WWW.HEATHUS.COM

certified WBENC WOMEN'S BUSINESS ENTERPRISE

Inside Gas Leak Detection

South Dakota/North Dakota
Pipeline Safety Operator Training

Paul Wehnert
p.wehnert@heathus.com

Heath®
Your Safety Our Commitment

About Heath

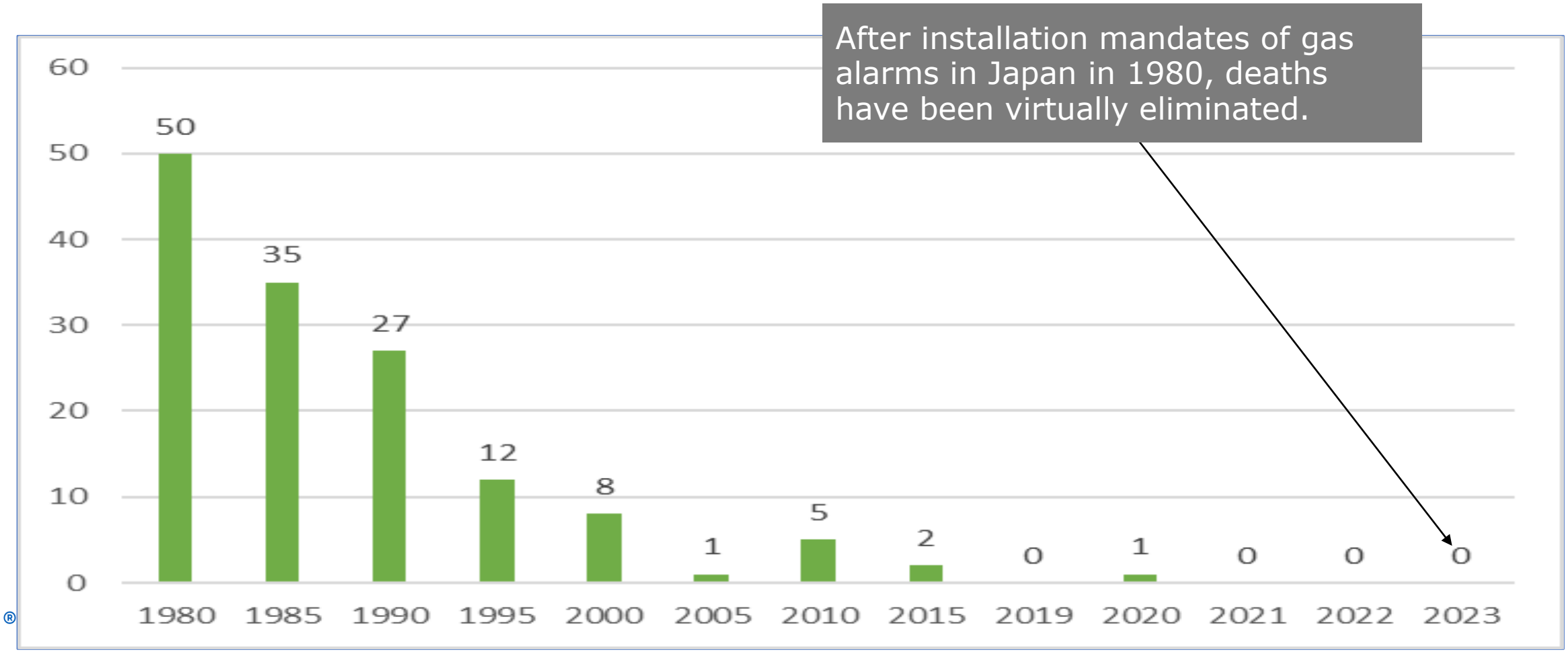
- Third-generation family-owned business founded in 1933
- Provide leak detection technologies and field services to natural gas utilities worldwide
- Over 1,800 employees across the United States
- Certified Woman’s Business Enterprise National Council (WBENC)
- Corporate Office – Houston, Texas USA

New Cosmos Electric

Since 1964, New Cosmos Electric has been the world-leader in residential gas explosion prevention – 70M alarms sold worldwide

- 1st residential natural gas alarm in the world
- 1st to develop UL 1484 battery powered residential NGD
- 1st battery powered AMI NGD mass scale deployment in the U.S.
- 1st to develop wirelessly integrated gas alarm product
- 1st to develop & launch 10yr battery powered wireless NGD w/ Mobile Application in the world
- **New Cosmos USA** EST. 2018 | Headquartered in Chicago, IL

Japan Case Study



MEMS Methane Sensor

- The MEMS sensor is much smaller than the conventional sensors. This size reduction allows 600X power saving with same features of a hot- wire semiconductor sensor.
- Features:
  - High selectivity to methane gas
  - 1% LEL lowest detection point
  - 10% LEL methane alarm threshold for 10 yrs.
  - 600X more power-saving vs. conventional sensors
  - Fast reaction time due to miniaturized sensor size
  - Sensor is UL2075 certified

NEW COSMOS MEMS METHANE SENSOR

New Cosmos succeeded in reducing the sensor size to be used for battery-powered gas alarms. Our MEMS sensor is much smaller than the conventional sensors. This size reduction allows 600X power saving with same features of the hot-wire semiconductor sensor.

FEATURES

High selectivity to methane gas

1% LEL lowest detection point

10% LEL methane alarm threshold for 10 yrs.

600X more power-saving vs. conventional sensors

Fast reaction time due to miniaturized sensor size

Sensor is UL2075 certified

Connected & Non-Connected Models

- Lorawan Network Compatible (806NLR)
- Itron Network Compatible (810NIT)

- Natural Gas & CO Alarm (DD622NCV)
- Natural Gas Alarm (DD620NV)

Gas Leak Detection Evolution

NETWORK TECHNOLOGY ROADMAP

2018
Itron (ConEd)
5-yr RMD

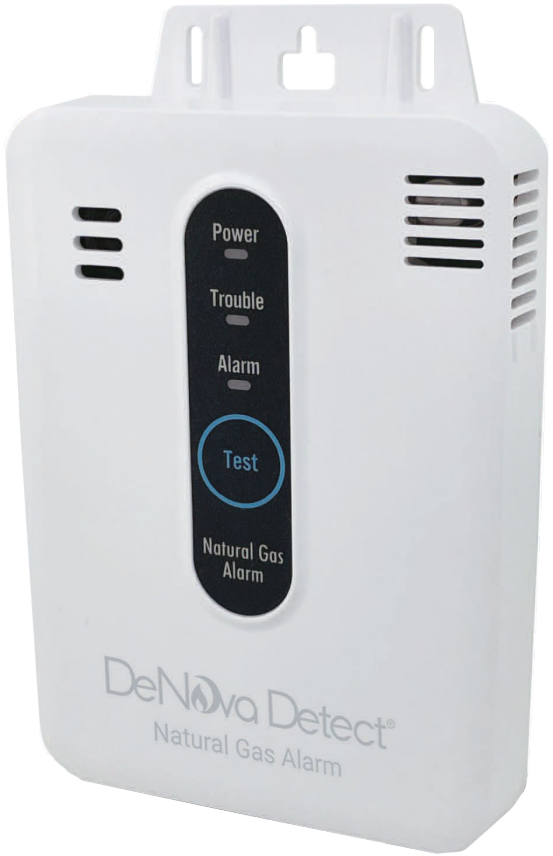
2021
Itron + LoRa
CE7 (ConEd)
806NLR (Pilot-ready)

2023
Itron + Amazon
CE10 'Industry 1st'
807NAS (Sidewalk) 'Industry 1st'

2024
LoRa + LTE
810NLR (Q2)
810NLTE (Q2)

Wireless Integration

New Cosmos USA daughter board easily integrates with utilities' wireless network.

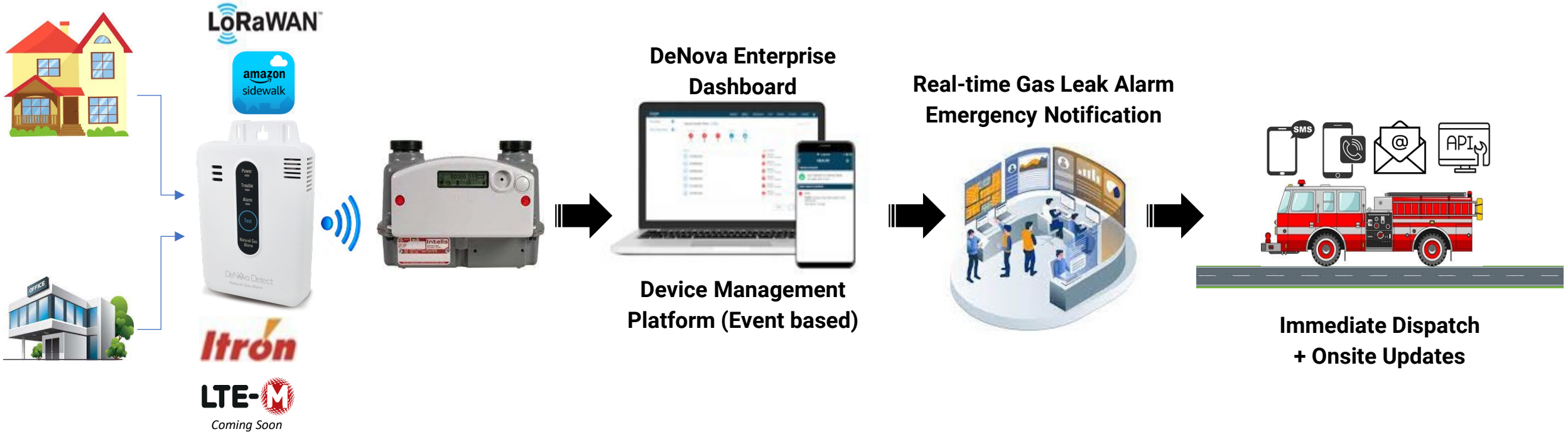


EXAMPLES OF PAYLOAD DATA

- Timestamp of payload message
- Hours spent powered on
- Status:
  - Low battery
  - System functionality
  - Gas alarm notifications
  - Gas alarm concentration
  - Measured in 1% LEL intervals up to 30% LEL

Smarter Gas Leak Detection

Automated 'Chain-of-Communication' options for Utilities



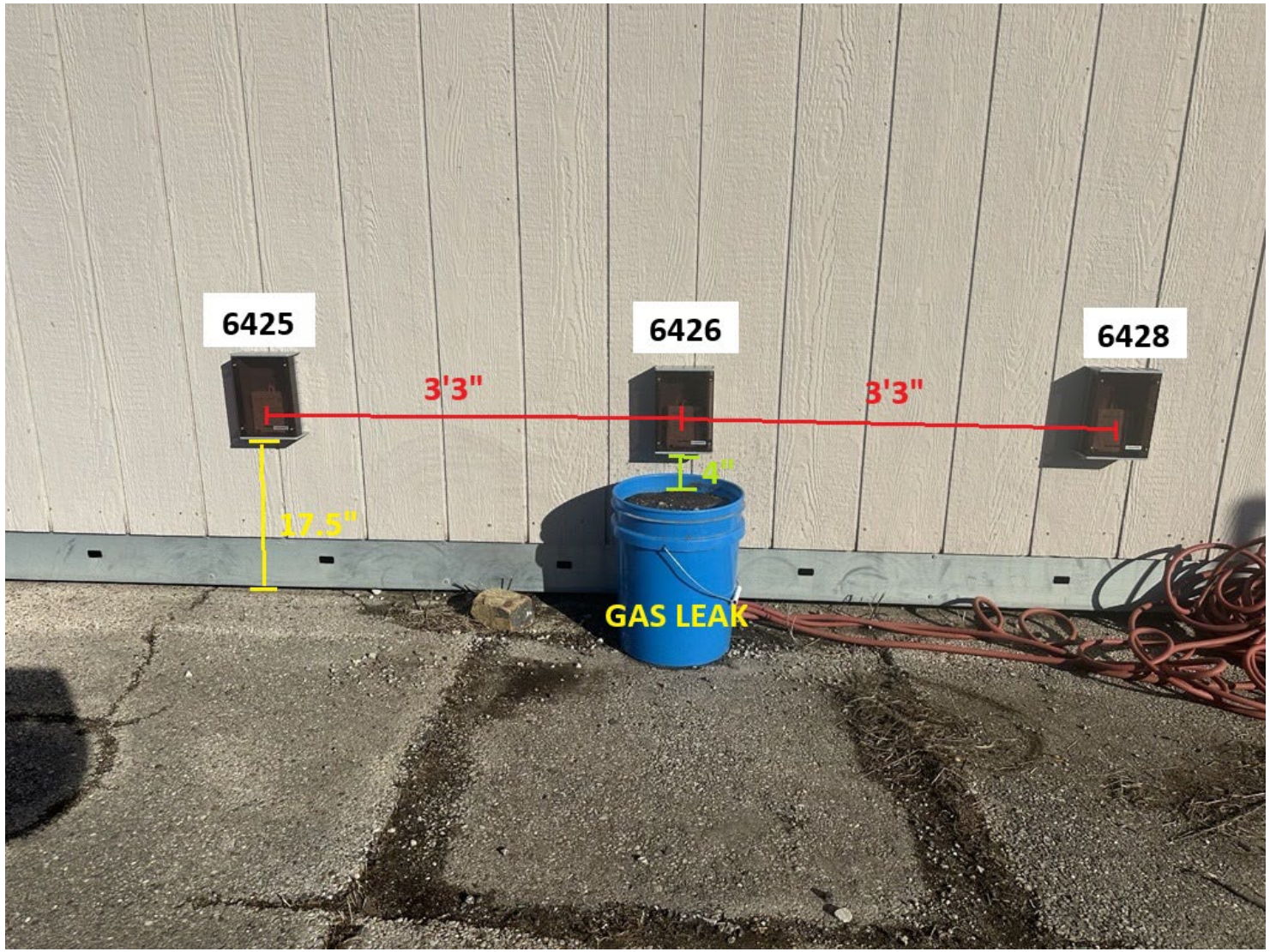
Detection > Notification > Response

The Future of Leak Detection

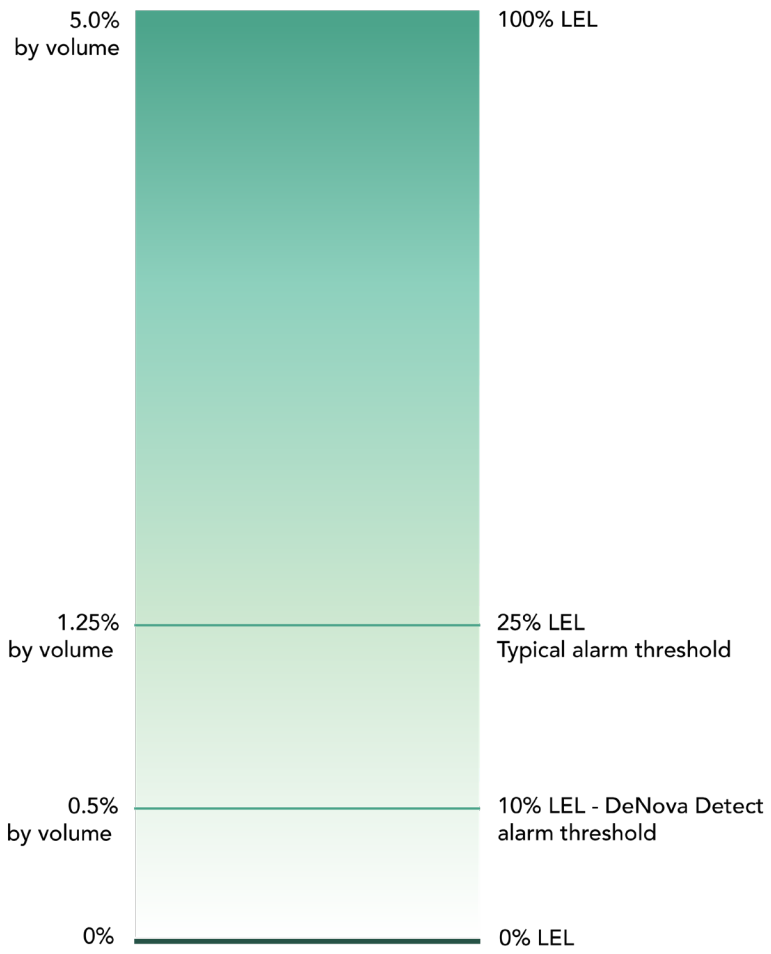
Gas Sensor R&D Roadmap

Q4/23’	1H/24'	2H/24'	1H/25'
Methane + Carbon Monoxide	Hydrogen Sulfide	Propane	Hydrogen

Outside Sensor Testing



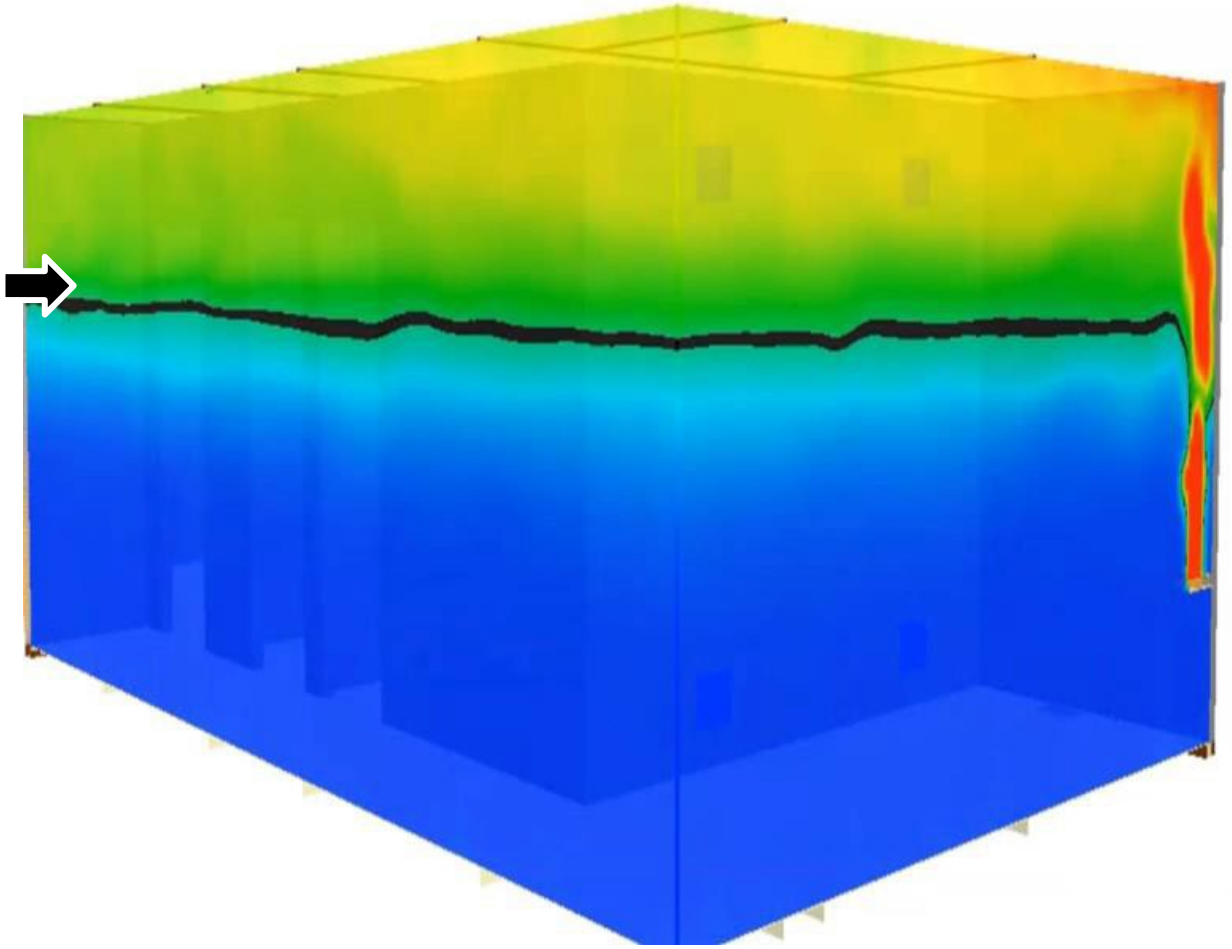
Natural Gas Danger Levels



- Typical alarm threshold set by competitors is 25% LEL, while the DeNova Detect gas alarm is set to 10% LEL
- Due to the lower alarm threshold, DeNova Detect gas alarm enables occupants to respond approximately 11 minutes sooner than a typical gas alarm

Natural Gas Leak Simulation

10% LEL



Color Key:

Natural Gas Accumulation

Undetectable levels of natural gas

Denova Detect battery powered alarm installed near ceiling 10% LEL

Competitors plug-in alarms mounted near the floor. Dangerous level of gas has not reached floor level at 20-25% LEL

Source: Fire & Risk Alliance

Proven Nuisance Resistant Gas Alarm

- Testing by the Gas Technology Institute (GTI) reveals the MEMS sensor's immunity to typical household chemicals, due to the filter cap placed on the sensor.
- Virtually eliminates nuisance alarms

Table 3. List of Test Household Products and Chemicals

Test Material	Supplier or Brand
Methane	Matheson (tech grade)
Propane	Matheson (CP grade)
Ethanol	Sigma-Aldrich (bio grade)
Acetone	Sigma-Aldrich (industrial grade)
Paint Thinner	Mineral Spirits (odorless)
Laundry Detergent	Tide® Advanced Power Plus Bleach Alternative Original Scent HE
Stain Remover	Carbona® Stain Devils
Cyanoacrylate Adhesive	Super Glue®
Bathroom Cleaner	Scrubbing Bubbles®
Home Dry Cleaning Kit	Dryel®
Fabric Freshener	Febreze® Air Effects - Linen & Sky
Aerosol Hairspray	Suave® Max Hold Unscented
Furniture Polish	Old English® Almond
Bleach	Clorox®
Household Ammonia	Essential Everyday®
Duster Spray	Blow Off®
Disinfectant Spray	Lysol®
Oven Cleaner	Easy-Off® Heavy Duty
Rust Stain Remover	LIME-A-WAY®
Hydrogen Sulfide	GTI technical blend

Validated by Gas Technology Institute report, Evaluation of Residential Methane Detectors, Phase III. Project No. 21696

Codes & Standards

UL1484

These requirements cover gas detectors intended to detect flammable gases such as Natural Gas and Propane

The UL Standard will be lowered from 25% to 10% LEL

UL 1484 – Ignition Test

- 48.1 Under intended and overvoltage operating conditions, the detector shall not be a source of ignition for the particular gas it is intended to detect.
- 48.2 To determine compliance with 48.1, the gas detector is to be installed in a test chamber. The gas detector is to be operated in the normal standby condition and the most easily ignitable mixture of the intended gas and air is to be introduced into the chamber. See 48.3. The gas detector is then to be operated in the alarm condition and the input voltage then increased to 110 percent of rated voltage. There shall not be ignition of the gas-air mixture in the test chamber during 10 minutes of exposure.
- 48.3 For the test described in 48.2, the most easily ignitable concentration of gas and air for a detector intended to detect natural gas is to be a 8.3 ±0.3 percent by volume mixture of methane and air. If the detector is intended to detect LP-gas or both LP-gas and natural gas, the mixture is to be a 5.25 ±0.25 percent by volume mixture of propane and air.

Codes & Standards

NFPA715

- The NFPA715 Standard was approved and released May 2022
- Natural gas alarms are recommended in every room where there is a gas appliance
- Installation must be up to 12” from the ceiling

NFPA 715 RECOMMENDATIONS:

- ✓ Install on wall within 12 inches of ceiling where natural gas rises first
- ✓ Should be **3-10 feet** horizontally from gas appliances
- ✓ Alarms are set to **10% LEL** as a standard requirement
- ✓ DeNova Detect natural gas alarms are **100%** battery-operated allowing for easy placement in accordance with NFPA 715 and earliest detection and warning

ALARM PLACEMENT GUIDE

One Natural Gas Alarm is Not Enough.

NTSB Improve Pipeline Leak Detection and Mitigation

Regulators should:

- Require methane-detection systems in residential occupancies with gas service.

Industry groups should:

- Revise the National Fuel Gas Code, National Fire Protection Association 54 to require methane-detection systems for all types of residential occupancies with gas service.

PHMSA LDAR NPRM 2023

"Another emerging area of industry interest is in-home methane detection. While gas piping downstream from the outlet of a customer meter is not regulated under the Federal pipeline safety regulations, PHMSA encourages the adoption of in-home methane detectors by operators, States, and standards developing organizations. As a result of NTSB investigations into a series of gas-related incidents in a neighborhood in Dallas, Texas in late February of 2018, and an investigation into an apartment explosion in Silver Spring, MD, the NTSB included in-home methane detection on its 2021-2022 NTSB Most Wanted List. NTSB recommended that the International Code Council, the National Fire Protection Association, and the Gas Technology Institute (GTI) cooperate to develop standards and incorporate provisions in applicable national codes to require methane detection systems for all types of residential occupancies with gas service. The NTSB recommended that, at a minimum, these requirements should cover the installation, maintenance, placement of the detectors, and testing requirements.

The PST and other public safety advocacy groups have also called on operators to install this technology wherever possible to provide for better public and environmental safety, as this technology can provide an extra level of protection against dangerous leaks. At the 2021 Public Meeting, the PST stated that the increased usage of in-home methane detectors would be relatively inexpensive and have the potential to dramatically reduce injuries, property damage, and deaths resulting from leaks and explosions from gas distribution systems."

ConEd Case Study - New York

- Started Mass Deployment of 400K AMI enabled natural gas detectors starting in 2020
- 275,000 units installed through YE 2024
- Over 5,000 alarms received – 15% from underground utility infrastructure
- ONE false alarm due to a defective detector
- Several serious events averted due to the early warning of gas leaks
- Separately ~70,000 standalone natural gas alarms distributed to targeted customers

Comprehensive Industry Approach To Consumer Adoption

- Evaluation of device response to varying levels of Methane
- Impacts on performance from common household environmental changes (e.g., temperature and humidity)
- Evaluation of proper placement to ensure detection if a release occurs >>> NFPA715 Developed
- Evaluation of proper placement to ensure detection if a release occurs >>> NFPA715 Developed

*The industry came together to address the barriers to consumer adoption and put science around placement and detection thresholds with the development of **NFPA 715** and the update to **UL 1484**.*

- Evaluation of existing UL Standards and Recommendations for improvements including lowering the detection threshold from 25% LEL to 10% LEL >>> UL1484 Updated
- Effects of common household chemicals on “false positive” detection & alarm including contaminants (e.g., hairspray, bleach, detergent, etc.)
- Consumer behavior studies and public awareness improvements

Industry Interest and Recognition

This Project Spanned the Globe with Multiple Stakeholders

- American Gas Association (AGA)
- Northeast Gas Association (NGA)
- U.S. & European utility operators
- NTSB & Public Service Commission
- GTI Energy
- Various manufacturers & vendors
- National Fire Protection Association (NFPA)
- Underwriters Laboratories (UL)
- Insurance risk underwriters

Natural Gas Alarms and Utility Customer

- Reinforces utility dedication to their safety
- Encourages customers to follow gas safety measures
- Presence of the alarm with audio and visual indications reminds customers of gas safety practices
- Opportunity to present additional safety tips
  - appliance safety tips
  - what to do in case of gas odor

General Public & Media Opportunities

General Public

- Creates awareness of gas safety
- Can improve public perception of the company
- Positive press coverage that can be leveraged
- A platform for live news interviews if desired to make many other good points about the company

Multi-Media

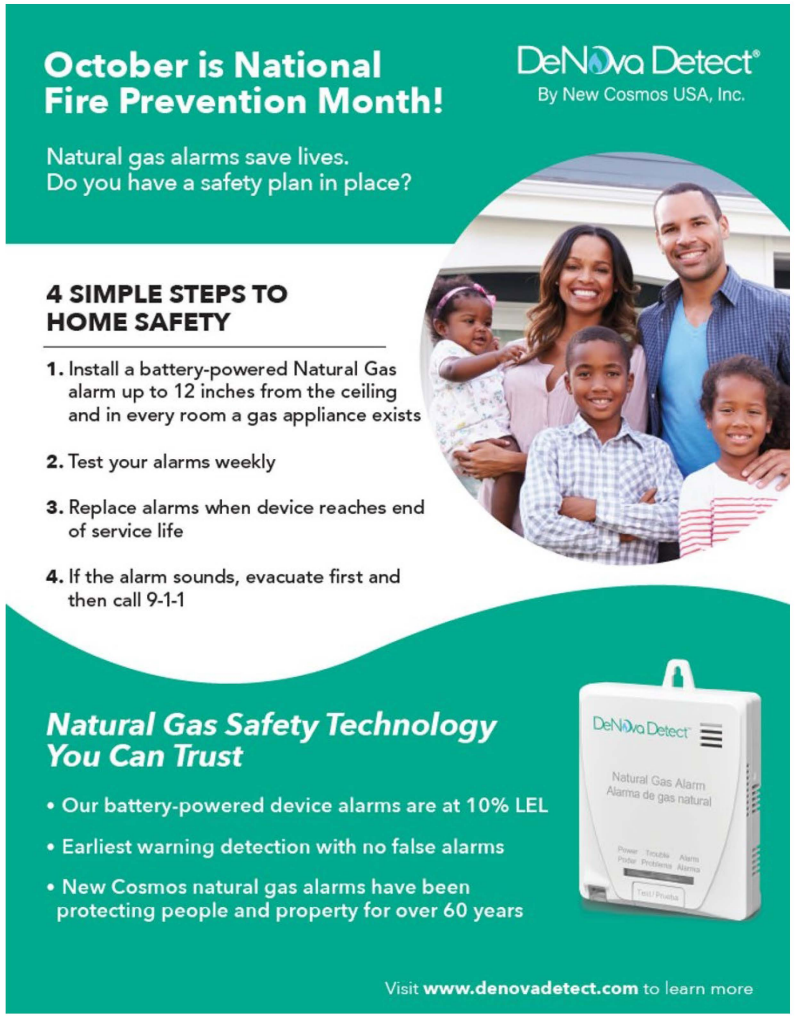
- Opportunity for positive media coverage
- Possibly advertise the program in the media to gain improved image and media favor
- Use the RMD program for a broader gas safety education initiative which would be favorably looked upon by regulators and the general public.

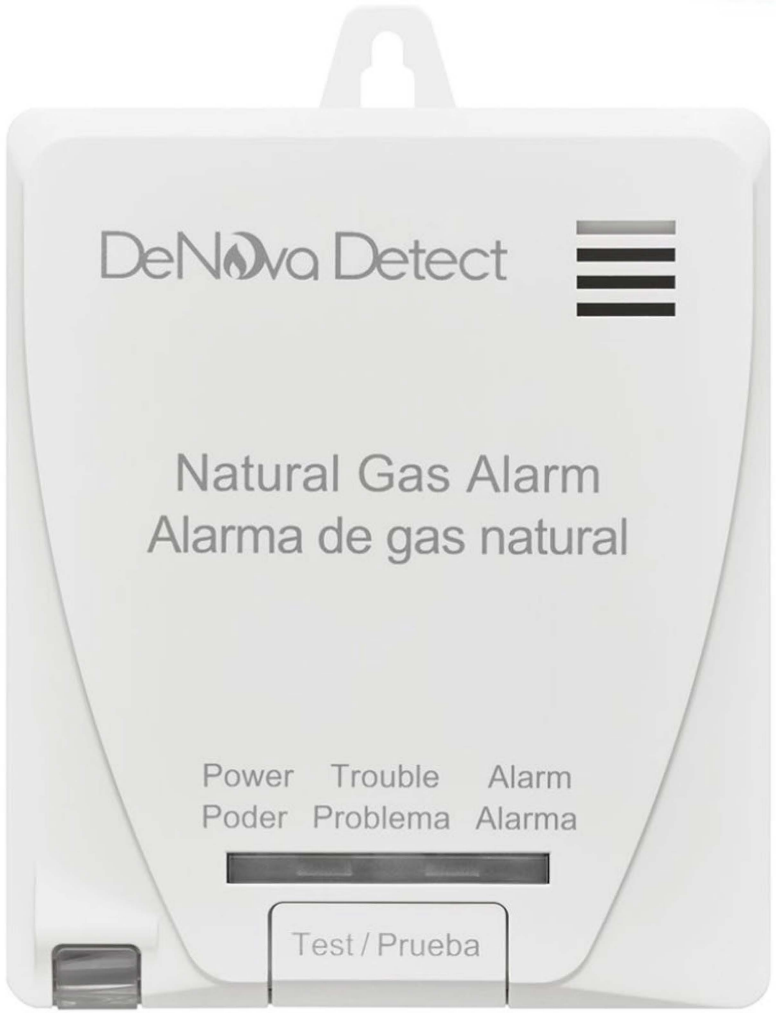
Bill Stuffer Program Sample

- Creates valuable good will
- Protects customers from potential gas leak incidents
- Improves company reputation for gas safety
- An opportunity for interviews to improve company image

Sample Box


HEATH CONSULTANTS
Your Safety... Our Commitment
DeNova Detect
Natural Gas Alarm
Alarma de gas natural
ML-310ES
MADE IN JAPAN
HECHO EN JAPON
BILL STUFFER & GAS SAFETY EDUCATION
OFFER FREE OR DISCOUNTED DEVICES
24-HOUR PROTECTION


October is National Fire Prevention Month!
DeNOva Detect®
By New Cosmos USA, Inc.
Natural gas alarms save lives.
Do you have a safety plan in place?
4 SIMPLE STEPS TO HOME SAFETY
1. Install a battery-powered Natural Gas alarm up to 12 inches from the ceiling and in every room a gas appliance exists
2. Test your alarms weekly
3. Replace alarms when device reaches end of service life
4. If the alarm sounds, evacuate first and then call 9-1-1
Natural Gas Safety Technology You Can Trust
• Our battery-powered device alarms are at 10% LEL
• Earliest warning detection with no false alarms
• New Cosmos natural gas alarms have been protecting people and property for over 60 years
Visit www.denovadetect.com to learn more


DeNOva Detect
Natural Gas Alarm
Alarma de gas natural
Power Trouble Alarm
Poder Problema Alarma
Test / Prueba

QUESTIONS?

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