

Methane vs. CO2 Global Warming Potential

Methane and Carbon Dioxide - CH4 and CO2

105 times. Level of heat trapping potency that methane is greater than carbon dioxide over a 20-year time frame according to NASA research. "But [Robert Howarth, a professor of ecology and environmental biology at Cornell University] and company took things even further, incorporating data from Drew T. Shindell at NASA's Goddard Institute for Space Studies, who published a study in 2009 in the journal Science that suggested that the interaction of methane with certain atmospheric aerosols might well amplify the global warming potential of methane, rendering it up to 105 times more potent than carbon dioxide in the 20-year time frame. Although the 100-year time horizon is more commonly used by climate scientists, Mr. Howarth relies on the shorter time-horizon, which would greatly intensify the impact of leaking methane on climate. Combining that with the novel methane leakage estimates at various points along the production and transmission life cycles, he and his co-authors were able to push the climate impact, per unit of energy, of unconventional natural gas industry well beyond that of the perennial environmental and climate demon, coal." (Tom Zeller Jr., "Methane Losses Stir Debate on Natural Gas," The New York Times, April 12, 2011)

72 times. Methane has a global warming potential 72 times greater than carbon dioxide over a 20 year period. Compared with carbon dioxide, methane has a high global warming potential of 72 (calculated over a period of 20 years) or 25 (for a time period of 100 years). (Intergovernmental Panel on Climate Change - IPCC - "Climate Change 2007: The Physical Science Basis - Summary for Policymakers," Fourth Assessment Report -FAR, Working Group 1, Chapter 2, IPCC Secretariat, Geneva, Switzerland, February 2007, p. 212)

72 times. Over a 20-year period, one pound of methane traps as much heat as at least 72 lbs. of CO2. "Methane is a far more powerful greenhouse gas than carbon dioxide, though it doesn't last nearly as long in the atmosphere. Still, over a 20-year period, one pound of it traps as much heat as at least 72 pounds of carbon dioxide. Its potency declines, but even after a century, it is at least 25 times as powerful as carbon dioxide. When burned, natural gas emits half the carbon dioxide of coal, but methane leakage eviscerates this advantage because of its heat-trapping power." (Anthony R. Ingraffea, "Gangplank to a Warm Future," The New York Times, July 28, 2013)

72 times. Over 20 years, emission of 1 ton of methane has the same climatic impact as the emission of 72 tons of carbon dioxide. "After Carbon Dioxide, Methane is the next most important GHG [greenhouse gas], because it has high capacity to absorb infrared radiation and is relatively abundant. [T]he observed lifetime of methane, in today's atmosphere, is on average 12 years. Methane has a GWP [global warming potential] of 72 over a 20 year period, meaning that over this time period, the emission of 1 ton of methane will have the same climate impact as the emission of 72 tons of carbon dioxide, or in other words methane is 72 times stronger than carbon dioxide. When looking at a 100 year period of time, however, the emission of 1 ton of methane has the same climate impact as the emission of 25 tons of carbon dioxide." Energy + Environment Foundation, info@eeocw.org, Global Warming Potentials, Energy + Environment OpenCourseWare, Washington, DC, 2008, p. 3)

Gangplank to the future. "As a longtime oil and gas engineer who helped develop shale fracking techniques for the Energy Department, I can assure you that [natural] gas is not 'clean.'"

Because of leaks of methane, the main component of natural gas, the gas extracted from shale deposits is not a 'bridge' to a renewable energy future — it's a gangplank to more warming and away from clean energy investments."

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(1) Kirk R. Smith, PhD, Nobel Laureate, "Carbon on Steroids, The Untold Story of Methane, Climate, and Health," PowerPoint presentation to the California Air Resources Board (CARB), Sacramento, California, November 10, 2008, Slide 18. See video of presentation.

(2) Kris Maher, "Mining Project Aims to Capture Methane," The Wall Street Journal, New York, June 2, 2010