

WHITE PAPER

Utilities are being challenged to increasingly reduce methane emissions, and to do so in a verifiable way. Part of that challenge is being able to know – at scale – the amount of total leakage in an area or pipe section or of individual leaks even if leak locations are known. Further, traditional, inventory-based emission factors based on historical models are known to be inaccurate, resulting in frequent under-reporting of actual emissions reduced in pipe replacement projects.

Picarro's solution enables emissions data to be taken rapidly at scale. Emissions reductions are easily quantified for individual pipe replacement projects, individual leak repairs as well as across a network. Large emitters, which frequently contribute disproportionately to emissions reduction goals, can be easily identified so they are remediated first as part of an informed and cost-effective emission reduction strategy. Additional benefits of identifying and removing high-emitting leaks include a reduction in odor calls as well as a reduction in risk since these leaks are more likely to migrate than smaller leaks, especially in winter months.

Emissions data from the Picarro system helps utilities in a myriad of ways:

- Emissions quantification data can be used for “methane mapping” to provide “heat maps” of emissions across large areas or along a pipeline sections to aid in repair vs. replace decisions.
- Emissions data measured along a pipeline that is ultimately replaced can be used as a proof point to regulators of exactly how much methane (and how many estimated leaks) were remediated through pipe replacement.
- Emissions measurements help utilities provide irrefutable evidence of achieving emissions reduction targets.
- For large-area emissions quantification, individual leak indications are not produced that would trigger a duty to investigate.
- For identifying high-emitting leaks, only leaks above targeted thresholds are flagged for investigation.

Example: Identification & Repair of High-Emitting Leaks

It has been shown in numerous studies that the bulk of the emissions in any natural gas infrastructure is due to a very small population of high-emitting leaks, often called “super emitters.” By using the Picarro system to measure and quantify the emissions across the gas distribution system, a number of utilities have been able to identify super emitting leaks and target them for accelerated repair, providing emissions and risk reduction benefits.

In 2018, one such utility used Picarro to measure one-third of their infrastructure for compliance leak survey and two-thirds of their infrastructure for a super emitter survey. This emissions quantification at scale allowed the identification and remediation of the highest-emitting leaks and enabled a methane map to be built for the entire infrastructure (useful for forecasting in later leak survey compliance seasons). What constitutes a “super emitter” in a particular infrastructure depends on the distribution of leak emission rates. In this case it was determined that leaks with emissions (flow) rates of >10 cu. ft./hr constituted “super emitters” and these leaks were targeted for repair to satisfy regulated emissions reduction requirements. In one year, 210 super emitters were identified by

Picarro emissions quantification measurements and analytics. These 210 leaks represent 49.7 Million cu.ft./yr of total emissions and account for 32% of the utility's emissions.



Figure 1. Picarro's Emissions Quantification Analytics dashboard used for super emitter leak identification and analysis. The dashboard allows gas operators to quickly look at repair scenarios, calculating aggregate emissions reduction benefits of different types, sizes and locations of leaks.

Example: Monitoring of Upstream Natural Gas Infrastructure for Fugitive Emissions

Utilities and natural gas producers can use the Picarro system to quickly measure whole-facility emissions from gas production, storage and transmission facilities. One Picarro customer has been able to quantify emissions more quickly than via previous methods over entire facilities to show compliance to regulators and land owners. The Picarro system enables remote natural gas facilities (wells, compressor stations, transmission lines, etc.) to be quickly and regularly scanned for leaks and can quantify any continuous or intermittent emissions.

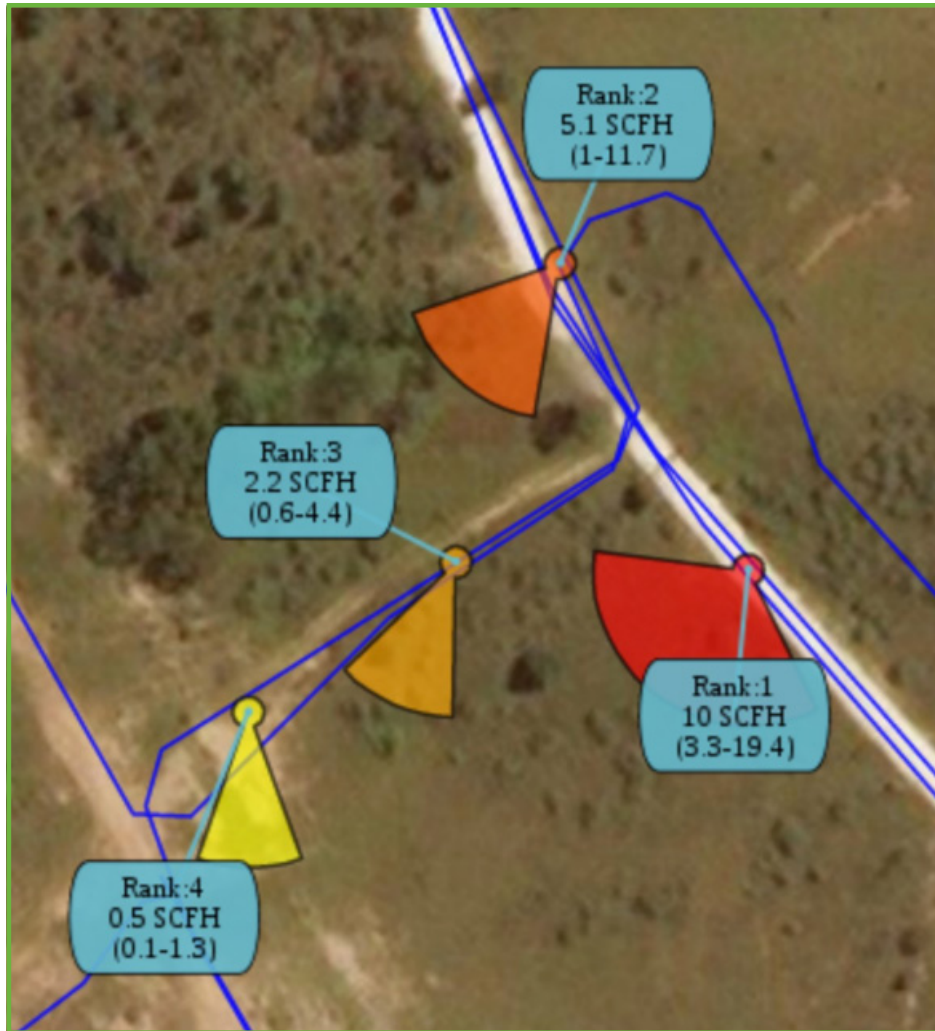


Figure 2. Upstream emissions quantification of individual gas assets. Methane plumes are measured, emissions rates calculated, and leak location indications are presented in this view so that leaks can be located and repaired.