American Gas Association

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U.S. Environmental Protection Agency.
EPA Docket Center
Mailcode 28221T
1200 Pennsylvania Ave., N.W.
Washington, D.C. 20460

RE: AGA's Comments on EPA's Request for Information about Funding to Address Air Pollution (Fenceline Monitoring, Air Pollution & Methane Monitoring/Research) under the Inflation Reduction Act §60105

The American Gas Association ("AGA") appreciates the opportunity to comment on the U.S. Environmental Protection Agency's (EPA) Request for Information (RFI) in this Docket regarding funding to address air pollution under section 60105 of the Inflation Reduction Act.

These air emissions monitoring programs are several initiatives created by the recent Inflation Reduction Act (IRA)[1] to make significant progress toward the important goal of reducing GHG emissions to net zero by 2050 as well as to reduce climate and air emissions impacts on low income and underserved communities. AGA will focus these comments on EPA's questions regarding methane monitoring under IRA section 60105(e), which appropriated $20 million to EPA for grants and other activities authorized under Clean Air Act section 103 paragraphs (a) through (c) (for research grants, investigation, training) and section 105 (grants to air pollution control agencies). In particular, we will focus on the opportunities to advance the reconciliation of top-down and bottom-up methane measurements through grants to support peer-reviewed academic research studies following the methodology recommended by the National Academy of Sciences (NAS) and used in the Fayetteville Basin Methane Reconciliation Study as discussed below.

AGA, founded in 1918, represents more than 200 local energy companies that deliver clean natural gas throughout the United States. There are more than 77 million residential, commercial, and industrial natural gas customers in the U.S., of which 95 percent — more than 73 million customers — receive their gas from AGA members. AGA is an advocate for natural gas utility companies and their customers and provides a broad range of programs and services for member natural gas pipelines, marketers, gatherers, international natural gas companies, and industry associates. Today, natural gas meets more than one third of the United States' energy needs.[2]

[1] Public Law 117-169, 136 Stat. 1818 (August 16, 2022).
[2] For more information, please visit www.aga.org.

AGA's Response to EPA's RFI Question 4 on Methane Monitoring & Reconciling Top Down and Bottom Up Estimates

EPA asks in RFI question 4 why methane "bottom-up sensor estimates differ so much from broader scale (e.g., satellite) estimates" and whether funding under IRA section 60105(e) can "help address this fundamental mismatch." AGA does not believe, based on the peer-reviewed study discussed below, that there is a "fundamental mismatch."

AGA recommends that EPA review the landmark, peer-reviewed Fayetteville Basin Methane Reconciliation Study[3] which found that the difference between the top-down and bottom-up methane measurements could be largely explained by the different time and spatial scale of the measurements. The study generated eight peer-reviewed scientific journal articles, culminating in the capstone paper: "*Temporal Variability largely Explains Difference in Top-down and Bottom-up Estimates of Methane Emissions from a Natural Gas Production Region*" published in the Proceedings of the National Academy of Sciences (PNAS) on October 29, 2018,[4] showed how the study successfully provided the first temporally- and spatially-aligned top-down and bottom-up methane emission estimates for a shale gas production basin in the United States. The study reconciled top-down aircraft measurements with facility and equipment level bottom-up measurements on basin, site, and component scales – by aligning them in the same time frame and place.

The Fayetteville Basin Reconciliation Study's key findings, insights and implications for industry practice and future studies of the Fayetteville Basin Reconciliation Study are described in layman's terms in a short Summary Paper provided on the study website.[5] The key findings were as follows:

> *1) While both top-down and bottom-up measurements are equally valid approaches to estimate methane emissions on a regional scale, this study illustrates that the measurements must be carefully aligned in both time and space to be compared. This alignment requires adjustments to measurement protocols – namely requiring near-simultaneous measurements at all scales – and also requires access to highly-resolved operational data on the timing and location of emissions during the study period. As such, this study showed excellent agreement between these two approaches to methane emission quantification, without requiring guesswork or statistical assumptions that have been used to close the gap in prior research.*

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[3] See Colorado State University Energy Institute website for links to the summary paper and a series of methodology papers as well as an explanatory video, Fayetteville Study: Basin Reconciliation - Energy Institute (colostate.edu), https://energy.colostat.edu/metec/fayetteville-study-basin-reconcilitation/

[4] Vaughn, TL, Bell, CS, Pickering, CK, Schwietzke, S, Heath, GA, Pétron, G, Zimmerle, DJ, Schnell, RC, Nummedal, D (2018) Temporal variability largely explains top-down/bottom-up difference in methane emission estimates from a natural gas production region. Proc Natl Acad Sci USA 115: 11712-1717. Temporal variability largely explains top-down/bottom-up difference in methane emission estimates from a natural gas production region | PNAS, https://www.pnas.org/doi/10.1073/pnas.1805687115.

[5] See BasinMethaneOverview.pdf (colostate.edu), https://energy.colostate.edu/wp-content/uploads/sites/28/2021/03/BasinMethaneOverview.pdf

2) The key source that explained the difference between top-down and bottom-up estimates in the Fayetteville play are manual well-clearing activities (called "liquids unloading" by industry, where "manual" refers to operator initiation and supervision). Emissions from these sources systematically occur during daytime operator shifts, which is also when meteorological conditions are ideal for basin-scale aircraft methane emission measurements. Bottom-up inventories that follow the standard practices of representing averages of daily, monthly or annual periods do not capture the diurnal coincidence of aircraft top-down measurements during peak emission periods. Collecting information about where and when liquids unloadings occurred during the study was critical to ensuring accurate bottoms-up emissions modeling and for proper temporal and spatial alignment for comparison with the top-down aircraft measurements.

3) The study for the first time deployed multiple measurement methods in a systematically designed method intercomparison framework to provide guidance on the accuracy and use cases for each. The study found systematic trends for three methods designed to quantify site-level methane emissions: two ground-level, downwind methods, one of which required site access to release a tracer gas at a known release rate which is measured along with methane downwind of the site ("tracer") and another only measuring methane downwind of the site ("OTM33A"); the third site-level method sums emissions measured at the equipment and activities existing within a site ("onsite").

a. At production sites (well pads), on average, the downwind OTM33A method estimates lower (and is less accurate) than onsite estimates while the tracer method estimates higher than both. Based on the tests performed in this study, OTM33A can be best deployed to discern "large" and "small" emissions. The study also found a similar systematic estimation trend for compression stations (in the gathering segment of the natural gas value chain) where tracer method estimates slightly lower than onsite estimates.

b. While these first-of-kind, site-level comparisons provide high confidence that both onsite and downwind methods can do an adequate job of capturing total site emissions, the methods have different use cases and more method intercomparison is needed to discern when each can be most accurately deployed, considering the desired level of accuracy required of the measurement.

4) When focused on science, strong safeguards for integrity coupled with robust and regular knowledge sharing between researchers, industry and government can lead to unprecedented advances in understanding of the role of industrial practices in GHG emissions. This in turn provides industry opportunity to improve profitability and sustainability from reducing the loss of natural gas through controllable emissions.

5) Operator direct participation in field studies, including providing physical access to sites as well as sharing data on location, count, timing, duration and strength of emissions sources is critical to the development of high-resolution spatio-temporal inventories of methane emissions. We were able to achieve kilometer-scale, hourly-resolution inventories based on contemporaneous measurements, yet note that an even higher temporal resolution could further improve top-down and bottom-up alignment (e.g., to better understand sources whose emission rate can vary significantly within an hour).

Nevertheless, the resolution achieved in this study improved the identification of specific large emission sources

A National Academies of Science (NAS) consensus report in 2018 recommended using the methodology used in the Fayetteville Basin Reconciliation Study for other studies seeking to reconcile top-down and bottom-up methane measurements.[6] Specifically, the NAS report recommended working with operators to obtain site access for bottom-up facility and equipment measurements and to align those measurements in time and space with top-down measurements.

In sum, AGA does not believe there is a "fundamental mismatch." Instead, the scientific literature shows the path toward reconciling the two styles of measurement. AGA urges EPA to deploy some of its funding under section 60105(e) and Clean Air Act section 103(a) to provide grants to support peer-reviewed academic research studies in other U.S. basins using a methodology similar to that in the Fayetteville Basin Reconciliation Study. This would help further refine measurement methods and provide a more accurate methane estimate for other more complex basins.

AGA appreciates the opportunity to comment. If you have any questions, please do not hesitate to contact me or Tim Parr, Deputy General Counsel, tparr@aga.org.

Respectfully Submitted,

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[6] National Academies of Sciences, Engineering & Medicine, *Anthropogenic Methane Emissions in the United States: Improving Measurement, Monitoring, Reporting, and Development of Inventories* (April 2018), p. 138, available at Anthropogenic Methane Emissions in the United States Improving Measurement Monitoring Reporting and Development of Inventories | National Academies, https://nationalacademies.org/our-work/antrhopogenic-methane-emissions-in-the-united-states-improving-measurement-monitoring-reporting-and-development-of-inventories.