

Climate Change PBL #7: Fracking

B.C.'s multi-billion dollar shale gas industry is booming. Two large northeast B.C. deposits could sustain 100 years of supply at current levels of demand, a "game changer," according to the Canadian Association of Petroleum Producers. However, the controversial drilling practice used to extract shale gas, horizontal high-volume slick water hydraulic fracturing (commonly known as "fracking"), has drawn wide-spread criticism for its environmental impacts.

Provincially, both the Liberals and the New Democrats have supported the industry. In this PBL, you will be tasked to examine the environmental impacts of hydrological fracturing. Could this be a "clean energy" source, as Premier Christy Clark has suggested? Is the existing regulatory framework sufficient for the scale of the industry? Are the available fracking technologies safe? Can BC significantly expand its natural gas industry while staying within the mandate of the Clean Energy Act?

Background

The discovery of enormous deposits like the Marcellus shale have led American commentators to place their faith in natural gas as the key to America's energy future. Proponents have claimed natural gas to be a clean, cheap, and readily available energy source. However, the controversial extraction method, hydraulic fracturing, or "fracking," has worried environmental activists, residents, and law-makers alike.

Essentially, the process of hydraulic fracturing is as follows: you drill a hole deep down into the earth and pump it with a solution consisting mainly of water, sand, and a chemical solution. The pressure pushes out the gas, which surges back up to the surface along with the wastewater. However, there have been reports that this toxic wastewater has contaminated local water sources. The documentary film *Gasland* shows some particularly sensational cases, including one man's flammable tap water. The local outcry from such stories prompted a series of investigative pieces from the *New York Times*, *Pro Publica*, the CBC, and other major news sources. Opinions are very divided, and some jurisdictions, like the state of New York, have considered all-out bans. In response, the industry has claimed to have improved their technologies and tinkered with their drilling solutions. However, for competitive reasons, there has been a reluctance to disclose the chemical ingredients of these proprietary solutions. Freshwater contamination has not been the only concern raised by environmental groups. Blow-backs, seismic activity, water consumption, high methane emissions, and other issues have been cited.

Provincially, the government has put their faith in this massively expanding industry, defining it a "clean energy" source. Most of BC's drilling activity has been concentrated in two main

deposits: the Montney Basin and the Horn River, located in the Northeastern part of the province. The gas from these two regions is not identical. Notably, the Horn River contains a significant amount of formation carbon dioxide that must be removed during processing. By 2020, extraction from both basins could account for 22% North American shale gas production. This is significant, as the Clean Energy Act requires that 93 per cent of its electricity come from clean energy sources.

Demand for British Columbia's natural gas comes primarily from Asia, and in order to be delivered to markets, the extracted gas must be transported over pipelines to coastal ports and then converted to liquified natural gas (LNG) in order to be shipped. The construction of natural gas pipelines and LNG facilities is very expensive. In order for the BC industry to be sustainable, the world price of natural gas must remain high enough to justify these investments.

Guiding Question

Because of the large scope of this topic and numerous directions this PBL can be taken, we ask you to choose from one of the following topics to focus your analysis on. However, if you have other ideas or suggestions for directions this topic can be taken, please speak to someone from the teaching team, we are happy to discuss alternatives to the questions below.

1. Alternatives to shale gas development

Is this truly a "clean energy" source? Are the existing regulatory frameworks, labour laws, and drilling technologies sufficient to ensure safety? Are the worries about groundwater contamination founded, or over-blown? How do the total greenhouse emissions compare to traditional energy sources, like coal and fossil fuels?

2. The benefits for British Columbia

What are the economic costs and benefits to British Columbians? Given the high processing and transportation costs, is the expansion of the industry feasible? If so, what are the social, political, and environmental costs?

Resources (Do NOT directly contact individuals in these organizations).

Multimedia

The fracking song

http://youtu.be/timfvNgr_Q4

"Game Changer," an episode of *This American Life*

<http://www.thisamericanlife.org/radio-archives/episode/440/game-changer/>

Gaslands, a documentary on fracking

<http://topdocumentaryfilms.com/gasland/>

Investigative Journalism

CBC Series on natural gas development in British Columbia.

<http://www.cbc.ca/daybreaknorth/cornering-gas/>

New York Times series on fracking

http://www.nytimes.com/interactive/us/DRILLING_DOWN_SERIES.html

Propublica series on fracking

<http://www.propublica.org/series/fracking>

Propublica on fracking in Canada

<http://www.propublica.org/article/oh-canadas-become-a-home-for-record-fracking>

Studies and Reports

An extensive University of Texas study on fracking

http://barnettprogress.com/media/ei_shale_gas_regulation120215.pdf

Nature

<http://www.nature.com/search/executeSearch?sp-q=fracking&sp-p=all&pag-start=1&sp-c=25&sp-m=0&sp-s=&siteCode=news&sp-advanced=true>

Cornell University study on methane emissions related to fracking

<http://thehill.com/images/stories/blogs/energy/howarth.pdf>

US Congressional report on the fracking solution

<http://democrats.energycommerce.house.gov/sites/default/files/documents/Hydraulic-Fracturing-Chemicals-2011-4-18.pdf>

Pembina Report on Hydraulic Fracturing in BC

<http://www.pembina.org/pub/2264>

Province of British Columbia's Natural Gas Strategy

http://www.gov.bc.ca/ener/natural_gas_strategy.html