U.S. DEPARTMENT OF ENERGY
Fossil Energy and Carbon Management

Overview of DOE Carbon Management Activities and the Carbon Dioxide Removal (CDR) Mission

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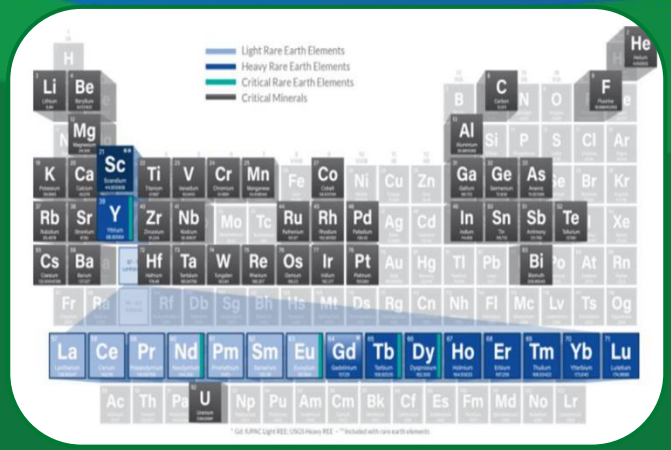
October 4, 2023



Carbon management helps with 3 core pillars of DOE's climate strategy

1

Carbon dioxide removal

Offset the most expensive-to-abate GHG emissions and clean up legacy CO_2 pollution

2

Industrial decarbonization for net-zero economy 2050

Reduce emissions while alternative manufacturing methods are developed over time that avoid production of CO_2 altogether

3

Decarbonized, resilient, low-cost, land-efficient power grid

Boosting grid resilience and reducing overall system costs and pollution in high-renewable deep-decarbonization scenarios

Carbon Management Investments (highlights, not comprehensive)

- Bipartisan Infrastructure Law (BIL) – enacted November 15, 2021
  - ***Over $12 billion in Carbon Management***
  - $8 billion for Hydrogen Hubs
  - $500 million for Industrial Emissions Reduction Technology Development Program
  - $50 million to the U.S. Environmental Protection Agency for states to attain class VI primacy (geologic storage permitting)

- Inflation Reduction Act (IRA) – enacted August 16, 2022
  - $5.812 billion for Advanced Industrial Facilities Deployment
  - Tax credit enhancements – ***45Q carbon capture***, 45V hydrogen

- ***President's Budget Request to Congress – Fiscal Year 2024***

Opportunities for the Entire Carbon Management Value Chain: Bipartisan Infrastructure Law (BIL)

Industrial and Power Plant Carbon Capture

- CCUS Integrated Demos: $2.5 billion (OCED)
- Carbon Capture Large Pilot: $1 billion (OCED)

Direct Air Capture

- Regional Direct Air Capture Hubs: $3.5 billion
- DAC Technology Prize Competition: $115 million

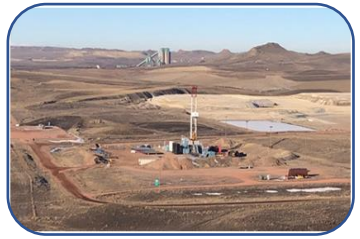
Project Applications Require New Components:

- Community and Stakeholder Engagement
- Diversity, Equity, Inclusion, and Accessibility
- Justice40 Initiative
- Quality jobs

Bipartisan Infrastructure Law Programs at Department of Energy

Carbon Transport Systems

- FEED Studies for Transport Systems: $100 million
- CIFIA – Loans and Future Growth Grants: $2.1 billion



Carbon Dioxide Utilization and Storage

- Carbon Storage Validation and Testing: $2.5 billion
- Carbon Utilization Program: $310 million

FOA Overview: Regional Direct Air Capture Hubs

Closing Date

03/13/2023
Applicants must have submitted mandatory LOI by 02/17/2023

Topic Area 1 (TA-1)

Feasibility (Phases 0a-0b)

Topic Area 2 (TA-2)

Design (Phase 1)

Topic Area 3 (TA-3)

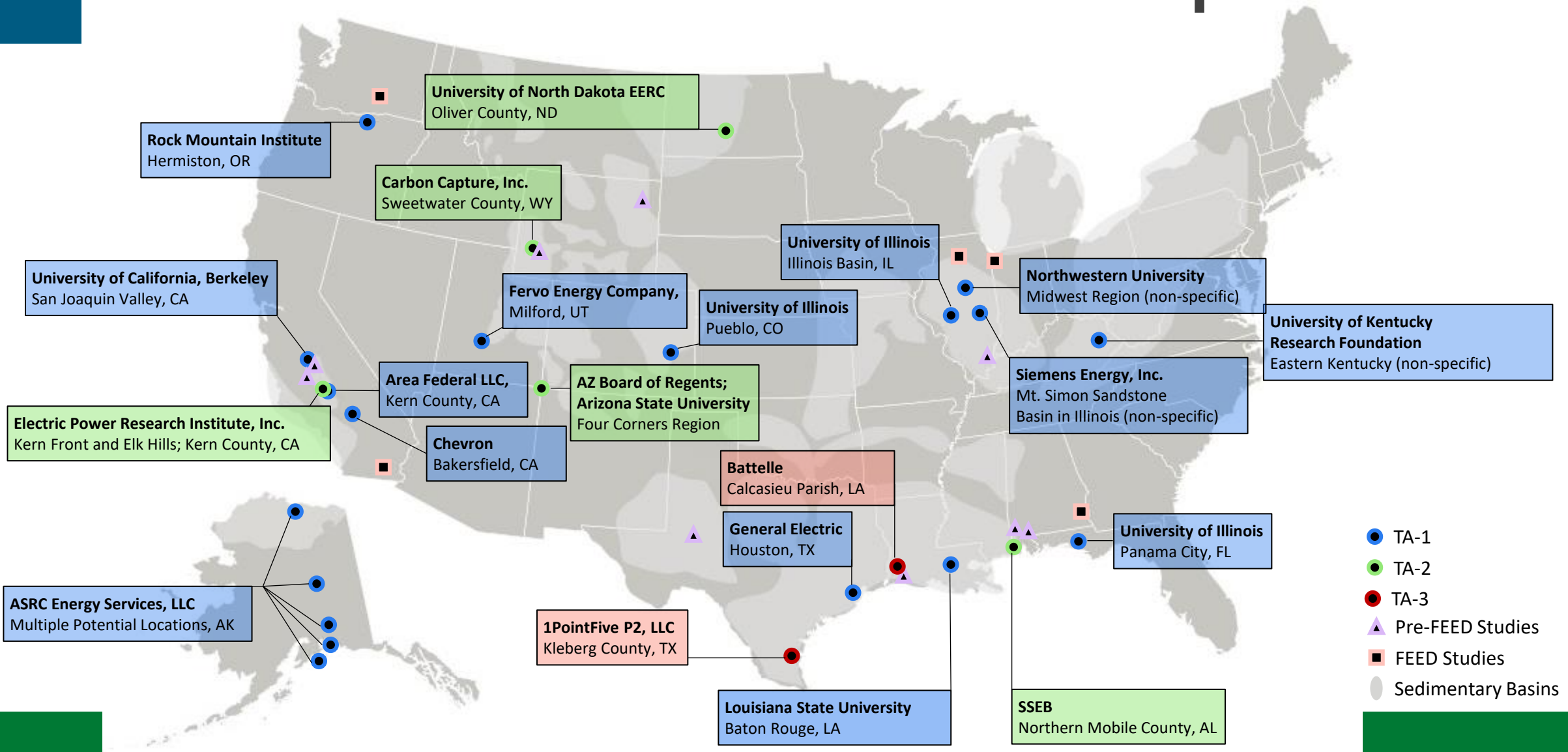
Build (Phases 2-4)

- "Regional Direct Air Capture Hub"
  - A network of direct air capture projects, potential CO_2 utilization/conversion offtakers, connective CO_2 transport infrastructure, subsurface resources, and sequestration infrastructure located within a region.

- DOE will invest $3.5 billion for the development of four domestic Regional Direct Air Capture (DAC) Hubs

- This FOA made $1.236 billion of funding available for three (3) Topic Areas

DAC Hub Location Map



Inflation Reduction Act – "45Q" Carbon Capture Tax Credit Modifications

	Old	New
Commence Construction	January 1, 2026	January 1, 2033
DAC Facility	100,000 metric tons/year*	1,000 metric tons/year
Electric Generator	500,000 metric tons/year*	18,750 metric tons/year
All other facilities	100,000 metric tons/year*	12,500 metric tons/year
Saline Storage Credit	$50/metric ton	$85/metric ton (industry and power); $180/metric ton (DAC)
EOR and Conversion Credit	$35/metric ton	$60/metric ton (industry and power); $130/metric ton (DAC)

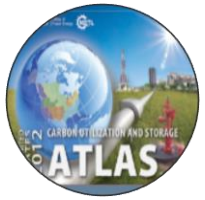
** Non-EOR Conversion facilities were previously 25,000 metric tons/year regardless of facility/source.*

Notes: New Modifications allows up to 5 years for direct pay (up to 12 years certain entities)

H_2 with Carbon Management
Conversion of carbon-based feedstocks to H2 coupled with carbon management

Carbon Dioxide Removal
Removal of atmospheric CO_2 and durable store

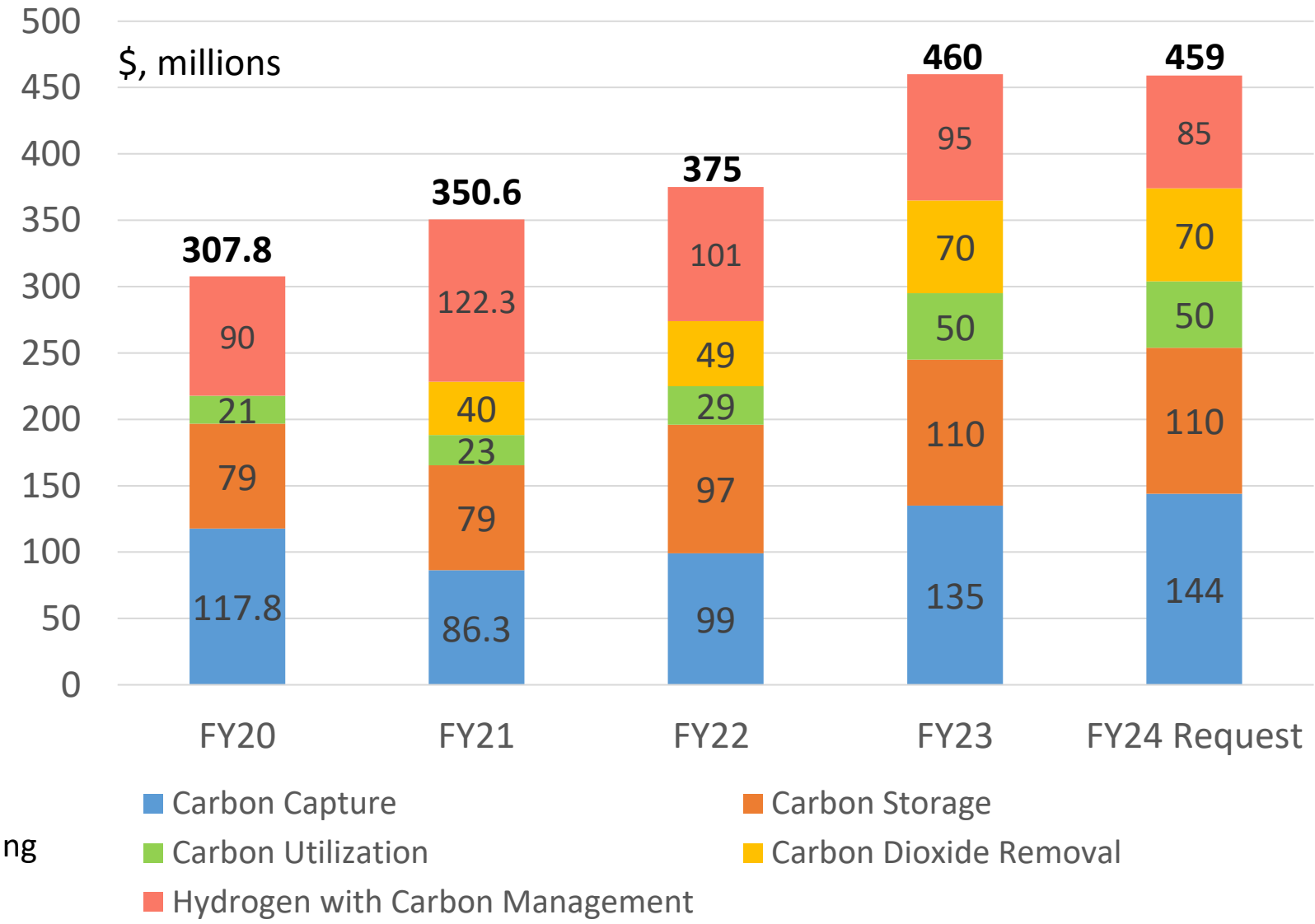
Carbon Utilization
Conversion of CO_2 to value-added products



Carbon Storage
Safe, cost- effective, and permanent geologic storage of CO_2

Carbon Capture
Capturing CO_2 from new and existing industrial and power plants

Fossil Energy and Carbon Management Regular Appropriations



Carbon Negative Shot: Key Performance Elements

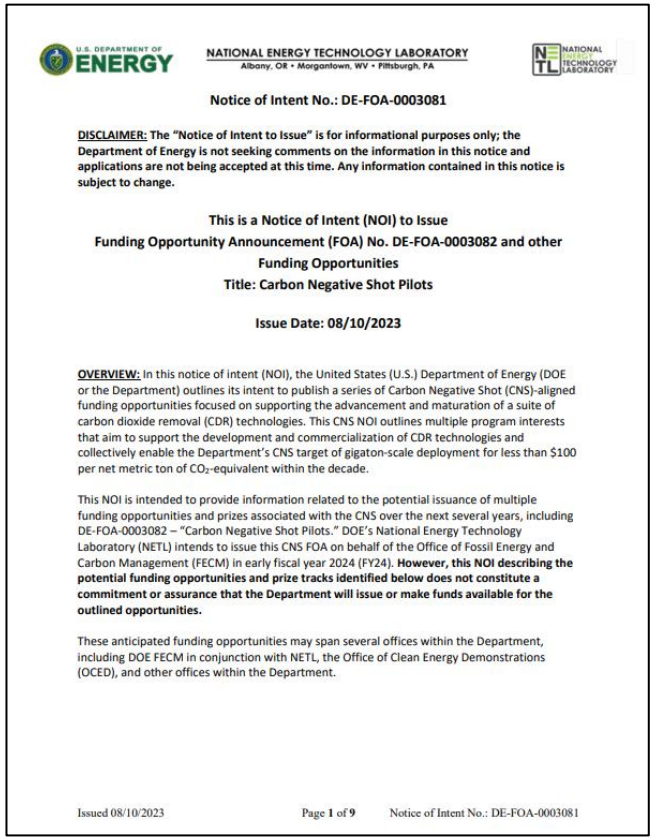
Carbon Negative Shot's key performance elements will guide a responsible industry that is responsive to the climate crisis, such that multiple true, durable removal pathways can be deployed at their most affordable cost at the scale required to address the climate crisis.

1. Less than **$100/net metric ton CO_2e** for both capture and storage
2. Robust accounting of full life cycle emissions
3. High-quality, durable storage with costs demonstrated for MRV **for at least 100 years**
4. Enables necessary **gigaton-scale** removal

Future Investments: Carbon Negative Shot

- DE-FOA-0003082 – Carbon Negative Shot Pilots (expected release date of early FY24)
  - Includes four (4) anticipated Areas of Interest (AOIs) related to:
    - Biomass, Mineralization Pilots, Marine CDR Small Pilots, and Multi-Pathway CDR Testbeds.

- Other intended funding opportunities and prize tracks include:
  - DAC Pilot Prize (expected release date late FY23)
  - CDR Purchase Prize (expected release date late FY23)
  - Regional DAC Hubs (expected release of additional FOA(s) in FY24/25 and beyond)
  - Monitoring, Reporting, and Verification (MRV) for CDR (expected release date FY24)
  - DE-FOA-0002614 – Carbon Management: CDR Technology Research and Development (expected release date FY24)



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Notice of Intent No.: DE-FOA-0003081

DISCLAIMER: The "Notice of Intent to Issue" is for informational purposes only; the Department of Energy is not seeking comments on the information in this notice and applications are not being accepted at this time. Any information contained in this notice is subject to change.

This is a Notice of Intent (NOI) to Issue
Funding Opportunity Announcement (FOA) No. DE-FOA-0003082 and other Funding Opportunities
Title: Carbon Negative Shot Pilots

Issue Date: 08/10/2023

OVERVIEW: In this notice of intent (NOI), the United States (U.S.) Department of Energy (DOE or the Department) outlines its intent to publish a series of Carbon Negative Shot (CNS)-aligned funding opportunities focused on supporting the advancement and maturation of a suite of carbon dioxide removal (CDR) technologies. This CNS NOI outlines multiple program interests that aim to support the development and commercialization of CDR technologies and collectively enable the Department's CNS target of gigaton-scale deployment for less than $100 per net metric ton of CO_2-equivalent within the decade.

This NOI is intended to provide information related to the potential issuance of multiple funding opportunities and prizes associated with the CNS over the next several years, including DE-FOA-0003082 – "Carbon Negative Shot Pilots." DOE's National Energy Technology Laboratory (NETL) intends to issue this CNS FOA on behalf of the Office of Fossil Energy and Carbon Management (FECM) in early fiscal year 2024 (FY24). **However, this NOI describing the potential funding opportunities and prize tracks identified below does not constitute a commitment or assurance that the Department will issue or make funds available for the outlined opportunities.**

These anticipated funding opportunities may span several offices within the Department, including DOE FECM in conjunction with NETL, the Office of Clean Energy Demonstrations (OCED), and other offices within the Department.

Issued 08/10/2023 Page 1 of 9 Notice of Intent No.: DE-FOA-0003081

CDR Mission Overview

SCOPE:

Accelerate RD&D of technological CDR approaches, including:

- Direct Air Capture
- Enhanced mineralization
- Biomass with carbon removal and storage

Emphasize long-term, secure CO_2 storage and conversion into long-lived products.

COALITION:

Co-leads – Canada, Saudi Arabia, United States

Members – Australia, European Commission, Japan, Norway, India, United Kingdom

Observers – Germany, Iceland, Bahrain, Switzerland, Costa Rica

Always open to additional members

Launched at COP-26, November 2021

CDR Mission Priorities for Rest of 2023

MISSION INNOVATION

Making progress on existing sprints and initiatives

- Five active technical tracks and sprints

Measuring impact

- Develop/refine KPIs and data sources
- Set up mechanisms for tracking progress

Maximizing opportunities for strategic engagements

- Identify opportunities for working with private sector
- Take advantage of synergies between missions and initiatives

Expanding on momentum

- Assess needs and develop actions for MRV working group
- Launch new sprint(s) and/or reports
- Maintain political support

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Thank you

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