

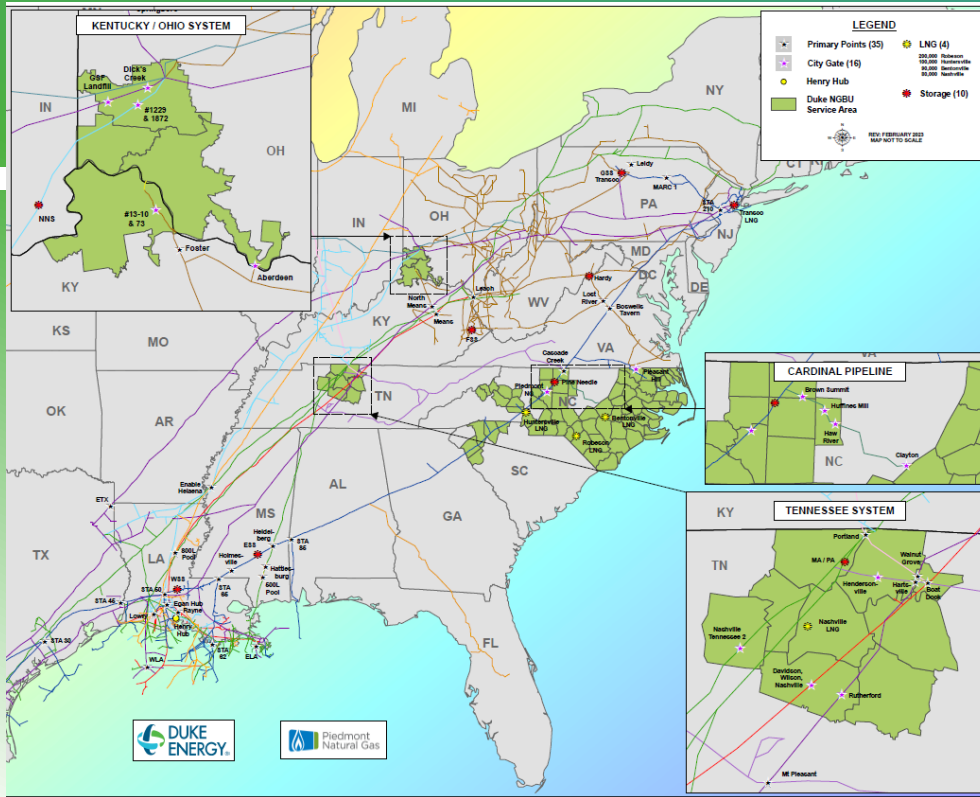
# Advanced Leak Detection and Emissions Measurement - A System of Things

KGA – March 19, 2024

Erin Jedlikowski – Natural Gas Business Unit



# The Natural Gas Business at Duke Energy



- 1.7 M customers in 5 states
- ~32,000 miles distribution main
- ~2,900 miles intrastate transmission main
- 5 compression stations
- 4 Liquefied Natural Gas (LNG) sites
- 2,000+ employees in NGBU

# Measuring Methane Emissions – Why Now?

- Generic, factor-based emissions reporting does not reflect progress on reduction efforts; calls for empirical data based on direct measurement
- Regulatory and legislative efforts
- Customer, community, investor, and employee interest

**The 5 Biggest US Utilities Committing to Zero Carbon Emissions by 2050**

Utility net-zero carbon pledges are piling up, even if the companies are a long way from kicking their fossil fuel habits.



**Consumers Want Companies to Take a Stand on Climate**

And they're willing to put their money where their mouths are.

**Americans Largely Favor U.S. Taking Steps To Become Carbon Neutral by 2050**

*But just 31% want to phase out use of fossil fuels completely*



**ESG scores: The good, the bad, & why they matter**

Today's investors are beginning to look beyond the bottom line to understand company value and long-term sustainability. ESG (Environmental, Social, Governance) disclosure provides investors with a way to identify and understand key issues that aren't typically accounted for on a traditional balance sheet yet have a critical impact on a company's risks and opportunities.



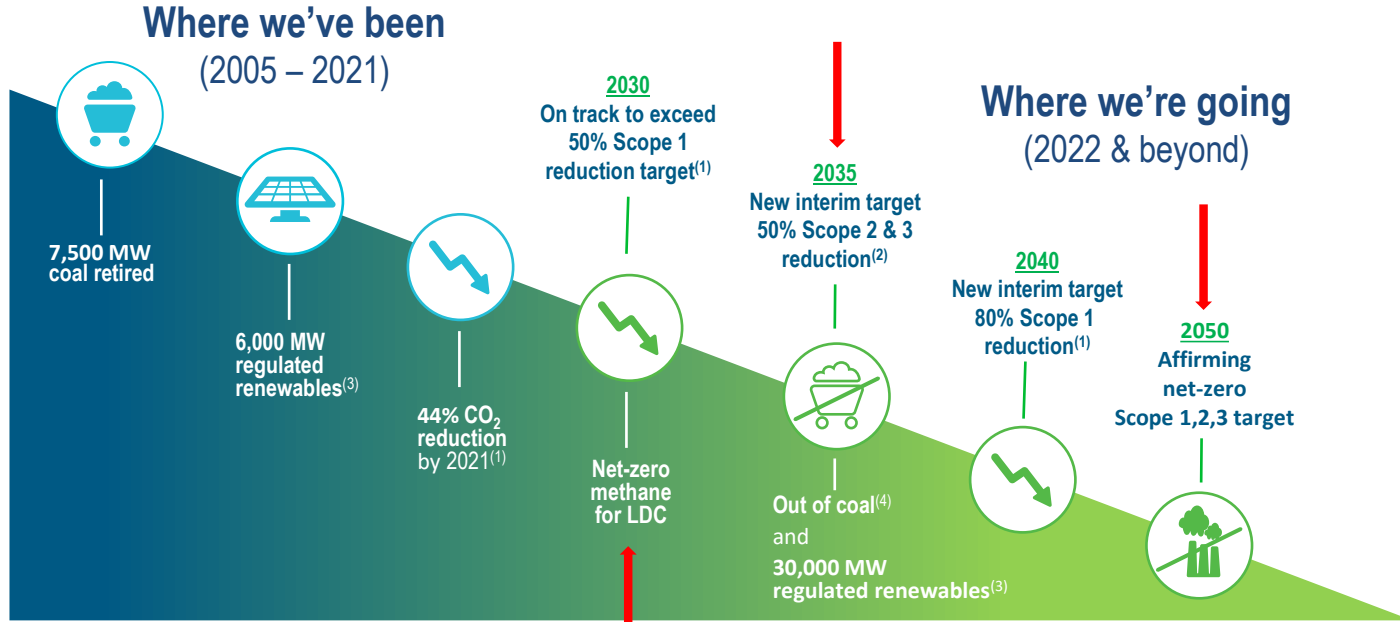
**FACT SHEET: President Biden Signs Executive Order Catalyzing America's Clean Energy Economy Through Federal Sustainability**

**GLOBAL INVESTORS DRIVING BUSINESS TRANSITION**

**EXCLUSIVE Investor group to pressure utilities on net zero emissions deadline**

*For General Informational Purposes Only – No Warranty of Completeness or Accuracy*

# Duke Energy's Commitment: The Road to Net-Zero



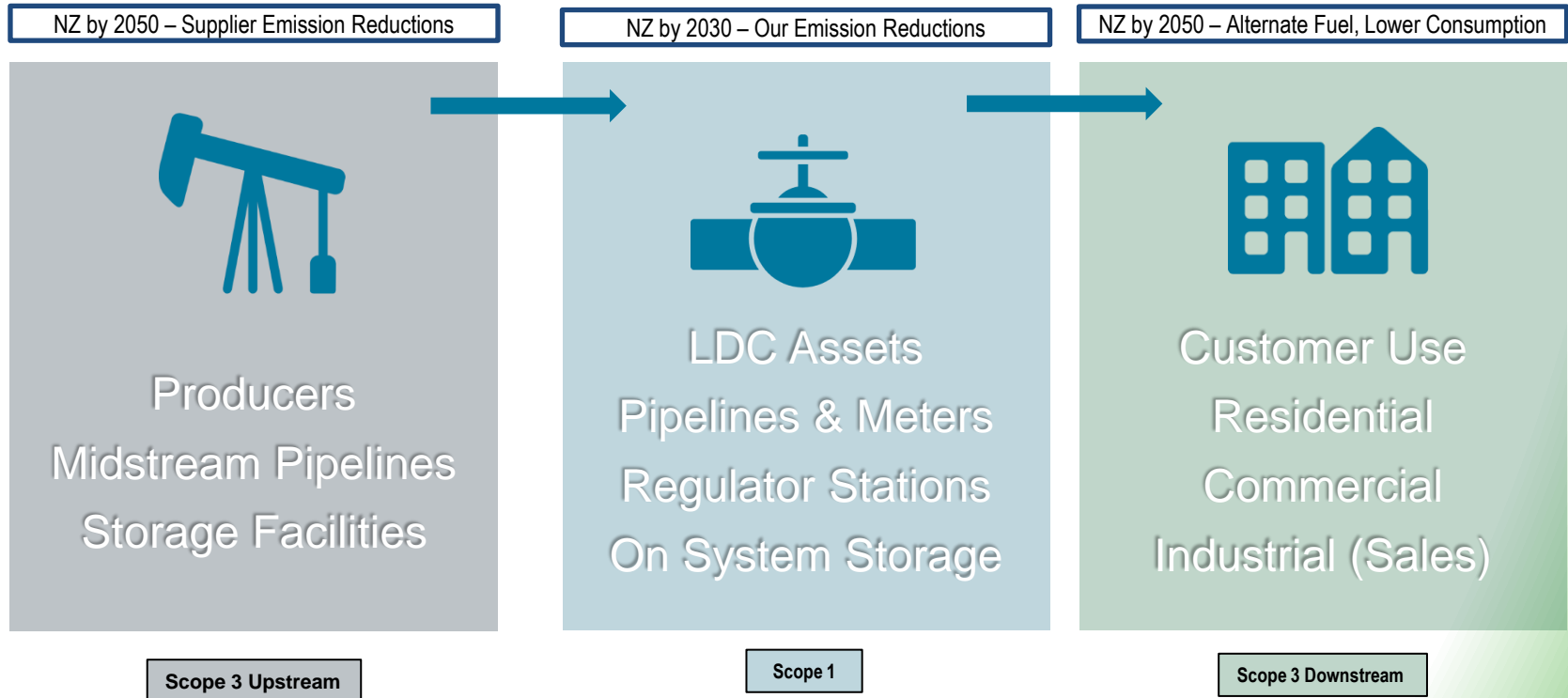
(1) Off 2005 levels

(2) Off 2021 levels. Certain Scope 3 emissions include: upstream fossil fuel procurement, production of power purchased for resale, and downstream use of sold products in our natural gas LDCs

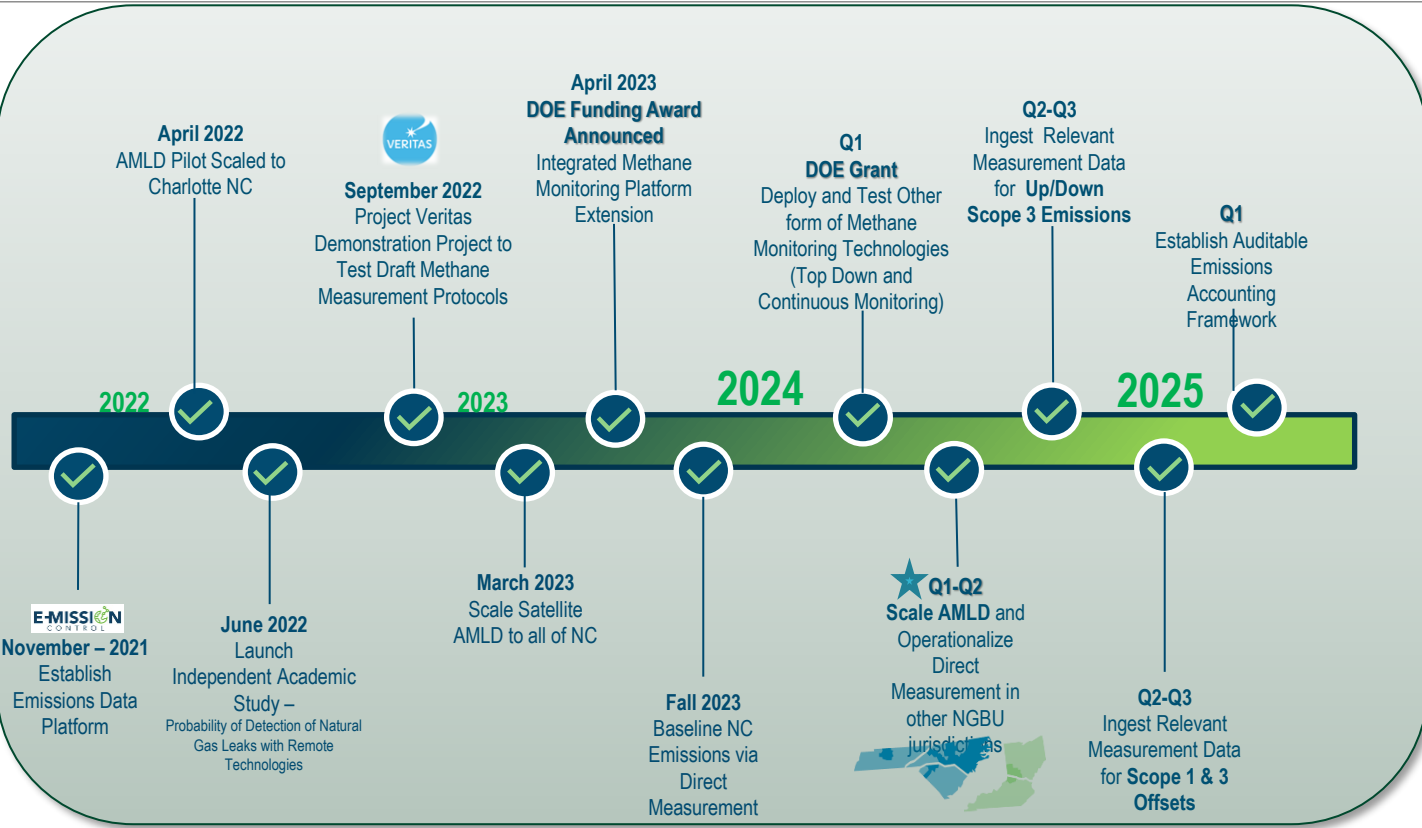
(3) Includes utility-owned and purchase power agreements

(4) Subject to regulatory approvals. Contemplates retiring Edwardsport coal gasifiers by 2035 or adding carbon capture utilization and storage to reduce carbon emissions

# The Natural Gas Supply Chain - LDC



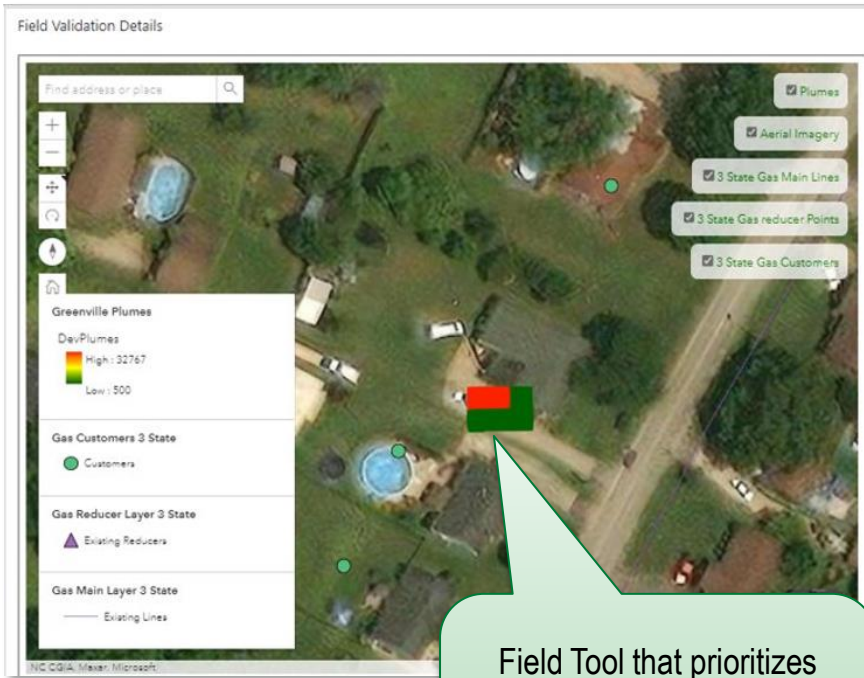
# Emissions Platform Roadmap



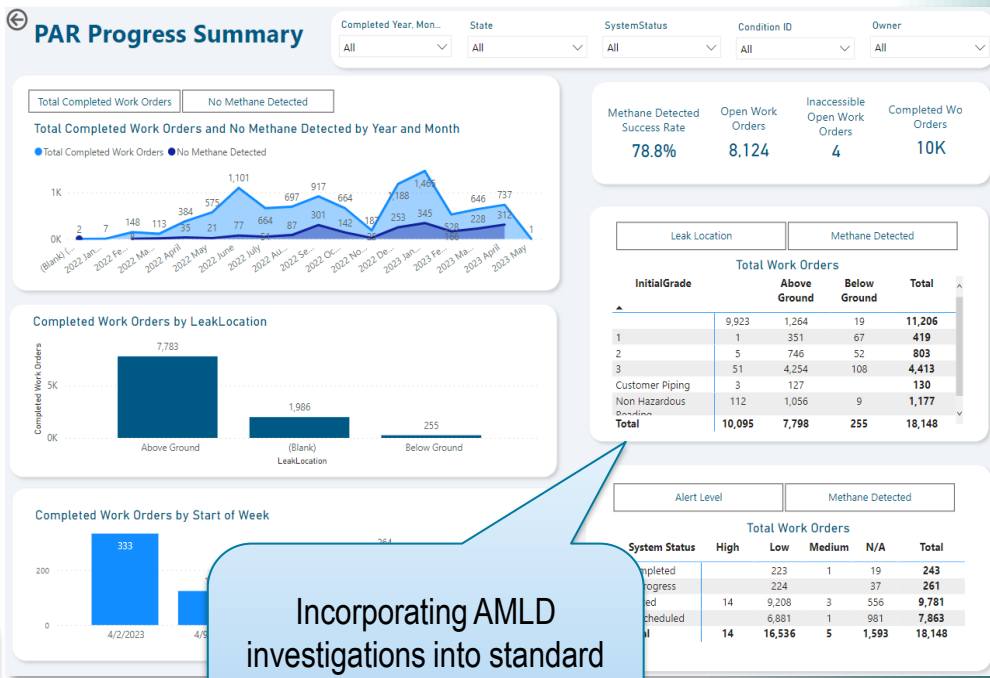
## 2024 Platform Areas of Focus:

- AI maturity and source point leak location and measurement (quantification) accuracy
- Supporting DOE Grant work, extending platform based on successful technologies deployed
- Work towards platform incorporating all emissions sources and offsets
- Build and mature empirically based emissions factors by asset class and ensure compliance with reporting requirements outlined by PHMSA LDAR, GTI, EPA and SEC

# PAR (“Pinpoint, Assess, Repair”) – Operationalizing ALD Response



Field Tool that prioritizes indications and field response based on leak size and risk criteria



Incorporating AMLD investigations into standard leak survey and repair work procedures

# DOE Awards \$1 Million Grant to Piedmont/Duke Integrated Methane Monitoring Platform Extension



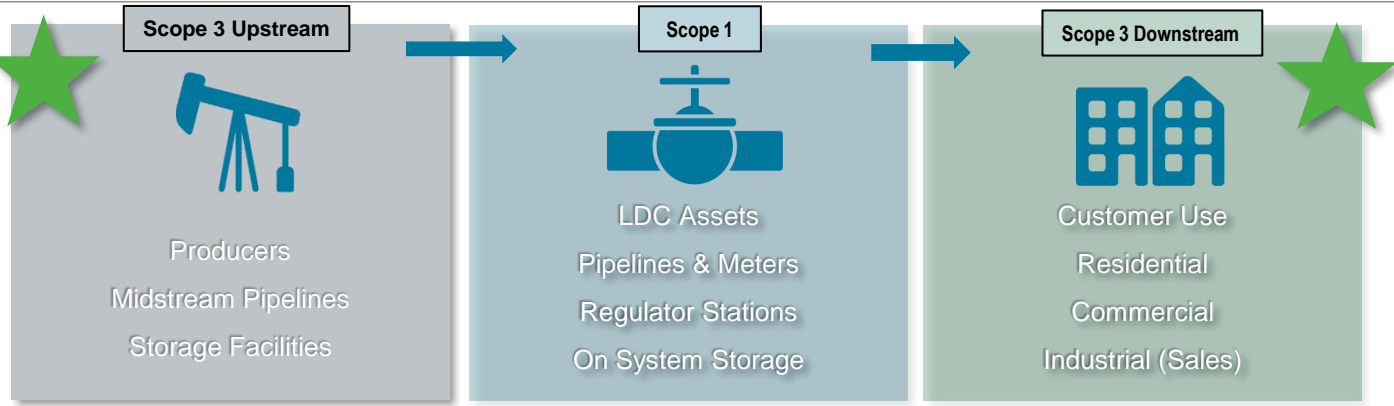
On **March 13, 2023**, the U.S. Department of Energy (DOE) announced nearly \$47 million in funding for 22 research projects to advance the development of new and innovative measurement, monitoring, and mitigation technologies to help detect, quantify, and reduce methane emissions across oil and natural gas producing regions of the United States. Methane emissions are the second largest contributor to climate change—only carbon dioxide ranks ahead of methane as a greenhouse gas source. DOE's methane mitigation program addresses critical environmental issues associated with the production, transmission, and storage of domestic oil and natural gas.

The selected projects will help to ensure an efficient, resilient, and leak-tight U.S. natural gas infrastructure and support President Biden's **U.S. Methane Emissions Reduction Action Plan** and the Biden-Harris Administration climate goal of a net-zero emissions economy by 2050.

*Integrated Methane Monitoring Platform Extension (IMMPE) – Piedmont Natural Gas Company-Duke Energy* (Charlotte, North Carolina) intends to leverage transdisciplinary expertise from academia, natural gas operations, digital, and advanced cloud computing technologies as well as data science to deploy, measure, and analyze methane emissions data. The IMMPE project will allow Duke Energy to close the gap in establishing a methane emissions baseline with direct measurement. The project team will evaluate and select technology to address assets and quantification that have not yet been explored. Upon completion, the IMMPE will offer a standardized framework that would allow others to leverage the approach and extend to upstream components, including midstream transmission and storage and upstream production and gathering. The project supports the goal of creating an industry-wide direct methane measurement standard for quantifying methane emissions through empirical means.



# DOE Grant - Project Scope



## Key Deliverables

- **Statistical analysis and research summary reports** that analyze data from the various technologies to better understand operational effectiveness and accuracy.
- Leveraging the results of the technology pilots and data architecture and design to develop a **platform engineering, feasibility, and strategic deployment plan.**

## Technology Pilots and Data Collection

Piloting **top-down methane-monitoring** technologies such as satellite, UAV's, and LiDAR to detect and quantify emissions.

Piloting **continuous methane-monitoring** technologies using monitoring sensors, gas cloud imaging cameras and handheld/portable gas-sensing analyzers to detect and quantify methane emissions.

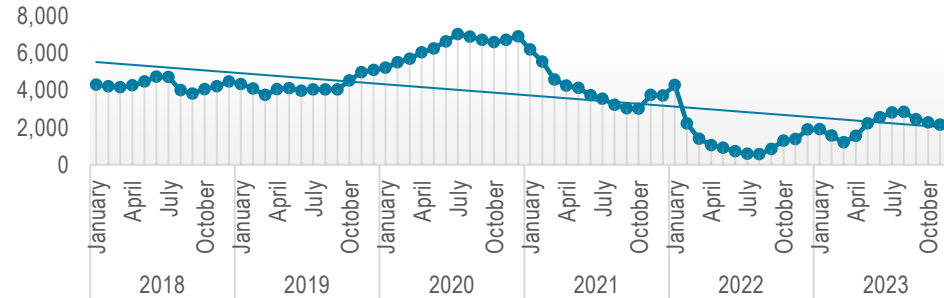
Pilot technologies capable of detecting methane downstream of the meter, such as AMI enabled sensors, IoT devices, or other handheld/portable gas-sensing analyzers to detect and quantify methane emissions.

# 2023 ALD Program Accomplishments

## 2023 AMLD Response Metrics - NC

- 13,668 Plumes Investigated
- Ranging 60-80% Methane Detection Rate
  - Note: This dropped from our ~80% detection rate in 2022 due to overlapping captures and responding to plumes where leaks had been repaired*
  - Pizza Slice Model will control for this issue
- 7,558 Leak Conditions Created from Plume Investigations
- 792 Successful Leak Repairs on first trip (Find It/Fix It) – Tighten and Grease Repairs
- Maintained an average # of days to repair leaks of **36 days!**

### NC Leak Backlog



### Average # of Days to Repair Leaks

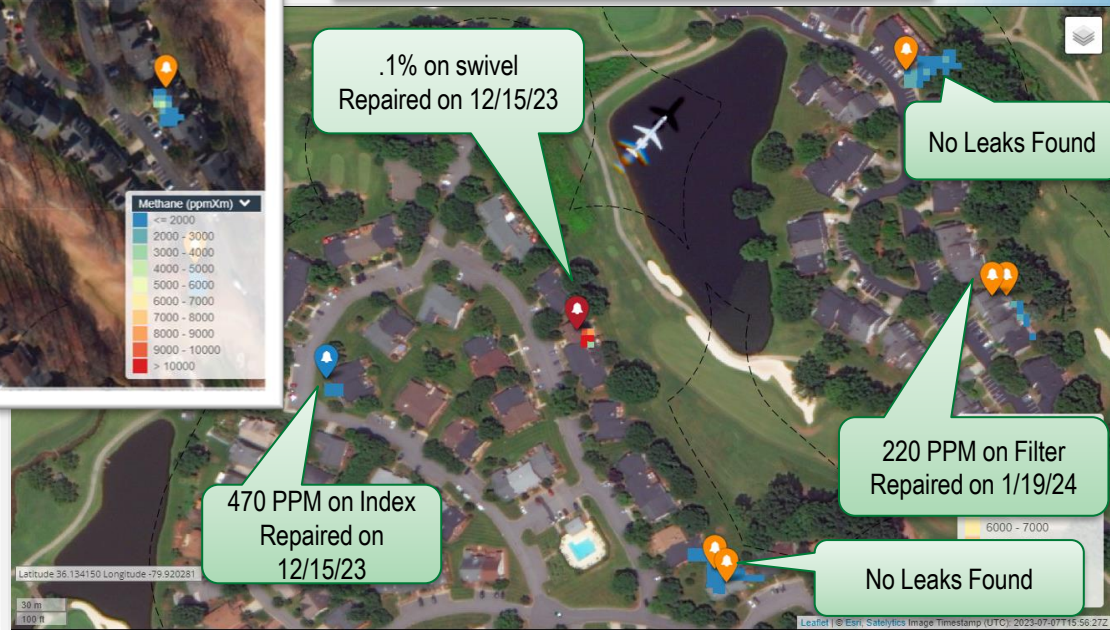


# Satellite Leak Detection – Find It/Fix It

January 8, 2024 Capture



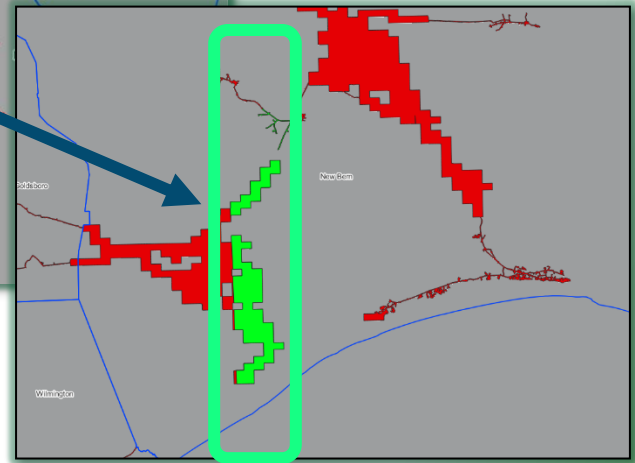
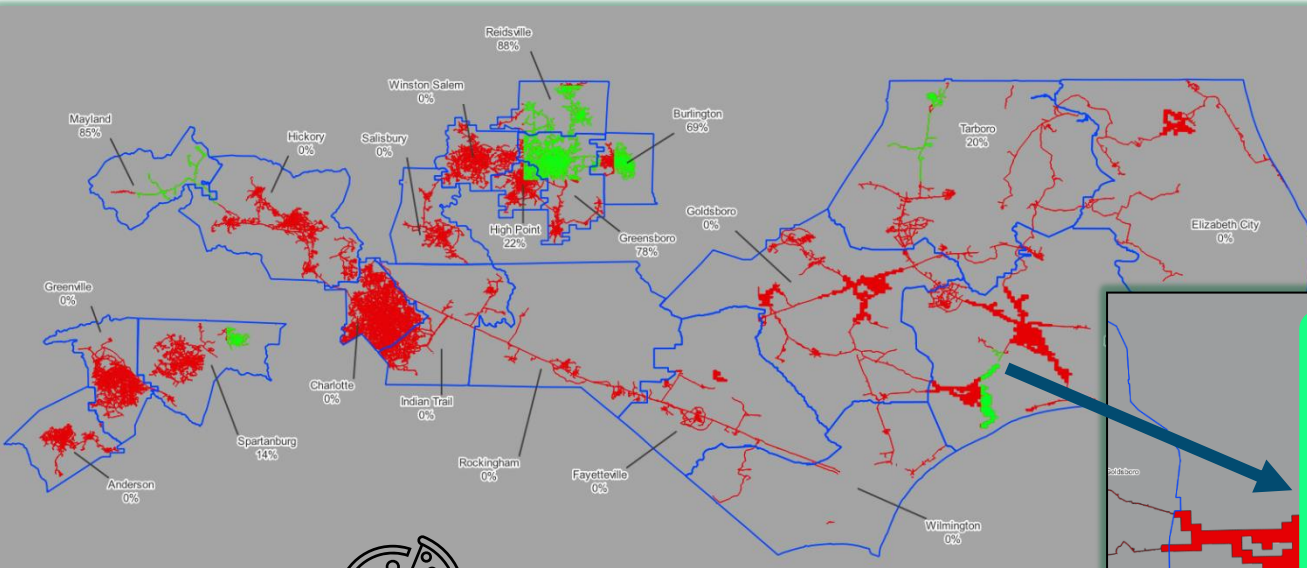
July 7, 2023 Capture



# Satellite Leak Detection Scaling Plan - 2024

## Jurisdictions:

- North Carolina
- South Carolina
- Tennessee
- Ohio – Pilot a 10 X 10 Sq KM Area



## “Pizza Slice Model”

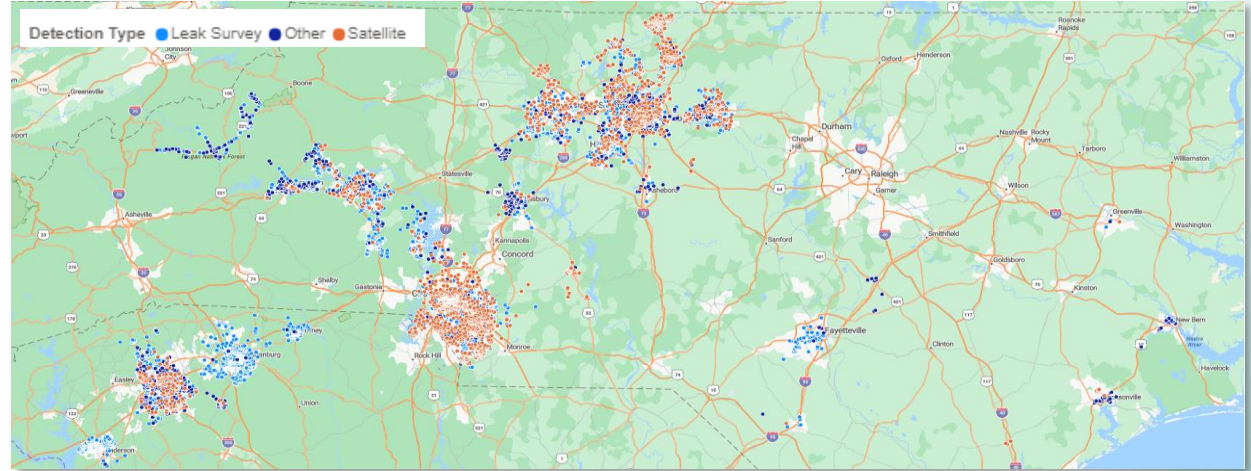


- Each “slice” size within an ops center should allow for optimal plume indication response time.

# 2024 Goals

## Operations Focus

- Maximize First Trip Resolution for Leak Repairs
- Assist Customers with Resources to Fix Leaks Downstream of the Meter
- Designing Leaks out of our system
- Regulatory Buy In for Long Term ALD adoption
- Leveraging ALD and change detection for other compliance work types



### 2024 Priorities

#### Capture Priority:

- NC/SC
- TN - Spring
- OH - Q2/3

#### Plume Investigation Response:

- Target: 10-30 Days

#### Avg Days to Repair a Leak:

- Target: 40 days

# Questions?

