how

METHANE

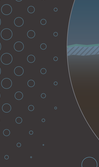
AFFECTS THE ARCTIC

WHAT IS IT?

Methane is a primary component of natural gas, a common fuel source. Emissions from human activities include industry, agriculture, and waste management. The remainder is emitted from natural sources, like wetlands, termites, oceans, sediments, volcanoes and wildfires. In the Arctic, methane is found on both land and ocean.

60% of GLOBAL METHANE EMISSIONS are HUMAN INFLUENCED

WHAT ARE ITS SOURCES IN THE ARCTIC?



METHYL CLATHRATES

Methyl clathrates are molecules of methane that are frozen into ice crystals. They can form deep in the earth or underwater, but it takes very special conditions, with high pressure and low temperature to make them.

IMMENSE RESERVES of METHANE EXIST ON CONTINENTAL SEABEDS

PERMAFROST

Methane trapped in the Arctic tundra comes primarily from microbial decomposition of organic matter in soil that thaws annually. This frozen soil layer is called permafrost.

THE ARCTIC ACCOUNTS FOR NEARLY **50%** of ALL ORGANIC CARBON STORED IN THE PLANET'S SOIL

WHY DOES IT MATTER?

A **3 DEGREE RISE** in GLOBAL TEMPERATURES COULD MELT **30-80%** of the TOP PERMAFROST LAYERS

IT'S AMPLIFYING THE PROBLEM

Permafrost layers are melting. If this trend continues, the vast carbon reservoirs might release into the atmosphere as either carbon dioxide or methane, upsetting the Arctic carbon balance and intensifying global climate change.

IT'S A LOT MORE POTENT THAN CARBON DIOXIDE

The fragile nature of methane deposits, the multiple pathways for release and feedback effects, and the potentially catastrophic impacts should a large-scale release occur all make methane a severe threat to human security not only in the Arctic, but across the globe.

METHANE is **84x** MORE POWERFUL THAN CO_2 in a **20** YEAR PERIOD

IT COULD BE A GAME-CHANGER ENERGY SOURCE

One cubic meter of frozen methane releases about 160 cubic meters of gas, making it a highly energy-intensive fuel. Two extraction methods have been successfully tested at experimental sites.

THERE IS MORE ENERGY in ARCTIC METHANE than ALL THE WORLD'S OIL, COAL AND GAS RESERVES COMBINED

WE NEED MORE RESEARCH

Scientists are still learning about methane in the Arctic and how they should build it into climate models. More information is needed so we don't hit an unaccounted feedback loop and "tipping point."

THE ARCTIC INSTITUTE

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