

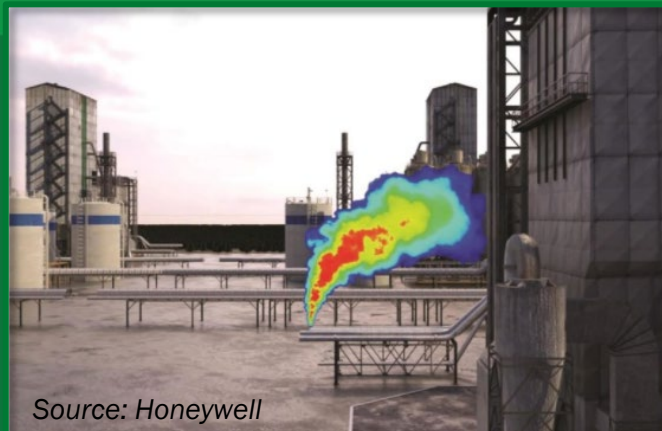


U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

# Methane Emissions Reduction Program (MERP) and Undocumented Orphan Well Program (UOWP)

2024 CH<sub>4</sub> Connections Conference  
October 14-15, 2024  
Fort Collins, CO



# FECM Division of Methane Mitigation Technologies R&D Program

## Methane Emissions Quantification

Direct and remote measurement sensor technologies and collection of data, research, and analytics that quantify methane emissions from point sources along the upstream and midstream portion of the natural gas value chain

## Methane Emissions Mitigation

Advanced materials, data management tools, inspection and repair technologies, and dynamic compressor R&D for eliminating fugitive methane emissions across the natural gas value chain

## Undocumented Orphaned Wells

Developing tools, technologies, and processes to efficiently identify and characterize undocumented orphaned wells in order to prioritize them for plugging and abandonment.

## Natural Gas Decarbonization and Hydrogen Technologies

Technologies for clean hydrogen production, safe and efficient distribution, and geologic storage technologies supported by analytical tools and models

## Methane Emissions Reduction Program

Under the IRA, MERP will help oil and natural gas sector operators cut methane emissions and transition to innovative methane emissions reduction technologies.

## Waste and Underutilized Natural Gas Conversion

Technologies for conversion and utilization of natural gas to reduce venting and flaring of the resource



# Methane Emissions Reduction Program (MERP)

- In August 2022, the Inflation Reduction Act (Section 60113) provided new authorities under Clean Air Act Section 136 to reduce methane emissions from oil and gas operations.
- \$1.55 billion was made available to EPA to reduce methane emissions across from oil and natural gas operations through financial and technical assistance efforts.
- EPA and DOE are collaborating to leverage our shared commitment and joint expertise in advancing methane monitoring and reduction technologies and, also tap into DOE's expertise on planning and implementing financial and technical assistance efforts.
- **Non-Competitive (ALRD)** – In 2023, provided \$350 Million to state agencies for the permanent plugging and abandonment of marginal conventional wells (MCWs)\* on non-Federal lands (voluntary basis).
- **Competitive (FOA)** – In 2024, provide up to \$850 million under a competitive solicitation to pursue broad scale methane emissions monitoring and mitigation across oil and gas sector, including tribal lands

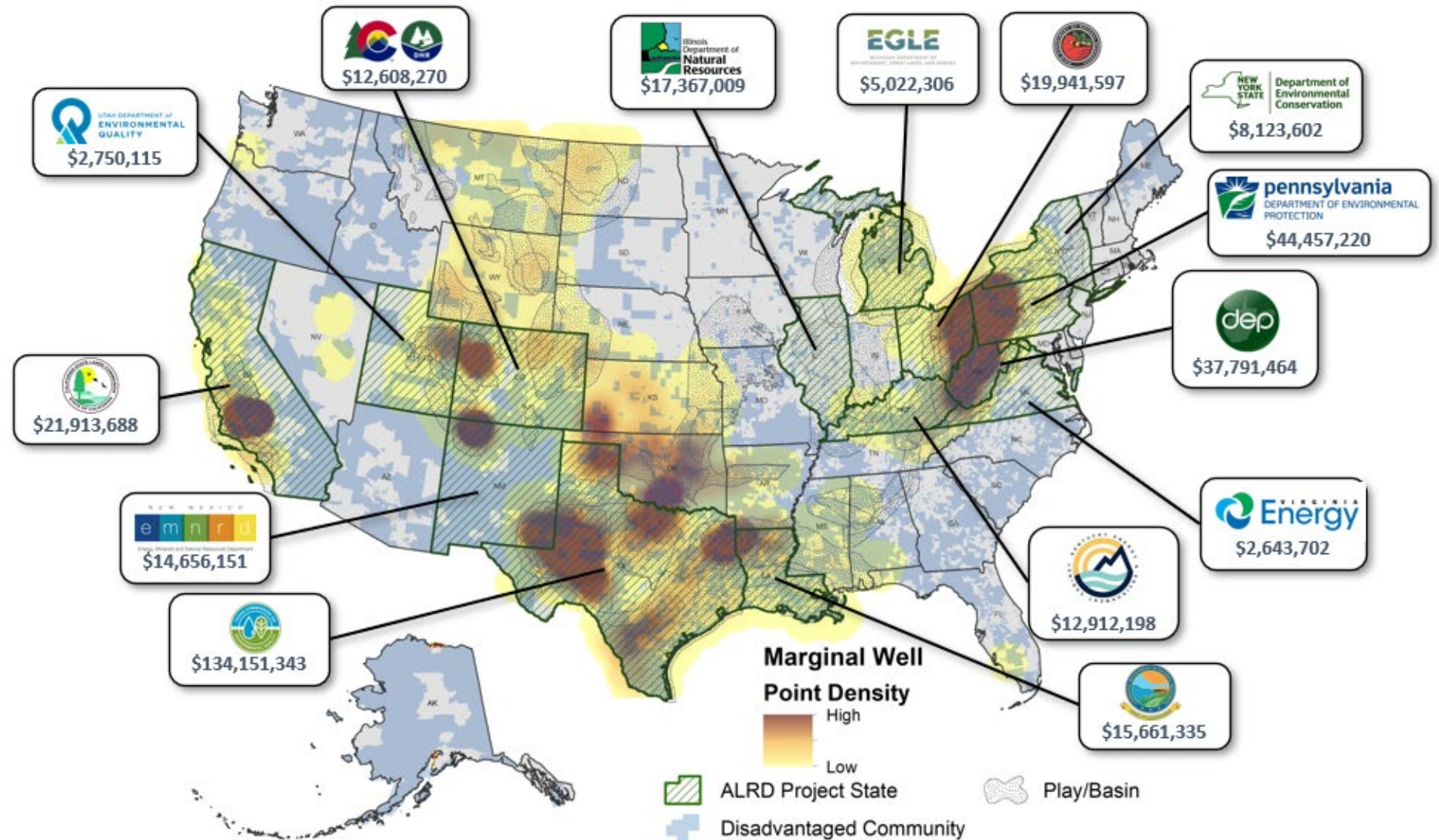
\* A MCW produces <15 BOED or <90 MCFD

# Round 1: State Grant Funding via ALRD (Non-Competitive)

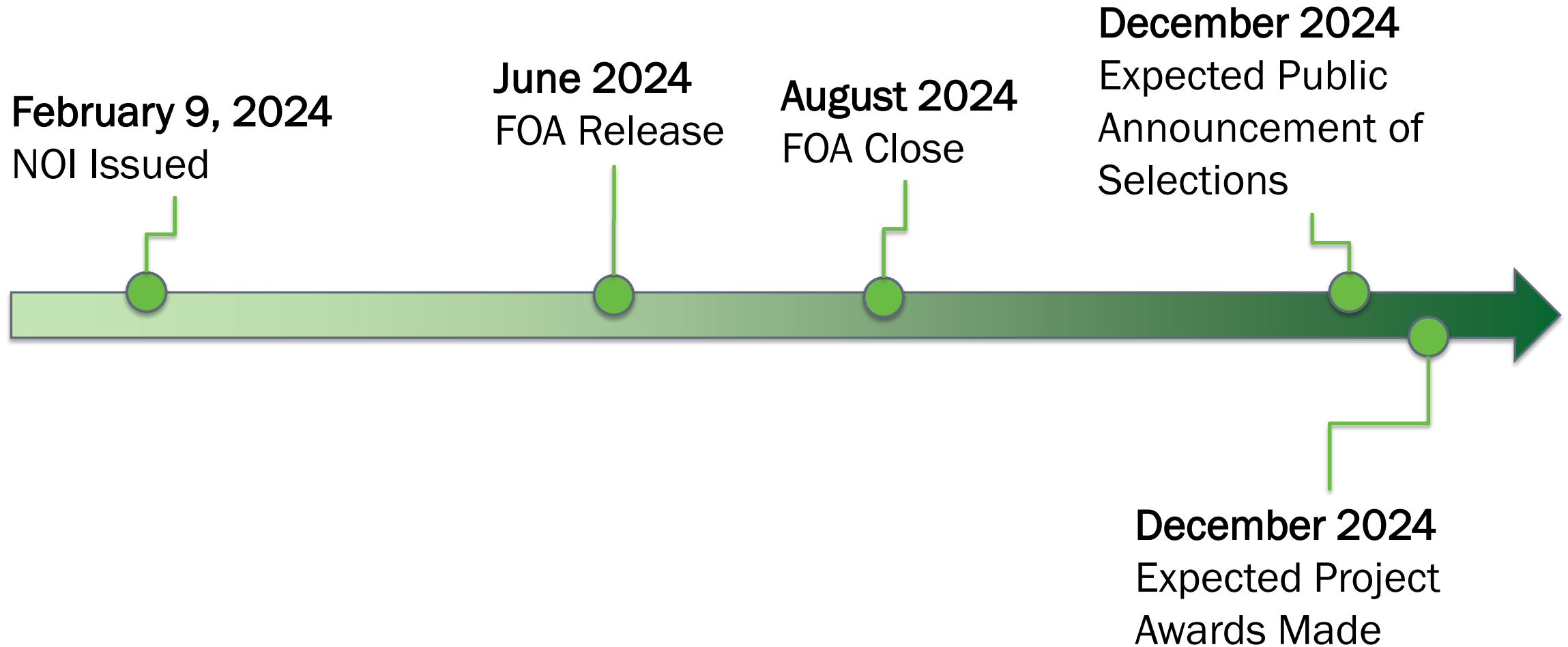


# Round 1 ALRD State Award Recipients

14 States awarded through the non-competitive State grant award application process



# Timelines and Milestones: Competitive FOA 3256



# Round 2 Funding Opportunity Announcement (FOA)

DE-FOA-0003256 Released: 6/21/2024, Closed on 8/26/2024 [Solicitation | netl.doe.gov](https://www.netl.doe.gov)

## **AOI 1: Methane Emissions Reduction from Existing Wells and Infrastructure (\$560MM) with No Cost Share**

- 1a. Reducing Methane Emissions from Marginal Conventional Wells (MCWs) – \$300mm
- 1b. Reducing Methane Emissions from Small Operators' Wells and Other Oil & Natural Gas Assets – \$210mm
- 1c. Reducing Methane Emissions from MCW and Oil & Gas Assets on Tribal Lands – \$50mm

## **AOI 2: Accelerating Deployment of Methane Emissions Reduction Solutions (\$150MM) with 20% Cost Share**

- 2a. Field Deployment of Engine and Compressor Methane Reduction Technologies – \$60mm
- 2b. Field Deployment of Gas Flaring Reduction Technologies – \$60mm
- 2c. Field Deployment of Emissions Reduction Technologies at Oil & Gas Production Facilities – \$30mm

## **AOI 3: Accelerating Deployment of Methane Monitoring Solutions (\$140MM) with No Cost Share**

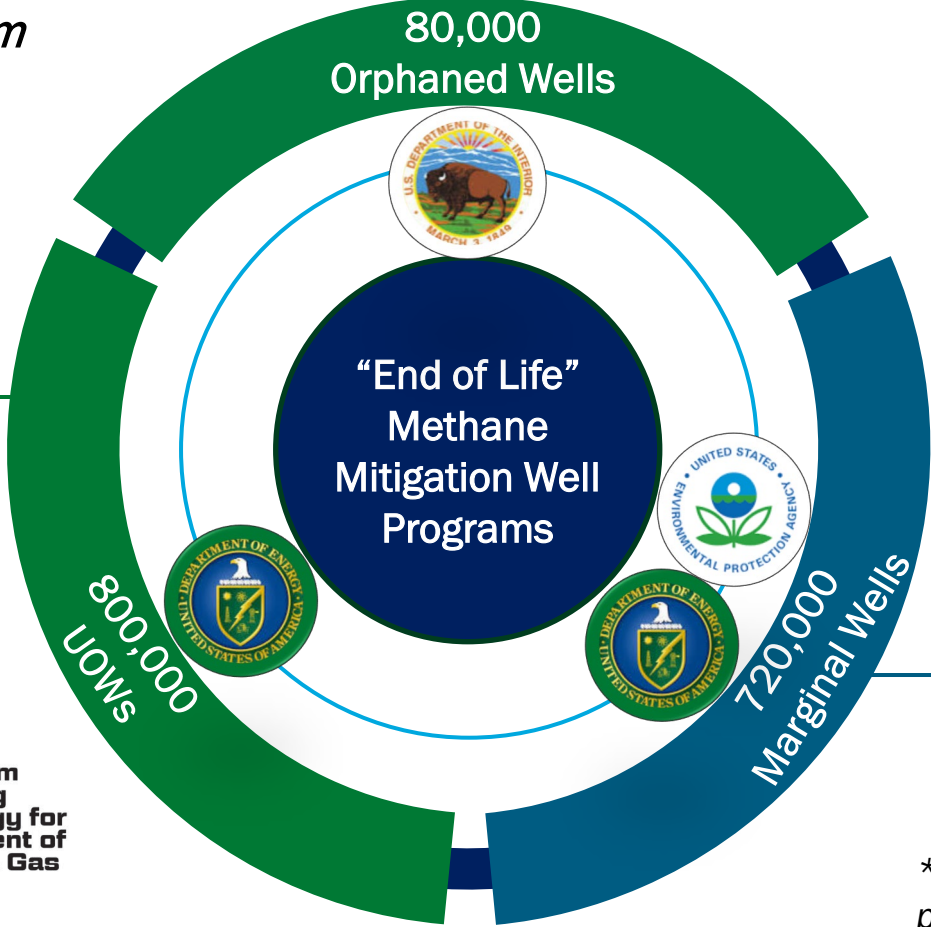
- 3a. Improving Access to Monitoring Data for Impacted Communities – \$40mm
- 3b. Regional Methane Emissions Characterization – \$100mm

\*Approximate Total Available = \$850million

# Reducing Methane from “End-of-Life” Oil & Natural Gas Wells

**DOI Orphaned Well Plugging Program**  
 Plugging and abandonment operations across Federal, Tribal, State, and private lands for wells with known locations.  
 Budget: \$4.7 billion

**DOE FECM Undocumented Orphaned Well (UOW) Program**  
 Find and characterize orphaned wells with unknown location and owner  
 Budget: \$30 million



**DOE/EPA Methane Emissions Reduction Program (MERP)**  
 Reducing methane emissions and environmental legacy pollution from Marginal Conventional Wells\* through voluntary plugging and repair  
 Budget: \$700 million

\* A marginal well is defined as a well producing less than 15 barrels of oil or 90,000 cubic feet of natural gas per day.



# Bi-Partisan Infrastructure Legislation

## *Relevant Appropriations Language*

### Section H2 (a, b)

Conduct research and development activities in cooperation with the Interstate Oil and Gas Compact Commission to assist the Federal land management agencies, States, and Indian Tribes in–

- (A) identifying and characterizing undocumented orphaned wells; and
- (B) mitigating the environmental risks of undocumented orphaned wells;

## *Program Budget*

DOE's Undocumented Orphaned Well Program will be executed over **5 years with \$30M** in appropriated budget.

IOGCC 2021 estimate of undocumented orphaned wells is between **310,000** and **800,000**.



# DOE Undocumented Orphaned Wells R&D Program

1. Methane Detection and Quantification
2. Well Identification
3. Sensor Fusion and Data Integration with Machine Learning
4. Well Characterization
5. Integration and Best Practices
6. Data Management
7. Records Data Extraction
8. Wells Database
9. Field Teams

**Purpose:** *Develop technologies and techniques to identify and characterize orphaned wells that are not currently in the regulatory inventory*



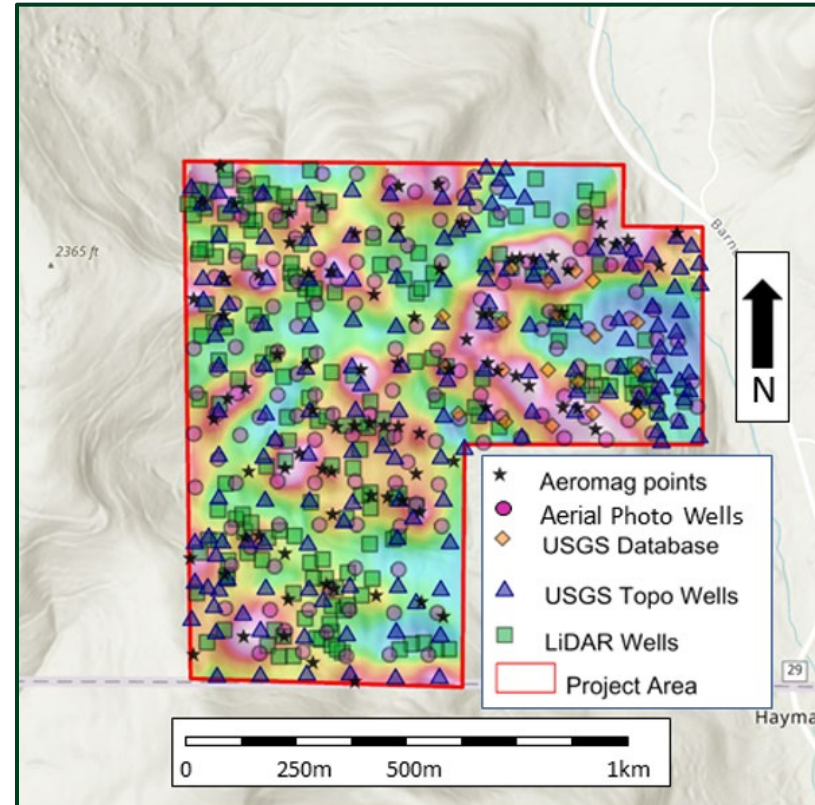
**Consortium  
Advancing  
Technology for  
Assessment of  
Lost Oil & Gas  
Wells.**

*catalog.energy.gov*



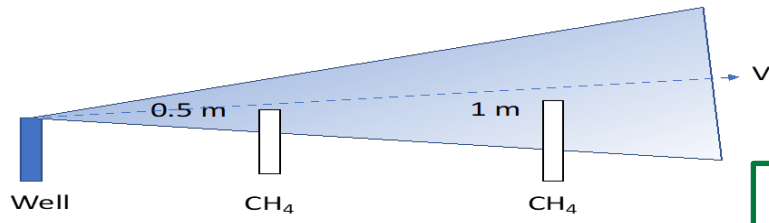
# There's No Silver Bullet to Identify UOWs

- Various methods can be used to locate wells
  - magnetic survey, aerial or satellite photography, LiDAR, methane measurements, historical records
- No method works in all cases
  - Magnetics fail when the well casing is removed (~15,000 wells had casings salvaged during WW2 for the metal) and is challenging in steep terrain or tall vegetation
  - Methane measurements fail when the well is not emitting (emissions are highly transient)
  - Aerial/satellite photos could be obstructed by vegetation or construction

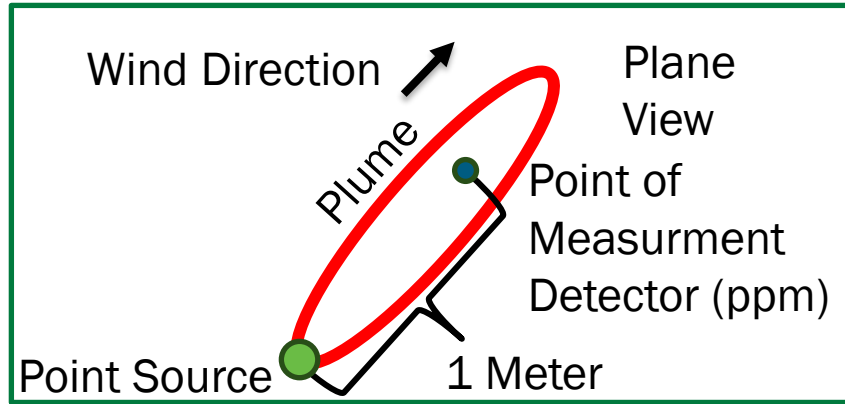


# Cost-effective methane emission estimation from UOWS

- Drive the emission measurement cost down to efficiently use DOI's \$4.7B budget
- White House asked CATALOG to develop a screening methodology to estimate flow rate from cheap concentration measurements: **defensible, simple procedure and cost effective**
- **Technical paper submitted for publication**



## Forced Advection Sampling Technique (FAST)

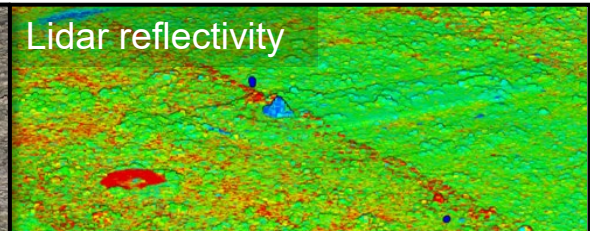
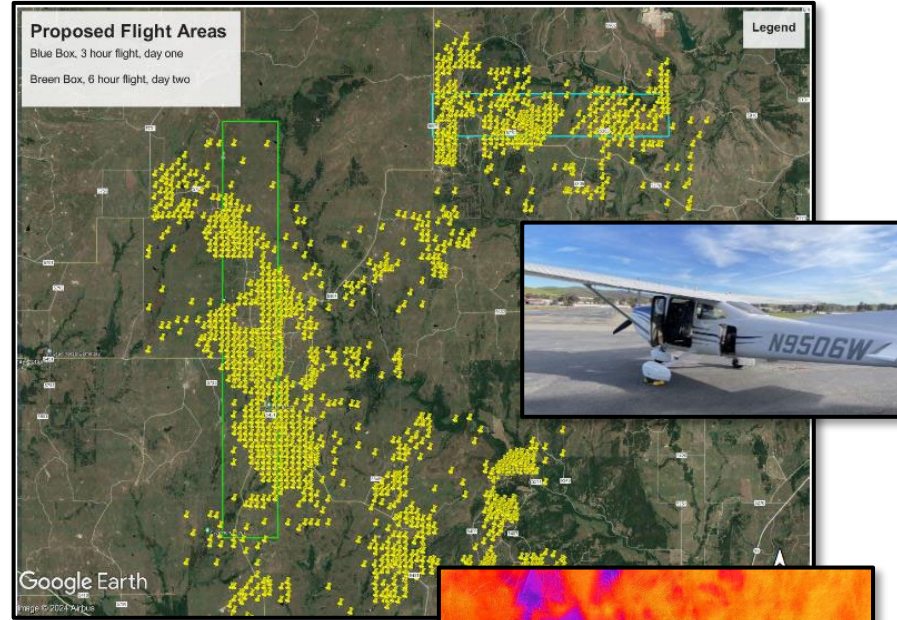
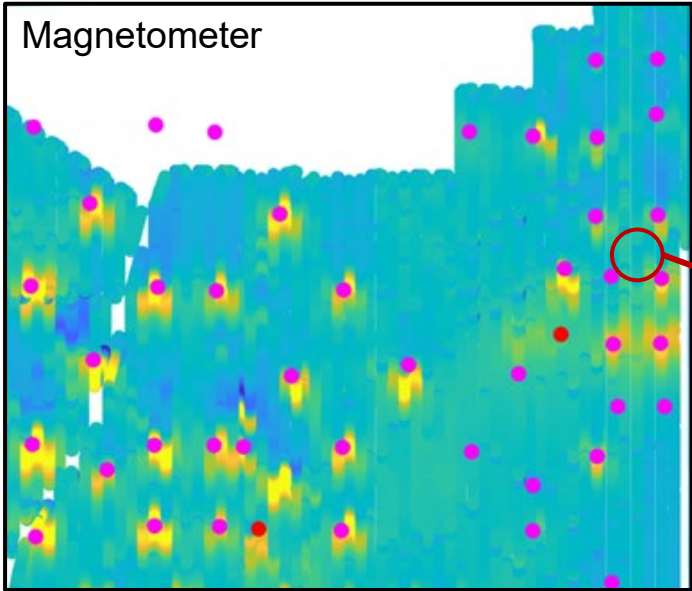


- ppm sensitivity, calibrated, and compact CH<sub>4</sub> sensor (MOS or spectroscopic)
- Handheld anemometer

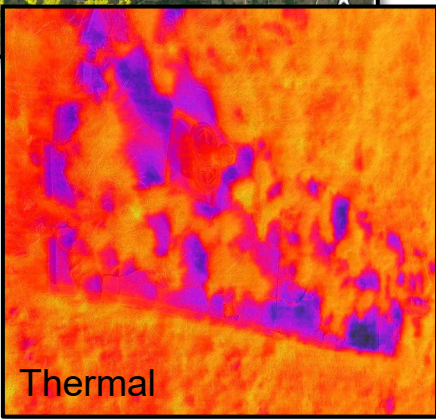


# Field Deployment

Identify a robust set of sensors that can efficiently locate orphaned wells at scale.



Topo map well with well head clearly seen in imagery but not in magnetometer





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# Questions?



Legend:

- Light Rare Earth Elements (Blue)
- Heavy Rare Earth Elements (Dark Blue)
- Critical Rare Earth Elements (Green)
- Critical Minerals (Black)

H																	He
Li	Be											B	C	N	O	F	Ne
Mg	Al	Si	P	S	Cl	Ar											
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	
Fr	Ra	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og	
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu			
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr			

\* Ga, K, Rb, Cs, Fr, REE, U, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr. \*\* Included with rare earth elements.

