



Staff Subcommittee on Gas and Subcomm / Staff Subcomm on Pipeline Safety: Pipelines and New Technologies

This session will begin at 3:15 pm



Decarbonization Begins with Accurate Data

MEASURE WHAT MATTERS!

Project Canary delivers independent, verified environmental performance data to measure and certify the “E” in ESG

We are a B-Corp with a mission to give methane emissions the “Bird”

Emissions estimates are just that...and will not get us to Net-Zero...

Preventable Leaks Occur Across the Gas Supply Chain & Wide Variability Exists Between Operators and Basins

Not all gas is produced the same
Environmental attributes differ greatly

Congressional House Science, Space & Technology Committee

“...GHG inventories [maintained by Feds] *drastically underestimating* the amount of methane ...”

Methane CH₄

86X

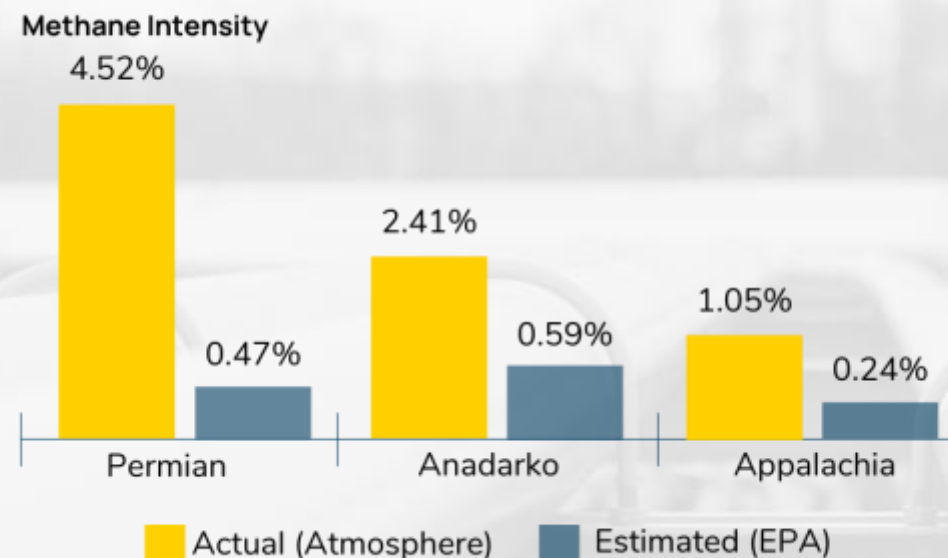
more potent than CO₂

Supply Chain Emission Sources

>50%

Intermittent, preventable events

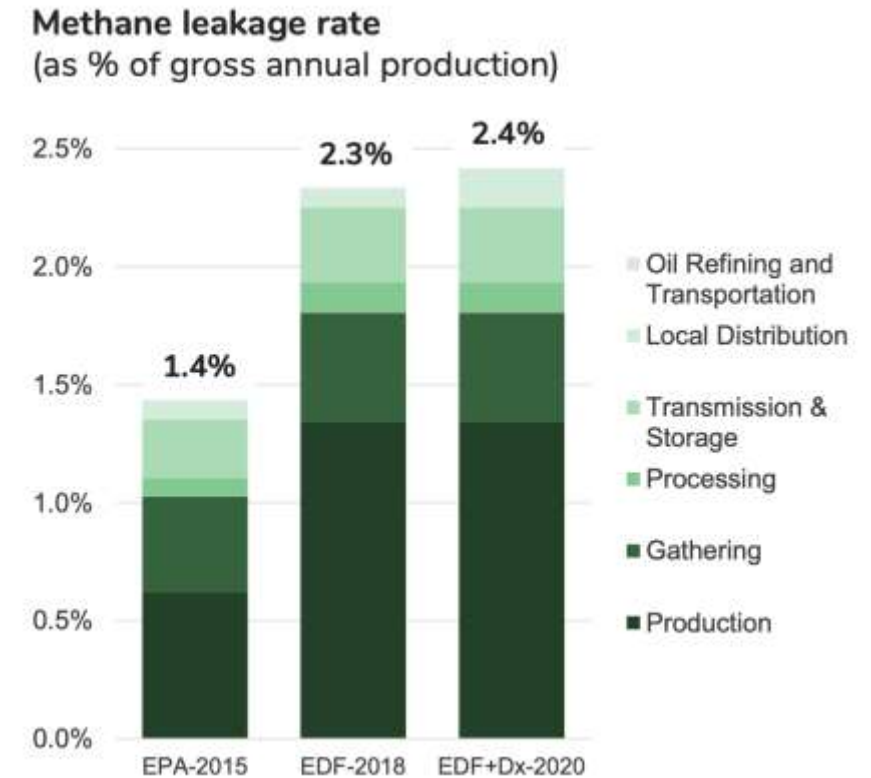
Actual methane emissions often
exceed EPA estimates



Source: Kayrros 'full inversion', EPA, BloombergNEF, study on US oil & gas assets

Real Opportunities Exist Across the Supply Chain to Reduce Methane Leaks

- ✓ Methane emissions under-reported using static and outdated estimation formulas
- ✓ Most methane leaks are intermittent
- ✓ Methane leaks are preventable
- ✓ Biggest impacts can be achieved at gas production sites
- ✓ Real-time monitors, data collection, and quantification needed to drive improvement



Source: Alvarez, Ramón A., Daniel Zavala-Araiza, David R. Lyon, David T. Allen, Zachary R. Barkley, Adam R. Brandt, Kenneth J. Davis et al. "Assessment of methane emissions from the US oil and gas supply chain." *Science* 361, no. 6398 (2018): 186-188.

Certified Low-Methane Gas, a.k.a. Responsibly Sourced Gas (RSG) Help Stop Methane Leaks

- Buyers use **Purchasing Power** to reduce methane emissions and other environmental impacts of natural gas production
- RSG undergoes independent, **3rd-Party assessments** or scoring of environmental best practices by producers
- **Certified Low Methane Intensity:** Top Tier RSG uses continuous monitoring to measure and verify true methane intensities **below 0.20%** at each well vs. the industry average of 1.3%-2%+
- Other Environmental Attributes: **Low Water Usage**, safety, seismic, land, and community impacts included
- **Larger Volumes Available Now:** 20% of the US gas market is expected to be certified by end of 2022



Benefits of Buying Responsibly Sourced Gas

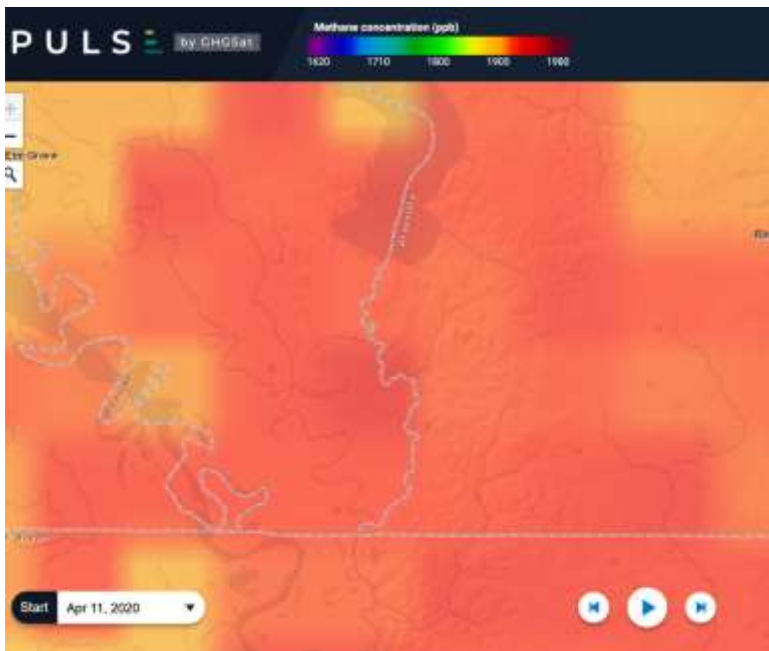
Certified or Responsibly Sourced Gas is geologic natural gas with low methane (GHG) emissions and ESG profiles with **immediate, low cost, positive impacts**

- ✓ Buying certified gas reduces methane emissions by 80%+
- ✓ Certified gas drives the O&G industry to improve and reduce leaks now
- ✓ Reduced GHG achieved at a very low cost - pennies per customer/month
- ✓ Water and other environmental impacts also measured and reduced
- ✓ Allows buyers to choose differentiated product with lower climate impact
- ✓ Simple, low-cost implementation - standard gas procurement contracts

Know and reduce the emission footprint of the gas supply chain

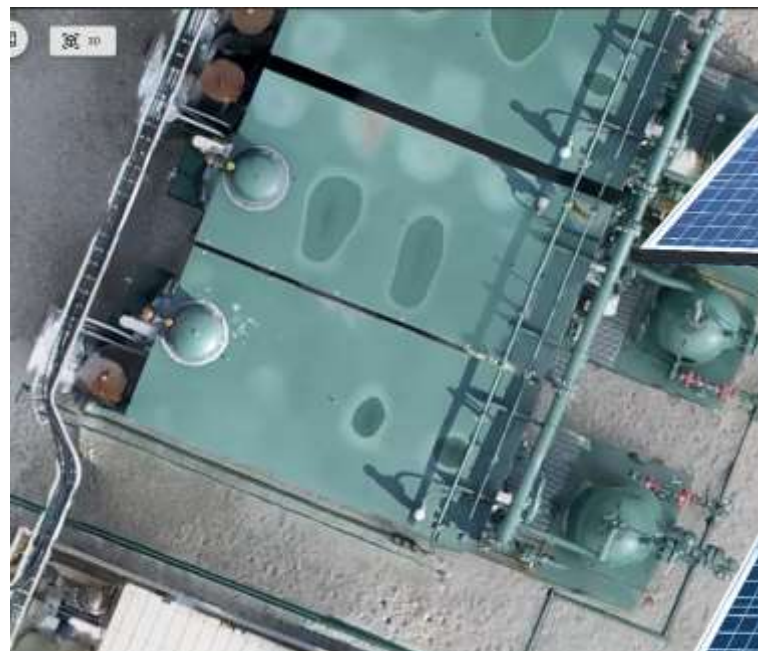


Both Top-Down (Satellite / Flyovers) & Bottom-Up (Facility-Level) Monitoring + Measurement Will Help Solve the Methane Problem



Satellite Resolution

Data from Pulse by GHGSat
<https://pulse.ghgsat.com/?lat=32.28&lng=-93.32&zm=12>



Project Canary Resolution

- Centimeter resolution
- Parts Per Billion detection
- Less than 1 kg/hour
- 24x7x365 second by second



High volume operations need continuous, facility-level data to address fugitive emissions

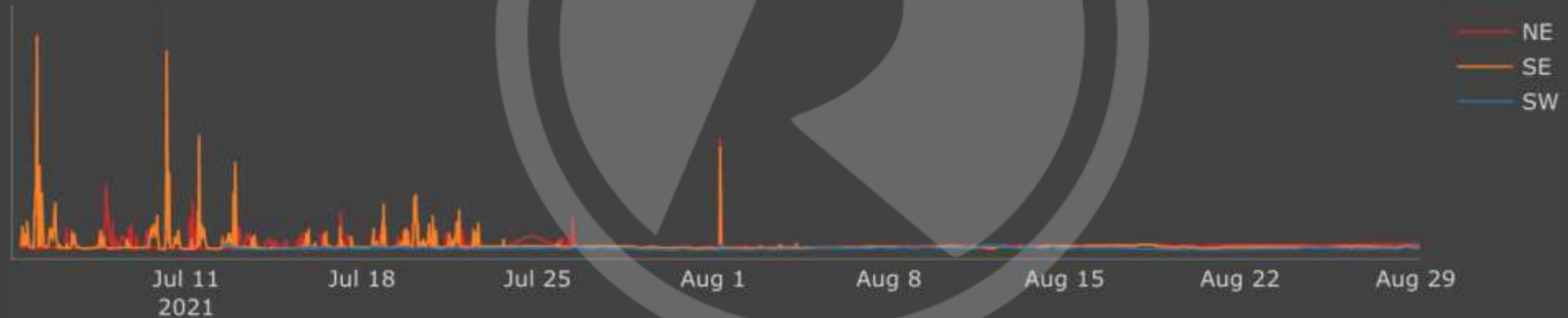
Emission Sources

>50%

intermittent events

Canary Provides Actionable Emission Data With Facility-Level Continuous Monitoring

Quantifiable methane data unlocks targeted intervention



Emissions Detected

Project Canary identifies thief hatch emissions

Operational Improvements

Company performs retrofits

Proven Emission Reductions

Data proves emission reduction after retrofit

Project Canary (PC) Certifies Low Methane Gas With Criteria That Ensures High Standards

- 1.** **PC installs state-of-the-art methane sensors around each well / facility**
 - PC owns and controls the INDEPENDENT monitors
 - Emissions continuously analyzed to determine actual leaks
 - Operators notified of leaks to initiate mitigation / fixes real time
- 2.** **PC performs INDEPENDENT, rigorous environmental assessments of each facility/well**
 - Criteria based on best practices by API, ISO, NORSOK, ANSI+
 - Engineers review 600+ data points & 1000+ pages of documents
 - On-site visits and subject matter interviews by qualified technicians
 - Result: independent environmental rating of each well / facility and the air, water, land, and community impacts
- 3.** **PC issues certificate that the well meets Certified Gas standards**
 - PC notifies operator if well / facility falls out of compliance
 - Certified Gas standard establishes methane intensity or leak rates of less than 0.20%, water usage, and other metrics
- 4.** **PC does not trade gas or benefit from RSG volumes transacted**
 - PC is paid a subscription fee for its services – providing the IoT monitors, data, and EA scores





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PICARRO

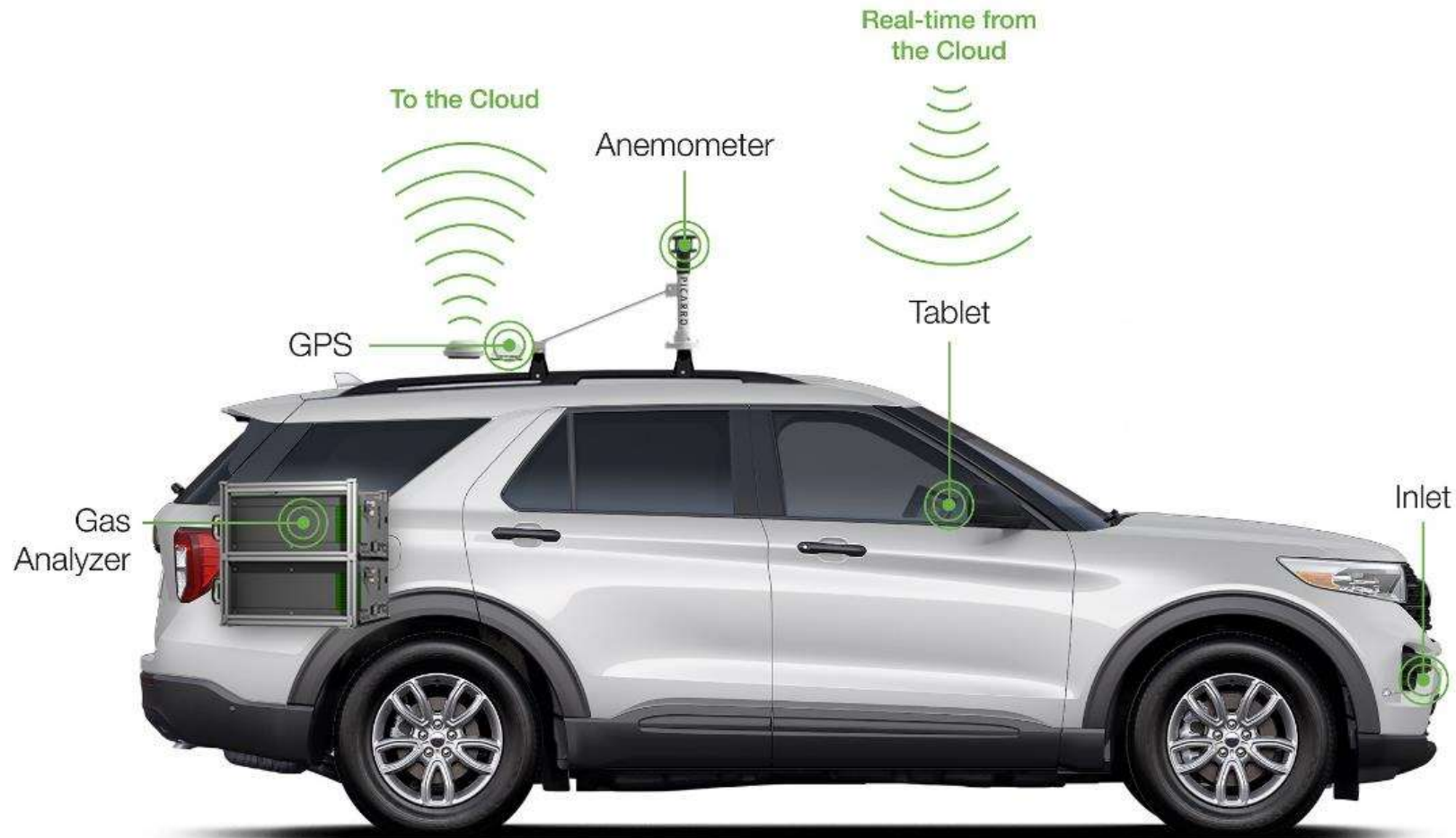
Global Leader in Emissions Measurement,
Emissions Reduction,
Pipe Replacement, and Advanced Leak Survey

NARUC
2022 Summer Policy Summit
July 16, 2022

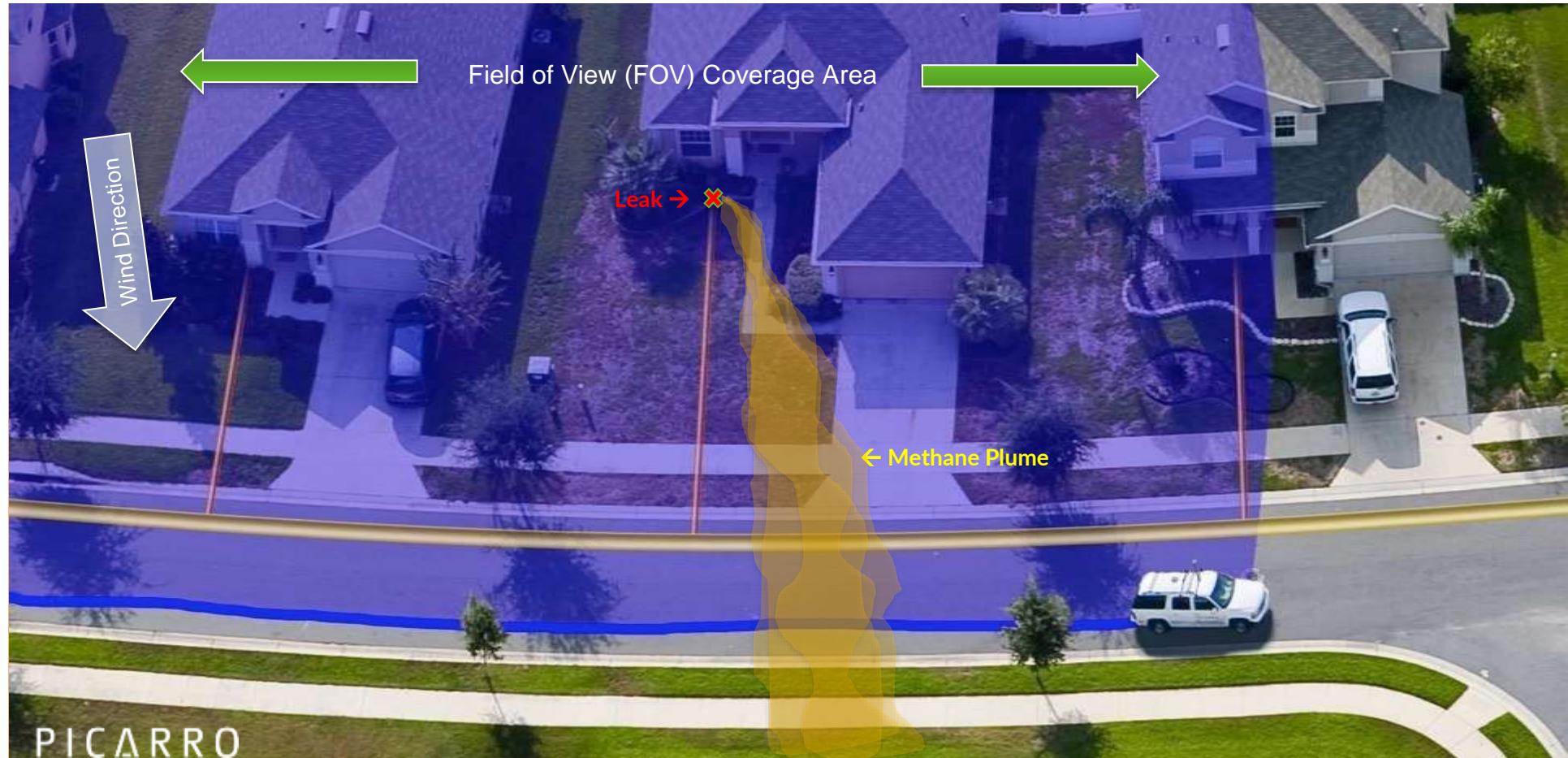
Douglas Ward
Director, Gas Sales & Marketing



Picarro Proprietary Hardware, Software & Analytics



Advanced Leak Detection and Emissions Quantification



Picarro Primary Applications

Emissions Measurement (Network)



Emissions Reduction



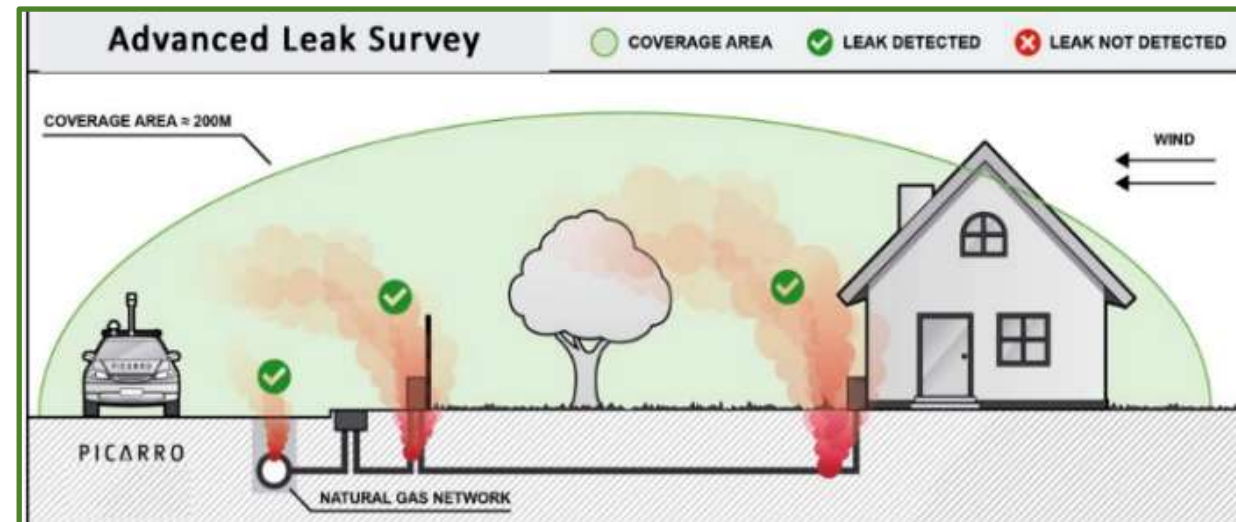
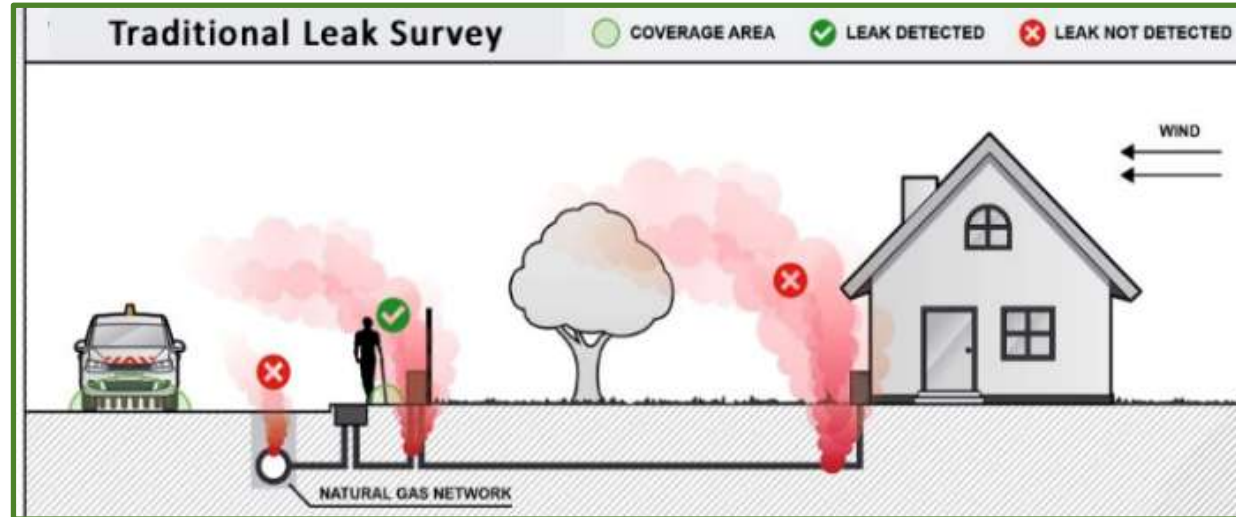
Pipe Replacement (Optimization)



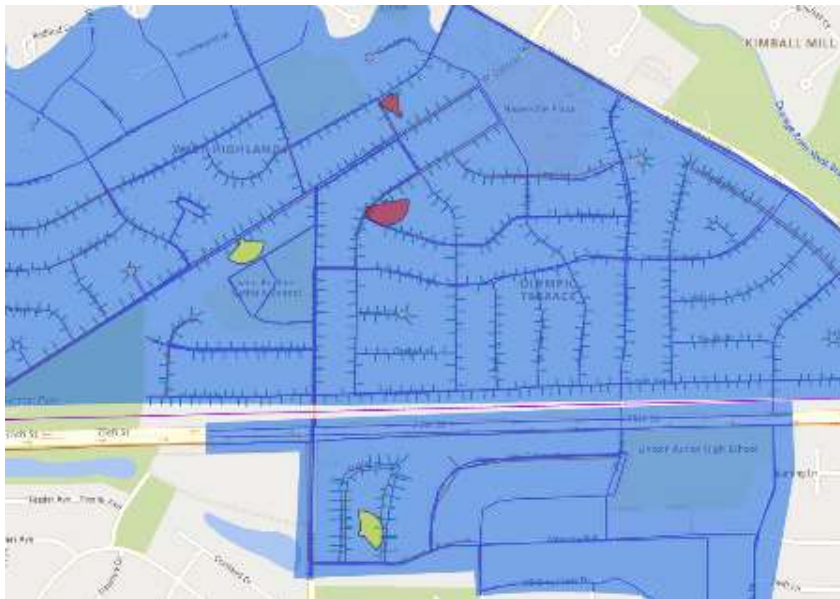
Advanced Leak Survey



Advanced Leak Survey



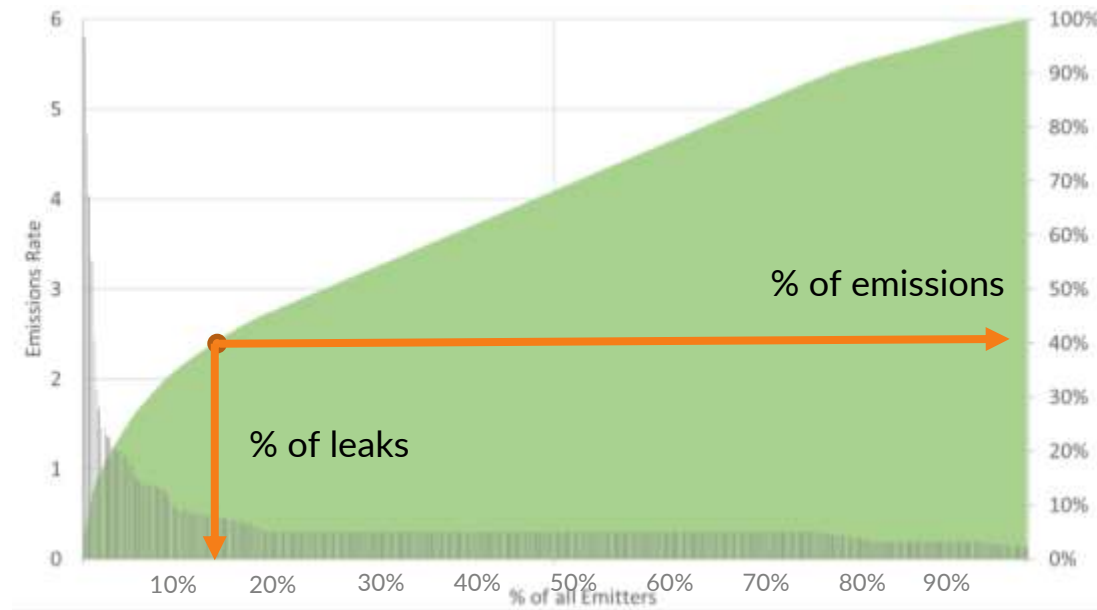
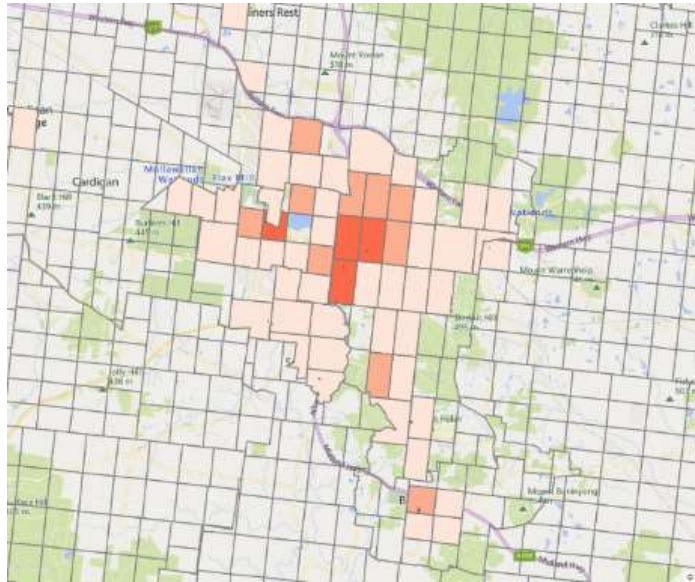
2X Faster Leak Survey, Yields 3X More High-Risk Leaks



Typical 95% FOV coverage example

	Picarro	Traditional
Gradeable Leak Find Rate*	89%	36%
Hazardous Leak Find Rate (Grade 1, 2+, 2 / Grade A, B)	91%	32%
Survey Coverage	90%	Undefined
Effective Survey Speed (mains)	0.45 mi/hr.	0.22 mi/hr.
Survey Speed (services)	28 services /hr.	13 services/hr.

Emissions Reduction Super-Emitters Program



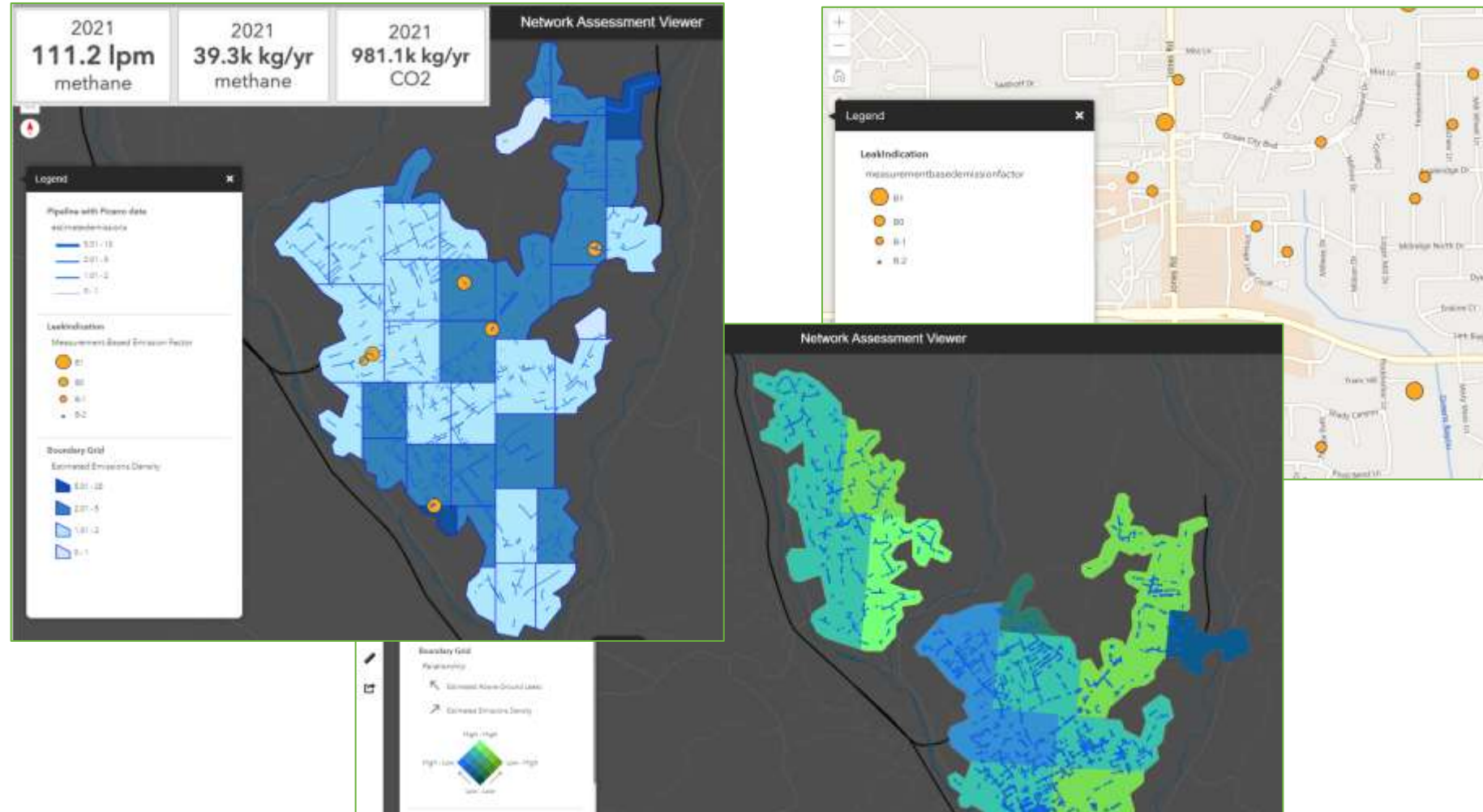
Drive network and identify Super Emitters



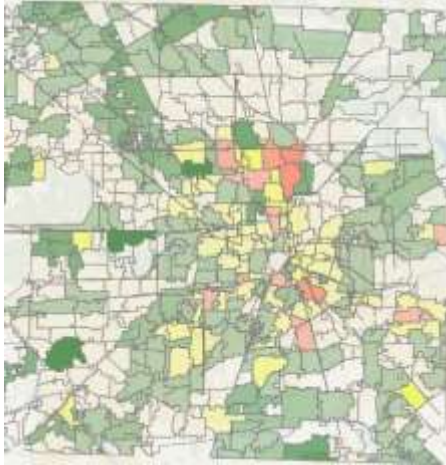
Remediate Super Emitters and reduce emissions

Note: Typically, 5 to 10% of the leaks =
50% or more of the total emissions

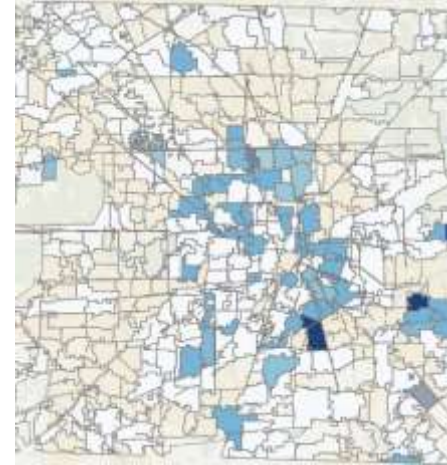
Network Emissions Measurement



Data-Informed Pipe Replacement



Leak density by areas (# leaks/mile)



Emission density by area (# SCFH/mile)



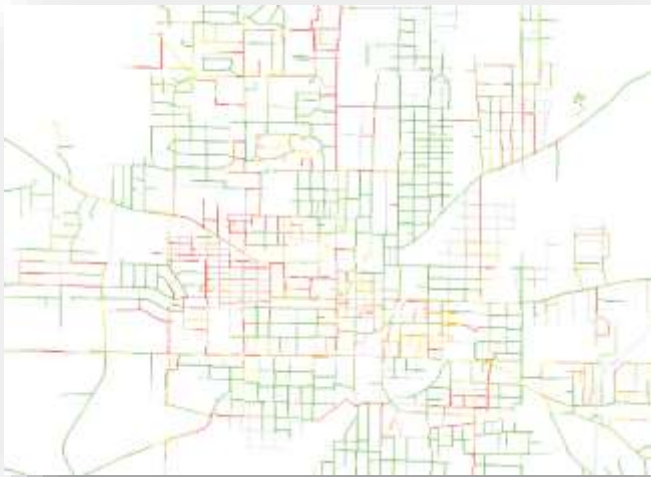
Rank main pipes by leak density (# leaks/mile)



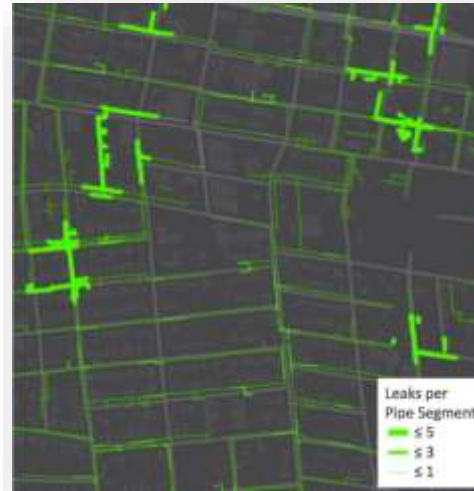
Rank main pipes by emission density (# SCFH/mile)

Pipe Replacement Optimization

Static DIMP risk modeling



Live methane Data collected with Picarro



**Optimized
pipe
selection**



PICARRO

Thank You!

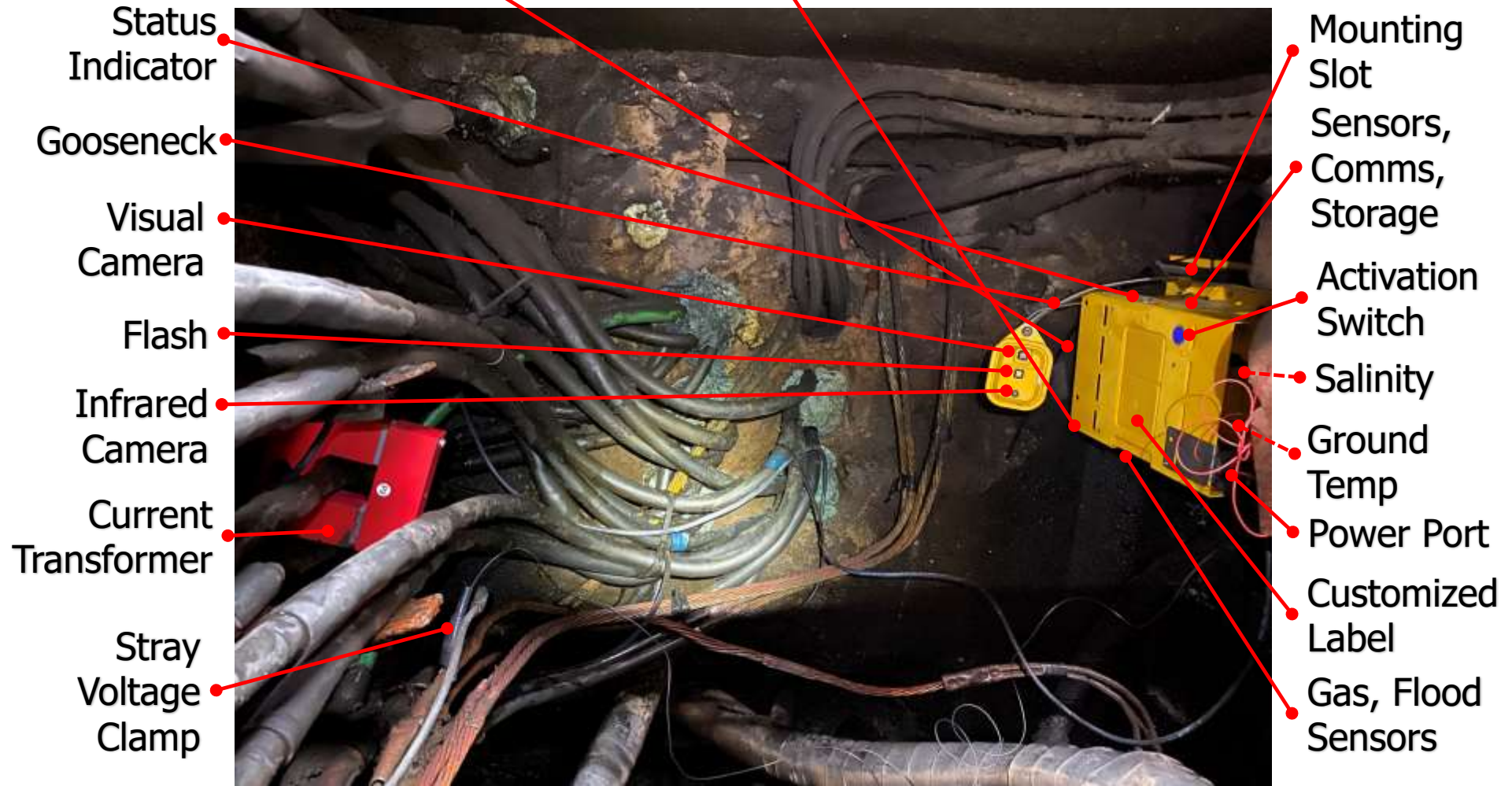
Douglas Ward
Director, Gas Sales & Marketing
Email: dward@picarro.com
Mobile: +1 (330) 439-3932



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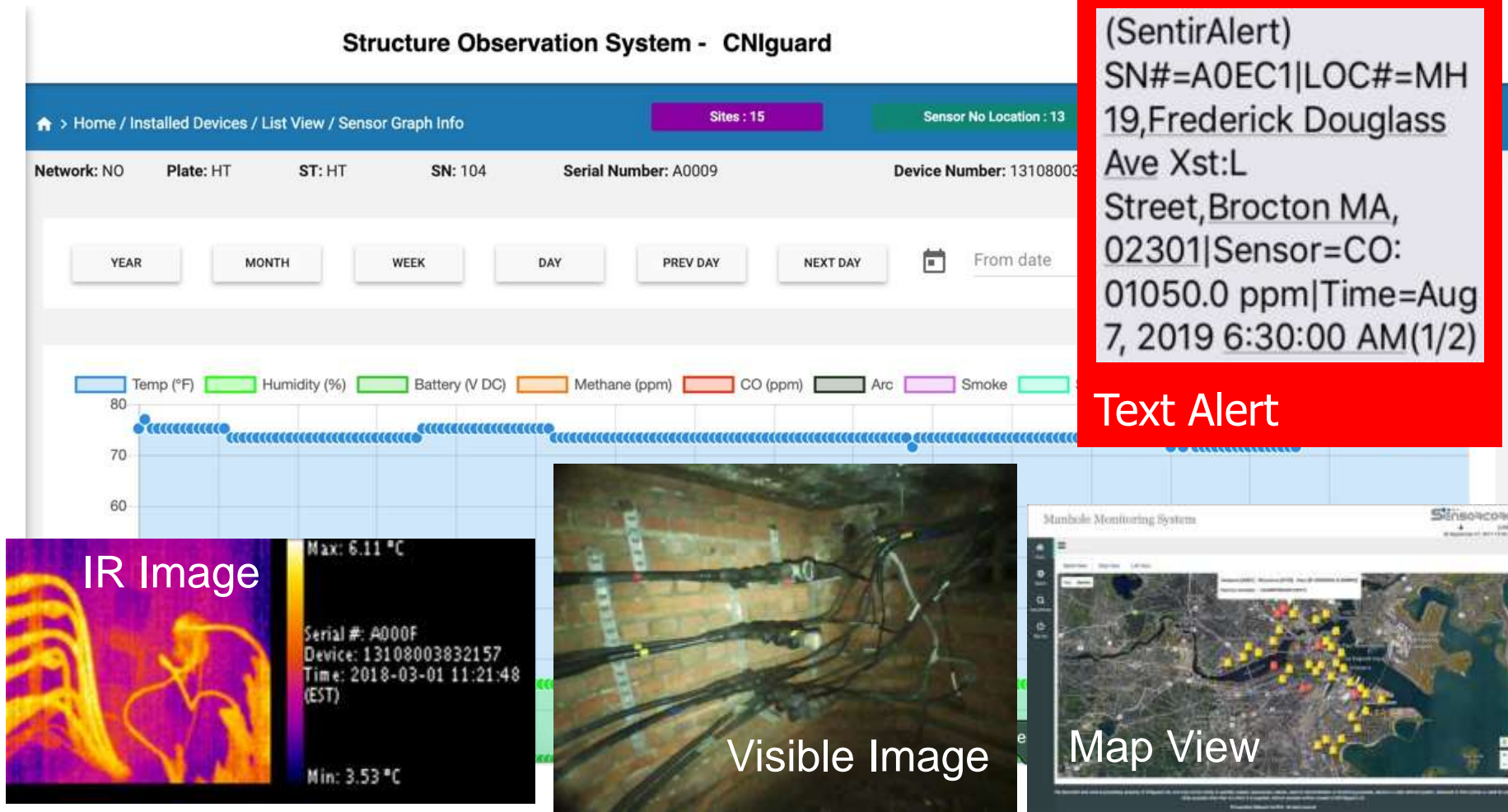
NARUC Summit Manhole Monitoring San Diego, CA July 2022



WIDE-RANGING FEATURES – AND GROWING



REMOTE MONITORING & ALARMING









Thank you
Jens Sterum, VP CNIGuard
202-550-5000



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DELIVERING WITH **FOCUS**

Tal R. Centers, Jr.
VP – Texas Regional Gas Operations

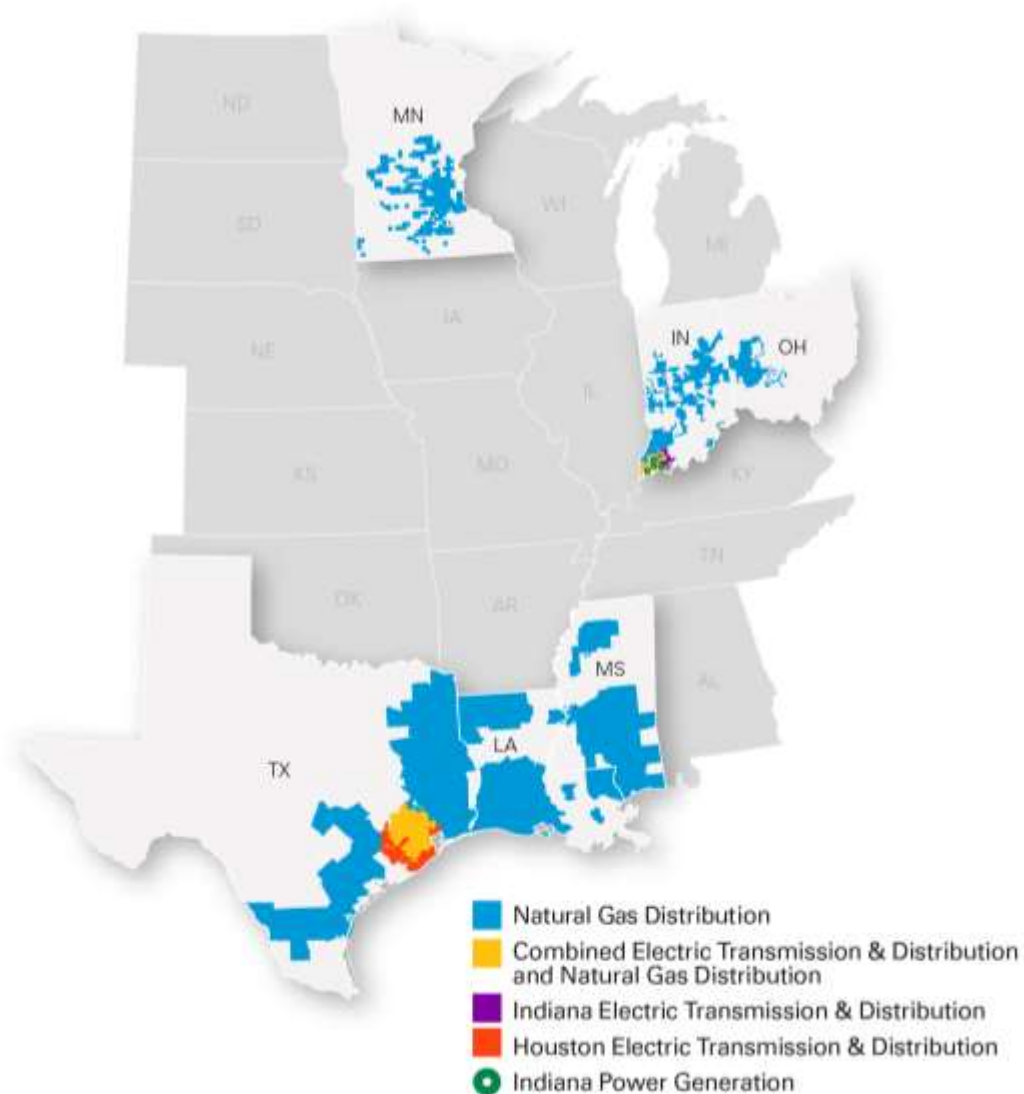
NARUC – Innovation Driving Solutions for Energy Delivery

07/16/2022

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Who We Are



Electric Transmission & Distribution and Power Generation



more than
2.8 million
 METERED CUSTOMERS

2
 states

Natural Gas Distribution



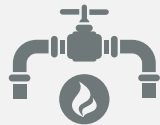
more than
4.2 million
 METERED CUSTOMERS

6
 states

Today's Focus on Natural Gas Innovation in Advanced Leak Detection and Emissions Reductions

CenterPoint Energy sells and delivers natural gas to more than **4.2 million homes and businesses** in six states: Indiana, Louisiana, Minnesota, Mississippi, Ohio, and Texas.

- The largest metropolitan areas served in each state are Houston, Texas; Minneapolis, Minnesota; Shreveport, Louisiana; Biloxi, Mississippi; Evansville, Indiana; and Dayton, Ohio.
- CenterPoint Energy is committed to investing in modernizing our natural gas infrastructure. This includes replacing legacy steel, cast-iron and vintage plastic systems as well as deploying smart meters to improve safety, reliability and customer experience.



CenterPoint Energy continues to be a top five natural gas utility in number of customers and top three in miles of main pipelines.

Innovation Drivers for Advanced Leak Detection



- **Safety**
 - 1,000 times more sensitive than traditional technology
 - 10 times more hazardous leaks found
 - Expanded field of view (customer piping leaks and emissions)
 - Emergency response support
 - Evacuation Zones
 - Safe work area
 - Post repair “Leak Clear” surveys
- **Event System Integrity Follow Up Surveys**
 - Earthquake
 - Hurricane
 - Tornado
- **Survey Audit Trail** (documented survey area and asset coverage)
- **Capital Infrastructure Replacement Optimization and Risk Mitigation**
 - Maximize customer benefits from replacement programs
 - Focus replacements on higher leak or emissions areas
 - Reduction of Emissions – ESG Targets and prioritizing on high emitters

Advanced Leak Detection Offers a Step Change in Leak Detection Capability



10 times more A leaks (Hazardous)
7 times more B leaks (Potentially Hazardous)
5 times more C leaks (Non-hazardous)

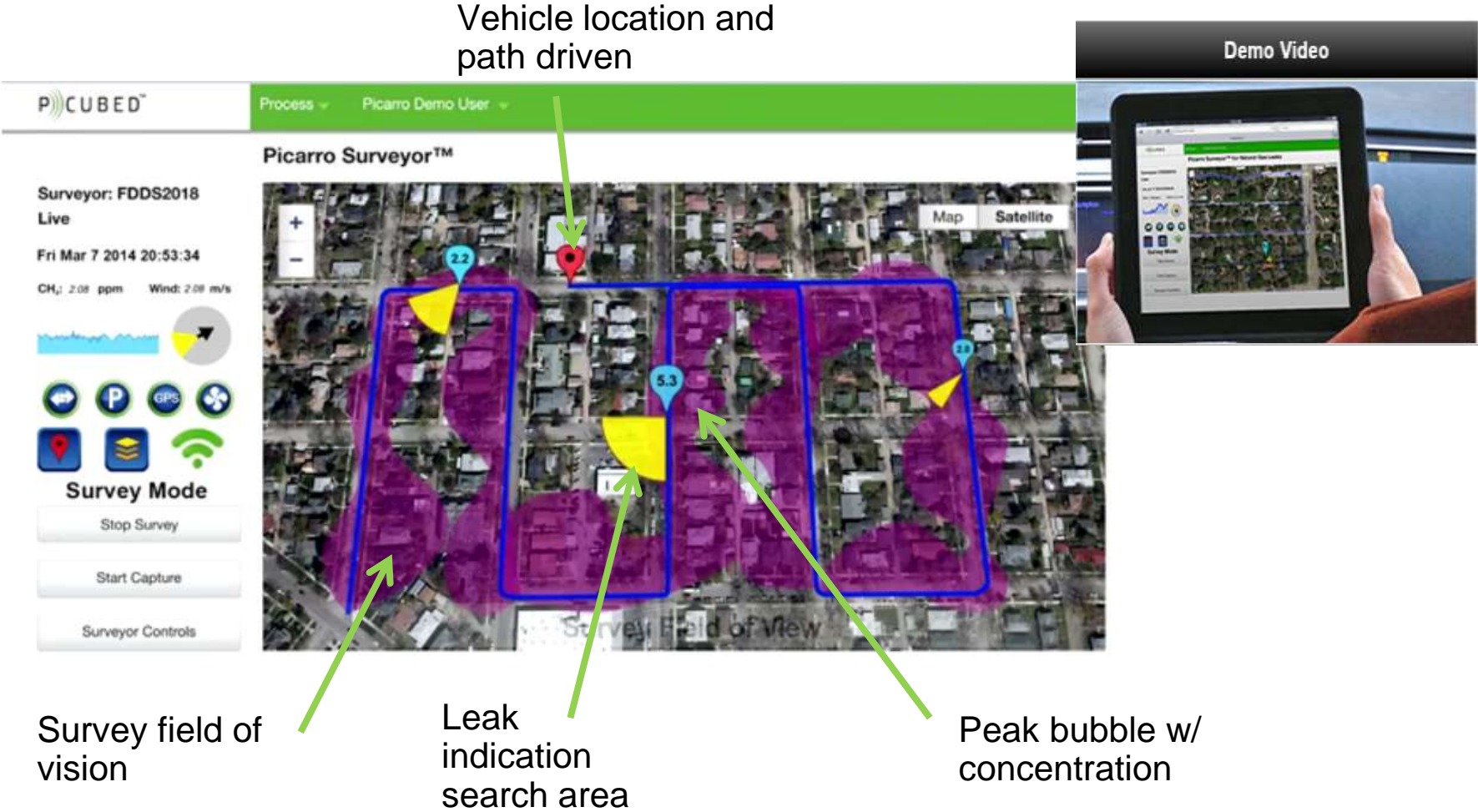
- Parts per Billion (PPB) analytic capability
- Senses natural gas up to 600 feet from the source
- Satellite tracking of the vehicle
- Asset confirmation

1800s
thru
1960s

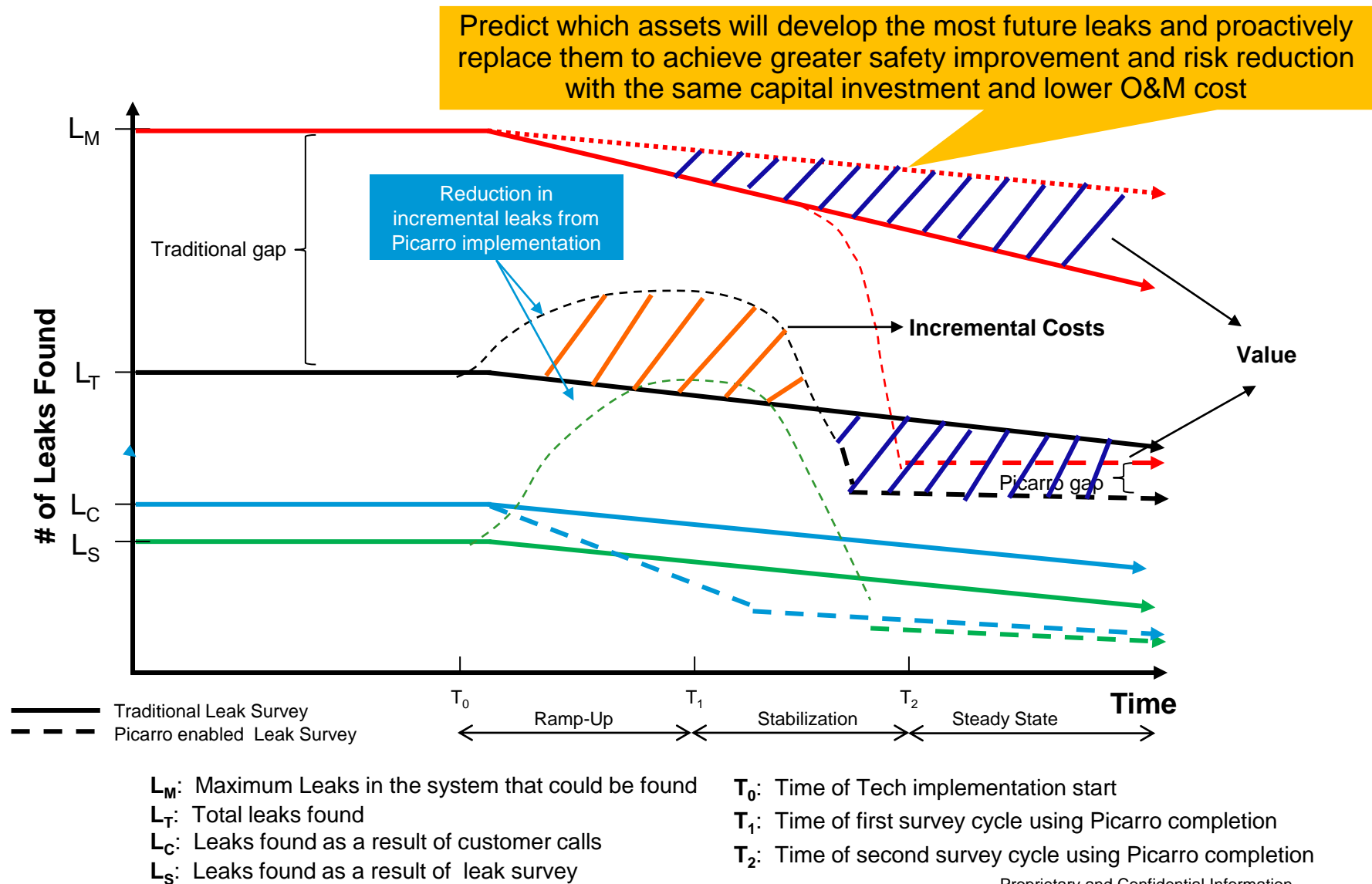
1960s
thru
today

The Future

Real-time Survey Results for the Leak Survey and Engineering Integrity Management



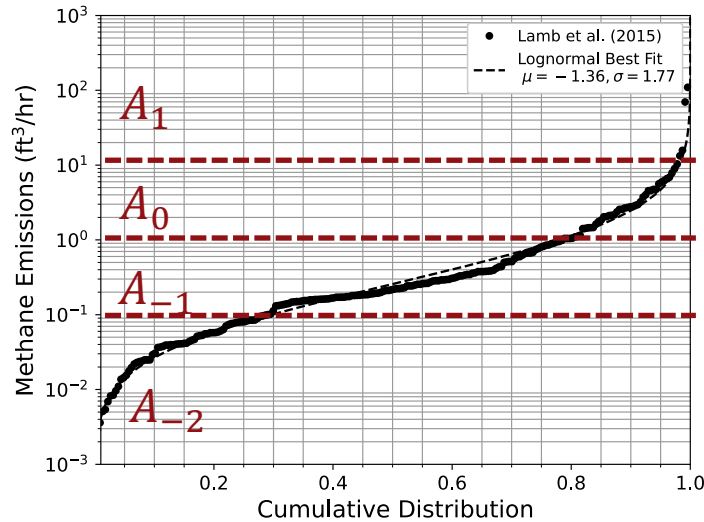
Value Proposition for Capital Replacement Prioritization Analytics Tool



Leak Sizes in a Distribution Network

Leak sizes follow extreme distributions.

Opportunity for significant emissions reduction if small fraction of large leaks can be rapidly identified and repaired.



Leak Bin (A_i)	Leak Size Range (ft ³ /hr)	% of Leaks	Average Leak Size (ft ³ /hr) $EF(A_i)$	% of Emissions
A_1	$[10, \infty[$	2%	25.2	39%
A_0	$[1, 10[$	20%	2.8	46%
A_{-1}	$[0.1, 1[$	48%	0.4	15%
A_{-2}	$[0, 0.1[$	30%	0.04	1%

Lamb, 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.

Vision: To exceed customer expectations regarding natural gas service, customer interaction, safety, and reliability using natural gas automation technology



The automation of gas meters will allow NGD to improve safety, customer experience, and operational efficiencies by leveraging fixed networks and connected devices

Panel - Questions & Answers





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AMI-enabled Natural Gas Detectors

Nickolas Hellen

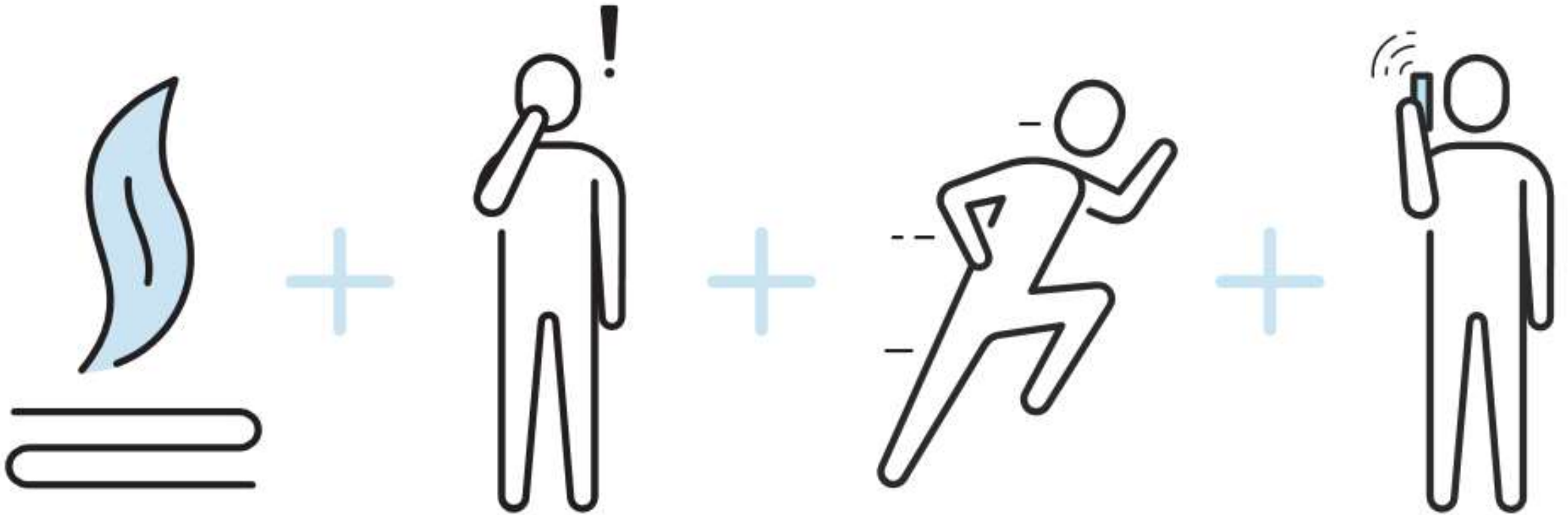
Chief Engineer – Gas Distribution

Findings From the Harlem Incident



- 10 consumers smelling gas and **did not** react
- 1 consumer smelling gas day before called Con Ed ~25 min prior to incident

Smell Gas. Act Fast.



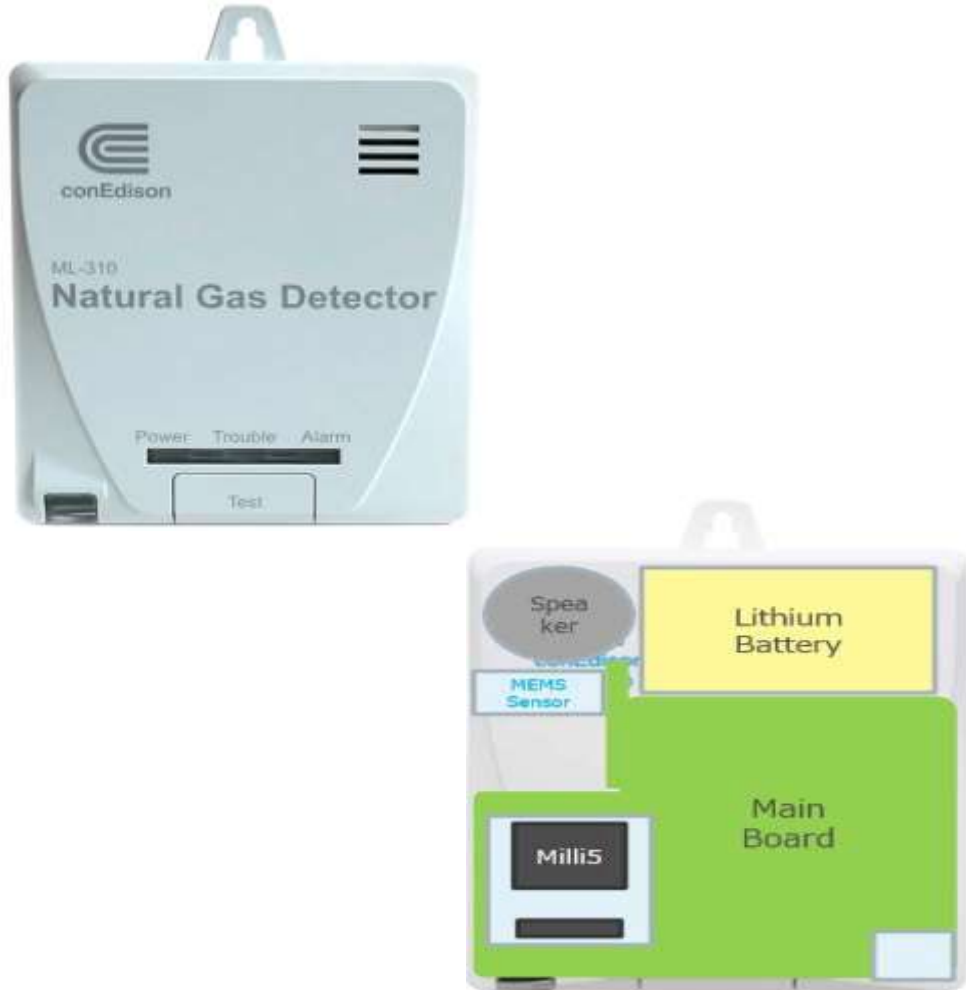
Don't assume someone else will report it.

Product Timeline & Testing

- Ensure alarmed only in response to methane
- Test sensor performance at 10% LEL (UL-1484 was 25% LEL)
- Testing showed no response to household products
 - Ethanol, acetone, paint thinner, stain remover, adhesives, polish, bathroom cleaner, sprays, fresheners, ammonia, hydrogen-sulfide & bleach

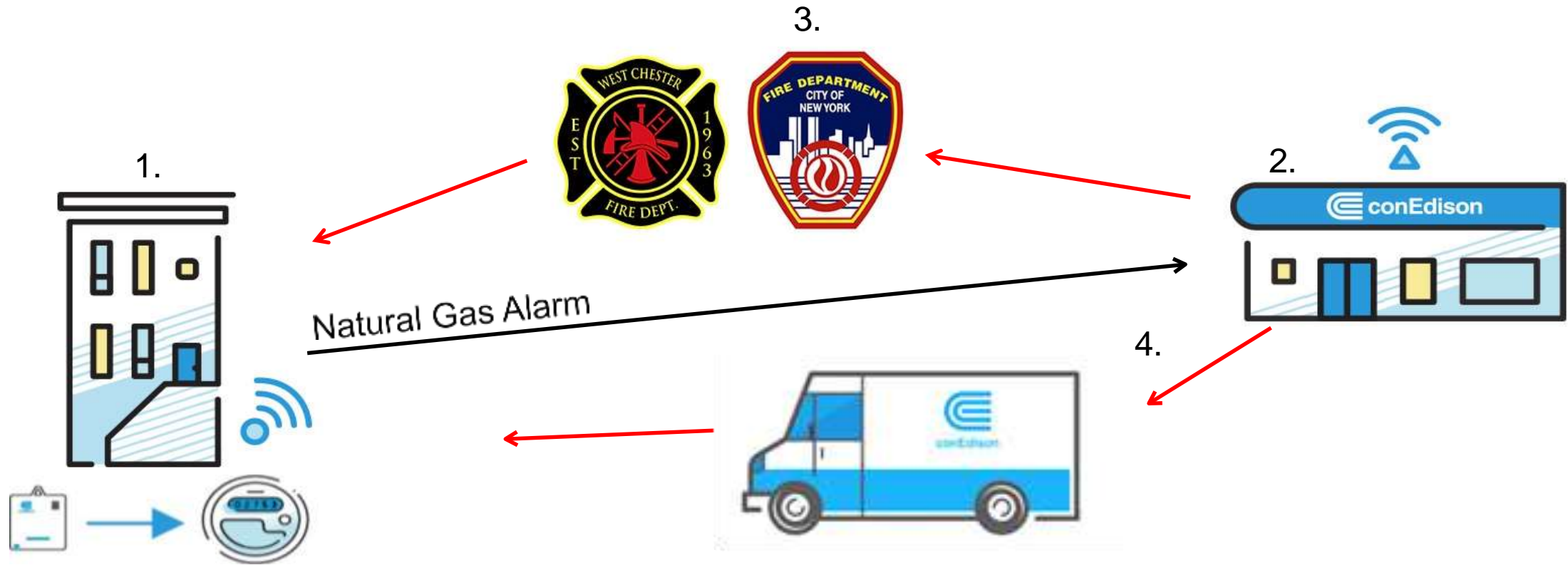


Final Product



- 5-6-7year life span
 - 10-year life pending in 2023
- UL and FCC certified
- Alarms (methane) 10% LEL
- Provides local audible alarm
- Alarm through Advanced Metering Infrastructure (AMI) Network
- No customer maintenance required

Response & Coordination



What Does The AMI Natural Gas Detector Communicate?

Main Functionality

- Gas Alarm
 - 10% LEL reached
 - Continuous messaging transmission
 - Audible sound locally always available

Maintenance & Reliability Features

- Heartbeat
 - Every 8 hours
- Low Battery
- Sensor Issue

Examples - Installation Locations



Warning Tag

**WARNING**

This device detects the presence of NATURAL GAS, which can IGNITE or EXPLODE, CAUSING SERIOUS INJURY or DEATH. NEVER IGNORE ANY ALARM.
DO NOT TAMPER WITH THIS DEVICE OR ITS BATTERY OR MOVE OR RELOCATE THE GAS DETECTOR FROM WHERE IT IS INSTALLED.
Doing so could disable this device, cause it to malfunction, and/or result in serious injury or death.
A yellow blinking light indicates that the Gas Detector may not be functioning properly or that its battery may be running low. CONTACT CON EDISON IMMEDIATELY AT THE PHONE NUMBER BELOW IF YOU OBSERVE A YELLOW BLINKING LIGHT.

Read and follow the other important Safety Information & Warnings for this Gas Detector available at:
conEd.com/NaturalGasDetector
or by scanning this QR code:



EVACUATION PROCEDURE

If at any time you SMELL NATURAL GAS or THE ALARM ON THIS DEVICE SOUNDS:

1. EVACUATE IMMEDIATELY and take others with you.
2. Do NOT use a phone, light a match, or turn on or off any light switches, flashlights, or appliances. Doing so could IGNITE a FIRE or EXPLOSION.
3. CALL 911 once you are safely outside the premises.
4. Do NOT reenter until told to do so by authorities.

**conEdison**

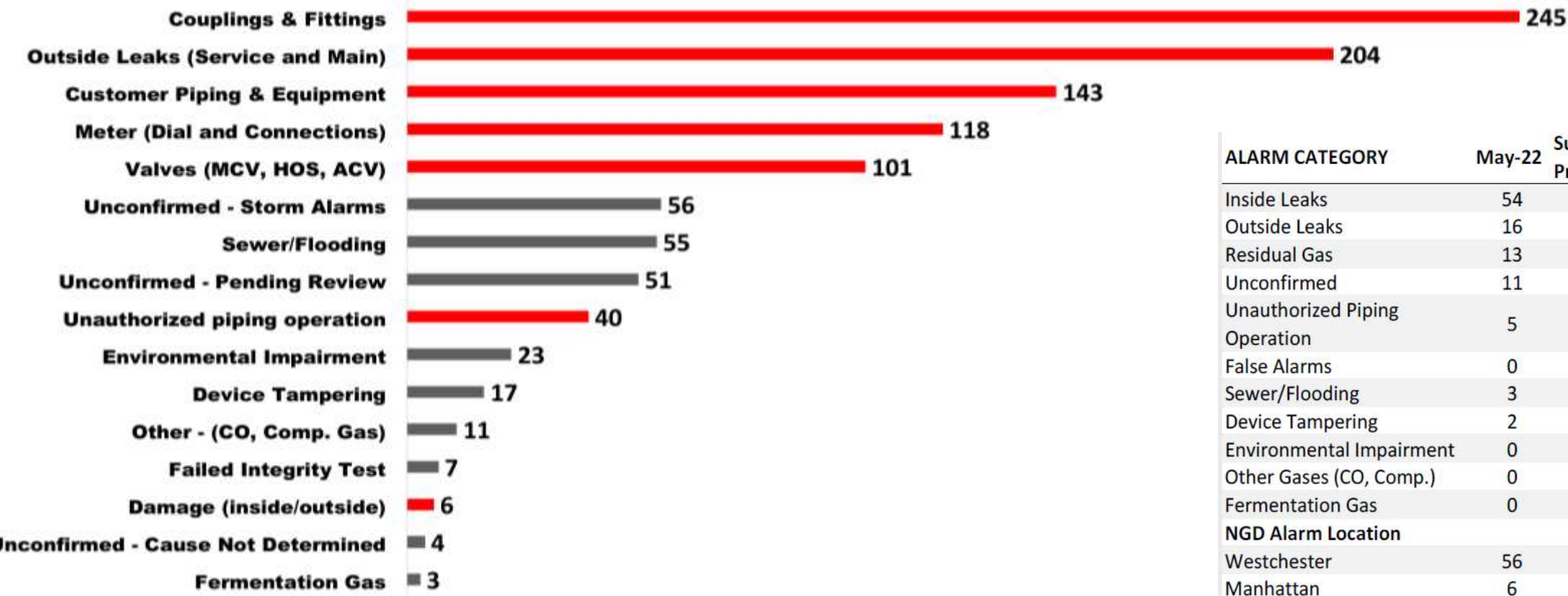
Natural Gas Detector
For information or questions, call
1-800-75-CONED (1-800-752-6633).
Mira el otro lado para español.
中文請見背面說明
다른 한 면에 참고 정보
См. другую сторону с русскими текстом
आपका पत्र पाना आना ठीक है (मधुन)

Deployment Status

				Unit Life %		
	Services	NGDs	% Installed			
As of		7/10/2022		5-yr	6-yr	7-yr
BRONX	84,034	18,446	22%	0%	26%	74%
MANHATTAN	42,283	4,791	11%	15%	45%	40%
QUEENS	103,741	26,646	26%	0%	27%	73%
WESTCHESTER	147,924	84,830	57%	7%	79%	14%
Grand Total	377,982	134,713	36%			

- Initial deployment of all units is from 2020-2025

Gas Leak Alarm (GLA) Cause



ALARM CATEGORY	May-22	Subtotal Program	% of Total Alarms
Inside Leaks	54	617	49%
Outside Leaks	16	207	17%
Residual Gas	13	149	12%
Unconfirmed	11	111	9%
Unauthorized Piping Operation	5	40	3%
False Alarms	0	14	1%
Sewer/Flooding	3	55	4%
Device Tampering	2	17	1%
Environmental Impairment	0	23	2%
Other Gases (CO, Comp.)	0	11	1%
Fermentation Gas	0	3	0%
NGD Alarm Location			
Westchester	56	1022	82%
Manhattan	6	106	9%
Bronx	19	50	4%
Queens	23	69	6%
Total Program	104	1247	

*Environmental Impairment alarms are due to building fires or water damage

Example GLA – Street Leak Entering from Telephone Point-Of-Entry

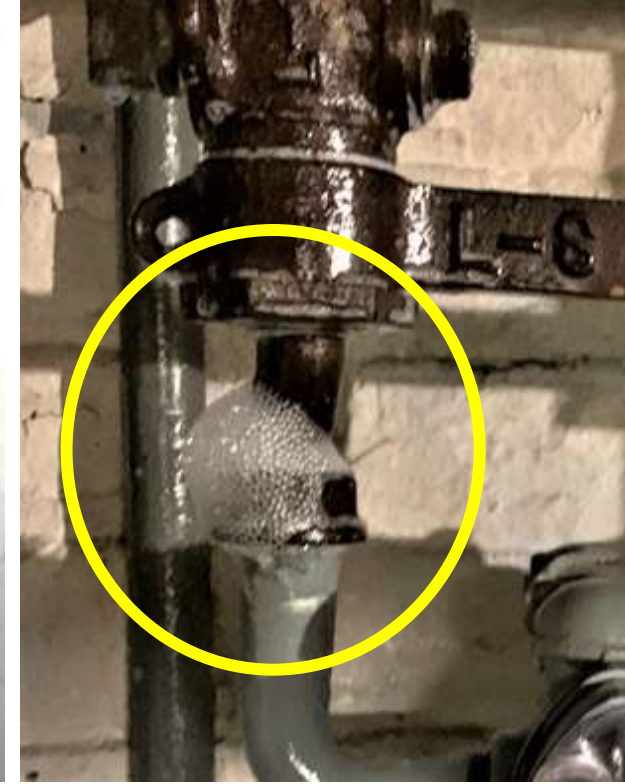


Example GLA – Outside Leak from Cracked CI Main

- Two detectors alarmed during a cracked cast iron gas main leak



Examples of Inside Pipe Leaks



Questions?





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NARUC Pipelines and New Technologies

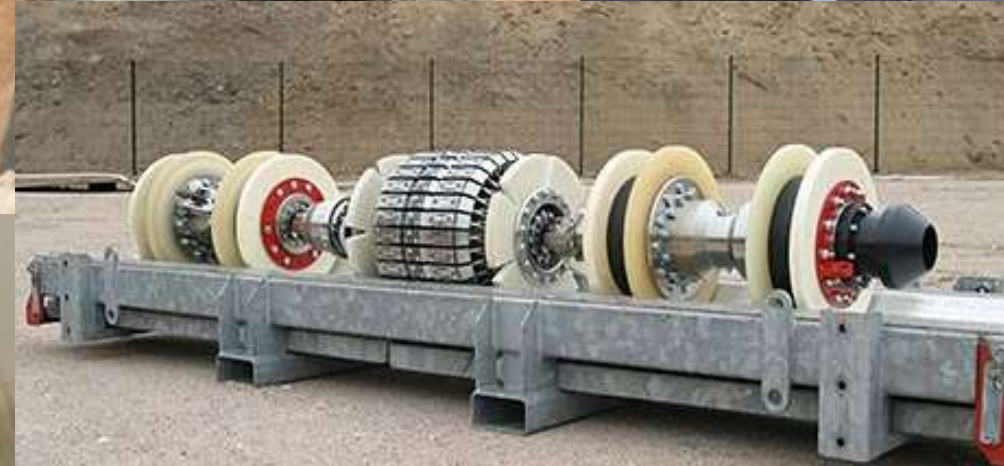
7/17/2022, San Diego CA

- **INGAA previously reviewed the Integrity Management Continuous Improvement (IMCI) 2.0 program with NARUC**
- **INGAA and its members are always evaluating new technologies that fit the needs of their systems**
- **The following are IMCI 2.0 technology initiatives that are being pursued by INGAA member companies**
 - Rupture Detection and Response
 - Managing Emissions from Integrity and Maintenance Work
 - Develop EMAT In-Line Inspection Technical Guidance
 - Facilitate Regulatory Acceptance of Non-Traditional Pipe
 - Safe Transportation and Storage of Hydrogen and RNG on Pipeline Systems

Assessment Technologies

Technologies Used

- MFL
- Material Determination
- UT & Guided Wave
- EMAT
- IC Electrical Probe



Methane Emission Reduction Technologies

Technologies Used

- LiDAR
- Pump Down Compression
- Satellite
- Drones
- OGI Camera



Thank you

Eric Taylor, Director Pipeline Safety Management Systems

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Eric.Taylor@bhegts.com

www.brkenergy.com/our-businesses/bhe-gts

www.INGAA.org





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Thanks for attending.
The welcome reception begins at
5:00 pm.