

Teacher Notes and Support Information for Smartflower Powerpoint Lesson

This information is a supplement to give educators ideas to spring off of, add to, or change the narrative as you teach the lesson. Sources are cited below each category. The goal with this information is to take time to go into some depth and demonstrate for the students the depth of investigation expected in their future research as well as generally inform and reinforce to students the variety of ways to analyze a society. The focus here is sustainable energy and the initiatives that promote and provide the environment where they can grow and evolve.

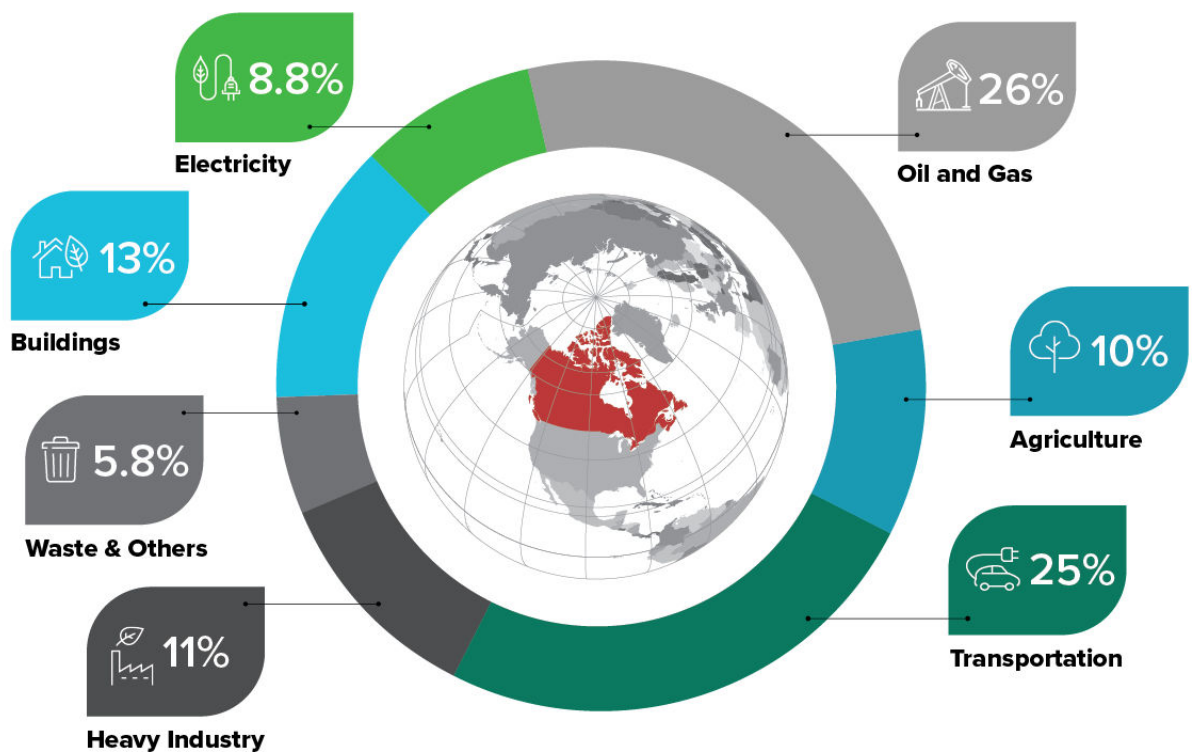
Social Structures (slide 2)

Government Background and Climate Change Initiative Info:

(<https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/reduce-emissions.html>)

Our current majority Liberal Canadian government has many initiatives that focus on climate control and reduction of emissions.

- Greenhouse emissions statistically are reported to come from the following sources from a 1990-2017 survey:



- The goal is to work towards a society that has a low-carbon future footprint and policies have been put in place to reinforce these ideals.

- **Housing:** codes for building are strict and reinforce energy efficiency, higher standards for home appliances and programs incentivising these products, phasing down fluorocarbons commonly found in fridges and air conditioners
- **Transportation:** historic investments in public transit and forms of it, \$182 million in funding (2021) for electric and alternative fuel infrastructure, producing zero-emission vehicles and policy targets to have 100% of vehicles sold being zero-carbon by 2040, also developing cleaner fuels for vehicles. Many regulations on emissions given by trucks, semis, and trains being revamped.
- **Industry:** investing in 'clean tech' and 'clean business solutions' as well as improving industrial energy efficiency. It is the goal to drive what they call 'clean growth' and climate action.
- **Oil and Gas:** Goal is to reduce methane emissions by 40-45% by 2025. Government is trying to develop a clean fuel standard to help reduce emissions and drive research toward more clean technologies and fuels.
- **Forestry, Agriculture and Waste:** supporting the use of renewable fuels and developing agricultural partnerships to reduce emissions from this sector.
- **Electricity:** most electricity comes from coal or natural gas-fired electricity. Attempts to phase out pollution from coal-burning, setting new standards for natural gas electricity, and general increases in funding for renewable energy (smart grids, support for rural communities to rely less on diesel), and putting a price tag on pollution from fossil-fuel based electricity.
- **For a review and interest, you can localize any location in Canada on the 'Climate Action Map' found at <https://climate-change.canada.ca/climate-action-map/App/index?GOCTemplateCulture=en-CA&zoom=4&lat=54.107145139546475&long=-112.19681459916622>**
- It is a pretty useful site to click around and easily check on any area in Canada and see the specific companies, funding, dates of effectiveness, and websites for further research that are involved in climate change initiatives**

Current Research Info on the Above Areas

- Creating more sustainable and efficient homes (<https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/sustainable-efficient-homes-buildings.html>)
- Canada is working internationally with other countries (USA) to develop cleaner fuels (<https://www.canada.ca/en/environment-climate-change/news/2019/06/canada-and-california-team-up-to-tackle-vehicle-climate-pollution.html>)
- Developing a standard of vehicle emissions in general to all automotive companies (<https://www.canada.ca/en/environment-climate-change/news/2018/08/canada-begins-consultations-on-vehicle-emission-standards.html>)
- Agricultural Partnerships information: \$3 billion, five year investment up to 2023* and programs listed on site (<https://agriculture.canada.ca/en/about-our-department/key-departmental-initiatives/canadian-agricultural-partnership>)

- Clean electricity information and links
(<https://www.canada.ca/en/services/environment/weather/climatechange/climate-action/powering-future-clean-energy.html>)

Social Structures (slide 3)

Economics Background Info:

- Most Canadian incentives here are designed to invest in order to reduce future emissions of a less-efficient technology is kept in homes, businesses, transport, etc. (examples are household appliances, furnaces, vehicles, large scale energy production plants, etc.)
- It is a long-term infrastructure plan that involves MANY partnerships over long periods of time and consistent leadership in all areas (country, province, cities, towns, townships, businesses)
- Incentives are included in the economic investment as returns for consumers buying into these initiatives not only reward the consumer (discounts, incentives, savings on purchase, reduced bills for purchase over time, etc.) but the producer by supporting new job growth and innovation in further research
- The Carbon Tax in general to attempt to hold companies accountable to the pollution and incentivise them to develop cleaner ways of producing their products. Fraught with issues with fairness and amount of tax to businesses and provinces**
- These initiatives also help us on a global trade scale to provide 'cleaner' products to the world and meet the demands for carbon-zero goods and services
- The Business Development Bank of Canada is working with over 60,000 Canadian entrepreneurs and investing to bring Canadian innovations to the market

Education Background Info:

- Climate change information in the early education systems (primary and secondary) is largely piece-meal concepts, and should be more solution focused to engage student thinking and guide future behaviors to be more environmentally based.
- Post-secondary institutions are becoming more conscious of the government and industry focuses on energy efficiency, reducing emissions, cleaner fuels, and understanding more environmentally friendly focused learning is the future.
- For example, Environmental Careers Organization Canada (or ECO Canada) is an institution that partners with and gives accreditation based on high standards of environmental education and development of careers and potential students can select specific programming for their career goals (<https://eco.ca/educators/program-accreditation/current-programs/>)
- Provincially and locally in Saskatoon, we have a huge variety of programs and businesses that encourage and help guide the future jobs and careers of citizens.
- Local Business Examples: SIEC (<https://saskatooniec.ca/programs/>), Siemens (<https://new.siemens.com/global/en/company/jobs.html>), Cameco, etc. A job search in this area will indicate there is likely over 50 available jobs in this area which indicate the educational requirements to do those jobs.

Social Structures (slide 4)

**[Slide 4 and 5 information is generalized as this information
can be too specific to a certain business or technology –
feel free to adlib and add onto this!]**

Public Interest Background Info:

- In general, there is a strong demand that if the technology is available and affordable, we should be developing and producing the most environmentally friendly products possible
- Locally developed and supported products are something the public take pride in venturing toward and promoting. Social media platforms are used constantly to give authentic feedback to manufacturers, policy makers, and promote investments in cleaner energy products.
- Companies listening to public interests while following along with governmental incentives are likely to succeed

Social Interest Background Info:

- Our current Liberal government is designed for growth through social change and adapting to the local, provincial, national and even global changes.
- As demands of our lives change, so does our way of meeting those demands. Much of the changes are met through governmental, educational, and financial partnerships / programs.

Investors Background Info:

- The climate action map from above would be a good place to start this discussion as it shows legitimate investors and investments in climate change*
- Provincial / local investors would be companies such as SaskPower, SaskEnergy, the government of Saskatchewan, the U of S, the U of R, Saskatchewan Polytechnic, SIEC, Siemens, and many other companies. All of these investors are investing for a better future and also to remain a leader in business and responsible citizenship for our future.

Social Structures (slide 5)

Communication and Interrelation Background Info:

- It always takes partnerships, people, and community to make any technology successful and practical in our lives today. From the initiatives given by government, institutions, educational programs, and investment; there is always more to creating and implementing a product.

- As a simple example; it takes researchers to come up with the idea, computer technicians to develop software / programming as necessary, businesses to forward the idea to the investors, salespeople to pitch the ideas to them, manufacturers to create the parts, world trade to find the resources to build the product, laborers to build and manufacture the product, transport systems to deliver the product from manufacturer to the sales office, possible trades people to install a technology, and representatives for the company to continue sales on media, local business, admin to oversee everything, and financial bookkeepers to ensure the business stays afloat.
- In order to have any successful product we use today, we require a huge variety of people of varying backgrounds, expertise, and skillsets to even have a shot at success. We all have a role!

Innovation Background Info:

- Innovation always comes from a variety of factors such as:

Existing technology, educational foundational knowledge, genuine research, social demand for change, policy makers / law changes, incentives by companies, social media influences and trends, company demands, genuine curiosity and experimentation, technology development over time, inspiration from other developers, competition, etc.

- The focus of future innovation should be on solution-based research that goes beyond just creating a physical environment that is more sustainable and environmentally friendly. It should encompass how to access the average citizen and how we approach our world in an eco-friendlier way

Supplementary Notes on the Smartflower Lesson (Day 2)

- Will include information as necessary if it does not fit into the teacher notes in the powerpoint itself as it comes*