Global Methane Tracker 2024

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Context:

The International Energy Agency's Global Methane Tracker 2024 indicates that methane emissions from fuel usage in 2023 were nearly at their highest level on record, representing a slight increase compared to 2022.

Background:

Methane is responsible for around 30 per cent of the rise in global temperatures since the preindustrial era. The energy sector— including oil, natural gas, coal and bioenergy — accounts for over a third of methane emissions from human activity.

Key highlights of the Global Methane Tracker 2024:

1. In 2023, methane emissions from fossil fuels totalled close to 120 million tonnes (Mt).
2. Bioenergy (largely from biomass use) contributed a further 10 Mt methane emissions. This level has stayed constant since 2019.
3. Major methane emissions events increased by over 50% in 2023 compared to 2022. These events included more than 5 million metric tons of methane emissions from significant fossil fuel leaks globally. One prominent incident was a major well blowout in Kazakhstan that lasted over 200 days.
4. Nearly 70% of methane emissions from fossil fuels come from the top 10 emitting countries. The United States is the largest emitter of methane from oil and gas operations, closely followed by Russia. China is the highest emitter of methane in the coal sector.
5. Cutting methane emissions from fossil fuels by 75% by 2030 is crucial for limiting global warming to 1.5 °C. The IEA estimated that this goal would require about USD 170 billion in spending. This is less than 5% of the income generated by the fossil fuel industry in 2023. Around 40% of emissions from fossil fuels in 2023 could have been avoided at no net cost.

Methane:

1. It is the simplest hydrocarbon, consisting of one carbon atom and four hydrogen atoms (CH_4).
2. It is the primary component of natural gas.
3. It is odourless, colourless, and tasteless gas.
4. It is lighter than air and burns with a blue flame in complete combustion, yielding carbon dioxide (CO_2) and water (H_2O) in the presence of oxygen.
5. Methane ranks as the second most important greenhouse gas (GHG) after carbon dioxide (CO_2). Its 20-year global warming potential (GWP) is 84, indicating that it traps 84 times more heat per mass unit than CO_2 over a 20-year period, making it a potent GHG.
6. It is a significant contributor to global warming, accounting for about 30% of the rise in global temperatures since the preindustrial era.

7. It contributes to the formation of ground-level ozone.

Major sources of Methane Emission:

1. Wetlands, both natural and human-made, are significant sources of methane emissions due to anaerobic decomposition of organic matter.
2. Growing paddy fields release methane due to anaerobic conditions in flooded rice paddies.
3. Excreta from cattle and other livestock undergo enteric fermentation, producing methane as a byproduct.
4. Burning of fossil fuels, including oil and natural gas, releases methane emissions.
5. Biomass burning, such as wood and agricultural residues, also contributes to methane levels.
6. Industrial activities like landfills and wastewater treatment plants generate methane during organic waste decomposition in anaerobic environments.
7. Fertilizer factories and other industrial processes can also release methane during production and transportation.