

PICARRO

Your Path to NetZero

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Picarro – Advancements and
Technology Initiatives for Leak
Survey Session

The Energy Transition

Emerging Regulatory Environment

- New and proposed rules are changing the game (IRA of 2022)
- Trickle-down through EPA, PHMSA, state regulators for DSOs
- Regulations require advanced technologies (AMLD) to combat fugitive methane emissions (Pipes Act of 2020-Section 113)

Social Responsibility

- IRA of 2022 defined a societal cost of methane for the first time in US
- \$900/metric ton in 2024 rising to \$1,500/metric ton in 2026

Evolving Reporting Standards

- Gold standard of methane emissions reporting
- Direct measurements, quantification, and validation



Current Practices and Challenges



Utility Practice

Emissions Reporting

Emissions Reduction

Leak Survey

Pipeline Replacement



Challenges

- Emission factors are outdated, generic, and inaccurate
- EPA EFs tend to overstate actual emissions
- Do not support abatement programs required to reach Net Zero goals

- Limited to pipeline replacement
- Lack of tools to assess effectiveness
- Slow, not actionable in real time

- Frequency
- Scale
- Cost

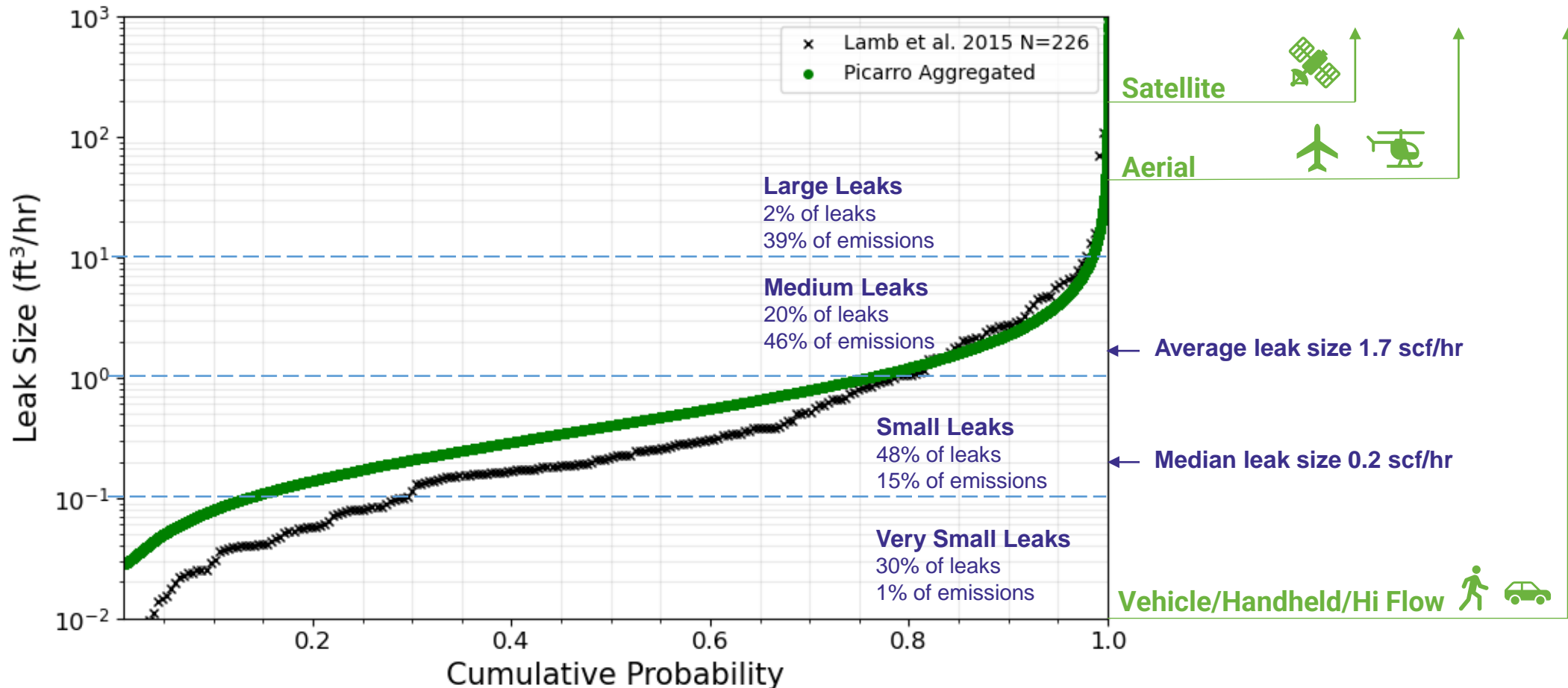
- Sparse historical data for risk models
- How to optimize CapEx
- Dealing with multiple constraints

| Asset | Emission Factor (scf/hour/components) |
|---|--|
| Population Emission Factors - Distribution Mains, Gas Service (Emission Factor is in units of "scf/hour/mile.") | |
| Unprotected Steel | 12.58 |
| Protected Steel | 0.35 |
| Plastic | 1.13 |
| Cast Iron | 27.25 |
| Population Emission Factors - Distribution Services, Gas Service (Emission Factor is in units of "scf/hour/number of services.") | |
| Unprotected Steel | 0.19 |
| Protected Steel | 0.02 |
| Plastic | 0.001 |
| Copper | 0.03 |

Aha! Moment: Leak Sizes Follow Extreme Distributions

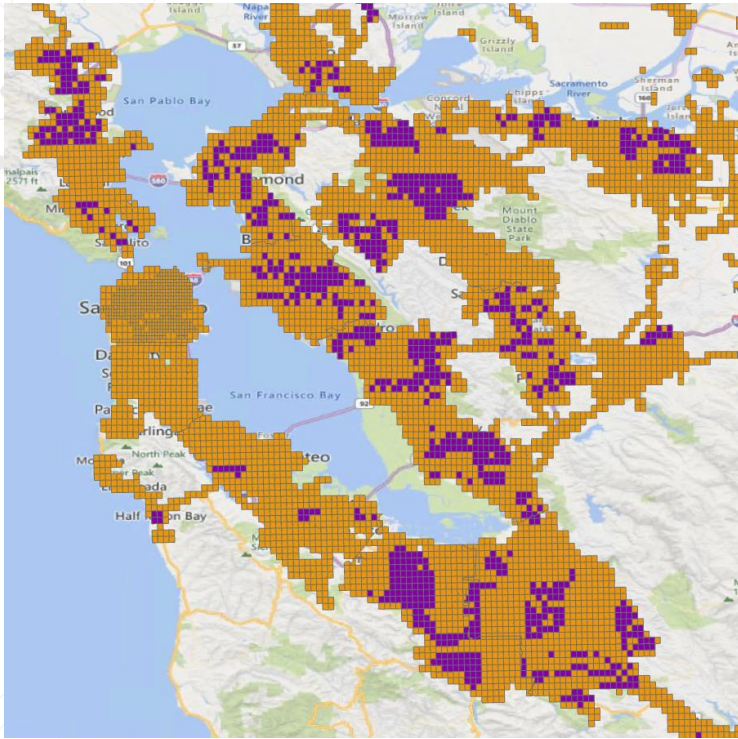
Opportunity: A small number of leaks (5%) represent most of the emissions (50%)

Challenge: Need an effective way to find the needles in the haystack



¹Lamb, B. K. et. al. Direct Measurements Show Decreasing Methane Emissions from Natural Gas Local Distribution Systems in the United States. Environmental Science & Technology 2015, 49, 5161–5169.

Making Data the Foundation of Next Gen Operations



Create a new source of truth with direct methane measurements for your entire network.

Viable and Scalable Solutions

- Direct measurements of an entire network emissions is now possible
- Latest advances in methane data collection and analytics solutions



“It sets us up to be the number one network and shows real intent towards us as a leading company in the sector and leading that journey to Net Zero.” – *Howard Forster, CFO, Cadent Gas*

+ Your Path to Net Zero

Utility Practice

EMISSIONS REPORTING

EMISSIONS REDUCTION

LEAK SURVEY

PIPE REPLACEMENT

A New Source of Truth

- Accurate and specific to your network
- Traceable and auditable methodology
- Compliant with current and upcoming standards and regulations
- Unlocks emissions abatement - You cannot reduce what you do not measure
- Super emitter program - quickly find and repair the largest leaks
- Technology and methodology enables path to NetZero
- Optimize leak survey programs to maximize safety, control costs, and maintain compliance
- Augment existing risk models with emissions data
- Optimize multi-year work programs
- Reduce risk and maximize value of asset ownership

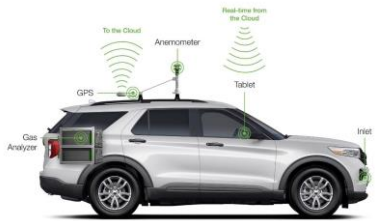


There is a way to reduce your emissions AND improve safety (and stay in budget)

+ One Source of Truth = Multiple Uses

From Data to Actionable Intelligence

Drive and Measure



Collect data on the full network at least once per year.

Apply Data To



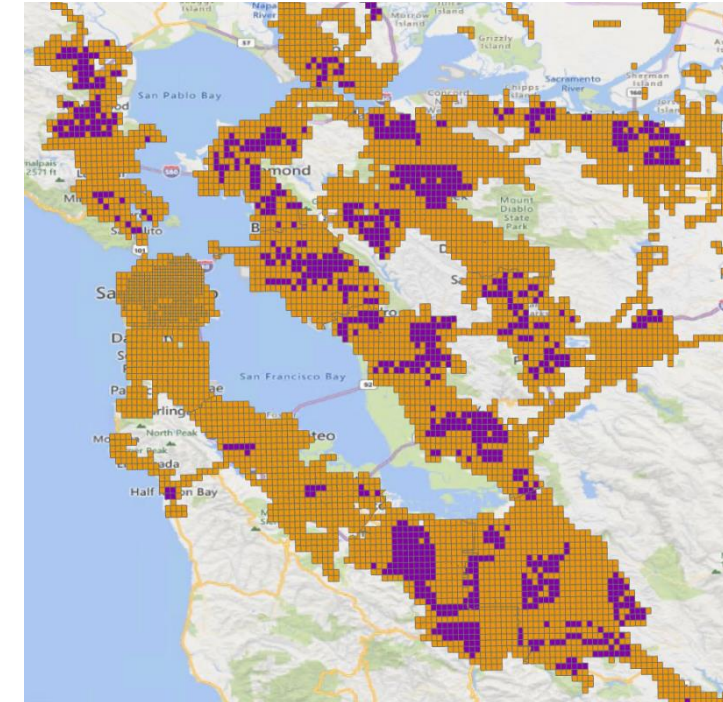
Leak Survey
20-30%
of network

Find and repair leaks for safety and demonstrate regulatory compliance.

Super Emitter
70-80%
of network

Most emissions are here. Find and repair only the large leaks.

Actionable Data Insights



Report emissions over the full network. Inform and quantify abatement efforts. Augment risk models to optimize pipeline replacement programs and maintenance activities.

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