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Assessing Emissions from the Natural Gas Distribution System Using Mobile Methane Techniques

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There are over 150,000 miles of underground natural gas pipelines in California, and there are thousands of leaks, large and small, scattered throughout this complex infrastructure. Understanding where these leaks are and how much natural gas is lost to the atmosphere via these leaks is of vital importance to California's efforts to reduce greenhouse gas (GHG) emissions due to methane, a potent greenhouse gas. Given this challenge, techniques that can rapidly detect, attribute, and quantify the emissions from these leaks are crucial to the effort to quantify and mitigate the impact of natural gas methane emissions into the atmosphere. We describe the current state of the art in ground-based, mobile methane measurements, which have a key role to play in this effort. Vehicles equipped with modern optical methane sensing technology, along with GPS and wind field measurements, can be used to rapidly detect and localize the emissions from even small natural gas leaks. Natural gas leaks can be distinguished from other environmental sources of methane on the basis of ethane or carbon isotope analysis, in real-time or near real-time. It is also now possible and practical to quantify the emissions from individual leaks by a direct measurement of the emissions plume using the mobile flux plane technique, without direct access to the leak or knowledge of its location. In this presentation, these techniques are described, and their potential for quantifying the emissions of methane into the atmosphere from California's natural gas infrastructure is discussed.