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Biogenic vs Non-Biogenic Carbon: What's the Difference?

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According to respected BBC naturalist David Attenborough, climate change is “the biggest threat to security that modern humans have ever faced”. Given that carbon is one of the most potent greenhouse gases which contributes to global warming and the extreme weather phenomena which accompany it, the element has understandably become demonised in popular perception.

While it's true that carbon emissions are certainly responsible for the climate issues facing planet Earth and its population, it would be a mistake to assume that all carbon is equally damaging. Indeed, scientists differentiate between **biogenic carbon** (<https://www.envirotech-online.com/news/air-monitoring/6/breaking-news/what-are-biogenic-carbons/56513>) (that which is absorbed, stored and emitted by organic matter like soil, trees, plants and grasses) and non-biogenic carbon (that found in all other sources, most notably in fossil fuels like oil, coal and gas). But what exactly are the differences between the two types?

Biogenic carbon vs non-biogenic carbon

On the one hand, **biogenic carbon is absorbed and stored by the flora on our planet** (<https://www.envirotech-online.com/news/air-monitoring/6/breaking-news/where-do-biogenic-carbons-come-from/56517>), as a natural consequence of its life cycle. Through the process of photosynthesis, carbon is taken from the air and distributed among the leaves, stems and roots of the plant in question, or else sequestered in the soil beneath it. When the plant reaches the end of its life, the carbon is slowly released from its decomposing remains, or else emitted when the organic matter is combusted as biomass.

By contrast, non-biogenic carbon has not been absorbed by living matter. Most commonly, the term is used to refer to carbon stored in fossil fuels, which have accrued their high carbon content over thousands or even millions of years and as a result of extreme atmospheric pressures. In the form of oil, coal or gas, this is used in power stations to generate electricity that heats and lights our homes and businesses, as well as petrol and diesel to power our transportation.

The benefits of biogenic carbon

Biogenic carbon is mostly regarded as preferable to non-biogenic carbon, given the fact that it can be replenished more readily than its counterpart. When trees are felled or plants cut down for use in biomass plants, they are generally replaced with new ones. This means that any emissions from their combustion are theoretically carbon-neutral, since a proportional amount of the greenhouse gas will be consumed by the organic matter which replaces them.

On the other hand, non-biogenic carbon releases a significant amount of carbon in a short space of time. Since it takes millennia or more to form fossil fuels, combusting them and releasing their stored carbon in a matter of hours, days or weeks is unsustainable from an environmental perspective. It is for this reason that governments and regulatory bodies around the globe are endorsing biogenic carbon and putting in place incentives for companies to favour its use. For more information on this fascinating subject, the article **Biogenic Carbons: Definition, Emissions, Storage and Measurement** (<https://www.envirotech-online.com/news/air-monitoring/6/breaking-news/biogenic-carbons-definition-emissions-storage-measurement/56512>), provides a more in-depth exploration of the themes at play.

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