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

DOE's Roadmap for CO2 Transport Fundamental Research Workshop

John Litynski
Division Director, Carbon Transport and Storage
U.S. DOE Office of Fossil Energy and Carbon Management

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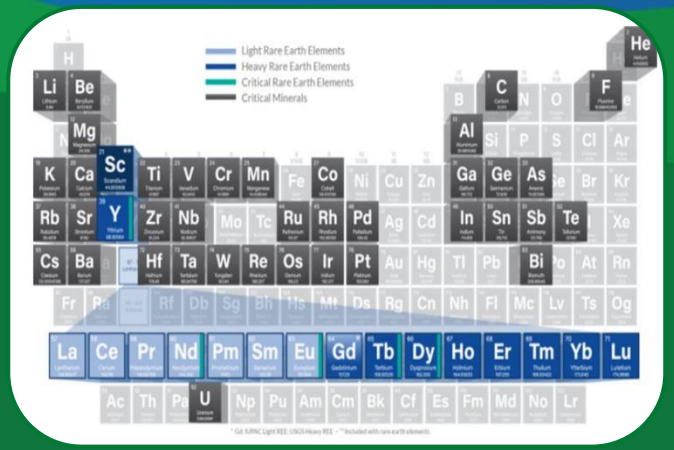


FECM Strategic Vision Released April 5, 2022

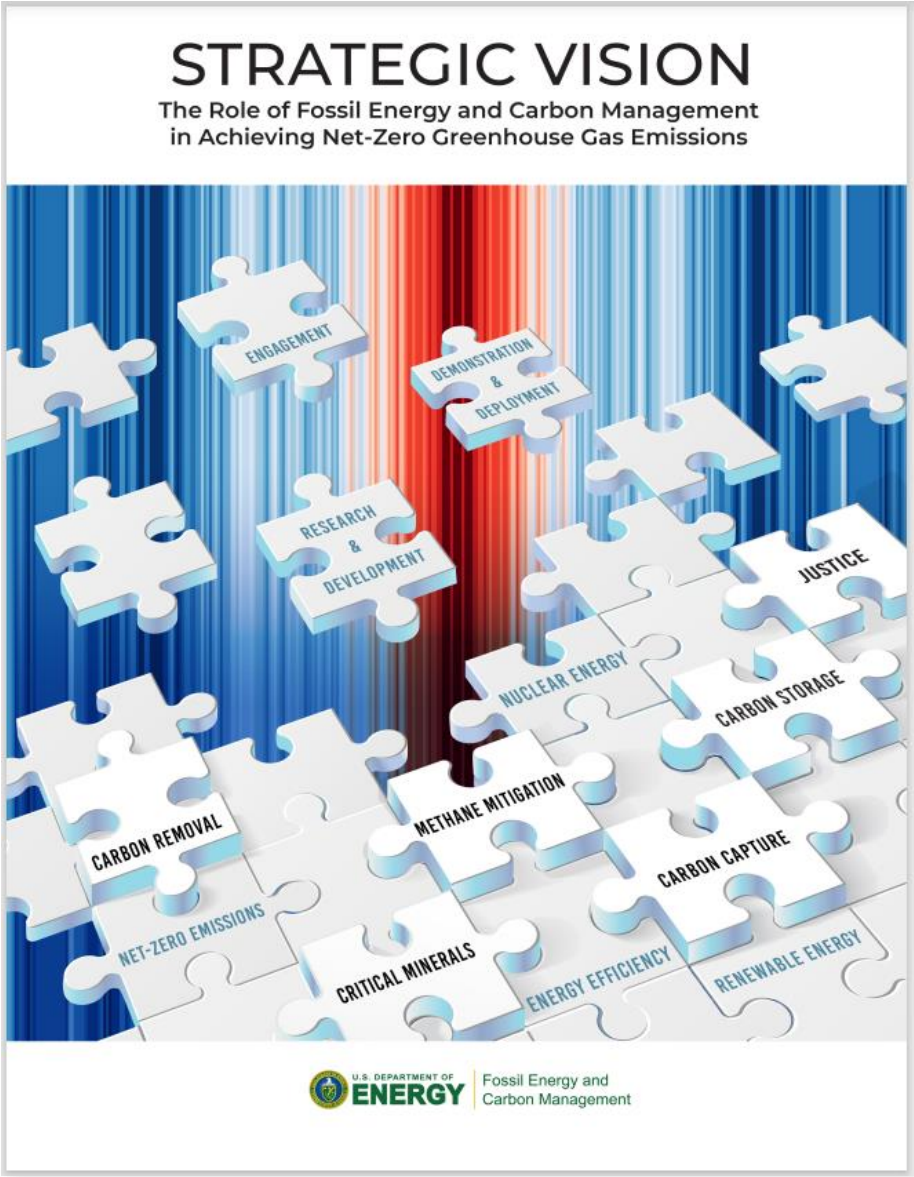
Office of Fossil Energy and Carbon Management

DOE-FE is now **DOE-FECM**

New name for our office reflects our **new vision**

President Biden's goals:

- 50 percent emissions reduction by 2030
- CO_2 emissions-free power sector by 2035
- Net zero emissions economy by no later than 2050



https://www.energy.gov/fecm/strategic-vision-role-fecm-achieving-net-zero-greenhouse-gas-emissions

Rapid CCS industry growth for decarbonization

U.S. DEPARTMENT OF ENERGY

CarbonSAFE Targets

	2025	2030	2035	2040	. . .	2050
	VALIDATION	ACTIVATION	EXPANSION	AT SCALE		MIDCENTURY
Injectivity	5 million metric tons (MT)/year	65 million MT/year	250 million MT/year	450 million MT/year	. . .	>1 billion MT/year
Commercial Storage Potential	250 million metric tons (MT)	2,000 million MT	7,500 million MT	13,500 million MT	. . .	> 30 billion MT

Biden Administration Executive Order 14008
Tackling the Climate Crisis at Home and Abroad

50-52 percent reduction in economy-wide net greenhouse gas pollution in 2030 from 2005 levels

Net-zero emissions from the power sector by 2035

Net-zero emission economy by 2050

External Metrics and Goals

The National Academies of SCIENCES ENGINEERING MEDICINE

↑CCUS 10-fold by 2030

IPCC INTERGOVERNMENTAL PANEL ON climate change

Cumulatively sequester 350-1,000 GT by 2050

The Long-Term Strategy of the United States, Pathways to Net-Zero Greenhouse Gas Emissions by 2050 (whitehouse.gov)

BIL Developing the Entire Value Chain

Transport and Storage Infrastructure Required for Deployment

Point Source Capture

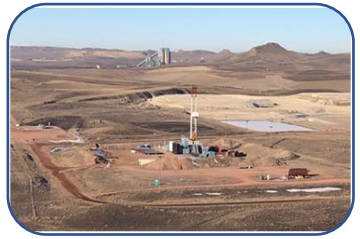
- CCUS Integrated Demos: $2.5 billion (OCED)
- Carbon Capture Large Pilot: $1 billion (OCED)

Hubs

- Regional Direct Air Capture Hubs: $3.5 billion
- Hydrogen Hubs: $8 billion (OCED)

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

Project Applications Require New Plans:

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

Bipartisan Infrastructure Law Programs | Department of Energy

Inflation Reduction Act for CCS – Highlights

Sec. 13104 - EXTENSION AND MODIFICATION OF CREDIT FOR CARBON OXIDE SEQUESTRATION. (45Q)

DOE Loan Programs Office

- $11.7 billion in total for LPO to support issuing new loans.
- Authorizes New loan program, the Energy Infrastructure Reinvestment (EIR) Financing Program (Sec.1706)
  - Loans up to $250 billion retool, repower, repurpose or replace energy infrastructure to mitigate GHGs
- Enhanced **Title 17 Innovative Clean Energy Loan Guarantee Program**
  - Additional $40 billion of loan authority through 2026 - $3.6 billion in credit subsidy

USDA SEC. 22004. USDA ASSISTANCE FOR RURAL ELECTRIC COOPERATIVES - $9.7B

Multiple provisions that benefit, CCS, hydrogen, and CDR

Legislation Language:
Guarantee loans to projects that retool, repower, repurpose, or replace energy infrastructure that has ceased operations, or enable operating energy infrastructure to **avoid, reduce, utilize, or sequester air pollutants or anthropogenic emissions of greenhouse gases**.

Federal Agencies — Addressing Regulatory, Safety Oversight, and Leasing for CCS

US Council on Environmental Equality (CEQ) - USE IT. Public Law 116-260, 134 Stat 1182.

- Identify challenges and successes for responsible permitting and provide recommendations to improve responsible permitting CCUS and Pipelines. Candidates to serve on the Federal and OCS Task Force.

US EPA - BIL Sec 40306. SECURE GEOLOGIC STORAGE PERMITTING.

- Federal Class VI Permitting Program - $25M ($5M/yr FY22-26)
- State Permitting Program Grants.- $50,000,000 (FY22-26)

Department of Interior SEC. 40307. GEOLOGIC CARBON SEQUESTRATION ON THE OUTER CONTINENTAL SHELF

- Developing regulation for the permitting and leasing of federal offshore assets for CCS. (No funding)

DOT - PHMSA and other offices

- May 2022 - PHMSA Announces New Safety Measures to Protect Americans From Carbon Dioxide Pipeline Failures
- Evaluation of Freight (Rail, Trucking, Shipping)

DOI BLM

- National Policy for the Right-of-way Authorizations Necessary for Site Characterization, Capture, Transportation, Injection, and Permanent Geologic Sequestration of Carbon Dioxide in Connection with Carbon Sequestration Projects https://www.blm.gov/policy/im-2022-041

States — Addressing Regulatory, Safety Oversight, and Leasing for CCS

California Senate Bill SB 905 - Carbon sequestration: Carbon Capture, Removal, Utilization, and Storage

- Unified permit application and centralized project database
- Defines:
  - financial responsibility,
  - pore space ownership (surface owner)

Wyoming SF0047 Senate Act - Carbon storage and sequestration-liability

- Pore space authority lies with Oil and Gas Conservation Commission
- Certificate of Completion:
  - Until issued: Injector owns CO_2
  - Once issued: title and custody of CO_2 transferred to state

Indiana Senate Bill 442 - Underground CO_2 storage to be considered a public use and service

- Pore space ownership/rights can be acquired if 60% of storage unit already under agreement
- State may obtain ownership after 12 years, if injection has ceased

North Dakota

- Certificate of Completion
  - Until issued: Operator owns CO_2 and pore space
  - Once issued: ownership of site transfers to state (no sooner than 10 years after injection ends)
- EOR can be converted to storage

UIC Class VI Primacy

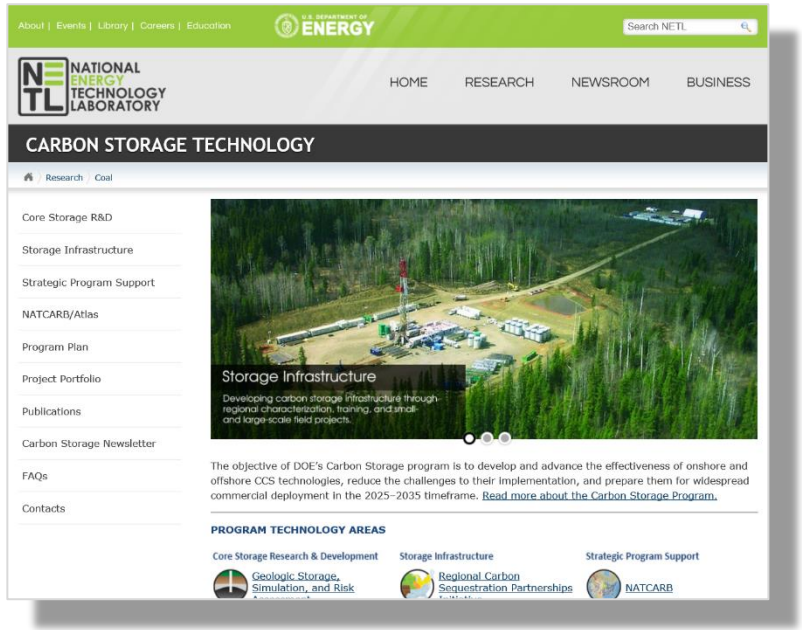
- EPA has granted primacy to **ND** and **WY**
- **WV, TX, AZ, CO, LA, others** are seeking primacy for Class VI

Any Questions?

For More Information

NETL Carbon Storage

https://netl.doe.gov/coal/carbon-storage



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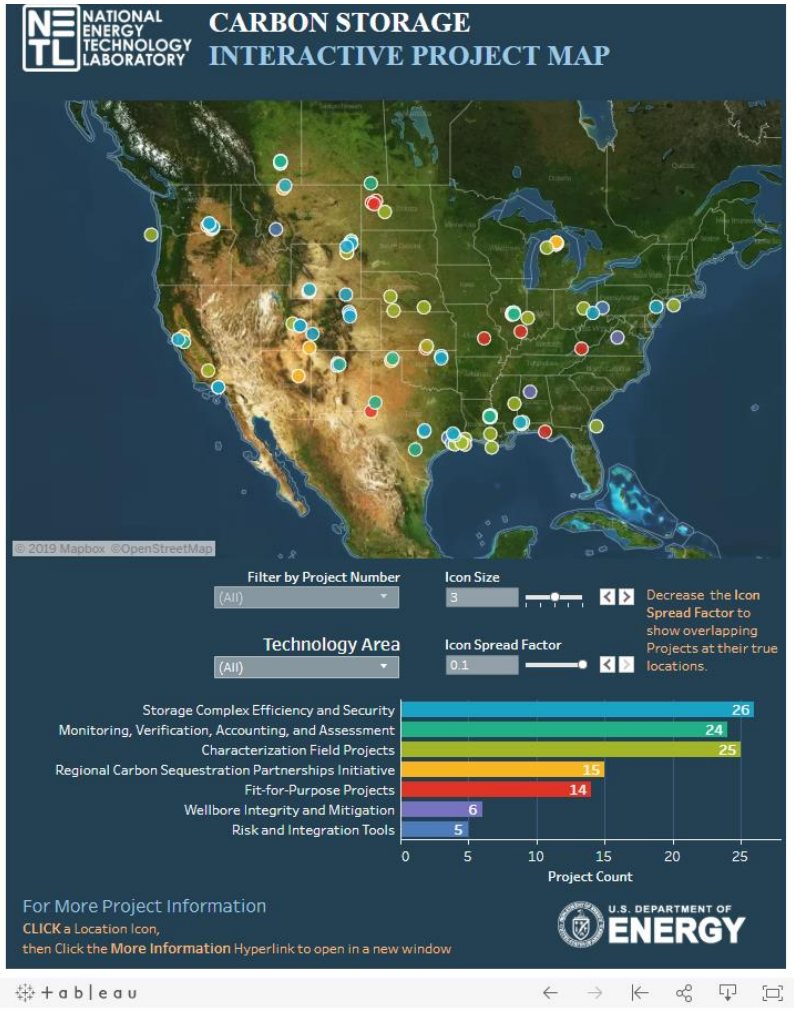
@NETL_News



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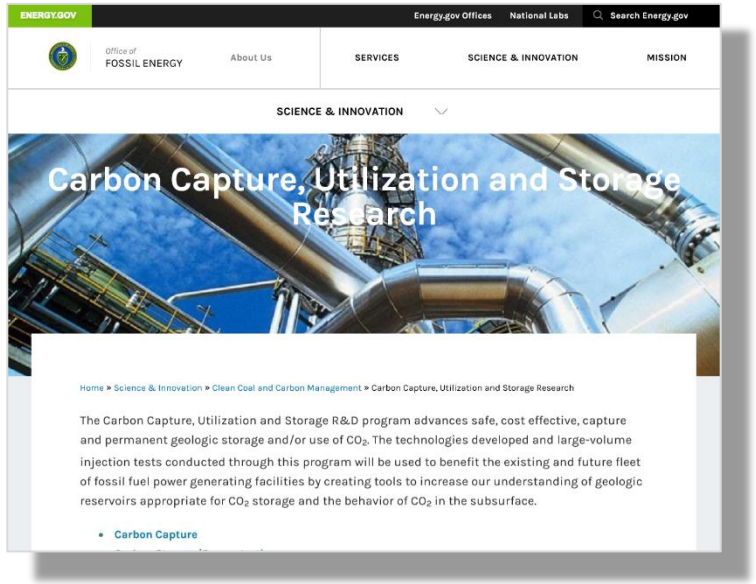

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