

New report recommends a nationwide effort to better estimate methane emissions

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The U.S. should take bold steps to improve measurement, monitoring, and inventories of methane emissions caused by human activities, says a new [report](#) from the National Academies of Sciences, Engineering, and Medicine. Better data on methane—a greenhouse gas that contributes to air pollution and threatens public and worker safety—would help inform decisions related to climate, economics, and human health.

"Methane is getting more attention because it is a potent, short-lived [greenhouse gas](#) that is increasing," said James W.C. White, professor of geological sciences at the University of Colorado, Boulder, and chair of the committee that conducted the study and wrote the report. "There have been recent advances in our abilities to measure and monitor methane from its many [sources](#), and now we need to strengthen and interlink these different approaches."

Anthropogenic sources of methane emissions span various sectors of the economy such as energy, agriculture, and waste disposal. There are a variety of reasons, beyond climate change, to measure, monitor, and track methane emissions. For example, monitoring of methane emissions is important to protecting the health and safety of workers in industries such as coal mining, and recovery of methane can have an economic benefit as a source of energy.

In general, there are two approaches to estimate these emissions. The top-down approach estimates emissions using observations of atmospheric methane concentrations and models that simulate their transport from

the source to the observation location. The bottom-up approach measures emissions at the scale of individual methane emitters, such as natural gas wells or cattle farms, and uses those results to extrapolate emissions at regional and national scales.

In some cases, the estimates produced by these two methods differ significantly, potentially revealing missing [emission](#) sources, for example, or problems with the atmospheric sampling. To address such discrepancies, the report recommends a national research effort to strengthen the two methods to improve accuracy, better attribute emissions to specific sectors and processes, and detect trends.

Currently, the Greenhouse Gases Inventory (GHGI) serves as the main source of information for emissions in the U.S., with emissions reported at national, annual scales. As a complement to the GHGI, the report says the U.S. should establish and maintain a gridded inventory that presents data at finer spatial (i.e. size and distance) and temporal (i.e. time) scales. Such an inventory, with values for major sources of emissions within the grid of a location, is necessary for scientists to make detailed comparisons between the top-down and bottom-up estimates of [methane](#) emissions, and would address the needs of state and local policymakers who require more detailed information than currently available.

Numerous inventories that track [methane emissions](#) over time and link them to their specific source have been developed to address specific needs. The GHGI trends in the data help policymakers assess the effectiveness of national-scale policy initiatives. State-level inventories are more detailed than the GHGI, allowing for tailoring of state policy. Individual facilities or companies use inventories for corporate sustainability reporting and to make informed investment and risk decisions.

As the science evolves and methodologies to estimate emissions become

outdated, the report stresses it is important to keep practices consistent with the best scientific understanding and current engineering practice. An advisory group should be established to guide how new science can be incorporated into improving the GHGI. The group could be facilitated by U.S. Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA) and should include experts from academia, industry, policymaking, other federal agencies, and nongovernmental organizations. Any changes to the GHGI resulting from these activities should be clearly communicated to the public, the committee said.

Provided by National Academies of Sciences, Engineering, and Medicine

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