

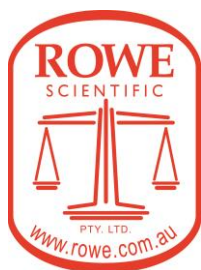


Prize Winner

Science Writing Year 9-10

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Global Warming is still so important – what is new in the field?

By Tianyue Yang Word count: 1021

What is Global Warming?

As the concentration of greenhouse gases, a gas that contributes to the greenhouse effect by absorbing infrared radiation (e.g. carbon dioxide and methane), increase uncontrollably (Denchak M, 2019), they become trapped inside Earth's atmosphere and cause an unusual artificial rise in the planet's average surface temperature (Riebeek H, 2010). The history of human-attributed global warming is a long-term effect, and dates back to the 1800s when people first started burning coal as a source of heat. Currently, the largest source of greenhouse gas emissions is from the burning of fossil fuels, which is an important component used in many transportations, electricity and heat sources (EPA, 2021).

The term "global warming" is not to be confused with "climate change". Whilst global warming is the build-up of greenhouse gases that are trapped within the atmosphere which speeds up the warming of the planet, climate change applies to a broader level and refers to the long-term change in climate due to a powerful effect of something, in this case, global warming (Makower J, 2019).

It is scientifically proven that Earth naturally undergoes interglacial periods, periods that last thousands of years which separate consecutive glacial periods and increase the average global temperature very slowly; however, the excessive amount of human activities are only amplifying this effect (Herring D, 2020).

Currently, China is responsible for more than 25 percent of the world's carbon dioxide emissions, followed by the United States, India, then Russia (Union of Concerned Scientists, 2020). According to NOAA's (National Oceanic and Atmospheric Administration) Annual Greenhouse Gas Index, an Index which tracks the warming influence of ever-increasing greenhouse gases, the emission of carbon dioxide globally has increased by 41 percent from 1990 to 2017, as can be seen in Figure 1 (NOAA, 2018).

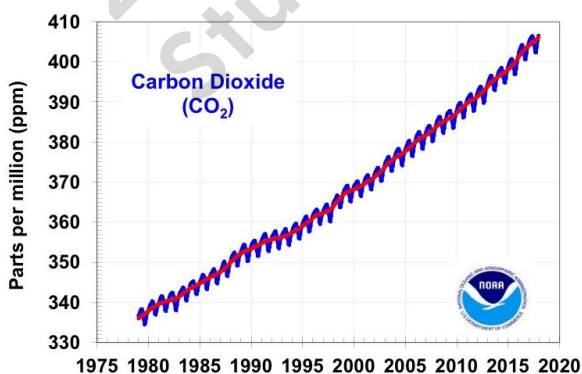


Figure 1 Source: NOAA 2018

Scientists' worries for the unusual increase in the temperature of Earth only caught public attention and awareness in 1988, which had the hottest summer on record till then. By the year 2000, the prediction made by some scientists that an "unprecedented global warming is coming our way" was verified (Weart S, 2012).

What is happening now?

Many technological advances have contributed to global warming, but they have also allowed the world to become aware of this issue. The most commonly used technologies currently include wind turbines and solar panels, both of which are substitutive power generators (DW, 2019).

Wind turbines use wind to generate electricity, instead of using electricity to make wind — like a fan. However, the turbines no longer generate electricity under situations where there is little or no wind, making it the machine's biggest limitation as it relies heavily on wind to turn its blades (Department of Energy, n.d.). Refer to Figure 2 as an image of wind turbines.



Figure 2. Source: Michele A.

fossil fuels (Infinite Energy, 2021).

Solar panels function when photons (the basic unit of all light) from sunlight strike the silicon cell in the panels, knocking electrons loose. Then the freed electrons start flowing quickly in a circuit, generating electricity as a result (Puiu T, 2021). On cloudy conditions, the machine will produce around 25% to 45% of the energy it would create under ideal conditions. Generally, a solar panel system has the capability of providing the electricity needs for an entire home with 80% lower carbon emissions than

Some other solutions that have been recently introduced to the field include carbon capture and storage (CCS), feeding cows seaweed, and improving household energy efficiency. CCS is a process of collecting emitted carbon dioxide and storing it at a site where it cannot escape into the atmosphere, it is predicted to be the only deep-decarbonising technology for now and the future (Clifford C, 2021). Feeding cows seaweed can reduce their methane emissions by as much as 82%, but this creates a drawback for dairy farmers as the cows produce much less milk (Morgan T, 2021). Household energy efficiency aims to make household items much more energy efficient, e.g. energy efficient light bulbs and fridges. Lastly, the practice of remote working due to COVID-19 is also an effective solution, reported to more than double US' emissions reduction in one year (Quartz, 2020).

Almost every one of the above technologies or proposed solutions require a great cost in order to be executed. So instead of continuing down the endless path of emitting greenhouse gas and endless struggle to find out cures to our problems, there is a much simpler and cost-effective solution, and it starts with us.

How can we help?

We can all start to minimise the effect of global warming from the smallest things we do in our daily lives. It can start with turning off lights and air-conditioners behind you, or even not wasting any food, and riding a bike as an alternative to driving a car (Nunez C, 2019). Approximately 20% of the energy globally goes into shipping, growing, packaging and processing food, and it is reported that if everyone in the world became vegan, food related carbon emissions would decrease by 70% by the year 2050 (Denchak M, 2017).

Reducing water waste can also contribute immensely to the reduction of emissions. It takes lots of energy to extract, filter, pump, heat, and treat the water before it becomes available to us, therefore, trying to take shorter showers and turning off the tap while brushing your teeth will help greatly in reducing the negative impacts. If possible, aim to install water-efficient fixtures. The Environmental Protection Agency (EPA) predicts that even if 1% of the total population in the US were retrofitted with water efficient fixtures, approximately 80 000 tonnes of pollution will be avoided annually (EPA, 2021).

Conclusion

Even though climate change is an ever-present process in nature, our constant emissions of carbon due to human activities are only speeding this process up. There are currently many innovative designs and technologies tailored to reduce the effects of global warming, but there is not enough. We have damaged our own home, so it is our responsibility to fix it. If everyone starts to make a change little by little, there will still be hope to alter our planet's future.

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