RESEARCH ARTICLE

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Net Zero/Net Zero Carbon Emission

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Abstract

Every other day we hear about environmental and climate issues and the effect of global warming or carbon emission. Many companies are shifting their concerns from making profits to making sustainable profits. The idea of saving the environment has propelled many start-ups also. Organizations worldwide are concerned about the consequences of wasting natural resources and trying their best to find a solution as soon as possible. The Paris Agreement and the Net Zero Coalition are some of the treaties the UN organization is trying to implement. The problem is that some people are ignoring climate change altogether or still think this is not a big concern. So, this article answers the following questions: what is net zero or net zero emission, how does it create an impact on our lives, and what, as an individual, do we could do about it?

Keywords: Net zero, Carbon emission, Greenhouse gases.

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Introduction

Net zero, also called carbon- neutrality, does not mean a country would bring down its emission to zero. Rather, net zero is a state in which a country's emissions are compensated by the absorption and removal of greenhouse gases from the atmosphere.

Now let's see, what are these greenhouse gases and why should we remove them from our atmosphere? A greenhouse gas is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse effect. The primary gases in Earth's atmosphere are water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and ozone (O_3). Without greenhouse gases, the average temperature of Earth's surface would be about 18°C, rather than the present average of 15°C.

Carbon dioxide (CO_2) makes up the vast majority of greenhouse gas emissions, but smaller amounts of methane (CH_4) and nitrous oxide (N_2O) are also emitted. These gases are released during the combustion of fossil fuels such as coal, oil, and natural gas, to produce electricity. We focus specifically on CO_2 when we talk about carbon emissions. Carbon, in its most basic form, is an element that is found everywhere: food, air, the human body, etc.

The largest source of natural carbon emission is the exchange of carbon dioxide between the oceans and the atmosphere. Animals and plants also emit CO_2 through the process of respiration (breathe in oxygen, breathe out carbon dioxide). And when these plants and animals decompose, organisms within the soil respire to produce energy and emit more CO_2 into the atmosphere.

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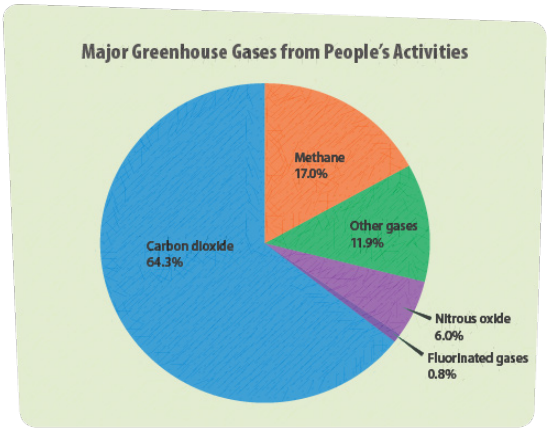
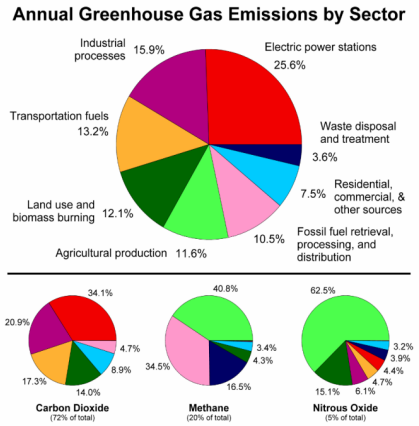


Source: International Energy Agency Report Atlas of Energy 2021

Chart 1: Major Greenhouse Gases from People's Activities



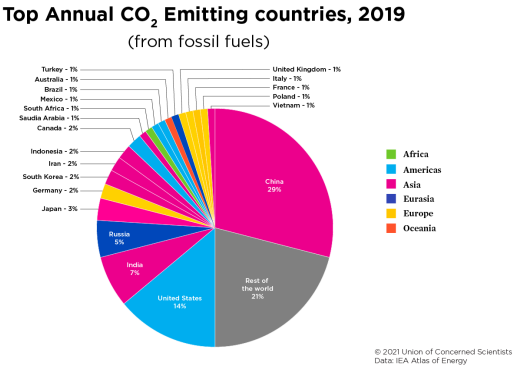
Source: Union of Concerned Scientist:International Energy Agency Report Atlas of Energy 2021

Chart 2: Annual Greenhouse Gas Emission by different sectors

We also effectively remove the natural systems that absorb and store carbon by removing forests. As we have already established, CO_2 is one of the greenhouse gases that absorbs radiation and prevents heat from escaping our atmosphere. The excess heat creates disrupted weather patterns, higher global temperature averages, and other changes in the climate (Chart 1).

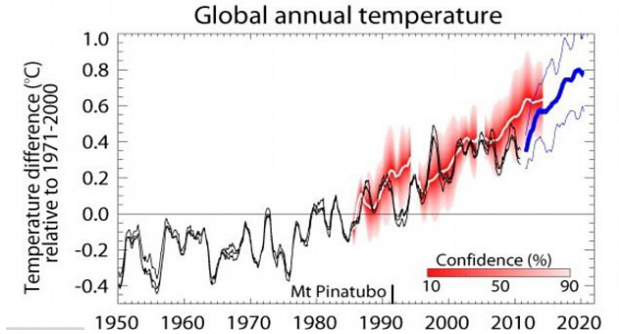
The scale of recent climate change is unprecedented over many centuries to many thousands of years. Many changes are irreversible for centuries to millennia, especially in terms of the ocean ice sheets and global sea level. Human-induced climate change affects every region. There is growing evidence of links to extreme heatwaves, heavy precipitation, droughts, and tropical cyclones (Chart 2).

You must have heard this one, earth is now about 1.1°C warmer than it was in the 1800s. We are not on track to meet the Paris Agreement target to keep the



Source: 2021 Union of Concerned Scientists: Data- IEA Atlas of Energy.

Chart 3: Top Annual CO2 Emitting Countries, 2020 (from fossil fuels)



Source: International Energy Agency Report 2021

Chart 4: Global Annual Temperature

global temperature from exceeding 1.5°C above pre-industrial levels (Chart 3). That is considered the upper limit to avoid the worst fallout from climate change. On the current path of carbon dioxide emissions temperature could increase by as much as 4.4°C by the end of the century.

Climate change is the single biggest health threat faced by humanity. The impacts are already harming health through air pollution, disease, extreme weather events, forced displacement, food insecurity, and pressures on mental health. Every year, environmental factors take the lives of around 13 million people. Not only this but a healthy ecosystem can provide 37% of the mitigation (reduction of the flow of greenhouse gases in the atmosphere) needed to limit global temperature rise. A damaged ecosystem releases carbon instead of storing it.

Not even the water bodies are safe. The ocean has absorbed more than 90% of the excess heat in the climate system, making it more acidic and less productive. This along with practices such as overfishing and dumping garbage threatens marine resources that feed 3.2 billion people. Also, the unsustainable use of land, soil, water, and food energy contributes to greenhouse gas emissions that cause rising temperatures. Higher temperatures in turn affect resources to produce food. Up to 811 million people in the world faced hunger in 2020, as many as 161 million more than in 2019.

So, emissions must drop 7.6% per year from 2020 to 2030 to keep temperatures from exceeding 1.5°C and 2.7% per year to stay below 2°C (Chart 4).

What can we do?

With so many experts on Climate change here, many people ask what they can do about it. And how does this fit into the bigger picture? The absorption of carbon emissions is necessary now. Altogether the planet absorbs and emits about 100 billion tons of carbon

Figure 1: Carbon dioxide emission

dioxide through this natural cycle every year. That total dwarf humanity's contribution, amounting to ten times as much CO_2 as humans produce through activities such as burning fossil fuels (Figure 1). Absorption of the emissions can be increased by creating more carbon sinks such as forests, while removal of gases from the atmosphere requires future technologies such as carbon capture and storage. Everyone can help limit climate change. From the way we travel to the electricity we use and the food we eat, we can make a difference.
Some of the measures that we can take are

Save energy at home

Much of our electricity and heat are powered by coal, oil, and gas. Use less energy by lowering your heating and cooling, switching to LED light bulbs and energy-efficient electric appliances, etc.

Walk, bike, or take public transport

Walking or riding a bike instead of driving will reduce greenhouse gas emissions – and help your health and fitness (Figure 2).

Eat more vegetables

Plant-based foods generally result in fewer greenhouse gas emissions and require less energy, land, and water (Figure 3).

Figure 2: Walk, bike, or take public transport

Figure 3: Eat more vegetables

Consider your travel

Airplanes burn large amounts of fossil fuels, producing significant greenhouse gas emissions. That makes taking fewer flights, one of the fastest ways to reduce your atmospheric impact (Figure 4).

Figure 4: Consider your travel

Throw away less food

Throwing away your food means wasting the resources and energy that were used in production. So, use what you buy and compost and leftovers (Figure 5).

Figure 5: Throw away less food

Reduce, Reuse, Repair, and Recycle

Electronics, clothes, and other items we buy cause carbon emissions at each point in production, from

the extraction of raw materials to manufacturing and transporting goods to market. To protect our environment, reduce the number of items you buy, try buying second-hand items, repair what you could, and of course recycles what you could (Figure 6).

Figure 6: Reduce, Reuse, Repair, and Recycle

Change your home's energy source

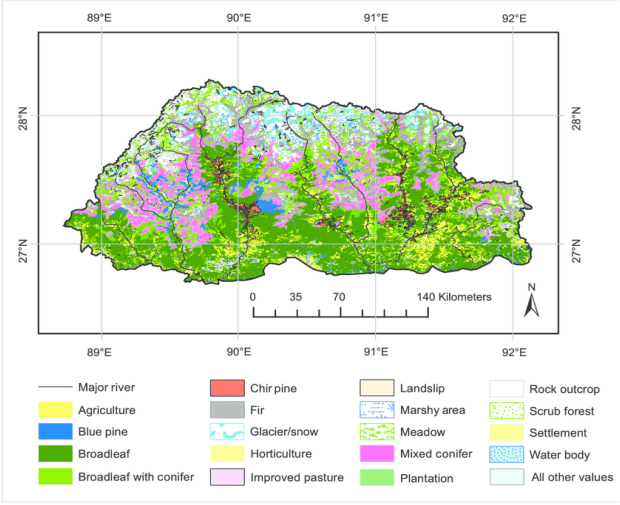
Few people had already switched their household energy sources from utility companies to renewable like solar or wind. If your energy source comes from oil, coal, or gas it contributes more carbon emissions than renewable resources (Figure 7).

Figure 7: Change your home's energy source

Choose eco-friendly products

Most of the products available in the market come in plastic packaging or are manufactured through various processes which contribute to carbon emission. To reduce your environmental impact, buy local and seasonal foods, and choose products from companies that use resources responsibly (Figure 8).

Figure 8: Choose eco-friendly products



Source: Bhutan at glance report.

Chart 5: Map view - Bhutan at a glance

Figure 9: Bhutan at a glance with respect to its geographies

Conclusion

Lastly, join in taking action and spread awareness of not only the impacts of climate change, global warming, and carbon emission but the possible measures that any individual could take. Let's make everyone believe their small contributions will be a great step in making the world a better place.

In this context, we can all learn from Bhutan. Fog-enshrouded temples nestled in mountainous terrains, it's one of the only two carbon-negative countries in the world. Carbon negative means the absorption and removal exceed the actual emissions. Despite its appeal, not many people travel to Bhutan.

This is because the government of Bhutan has put steps in place to prevent large amounts of tourists from entering the country at any given time. More than 70% of the country is covered in trees. Bhutan absorbs roughly 7 million tonnes of carbon dioxide annually and only produces around 2 million tonnes. This country also exports most of the renewable hydroelectric power that it generates from its rivers. This country has made us believe that we can address climate change with

compassion, commitment, and creativity and come out on top (Figure 9 and chart 5).

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