Program Overview
Residential Methane Detectors and Asset Lifecycle Tracking & Traceability

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GTI Overview

ESTABLISHED 1941

> Independent, not-for-profit company established by natural gas industry
> Providing natural gas research, development and technology deployment services to industry and government clients and gas consumers
> Performing contract research, program management, consulting, and training
> Facilities
  — 18 acre laboratory near Chicago
  — 200,000 ft² with 28 labs
> Staff of 250
> Wellhead to the burner tip including energy conversion technologies
Residential Methane Detector Background

Safety is Priority #1

> **Customer behavior** suggests that odorant alone is not enough for customers to report leaks

> Recent events have heightened the focus on how unreported leaks can result in tragic outcomes

> The natural gas industry has an **opportunity** to augment existing safety programs and be more proactive in regards to the detection of our product in homes

> Having an alert system such as a **residential methane detector** benefits both the customer and the utility
Strategy for Adoption of Residential Methane Detectors

ISSUES
- Economics
- Safety
- Codes
- Market Channels
- Consumer Behavior
- Product Performance

NEEDS
- Improved Lifecycle Costs
- Improved Accuracy and Reliability
- Adoption of Codes and Standards
- Expansion of Channel Partners
- Enhanced Awareness and Education
- Product Development

PATHWAYS
- Market Analysis
- National Campaign
- State/Regional/National Approach
- Technology Development

Full Adoption
Cost-effective, reliable, accurate product that is readily available
Residential Methane Detectors are Commercially Available…

> Can be purchased at home improvement stores

> International products are also available

> Prices range from $40 - $100+

> But product availability and price do not make a market
  — Concerns with performance
  — Framework doesn’t exist to promote the installation of residential methane detectors
  — Lack of public awareness

Low customer adoption
Product Performance Issues

> **2010 Testing** - OTD project performed baseline testing and evaluation of commercially available, domestic residential methane detectors
  - Concerns exist with performance – **False positives to common household agents; level of detection; humidity range, battery backup**

> **Repeat baseline testing** and evaluation of commercially available, domestic & international detectors (current OTD project)

> Conduct a comprehensive **pilot program** for those most promising detectors to gain real-world experience in a controlled environment

> **Technology development**
  - New sensors have promise to address false positives and lower sensitivity levels, but will take time to develop?
  - Efforts underway with ARPA-E, GTI, NYSEARCH, PRCI

**Action:** Complete baseline testing, initiate pilot program, monitor sensor development efforts, validate new technology as it becomes available
Level of Detection Issue

> What is the appropriate “fit for purpose” detection level?

- **Current detectors alarm at 25% LEL**, but this is too high.
  Odorant detection code requirements are less (20% LEL federal; some states are lower - NY 10%, MA 3%). Should there be alignment between odor detection and alarm points? What is appropriate for this application?

- **Instantaneous or Integrated?** Initial alarm could be based on an integration of readings over a defined period of time (similar to CO) in the 5% LEL range with a steady alarm warning of 10% LEL. But this technology doesn’t exist, yet.

> Evaluate the appropriateness of current UL standards (1434 and 1484)

- 1434: Standard for Thermistor Type Devices (includes sensing devices)
- 1484: Standard for Safety Residential Gas Detectors (25% LEL)
- Develop and incorporate installation guidelines
- Develop new “fit-for-purpose” UL standard with lower detection point

**Action:** Need consensus on “fit for purpose” detection level and strategy to address UL standards. “It all starts with an appropriate standard.”
Consumer Behavior Issues

> Need to understand behavior – why aren’t gas odors being reported? In order to address issues appropriately for both odor and alarms

> Public Awareness
  
  — Ensure messaging is clear that the public should call if they smell gas OR if an alarm goes off – potential confusion and unintended consequences
  
  — Educate customers on why they should use these detectors, potential consequences and what to do if they alarm

> Coordinate public awareness strategy and campaigns
  
  — Establish stakeholder groups (e.g., utilities, AGA, APGA, regional trade associations, safety officials, state and local governments)

Action: Expand market research data on consumer behavior, develop key points and concise messaging for public awareness campaigns and coordinate with all stakeholders
Alarm Reporting Issues

> Is an audible alarm sufficient? Precedent established with smoke and CO alarms

> Do we want automated alarm reporting? Who would get notified and respond (e.g., utility, fire department, home monitoring service)? Is this appropriate for certain building types (multi-family)?

> Are interconnected alarms for multi-unit buildings warranted?

> Combination CO/Methane detectors are preferred? Do we need to distinguish which threat is present?

**Action:** Develop stakeholder group to reach industry consensus. “Start with the basics, let the market drive the bells & whistles.”
Market Channel Strategy

> Assess pros/cons of various market channel approaches in achieving desired results

  - **Building Codes** – should building codes be developed that mandates the use of residential methane detectors (similar to smoke alarms)?

  - **Utilities** – Should utilities encourage the use of residential methane detectors? Should they provide financial incentives? Should there be targets established? And cost recovery?

  - One size fits all or should the strategy be dependent on the environment (urban, cast iron, multi-family, higher risk)?

**Action:** Develop deployment and distribution strategy to achieve desired customer adoption rate.
Economic and Market Issues

> **Price Implications**
  - Existing detectors are in the $40 - $100+ range
  - Is this target price achievable given the desire to lower the detection limit?
  - Is this target price achievable with remote reporting functionality?
  - What is the consumer willing to pay and how will this impact adoption rates? Are subsidies warranted?

> Should utilities pursue **cost recovery mechanisms** (similar to energy efficiency programs)?

> What are the **economics associated with advanced features**?

> Determine target adoption rate and projections under various scenarios; compare to adoption rates for CO and smoke detectors

**Action:** Develop scope for economic and market analysis
Pathways to Address Issues

> **Standards development** – define “fit-for-purpose” product performance criteria

> **Technology development and validation** – ensure reliable and effective products are readily available

> **Stakeholder engagement** – ensure industry alignment on critical issues such as market channels, consumer behavior and public awareness to enable full market adoption
Asset Lifecycle Tracking & Traceability

Create GIS Features in the Field

Post to Enterprise GIS

Integrate Data into GIS System of Record
Mobile GIS for Mapping and T&T

> Objectives

– Develop **mobile GIS** technology that creates **digital as-builts** with complete **tracking and traceability** information of pipes, fittings, and fusions

– **Eliminate back-office** post-processing and GIS integration as well as traditional mapping functions

– Utilize recent advances in GIS, tablet computers, GPS, barcode scanning, and cloud computing to **improve the quality and efficiency** of data collection
GTI’s Mobile GIS Technology

> Technology features:

- Tablet with mobile GIS data collection software
- High accuracy GPS receiver (connected via Bluetooth)
- Barcode scanner (connected via Bluetooth)
- Application to convert barcodes into asset attributes to auto populate the GIS
- Fusion tracking and traceability system that captures information directly from leading fusion machines
- Labels with 50 year life in underground conditions
- Disconnected editing capability
Supporting Implementation

> GTI spinout, LocusView Solutions, created to provide implementation services for advanced geospatial technologies

> Provides field tested, customer validated, commercial products

> Turn-key implementation services including hardware, software, hosting, training, and IT support
Results in Action

> Mobile GIS software with barcode scanning and high accuracy GPS commercially released in October 2013 and available through LocusView Solutions

> Integration with leading fusion equipment manufactures complete in 2014

> Five pilot projects complete
  - Integrys, Avista, National Grid, NiSource, Dominion

> Five new pilot projects in 2014
  - ConEd, Colorado Springs, MLGW, NSTAR, Piedmont

> Production implementations in Q1 2015
Thank you!

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