An Introduction to Climate Change

Introducing A New Blog

Welcome to this new blog series. In 2017, the Beaverhill Bird Observatory published Climate Change Reports, which focused extensively on how climate change is impacting our world and the birds we share this planet with. Unfortunately the climate crisis continues to worsen and we need to take action quickly, if we are to make a difference and save our planet. We are launching another climate change blog series to further provide background information to you, our reader. In contrast to the 2017 series, this new blog series will cover a wide variety of environmental issues ranging from broad scale issues, such as collapse of biodiversity, to specific local issues, such as wildfires and climate change in Alberta. By focusing on multiple environmental issues at various levels, we will help readers to understand more intricately the full extent of human impacts on our planetary systems. We hope that this information will motivate you to reduce your carbon footprint in your daily life.

What is Climate Change?

Climate change and global warming are often used interchangeably but they refer to different phenomenon. Global warming is the long-term increase in the temperature of the earth since the industrial revolution due to fossil fuel emissions. On the other hand, climate change is the long-term, gradual change in the temperature of the earth ***AND*** the changes in extremes in the environment that go along with it, such as sea level rising, increases in severe flooding and drought, more frequent forest fires, etc. The average temperature of earth's surface has increased by 0.8° Celsius since 1880, which is causing these global impacts.

Why is the Climate Changing?

Fossil fuels are the single biggest cause for climate change. Since the industrial revolution, humans have been burning increasing amounts of fossil fuels, which release **Greenhouse Gases** like carbon dioxide and methane into the atmosphere. These gases act like a greenhouse and trap the incoming energy from the sun, thus, warming our planet (figure 1).

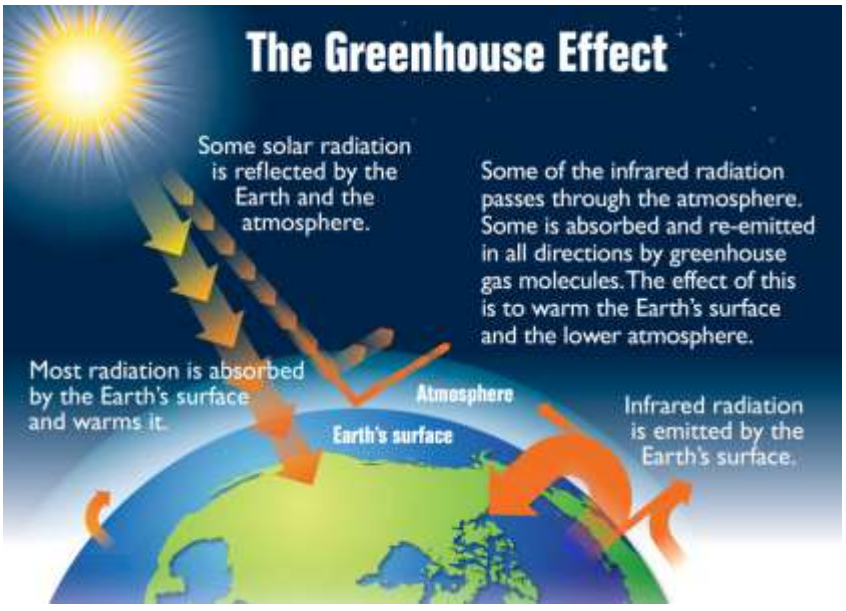
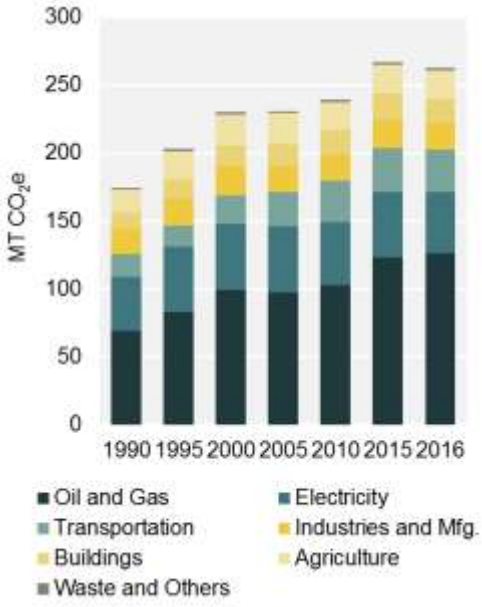


Figure 1: *Energy from the sun reaches our planet in the form of UV rays, and visible light, etc. When these rays of energy collide with our atmosphere some of it reflects back into space. The remaining rays upon reaching the surface of our planet heats it up and transforms into thermal radiation, i.e., heat. This thermal energy reflects back into the atmosphere, but instead of escaping into space, the energy gets trapped by the gases in the atmosphere, causing the increased warming our planet.*

This **Greenhouse Effect** is growing stronger as we continue burning increasing amounts of fossil fuels and putting more gases into the atmosphere. In fact, we are burning so much fossil fuels that the concentration of some greenhouse gases, such as Carbon Dioxide, is higher now than they have been in the last 400,000 years. As a result, the long-term weather patterns, i.e. our global climate, is severely changing and destabilizing our planetary systems. Severe and more frequent hurricanes, droughts, forest fires, as well as sea level rising due to melting polar ice caps, are examples of how climate change is impacting our world.

Where do the Greenhouse Gases Come From?



Although Canada only accounted for less than 2.0% of the net global greenhouse gas emissions in 2014, due to our high per person emissions, **Canada is ranked the 2nd largest emitters of greenhouse gases among the developed countries**. This is largely because the Canadian economy relies heavily on the fossil fuels, i.e., oil and gas, which generated 26% of our total emissions in 2016. Similarly, due to our large landmass we require a vast network of transportation, which produced 24.7% of our total national emissions in 2016. The situation is not much different here in Alberta (figure 2).

Figure 2: *Greenhouse Gas emissions by sector in* ***Alberta*** *with timeline. In 2016, Oil and Gas sector produced about 48% of our total emissions, while electricity generation produced 17%, and transportation produced 12%.*

Tip: How You Can Reduce Your Carbon Emissions

Food consumed by Canadians has to travel a lot before making its way onto our dining tables. For example, red grapes that are produced in California have to travel well over a thousand kilometers to be consumed, say, in Edmonton, which produces a lot of greenhouse gases. You can help reduce this food related greenhouse gas emissions by switching to locally produced food. Being produced locally, food does not need to travel hundreds of kilometers before reaching your dining table, and your purchases will also support your local economy.

Next Blog

Our next installment will talk about the coping machinery of our planet, i.e., forests and oceans. We will explore how forests and oceans help us combat against the climate change.

Picture credit:

1) https://commons.wikimedia.org/w/index.php?curid=27013490
2) https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/ab-eng.html

Additional Readings:

1) https://climate.nasa.gov/resources/global-warming/

2) https://earthobservatory.nasa.gov/world-of-change/DecadalTemp
3) https://climate.nasa.gov/climate_resources/24/graphic-the-relentless-rise-of-carbon-dioxide/
4) https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/cda-eng.html
5) https://www.neb-one.gc.ca/nrg/ntgrtd/mrkt/nrgsstmprfls/ab-eng.html