

# **Unearthing the Environmental Impact of Human Activity:A Global CO2 Emission Analysis**

## **Introduction:**

Carbon dioxide is Earth's most important greenhouse gas: a gas that absorbs and radiates heat. Unlike oxygen or nitrogen (which make up most of our atmosphere), greenhouse gases absorb heat radiating from the Earth's surface and re-release it in all directions—including back toward Earth's surface. Without carbon dioxide, Earth's natural greenhouse effect would be too weak to keep the average global surface temperature above freezing. By adding more carbon dioxide to the atmosphere, people are supercharging the natural greenhouse effect, causing global temperature to rise. According to observations by the NOAA Global Monitoring Lab, in 2021 carbon dioxide alone was responsible for about two-thirds of the total heating influence of all human-produced greenhouse gases.

Another reason carbon dioxide is important in the Earth system is that it dissolves into the ocean like the fizz in a can of soda. It reacts with water molecules, producing carbonic acid and lowering the ocean's pH (raising its acidity). Since the start of the Industrial Revolution, the pH of the ocean's surface waters has dropped from 8.21 to 8.10. This drop in pH is called ocean acidification.

## **Past and future carbon dioxide**

Natural increases in carbon dioxide concentrations have periodically warmed Earth's temperature during ice age cycles over the past million years or more. The warm episodes (interglacials) began with a small increase in incoming sunlight in the Northern Hemisphere due to variations in Earth's orbit around the Sun and its axis of rotation. (For more details, see the "Milankovitch cycles and ice ages" section of our Climate change: incoming sunlight article.) That little bit of extra sunlight caused a little bit of warming. As the oceans warmed, they outgassed carbon dioxide—like a can of soda going flat in the heat of a summer day. The extra carbon dioxide in the atmosphere greatly amplified the initial, solar-driven warming.

Based on air bubbles trapped in mile-thick ice cores and other paleoclimate evidence, we know that during the ice age cycles of the past million years or so,

atmospheric carbon dioxide never exceeded 300 ppm. Before the Industrial Revolution started in the mid-1700s, atmospheric carbon dioxide was 280 ppm or less.

By the time continuous observations began at Mauna Loa Volcanic Observatory in 1958, global atmospheric carbon dioxide was already 315 ppm. Carbon dioxide levels today are higher than at any point in human history. In fact, the last time atmospheric carbon dioxide amounts were this high was more than 3 million years ago, during the Mid-Pliocene Warm Period, when global surface temperature was 4.5–7.2 degrees Fahrenheit (2.5–4 degrees Celsius) warmer than during the pre-industrial era. Sea level was at least 16 feet higher than it was in 1900 and possibly as much as 82 feet higher.

If global energy demand continues to grow rapidly and we meet it mostly with fossil fuels, human emissions of carbon dioxide could reach 75 billion tons per year or more by the end of the century. Atmospheric carbon dioxide could be 800 ppm or higher—conditions not seen on Earth for close to 50 million years.

Carbon emissions are dangerous in that they threaten the livelihood of our planet, animals, humans, and ultimately, life as we know it. The amount of carbon emissions trapped in our atmosphere causes global warming, which causes climate change, symptoms of which include melting of the polar ice caps, the rising of sea levels, the disturbance of animals' natural habitats, extreme weather events, and so many more negative side effects that are dangerous to the planet, to human and animal life, and to our future.

### **Eating, travelling, heating your home... What's the carbon footprint of these activities and how can we make more climate-friendly choices?**

When you drive your car, buy a pair of sneakers or grill a steak, you contribute to the emission of carbon dioxide and other greenhouse gases into the atmosphere. It's your carbon footprint. Many countries, institutions and companies have committed to reduce their emissions while the EU has even set

the objective of being “climate neutral” by 2050. As an individual, you can also estimate your carbon footprint and reduce it. Discover how.

### **What is a carbon footprint?**

Greenhouse gases are emitted through the production and consumption of goods and services. Carbon footprint is a concept used to quantify the impact of an activity, a person or a country on climate change.

How much carbon is emitted to produce your t-shirt, meal or phone? The amount will depend on production and consumption choices. If we take the example of transport, taking the plane emits 285g of carbon per kilometre, compared to 104g for a car and 14g for a train. The same goes for the type of meat or fish you eat or the type of jeans you buy.

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### **Why should you care?**

The world's seven billion people consume varying amounts of the planet's resources. According to the United Nations’ predictions, global population could

reach 9.7 billion people by 2050, and over 11 billion by 2100. Growing populations drive up emissions and deplete the planet's resources.

Increased greenhouse gas emissions have a direct impact on global warming. It accelerates climate change with disastrous effects on our planet. All of us can contribute to fighting global warming by making climate-friendly choices in our daily lives.

### **How to limit your carbon footprint?**

Understanding your carbon footprint can help limit the impact of your consumption on the environment. There are different online solutions to help you estimate your carbon footprint.

Small changes can make a big difference in the long run, for example when it comes to transportation, food, clothing, waste, etc. Here are some tips:

1. Food
2. Consume local and seasonal products (forget strawberries in winter)
3. Limit meat consumption, especially beef
4. Select fish from sustainable fishing
5. Bring reusable shopping bags and avoid products with excessive plastic packaging
6. Make sure to buy only what you need, to avoid waste
7. Clothing
8. Take good care of your clothes

9. Try swapping, borrowing, renting or buying second-hand
10. Buy responsibly-made clothes, e.g. made from recycled material or with an eco-label
11. Transport
12. Cycle or use public transport
13. Be smart about when and how you drive
14. Try the train for your next holiday
15. Energy and waste

### **Conclusion:**

#### **What level of CO<sub>2</sub> is harmful to humans?**

around **40,000 ppm**

At even higher levels of CO<sub>2</sub> can cause asphyxiation as it replaces oxygen in the blood-exposure to concentrations around 40,000 ppm is immediately dangerous to life and health.03-Oct-2022