

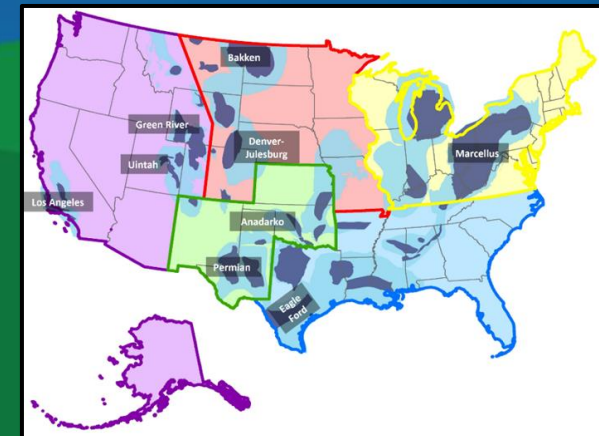
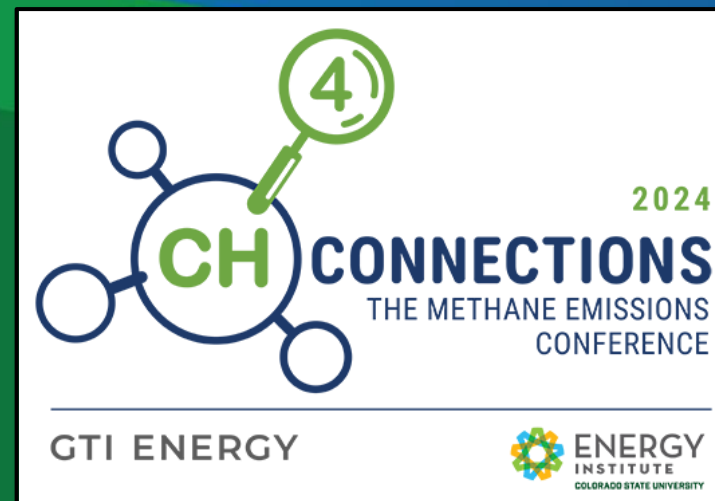
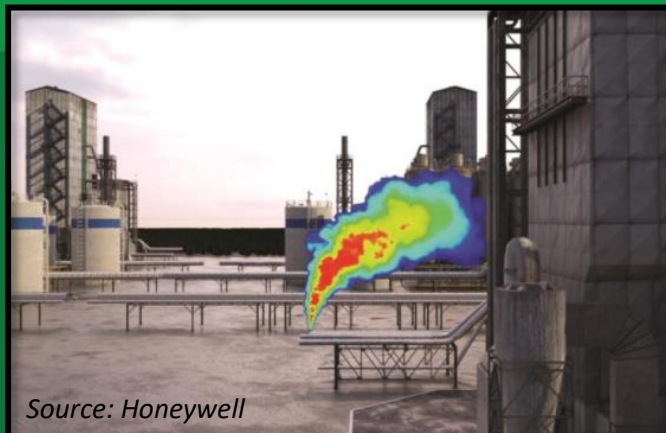


U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management

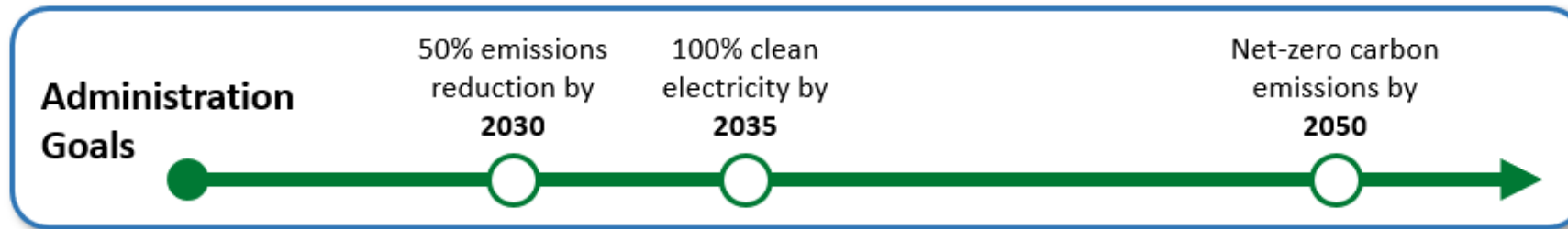
# CH<sub>4</sub> Connections Conference

Tim Reinhardt  
October 16, 2024



# Program Mission

## Administration's Goals



Accelerate the development and deployment of ***technology solutions*** to increase the efficiency, reliability, resiliency, and ***elimination of methane emissions*** across the oil and natural gas infrastructure—from oil and natural gas production, through processing, transportation, and storage, to end-use utilization.



# Dynamic Factors Shape R&D Portfolio

## Administration's Goals



Administration Goals

50% emissions reduction by 2030

100% clean electricity by 2035

Net-zero carbon emissions by 2050



## Shifting Priorities of Industry Research Partners



## International Considerations



## Rapidly Changing Technology



## National Laboratory and Academic Research Partners Capabilities



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# Existing Program- Quantification, Mitigation, Conversion

## 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 engine and 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.

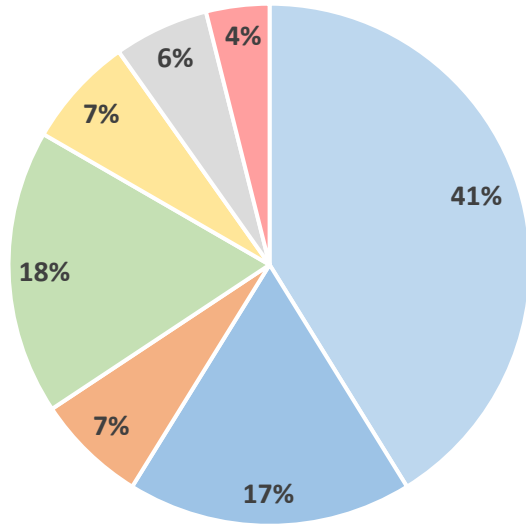
## Waste and Underutilized Natural Gas Conversion

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



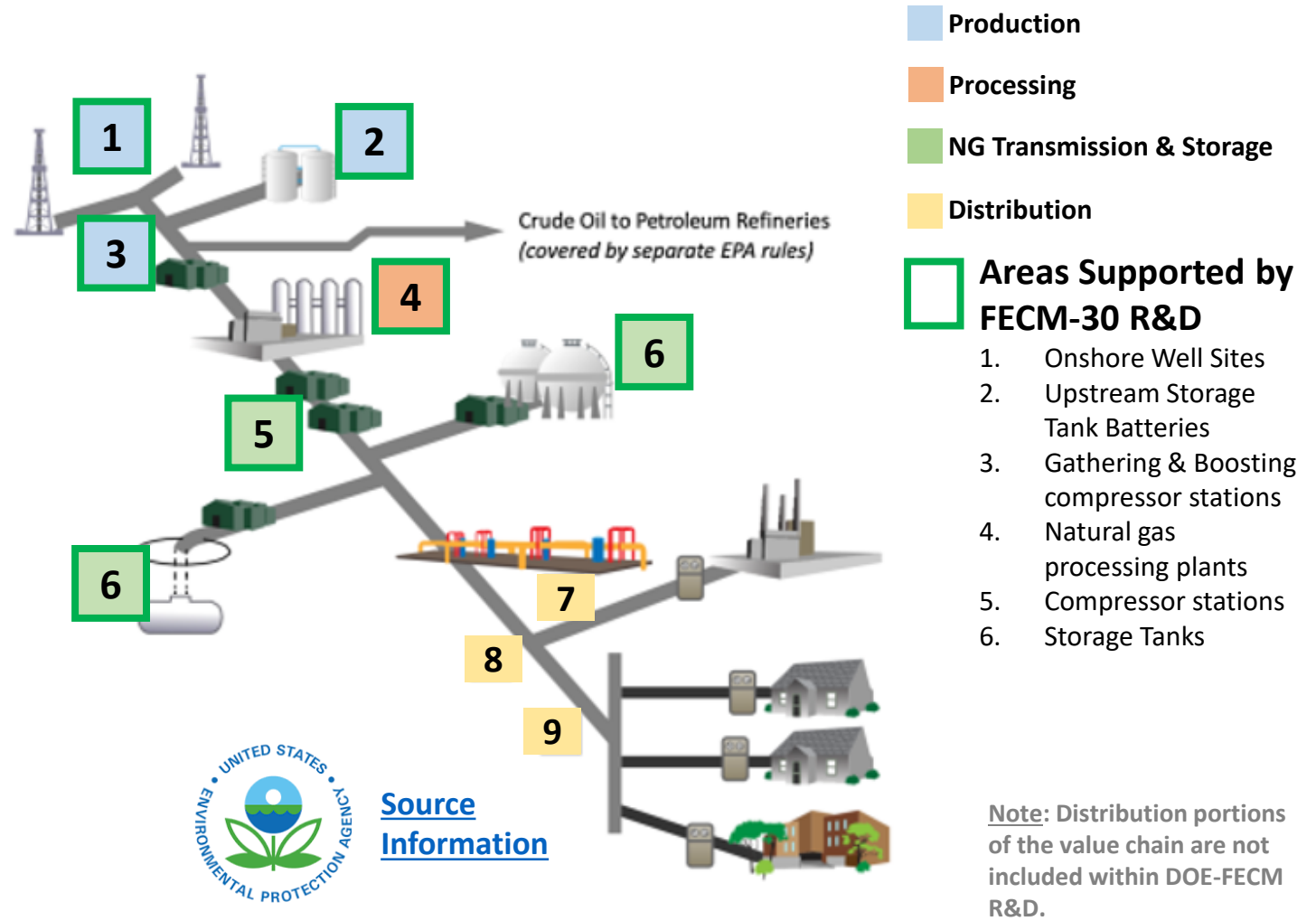
# Research Portfolio Prioritized to Reduce Emissions Across the Existing Natural Gas Value Chain

Total Emissions: ~220 MMTCO<sub>2</sub>e



2022 US Methane Emissions, Natural Gas Systems Overview

Activity	MMTCO <sub>2</sub> e	Percentage
Natural Gas Production	90.2	41
Oil Production	39.6	18
Processing	15.4	7
Transmission and Storage	39.6	18
Distribution	15.4	7
Post-Meter	13.2	6
Abandoned Wells	8.8	4



[Source Information](#)

Figure: Adapted from American Gas Association and EPA Natural Gas STAR Program

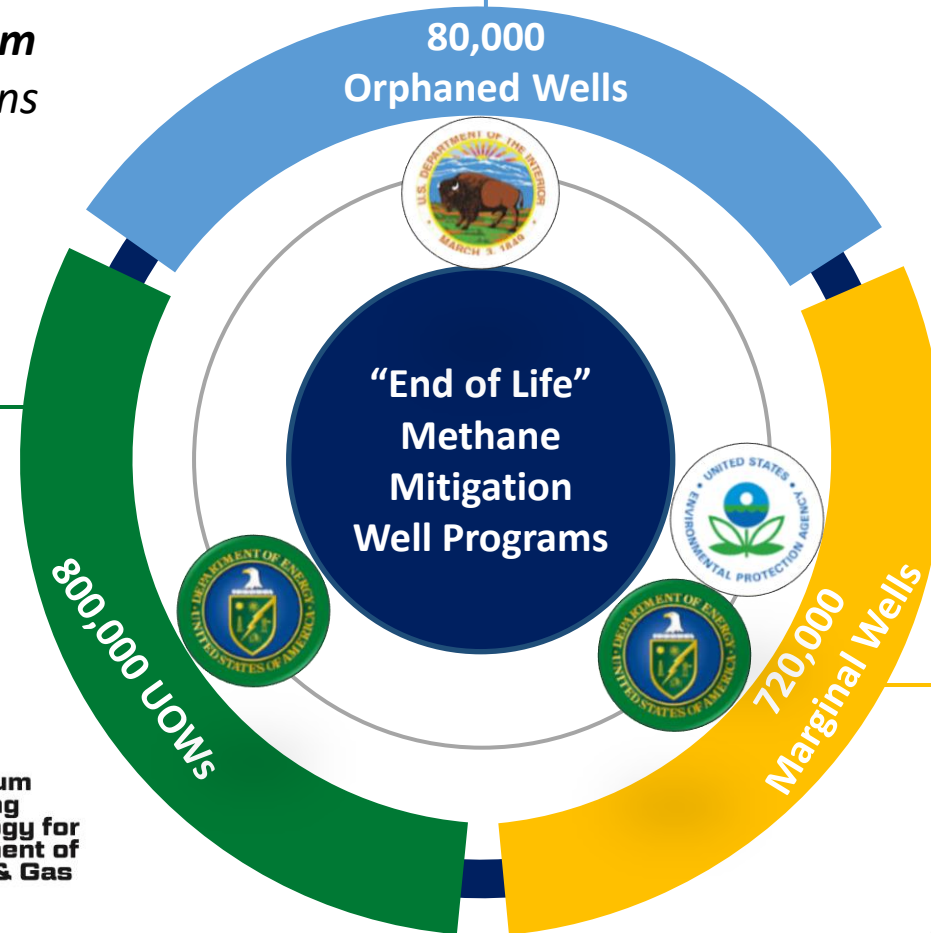
# Research Priorities Expanded to Reduce Methane Emissions from Legacy or “End-of-Life” Oil & Natural Gas Assets

**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**



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



**DOE/EPA Methane Emissions Reduction Program (MERP)**  
Reducing methane emissions and environmental legacy pollution from Marginal Conventional Wells\* through voluntary plugging and repair of high emitting wells  
**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.

# DOE's Role in Methane Emissions Reduction Program (MERP) Technical and Financial Assistance

- 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



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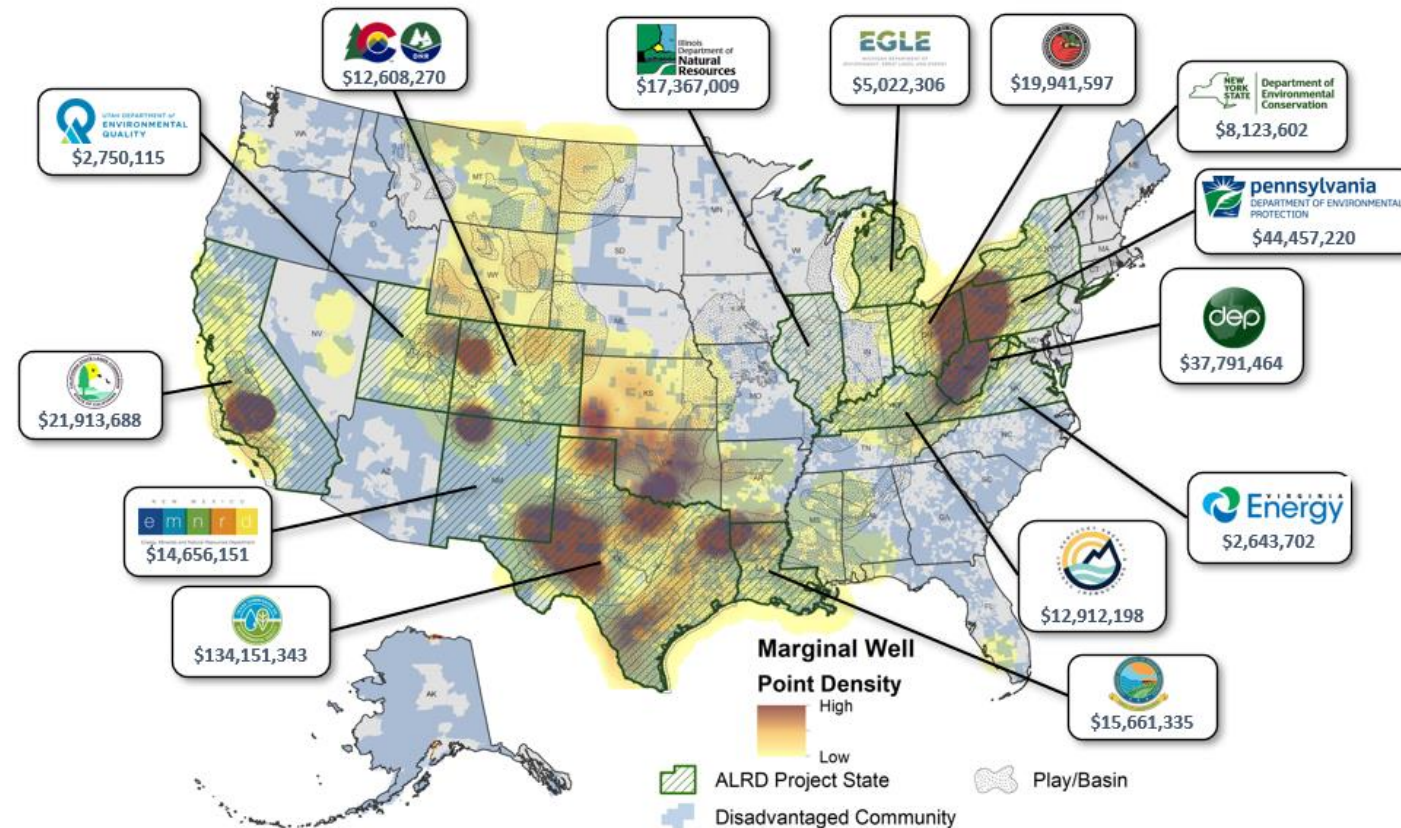
[www.energy.gov/fecm](http://www.energy.gov/fecm)

# Non-Competitive (ALRD) FOA-0003109 – State Formula Grants

## 14 Financial Assistance Awards to State-based organizations totaling \$350 million,

focused on the emissions mitigation related to marginal conventional wells (MCWs):

- **Measure** methane emissions to provide a preliminary screening of emissions from MCWs as a mechanism to inform plugging prioritization;
- **Mitigate**, to the maximum extent possible, methane and other greenhouse gas emissions by assisting operators to voluntarily identify and permanently plug MCWs;
- **Measure** methane emissions from MCWs (in accordance with the [NETL methane measurement guidelines](#) for MCWs) prior to and following plugging and abandonment to quantify mitigated emissions; and
- **Support** elements of environmental restoration required for full compliance with applicable State or Federal well plugging and abandonment standards and regulations.



State Project Landing Pages: [Summary Information for External R&D Awards | netl.doe.gov](#)



# Competitive Solicitation for Methane Monitoring and Mitigation (FOA-0003256)

NETL has recently released [a competitive solicitation offering \\$850 million in financial assistance](#) for broad emissions mitigation, including:

## 1. Methane Emissions Reduction from Existing Wells and Infrastructure

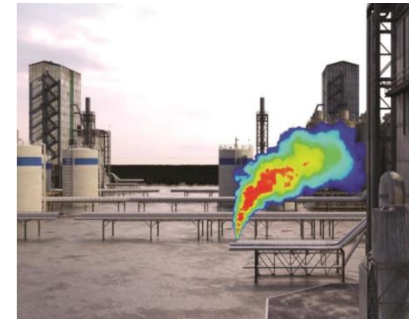
- Technology deployment for reducing methane emissions from MCWs and other oil & natural gas assets on public, private, and tribal lands.

## 2. Accelerating Deployment of Methane Emissions Reduction Solutions

- Field deployment and validation of a variety of advanced technologies for emissions reduction, including:
  - Compressor and engine upgrades/retrofits
  - Gas conversion/upgrading
  - High efficiency combustion flares
  - Upstream equipment/process updates

## 3. Accelerating Deployment of Methane Monitoring Solutions

- Improving access to monitoring data for impacted communities and support for regional methane emissions characterization



*Equipment leak*



*Storage Tanks*



*Produced Water Impoundment*



*Pneumatic Controller*



*Gas Engine*

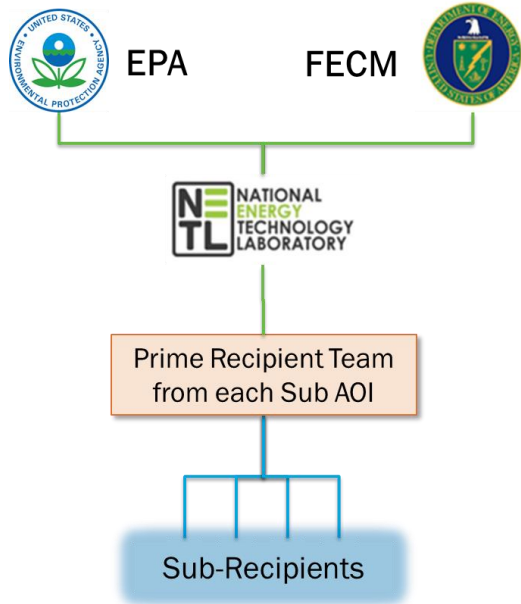


*Natural Gas Compressor*

# Competitive Solicitation for Methane Monitoring and Mitigation (FOA-0003256)

## AOI 1: Implementation & Management

- 1a. Marginal Conventional Wells 1 Project at \$300MM
- 1b. Small Owner/Operators\* 1 Project at \$210MM
- 1c. Tribal Lands 1 Project \$50MM



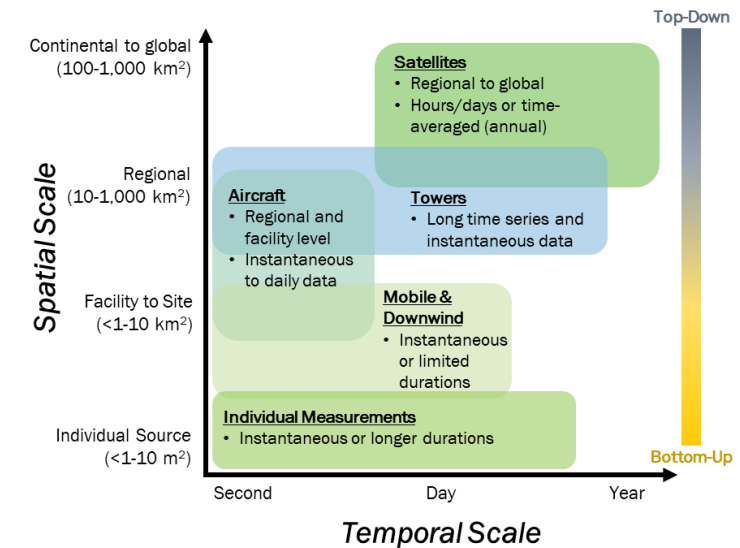
## AOI 2: Accelerating Deployment of Methane Emission Reduction Solutions

- 2a. Engines and Compressors Up to 10 Projects at \$60MM
- 2b. Flaring Reduction Technologies Up to 10 Projects at \$60MM
- 2c. Other Advanced Reduction Technologies Up to 6 Projects \$30MM



## AOI 3: Accelerating Deployment of Methane Monitoring Solutions

- 3a. Improving Access to Monitoring Data for Impacted Communities 4 Projects at \$40MM
- 3b. Regional Methane Emissions Characterization 5 Project at \$100MM



# NETL MCW Methane Measurement Guidelines & Well Plugging Prioritization Tool (PRIMO)

The NETL-RIC MERP team developed guidelines to assist in the detection, identification, and characterization of methane emissions to prioritize the plugging and abandonment of MCWs

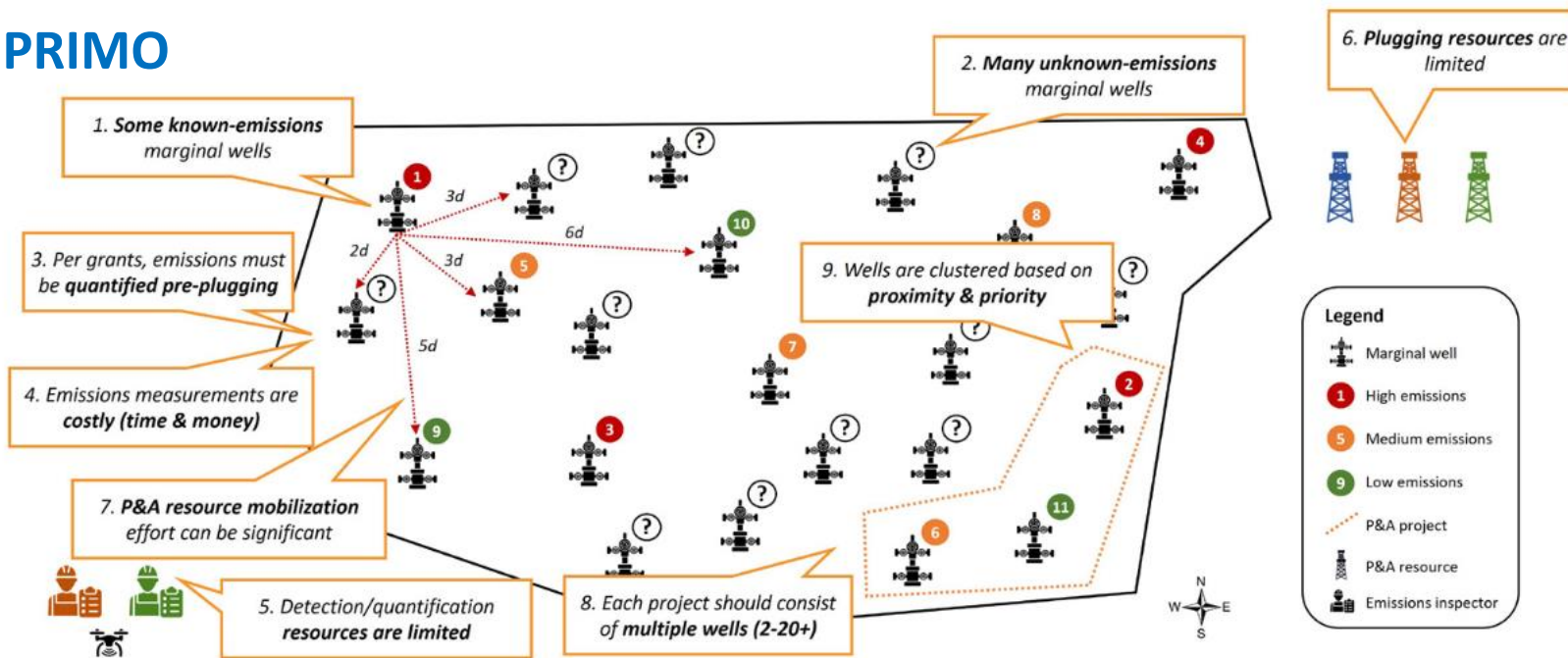
- Direct source measurements, aerial surveys, satellite surveys, and safety considerations

Step 1: Read Relevant Data

Step 2: Specify Objectives & Restraints

Step 3: Provide Specific, Actionable Recommendations

## PRIMO



## Guidelines

Performance Metrics:



[PRIMO - The P&A Project Optimizer - Submissions - EDX \(doe.gov\)](https://www.edx.org/course/netl-primo)

[DOE-NETL Methane Measurement Guidelines for Marginal Conventional Wells April 2024.pdf](#)

# Questions?



**Timothy Reinhardt**

Director, Methane Mitigation Technologies

Office of Fossil Energy and Carbon Management | Office of Resource Sustainability

## Thank You!

Teams at all participating research partners, NETL, DOE, and associated stakeholders

