

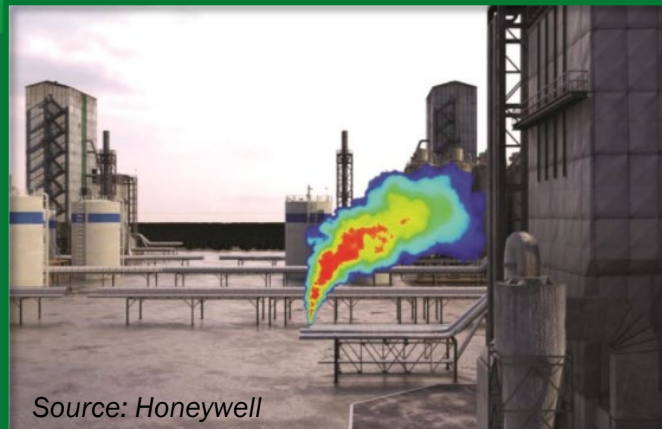


U.S. DEPARTMENT OF
ENERGY

Fossil Energy and
Carbon Management

Methane Emissions Reduction Program (MERP)

2024 IOGCC Conference
October 28-30, 2024
Colorado Springs, CO



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 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



Federal Methane Reduction Programs

DOI Orphaned Wells Program

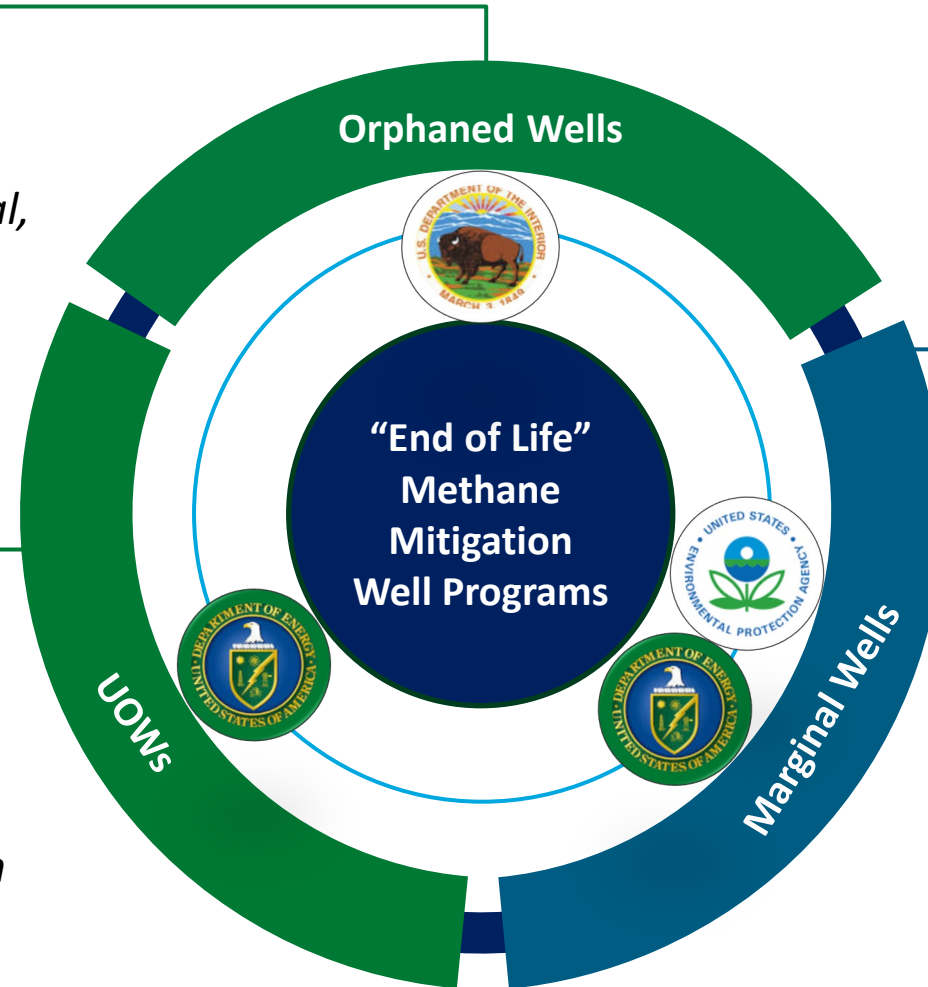
Purpose: Support plugging and abandonment operations across Federal, Tribal, State, and private lands.

Budget: \$4.7 billion to be obligated by 2030

Undocumented Orphaned Well (UOW) Program

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

Budget: \$30 million for 5 years



* 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/EPA Methane Emissions Reduction Program (MERP)

Purpose: Assess marginal well* methane emissions, prioritize methane mitigation opportunities, plugging/repairing wells and surface reclamation

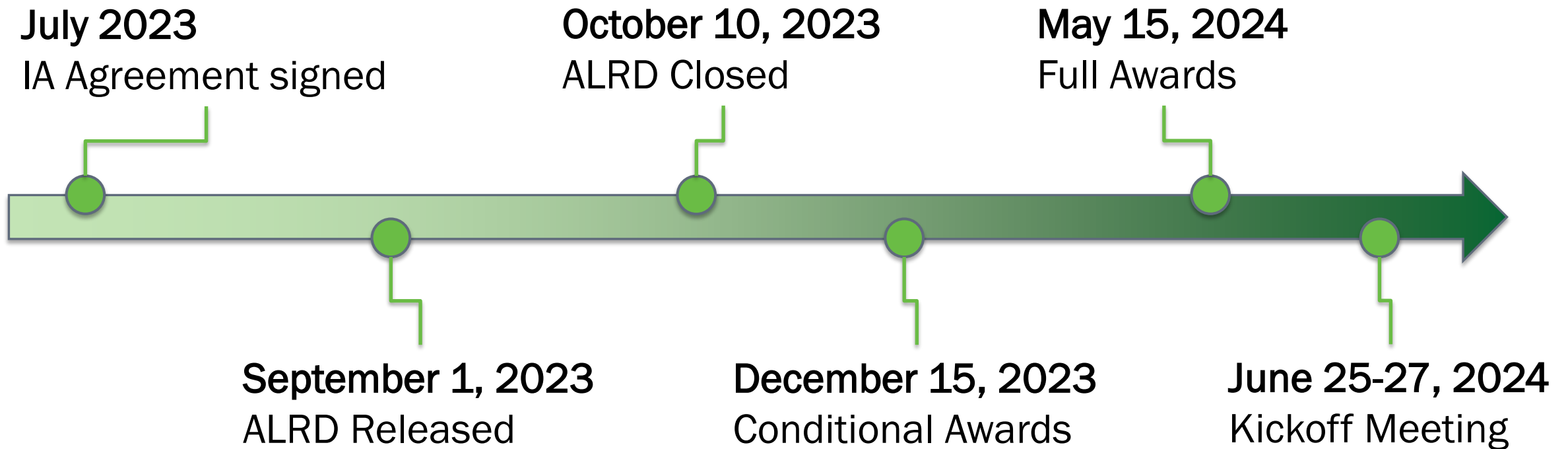
Budget: \$1.3 billion to remain available until September 30, 2028

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

Timelines and Milestones: ALRD (Non-Competitive)



Phase 1: Overview of Marginal Conventional Wells (MCWs)

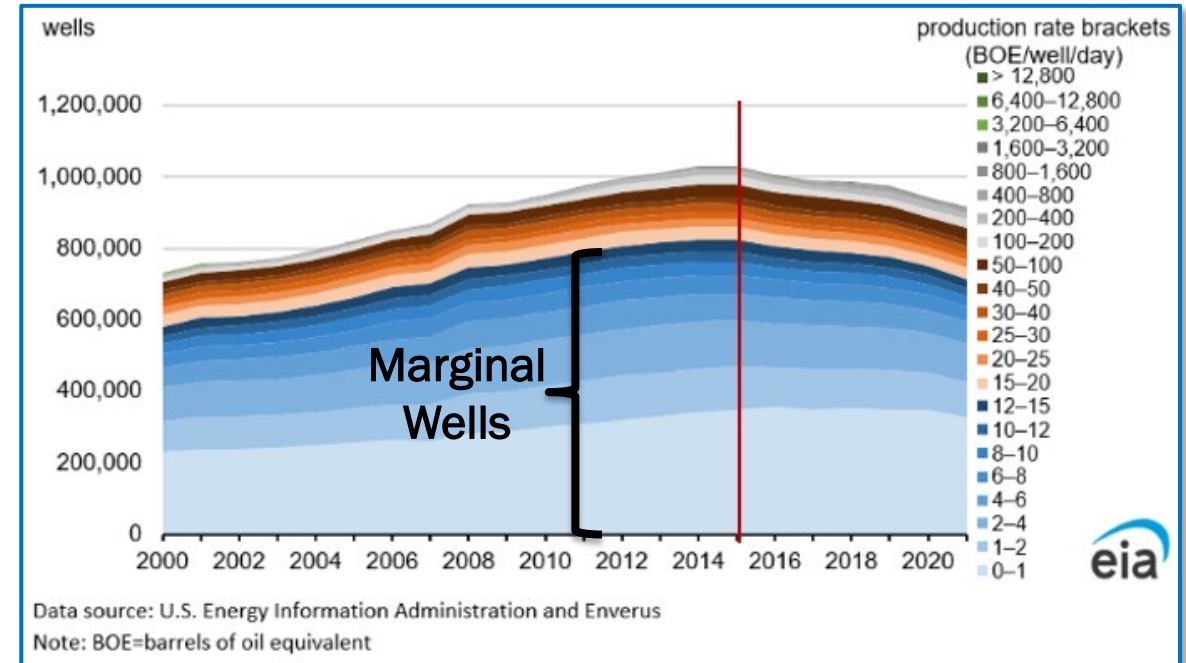
What is a marginal well?

A well is designated as a marginal well if it has low production (i.e., produces less than 15 barrels of oil per day or 90 MCF per day of natural gas) for a period of at least a year¹

An estimated 714,603 low production well sites accounted for 81% of the total number of United States active onshore O&G well sites in 2019.²

Well Type	Oil Wells	Natural Gas Wells
Number of Wells	318,256	396,347
Percentage of Like Wells	79%	77%
Annual Production (MMbbls & BCF)	252	2,399
Percentage of Like Production	7%	7%

U.S. Oil and Natural Gas Wells by Production Rate, Release Date: December 29, 2022, <https://www.eia.gov/petroleum/wells/>



Number of Marginal Wells from 2000 to 2021

The share of United States oil and natural gas wells producing less than 15 BOE/d has remained steady at about 80% of total wells from 2000 through 2021.

1. Marginal and stripper wells: What tax breaks are available to low production oil and gas companies?, <https://www.bakertilly.com/insights/marginal-and-stripper-wells-what-tax-breaks-are-available-to-low-production/>
2. U.S. Oil and Natural Gas Wells by Production Rate, <https://www.eia.gov/petroleum/wells/>

FOA Overview and Objectives

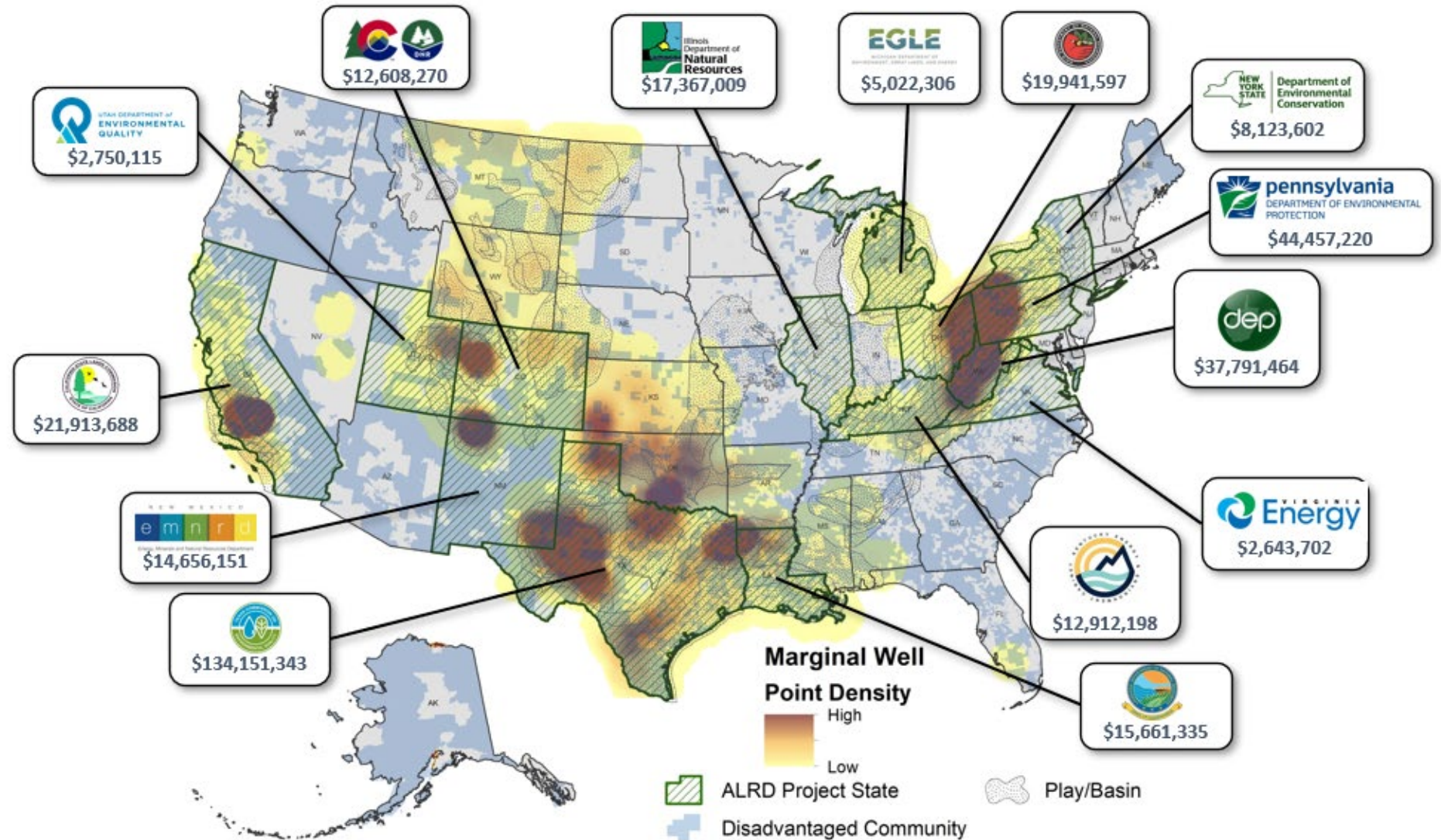
Planned		Actual						
Topic Areas	Original Total Federal Share + Awards Target	# of Concept Papers		# of Applications		Total Federal Share	Total Recipient Cost Share	Total Value of Projects
	<i>DOE</i>	<i>Received</i>	<i>Encouraged</i>	<i>Received</i>	<i>Selected</i>	<i>DOE</i>		
<i>Mitigating Emissions From Marginal Conventional Wells</i>	<i>\$350 Million *30 Eligible States</i>	<i>NA</i>	<i>NA</i>	<i>14</i>	<i>14</i>	<i>\$350 Million</i>	<i>\$0</i>	<i>\$350 Million</i>

*See Appendix

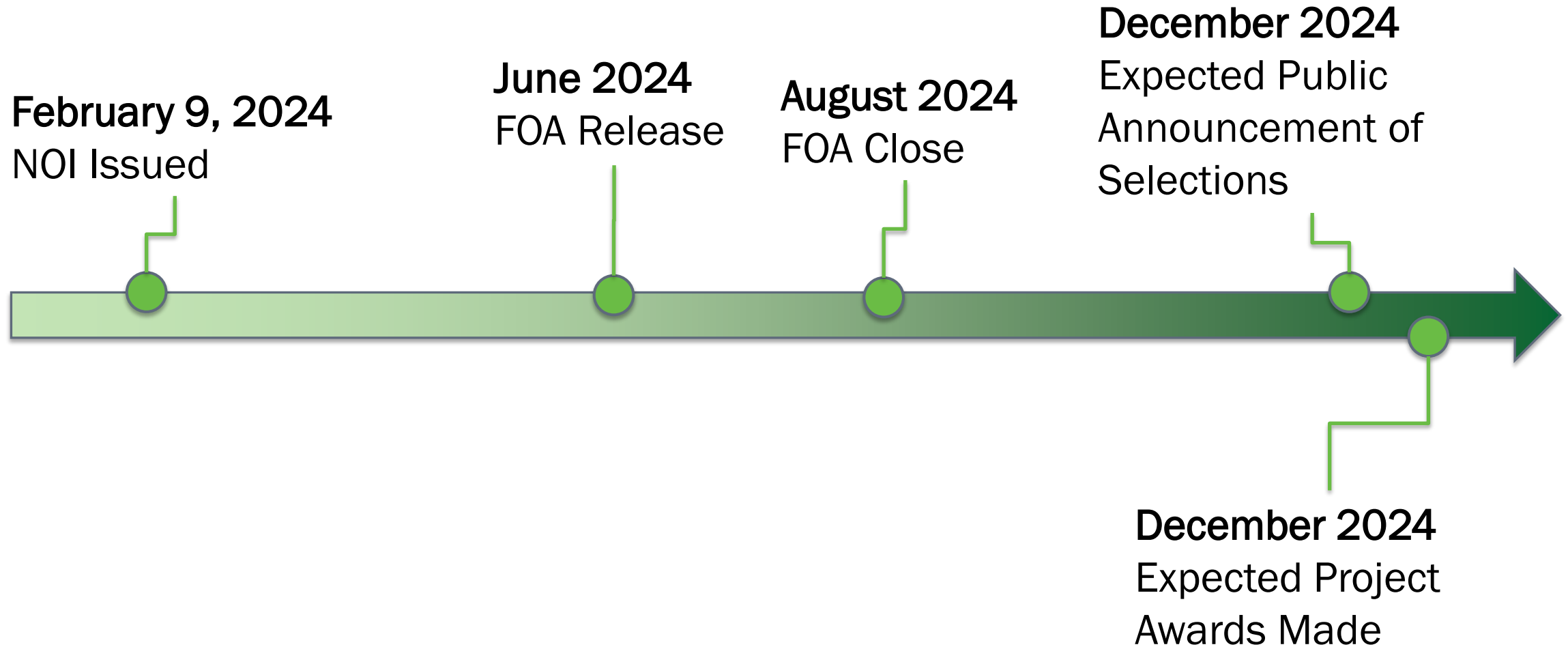
- 1. Measure** methane emissions from MCWs to provide a preliminary screening of emissions as a mechanism to inform plugging prioritization across eligible States;
- 2. Mitigate**, to the maximum extent possible, methane and other greenhouse gas emissions by assisting operators to voluntarily identify and permanently plug marginal conventional wells;
- 3. Verify** methane emissions reductions from MCWs following plugging and abandonment operations;
- 4. Support** elements of environmental restoration required for full compliance with applicable State or Federal well plugging and abandonment standards and regulations.

ALRD Award Recipients

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



Timelines and Milestones: Competitive FOA 3256



Funding Opportunity Announcement (FOA) Overview

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

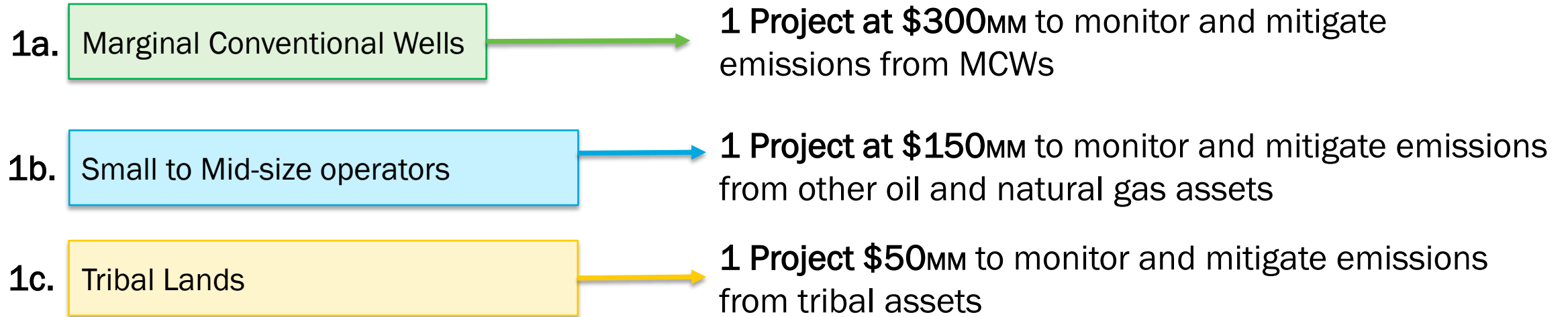
- 2a. Field Deployment of Engine and Compressor Methane Reduction Technologies – \$60mm
- 2b. Field Deployment of Gas Flaring Reduction Technologies – \$60mm
- 2c. Field Deployment of Emissions Reduction Technologies at Oil & Gas Production Facilities – \$30mm

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

AOI 1: Methane Emissions Reductions from Existing Wells and Infrastructure



Three individual Projects will:

1. Coordinate with EPA, DOE, and NETL on MCW emissions mitigation reduction opportunities and ensure compliance with local, state, and Federal regulations;
2. Coordinate with EPA, DOE, and NETL on the distribution of funds towards equipment purchase and installation; estimated up to 10,000 repairs over 48 months (analogous model to the EERE weatherization program investments);
3. Prioritize assets for repair/replacement/upgrade;
4. Conduct post-mitigation monitoring

AOI 2: Accelerating Deployment of Methane Emission Reduction Solutions

- 2a. Engines and Compressors → \$60MM to mitigate methane emissions from natural gas engines, compressors, and blowdown events
- Up to 10 Projects
- 2b. Flaring Reduction Technologies → \$60MM to mitigate methane emissions from natural gas that is flared or underutilized
- Up to 10 Projects
- 2c. Other advanced Reduction Technologies → \$30MM to mitigate methane emissions liquids unloading, produced water, and equipment leaks
- Up to 15 Projects

Intended Recipients

Small oil & gas operators, tribal organizations, technology developers of advanced monitoring and methane mitigation equipment, State/Federal/Industry agencies and experts, NGOs, Universities.

AOI 3: Accelerating Deployment of Methane Monitoring Solutions

3a. Improving Access to Monitoring Data for Impacted Communities → \$40MM to accelerate emissions monitoring, reporting, and reduction for communities

- 1 Projects → multiple installations

3b. Regional Methane Emissions Characterization → \$100MM to pursue consistent, accurate, and transparent multi-scale methane measurement and characterization

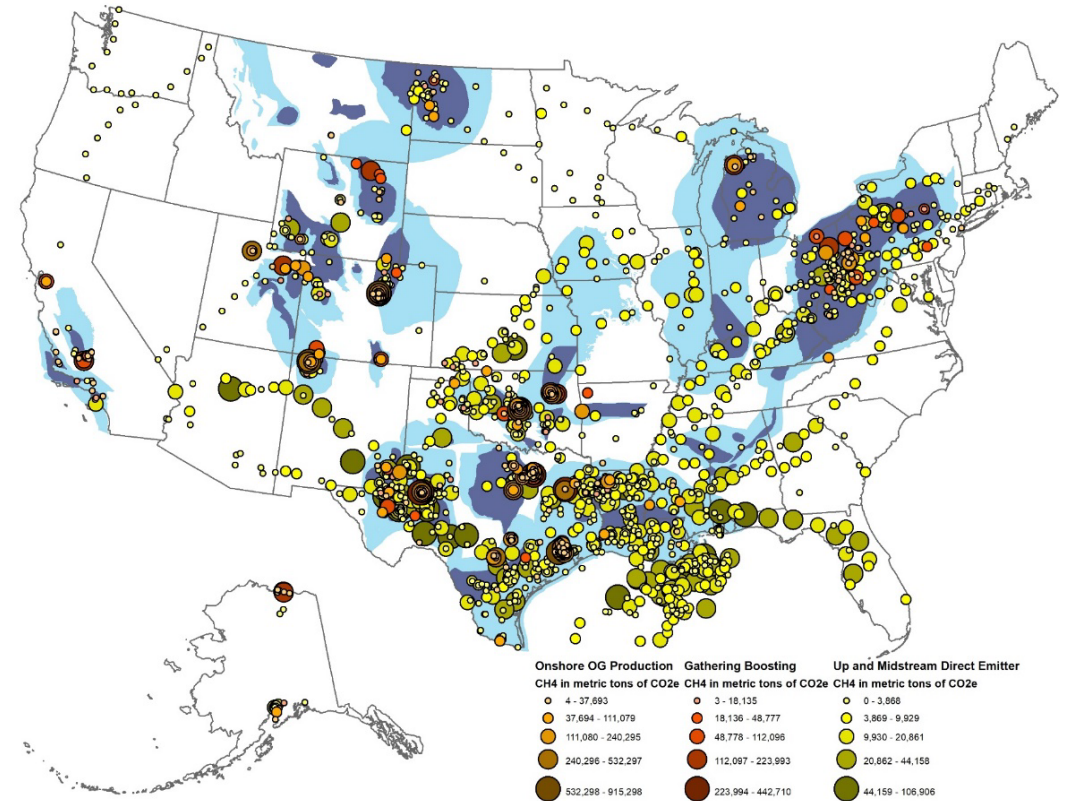
- 5 Regional projects

Intended Recipients

Small oil & gas operators, tribal organizations, technology developers of advanced monitoring and methane mitigation equipment, State/Federal/Industry agencies and experts, NGOs, Universities.

AOI 3: Regional Methane Emissions Characterization

- Today, there is a need for consistent, accurate, and transparent multi-scale methane measurement and characterization across the largest producing basins across the U.S. (DOE DMMT is pursuing initial elements within this area)
- Significant uncertainties remain across all available methane detection and measurement technologies, from point source through satellite
- Field monitoring campaigns for methane emissions characterization and quantification have not been sufficient in scope or scale to provide effective, defensible accounting on a regional scale.
- Intermittent emissions, unpredictable atmospheric conditions, geographic diversity, and dynamic O&G production



EPA, 2022 Greenhouse Gas Reporting Program (GHGRP) methane emissions.

- Onshore Oil & Gas Prod. facilities
- Gathering & Boosting facilities
- Direct Emitter facilities filtered by North American Industry Classification System (NAICS) to identify upstream and midstream oil and gas industry types.

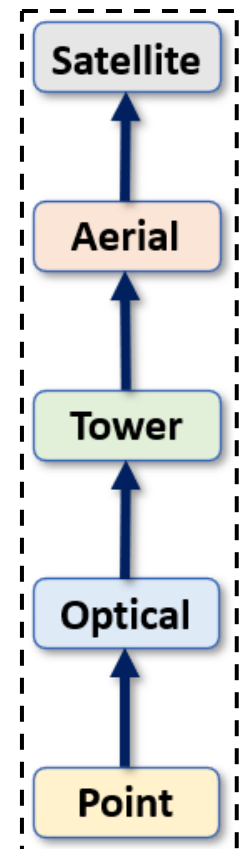
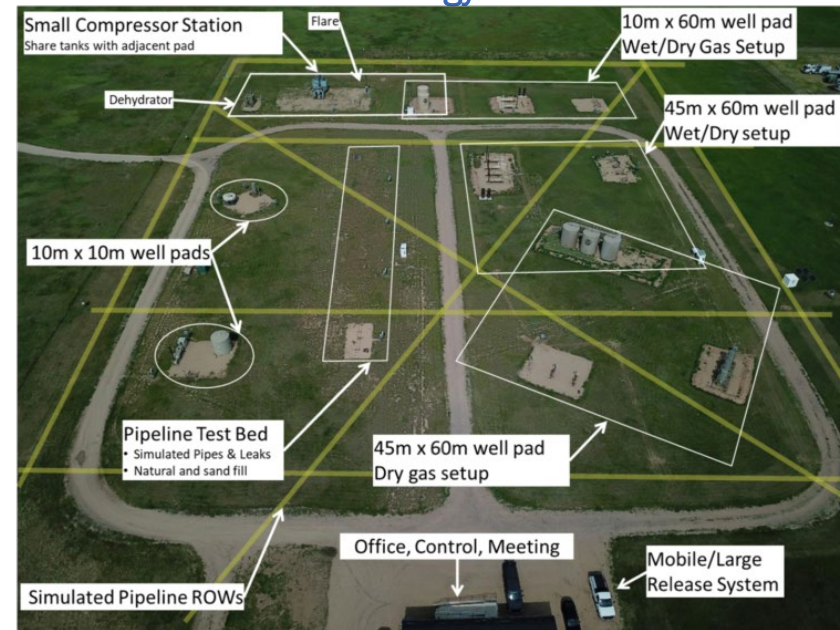
METEC - Advancing Development of Emissions Detection

Comprehensive process of protocol development and testing to accelerate the adoption of natural gas leak detection and quantification (LDAQ) solutions by natural gas operators, and their approval by cognizant regulatory authorities.

- Develop test protocols for LDAQ methods through controlled testing performed at CSU's Methane Emissions Technology Evaluation Center
- Comprehensive field testing of LDAQ solutions on a variety of oil and natural gas emulated facilities (e.g. equipment); and
- Demonstrate methods to evaluate the control efficacy of LDAQ solutions using simulation software developed in parallel projects.



Colorado State University Methane Emissions Technology Evaluation Center





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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			

