

Illustration 4.3 - Methane vs CO₂ over time

HOW TO READ THIS GRAPH

The graph shows the warming effect over time after an equal one-off release of each gas (same mass).

The height of each line shows how strong the warming effect is at that time. The area under each line shows the total warming effect over a period (for example 20 or 100 years).

Methane has a much stronger effect at first, but it breaks down faster. Carbon dioxide has a weaker effect per kilogram, but it lasts much longer.

Methane (CH₄)



One carbon atom and four hydrogen atoms.

Carbon dioxide (CO₂)



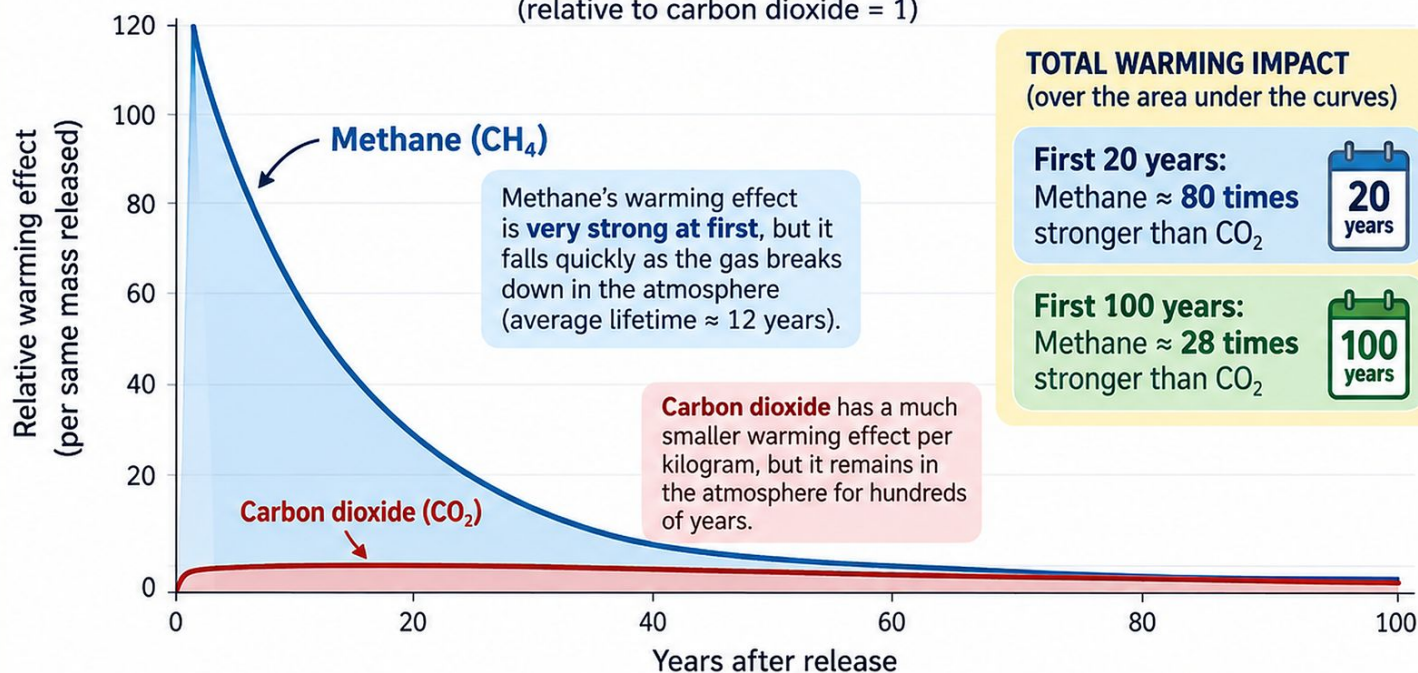
One carbon atom and two oxygen atoms.

METHANE vs CO₂ – WARMING EFFECT OVER TIME

Methane is much more powerful than carbon dioxide at trapping heat, but it does not stay in the atmosphere as long.

WARMING EFFECT AFTER AN EQUAL ONE-OFF RELEASE

(relative to carbon dioxide = 1)



THE BIG PICTURE



Methane is a short-lived but super-powered greenhouse gas. Carbon dioxide is less powerful per kilogram, but it stays in the climate system for a very long time.

KEY NUMBERS



Over the first 20 years methane traps about **80×** more heat than CO₂.
Over 100 years it traps about **28×** more.



WHY THIS MATTERS

Methane is a key driver of near-term warming. Reducing methane emissions can make a real difference, even though there is less of it in the air than carbon dioxide.