

ACTIVITY 2: ENERGY FACT SLEUTHS

OVERVIEW	Students use the NEB visualizations to support or refute the statements made about energy demand and production in Canadian provinces and territories.
LEARNING OUTCOMES	<ul style="list-style-type: none"> • Identify the information available through the NEB visualization tool • Manipulate the visualization tool to find evidence that supports their claim • Employ media literacy skills to determine fact from fiction
MATERIALS	<ul style="list-style-type: none"> • Slides template (access to the same document for all of the teams) with provincial/territory statements • Computer access (easier to manipulate on computers/laptops than on tablets) • Projector
NEB VISUALIZATION(S)	<ul style="list-style-type: none"> • All may be used
WHAT TO DO	<ol style="list-style-type: none"> 1. Download the slides template and upload to a file-sharing platform, such as Google Slides or Microsoft Office 365 (this will make it easier for students to present their findings). 2. Demo the activity with the example slide on the overhead projector. Point out the 'Twitter' button to shorten the link when embedding it in the presentation. Point out the 'Download Image' button so that they can include a snapshot of their file. Remind them that they can use any visualization, or a combination of visualizations to make their argument. (5 min) 3. Assign one province or territory per group of two or three students (total: 14 groups). Each slide contains true and false statements regarding energy in a specific province or territory. Teacher tip: snapshots have been rated on a scale of one (easiest) to three (challenging) to enable task differentiation. 4. Students read through short market snapshots for their assigned province/territory, then use the NEB data visualizations to prove or refute the statement. (20 min) 5. Students copy the URL link for their evidence and paste it under the relevant statement. The students should all be working simultaneously on the same document. Teacher tip: although sample visualizations have been provided in the key to support or refute the statement, students may manipulate the tool differently to come up with similar conclusions. 6. Students present their work to the class using a single Google Slides document. (20 min) <p>TEACHER TIP: the links provided in the table below are for your information. Many of the links would provide students with the answer without having to manipulate data.</p>
PORTALS FOR GEOGRAPHICAL THINKING	<ul style="list-style-type: none"> • Spatial significance • Patterns and trends • Interrelationships • Geographical perspective • Evidence and interpretation



ACTIVITY 2: ENERGY FACT SLEUTHS – TEACHER KEY

LEV-EL	PROV	STATEMENT	TRUE/FALSE	VISUALIZATION
2	AB	In 2038, BC and Alberta will have similar population totals. Their total energy demand will therefore be very similar.	F	BC Population 2038 https://apps.neb-one.gc.ca/ftppndc/dflt.aspx?GoC-TemplateCulture=en-CA and AB Population 2038 https://apps.neb-one.gc.ca/ftppndc/dflt.aspx?GoC-TemplateCulture=en-CA and Total Energy Demand 2038 http://bit.ly/2A5UaZm
2	AB	In 2018, about 90% of electricity in Alberta is produced from fossil fuels.	T	Electricity generation Alberta 2018: https://bit.ly/2A4pHZA See Provincial and Territorial Energy Profiles - Alberta https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmp-rls/ab-eng.html
1	BC	BC is expected to produce more electricity from renewables than from natural gas and oil combined during the entire projection.	T	Electricity generation BC 2030 https://bit.ly/2PtDVsj See Canada's Energy Future 2016: Province and Territory Outlooks https://www.neb-one.gc.ca/nrg/ntgrtd/ft/2016pt/k-fndngs-prvnc-trtr-eng.html
2	BC	BC is expected to be the province with the highest demand for electricity in transportation by 2040.	F	Energy demand by Sector http://bit.ly/2v22oMq Correct answer: QC and ON expected to have approximately three times more electricity demand than BC in the transportation sector.
1	MB	Manitoba is one of the top producers of natural gas in Canada.	F	Natural gas production MB https://bit.ly/2Ef7D32 Correct answer: Manitoba does not produce natural gas.
2	MB	Renewable electricity generation in MB is projected to take up a larger share of the total generation mix in 2040 compared to 2016.	T	Electricity Generation MB (2016 and 2040) http://bit.ly/2A0UAjK See Canada's Energy Future 2016: Province and Territory Outlooks https://www.neb-one.gc.ca/nrg/ntgrtd/ft/2016pt/k-fndngs-prvnc-trtr-eng.html
1	NB	Most of New Brunswick's electricity is expected to be generated by nuclear by 2040.	T	Electricity Generation NB (2040) http://bit.ly/2A33NrD



ACTIVITY 2: ENERGY FACT SLEUTHS – TEACHER KEY

LEV-EL	PROV	STATEMENT	TRUE/FALSE	VISUALIZATION
2	NB	Generation from solar/wind/geothermal power in New Brunswick is projected to increase from none in 2005 to approximately 5% of total generation in 2040.	F	<p>Electricity Generation NB (2005 and 2040) http://bit.ly/2A33NrD</p> <p>Hint: Click the “Download data” along the bottom to easily calculate the percentage.</p> <p>Correct answer: it is projected to increase to approximately 15% of total generation by 2040.</p> <p>See Provincial and Territorial Energy Profiles – New Brunswick https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nb-eng.html</p>
1	NL	Newfoundland and Labrador generate approximately 95% of their electricity from hydro sources in 2018. It is projected to produce even more electricity from hydro resources in 2040.	T	<p>Electricity Generation NL (2018 and 2040) http://bit.ly/2A4Dy44</p>
1	NL	In 2015, the largest sector for energy demand in Newfoundland and Labrador was industrial. In 2040, the NEB projections show residential will be the largest sector for energy demand.	F	<p>Energy Demand by Sector NL (industrial and residential) http://bit.ly/2uVrRaf</p> <p>Correct answer: It will still be industrial.</p> <p>See Provincial and Territorial Energy Profiles – Newfoundland and Labrador https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nl-eng.html</p>
1	NS	Although coal was the main source of electricity generation in 2005, hydro is expected to take the lead by 2040.	F	<p>Electricity Generation NS (2005 and 2040) http://bit.ly/2A5iJFF</p> <p>Correct answer: Natural gas is expected to take the lead by 2040.</p>
2	NS	Nova Scotia currently produces natural gas, but is expected to stop producing over the projection period.	T	<p>Gas Production NS http://bit.ly/2oVku5Y</p>



ACTIVITY 2: ENERGY FACT SLEUTHS – TEACHER KEY

LEV-EL	PROV	STATEMENT	TRUE/ FALSE	VISUALIZATION
3	NU	Almost all of Nunavut's electricity is generated from importing diesel fuel.	T	<p>Oil Production NU</p> <p>https://bit.ly/2CBRqDh</p> <p>and</p> <p>Total demand NU:</p> <p>http://bit.ly/2uYA6IU</p> <p>and</p> <p>Total Electricity Generation NU:</p> <p>http://bit.ly/2v0EsJ5</p> <p>Note: "Total electricity generation" is the total electricity generated within the province, regardless where the fuel comes from. In this case, it is interesting to note that importing diesel is its main fuel source. Shorter ice road access caused by climate change has major implications for diesel transportation.</p> <p>See The ice roads of Northern Canada are disappearing (CBC) https://www.cbc.ca/radio/day6/episode-335-100-days-of-sean-spicer-disappearing-ice-roads-beatles-live-retro-futurism-at-expo-67-and-more-1.4084549/the-ice-roads-of-northern-canada-are-disappearing-1.4084560</p>
1	NU	Nunavut's largest consuming sector for electricity in 2015 was transportation. This is expected to still be true in 2040.	F	<p>Energy Demand by Sector (transportation)</p> <p>https://bit.ly/2QLf43w</p> <p>See Provincial and Territorial Energy Profiles - Nunavut https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nu-eng.html</p>
2	NWT	In 2018, natural gas production in the Northwest Territories represents more than 10% of Canadian natural gas production.	F	<p>Gas production in NWT (2018)</p> <p>http://bit.ly/2l8thUE</p> <p>Correct answer: it accounts for less than 1% of Canadian natural gas production.</p> <p>See Provincial and Territorial Energy Profiles - NWT https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nt-eng.html</p>
3	NWT	The Government of NWT's Draft 2030 Energy Strategy drafted in 2017 proposed the installation of wind turbines in Inuvik to reduce reliance on diesel generation.	T	<p>Energy demand by sector (Wind/Solar/Geothermal)</p> <p>http://bit.ly/2E75ZjX</p> <p>See Provincial and Territorial Energy Profiles - NWT https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/nt-eng.html</p>



ACTIVITY 2: ENERGY FACT SLEUTHS – TEACHER KEY

LEV-EL	PROV	STATEMENT	TRUE/FALSE	VISUALIZATION
3	ON	In 2017, about 85% of electricity in Ontario is produced from zero-carbon emitting sources.	T	Electricity Generation Ontario 2017: http://bit.ly/2yiKaKW See Provincial and Territorial Energy Profiles - Ontario https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmpr-fls/on-eng.html
1	ON	A sharp increase in energy demand is forecasted in Ontario between 2020 and 2040.	F	Total Energy Demand ON http://bit.ly/2mEdxiH
2	PEI	PEI generates enough electricity to meet its own electricity demand.	F	Total Energy Demand PEI http://bit.ly/2E9cRgM and Electricity generation PEI: http://bit.ly/2mBSRYr Hint: remind students to keep units the same (petajoule vs. GW.h vs. kBOE/d in left column) Correct answer: PEI does not generate enough electricity to meet its own electricity demand.
2	PEI	PEI's electricity generation from solar/wind/geothermal is predicted to nearly double between 2014 and 2040.	T	Electricity Generation PEI (2014 and 2040) http://bit.ly/2mBIJPt
1	QC	In 2018, hydroelectric stations generate most of Quebec electricity. Wind is the second-largest source of electricity generation in Quebec.	T	Electricity Generation QC (2018) http://bit.ly/2mDlJrl See Provincial and Territorial Energy Profiles – Quebec https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmpr-fls/qc-eng.html
1	QC	Quebec will be significantly increasing its nuclear energy production by 2040 compared to 2005 levels.	F	Electricity Generation QC (2005 and 2040) http://bit.ly/2mCofpG Correct answer: Nuclear energy is no longer produced as of 2013.



ACTIVITY 2: ENERGY FACT SLEUTHS – TEACHER KEY

LEV-EL	PROV	STATEMENT	TRUE/FALSE	VISUALIZATION
2	SK	Renewables' share of the electric capacity mix in Saskatchewan is projected to grow substantially between 2015 and 2040.	T	<p>Electricity Generation SK (2015 and 2040) http://bit.ly/2uZMt0L</p> <p>Note: In the fall of 2015, Saskatchewan announced a target of 50% renewable power by 2030. In the Energy Future 2016 projections, which were completed before this announcement, the share of renewable capacity increases from 25 to 40% over the projection period. Currently, SK relies on coal for baseload generation.</p> <p>See Canada's Energy Future 2016: Province and Territory Outlooks https://www.neb-one.gc.ca/nrg/ntgrtd/ftr/2016pt/k-fndngs-prvnc-trrtr-eng.html</p>
2	SK	Saskatchewan is Canada's second-largest producer of oil, behind Alberta.	T	<p>Oil Production Canada http://bit.ly/2l5vHn1</p> <p>See Canada's Energy Future 2016: Province and Territory Outlooks https://www.neb-one.gc.ca/nrg/ntgrtd/ftr/2016pt/k-fndngs-prvnc-trrtr-eng.html</p>
1	YT	In 2018, Yukon has significant commercial crude oil production.	F	<p>Oil Production YK (2018) http://bit.ly/2l5vHn1</p> <p>Correct answer: Yukon does not produce crude oil.</p>
2	YT	In 2018, Yukon's total energy demand was the smallest in Canada.	T	<p>Total energy demand (2018) http://bit.ly/2mBoYaV</p> <p>Hint: It is so small that it can't be seen when all provinces are selected. Students must look at YT individually to see its energy demand. Students should note that the "k" in petajoules represents thousands. The "k" is absent when it comes to YT!</p> <p>See Provincial and Territorial Energy Profiles – Yukon https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmp-rfls/yt-eng.html</p>
2	CAN	Only high CO ₂ prices would result in lower energy demand across Canada compared to the reference scenario. Innovative technology would not affect energy demand.	F	<p>Total demand by region (Canada): http://bit.ly/2mBy5ln</p> <p>Correct answer: Both high CO₂ prices and efficient technology would result in lower energy demand across Canada compared to the reference scenario.</p> <p>See Recent Climate Policy Developments http://www.neb-one.gc.ca/nrg/ntgrtd/ftr/2017/ppndx-eng.html and Canadian innovations continue to shape the future of energy http://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/ftrtcl/2017-06-29cndnntns-eng.html</p>



ACTIVITY 2: ENERGY FACT SLEUTHS – TEACHER KEY

LEV-EL	PROV	STATEMENT	TRUE/ FALSE	VISUALIZATION
2	CAN	Ontario ranked at the top in Canada in terms of its total amount of installed solar/wind/geothermal capacity in 2017. Between 2007 and 2017, the solar/wind/geothermal capacity of Ontario has grown almost 30 fold.	T	<p>Electricity Generation Solar/Wind/Geothermal (2007 and 2017): http://bit.ly/2mEdXFN</p> <p>See Market Snapshot: Ontario and Quebec are among the leaders in North American wind power capacity https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/snpsht/2018/05-01ntrqbcldrs-eng.html</p>
1	CAN	In 2018, Alberta is the largest producer of crude oil in Canada, accounting for approximately 80% of total production.	T	<p>Oil production Alberta (2018) http://bit.ly/2ili9eN</p> <p>Hint: Click the “Download data” along the bottom to easily calculate the percentage. Students should filter only 2018 data in the spreadsheet.</p> <p>See Provincial and Territorial Energy Profiles - Alberta https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/ab-eng.html</p>

