Unprecedented data collection effort to better understand the climate impacts of natural gas

AUSTIN, Texas, Sept. 16, 2013 /PRNewswire-USNewswire/ -- The first of sixteen methane emissions studies in a comprehensive research initiative organized by Environmental Defense Fund (EDF), and involving more than 90 partners – universities, scientists, research facilities, and oil and gas companies – is now available. The paper, "Measurements of methane emissions at natural gas production sites in the United States," was published today in the *Proceedings of the National Academy of Sciences* (PNAS). Led by Dr. David Allen at The University of Texas at Austin (UT), the study took direct measurements of methane emissions associated with unconventional natural gas production — specifically, shale gas wells that use hydraulic fracturing.

The UT study, which only deals with the extraction phase of the natural gas supply chain, is the opening chapter in this broader scientific effort designed to advance the current understanding of the climate implications of methane emissions resulting from the U.S. natural gas boom. Methane, the primary component of natural gas, is a powerful greenhouse gas – 72 times more potent than carbon dioxide over a 20-year time frame. The nation's largest single source of methane emissions is the vast network of infrastructure, including wells, pipelines and storage facilities, that supplies U.S. natural gas. Experts agree that methane leaked or vented from

natural gas operations is a real concern, yet estimated emission rates vary greatly – from 1 to 8 percent of total production.

"We know that immediate methane reductions are critical to slow climate change," said Fred Krupp
,
president of EDF. "But we don't yet have a handle on how much is being emitted. We need better data, and that's what this series of studies will deliver. As we understand the scope of what's happening across the natural gas system, we will be able to address it. We already know enough to get started reducing emissions, and thanks to the first study, we know that new EPA regulations to reduce wellhead emissions are effective. EPA got it right."

Launched last year, the overall research effort is designed to collect methane emissions data associated with natural gas production, gathering lines and processing facilities, long-distance pipelines and storage, local distribution, and commercial trucks and refueling stations. A variety of scientific methods are being used across the various studies, including approaches that measure emissions directly at the source and those that use airplanes or towers equipped with sensors to measure total emissions in a given area. In some cases, these methods are paired to provide greater insight and certainty. EDF anticipates all of the projects will be submitted for publication in peer-reviewed journals.

"The scientific talent leading these studies, the partnership with industry and access to their facilities, and the diverse research methods used, gives us the confidence that when the project concludes in late 2014, we'll be able to greatly increase our understanding of the climate impacts of switching to natural gas from other fossil fuels, through this unprecedented collective research effort," said EDF Chief Scientist Steve Hamburg.

UT's peer-reviewed study, the first work published in this overall series, reports data from emission sources from natural gas production – the first part of the supply chain. Study results show that total emissions are in line with EPA estimates from the production of natural gas, yet the distribution of those emissions among activities differ. Methane emissions are lower than estimated by EPA for well completions and higher for valves and equipment used to control routine operations at the well site. All of the data generated in this study are available for public scrutiny.

According to Hamburg, UT's low well emissions finding indicates an early phase-in of EPA's New Source Performance Standards (NSPS), which requires all new fractured natural gas wells

to either burn-off or use "green completions" (an emissions control method that routes excess gas to sales), is working. Results also suggest that these new regulations, which will be fully implemented in 2015, are having the desired effects. No national survey of how many operators currently use green completions is available, but the data suggest that once this practice is required, emissions from this phase of the production process will decline.

Hamburg also noted that the higher-than-estimated emissions from valve controllers (also known as pneumatics) and equipment leaks show important opportunities for reducing methane emissions in the future. Considerable opportunities exist under the Clean Air Act to strengthen NSPS, including requiring emissions controls for equipment routinely found at oil and natural gas production sites, such as valves or connectors at the well pad or pressure relief valves on storage tanks, and controls for nearly half a million existing pneumatics at natural gas wells and for the thousands of existing compressors that move gas from the well through the system to the end user. Similarly the NSPS do not contain requirements to reduce well completion emissions from hybrid wells that produce both oil and natural gas, which are becoming much more common as the price of oil remains high. Robust leak detection and repair requirements are also necessary to assure the equipment in the field is operated and maintained properly at all times. Many of the same cost-effective clean air measures that the NSPS deploys can be used to reduce emissions from these potentially significant sources. Additional emissions reduction opportunities should be considered as further data unfolds around liquids unloading.

Full details on the UT study findings, access to the dataset and an overview of the second phase of data collection, already underway, is provided on UT's methane website .

A key element of UT's study, and the other EDF-industry collaborative studies, is the focus on ensuring their scientific integrity. Built into the research process of each of these studies is a Scientific Advisory Panel, experts from academic and other institutions serve as external advisors and review the procedures, results and conclusions. An additional independent review is conducted by the scientific journal to which the study is submitted for publication — in this case, *PNAS* — a key step in all studies within this methane research series.

Findings from this effort will help inform policymakers, researchers and industry, providing new insights and data about the sources of methane emissions and illuminating ways to reduce those emissions. The full set of studies is expected to be published by the end of 2014.

Funding Disclosure:

The University of Texas at Austin is committed to transparency and disclosure of all potential conflicts of interest of its researchers. Lead researcher David Allen serves as chair of the Environmental Protection Agency's Science Advisory Board, and in this role is a paid Special Governmental Employee. He is also a journal editor for the American Chemical Society and has served as a consultant for multiple companies, including Eastern Research Group and ExxonMobil. He has worked on other research projects funded by a variety of governmental, nonprofit and private sector sources including the National Science Foundation, the Environmental Protection Agency, the Texas Commission on Environmental Quality, the American Petroleum Institute and an air monitoring and surveillance project that was ordered by the U.S. District Court for the Southern District of Texas .

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