

# Assessment of Fugitive Emissions from the Natural Gas System- Commercial Buildings

*“A first-of-its-kind investigation in California to look at after-meter methane emissions from the commercial foodservice and inpatient healthcare building sectors.”*

## Project Description

This project developed and validated a field method to measure after-meter methane leakage from natural gas-fired appliances and gas piping. Field measurements were taken at 20 commercial foodservice sites and two inpatient healthcare facilities in California. Using data collected from these buildings, the project team performed a variety of statistical analyses to estimate the magnitude of methane emissions.

## Key Findings

- **Most gas piping and equipment operates with low to no emissions.** 98.5% of the piping components measured had no leaks. 54.2% of gas-fired appliances were no or low emitting (99.9% of natural gas was combusted).
- **Small percentage of leakers account for vast majority of emissions.** For example, of the 179 appliances measured, the top 3% of leakers accounted for over 50% of the total amount of emissions. For piping components, the same observation was made, that the highest 3% of leakers accounted for over 50% of the leaks observed.
- **It may be possible to significantly reduce methane emissions by identifying and repairing a relatively small number of problem areas.** As such a small number of appliance and component types were deemed the most serious leakers, it might be possible to develop easy technical or regulatory “fixes” to result in notable cumulative emissions reductions.
- **Field data and analyses indicates fugitive methane emissions to be higher than characterized in current inventories.**
- **A larger field data collection effort is needed.** There were some appliance types that could not be included in the statistical analyses because either none or very few were seen at the 22 field sites. An example would be cooking steamers. A larger field data collection effort

would gather samples from more units and thus be more representative of the broader population.

- **Future field data collection efforts should focus on other commercial building types.** Follow-on work should focus on using these methods in other sectors, such as educational, office, or retail buildings. These efforts would capture different types of appliances and gas piping.
- **Protocols and tools are developed for future work to provide statewide emissions estimate.** Once the methods are applied to and validated in other commercial building sectors, the results can be combined to yield a statewide emissions estimate.



## Benefit for California

- In one of the scenarios proposed of a large urban region, based on the statistical Monte Carlo simulation, the average benefit to restaurant owners would be about \$170 per year of saved gas costs, with notable variation between restaurants depending on their annual gas use and number and types of gas appliances.
- The 2016 California Air Resources Board Greenhouse Gas Inventory estimated methane emissions of 884 and 706 metric tons of CO<sub>2</sub> equivalent from the commercial food services and healthcare sectors. These numbers account only for the methane emitted during combustion. Fugitive leaks post meter are not included. This project began the process of better estimating the impact of these sectors on total statewide emissions.