

ACTIVITY 1: CANADIAN ENERGY STORIES

OVERVIEW	Students look at the <i>Electricity Generation</i> visualization (bubbles) for a specific province/territory and attempt to make sense of the information they are seeing. Note that the data can be manipulated and viewed in a number of ways using the online tool. Note as well that ‘electricity generation’ refers to the energy being produced in the province and is different from the energy being consumed (see the province of PEI for example) Extension activities propose sample questions for exploring the <i>Energy Demand by Sector</i> and <i>Energy Demand by Region</i> visualizations.
LEARNING OUTCOMES	<ul style="list-style-type: none"> Recognize that provinces and territories have different energy stories Ability to manipulate NEB visualization tools to have the energy stories emerge
MATERIALS	<ul style="list-style-type: none"> Student handout: Activity 1: Canadian Energy Stories Computer access (One computer per two to three students)
NEB VISUALIZATION(S)	<ul style="list-style-type: none"> Explore Electricity Generation (bubbles) http://bit.ly/2mBo6Db Energy Demand by Sector (extension) http://bit.ly/2myqEEK Energy Demand by Region (extension) http://bit.ly/2mBoYaV
WHAT TO DO	<ol style="list-style-type: none"> Assign one province/territory per group of two or three students. Ask students to explore the Electricity Generation visualization for their province/territory and answer the questions on the handout. (5–10 min) <ul style="list-style-type: none"> What is happening? In a few lines, summarize your province or territory’s energy story. What surprised you? What caught your attention? Does changing the scenario (reference, technology, high CO₂ price) change the trajectory? How? Does focusing on one energy source in particular change the story? How? Pair students from another province to further their analysis. Point out that provinces can be compared by selecting one or many provinces (5–10 min) What are some similarities? Brainstorm some hypotheses to explain the similarities. What are some differences? Brainstorm some hypotheses to explain the differences. Are these trajectories etched in stone? Why or why not? Students share their findings with the class. (2–3 min per province/territory).
HOMEWORK	<ul style="list-style-type: none"> Ask students to research a question that arose during the activity (e.g. Why is coal not being phased out in Saskatchewan?). Provide a resource list to help them along. Ask students to provide one fun fact about the energy demand or production in their province or territory for a bonus mark (provide the link to the province/territorial market snapshots).

TEACHER TIP

When all energy sources are shown at once, smaller energy productions such as renewables are not highlighted. By focusing on one energy source in particular, we are better able to see its trend. Example: Solar/Wind/Geothermal Electricity Generation <http://bit.ly/2myU6Yq>

TEACHER TIP

Read the NEB’s Recent Climate Policy Developments (www.neb-one.gc.ca/nrg/ntgrtd/fttr/2017/ppndx-eng.html) and the feature article *Canadian innovations continue to shape the future of energy* (www.neb-one.gc.ca/nrg/ntgrtd/mrkt/fttrtcl/2017-06-29cndnn-nvtns-eng.html) to help support your students with their answers.



EXTENSION ACTIVITIES**TEACHER TIP**

Availability of resources, provincial climate policies, economic growth, and adoption of technological innovation may all influence trajectories.

TEACHER TIP

When all energy sources are shown at once, smaller energy productions such as renewables are not highlighted. By focusing on one energy source in particular, we are better able to see its trend. Example: Solar/Wind/Geothermal Electricity Generation in Ontario: <http://bit.ly/2mwsDGV>

- Find another province/territory that has a similar trajectory to yours. Can you brainstorm reasons why this might be?

ENERGY DEMAND BY SECTOR VISUALIZATION

- Take a look at the Energy Demand by Sector visualization. Does focusing on one sector in particular (residential, commercial, industrial, manufacturing) change the story?
- Does focusing on one energy source in particular change the story?
- Which sector uses the most oil products? In Canada, transportation is the most heavily reliant on oil. In fact, Canada is the third-largest consumer of oil per person among the world's most economically-advanced countries.
- Why would Canada consume more oil than most other countries? The transportation sector accounts for 60% of Canadian oil demand. The relatively sparse population, number of vehicles on the road, and the long distances across which people and goods must be transported may explain Canada's relatively high transportation fuel consumption per capita.

ENERGY DEMAND BY REGION VISUALIZATION

- Think about energy demand in your province or territory. Would you expect energy demand to increase, decrease, or stay the same over time? *Students may suggest that it will increase with an increase in population.*
- Take a look at the Energy Demand by Region visualization. Does the trend correspond with what you were thinking? Is a province's energy demand always proportional to its population? **TIP:** Find the province/territory populations on the Statistics Canada website.
- Can you provide hypotheses for why energy demands may decrease or stabilize, even though the population is increasing? *Energy demand in Canada may peak and start a decline within the next 40 years. The overall decrease in demand is primarily due to conservation efforts, improvements in energy efficiency (e.g. light bulbs such as LED which use up to 85% less energy thanks to LED and CFL technologies, appliances such as refrigerators and freezers, which comprise up to 12% of household energy use, have also become more energy efficient both at the residential and industrial levels). Energy demand will depend on policies such as climate change targets, environmental regulations, electric vehicle subsidies, and carbon taxing.*

REFERENCE MATERIALS FOR STUDENTS

- Canada's Energy Future 2016: Province and Territory Outlooks
- Provincial and Territorial Energy Profiles

PORTALS TO GEOGRAPHICAL THINKING

- spatial significance
- patterns and trends
- interrelationships
- geographical perspective
- evidence and interpretation



Team members: _____

Assigned province/territory: _____ Date: _____

WHAT TO DO?

1. Open the Exploring Canada's Energy Future Electricity Generation visualization (<http://bit.ly/2mBo6Db>).
2. Select only your province or territory.
3. Scroll along the timeline to see your province or territory's energy story emerge. Then discuss the following questions:

What is happening? In a few lines, summarize your province or territory's energy story.

What surprised you? What caught your attention?

Was there a moment in time where things started to change?

Does changing the scenario (reference, technology, high CO₂ price) change the trajectory? How?

4. Pair up with students from another province or territory and compare your analyses.

What are some similarities? Brainstorm some hypotheses to explain the similarities.

Possible reasons: _____

What are some differences? Brainstorm some hypotheses to explain the differences.

Province/Territory: _____ Province/Territory: _____

Possible reasons: _____

Are these trajectories guaranteed? Why or why not?
