**Problem**

Anthropogenic emission of greenhouse gases poses a significant issue for both natural and human systems. The Intergovernmental Panel on Climate Change (IPCC) published their fifth assessment report in 2014 outlining the climate changes from 1850 to recent years (IPPC, 2014). According to the World Bank, in 2014 the world’s CO2 emissions (metric tons per capita) is measured at 4.981 while Norway is at 9.271 per capita (Bank, n.d.). A continuation of such development is deemed to be insufficient to meet the requirements of the Paris Agreement (Tracker, 2019).

**Causation**

Global warming is essentially a natural process. Greenhouse gases (GHG) which contains mainly carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). All of these gases work as the glasses in a greenhouse to trap a fraction of the sunlight as heat (EPA, Overview of Greenhouse Gases, n.d.). Any increase of these gases will “thicken” our atmosphere contributing to an increase in global mean temperature.

**Carbon** emission is a natural process however anthropogenic emission has made the concentration of CO<sub>2</sub> abundant. Fossil fuel is a main contender for the increase of CO<sub>2</sub> through industrial processes, transportation and energy consumption (EPA, Overview of Greenhouse Gases, n.d.). Additionally, other processes such as deforestation reduce the natural means to reduce CO<sub>2</sub> in the air.

**Methane** is a biproduct of agriculture and decomposition of organic materials. Hence, waste management play a significant part in the climate change. Moreover, CH<sub>4</sub> is more effective at trapping heat than CO<sub>2</sub> (Nyman, 2014) making it all the more reason to monitor the emission of CH<sub>4</sub> into the atmosphere.

**Nitrous oxide** is emitted mostly from agriculture typically through fertilization of soils. Moreover, N<sub>2</sub>O is more potent than CH<sub>4</sub> at trapping heat. Fortunately, the lifespan of N<sub>2</sub>O is short. However, during its short life expectancy the compound reacts to sunlight and oxygen to produce nitrogen oxide which harms the ozone layer (Shankman, 2019).

**Impact**

Generally, the biproduct of most of human systems involving combustion of fossil fuel or agriculture yields a combination of the before mentioned GHG. Hence, emissions due to human activity has a huge impact on natural systems. This causes a feedback loop which again contributes to the climate issue we have at hand.

The synthesis report (IPPC, 2014) shows clear indications of increase in global temperature in both ocean and air. The temperature increase poses great risk on both land and marine species shifting ecosystems and risking extinction. Furthermore, the consequences of global warming are melting of glaciers and sea ice which means a rise in sea level (Glick, n.d.). Since, water expands at higher temperatures this will further imply a further increase in ocean level. In addition, extreme weather has also implied to be correlated to global warming (Assessment, 2014).

Moreover, ocean water acts as a carbon sink meaning it absorbs the available CO<sub>2</sub> in the air (Platform, 2016). Dissolved CO<sub>2</sub> creates carbonic acid means increase in pH. Thus, harming marine life for instance species with calcium shells (Ford, 2009).

Global warming is not the only concerns when discussing climate issue. Pollution in general and typically acid deposition is a great concern as well. Nitrogen oxide can easily combine with oxygen to create an acidic aqueous solution (Ford, 2009). Acid rain greatly impacts crop yields as per (IPPC, 2014). The damage is not limited to crop yield, however. Acid rain poses a great risk on both marine species, vegetation and human health (EPA, Effects of Acid Rain, n.d.).

**Conclusion**

Issues caused by climate change is not limited to the discussion provided in this page. It is crucial that we take these matters seriously and work towards a sustainable resolution. Thus, being engineering students in Norway, we have chosen to start implementing a solution locally that will provide both an incentive for change and increased awareness towards the climate issue. The goal of our solution is to work toward the Paris Agreement and at least meet the 2009 Copenhagen goal as a milestone within 5 years.

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