Additional background information on methane mapping in the greater Los Angeles area

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Between August 2014 and April 2015, EDF's methane mapping project, in partnership with Google and Colorado State University, surveyed and analyzed data for methane in three distinct areas in the Los Angeles metropolitan area: Pasadena, Inglewood, and Chino. Google Street View cars outfitted with research grade fast response methane detectors drove on city streets collecting data that was subsequently analyzed by scientists from Colorado State University. The following five Q&A's provide additional context for this project.

1. Do the maps listed on www.edf.org provide an accounting of all methane emissions coming from Southern California Gas Company's System today?

No, EDF's methane mapping project provides a snapshot in time of the location and size of methane leaks detected using vehicle-mounted research-grade instruments in several areas within the Southern California Gas Company (SoCalGas) service territory.

The mapping methodology and algorithm developed by Colorado State University and EDF is designed to be conservative in detecting and measuring methane emissions; if two or more passes over an area reveal inconsistent data, methane readings based on that data were not included. As a result, it is likely that methane emissions may be present from the distribution system that the mapping project did not identify.

In addition, since the mapping project shows where methane emissions were located within the study area as of the date the data were collected, the maps do not necessarily represent conditions as they currently exist. Accordingly, remedial actions taken by the utility after a leak was measured within the study would not be reflected in the maps. Further, even though the algorithm was designed to avoid "false positives" (a detection of methane leak where none existed) – it is possible some of the indications of elevated methane concentrations could have stemmed from natural sources of methane within the study area, such as naturally occurring natural gas seeps.

2. How is the data from EDF's methane mapping project different from the Washington State University study released in March 2015?

On March 31, 2015, a study published in the journal *Environmental Science & Technology* by Washington State University (WSU) found that extensive infrastructure upgrades, better methane leak detection and repair, and regulatory changes at both the state and federal levels have resulted in reduced methane emissions from natural gas systems since the early 1990s, when the last such national assessment was undertaken.

The WSU study was based on direct measurements of 400 known methane leaks (approx. 200 from pipelines and 200 from metering and regulating stations), randomly selected by the research team from those reported by 13 different utilities across the United States. Measurements were made using surface enclosures and special samplers to accurately quantify emission rates of methane from the surface manifestation of known leaks. The data were then extrapolated to determine national estimates for local distribution utilities.

The EDF methane mapping project, on the other hand, measures methane concentrations in the air above city streets to identify potential leaks from the natural gas system and determine their relative size. For this project, the study team does not know in advance where methane leaks are located. Rather, observations of elevated methane emissions determine the location and relative size of potential leaks using a computational algorithm developed based on extensive testing. Research results were provided to SoCalGas for additional analysis, though no modification to the identified methane emissions count and location was made prior to display on the map.

3. How does the EDF's methane mapping project fit into the regulatory efforts underway at the California Public Utilities Commission (CPUC) and any data reported by regulated utilities in California?

The EDF methane mapping project is designed to accelerate the development and deployment of emerging technology able to identify where potential leaks are located, and quantify their sizes. Leak detection and quantification can help utilities minimize overall emissions of methane, which is a potent greenhouse gas. In addition quantifying leaks can assist in operating systems safely with minimal environmental impact by providing critical information for prioritizing pipe repair or replacement.

Currently, the CPUC is in the process of developing new rules and determining best industry practices for monitoring and reducing methane emissions in natural gas storage, distribution and transmission systems. As part of a new law passed in 2014, SB 1371, the CPUC is requesting utilities to provide, by May 15, 2015, an inventory of methane emissions including leaks found within their systems since 2009. Utilities must also report what remedial actions were taken to correct or monitor leaks. Once that information is processed and released by the CPUC, it will inform a regulatory discussion of utility practices across California, including in the study area.

Currently, EDF and all regulated California gas utilities are parties to the rulemaking at the CPUC. EDF plans to evaluate the leakage information submitted in that process. EDF also expects the results of the methane mapping project to be considered in the rulemaking.

4. Why might this mapping data may differ from data collected by the utility on methane leaks

In addition to the discussion above, there are several reasons why the EDF methane mapping project data might differ from the data SoCalGas reports about leaks on its system.

- Instrument sensitivity. Methane mapping vehicles used in this study are outfitted with instruments that are much more sensitive than instruments typically used by utilities. Whereas utilities typically use equipment that can detect elevated readings if they are more than ~20 ppm above background, the methane mapping instruments in this study can detect elevated readings when they are as little as 0.2 ppm above background. Thus, this project may more easily detect weaker leak indications than traditional utility equipment.

- Method of Survey. The methane mapping project uses street-based vehicle surveys, while the utility uses a combination of walking and vehicle-based approaches. Depending on the location of the emissions source (e.g., in a front yard vs. beneath the street), one method may find a leak more easily than another.

- Environmental variability. A number of environmental variables can affect the ability of a leak surveyor to observe methane coming from a leak. Changes in soil moisture can affect movement of methane from the ground to the air, or otherwise seal off a methane release for a period of time. Wind conditions and changes in atmospheric pressure may also influence methane plume direction and dispersion. The presence of methane in the air from other distant sources can also obscure the detection of methane from local leaks. In combination, these effects mean that the probability of observing a leak can vary from day to day.

- Leak size: In general, larger leaks emit more methane and are therefore easier to detect than smaller leaks. Large leaks expand the area where methane is above background levels and make it more likely that a surveyor will encounter it.

5. Should members of the public be concerned about their safety, given their proximity to any of the points on the methane maps?

This methane mapping project was intended to identify leaks in the transmission and distribution system within the survey area. Data on verified leaks was shared with SoCalGas soon after it was analyzed. This data was evaluated by SoCalGas as part of its overall leak program – which is based on federal and state safety requirements for identifying, assessing and promptly repairing gas leaks in its pipeline system which pose a safety concern. Accordingly, none of the leaks identified in this study would be allowed to persist if they posed an imminent threat to the public safety.

For more information on cutting methane emissions, or to locate an EDF staff member affiliated with this project, please visit the EDF website at: http://www.edf.org/climate/methanemaps

123 Mission Street
San Francisco, CA 94105
T 415 293 6050
F 415 293 6051
edf.org
New York, NY / Austin, TX / Bentonville, AR / Boston, MA / Boulder, CO / Raleigh, NC
Sacramento, CA / San Francisco, CA / Washington, DC / Beijing, China / La Paz, Mexico