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**ELECTRICITY
GENERATION**



**ENERGY
EDUCATION
TOOL KIT**

BY INSIDE EDUCATION



ELECTRICITY GENERATION

GUIDING QUESTIONS

- How do we generate electricity from a natural resource?
- How does electricity generation contribute to climate change?
- How might the resources we use to generate electricity change over time?
- What are some hazards associated with electricity?
- What is an electromagnet?

Across Canada we use a variety of natural resources to generate electricity; which natural resources are used depends on what is available, as well as social, environmental and economic considerations. In 2023, Alberta used natural gas to generate most of its electricity¹.

We use electricity in our day to day lives for lighting, cooking, transportation, entertainment, communication, and more. Although electricity is not necessary to survive, we rely on it in our homes, schools, businesses and industries. There are many steps involved in getting electricity safely from the energy source to the consumer; starting with a natural resource, transforming that resource into flowing electrons (*power generation*), sending those electrons through transmission lines and delivering them safely to where they are needed.

Burning fossil fuels like natural gas and coal to produce electricity releases **greenhouse gases** into the atmosphere, which enhances the **greenhouse effect** and contributes to **climate change**. Fossil fuels are used to produce most of Alberta's electricity. As environmental awareness increases and renewable energy technologies improve, our energy future might look much different than it does today.

CLIMATE CHANGE

A change in global or regional climate patterns is often attributed to increased levels of greenhouse gases in the atmosphere. This increase is caused in part by the production and use of fossil fuels.



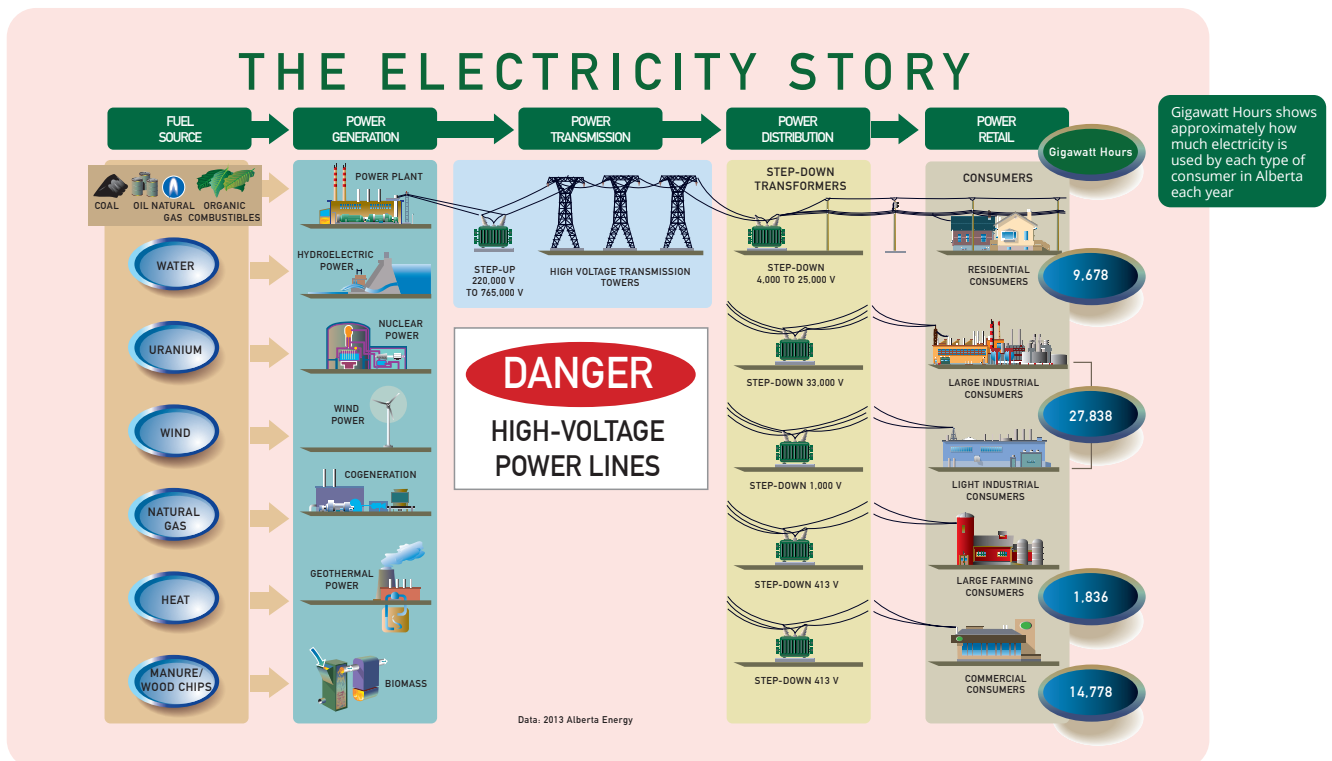
GREENHOUSE GASES

Gases including carbon dioxide (CO_2), water vapour and methane (CH_4) that trap the sun's heat near the earth's surface.



GREENHOUSE EFFECT

A natural process where heat from the sun is trapped by greenhouse gases in the Earth's atmosphere, warming the earth's surface. Without the greenhouse effect the earth would be too cold and unable to support life; however, an enhanced greenhouse effect caused by emissions from human activity contributes to climate change.



MATERIALS FROM KIT:

- **Electricity Generation - Fill in the blank activity** (Elementary)
 - Turn on a light using natural gas
 - Turn on a toaster using wind power
- **Alberta's Electricity Mix - Discussion Questions** (Junior/Senior High)
- **Electricity Poster**
- **Hand generator**
- **Multimeter**
- **Electromagnet** (battery, copper wire, electrical tape, paper clips)

TRY THESE ACTIVITIES:

- **Complete the Fill in the Blank stories.** (Elementary)
- **Check out Alberta's Electricity Mix and answer the discussion questions.** (Junior/Senior High)
- **Use the hand generator & multimeter to see how much electricity you can generate.**
 - Can you see the copper wire and magnets? Inside a generator, copper wire and magnets work together to generate an electrical current.
- **Experiment with the electromagnet.**
 - Can you build an electromagnet and pick up the paper clip?
- **Explore the electricity poster.**
 - Find the cross-country electricity snapshot on the back of the poster. How does Alberta compare to the rest of Canada in how we generate electricity?
 - Find the Electricity Story on the back of the poster and follow the flow of electricity from power generation to power retail, also known as consumers. Who are the biggest consumers of electricity?
 - There are several red triangles with lightning bolts on the poster that highlight electrical hazards. Can you find all 12 hazards?



CONSIDER ...

As long as we can **turn a turbine**, we can generate **electricity**! Consider how the process for generating electricity changes when using wind, water, biomass and solar. Use the electricity poster for clues.

CONNECT ...

In 2023, the average Alberta home spent \$0.258 per kWh¹³, or \$258 per month, assuming an average monthly usage of 1,000 kWh. Ask an adult if you can see an electricity bill. How does your home compare?

LEARN MORE ...

Check out the electricity poster to see all the ways we use electricity in our homes.

> <https://www.insideeducation.ca/learning-resources/electricity-poster-36/>