



Climate Change Presentation Script

1. This presentation has been prepared by the Saskatchewan Environmental Society for Student Action for a Sustainable Future, and will outline: the greenhouse effect, climate change impacts – both globally and in Saskatchewan, a few of the major greenhouse gasses and where they come from, electricity production in Saskatchewan, and will touch on some things we can do to help reduce climate change.
2. We have our sun and our earth.
3. Our earth has an atmosphere made up of gasses, including some greenhouse gasses
Click: energy from the sun comes to earth, mostly as visible light, but with some ultraviolet and infrared light.
Click: some of this energy reflects off the atmosphere, and back into space
Click: the rest comes through the atmosphere and hits the earth
Click: some of that reflects back into space
4. The rest of that energy heats up the earth, and our atmosphere
Click: because the earth is warm, it now radiates, or gives off, infrared heat
Click: some of this heat radiates out into space
Click: but some of it is captured by the greenhouse gasses in the atmosphere, and stays in the atmosphere or radiates back to earth.
The energy, or heat, that is captured is called “the Greenhouse Effect”. It is a very good thing. It is what keeps our planet at temperatures we can live in. Overall the average temperature of our planet is 15°C. Without the greenhouse effect, the average temperature would be about -25°C.
5. But we’ve been adding more greenhouse gasses to the atmosphere.
6. (no words)
7. (no words)
8. Click: The energy still comes from the sun,
Click: and reflects off the atmosphere
Click, click: and earth



9. Energy still radiates from the earth

Click: but less of this energy makes it through the atmosphere and out to space

Click: more of the energy is radiated back to earth

10. making the earth and atmosphere warmer

This warming of the earth and atmosphere is called "global warming". The impact of global warming, however, is not that it will be a bit warmer everywhere, every day. Really, it is changing our weather patterns, and weather systems. It is creating Climate Change.

11. There is a group of scientists from 195 countries who look at the science of climate change, and see what it will mean for the earth. They are part of the Intergovernmental Panel on Climate Change. Their latest science report came out in September 2013. They say that "warming of the climate system is unequivocal (which means leaves no doubt)"

Extra: The full quote is:

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased.

**Working Group I Contribution to the IPCC Fifth Assessment Report
Climate Change 2013: The Physical Science Basis
Summary for Policymakers**

12. They have also found that "Human influence on the climate system is clear", which means that it is clear that we are the cause of climate change.

Extra: the full quote is:

Human influence on the climate system is clear. This is evident from the increasing greenhouse gas concentrations in the atmosphere, positive radiative forcing, observed warming, and understanding of the climate system. Human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes (Figure SPM.6 and Table SPM.1). This evidence for human influence has grown since AR4. It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century. ("extremely likely" is defined as 95-100% certainty)

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13. Weather is what it's like out today, or this week, or even this year.
Climate is the pattern of weather over years and decades.
14. So, what does Climate Change mean for us and for our planet? Some of the impacts of changes in our climate will include:
Shrinking glaciers. With overall warmer weather, glaciers are melting more than they are growing each year, so are shrinking. These photos are of the Athabasca Glacier in the Canadian Rockies. See how much smaller the glacier is in 2005 than it was in 1917.
15. A warmer atmosphere holds more water vapor. Water vapor is the energy that fuels storms. This photo is of Hurricane Sandy in 2012. The damage caused by Hurricane Sandy was made worse by the fact that sea levels are rising, allowing storms to push water higher and further into cities during storms.
16. A major storm just east of the Rocky Mountains in Alberta, in spring of 2013 caused major flooding in Calgary as well as in Canmore, High River and other communities. Our infrastructure (roads, storm sewers etc) is designed to handle the type of weather we used to get. In Saskatchewan, we had a "one in one hundred year flood" in 2011 and again in 2014. As we get more intense rain storms, more roads will wash out, and more communities will be flooded.
17. It seems counterintuitive, but as well as more storms and more flooding, we can expect longer droughts in many parts of the world. This photo was taken in California in 2014. Droughts affect our ability to grow food. (So do floods).
18. We can also expect more forest fires. This will be related to drought, disease and insects. For example, in British Columbia, normally many pine bark beetles die off in the cold each winter. However, a few warm winters in a row allowed the beetles to thrive. The beetles killed many trees. With so many dead trees in the forest, forest fires burned easily.
19. We can expect more, hotter heat waves. The top picture was taken in Quebec in 2012. The bottom was taken in Russia in 2010. That summer, as well as the heat, there were major forest fires burning in Russia, causing all the smoke you can see in the air in this photo.
20. In Saskatchewan, we can expect more extreme weather events, and more frequent and more serious flooding, similar to what we've seen in the past few years. But as the century goes on, there is also greater risk of longer and more intensive droughts.



In the southern part of the boreal forest – for example around Prince Albert National Park – we can expect things like fire and insects to kill off many of the trees, and that area is likely to become more open farmland.

The glaciers are a major source of water in Saskatchewan, so our river flows will be less when the glaciers are smaller particularly in late summer and early fall.

21. Climate change will impact our health as well. We can expect to have more smog in Saskatchewan because smog forms more easily in hotter weather. If it becomes more humid as well, we can also expect more mould, fungus and pollen. All of these things cause breathing problems for people.

One benefit of climate change is that milder winters will reduce the number of people who die in the winter. However, hotter summers will increase the number of people who get sick or die from heat related illnesses.

Vectors are insects and animals that carry disease. We can expect to see an increase in vector borne diseases and food borne illnesses. For example, the occurrence of West Nile virus in Saskatchewan is likely due to our milder winters.

On top of this is the mould and the mental stress associated with flooding.

22. So, what are these greenhouse gasses, and where do they come from?

There are many greenhouse gasses. Three of the main ones are:

Click: CO₂ or Carbon Dioxide

Click: N₂O or Nitrous Oxide, and

Click: CH₄ or Methane

Most often when we hear people talk about greenhouse gasses, we hear them talk about Carbon Dioxide. To keep things simple, we talk about the equivalent amount of Carbon Dioxide that would have the same global warming potential the other gasses have. (Click) So we add up the effect of all the greenhouse gasses, and state it as an equivalent amount of Carbon Dioxide.

23. Carbon Dioxide comes mainly from burning things. We burn natural gas (click) to heat our homes and businesses, we burn gasoline and diesel (click) to run our vehicles, and SaskPower burns coal and natural gas (click) to make our electricity. The carbon dioxide we put into the atmosphere today will stay in the atmosphere for (click) an average of 100 years. 20% of that carbon dioxide will stay in the atmosphere for hundreds of years. This is very important, because it means our actions today will affect the planet and future people for a very long time.

Extra: For more information on the lifetime of carbon dioxide in the atmosphere see: Climate Change 2007: The Physical Science Basis, Working Group 1 of the Contribution to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, page 824. "If Emissions of Greenhouse Gases are Reduced, How Quickly do Their Concentrations in the Atmosphere Decrease?"



24. All that burning that produces Carbon Dioxide also produces Nitrous Oxides.
Click: Nitrous Oxides are also produced in some farming practices.
Click: Nitrous Oxides will stay in the atmosphere for 114 years.
25. Methane comes mainly from cattle and from oil and gas production. Because of the way they digest food, cattle fart large volumes of methane. During oil and gas production, some gas leaks out, and other gas is vented (released directly to the atmosphere) or flared (burned, without being used for anything).
Click: methane only lasts 12 years in the atmosphere, but it is a much more potent, or stronger, greenhouse gas while it is in the atmosphere.
26. In Saskatchewan, 34%, or about 1/3, of our greenhouse gas emissions come from the oil and gas industry.
21%, or almost 1/4, come from making electricity;
16% from agriculture;
21% from transportation - both moving people (passenger transportation) and moving stuff (freight transportation)
Other industries produce about 4%
Our buildings produce about 3% and
Waste or garbage produce about 1%
Remember that we use oil and gas, the products that industries produce, and the electricity SaskPower makes.
27. Coal is SaskPower's main way of making electricity. Because coal is mostly carbon, when we burn it, it produces a lot of carbon dioxide.
Gas produces about half as much carbon dioxide as coal does. When SaskPower builds new generation facilities they normally use gas.
Making new dams for hydro creates a lot of methane, because of the plants that get flooded in a reservoir. Other than that, hydro has almost no greenhouse gas emissions. Once wind turbines are built, there are no greenhouse gas emissions from generating electricity.
"Other" refers to things like diesel operated generators in the far north.
Every year, SaskPower buys a bit of power from other utilities, such as Manitoba Hydro. That is what is referred to as "imports"
28. So how much have we changed things?
In 1870, the amount of CO₂ in the atmosphere was 290 parts per million. In 2013 it was 396 parts per million. That is an increase of 37%
In Saskatchewan, we now emit 74 million tonnes of CO₂ each year. In 1990 when we already knew we had to cut back, we were emitting 44 million tonnes of CO₂ per year. If Saskatchewan was a country, we would have the second highest greenhouse gas emissions per person in the world.



29. So what can we do about it?

Student Action for a Sustainable Future will be one chance for you to undertake a project to reduce greenhouse gas emissions.

Things that will help are using less, or generating renewable, energy; using less water (it takes a lot of energy to treat water and bring it to your home or school); reducing waste; eating locally grown food or eating less meat and reducing our use of vehicles by using active transportation.

We're looking forward to your projects to reduce greenhouse gas emissions.