



# GOING BEYOND THE NOSE

A Proven Addition to Gas  
Odorization

A Critical Layer of Protection  
for Natural Gas Safety

Marc A. Adams, Vice President

# OUR MISSION

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*TO PROTECT PEOPLE  
AND LIVES WITH  
INNOVATIVE GAS  
SAFETY PRODUCTS*

65  
YEARS

Eliminating gas accidents  
around the world is at the  
heart of everything we do.



# KEY INDUSTRY CONSIDERATIONS



## Utilities

*Employee Safety & Awareness  
Automated Meter Infrastructure (AMI)  
Rate Base Justifications (Repair/Replace)  
Odorization + Natural Gas Detectors*

## Regulators

*Gas Service Line Inspections  
Gas Leak Detection Solutions  
Indoor Meter Monitoring  
Rate Payer Advocacy (Expenses)*



## First Responders

*Firefighter Safety Measures  
Gas Safety Advanced Technology  
Safety Training & Education Practices*

## Residents

*Seniors, Schools, Low Income Areas  
Community Safety Awareness  
Education, Advocacy, Adoption*



# CATALYST EVENTS

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**15 Fatalities:** Shizouka,  
Japan explosion, 1980



**8 Fatalities:** East Harlem,  
New York explosion, 2014



**2 Fatalities:** East Village,  
New York explosion, 2015



**7 Fatalities:** West Reading,  
Pennsylvania explosion, 2023

# NTSB RECOMMENDATIONS

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## REGULATORS

- Require the installation of automatic shutoff valves or remote-control valves in high-consequence areas (HCA) and in class 3 and 4 locations
- Require natural gas alarms in residential occupancies with gas service

## INDUSTRY GROUPS

- Revise the National Fuel Gas Code (NFPA 54) to require natural gas alarms for all types of residential occupancies with gas service
- Add guidance identifying steps gas distribution operators can take to safely respond to leaks, fires, explosions, and emergency calls

## GAS OPERATOR | SAFETY IMPERATIVES

- **Education** about Natural Gas Detectors
- **Advocacy** for Smarter Gas Leak Detection
- **Adoption** of Natural Gas Detectors wherever people congregate



*On March 24, 2023, a natural gas explosion at the R.M. Palmer facility in West Reading, Pennsylvania resulted in fatalities, injuries, and structural damage. The NTSB's April 2025 report underscored the value of layered safety measures—including evacuation protocols and gas detection alarms—in reducing risk and supporting the safe, reliable use of natural gas.*

*“Natural gas alarms can alert people of a gas leak so they can evacuate the area.” — NTSB Pipeline Investigation Report PIR-25-01*

# Natural Gas Detectors: 101

## Key Requirements for Gas Leak Detection Prioritization

**Standards-backed:** UL-1484 defines device performance; NFPA 715 defines installation, bringing fuel-gas detection alongside smoke/CO frameworks.

**Safety threshold:** Devices warn at 10% LEL and are not ignition sources when used as listed.

**Clarity in communications:** Methane is not Carbon Monoxide, and detecting a natural gas leak requires distinct placement and actions.



*NGDs are mature, standards-driven safety devices that provide early warning distinct from CO alarms and fit seamlessly into existing life-safety practices.*

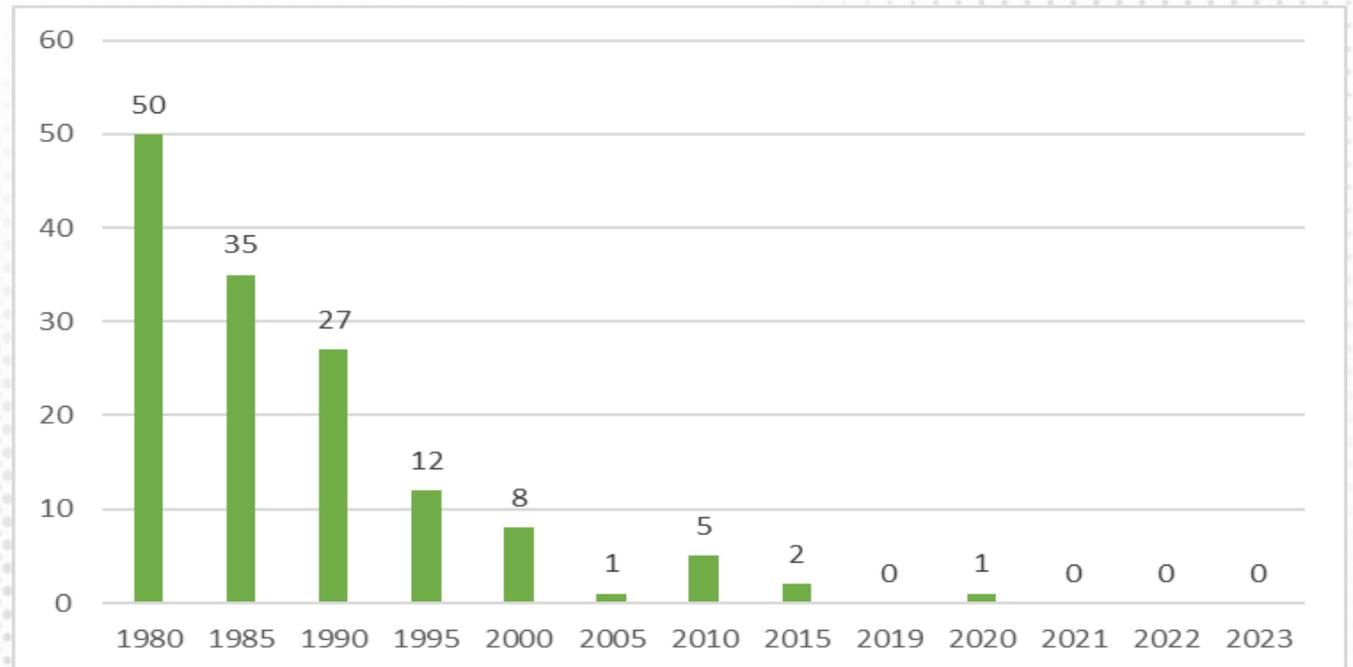
# GAS ALARMS ARE PROVEN TO HELP SAVE LIVES IN JAPAN

## THE JAPAN EXPERIENCE

**1980** – Japan mandates stand-alone gas alarms (50% use Natural gas as primary heating source)

**2021+** - Zero gas explosion deaths through awareness, propane alarm mandates, and strong methane alarm advocacy

Deaths drop from 50 per year to **ZERO**



# WHY JAPAN LEADS THE WORLD IN GAS SAFETY

The Japan approach includes:

1. **Smart Detection & Shutoff:** Gas alarms + auto shutoff during leaks & quakes
2. **Strong Infrastructure & Standards:** Seismic-resistant pipelines, strict appliance regs
3. **Utility-Led Education & Compliance:** Inspections, subsidized alarms, high adoption
4. **Cultural & Historical Drivers:** Safety culture strengthened after tragic incidents

Japan's Approach	What the U.S. Can Learn from Japan's Approach
Voluntary education and inspection programs led by major utilities	Incentivize utilities to run residential outreach and subsidize alarms
Advanced detectors with shutoff capability	Accelerate adoption of detectors with automatic shutoff valves
Seismic-trigger utility shutoffs	Expand real-time smart meters in earthquake and gas-prone regions
Industrial alarms required in high-density buildings	Update U.S. commercial codes to mandate detectors in basements, malls, and apartment complexes
High public trust and adoption	Safety campaigns using trusted messages

Japan has created one of the most robust natural gas safety ecosystems in the world.

Through advanced technology, regulations, infrastructure, and public engagement, they've virtually eliminated gas leak explosions.

# WIRELESS CONNECTED DEVICES = GAS INNOVATION

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Using **'Drop-in Sensor Technology'** to easily integrate with utilities' wireless network is the next phase of innovation...



## EXAMPLES OF PAYLOAD DATA

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- 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

# WIRELESS COMMUNICATIONS FOR GAS SAFETY SYSTEMS

## Technology Overview

### Wireless Advantages for GSS

**DeNova Detect** has proven experience with LoRaWAN, RF-Mesh, and LTE-M through development, interoperability testing, and field trials including secure connectivity, mesh and D2D functionality.

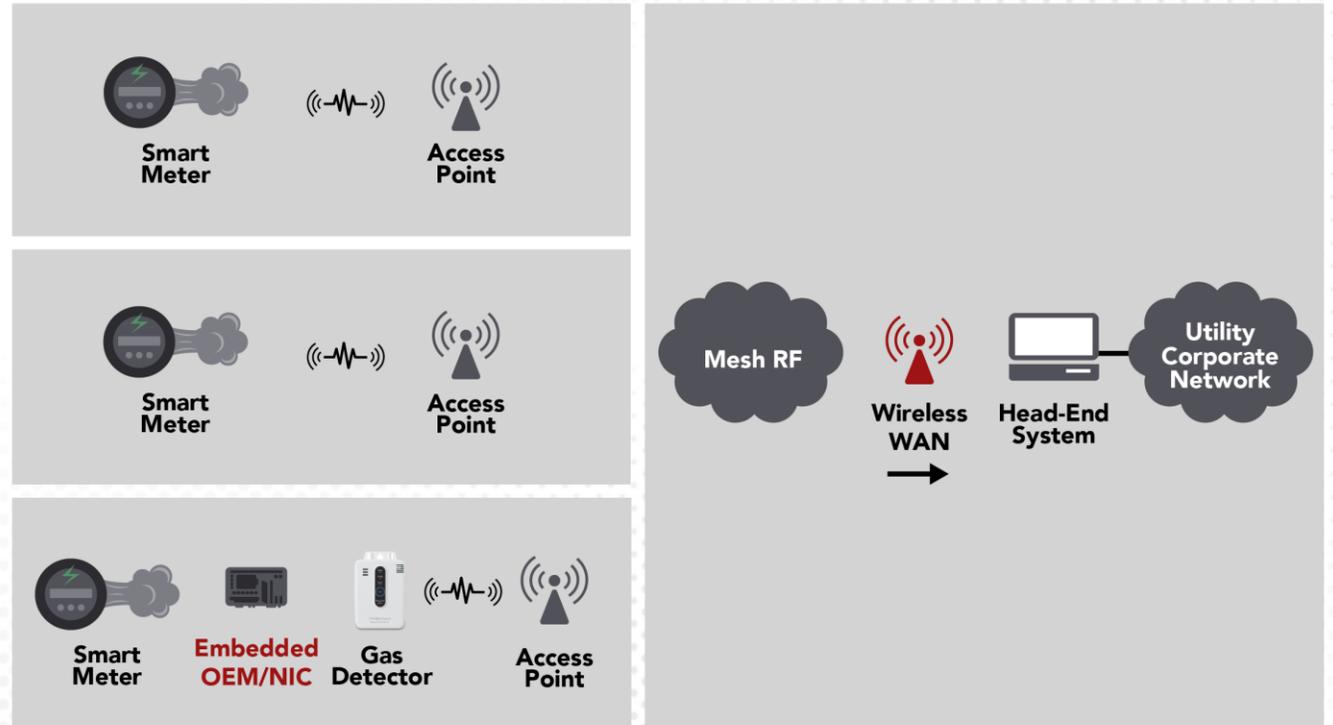
	RECOMMENDED		CURRENT	COMING SOON	
	LTE-M	LoRaWAN	RF-Mesh	Wi-SUN	DeNova Detect
Key Features	Licensed LTE spectrum; Mobility & roaming; IP-based ubiquitous networks; higher bandwidth	Unlicensed ISM band; Star-of-stars topology; AES 128-bit encryption	Sub-GHz bands; Mesh topology; AES encryption	IPv6-based sub-GHz mesh; IEEE 802.15.4g/e; Self-healing mesh	Battery-powered wireless edge sensor; Supports multiple protocols
Speed / Data Rate	~300 kbps	0.3–50 kbps	Low data rates (metering)	Up to 300 kbps	Optimized for low data rate sensing
Coverage	Nationwide via cellular networks	2–15 km (urban/rural)	Wide area via dense mesh deployments	Up to 4 km per hop; scalable	Flexible placement indoors/outdoors
Signal Propagation	Good, depends on cellular coverage	Excellent through obstacles (sub-GHz)	Strong propagation through obstacles	Sub-GHz bands for strong penetration	Operates in sub-GHz bands for robust coverage
Security	3GPP standards	AES 128-bit end-to-end encryption	AES encryption, secure key exchange	Multi-layer security; Wi-SUN Alliance certification	AES encryption and secure provisioning
Redundancy	Relies on cellular infrastructure	Limited (gateway failure affects nodes)	High redundancy via mesh topology	High redundancy via self-healing mesh	Supports fallback modes for local actuation
Benefits	High reliability & QoS; Mobility support	Low power, long battery life; Cost-effective for IoT	Long battery life; Reliable in harsh environments	Interoperable multi-vendor networks; Scalable for smart utilities	Long battery life; Compact design; Multi-network compatibility
Industry Standards	3GPP Release 13+	LoRa Alliance specifications	IEEE 802.15.4g	IEEE 802.15.4g/e; Wi-SUN FAN profile	Compliant with LoRaWAN, Wi-SUN, RF-Mesh, LTE-M integration options

# RF-MESH: OEM INTEGRATED NGD MODEL

## End-2-End AMI + Detector Enablement

### Joint-Vendor-enabled Solution

- **Lower Total Cost of Ownership & reduce** upfront infrastructure and IT expense.
- **Scalable and Flexible means to add** devices and features without major upgrades; support rapid expansion & compliance.
- **Centralized Services & Data for analysis with** real-time visibility and actionable insights from any location for faster decision-making.
- **Enhanced Security and Compliance to maintain** up-to-date encryption, certifications, and reduce cyber risk and regulatory burdens.



*\*Architecture model images are developed solely by DeNova Detect and are for informational purposes only.*

# THE U.S. EXPERIENCE

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Started mass deployment of AMI enabled natural gas detectors in January 2020

Over 287,000 units installed through YE 2025

Over 6,700 alarms received – 13% of leaks from outside 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 stand-alone natural gas alarms distributed to targeted customers

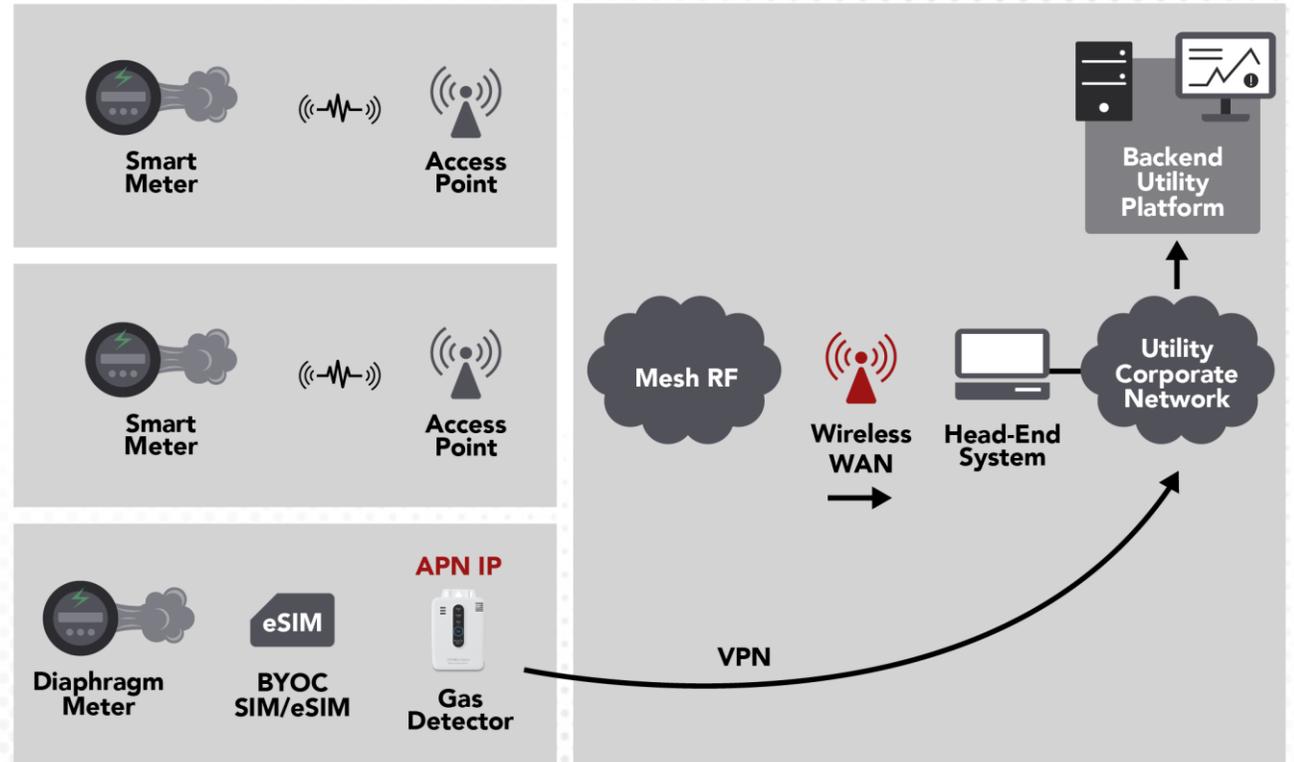


# LTE: OEM-ENABLED NGD MODEL

## OEM-Managed Gas Detector Enablement

### LTE Wireless Solution (AMI vs. Non-AMI)

- **LTE-Enabled integration** over standard wireless protocol (i.e., MQTT, etc.) into OEM Headend system
- **Customer Provided Wireless Carrier (BYOC)** options acceptable (SIM/eSIM + Data services)
- **Direct Integration to Utility Network** via secure firewall access (IT/OT Utility resources required)
- **DeNova Detect support** of backend logistics (i.e., SIM/eSIM management, provisioning at manufacturing)
- **Dual-value approach** for evaluation/testing of AMI-enabled deployment



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# WIRELESS INTELLIGENCE FOR FASTER, SAFER EMERGENCY RESPONSE

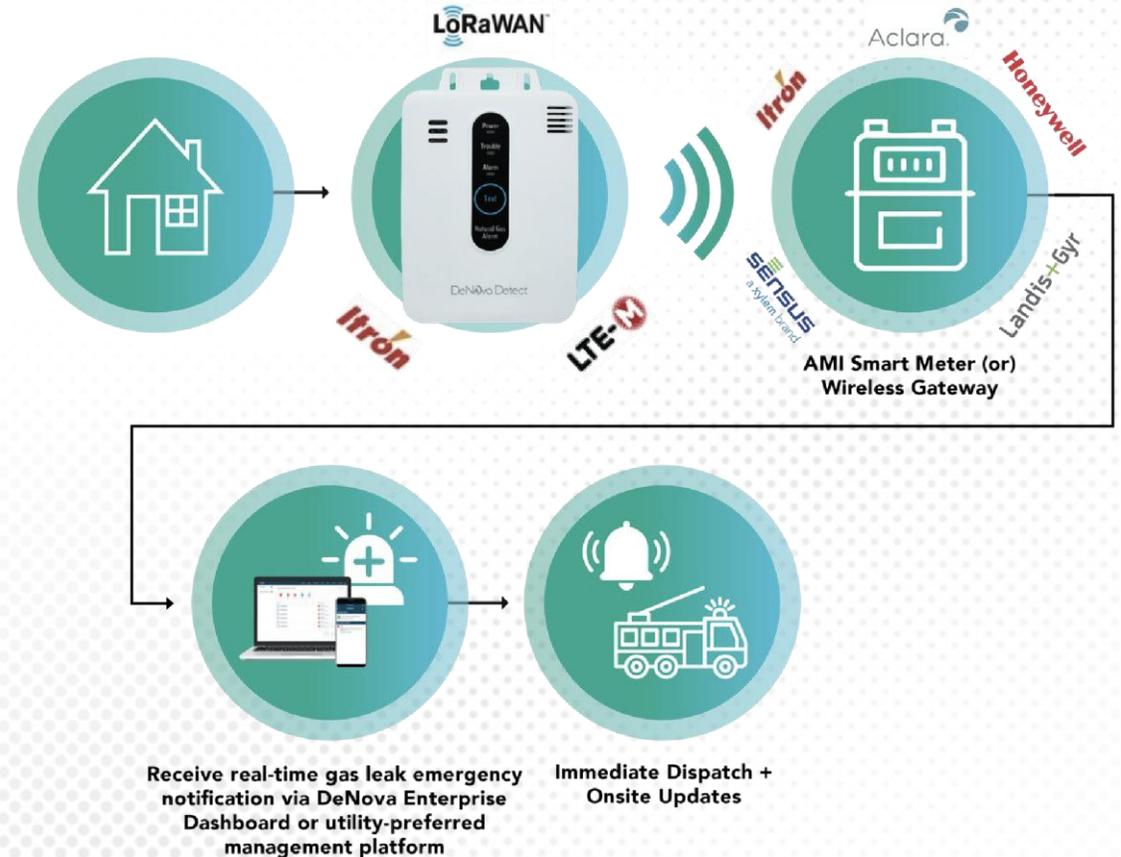
## Real-time Leak Detection & Integrated Dispatch Notification

### Communication Infrastructure

- Multi-channel communication (radio, cellular, IPv4).
- Redundant systems for disaster resilience.
- Secure messaging for sensitive operational data.

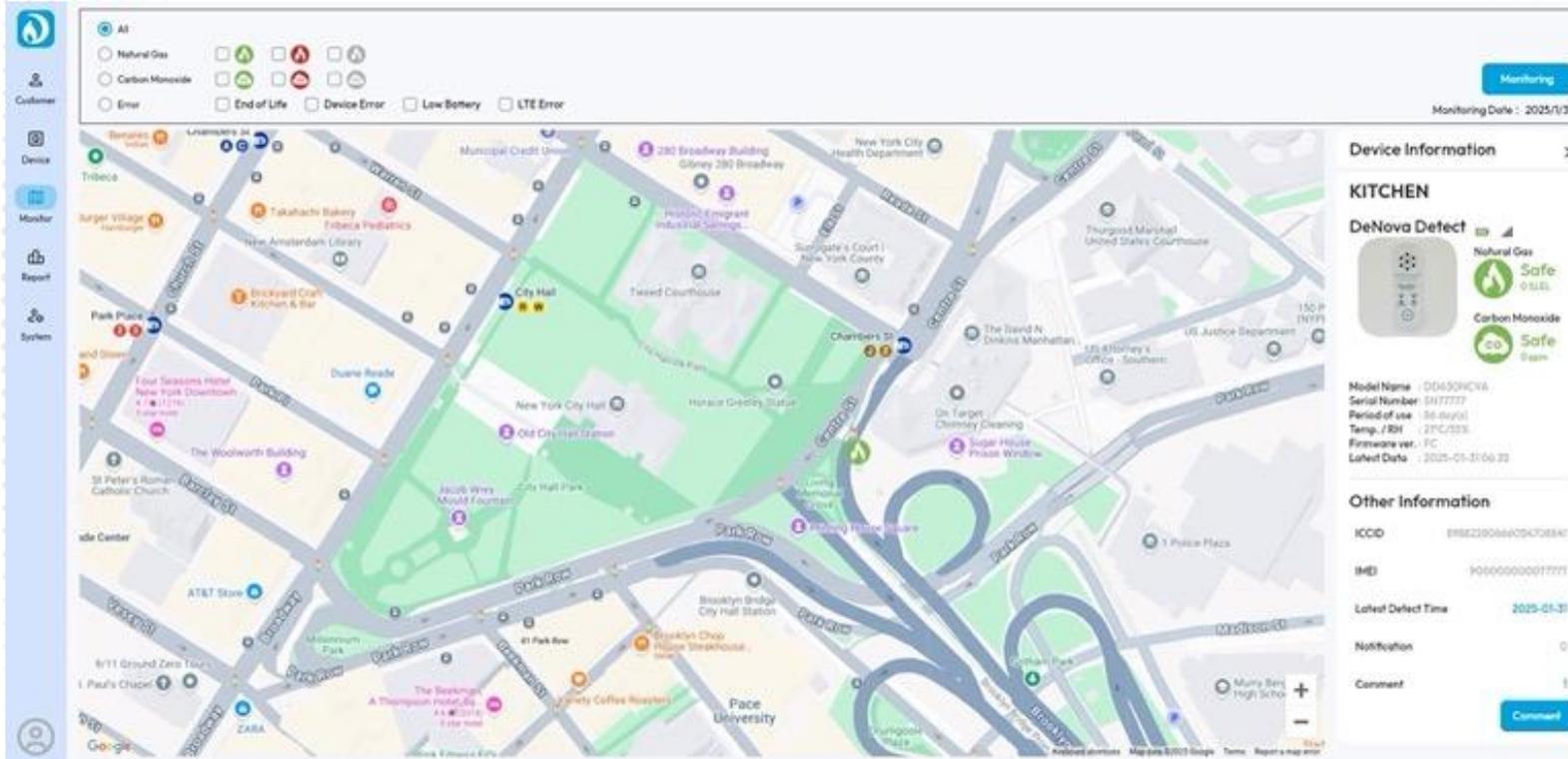
### Monitoring and Control Systems

- Supervisory Control and Data Acquisition (SCADA) for real-time telemetry.
- Integration with AMI for sensor data (pressure, flow, leak detection).
- Automated shutoff capabilities for high-risk zones.



# REAL-TIME VISIBILITY FOR EARLY GAS LEAK DETECTION

Always-On 'Event-based' Monitoring for Smarter Gas Leak Notification & Response



## KEY PLATFORM FEATURES

- *Comprehensive Device Monitoring*
- *Detailed Gas Detector Info*
- *User-Friendly Navigation*
- *Alarm & Event Logging*
- *Customizable Reporting*
- *Real-time Map Views*
- *Secure Platform Access*

The DeNova Connect Enterprise Connect Dashboard is an advanced monitoring solution designed for U.S. utilities to track gas safety devices in real time using an intuitive interface with mapping and data visualization tools that enables quick decision-making and efficient gas detector-to-network management.

# GTI PILOT STATUS

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**LTE Project Duration:** 12-month program

**OTD Member Participation:** 13 Utilities (>40% of membership)

**Project Resources:** New Cosmos USA, GTI Energy, Heath Consultants

## **Project Objectives:**

1. Test LTE connectivity
2. Test gas concentration sensitivity
3. Get familiar with device features, functions, etc.
4. Develop standard gas operations procedures (SOPs)
5. Operator satisfaction / Ease-of-use feedback (GTI/OTD survey)

## **Training process:**

1. 3-4 LTE units provided to each utility
2. DeNova Enterprise dashboard overview
3. Additional LTE units available thru Heath Consultants
4. Over 70% of utilities successfully onboarded & 'Active'



GTI will render the results of the OTD at the 2026 Spring AGA Operations Conference

*April | Tampa, FL*



# PROTECTING YOUR CUSTOMERS

Marc A. Adams, Vice President

# NFPA 715

Standard for the installation of Fuel Gases Detection and Warning Equipment

# UL-1484

Standard for Residential Gas Detectors

DeNova NGD is not an Ignition Source

Represents the minimum amount of explosive gas concentration, set at 10%LEL

*Two of the Three Essential Elements needed to enable widespread adoption of **Fuel Gas Detectors as Public Safety Devices**, just like Smoke and Carbon Monoxide Detectors. The Third is **Proven Reliable Technology**.*

# BATTERY-POWERED NATURAL GAS ALARM LIFE-SAVING TECHNOLOGY

Natural Gas



Natural Gas + Carbon Monoxide



Natural Gas



Utility | AMI

Propane



2H 2026

# NATURAL GAS DETECTOR: DEPLOYMENT OPPORTUNITIES

## Options for Gas Leak Detection Prioritization

### NON-AMI NATURAL GAS DETECTOR STANDALONE PROGRAMS

#### Community Outreach Program (Customer Sign-up)

- Community Education Initiative
- Customer Self-Install
- 1 NGD per Household
- Compliment to AMI Network Model Deployment

#### Service Area Safety Program (Utility-based Installation)

- Direct-to-Customer (Self-Install)
- Zero Resident Entry Required
- Low-pressure/Low-Income Area
- Maintain Migration Path to AMI Network

#### Hybrid Safety/Efficiency-based Program (Assessment/Inspection Supported)

- Home Assessment (3<sup>rd</sup> Party) Program
- Combined Community Safety & Education Initiative
- Consumer Engagement Required
- Energy Efficiency & Safety Modeling

#### Safety Compliance Program (State Requirement)

- Zero Resident Entry Required
- Service Order Add-on (e.g., ERT Replacements)
- Direct Customer Education Initiative (PSC Recommended)

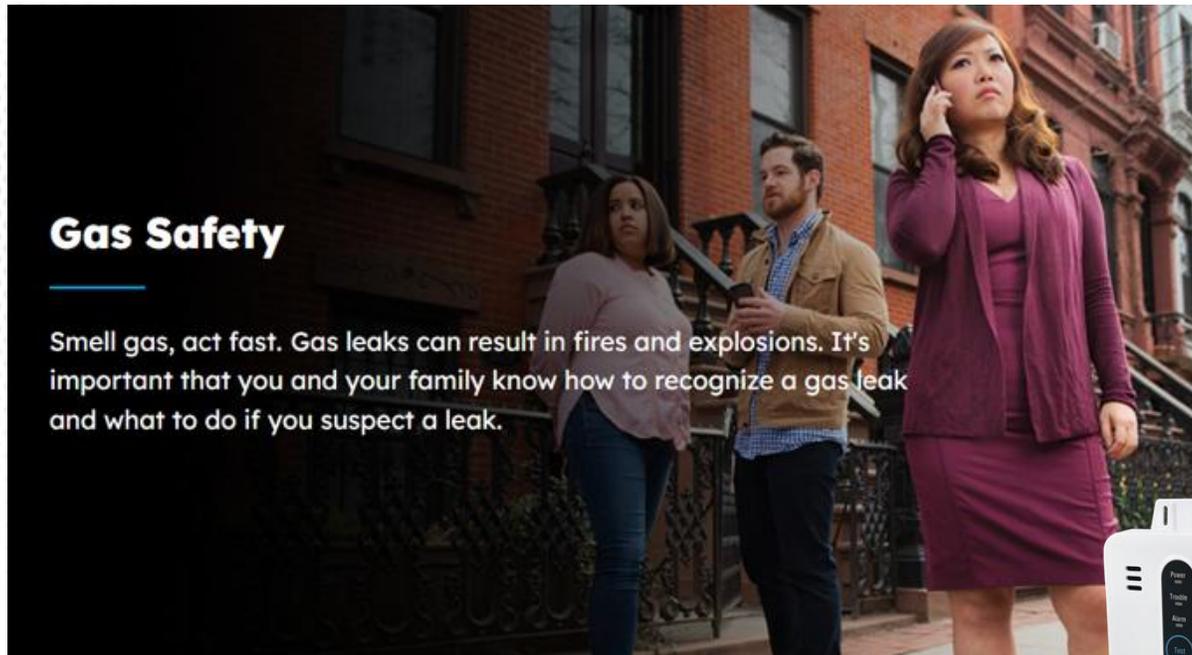
# GROWING UTILITY PARTICIPATION IN NATURAL GAS DETECTOR PROGRAMS

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# CON EDISON | NEW YORK

ConEd.com | Home > Safety >  
Gas Safety > Gas Leak Detectors



## Smell Gas, Act Fast

Even if the odor isn't very strong, you should still leave the area immediately, taking others, and then call. Don't assume someone else has already called. You don't have to give your name.

Don't light a match, smoke, flip a switch, ring a doorbell, or touch appliances or electronics, including your phone. Doing so can produce sparks that might cause the gas to explode.

## Gas Leak Detectors

A slow gas leak may not produce enough scent to be detectable, and even large leaks may not be detected by people with a weak sense of smell. A gas leak detector can give you peace of mind and help keep you and your neighbors safe by sounding an alarm before natural gas reaches the explosive range.

## Safety Starts in Your Home

- Make sure all burners are turned completely off when you're done cooking and before you leave the house.
- Your pilot light should always be on. Blowing out the pilot light doesn't stop gas from escaping and can be dangerous.
- Call a professional if you need to move or replace a gas-fired appliance, like a stove or clothes dryer.
- Regularly check the flexible connector that brings gas to an appliance. Over time, it may become brittle and develop small cracks. If the connector is old and dried out, replace it.

# GAS SAFETY EDUCATION MATERIALS

(License & Royalty-free Materials for Gas Industry Use)

[View Gas Education Materials](#)

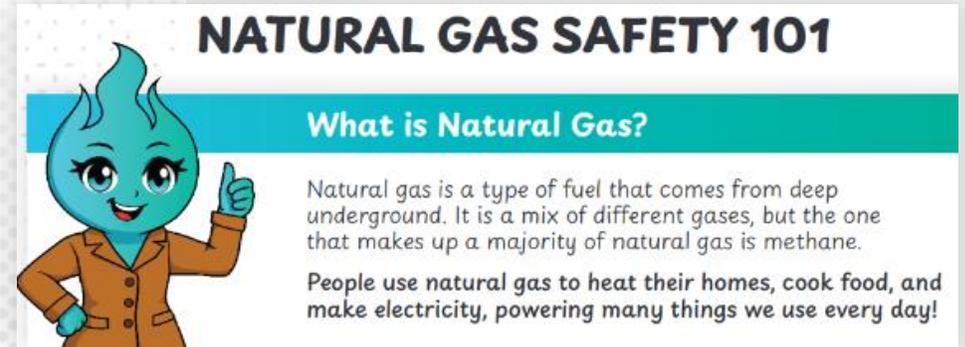
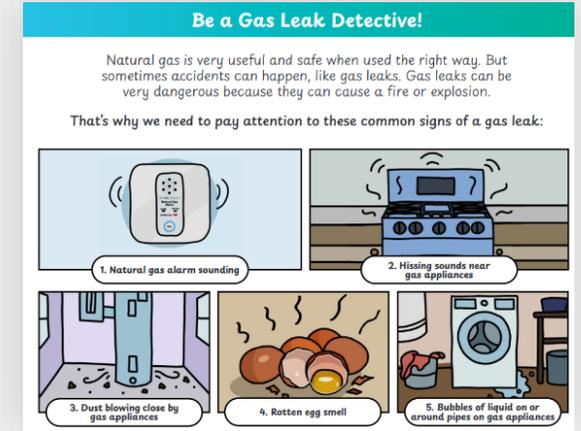
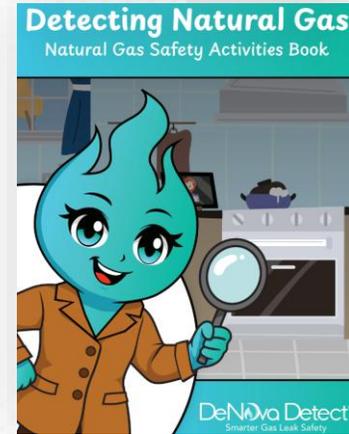
The screenshot shows the homepage of the Gas Safety Education website. At the top left is the logo "Gas Safety Education". To the right are navigation links: "Gas Safety for Kids", "Utility / Regulator / Associations", and "Contact". Below this is a blue header with the slogan "Gas Safety Is a Shared Responsibility" and a flame icon. Further right are links for "Downloadable Guides", "Web Resources", and "Social Media Assets". The main content area features three images: a group of people in a meeting, a woman and child in a kitchen, and a gas worker in a blue uniform and hard hat. A text overlay reads: "Downloadable and campaign-ready content for utilities, regulators, and gas associations." At the bottom of the screenshot, it says "SPREADING THE WORD" and "Gas Safety Is a Shared Responsibility".



 [View Now](#)

# K-12 EARLY EDUCATION & SAFETY CURRICULUM

- **Utility Partnerships** – Collaborating with utilities to deliver trusted gas safety education to communities.
- **Child-Friendly Learning** – Using our mascot and activity books to teach safety to young learners.
- **Practical Awareness** – Providing clear guidance on recognizing and responding to gas leaks.
- **Co-Branded Outreach** – Supporting utility campaigns with engaging educational content.
- **Safety Collaboration within Utility** – Introduction, Discussion & Ideation with Community/Corporate Affairs team



# MARKETING & EDUCATION SUPPORT AVAILABLE FOR UTILITIES

## Multiple Tools Designed for Education & Advocacy in Natural Gas Safety:

- Draft or final email communications
- Educational one-pagers and FAQs
- Intranet and internal portal content
- Visual assets and signage (digital & print)
- Clear messaging differentiating natural gas vs. carbon monoxide

## All materials can be:

- Utility Company branded
- Co-branded
- Customized to align with internal policies, corporate pillars & more ...
- For more access license & royalty free gas safety & detector content visit <https://gassafetyeducation.com>

**Gas Safety & Fire Prevention – How They Work Together**

**Why It Matters**  
Natural gas leaks can lead to fires or explosions if undetected. Fire prevention starts with gas safety.

**Gas Safety Practices for Fire Prevention:**

- Install and test natural gas alarms.
- Keep smoke and carbon monoxide detectors up to date.
- Have all fuel-burning appliances inspected and piping clear of snow, ice, or clutter.
- Keep gas meters and shut-off valve located.
- Know where your household gas shut-off valve is located.

**Shared Responsibility Tip:**  
Fire Prevention Month is a perfect time to test smoke alarms, CO alarms, and natural gas alarms – your fall toolkit for family safety.

Prepared in partnership with DeNova Detect to support community gas safety education. [www.denovadetect.com](http://www.denovadetect.com)

**Emergency Actions – What To Do If You Smell Gas or Your Alarm Sounds**

**Why It Matters**  
Quick, calm action protects lives.

**Smell Gas or Your Alarm Sounds:**

1. Do not ignore it. Every alarm or smell is serious.
2. Evacuate immediately. Leave the house or building without delay.
3. Do not use electronics or switches. Even turning on a light could spark ignition.
4. Call 911 and your utility company once you are outside and at a safe distance.
5. Do not re-enter until professionals say it is safe.

**Shared Responsibility Tip:**  
Natural gas alarms provide the earliest warning that it's time to act. Make sure your family includes alarms in evacuation drills.

Prepared in partnership with DeNova Detect to support community gas safety education. [www.denovadetect.com](http://www.denovadetect.com)

**Where to Place Natural Gas Alarms**

**Why It Matters**  
Proper placement of alarms correctly ensures they provide the earliest warning possible.

**Locations for Alarms:**

- For each natural gas appliance (furnace, water heater, stove, dryer, fireplace).
- In utility rooms, kitchens, and areas where appliances are located.
- On or near the ceiling or high on the wall, since natural gas rises.
- In sleeping areas for night-time protection.

**Where NOT to Place Alarms:**

- Inside bathrooms (steam may interfere).
- Near open windows or fans (airflow may dilute gas concentration).
- Directly next to gas appliances (to avoid nuisance alarms).

**Shared Responsibility Tip:**  
Think of alarms like smoke and CO detectors – one may not be enough. Natural gas alarms in multiple key areas for full-home protection.

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**Proper Use & Installation of Natural Gas Appliances**

**Why It Matters**  
Safe installation and maintenance of appliances is the first step in preventing natural gas accidents.

**Safe Practices for Appliances:**

- Always hire a qualified technician for installation.
- Have appliances serviced annually for safety and efficiency.
- Ensure proper ventilation.
- Keep flammable materials away from gas appliances.

**Appliance Safety Checklist:**

3. Annual inspection completed.
3. Vents clear of debris, snow, or blockages.
3. No unusual smells or flames (blue flame = safe, yellow/orange = possible issue)

**Shared Responsibility Tip:**  
Add natural gas alarms near gas appliances and sleeping areas to give households early warning if a leak occurs.

Prepared in partnership with DeNova Detect to support community gas safety education. [www.denovadetect.com](http://www.denovadetect.com)

**Signs of a Natural Gas Leak**

**Why It Matters**  
Natural gas is safe and reliable when used properly. But leaks can happen, and recognizing the signs early can prevent danger.

**Know the Signs of a Leak:**

- Smell:** A distinct sulfur or rotten egg odor is added to natural gas as a warning.
- Sound:** Hissing, roaring, or whistling noises near appliances or gas lines.
- Sight:** Dead or discolored vegetation near pipelines, bubbling in water, or dust blowing from the ground.

**What To Do if You Suspect a Leak:**

1. Leave the area immediately.
2. Do not turn on lights, electronics, or anything that could spark.
3. Call 911 once you are outside and at a safe distance.
4. Contact your utility company.

**Shared Responsibility Tip:**  
Installing natural gas alarms provides an extra layer of early detection and awareness – alongside recognizing smell, sight, and sound.

Prepared in partnership with DeNova Detect to support community gas safety education. [www.denovadetect.com](http://www.denovadetect.com)

# A SIMPLE PROGRAM WITH MEANINGFUL IMPACT...

## 2-in-1 Natural Gas + Carbon Monoxide Alarm

Model DD623NCV (10-Yr)



## Natural Gas Alarm

Model DD620NV (10-Yr)



## Employee Gas Detector Program

It's about awareness,  
responsibility, and leadership.

Gas is safe.

Safety is shared.

And education starts at home.

## Offering natural gas detectors to employees:

- Reinforces education where it matters most
- Builds internal confidence and external trust
- Demonstrates senior leadership while promoting advocacy for public safety



# THANK YOU

## Q&A

Marc A. Adams, Vice President