



U.S. DEPARTMENT OF
ENERGY

Fossil Energy and
Carbon Management

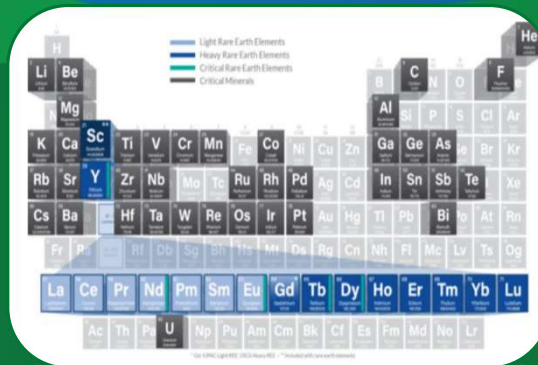
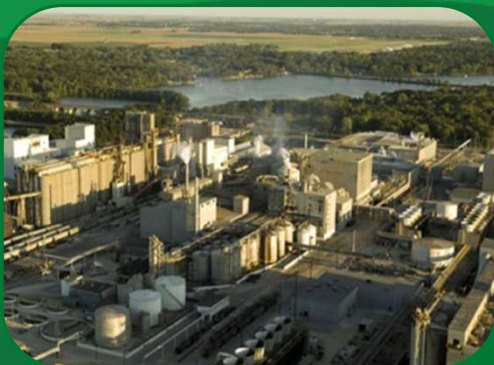
Summary of CO₂ Transport Applied RD&D Workshop Report

Kevin Dooley

Carbon Transport Engineer

Office of Fossil Energy and Carbon Management

August 31, 2023



2023 CO₂ Transport Applied RD&D Workshop

- Inaugural workshop took place Feb 21-23 in Columbus, Ohio
- Broad and diverse perspectives shared (e.g., 100+ attendees)
- Participation by various stakeholders including Labor, Industry, Academia, Standards Bodies, NGO's, etc.
- Timeframe: Vision for next 5 years
- Technical topics discussed included:
 - Ongoing Industry Initiatives
 - CO₂ Impurities
 - CO₂ Specific Leak Detection and Emergency Response
 - Repurposing of Existing Infrastructure for CO₂ Service
 - Developing and Connecting with Other Modes of CO₂ Transport /Intermodal Hubs



<https://www.netl.doe.gov/carbon-management/carbon-storage/transport>

Workshop Key Themes



CO₂ Transport Workshop RD&D themes over the next five years

Workshop Key Takeaways

Based on the individual perspectives shared, DOE took away the following with respect to carbon transport:

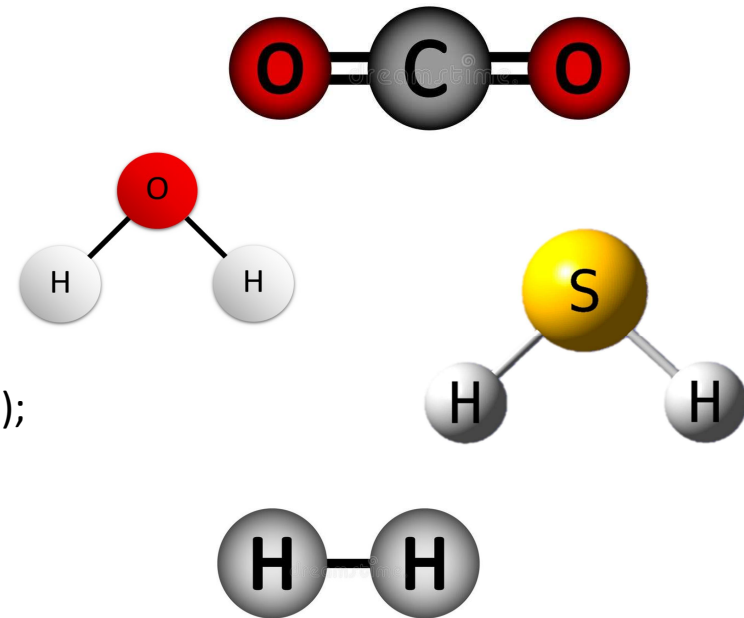
- Develop a CO₂ transport consortium to coordinate RD&D efforts and facilitate communication among stakeholders;
- Compile and curate information in an open access platform to facilitate gap analyses;
- Accelerate experimental and modeling RD&D efforts to keep pace with the timeline for CO₂ transport demonstration projects and at-scale deployment;
- Create pathways to engage and grow the workforce in an equitable, inclusive, and accessible manner;
- Engage the public in two-way communication.

RD&D Area of Interest #1:

Impact of CO₂ Impurities on Asset Integrity

CO₂ IMPURITIES MANAGEMENT

- Guide materials selection, standards, and potential regulations by better understanding integrity threats and their evolution over time periods corresponding to asset operational life;
- Determine the effect CO₂ stream impurities has on materials, corrosion, and fluid behavior through testing and modeling;
- Create a testing protocol to complement ongoing work and coordinate experimental and modeling efforts;
- Scale up the size and duration of tests (i.e., small scale to large scale);
- Progress odorant additives applications.



RD&D Area of Interest #2:

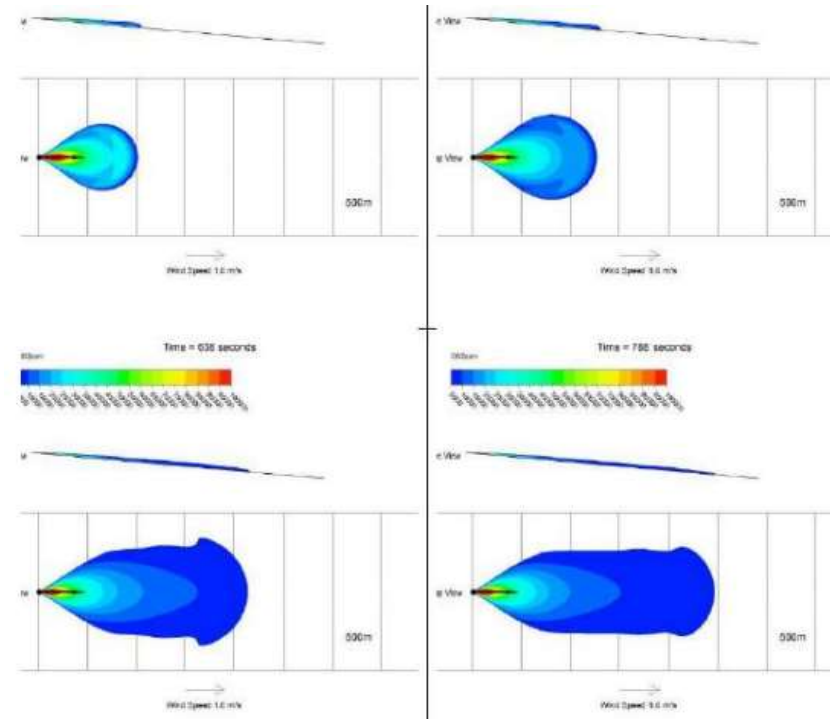
CO₂-SPECIFIC LEAK DETECTION AND EMERGENCY RESPONSE PROTOCOLS

LEAK DETECTION

- Compile relevant existing research and models, as well as lessons learned from industry, in a centralized open repository;
- Advance computational and sensor technologies specific to CO₂ service.

EMERGENCY RESPONSE

- Advance CO₂ dispersion modeling capabilities to inform emergency response protocols and real-time response;
- Expand understanding of CO₂ exposure health risks;
- Leverage existing organizational models for pipelines as templates for founding a Center for CO₂ Safety.



RD&D Area of Interest #3:

REPURPOSING OF EXISTING INFRASTRUCTURE FOR CO₂ SERVICE

REPURPOSING INFRASTRUCTURE

- Compile and efficiently leverage existing information, especially component materials and lessons learned from industry
- Conduct gap analyses and related RD&D to address materials standards
- Develop LCA and TEA tools to support repurposing infrastructure
- Create checklists of considerations to guide repurposing efforts

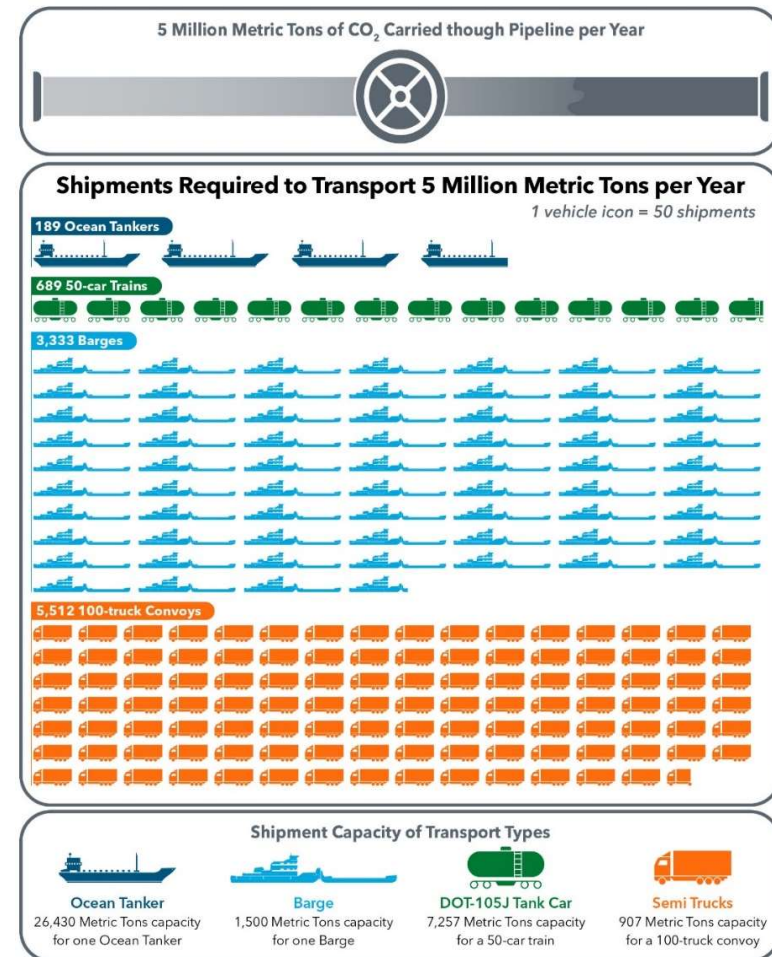
RD&D Area of Interest #4: Developing and Connecting with Other Modes of CO₂ Transport & Intermodal Hubs

DEVELOPMENT

- Many U.S. sources produce small amounts of CO₂ at the individual level but collectively produce approx. 128 million MT of CO₂/year;
- Develop of TEA and LCA tools across various scales and transportation systems.

CONNECTION

- Support development of intermodal CO₂ carriers compatible with transportation via truck, rail, barge, or ship;
- Improve metering of CO₂ for monitoring, reporting, and verification purposes to accurately track CO₂ storage levels.



Visual comparison between freight modes to transport 5 million metric tons of CO₂. This annual volume is approximately equal to total CO₂ emitted from one 680 MW power-generation station.

Funding Pathways

- **DOE FECM Field Work Proposals (FWPs)**

Enables DOE FECM to directly allocate funds to DOE FECM national laboratories and facilities, including when the laboratory applicant is a partner on a DOE FECM proposal submitted by a different entity

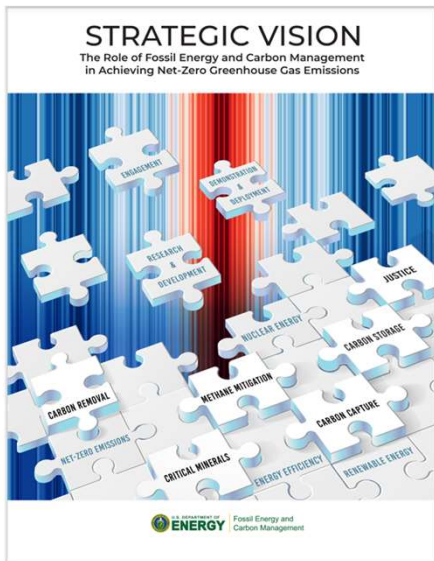
- **DOE FECM Cooperative Agreements advertised through Funding Opportunity Announcements (FOAs)**

Enables transfer of DOE FECM funds to grant recipients. The Carbon Capture Technology Program, FEED for CO₂ Transport (DE-FOA-0002730) is an example FOA funded by BIL

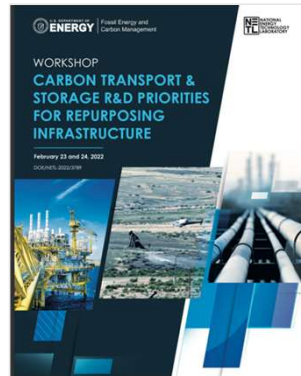
- **DOE FECM Cooperative Research and Development Agreements (CRADAs)**

Enables the DOE FECM national laboratories and one or more parties (e.g., industry) to collaborate on RD&D efforts in the DOE FECM mission space. An example call is the 2021 H2@Scale Laboratory CRADA Call. H-MAT Consortium is the product of a CRADA

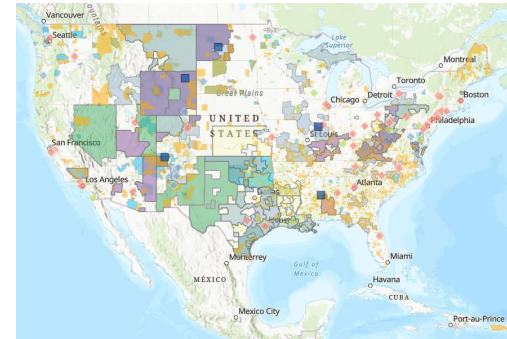
Resources and Engagement Opportunities



[FECM Strategic Vision](#)



[Workshop R&D Priorities for Repurposing Infrastructure](#)



[Carbon Matchmaker](#)



[DOE's Roadmap for CO2 Transport Fundamental Research Workshop \(2023\)](#)



[Industrial Decarbonization Roadmap](#)



[Carbon Management Collegiate Competition](#)



U.S. DEPARTMENT OF
ENERGY

Fossil Energy and
Carbon Management

Questions?

Kevin.Dooley@hq.doe.gov

