moving Canadian energy products to overseas markets. By 2025, natural gas will also move through a pipeline to a plant in Kitimat, B.C., where it will be cooled down to liquified natural gas (LNG) and shipped overseas.

British Columbia was the second Canadian province to implement a carbon tax designed to reduce the use of carbon emitting fuels. The tax is “revenue neutral,” which means every dollar the tax brings in goes to reducing another tax, such as income tax.

British Columbia exports natural gas and crude oil primarily to the United States. Natural gas is transported via

pipelines. Oil is primarily moved by pipelines, but there are also two rail facilities in Burnaby, B.C., that offload crude oil.

As for electricity, British Columbia both imports from and exports to the United States. However, British Columbia has been successful at “buying low and selling high,” which means that the province has made a profit on its electricity trade. More than two-thirds of British Columbia’s electricity exports go to California, which represents about 15 per cent of Canada’s total power exports.



ENERGY FUTURES

Although British Columbia relies on a variety of energy sources to meet its electricity, heating and fuel needs, there is always the potential for diversification and finding ways to improve upon existing energy infrastructure.

Natural gas will continue to be an important energy resource for British Columbia, and it is projected that for the near future, the province’s natural gas production will continue to grow. Currently, British Columbia has several proposed large-scale LNG export facilities, two of which are moving ahead with planning and construction. These facilities are expected to begin exporting in 2024 and will play a big role in British Columbia’s economy once they begin exporting billions of cubic feet of LNG per day (also the construction of these facilities is providing economic benefits to the province).

British Columbia is also in a unique position to develop energy resources that are not readily available in other provinces or territories. For example, British Columbia is located along a region called the “Ring of Fire,” which encompasses the Pacific Ocean basin

and is known for earthquakes and volcanic activity. These volcanic hot spots could have the potential to be used to develop geothermal energy for electricity generation. Currently, this renewable energy option is only in the exploration stages and no geothermal power plants yet exist. Similarly, British Columbia could also develop tidal technology and it is one of the few places in Canada with such high potential.

There are some challenges in developing geothermal and tidal technology, from technical obstacles to gathering the support necessary to fund such projects, but there is also a lot of opportunity with providing electricity to remote communities through renewable resources. As energy demand continues to grow in Canada, both renewable and non-renewable resources will be needed to meet needs at home and abroad.





Test your knowledge of British Columbia's energy resources.

1) British Columbia represents what percentage of Canada's energy demand?

- A) 5.6% B) 18.2%
C) 10.9% D) 46.5%

2) TRUE or FALSE: British Columbia has the highest installed capacity for hydroelectricity in Canada.

- A) True B) False

3) Where does British Columbia rank in Canada in terms of installed capacity for wind energy?

- A) 1st B) 6th
C) 4th D) 2nd

4) Where does British Columbia get most of the materials for its biomass energy production?

- A) Pulp and paper mills B) Surplus crops
C) Recycled paper D) Imported waste

5) How much of Canada's natural gas production is in British Columbia?

- A) 15% B) 52%
C) 80% D) 29%

6) How many kilometres of natural gas pipeline exist in British Columbia?

- A) 44,000 km B) 1,600 km
C) 26,000 km D) 140,000 km

7) At what temperature is natural gas cooled to be liquefied?

- A) -35 C B) -220 C
C) -162 C D) -86 C

8) TRUE or FALSE: British Columbia transports, uses and exports crude oil from Alberta.

- A) True B) False

9) Which state does British Columbia export most of its electricity to?

- A) North Carolina B) California
C) Colorado D) Kentucky

10) What is British Columbia in the process of building at Kitimat?

- A) A refinery B) A dam
C) An LNG plant D) A solar farm

WORD SEARCH PUZZLE

S A S T O R A G E S O F
W A N H X H F U P I S O
I C A R B O N T A X T U
N O C A L R E B B O R R
D A Q S U N M I N E A M
G L B H F R C O R N W S
O A P A C I F I C L E F
D H I G H V O L T A G E
R A M O S E A M S J O R
S N A T U R A L T P B N

Questions

- 1) _____ emits the most greenhouse gases out of all the fossil fuels. (4 letters)
- 2) British Columbia's largest solar project: _____ (7)
- 3) The cleanest fossil fuel: _____ gas (7)
- 4) British Columbia has a _____ on fossil fuels (6, 3)
- 5) Primary challenge for solar and wind energy (7)
- 6) British Columbia is on the _____ ocean (7)
- 7) _____ mills have large propellers (4)
- 8) British Columbia's natural gas is found in _____ Basin, Montney, Liard Basin and Cordova Embankment (4, 5)
- 9) _____ fuel can be made from straw, grains and _____ (3, 4)
- 10) _____ - _____ transmission lines carry electricity (4, 7)

EDUCATION

CANADIAN
Geographic

ÉDUCATION

CPP ACPP

CANADIAN ASSOCIATION | ASSOCIATION CANADIENNE
OF PETROLEUM PRODUCERS | DES PRODUCTEURS PÉTROLIERS

