



# CLIMATE AND DEVELOPMENT BRIEF

## **Methane: The Fast Mitigation Sprint**

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- Reducing methane emissions is essential to achieve global climate targets.
- Cost-effective interventions to reduce these emissions are available and should be prioritized.
- Actions must target the sectors responsible for 90-95% of anthropogenic methane emissions – agriculture and food (41%), energy (35%), and sanitation and waste (20%).
- The World Bank Group is actively engaged in methane abatement work in all key sectors and will deepen its engagement for a fast mitigation sprint by taking a leadership role in working with other development finance institutions, multilateral development banks and the private sector to have maximum impact.

## The Challenge

**Reducing methane emissions is crucial for achieving global climate targets.** Methane concentration in the atmosphere had the largest year-on-year jump in both 2020 and 2021 since systematic measurements began nearly 40 years ago.<sup>1</sup> Given the short-term potency of methane, cost-effective interventions to reduce methane emissions are an immediate priority.

**There are many opportunities to reduce methane emissions quickly and at a low cost.** Interventions that reduce methane emissions can also have significant other development benefits, including improved health outcomes, better agricultural yields, and higher worker productivity.

Reducing methane emissions rapidly can also slow temperature increases over the short run, lowering the likelihood of reaching dangerous climate tipping points or feedback loops, such as:

- the loss of permafrost, which releases carbon and methane into the atmosphere;
- the loss of sea ice, which reflects solar radiation away from earth (to be replaced by darker ocean surface, which absorbs solar radiation, adding to warming); and,
- the dieback of forests, which can lead to more wildfires and the release of additional carbon into the atmosphere.

## What is Needed?

**Actions must target the sectors responsible for 90-95% of global anthropogenic sources of methane: agriculture and food; energy; and sanitation and waste.** The agri-food sector is the largest source of human-induced methane emissions, particularly from livestock production, rice, food loss and waste. The energy sector is the second largest source of methane emissions.

## Major Sources of Methane Emissions

Sector	Subsector	Estimated % of total annual anthropogenic emissions	2030 reduction potential using currently available measures (in tons of methane)	Types of Interventions
Agriculture and Food 40%	Enteric fermentation and manure management	~32%	4-42 MT/year	<ul style="list-style-type: none"> <li>• Feed changes and supplements</li> <li>• Selective breeding</li> <li>• Improved manure treatment</li> </ul>
	Rice cultivation	~8%	6-9 MT/year	<ul style="list-style-type: none"> <li>• Improved water management of rice paddies</li> <li>• Treatment to inhibit methanogenesis</li> <li>• Composting rice straw</li> </ul>
	Agriculture waste burning	~1%		<ul style="list-style-type: none"> <li>• Ban burning of crop residues</li> </ul>
Energy 35%	Release during oil and gas extraction, production, and transport	~23%	29-57 MT/year	<ul style="list-style-type: none"> <li>• Upstream/downstream leak detection and repair</li> <li>• Recovery/utilization of vented and flared gas</li> <li>• Replace pumps</li> <li>• Cap unused wells</li> </ul>
	Coal mining	~12%	12-25 MT/year	<ul style="list-style-type: none"> <li>• Flood abandoned coal mines</li> <li>• Recovery and oxidation of ventilation air methane</li> </ul>
Sanitation and Waste 20%	Landfills, wastewater treatment	~20%	29-36 MT/year	<ul style="list-style-type: none"> <li>• Eliminate landfilling of organic waste</li> <li>• Collection and flaring of landfill gas</li> <li>• Upgrade to anaerobic treatment with biogas recovery &amp; utilization</li> </ul>

**Efforts to reduce methane emissions can also have a strong geographic focus.** Globally, China (56.8 MT/year), the Middle East/North Africa region (46 MT/year), and Latin America (45.9 MT/year) are among the largest sources of methane emissions. South Asia (42.7 MT/year), North America (34.7 MT/year), and other countries in East Asia (29.8 MT/year) are not far behind.<sup>iv</sup> The sources of emissions reflect the prominence of the energy and agriculture sectors in each region.

**The primary drivers of methane emissions are well understood within each sector and require sector-specific roadmaps to reduce emissions.** Within the agricultural sector, the main driver is the demand for cattle-based foods (beef and dairy), as enteric fermentation by ruminant animals is the main source of emissions. Agriculture-related methane emissions are also linked to manure management and rice-growing practices. In the energy sector, most methane emissions occur during the extraction, production, and transport of oil and gas. Within the waste sector, the drivers are total consumption (highly correlated with total population) and waste and water management practices. Interventions should focus on cost effective measures to reduce emissions across all these fronts.

**Governments and private sector actors all need to take action to address the various sources of emissions.** Government stakeholders at both national and subnational levels should be involved in creating the proper regulatory and policy incentives targeting emitters. Governments may also be operators of solid waste or wastewater treatment facilities responsible for methane emissions, which may need to be rehabilitated. In the case of the energy sector, most methane emissions arise from a minority of sources ('super-emitters'), many of which are national oil companies in developing countries. In the agriculture sector, key operating decisions will be needed by many thousands of individual farmers, requiring a collective effort.

During COP26, 104 countries committed to the Global Methane Pledge to collectively reduce methane emissions by at least 30% by 2030 (relative to 2020). **Delivering on the methane pledge requires both political will to target emissions in each sector through policy, regulatory, and technical changes, and the financial resources to implement these changes in each country.** In 2022, spending on methane abatement constituted less than 2% of global climate investment, or just over \$11 billion.<sup>V</sup> This figure would need to increase ten-fold to meaningfully reduce methane emissions.

## How is the World Bank Group Contributing to Solutions?

**The World Bank Group (WBG) has a long track record of supporting climate actions that reduce methane emissions across the sectors with the largest footprint, including agriculture and food; energy; and sanitation and waste.** Solutions implemented span across all stages of interventions, including:

- *Data and oversight:* monitoring and detection systems;
- *Technical solutions:* leak, flaring and venting reductions, capping of unused wells, and upgrading anaerobic wastewater treatment to include biogas capture;
- *Policy changes:* burning bans, mandatory diversion of organic waste from landfills, capping/venting requirements; and
- *Operational changes:* changes in cattle feed and farming/irrigation practices.

### Agriculture and food

Paddy rice cultivation accounts for roughly 8% of anthropogenic methane emissions. Enabling farmers to use water more efficiently when cultivating rice in paddies is key to reducing methane emissions. The World Bank provided \$250 million in financing to Indonesia to rehabilitate and modernize irrigation infrastructure and improve soil carbon pools, improving the efficiency of on-farm water delivery to rice farms and reducing methane releases.

**Fast mitigation actions, especially methane reduction, are also increasingly a focus of the WBG's new core diagnostics tool, Country Climate and Development Reports (CCDR).** The CCDR for Vietnam, for instance, found that more than a third of the country's emissions come from non-CO2 gases, most notably methane. The report points out that pursuing the alternating wetting and drying approach, rather than simply flooding rice fields, can virtually eliminate methane production from those fields. Cost effective measures such as this one can reduce emissions, decrease production cost, and provide higher income for farmers – a triple win.

## Energy

**The WBG's Global Gas Flaring Reduction Partnership's (GGFR) "Zero Routine Flaring by 2030" Initiative (ZRF)** commits governments and oil companies to not flare or vent associated gas in any new oil field developments, and to end routine flaring and venting at existing oil production sites no later than 2030. 17 endorsing governments and 16 oil companies (which collectively account for approximately 60 percent of total global gas flaring) committed to annually report their flaring and progress towards the Initiative. While the Initiative is voluntary, commitments are monitored through a variety of means, including government and company reports and satellite observations.

**The World Bank Group also provides financing to operationalize the interventions to reduce methane emissions in the energy space.** For example, IFC, the private arm of the WBG, arranged a \$360 million financing to reduce gas flaring in Basrah, supporting one of the largest gas flaring reduction projects in the world. The project will help improve energy access, prevent associated greenhouse gas (GHG) emissions, and support a more resilient, sustainable energy sector in Iraq. The project also will help build local capacity for replication of such interventions.

## Sanitation and waste

**Wastewater treatment is an important component of reducing methane emissions and also provides opportunities to use the biogas to generate electricity.** In Ecuador, the World Bank provided technical and financial support to enable sustainable wastewater management in Guayaquil by improving and completing two full sanitation service chains, i.e., the installation of more than 35,000 new intra-household sanitary connections, improvements in the sewage networks, and the construction of two wastewater treatment plants. These plants incorporate cogeneration facilities to transform biogas (including methane) derived from sewage sludge digestion into electricity, with the potential to generate up to 35-40% of the onsite power requirements to run the plants.

**There are also private sector opportunities in the waste-to energy space that can have significant impact.** In Belgrade, IFC provided a financing package of €163 million and MIGA provided a €97 million guarantee to facilitate private sector investments in a new waste-to-energy project. The project replaces an old and poorly designed landfill that has reached capacity. The new facility will sit alongside the old site, using methane from the landfill to power a 3 MW gas-to-energy project that will ultimately prevent the release of more than 12,000 tons of methane per year (the equivalent of 11 million tons of CO<sub>2</sub> equivalent over a 30-year period).

## Blended finance and results-based finance

**The World Bank partners with financial institutions to improve blended finance available for projects that reduce methane emissions.** The World Bank's Carbon Partnership Facility partnered with the Caixa Econômica Federal (CAIXA), the second largest public bank in Brazil, to blend multiple sources of financing and offer loans to companies that manage and operate landfills. To qualify for funding, landfill operators had to agree to fulfill the rigorous requirements of the United Nations Framework Convention on Climate Change's Clean Development Mechanism and reduce their greenhouse gas emissions by a specific amount each year.

**The World Bank also channels funds through results-based finance to catalyze private sector projects that reduce methane emissions.** From 2015-2021, the Pilot Auction Facility for Methane and Climate Change Mitigation (PAF), a de-risking instrument, tested an innovative model for delivering climate finance to incentivize private sector action to reduce methane emissions. The PAF targeted emissions reductions from landfills, animal waste, and wastewater treatment facilities, holding four auctions in which companies competed to indicate how many emission reductions they could achieve in the future at a given price. Competitive auctions maximized the impact of public climate finance, resulted in price discovery of the incremental cost needed by the private sector to reduce methane emissions, and allowed the private sector to identify the lowest-cost opportunities for reducing emissions.

## What Will Success Look Like?

**The WBG is committed to deepening its engagement on methane and other short-lived climate pollutants for a fast mitigation sprint.** The WBG will raise awareness with clients using sound analytics and data-based evidence, including by giving methane and fast mitigation opportunities prominence in CCDRs. The WBG also stands ready to support clients in the preparation of sector roadmaps for each key source of methane emissions to focus on both public and private sector responses and impactful projects that can yield fast results at scale.

**The World Bank is working to expand the Global Gas Flaring Reduction Partnership into the Global Flaring and Methane Reduction Partnership, with a broader scope on reducing methane emissions from the oil and gas sector.** A key strategy will be to support oil-producing developing countries to build the knowledge and capacity to detect and quantify methane emissions from extraction and production through enhanced monitoring, which would result in leak detection and repair programs alongside flaring and venting reduction initiatives.

**The WBG will also play a leadership role in working with other development finance institutions, multilateral development banks and private firms** with a financial or operating interest in methane emissions to encourage others to take similar action. There are many opportunities to collaborate, including on projects that reduce methane emissions or new financing instruments that can channel more funds into this effort, including through voluntary carbon markets.

Finally, **the WBG will be a global knowledge broker on methane** to share lessons on opportunities for action and best practice solutions.

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<sup>ii</sup> <https://public.wmo.int/en/greenhouse-gas-bulletin#:~:text=WMO's%20Greenhouse%20Gas%20Bulletin%20reported,biological%20and%20human%2Dinduced%20processes>

<sup>iii</sup> UNEP/CCAC (2021) Global Methane Assessment. p 28

<sup>iii</sup> McKinsey Sustainability (2021) Curbing methane emissions. How five industries can counter a major climate threat.

<sup>iv</sup> Saunio et al (2020) The Global Methane Budget 2000-2017, Earth Systems Science Data, 12, p 1561-1623, as represented in UNEP/CCAC p 33.

<sup>v</sup> <https://www.climatepolicyinitiative.org/publication/the-landscape-of-methane-abatement-finance/>



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