

# *The* **Large Volume Leak Study**

## *Brief Summary of Research Methods and Findings*

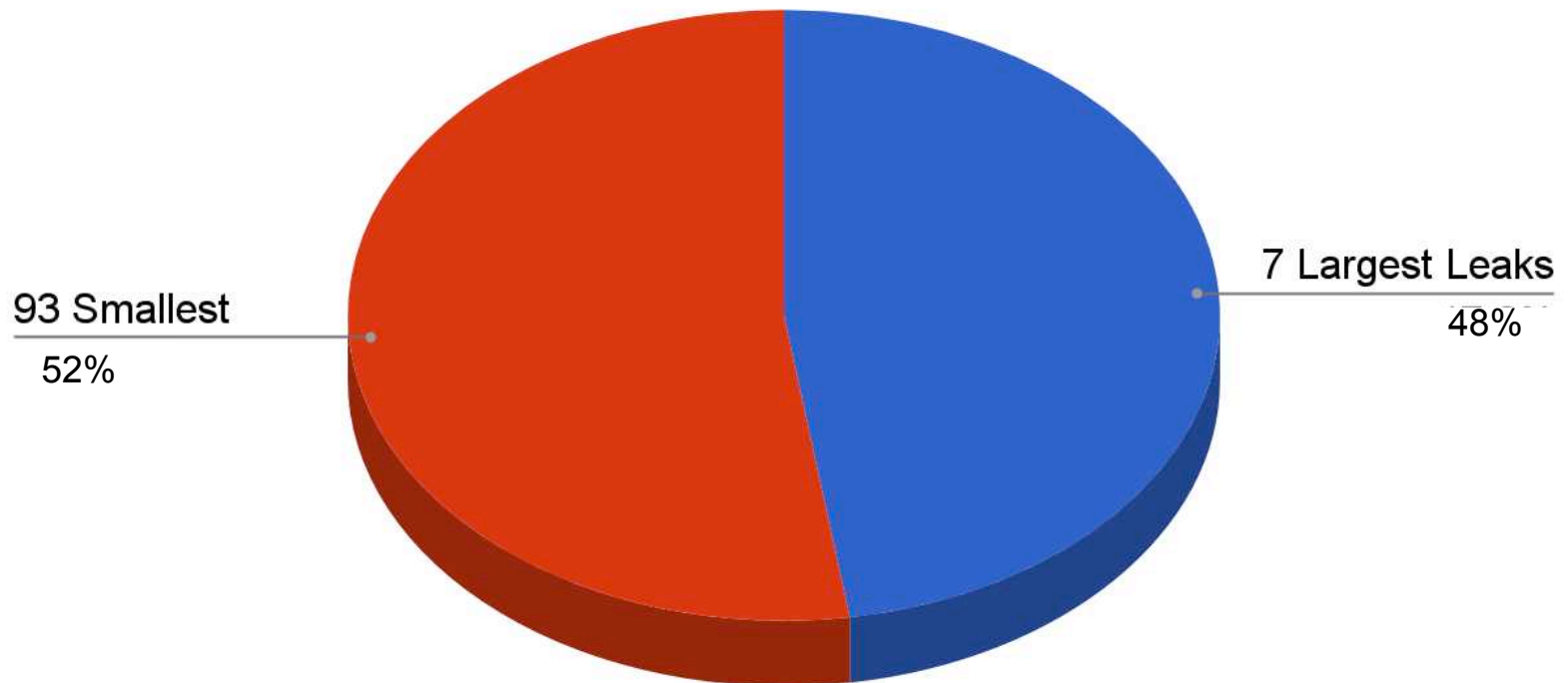
### **Research Team:**

Zeyneb Magavi, Robert Ackley, Jason Taylor, Audrey Schulman, Eddy Salgado, & Nathan Phillips



# 2016: Hendrick et al. “Super-emitter” study found 7% of leaks emit almost half the gas

Emissions of 100 leaks in Boston area  
(cast iron, primarily low pressure)



**Hendrick's study used the chamber method:**  
Scientifically verified but laborious



## 2016: Law Passed

Utilities need identification method.

Chamber method too slow for 16,000 leaks.

50% or higher barhole method suggested.



## **2017: The Large Volume Leak (LVL) Study**

- **Goal:** Find a scalable, reliable proxy method to identify LVLs so utilities can prioritize them.
- **Participating Utilities:**  
National Grid, Eversource & Columbia Gas
- **Leaks Studied:**
  - 69 leaks selected for barhole-read
  - 14 selected by Picarro



# All Leaks in Study by Pipe Material

83 total leaks

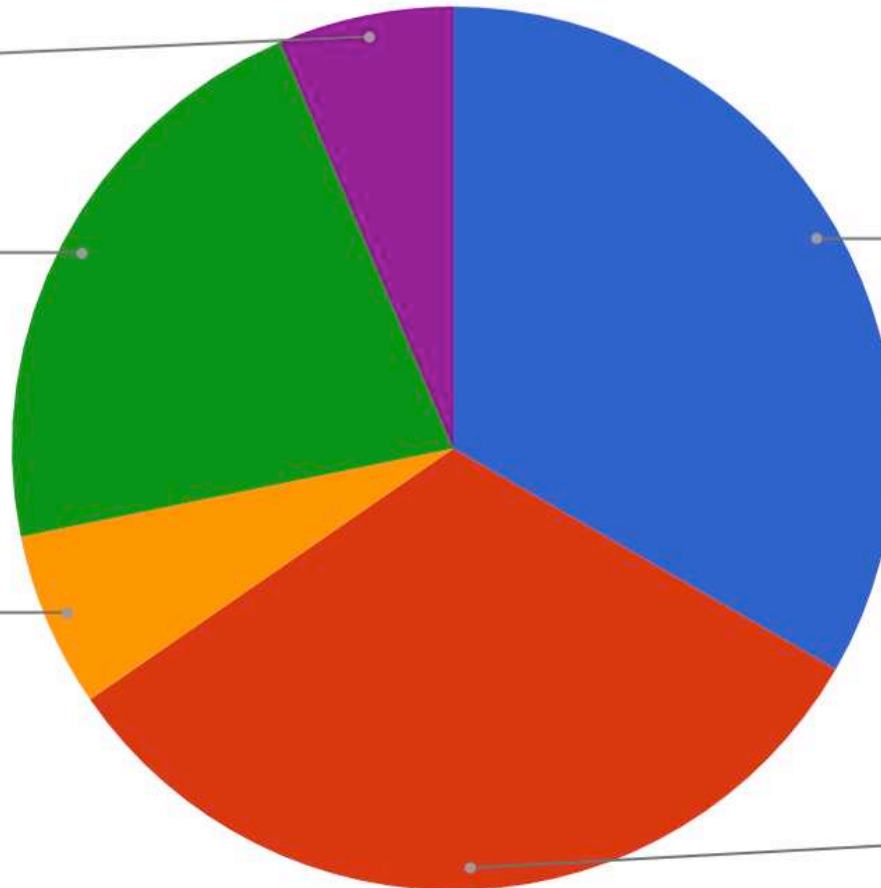
Plastic  
6.5%

Coated Steel  
22%

Wrought Iron  
6.5%

Cast Iron  
33%

Bare Steel  
32%



# All Leaks in Study by Pipe Pressure

83 total leaks

99 PSI

60 PSI

0.5 PSI

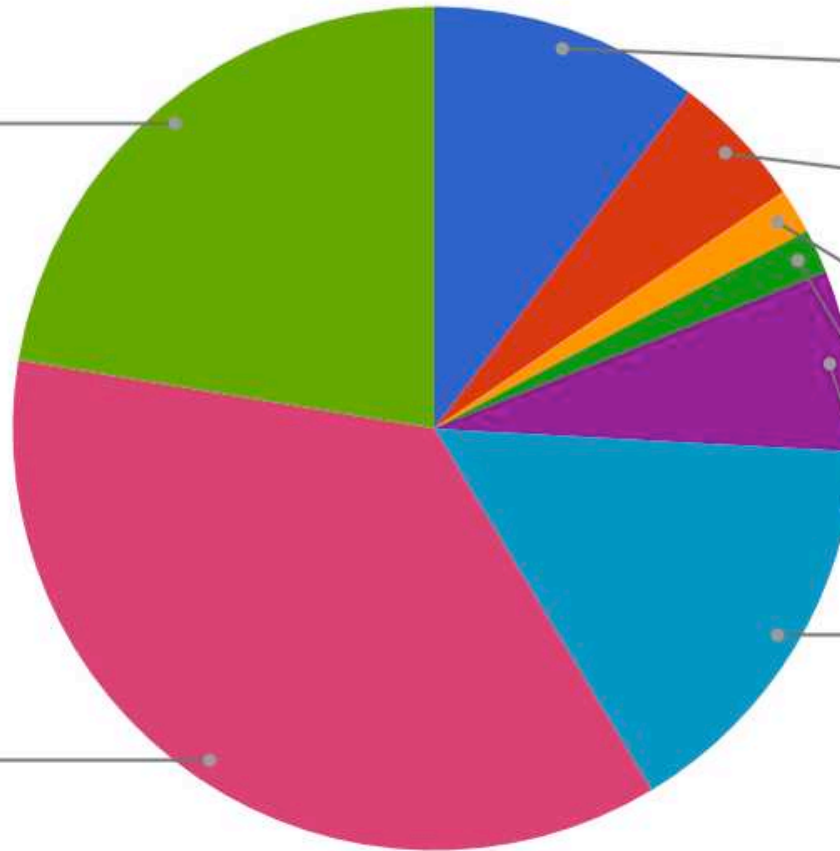
2 PSI

4 PSI

15 PSI

22 PSI

25 PSI



# Research Methods

1. Surveyed the leaks
  - a. **Normal Leak Survey**





# Research Methods

1. Surveyed the leaks.
  - a. Normal Leak Survey
  - b. Picarro Survey**

*(using Boston University's  
GPS-enabled Cavity  
Ringdown Spectrometer)*



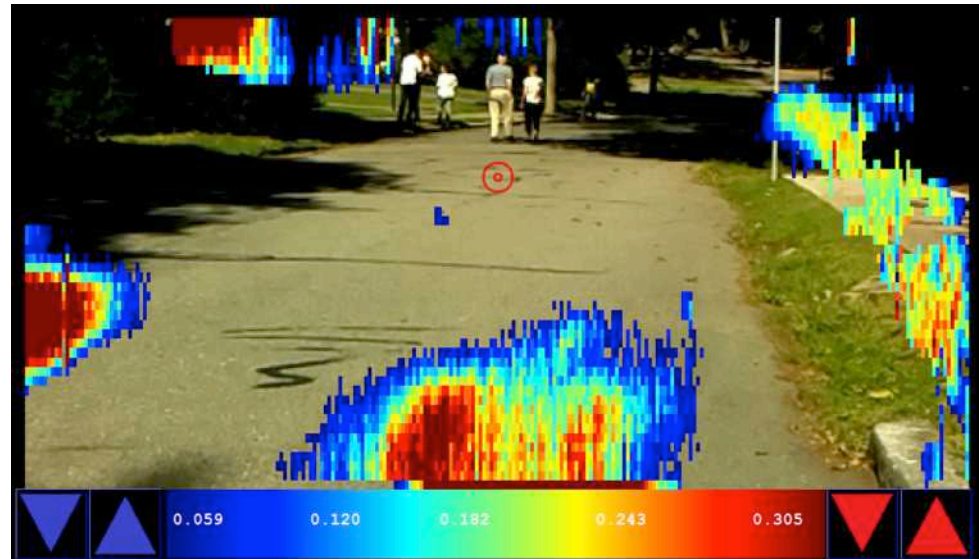
# Research Methods

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  - b. Picarro Survey
2. Measured the leaks multiple ways
  - a. Chamber Method**



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  - b. MSS camera**



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2. Measured the leaks multiple ways
  - a. Chamber Method
  - b. MSS camera
  - c. **FLUXbar**



# Background Info on Innovative Technology:

MultiSpectral Imaging Camera by Multisensor Scientific (MSS)



Documentation of Leak Repair Success (Proof-of-Concept Results)

Provides real time detection and visualization of methane gas using absorption spectroscopy technology and sunlight.



# Background Info on Innovative Technology:

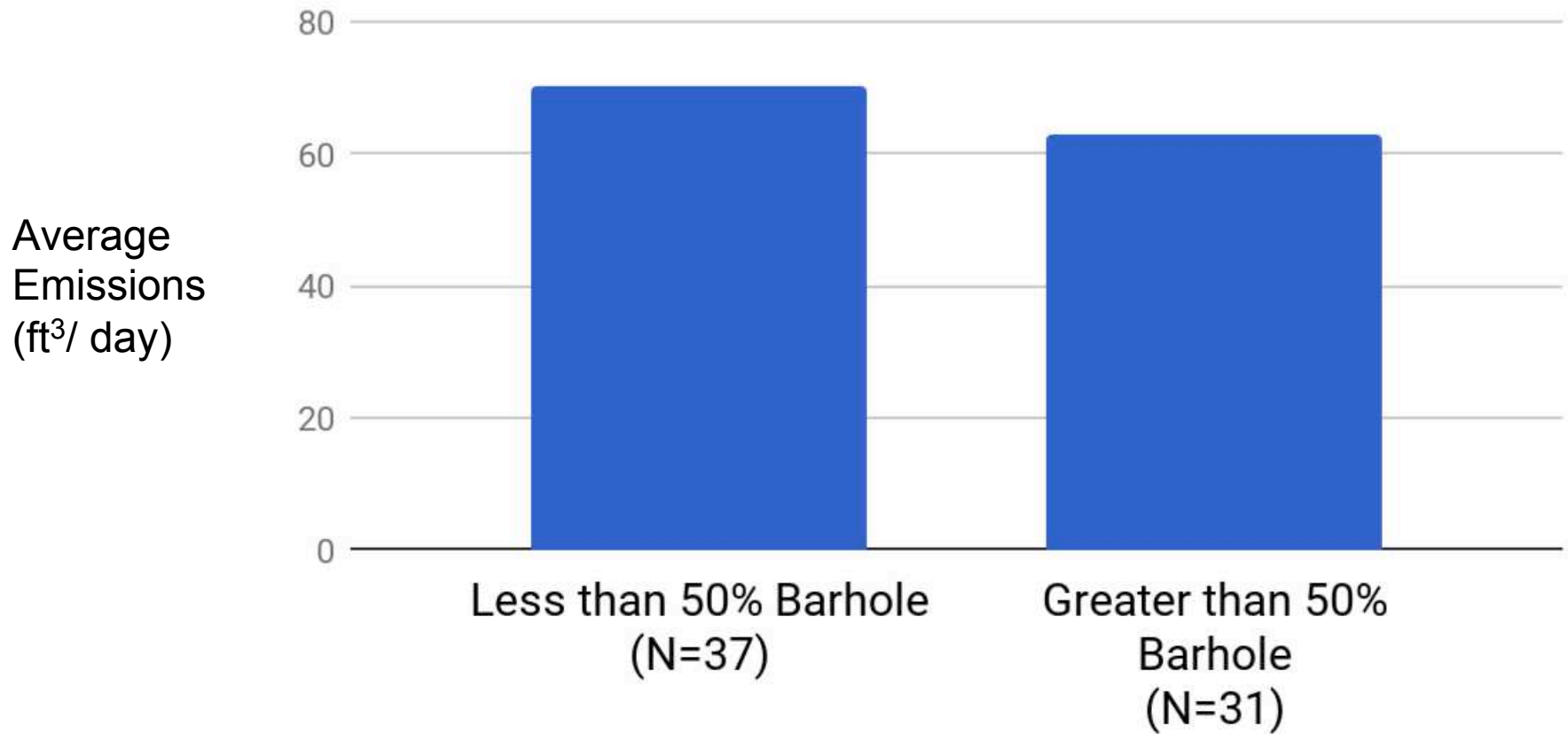
FLUXBar - created for the study by Millibar, Inc.

1. Inserted into hole drilled directly over leak.
2. Sucks air from under street at constant rate (3CFM).
3. Measures percent of gas in airflow.
4. Drains residual gas away until percent of gas plateaus.
5. This measure is a good proxy for the flux of a leak.



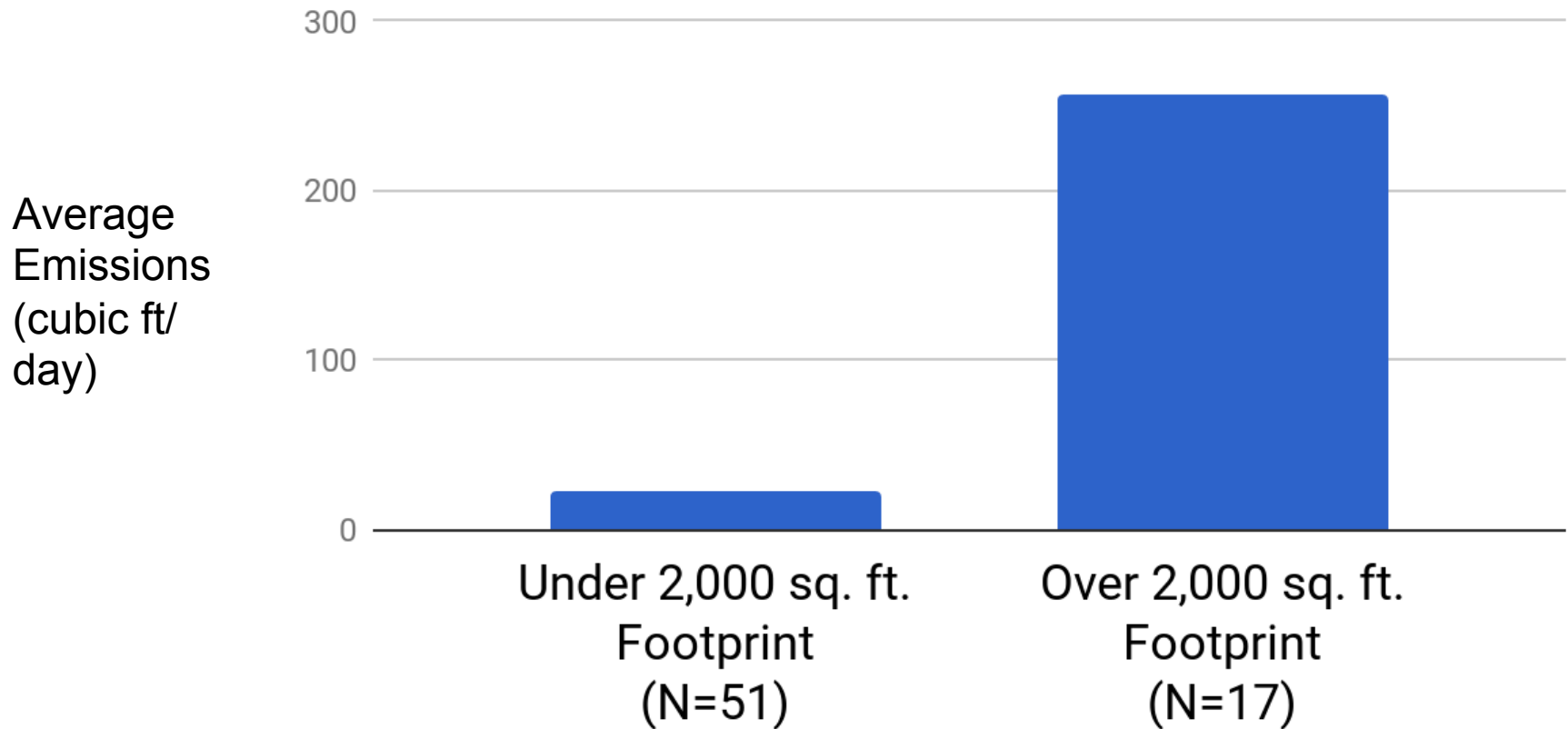
## Research Key Findings:

Barhole reads are **NOT** correlated with emissions



## Research Key Findings:

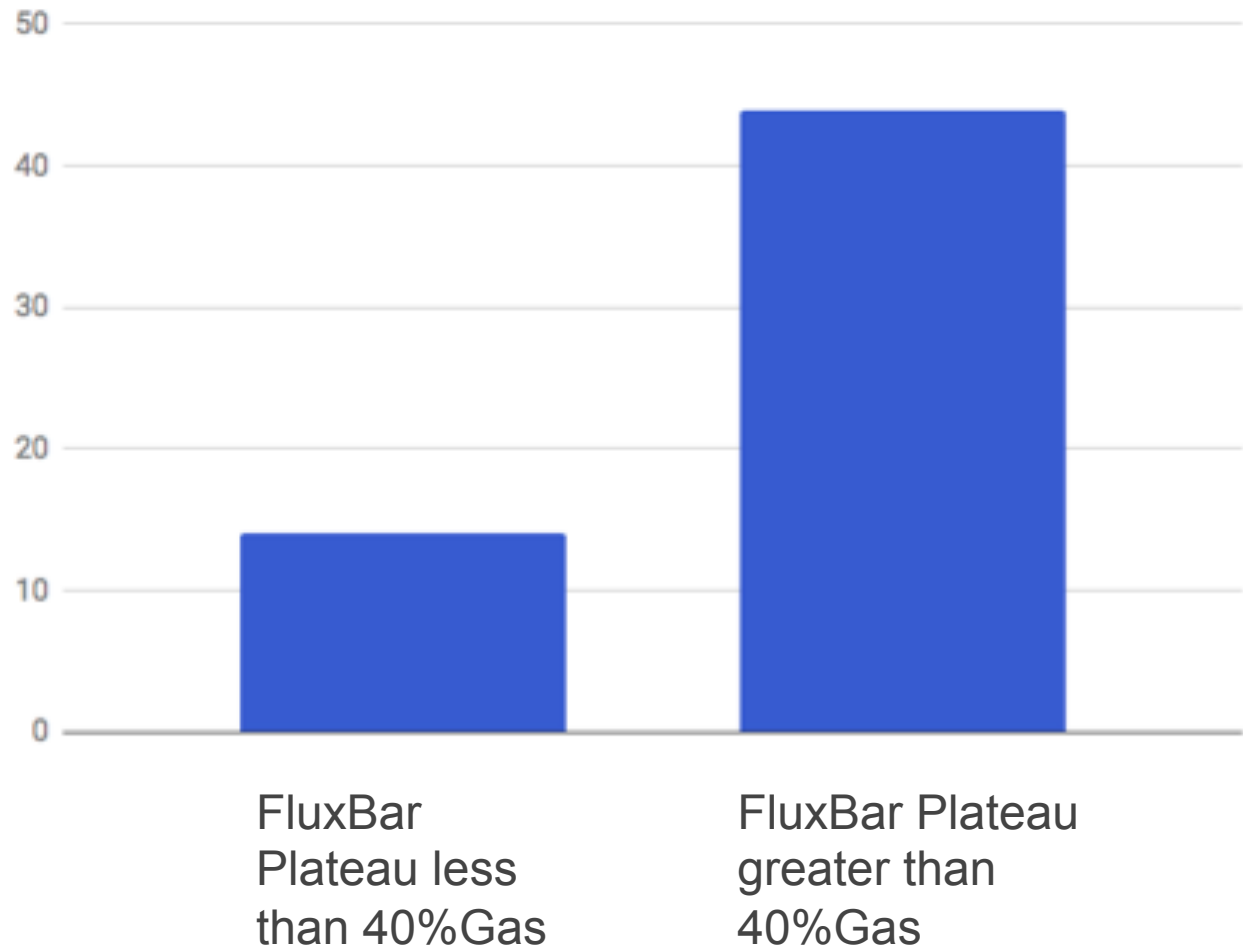
Leak footprint **IS** correlated with emissions



# Research Key Findings:

## FLUXBar IS correlated with emissions

Average  
Emissions  
(ft<sup>3</sup>/ day)



## **Practical Note:**

FLUXBar use requires a compressor truck.

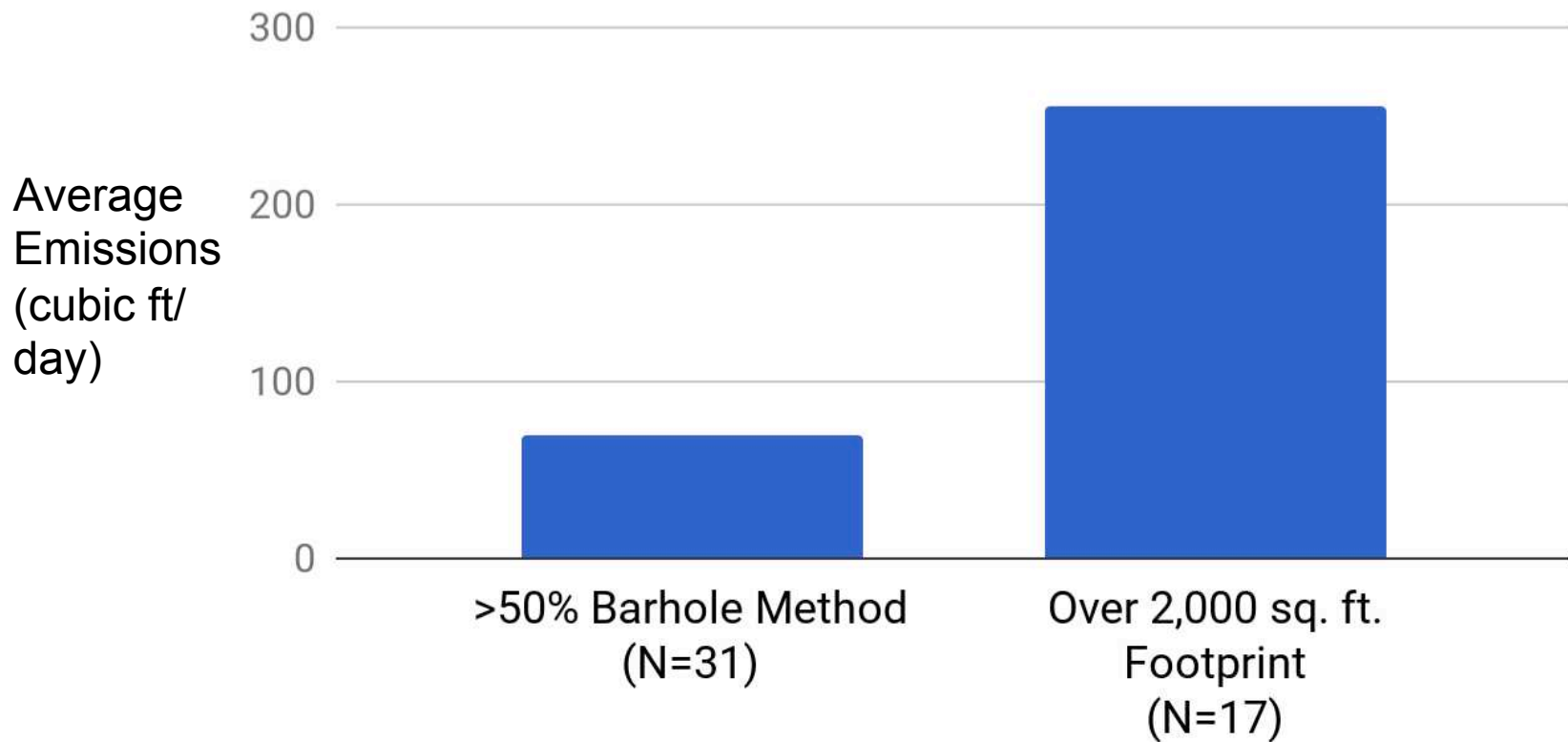
Therefore not cost-effective to use during leak survey.





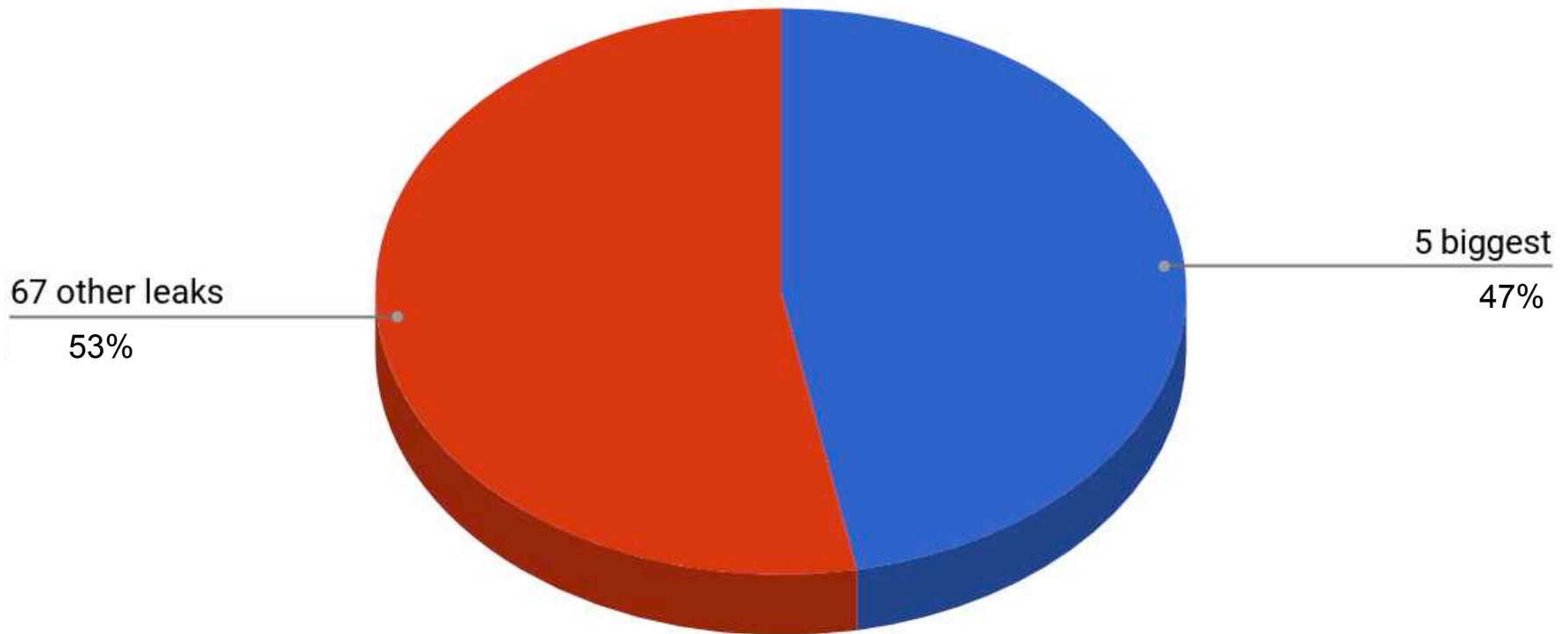
## Research Key Findings:

Comparison of LVL ID by barhole and by footprint:



# Research Key Findings:

LVL Study Duplicated Hendrick et al. 2016 Results  
(even with varied pipe pressures & materials)



## **CONCLUSION:** Path to cut emissions in half

1. Initial ID of LVLs during survey using
  - Leak Footprint  $> 2,000 \text{ ft}^2$
2. Verify LVLs & improve data by using
  - FLUXBar during leak repair
3. Repair the leaks
4. Report results publicly to DPU
5. Reassess annually

