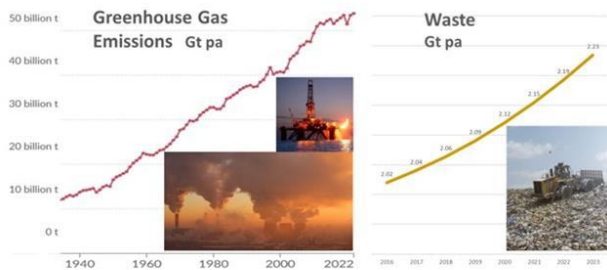


### Greenhouse Gases Continue to Rise at an Alarming Pace

#### CO<sub>2</sub>e Emissions & Waste: Both Still Rising



#### What We Can Do About It

In 2022, carbon dioxide (CO<sub>2</sub>), methane, and nitrous oxide - the three primary greenhouse gases - continued their historically high rates of growth in the atmosphere. Here are the key points:

**CO<sub>2</sub> Levels:** The global surface average for CO<sub>2</sub> rose by 2.13 parts per million (ppm) to 417.06 ppm. This marks the 11th consecutive year of CO<sub>2</sub> increases exceeding 2 ppm, the highest sustained rate in 65 years. Atmospheric CO<sub>2</sub> is now 50% higher than pre-industrial levels.

**Methane:** Methane, a potent heat-trapping gas, increased to an average of 1,911.9 ppb in 2022. This was the fourth-largest annual increase recorded since systematic measurements began in 1983.

**Nitrous Oxide:** Levels of nitrous oxide rose by 1.24 ppb to 335.7 ppb, tied with 2014 as the third-largest jump since 2000. Agriculture, particularly nitrogen fertilizer use, drives this increase.

These observations underscore the urgent need for global action to curb emissions and mitigate climate change. The situation demands immediate attention and concerted efforts to transition toward cleaner energy sources and sustainable practices.

## Carbon Black vs Activated Carbon – what’s in a name?

Activated Carbon and Carbon Black are two distinct forms of carbon that play crucial roles in various industries due to their unique properties and applications.



**Activated Carbon**, also known as activated charcoal, is a highly porous form of carbon with a large surface area, making it exceptionally effective at absorbing impurities from gases and liquids. This property makes it invaluable in purification processes.

**Production:** Activated carbon is produced from carbonaceous materials such as wood, coal, or coconut shells. The production process involves two main steps:

1. **Carbonization:** The raw material is heated in an inert atmosphere to remove volatile components.
2. **Activation:** The carbonized material is treated with oxidizing agents (like steam or carbon dioxide) at high temperatures to create a porous structure.

**Applications:**

- **Water and Air Purification:** Used in filters to remove contaminants and Odors.
- **Medical Uses:** Employed in treating poisonings and overdoses due to its ability to adsorb toxins.
- **Food and Beverage Industry:** Used to decolorize and purify products like sugar and alcoholic beverages.



**Carbon Black** is a fine black powder composed of elemental carbon. It is produced through the incomplete combustion of heavy petroleum products and is primarily used as a reinforcing agent in rubber products, especially tires.

**Production:** The most common method of producing carbon black is the furnace black process, which involves burning hydrocarbons in a controlled environment with limited oxygen i.e. pyrolysis.

## Applications:

- **Rubber Industry:** Enhances the strength and durability of rubber products, particularly in automobile tires.
- **Pigments:** Used as a black pigment in inks, paints, and coatings.
- **Conductive Additives:** Incorporated into plastics and other materials to improve electrical conductivity.

## Key Differences

1. **Surface Area:** [Activated carbon has much higher surface-area-to-volume ration compared to carbon black, making it more effective for absorption purposes](#)
2. **Production Process:** [Activated carbon is derived from organic materials through carbonization and activation, while carbon black is produced from the incomplete combustion of petroleum products<sup>2</sup>.](#)
3. **Applications:** [Activated carbon is primarily used for purification and filtration, whereas carbon black is mainly used as a reinforcing agent and pigment<sup>3</sup>.](#)

Both activated carbon and carbon black are indispensable in their respective fields, contributing significantly to environmental management, health, and industrial advancements.

At INNOVO Net Zero we are partnering with technology companies in this space and collaborating with clients in developing off take markets for this valuable sustainable technology.

## Interesting reading:

Activated carbon market.

<https://www.prnewswire.com/news-releases/global-activated-carbon-market-to-reach-3-9-million-tons-by-2026--301506731.html>

Minneapolis is on the leading edge of biochar.

<https://phys.org/news/2024-07-minneapolis-edge-biochar-carbon-sequestering.html>