Economic Opportunities in Reducing Methane Emissions from the US Oil and Gas Sector

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Methane Spotlight Hearing

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Ranking Member Whitehouse and Members of the Committee,

Good morning and thank you for the opportunity to speak with you today.

My name is Arvind Ravikumar, and I serve as the Frank W. Jessen Centennial Fellow in Petroleum Engineering and the Co-Director of the Center for Energy and Environmental Systems Analysis at the University of Texas at Austin. My testimony reflects my personal views, based on over a decade of research on methane emissions from the oil and gas industry – a key issue in the preservation of U.S. leadership, competitiveness, and energy dominance in global markets. In fact, as we speak, my team is leading a major methane measurement campaign just a few hours from here in the Appalachian Basin. We're collecting data not just from oil and gas facilities, but also from coal mines and landfills.

My team collaborates closely with industry partners, federal and state agencies, and non-profit organizations to ground our research in real-world operations and inform practical, science-based solutions. Our goal is to provide credible, independent data that helps policymakers, regulators, and industry make better decisions and preserve the value of US oil and natural gas.

I want to open today's discussion with three key points.

1. Methane emissions have been historically underestimated in official inventories – research has shown that measured methane emissions are higher than inventories by about 60%. However, recent research and technology development is helping close this gap.

2. Methane emissions reductions are achievable – indeed, methane emissions from the oil and gas sector have reduced by 23% since 2005, supported by regulations, new technologies, and a growing domestic methane tech industry, creating jobs and export value.

3. Verifiable methane measurement and mitigation is becoming a differentiator on the global energy market – continued US leadership on methane is key to US dominance in the sector.

State of Methane Emissions

Methane accounted for 11% of U.S. greenhouse gas emissions in 2023. Of this, the oil and gas sector constitute 29%, with significant near-term mitigation potential. The past decade of field

campaigns has made clear that a small number of sources, often referred to as "super-emitters," account for over 50% of oil and gas sector emissions. The dominance of "super-emitter" events is a key characteristic in other sectors. For example, in a recent study that I led across the Appalachian Basin in Pennsylvania, Ohio, and West Virginia, we found that just 5 coal mines contributed to nearly 80% of all methane emissions from coal mines in the region. Similarly, just 10% of all landfills we measured contributed nearly half of all methane emissions from landfills.

Technology to monitor and mitigate methane emissions has advanced significantly over the past decade, thanks in large part to forward-looking investments by the Department of Energy, including significant activity under the first Trump Administration. These programs supported the development of advanced sensors, aerial and satellite leak detection, and continuous monitoring systems that are now routinely deployed across major oil and gas basins in the U.S. to find and fix super-emitters. They have also enabled the industry to pinpoint the underlying causes, reduce emissions more effectively, and produce far more precise, measurement-informed emissions profiles across the natural gas supply chain. EPA used this valuable data to revise its greenhouse gas reporting requirements for oil and gas facilities. These updated requirements would ensure that reported emissions more accurately reflect actual emissions on the ground and would build on existing efforts to drive down methane emissions. This positions the U.S. to credibly characterize the emissions intensity of its globally traded commodities, such as LNG, and maintain a competitive edge in an increasingly carbon-conscious global energy market.

Success in Methane Mitigation

Advancements in technology and improved emissions reporting have already driven measurable success in U.S. methane reduction. Since 2005, methane emissions from the oil and gas sector have declined by 23% even as oil and gas production more than doubled – a result of targeted regulations, increased pipeline takeaway capacity in the Permian Basin that has sharply reduced flaring, significant cost reductions in methane monitoring technologies, and growing industry participation in voluntary initiatives. These actions have also led to declines in co-emitted pollutants, contributing to improved air quality in energy-producing communities.

The U.S. has emerged as the global leader in methane mitigation innovation, with over 80% of new methane-focused small businesses founded in the past decade based here. The United States boasts 268 companies – nearly 150 of which are manufacturing firms – focused exclusively on methane monitoring or mitigation. These businesses are generating high-paying, skilled jobs in key oil and gas states, with Texas at the forefront. This sector has seen double-digit growth in the last five years and is well-positioned to scale further by exporting American-made technologies and services abroad.

Of course, there's still room to drive additional reductions. Some operators have adopted advanced methane technologies and practices far more quickly than others, resulting in large variability in performance. Some of the lowest methane intensity gas in the world is produced right here in the Appalachian basin – but the U.S. produces some of the world's highest methane

intensity gas as well. That variability presents a powerful opportunity to reward and scale best-in-class performance, including through regulation, and market-based mechanisms, to ensure the U.S. gas sector continues to lead on both economic and environmental fronts.

What Comes Next?

Looking ahead, as demand for U.S. natural gas continues to rise, credible methane data is becoming a key differentiator in the global market. Buyers are increasingly factoring emissions intensity into procurement decisions, with the European Union requiring verifiable methane data and moving toward an emissions intensity standard for imported fuels. For U.S. gas to remain competitive, we must be able to demonstrate that our emissions intensity is among the lowest in the world. To achieve this efficiently, large-scale, regional monitoring programs – like those being developed under the Department of Energy's Methane Emissions Reduction Program – and supportive, predictable policy and regulation will be essential. These programs especially help small and medium sized operators by creating cost-effective pathways to participate in transparent, verifiable emissions reporting.

This also presents a major strategic opportunity: U.S. technology companies are already leading the world in methane detection and quantification, and global markets increasingly need the tools we've developed. By helping other countries improve their measurement-informed emissions profiles, we can support global climate efforts while expanding export markets for U.S. technology and services. But to maintain this leadership, we must hold all producers – domestic and international – to the same high standards we demand of ourselves. Disengaging from global methane initiatives and introducing domestic regulatory uncertainty risks ceding influence to others with less experience and less rigorous approaches, potentially disadvantaging U.S. firms.

Closing

In closing, the U.S. has a real opportunity to lead in setting the global benchmark for responsible methane management. Thanks to a decade of innovation, smart public investments, and growing private-sector engagement, we are already seeing measurable progress.

To go further, we must keep investing in technologies that provide accurate, actionable emissions data and build policy and market frameworks that reward low-emitting operators. By doing so, we're not just cutting waste and pollution – we are strengthening U.S. energy leadership and opening new markets for American technology. Methane mitigation isn't a regulatory burden; it's a strategic advantage that can deliver benefits across industry, consumers, and communities.

Thank you again for the opportunity to speak with you today. I look forward to your questions.