

How Reducing Industrial Methane Emissions Can Curb Climate Change

Carbon dioxide (CO₂) emissions frequently receive the most notoriety in greenhouse gas (GHG) discussions, as they comprise [roughly 80%](#) of total output. However, methane emissions are just as impactful and must be part of any holistic climate change management efforts.

Fortunately, methane reduction technologies are relatively inexpensive and can be applied to different emission sources.

Methane's Climate Change Impact

Elevated [methane emissions](#) are generally a byproduct of natural gas consumption (e.g., home heating, power plants), agriculture, and waste, and levels have risen over 200% in the last 200 years. Even at 11% of total US GHG emissions, methane causes notable concern.

When comparing CO₂ and methane GHGs, the former is emitted into the atmosphere at much higher rates and remains present for hundreds or thousands of years. In contrast, methane is considered a “short-lived climate pollutant” (SLCP). This is because it only stays for roughly 12 years before 80% disappears, but in that time, methane warms the atmosphere [28 times](#) more than CO₂ over 100 years.

Since methane emissions tend to have specific sources, and the viable solutions are comparatively simpler than for CO₂, targeting this GHG provides one of the most effective near-term climate change mitigation efforts.

Fossil Fuels

Surprisingly, the fossil fuel industry isn't the most significant source of methane emissions; they only account for 35%, per the [Council on Foreign Relations](#). However, methane output from fossil fuels can be reduced more than in other sectors and with affordable technologies or methods.

Methane is [most commonly released](#) by the fossil fuel industry via:

- Leaks
- Venting
- Incomplete combustion.

It's primarily an infrastructure maintenance issue, but quantities also add up quickly and contribute to companies' lost revenue. So, performing regular maintenance and upgrades on vapor recovery units and leak detection systems will help drastically reduce this methane emissions source—from upstream compressors to downstream delivery.

Aside from “fugitive methane” that escapes infrastructure, the GHG is also released by coal mines. Many abandoned coal mines are already flooded—naturally when dewatering systems are deactivated and forcefully to prevent acid water from entering the environment. The same technique can be used for methane [to significant effect](#).

Reducing Methane by Transitioning to Green Hydrogen

The fossil fuel industry similarly bears responsibility for heightened methane emissions via coal gasification and the production of dirty hydrogen. Unfortunately, some hydrogen gas comes from coal sources (i.e., “brown hydrogen”). By transitioning to “green hydrogen”—produced via electrolysis and renewable energy, this methane source can be reduced, if not eliminated entirely.

Furthermore, substituting green hydrogen for natural gas will substantially reduce methane emissions. For example, SoCalGas’ [Angeles Link proposal](#) will replace the Aliso Canyon natural gas facility to provide green hydrogen to Los Angeles.

Agriculture

The agriculture industry is responsible for the most methane emissions at roughly 40% of total amounts. Most commonly, people associate agricultural methane release with cows (i.e., enteric fermentation and manure), but additional sources include:

- Field burnings following harvests
- Rice cultivation
- Food waste

However, methane emissions from agricultural sources are complicated. Whereas fossil fuel emissions release GHGs trapped underground and introduce new methane into the atmosphere, many agricultural sources are part of a relatively “closed system.”

Some of that carbon within the methane (CH₄) was already present in the environment.

Still, as we globally increase agricultural production and clear more fields to keep pace with a growing population’s food supply demands, we upset the balance of that cycle. As a result, we’re now overloading the amount of methane naturally released into the atmosphere.

Agricultural Methane Solutions

To counteract agriculture’s rising methane emissions, we can address these individual sources with sustainable farming practices. Some solutions will even improve soil conservation and lead to better revenues for farmers:

- By changing the feed and diet of methane-producing livestock, we can reduce the amount that they release. This is because methane is produced via enteric fermentation as a byproduct of cows breaking down the grass they eat. Notably, this effort would help reduce naturally occurring methane already present in nature’s “closed system,” helping us on the way to achieving negative emissions rates.
- Field burnings are commonly utilized as a fast, cost-effective method for clearing out dead crops, weeds, and other pests. But, the effects also reduce essential soil nutrients like nitrogen. Farmers can instead utilize [crop rotations](#), no-till planting, and shredding previous crops over the soil to achieve 10-20% profit increases and [78% GHG reductions](#).
- Traditional practices of continually flooding rice paddies create conditions that produce more methane. Alternatively, farmers can drain paddies 2-3 times per year with a method known as “[alternate wetting and drying](#)” (AWD). AWD helps a farm reduce water consumption by 30% and methane emissions by 30-70% without impacting crop yields or profits.

Crucially, these methane reduction efforts don’t affect farmers’ yields or profits, so the remaining barriers are access to education and equipment.

Waste Reduction

In the US, landfills and decomposing municipal solid waste (MSW)—or garbage from local trash collections—comprise [roughly 15%](#) of methane emissions as the third-largest source. Within a year, bacteria begin decomposing food, yard, and other biowaste, producing methane.

To help contain and control methane released from MSW sources, liners and layers of dirt are used in landfills along with a thicker, less permeable top layer (e.g., clay, sand). [Pump and pipe systems](#) help extract and capture it—which then provides a recyclable source for natural gas.

However, only around 0.07% of the 1,000 substantial landfills in the US are set up to sell recycled natural gas and earn a profit.

Part of the challenge is that the vast majority of pumps collecting methane from landfills are unable to adjust and optimize their collection for various environmental factors (e.g., temperature). [Solutions are emerging now](#), but much more widespread adoption will be necessary to capture and recycle methane from landfills. Until then, most excess methane that goes uncaptured will likely be burned off via “flaring.”

A broad and multifaceted effort to reduce MSW (e.g., reducing food waste, composting) is one of the more impactful efforts we can adopt.

Leading the Fight Against Climate Change With Renewable Energy Solutions

As one of the fastest paths to reducing GHG accumulations in our atmosphere, solutions for limiting methane emissions should be a top priority within any holistic climate change management plan. Not only are the technologies to do so already in use, but they're also affordable.

At [REDACTED], we provide energy solutions—from construction to maintenance and testing—designed to mitigate and reverse the effects of climate change. Especially with our efforts to increase the adoption of green hydrogen, we're helping to reduce the impact of CO₂, methane, and other GHGs.

To discuss an upcoming energy project or consult with our experts, contact us.

Sources:

EPA. *Inventory of U.S. Greenhouse Gas Emissions and Sinks.*

<https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>

UC Davis CLEAR Center. *Why methane from cattle warms the climate differently than CO₂ from fossil fuels.*

<https://clear.ucdavis.edu/explainers/why-methane-cattle-warms-climate-differently-co2-fossil-fuel>

Council on Foreign Relations. *How Cutting Methane Emissions Can Move the Needle on Climate Change.*

<https://www.cfr.org/in-brief/how-cutting-methane-emissions-can-move-needle-climate-change>

McKinsey. *Curbing methane emissions: How five industries can counter a major climate threat.*

<https://www.mckinsey.com/business-functions/sustainability/our-insights/curbing-methane-emissions-how-five-industries-can-counter-a-major-climate-threat>

EPA. *Methane Emissions From Abandoned Coal Mines in the United States: Emission Inventory Methodology and 1990-2002 Emissions Estimates.*

https://www.epa.gov/sites/default/files/2016-03/documents/amm_final_report.pdf

SoCalGas. *Angeles Link.* <https://www.socalgas.com/sustainability/hydrogen/angeles-link>

EPA. *Basic Information about Landfill Gas.*

<https://www.epa.gov/lmop/basic-information-about-landfill-gas>

NPR. *Your Trash Is Emitting Methane In The Landfill. Here's Why It Matters For The Climate.*

<https://www.npr.org/2021/07/13/1012218119/epa-struggles-to-track-methane-from-landfills-heres-why-it-matters-for-the-clima>

MIT News. *Reducing methane emissions at landfills.*

<https://news.mit.edu/2022/loci-methane-emissions-landfills-0202>

California State University Chico. *Regenerative Alternatives to Burning the Rice Fields.*

<https://www.csuchico.edu/regenerativeagriculture/blog/rice-burning.shtml>

CGIAR. *Alternatives to burning can increase Indian farmers' profits and cut pollution, new study shows.*

<https://www.cgiar.org/news-events/news/alternatives-to-burning-can-increase-indian-farmers-profits-and-cut-pollution-new-study-shows/>