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Waste Methane Framework

The Methane Framework Series

Methane is a powerful planet-heating gas that demands swift action. It is 80 times more potent than carbon dioxide over a 20-year period. Human-caused methane emissions contribute up to 0.5 degrees Celsius (0.9 degrees Fahrenheit) to current warming.

Methane also presents a major climate opportunity: Because this gas decays quickly in the atmosphere, actions taken to lower methane emissions today can dramatically reduce the rate of planetary warming. Moreover, a large share of methane emissions are essentially wasted energy that can be captured or redirected for profit. Recognizing this opportunity, more than 110 countries have endorsed the Global Methane Pledge, which aims to cut worldwide methane emissions by at least 30 percent by 2030, compared to 2020 levels.

The Methane Framework series serves as a guide for local, provincial, and regional governments to commit to methane emission reduction, rapidly scale up jurisdictionally appropriate action, and join a coalition with other leading governments across each of the three largest sources of human methane emissions. These include agriculture (e.g. cattle and rice production), energy (e.g. natural gas, coal, and oil), and waste (e.g. landfills and wastewater).

Introduction

The Waste Methane Framework introduces governments of all levels to techniques for tracking, managing, and reducing methane emissions from solid waste and wastewater systems. The waste sector is the third-largest source of anthropogenic methane, accounting for about 20 percent of the total, thereby presenting a major opportunity to slow the pace of near-term global warming. Waste methane releases result from the decay of organic materials in oxygen-free (anaerobic) conditions, including in landfills, wastewater facilities, septic systems, and latrines. Waste sector methane reduction techniques can control emissions, and, in some cases, redirect this energy for productive uses, including products and fuel. About 60 percent of waste methane solutions have negative or no cost.

Because landfills and wastewater systems tend to be managed at the subnational level, waste sector methane presents an opportunity for cities, municipalities, states, and provinces to lead. While research in this domain is ongoing, there are many well-established waste methane strategies that can be deployed today with great effect. This framework first presents six governance components: (1) locating waste sector emissions sources; (2) calculating waste emissions; (3) setting a waste emissions reduction

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target; (4) introducing incentives and/or regulations; (5) implementing monitoring, reporting, and verification methods; and (6) sharing information, technology, and policy best practices.

Governments that endorse this framework commit to implementing these actions, as appropriate to their jurisdiction, in order to quickly address waste methane emissions. Strategies will vary by jurisdiction based on the nature of waste operations and the scope of government authority. Efforts should be adjusted as techniques and institutions evolve. This framework is intended to orient policymakers and is not exhaustive.

Identify methane-emitting waste facilities *to compile an active, jurisdiction-wide database.*

To the extent possible, identify and create an inventory of all solid waste and wastewater facilities that could realistically be subject to methane initiatives in the jurisdiction. These inventories should be updated regularly to reflect changes in operations. Where possible, this data should be made publicly available in an easily accessible and analyzable form.

Inventory total methane emissions from waste sources *and develop an emissions baseline.*

Track and inventory methane emissions from all operations in the source inventory and determine a baseline for emissions reduction, including emissions data for major operations and the jurisdiction overall. The emissions inventory may incorporate aerial observations (e.g. from satellites and airplanes), ground-based observations (e.g. from short-range drones and handheld devices), and statistical estimates (e.g. from waste volume). The inventory should be updated regularly to detect emissions changes. Note that many waste operations have cyclical emissions based on weather patterns and waste stream variability. Where possible, regulators should make emissions baselines publicly available in an intuitive format.

Free modeling tools for landfill emissions include WARM (for municipalities) and SWEET (for state and regional governments). Landfill-oriented financial tools include a financing handbook for developing jurisdictions and the Energy Benefits Calculator, which helps determine the total avoided greenhouse gas reductions from energy projects. Operators considering landfill gas projects may also consult LFGcost, which helps landfill operators determine the cost of gas capture projects, and the Landfill Gas Screening Tool, which assesses the feasibility of such projects.

Set a jurisdiction-wide emissions reduction target *and design strategies to achieve it.*

Establish a waste methane reduction target based on the scale of waste operations, current emissions levels, and broader climate change mitigation goals. The waste methane target should be ambitious and feasible. It may be structured as a total, mass-based emission reduction or as a percentage reduction

compared to a baseline. It is important to establish frequent benchmarks to evaluate progress. Targets and policies should be adjusted regularly to maintain ambition.

Implement regulations, performance standards, or incentives *for individual facilities and operations, applicable as necessary in the jurisdiction.*

Establish requirements or incentives for operators to achieve the emission reductions established for the jurisdiction. Governments may deploy a combination of regulations, direct incentives, trading schemes, capital projects, and programming both upstream (e.g., composting and source separation) and downstream (e.g., landfill gas capture). Regulations or performance standards require the reduction of waste emissions, where appropriate, in accordance with regulatory authority and capacity. Direct incentives promote methane reduction through payments, tax deductions, or technical assistance. Trading schemes, meanwhile, can provide a credit market that rewards operators or businesses for reducing waste methane, either independently or in concert with other incentive or regulatory schemes. Capital projects improve or add to existing physical infrastructure, enhancing the separation or processing of waste. Finally, programming can be used to alter behaviors by operators and the public in order to reduce emissions. All policies should account for the impacts of methane emission reduction actions, both positive and negative, on nearby communities.

Conduct monitoring, reporting, and verification *of emissions and emissions reductions.*

Implement monitoring, reporting, and verification (MRV) best practices to verify facility- and jurisdiction-scale emission reductions pursuant to the target and selected regulatory or incentive strategies. MRV can include satellite-based imaging; measurement at individual facilities where available; ground-level observations; operator documentation and compliance reporting; and inspection and enforcement where appropriate.

Participate in information and technology sharing forum.

Framework endorsers participate in a forum to share policy best practices, technological developments, and regulatory analyses. The forum can provide research updates, model provisions for legislators and regulators, and regular contact between industry, regulatory, research, and NGO leaders.