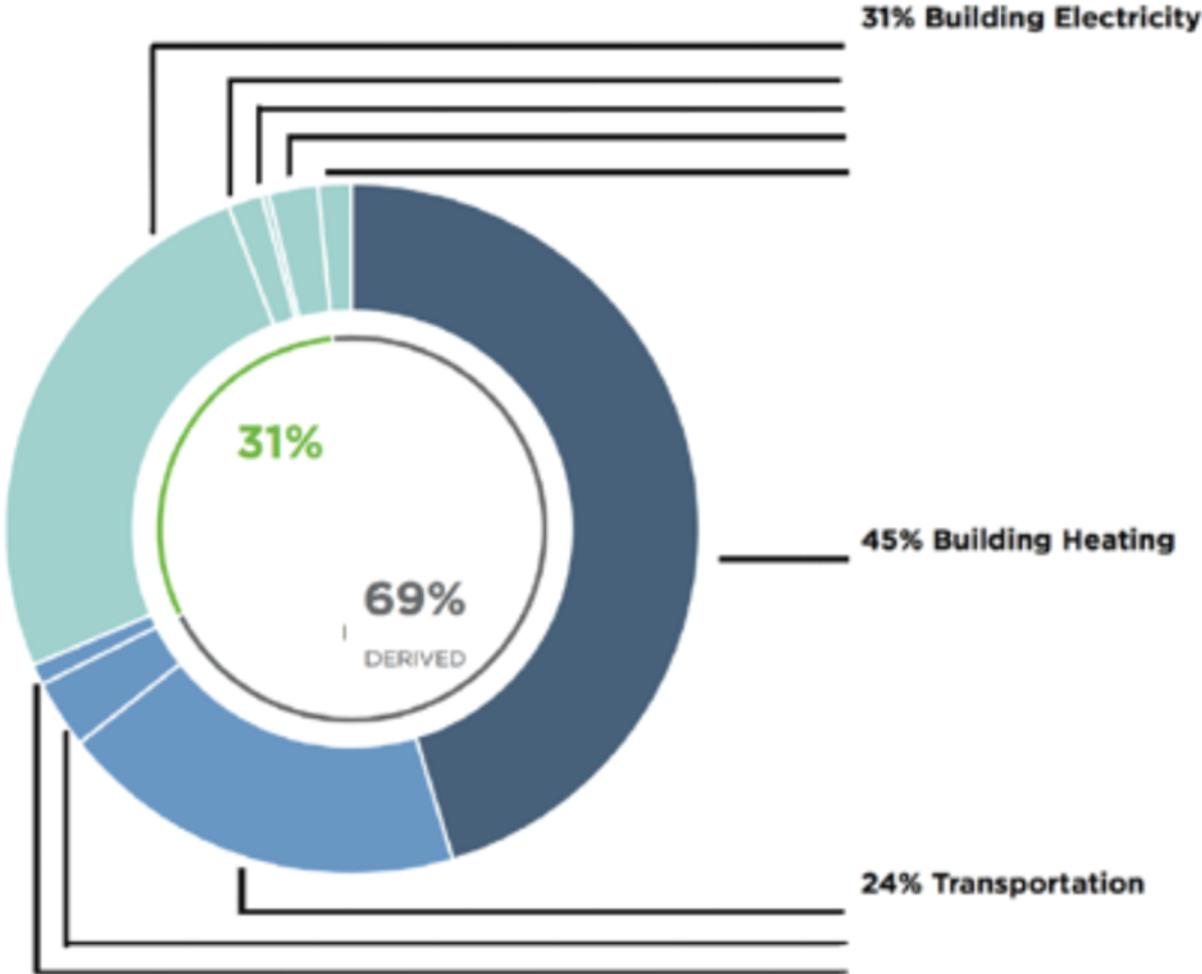


Vancouver's Recipe for Energy



Lesson 1

SOURCES OF ENERGY USED IN VANCOUVER
2014



Vancouver's Recipe for Energy



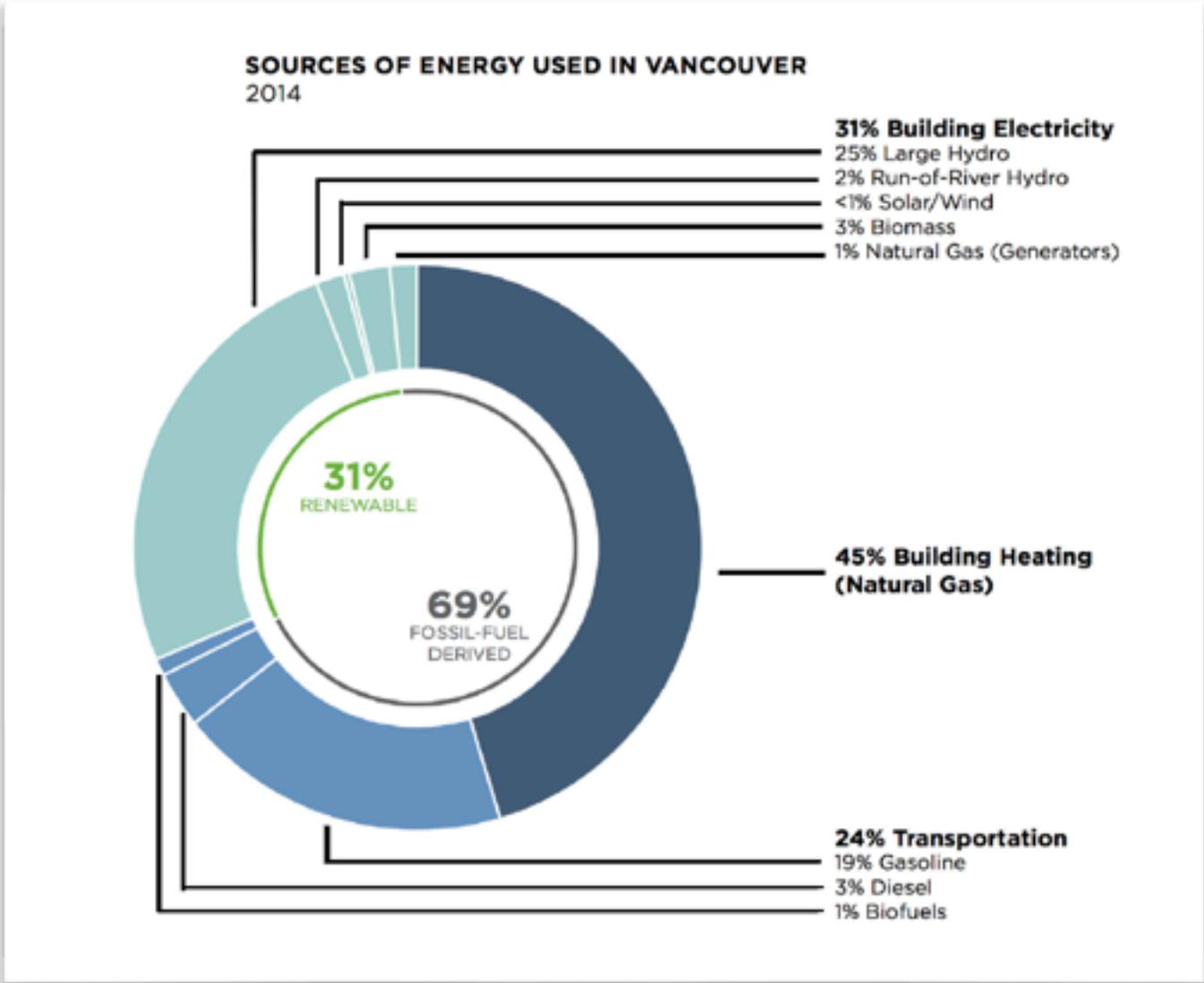
Lesson 1

- Which percentage indicates the amount of renewable energy used in Vancouver?
- Which percentage refers to energy from non-renewable sources (fossil fuels)?
- Can you guess where Vancouver gets most of its electricity? What about its heating?
- Which types of transportation use the most energy in Vancouver? Which types do you think use the least?

Vancouver's Recipe for Energy



Lesson 1



Vancouver's Recipe for Energy



Lesson 1

Discussion

1. What surprises you most about Vancouver's energy use? Is it what you expected?
2. What geographical factors effect Vancouver's energy use?
3. Why do you think Vancouver still relies on 69% nonrenewable resources?
4. Why social and economic factors effect Vancouver's ability to use renewable energy?
5. How do you think Vancouver's energy use compares to other cities in British Columbia? What about other cities in North America or in other parts of the world?

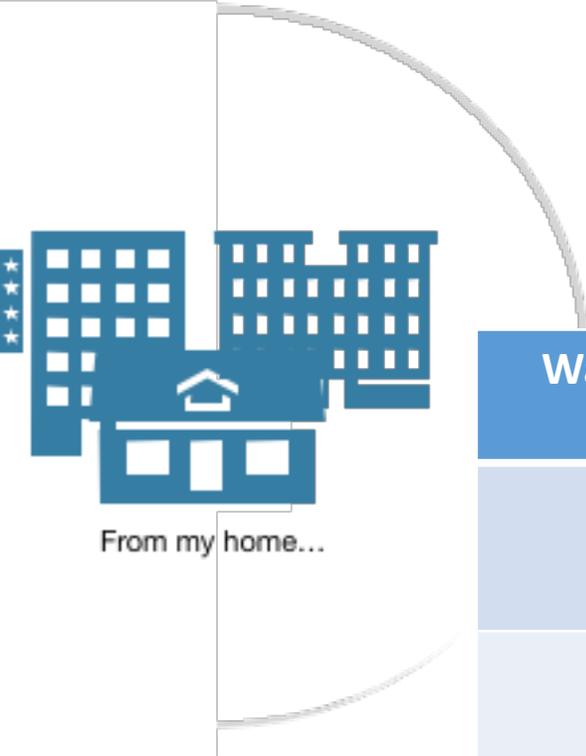
How Does Our Class Move?



Lesson 2

Which form of transportation do you use most frequently to get to the following places?

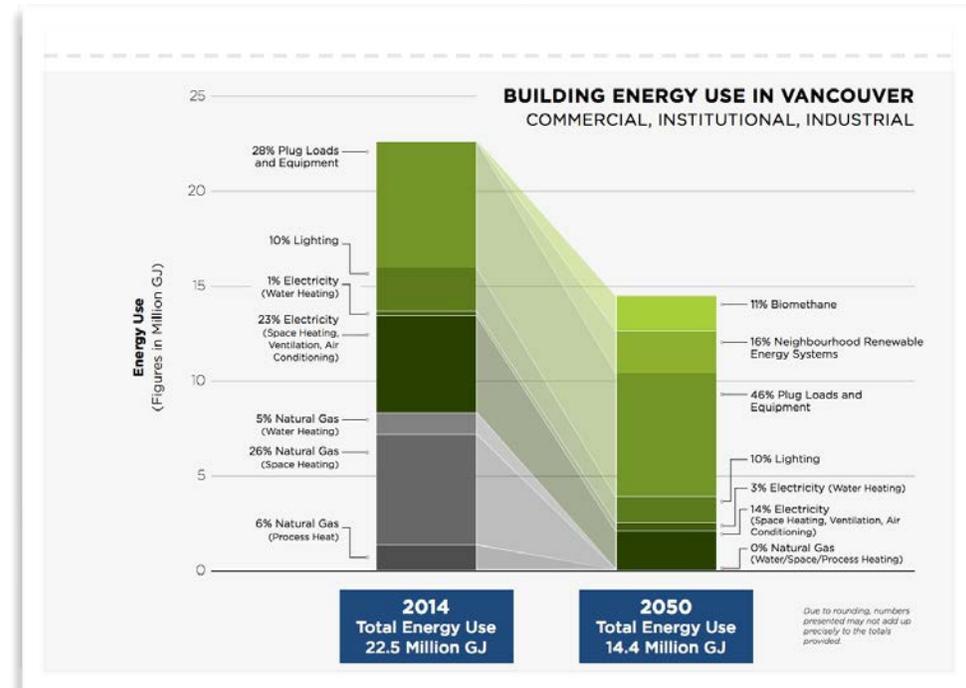
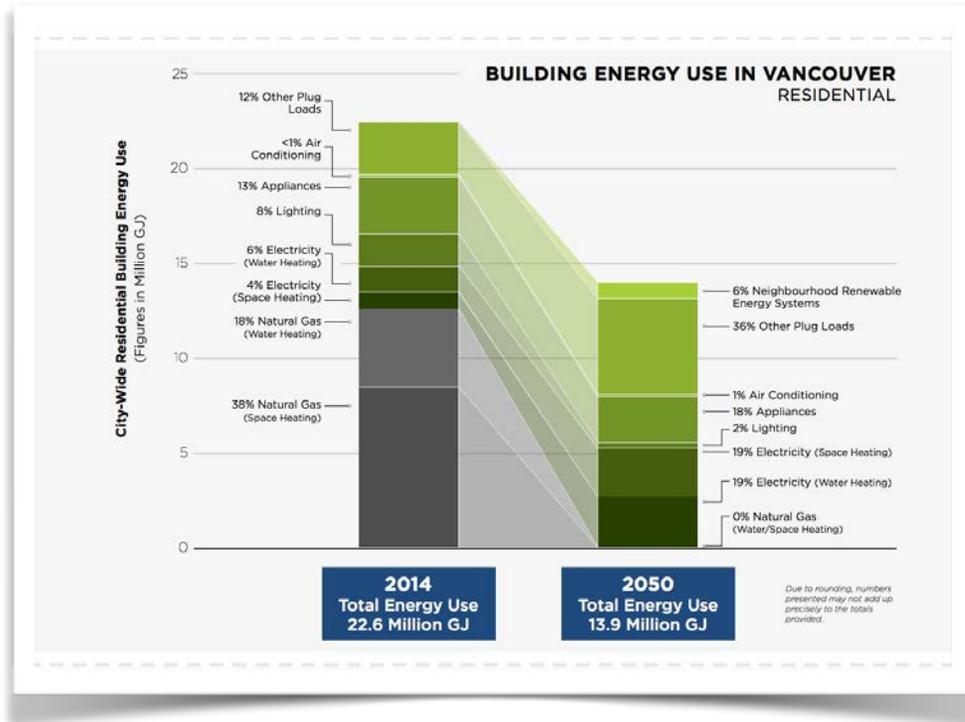
Walk	Skate	Bike	Commuter Rail	Bus	Car	Destination
						School
						Grocery Store
						Green Space or Park
						Extracurricular Activity or Sport
						Another place you visit often



Building Energy Use in Vancouver



The charts below detail the energy used in Vancouver’s buildings in 2014 and the City of Vancouver's plans to shift to renewables by 2050. Information related to Vancouver’s energy use is updated regularly. You can find the latest information on the City of Vancouver’s website.



Collective Effort

Communities of like-minded people in a local area pool their resources to create renewable energy for their neighbourhoods.

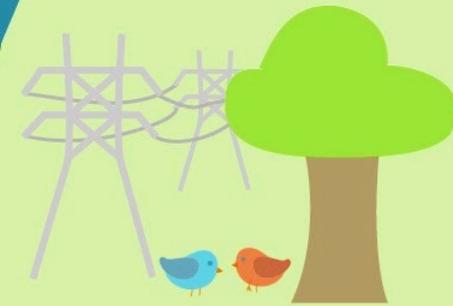


Economic Benefits

- 1.
- 2.
- 3..

Social Benefits

- 1.
- 2.
- 3.



Environmental Benefits

- 1.
- 2.
- 3.

Community Energy

Based on the previous local examples, list four social, environmental, and economic benefits of community energy.



Building Energy Use in Vancouver



Lesson 3

Benefits of community energy projects:

Social

- Community energy projects can bring communities together to collaborate which encourages better relationships and community cohesion
- Contributes towards a renewably powered future and creates a sense of accomplishment in communities
- Community energy projects can be educational and offer opportunities for skill development and capacity-building
- local self-reliance and resilience

Environmental

- On-site generation can also allow buildings and neighbourhoods to be more resilient to disruption and outages, particularly during extreme weather events
- Renewable energy projects reduce carbon pollution
- Improves air quality

Economic

- Community energy projects can create local jobs to set up and maintain the equipment
- Community energy projects eliminate the need for a lot of extra energy infrastructure that carries energy from far away, so the process is more efficient.
- Community energy can give the public and businesses the opportunity to meet their own energy needs at a more affordable rate
- Money stays in the community instead of going to an outside utility

Barriers to community energy projects:

Social

- It can be difficult to get large numbers of people to work together.
- It can be hard to overcome tradition where energy is top down from a large company. Community members may not think it is possible.
- A management plan must be created to get energy projects started and keep them working well

Environmental

- It may be difficult to find space for community energy infrastructure
- Some places are not well suited to renewable energy projects. For instance, there might not be enough sun for solar or enough wind for wind turbines.

Economic

- May be difficult to find investors and get the money to start community energy projects
- Legal and regulatory challenges to get permits to build and connect energy projects

Activity Directions:

Visit the Community Energy Explorer webpage:

1. Read about the different kinds of community energy that are available and some case studies of each type. The following examples are a good place to start:

Solar Examples: <http://latest.energyexplorer.ca/energy101/energy101-4#page3>

Geoexchange Examples: <http://latest.energyexplorer.ca/energy101/energy101-4#page5>

Bioenergy Examples: <http://latest.energyexplorer.ca/energy101/energy101-4#page7>

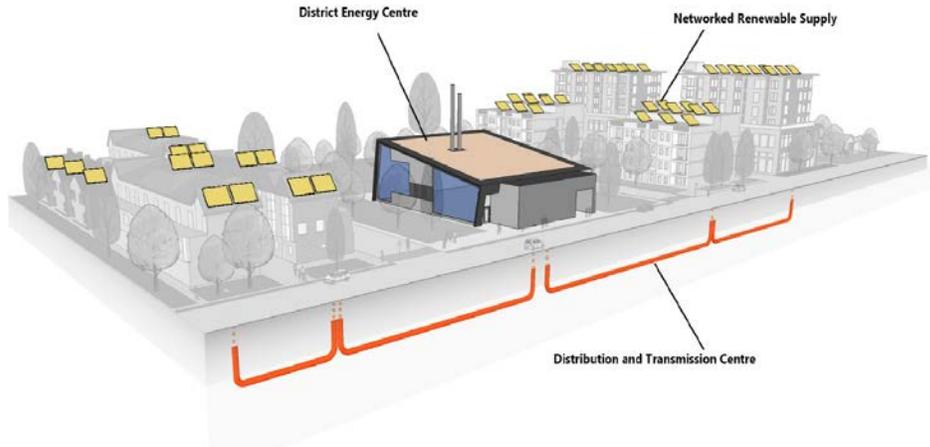
Wind Examples: <http://latest.energyexplorer.ca/energy101/energy101-4#page10>

2. Think about the different ways community energy might be beneficial:

Social Benefits: A social benefit is something that helps people live together in a good way. It facilitates a sense of well-being and promotes community that creates a healthy and happy place to live.

Environmental Benefits: Environmental benefits are things improve the natural world and decrease the impact of human activity on its condition making it a better place to live for people, plants, and animals.

Economic Benefits: An economic benefit is a benefit that can be quantifiable in terms of money, such as revenue, cash, or income. Economic benefits may also relate to equitable distribution of money or the opportunity to to access economic opportunities.



Building Energy Use in Vancouver



Lesson 3



3. Now, based on the case studies you explored, come up with three benefits of community energy related to each category (social, environmental, and economic) on the following worksheet.

4. Next, think about barriers to community energy projects. Why would starting and maintaining a community energy project be difficult?

False Creek Neighbourhood Energy Case Study

Building Energy Use in Vancouver



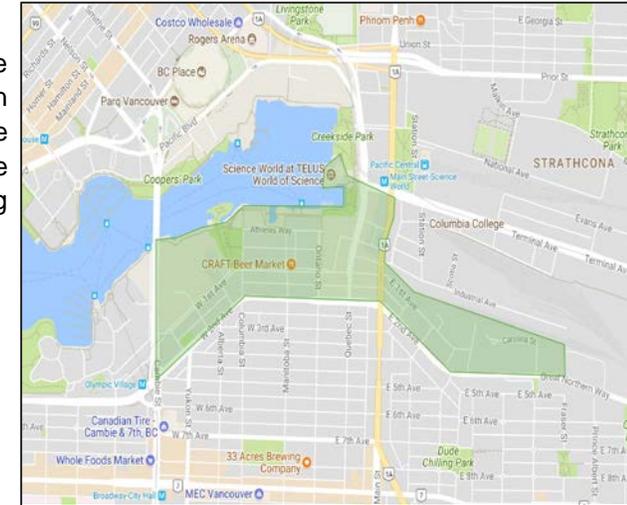
Lesson 3

Neighbourhood Energy

Neighbourhood energy systems (also known as district energy systems) supply hot water and heating, and sometimes cooling, for multiple buildings in a community. The systems draw energy from renewable energy sources to reduce the use of fossil fuels and carbon pollution while providing affordable heat and hot water. Energy is produced at an energy centre. Pipes then distribute the heat from the energy centre to commercial and residential buildings to provide heat and hot water. Energy centres can use a variety of renewable technologies to create heat. For example, they may use sewer heat recovery, geothermal heat, urban wood waste, or waste heat recovered from building cooling or industrial processes.

The City of Vancouver is using neighbourhood energy systems as a strategy throughout Vancouver to meet renewable energy goals:

- Reduce carbon pollution
- Reduce dependence on fossil fuels
- Make energy affordable over time
- Meet all of Vancouver's energy needs from renewable sources



How does it work?

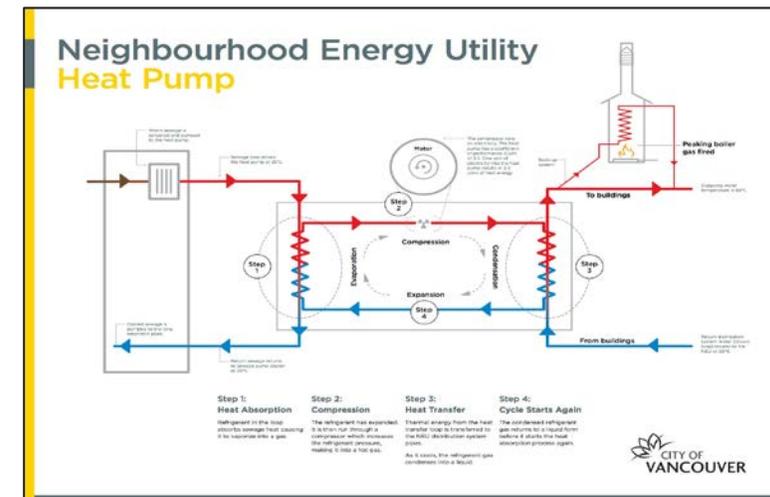
When you wash the dishes or take a hot shower, the energy used to warm the water is usually wasted when the water goes down the drain. The neighbourhood energy system saves this energy by processing the heat from sewage in the energy centre and then sending the heat through pipes to buildings to be used for heat and hot water. Recycling sewage energy prevents 60% of the carbon pollution that come from the buildings.

Environmental Benefits

- The neighbourhood energy centre reduces carbon pollution by 60% compared to non-renewable energy sources
- The heat that is recycled through the sewage waste supplies 70% of the buildings' energy demands

Customer Benefits

- The system is reliable. The neighbourhood energy system has been providing energy since 2010 without any major disruptions or problems.
- The energy rates related to the neighbourhood energy system are stable because the sewage heat recovery system uses a localized, clean energy source that is more stable than fossil fuels and can also adapt to future clean energy technologies.

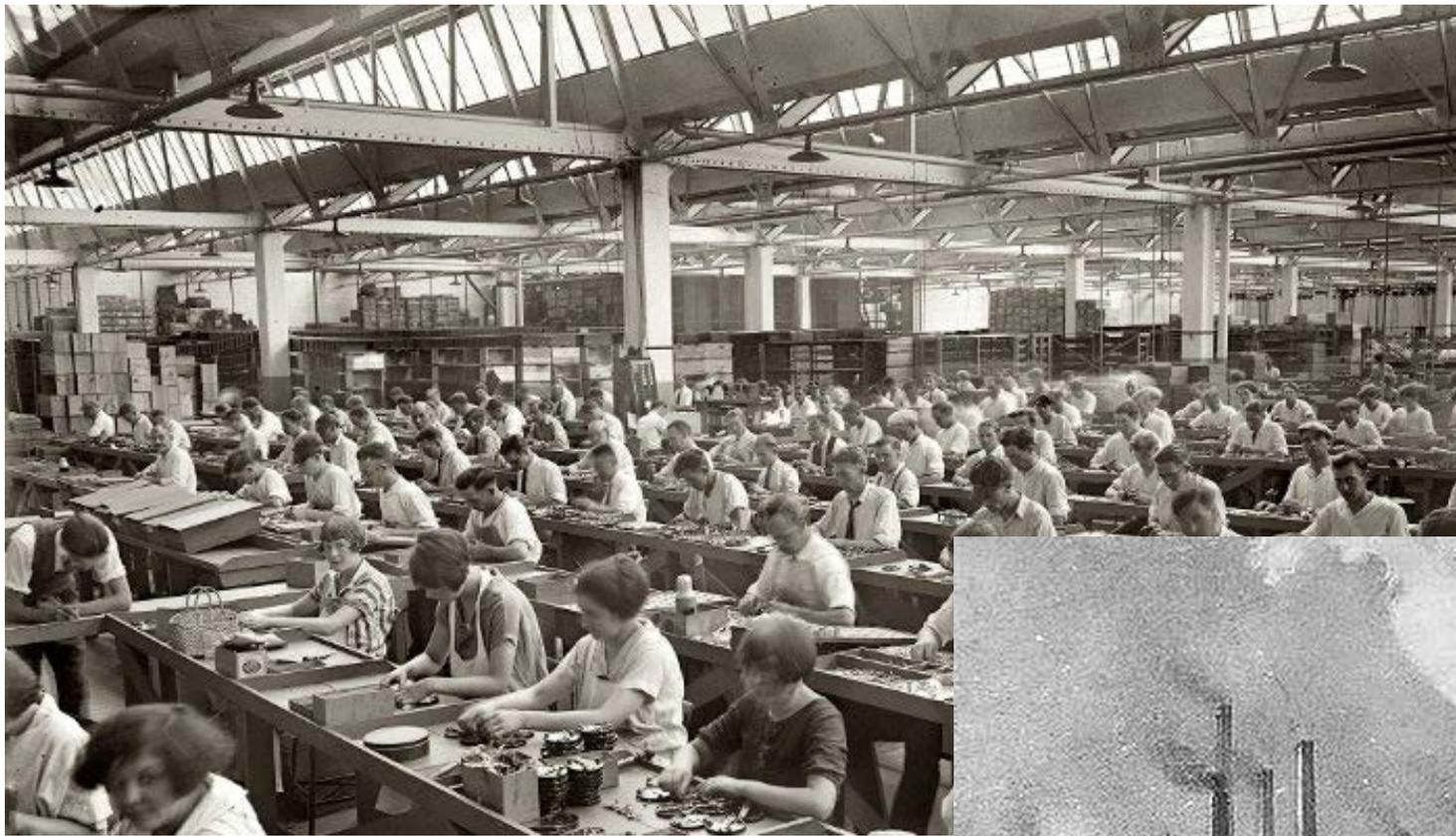


What is social change?

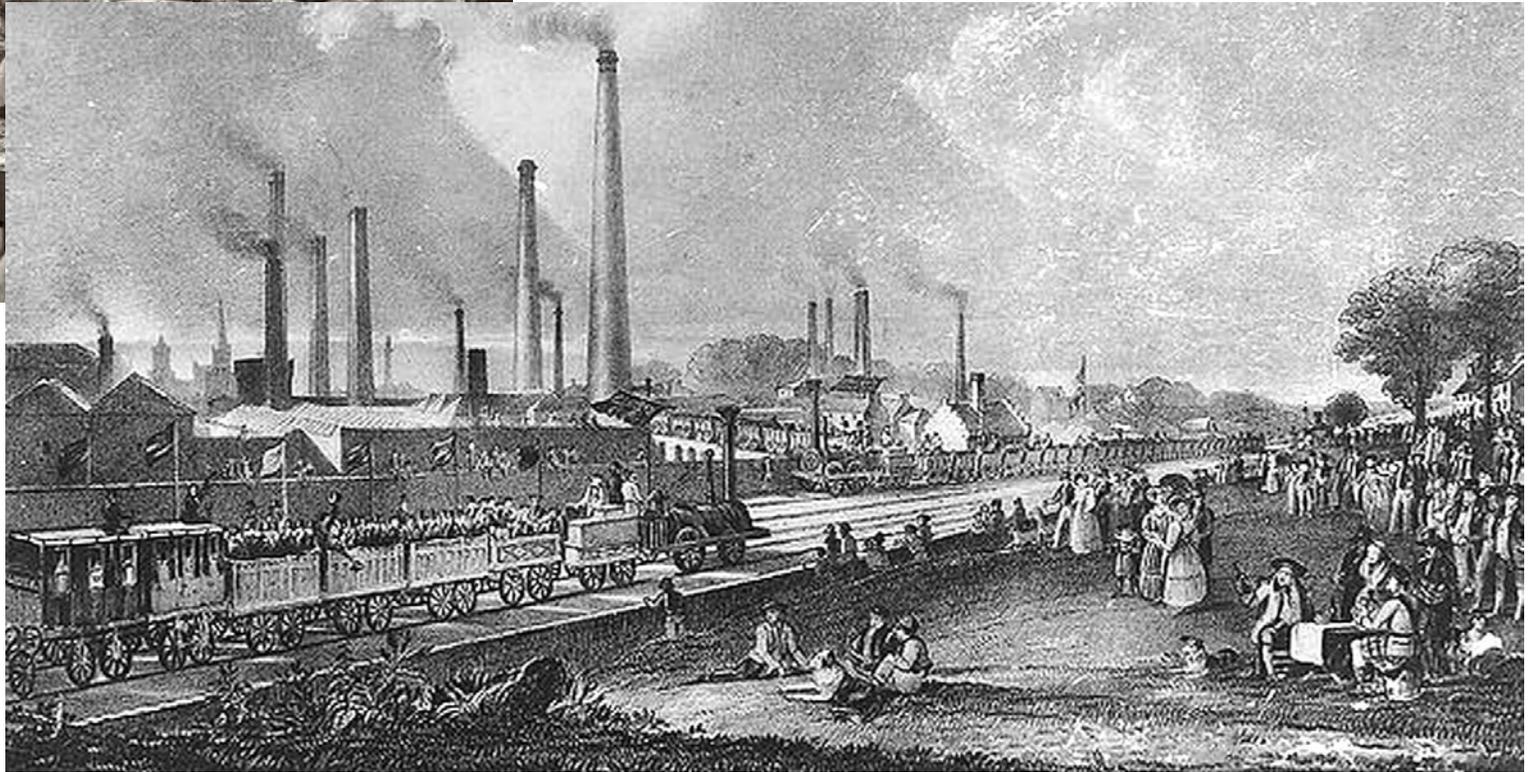


Lesson 5

- changes in human interactions and relationships that transform cultural and social institutions, alter social norms, and change cultural values.
- change occurs over time and can happen very quickly or can take generations.
- often has profound and long-term consequences for society.
- change may be supported or resisted within society.
- It can also be positive or negative.



<http://www.thinkolio.org/olios/history-science-industrial-revolution/>



The Industrial Revolution

<https://microform.digital/boa/series/21/the-british-industrial-revolution-mills-and-education%09>



Brown Vs. Board of Education
<https://www.timetoast.com/timelines/civil-rights-movement-timeline-498a4673-bbd9-4a8f-bc5d-a65a71989d87>



Black Lives Matter Movement
<https://www.flickr.com/photos/johnnysilvercloud/28476745294>



Women's Suffrage Movement
<https://patimes.org/nineteenth-amendment/>



Women's March Vancouver 2017
<http://dailyhive.com/vancouver/vancouver-events-saturday-january-20>

Indian Residential Schools

“A National Crime”



<https://slideplayer.com/slide/12263726/>



Battles for Indigenous sovereignty and land rights - resistance to extractive Fossil Fuel Infrastructure.
<https://www.thestar.com/opinion/contributors/2018/04/24/trans-mountain-pipeline-another-colonial-project-asserting-jurisdiction-over-indigenous-lands.html>