

Methane emissions increase by 20 per cent in 20 years

Summary sentence: Global methane emissions, a greenhouse gas more potent than carbon dioxide, are rising at an accelerating rate due to human activities.

The Global Methane Budget 2024 [released today](#) highlights methane emissions from human activities have increased by 20 per cent in the past two decades.

Methane is one of three core greenhouse gases that contribute to climate change. It lasts in the atmosphere for just a few decades, which is shorter when compared to its counterparts, carbon dioxide and nitrous oxide. Methane has the highest short-term global warming potential as it holds more heat in the atmosphere.

The budget is produced by international research partners, including CSIRO, Australia's national science agency, as part of the Global Carbon Project. It covers 17 natural and anthropogenic (human-induced) sources and shows that methane has increased by 61 million metric tonnes per year.

Pep Canadell, CSIRO's Executive Director for the Global Carbon Project, said methane concentrations have recently risen faster than ever, since reliable measurements began in 1986.

"We have seen higher growth rates for methane over the past three years, from 2020-2022, with a record high in 2021. This increase means methane concentrations in the atmosphere are 2.6 times higher than its pre-industrial (1750) levels," said Dr Canadell.

"Human activities are responsible for at least two-thirds of global methane emissions, adding about 0.5°C to global warming that has occurred to date."

The report found agriculture contributes 40 per cent of global methane emissions from human activities. This is followed by the fossil fuel sector (34 per cent), solid waste and wastewater (19 per cent), and biomass and biofuel burning (7 per cent).

The top five country emitters of anthropogenic methane in 2020 were China (16 per cent), India (9 per cent), USA (7 per cent), Brazil (6 per cent), and Russia (5 per cent).

The European Union and Australasia have successfully reduced their anthropogenic methane emissions over the past two decades. However, if the trend of anthropogenic methane emissions continues to increase globally, this would jeopardise the success of the Global Methane Pledge, an international commitment to reduce methane emissions by 30 per cent by 2030.

“Methane is a short-lived greenhouse gas compared to carbon dioxide. Most emissions, and therefore their warming effect in the atmosphere, occur during the first 20 years after being released, so it’s a good target for fast mitigation of global warming,” said Dr Canadell.

“For net-zero emission pathways consistent with the Paris Agreement, which is stabilising temperatures below 2°C from pre-industrial levels, anthropogenic methane emissions need to decline by 45 per cent by 2050, relative to 2019 levels.

Addressing methane emissions from the agriculture sector include improved land management practices, such as improving the efficiency of animal production, provision of feed additives that reduce enteric methane, and breeding animals that produce less methane.

Dr Michael Battaglia, CSIRO’s Towards Net Zero Lead, said CSIRO is working on a range of research and innovation to support sustainability goals to reduce methane emissions.

“Mitigation efforts include developing FutureFeed, with partners Meat & Livestock Australia and James Cook University, an Asparagopsis seaweed-based feed additive to significantly reduce enteric methane emissions in livestock. This is one of an array of feed supplements in a suite of technologies to address ruminant methane,” said Dr Battaglia.

“We’re also researching how legumes may be used to reduce methane in grazing livestock.”

The Global Methane Budget 2024 is the fourth such budget published in the journal [Earth System Science Data](#). The summary paper is available through [Environmental Research Letters](#).

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