

Regional Initiative to Accelerate CCUS Deployment in Midwestern and Northeastern USA (MRCI)

DE-FE0031836

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U.S. Department of Energy

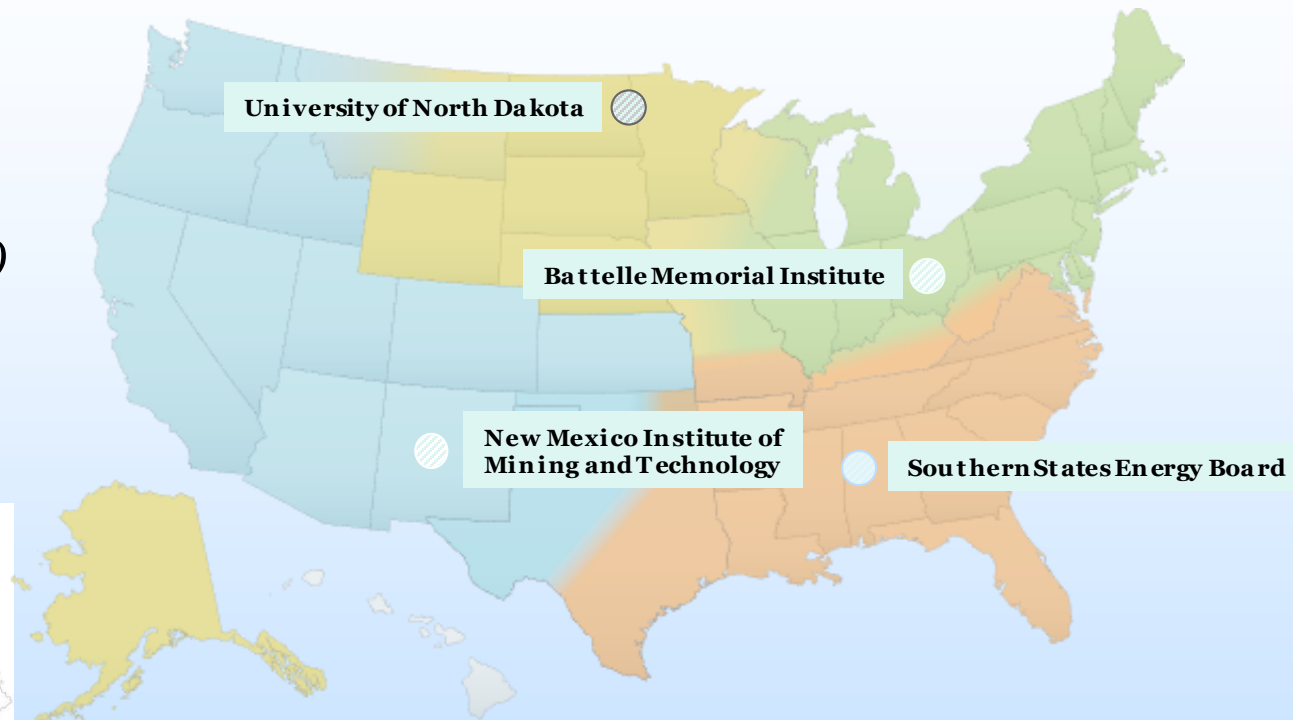
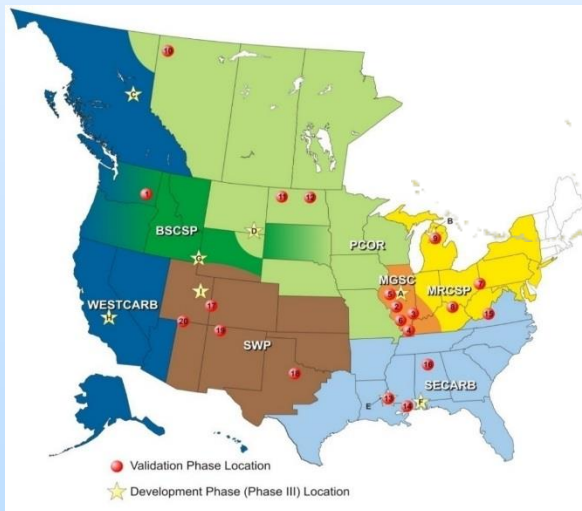
National Energy Technology Laboratory

**Carbon Capture Front End Engineering Design Studies and CarbonSafe
2020 Integrated Projects Review Webinar**

August-17-19 2020

Regional Initiative to Accelerate CCUS – National Perspective

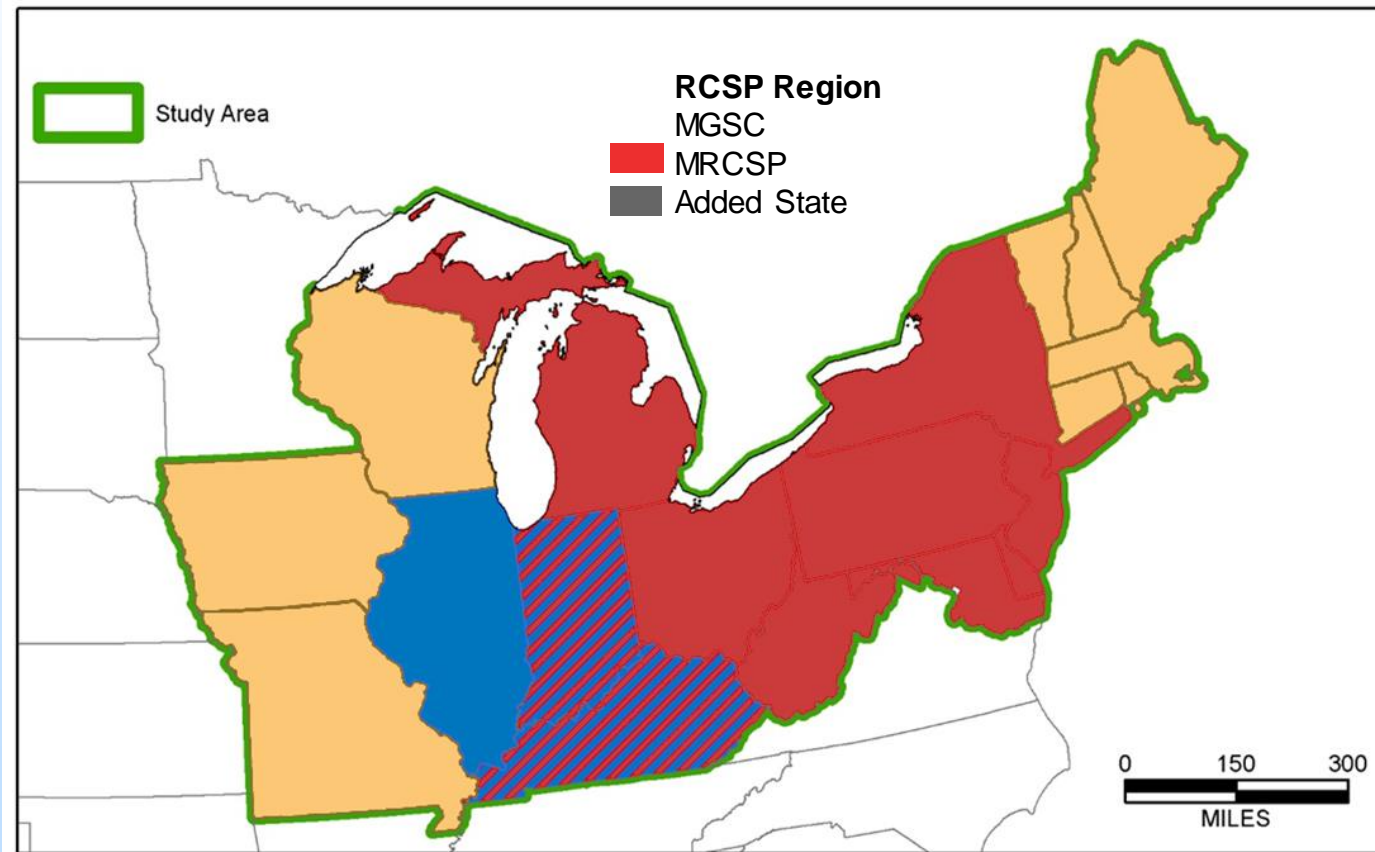
- DOE FOA2000
- 4 New Initiatives
- \$5M each in FY19 DOE Funds



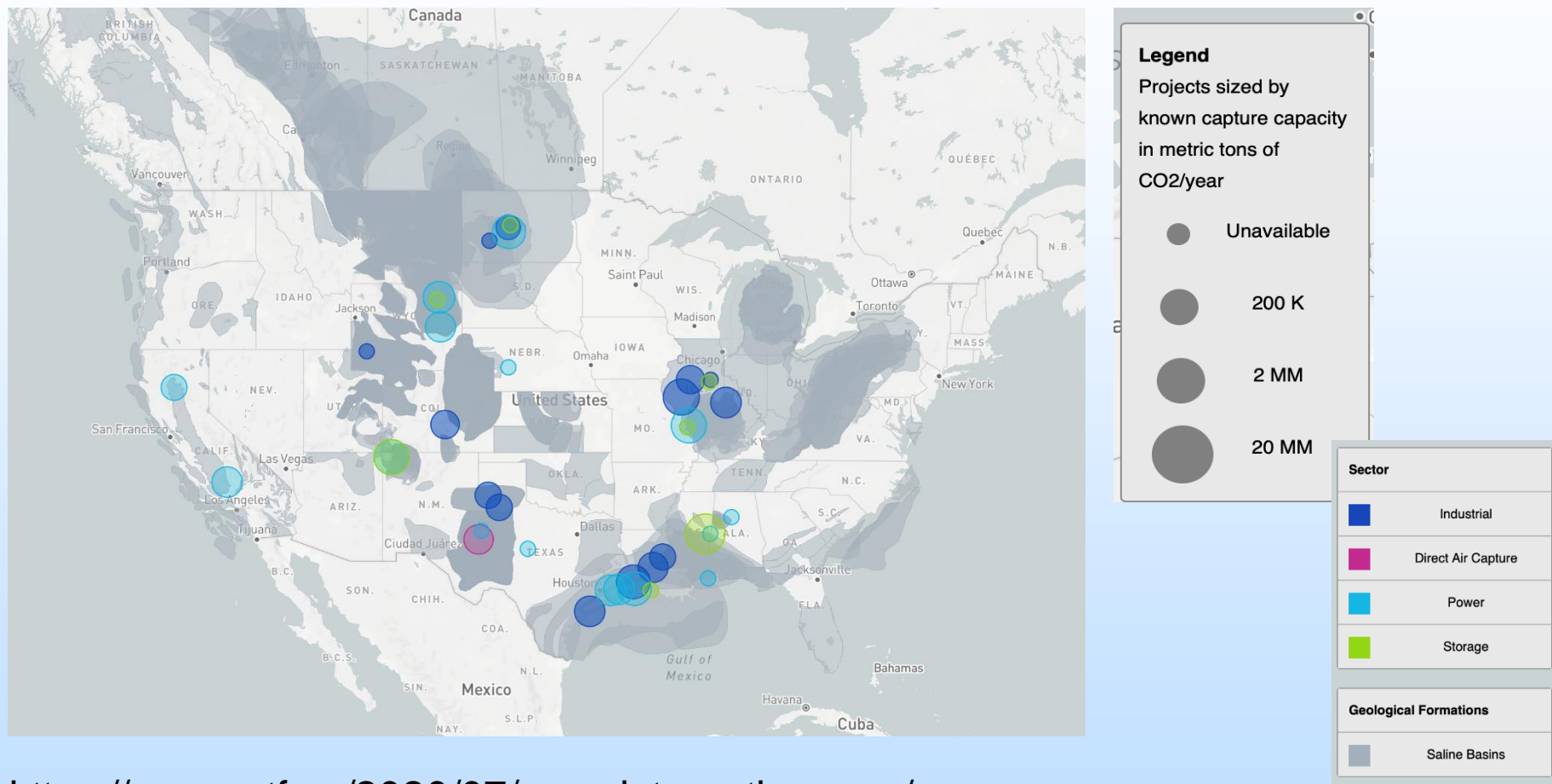
- 7 Regional Partnerships transitioned to 4 Regional Initiatives

Regional Coverage – 20 States

- Battelle and Illinois State Geological Survey combine expertise from MRCSP and MGSC
- Working with State Geological Surveys and Universities across the Region to Accelerate deployment of CCUS



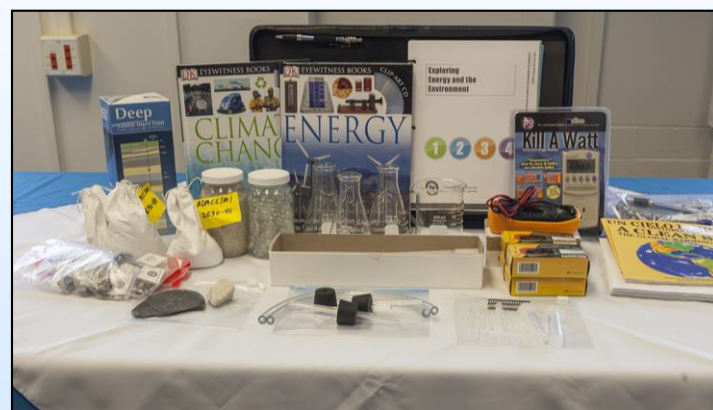
CATF Interactive Database for CCUS













<https://www.catf.us/2020/07/ccus-interactive-map/>

Program Goals

- Implement a collaborative Regional Initiative to accelerate CCUS deployment in the Midwestern and Northeastern US.
- Build on more than 20 years of CCUS experience by combining expertise of two RCSPs (MRCSP & MGSC).
- Engage national and international stakeholders, including state geological surveys, universities, industrial partners and advisors, fossil fuel production and utilization companies, and NGOs.
- Advanced CCUS research through four tasks:
 - Addressing key technical challenges.
 - Obtaining and sharing data to support CCUS.
 - Facilitating regional infrastructure planning.
 - Performing regional technology transfer.



Team Members

- Battelle (Columbus, OH) 
- Illinois State Geological Survey (Champaign, IL) 
- Indiana Geological and Water Survey (Bloomington, IN) 
- Kentucky Geological Survey (Lexington, KY) 
- Maryland Geological Survey (Columbia, MD) 
- Ohio Division of Geological Survey (Columbus, OH) 
- Pennsylvania Geological Survey (Middletown, PA) 
- Rutgers University (New Brunswick, NJ) 
- Western Michigan University (Kalamazoo, MI) 
- West Virginia Geological and Economic Survey (Morgantown, WV) 

Team Members

- Core Energy LLC (Traverse City, MI)
- CornerPost, CO₂, LLC – Keith Tracy (Edm IEC OK)
- Industrial Economics, Inc (Cambridge, MA)
- Wade, LLC - Sarah Wade (Washington, DC)
- Los Alamos National Laboratory (Los Alamos, NM)
- Pacific Northwest National Laboratory (Richland, WA)
- EGO Water Solutions, LLC

CORE ENERGY, LLC

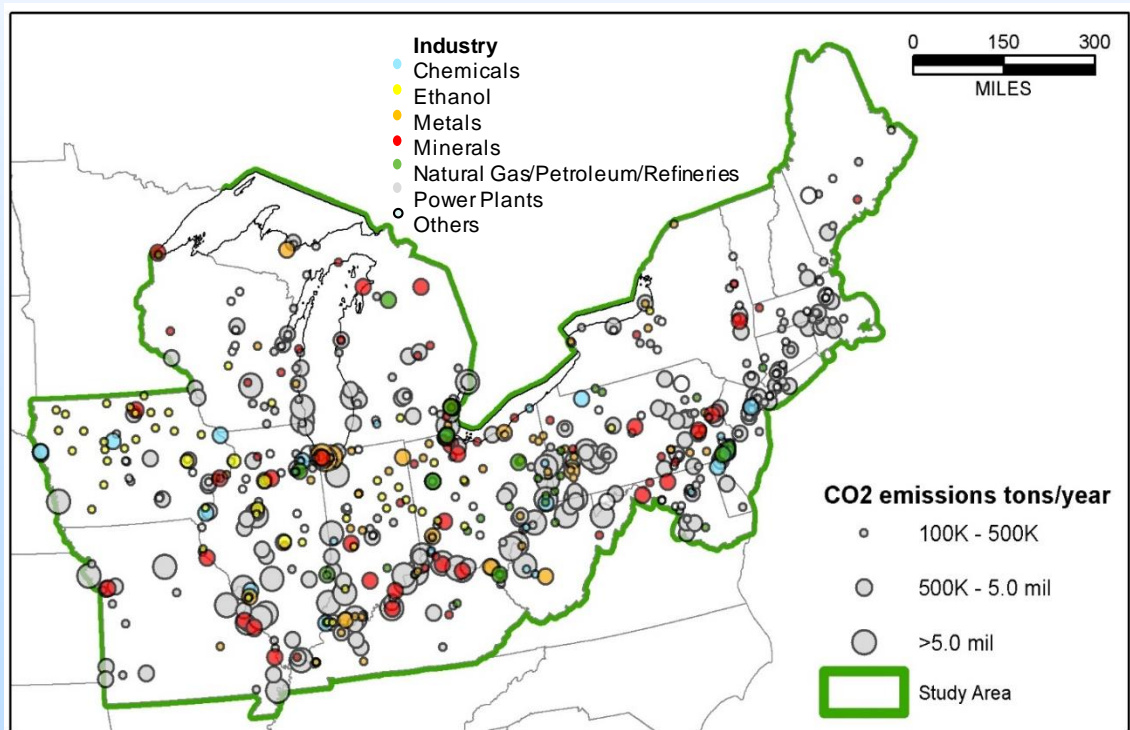


IEC



Diversity of CO₂ Sources at Play

- More than 1/3 of the nation's CO₂ point sources
- Regional emissions from various industrial sources, power plants make up nearly 3/4 of the overall emissions
- Future emissions sources maybe different then present sources



Source Type	2017 Emissions (MMt)	%
Power Plant	694	73%
Metals	72.5	8%
Minerals	44.4	5%
Chemicals	38.3	4%
Petroleum, Natural Gas, Refineries	28.4	3%
Other	28.0	3%
Ethanol	16.9	2%
Pulp, Paper	10.7	1%
Waste	7.9	1%
Manufacturing	3.5	<1%
TOTAL	945	-

- Multiple pilot and full-scale projects conducted in the region provide a solid foundation for moving forward

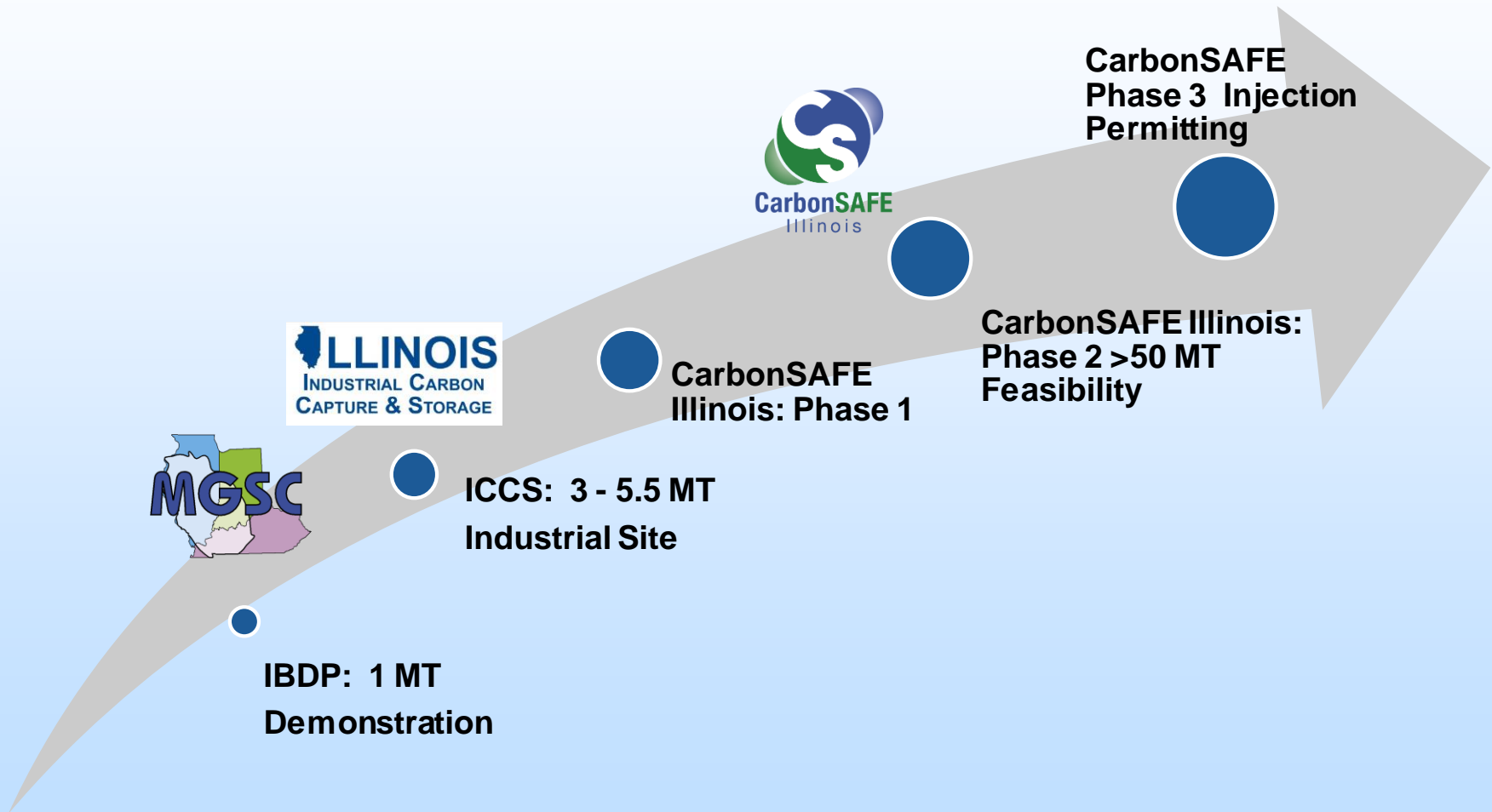


Existing Projects in the Region

- Project team activities have emphasized applied research with industry partners.

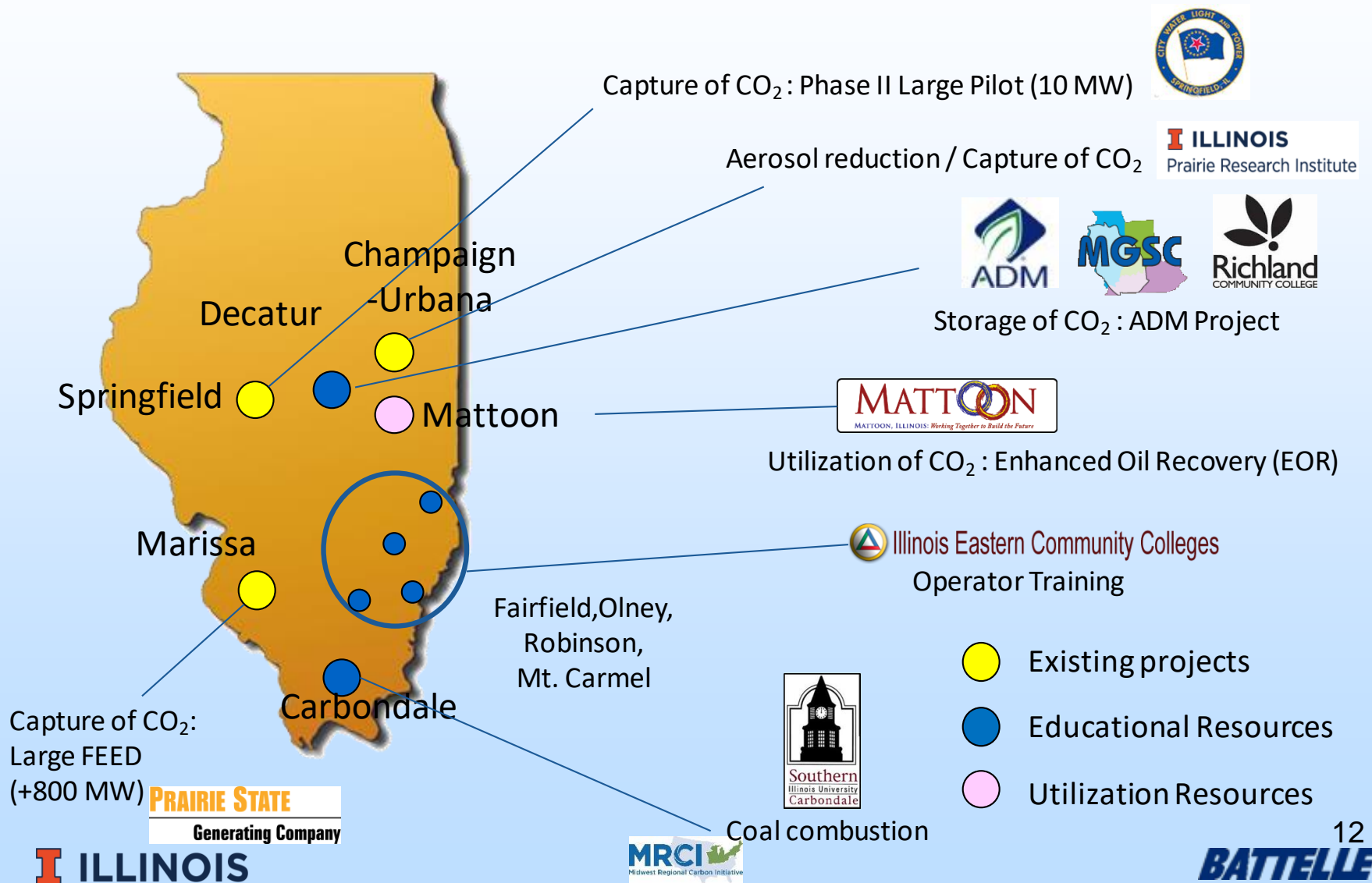


Leveraging CCS Experience in the Illinois Basin



Regional & Global CCUS Deployment

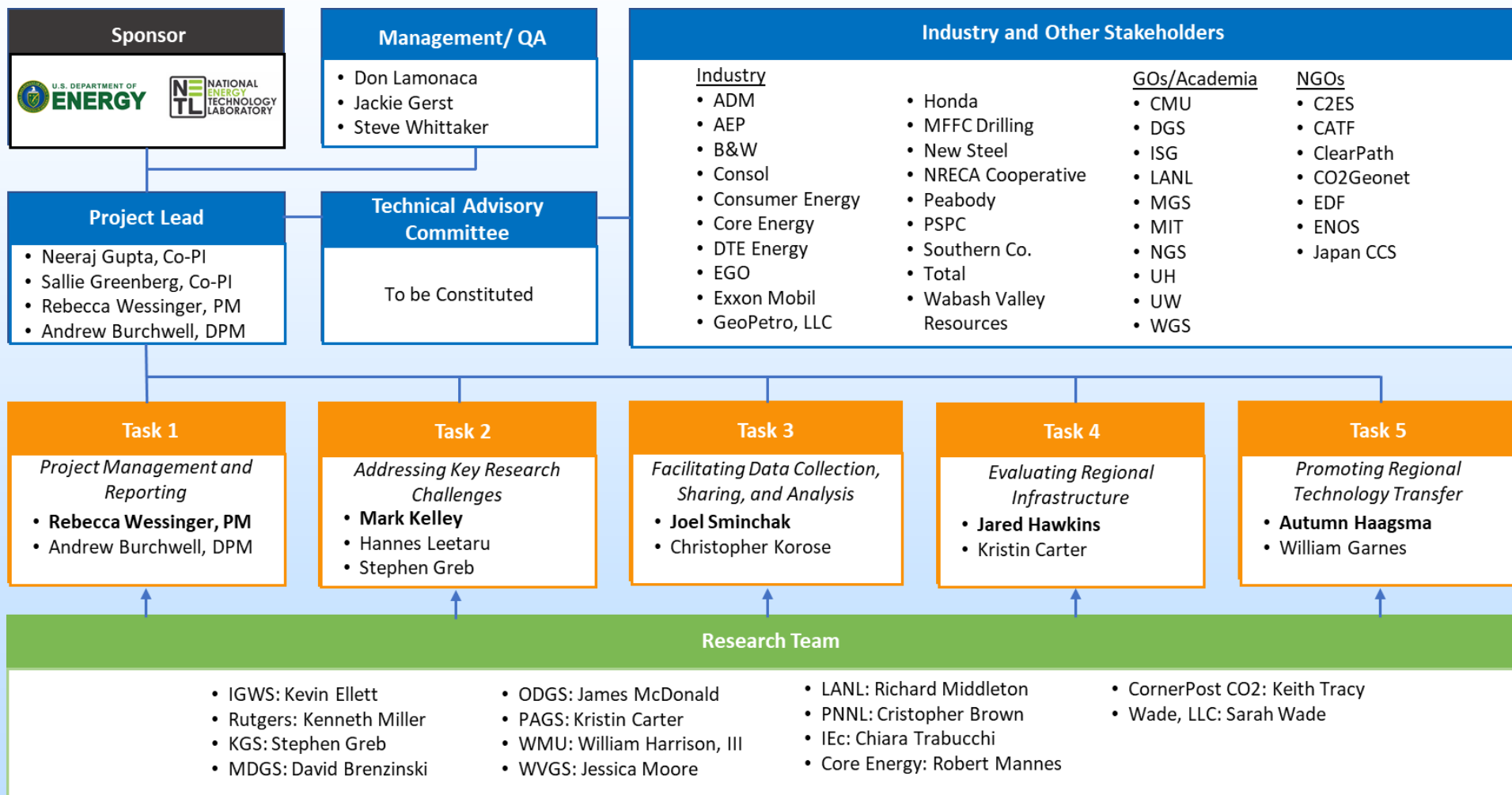
Concentration of natural resources and intellectual capital



*Please see MRCI Detailed Overview September 8
Morning Carbon Storage Session*

BACK UP SLIDES

Organization Chart

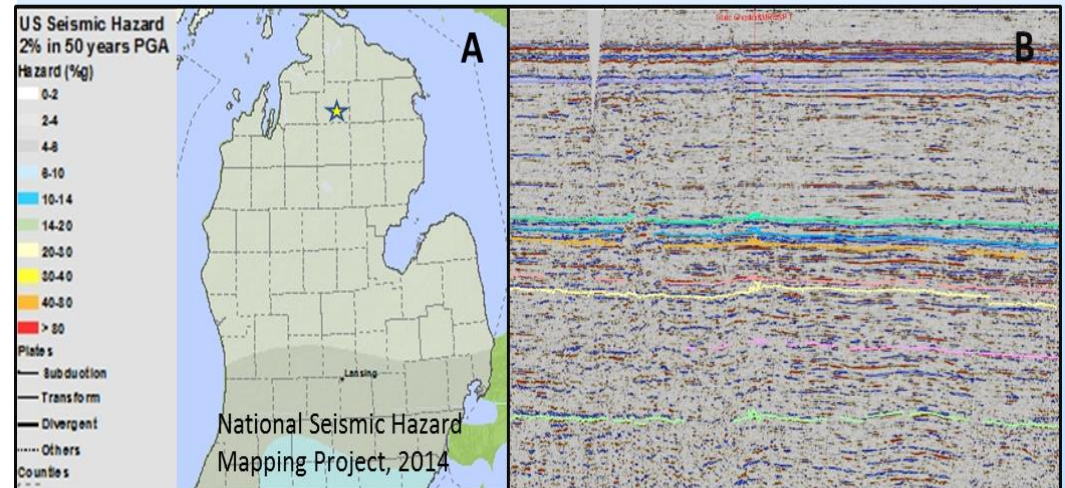
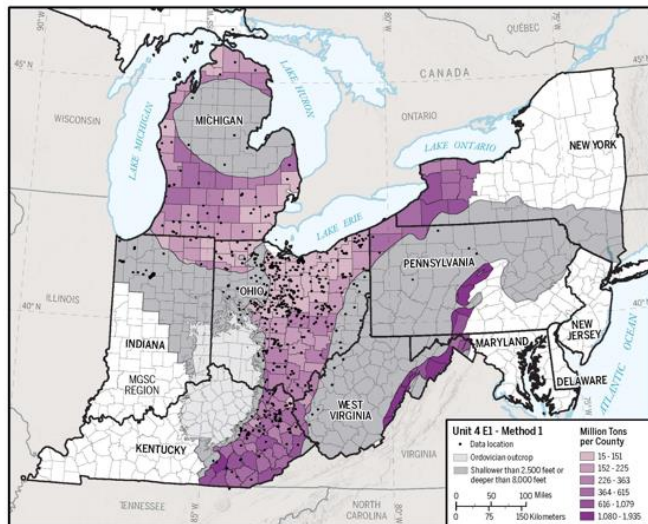


Addressing Key Technical Challenges

- Complex geology of basins – finding storage reserves in deep basins in carbonate plays – Knox/Copper-Ridge
- Structural features and basement faulting – mitigate induced seismicity; safe use of basal sandstone reservoirs; Build on work at ISGS, Battelle (eastern Ohio), and FutureGen
- CCUS along Atlantic Coast – many sources, few onshore sources. Position for offshore storage in future?
- CO₂-EOR facilitated and stacked storage – expand assessment to entire region
- Identify/screen multiple areas for storage complexes

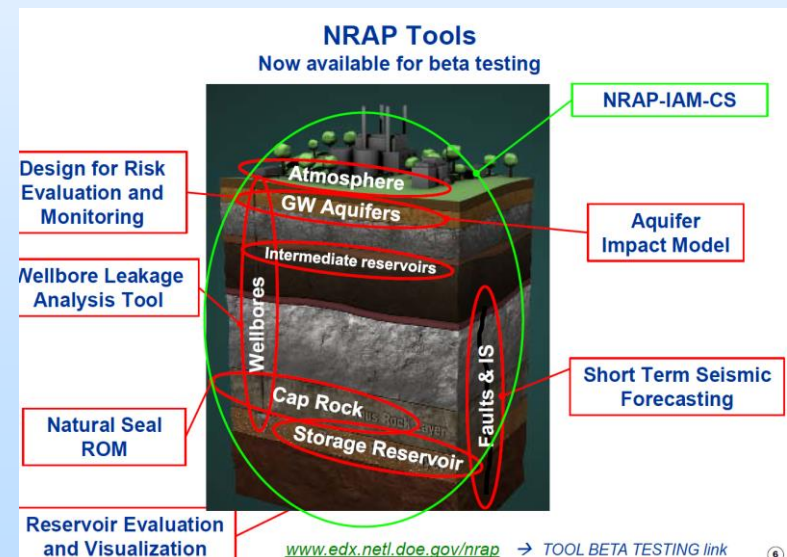
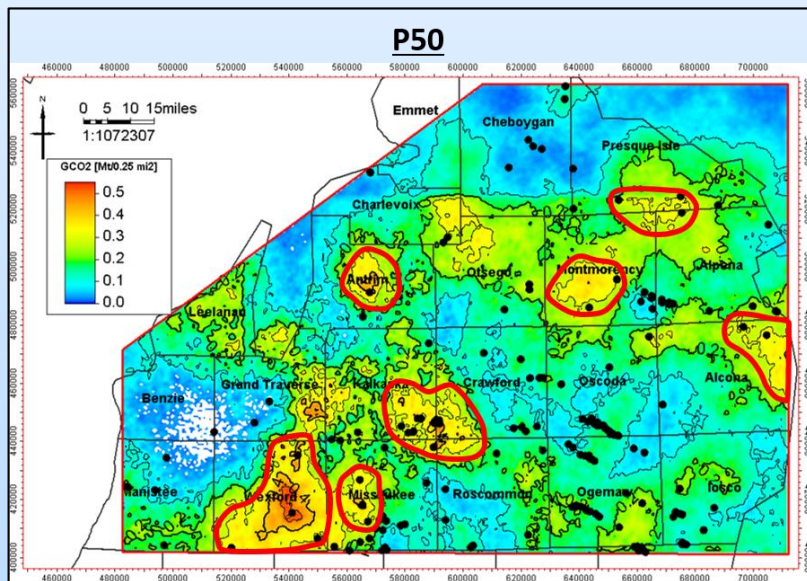
Addressing Key Technical Challenges - Task 2

- **GOAL:** Identify and address key technical challenges impeding or preventing the establishment of CCUS in the region.
 - Determine **sub-regional frameworks** for selected area
 - Analyze **basement faulting**, state-of-stress related issues
 - Develop **industrial** partnerships
 - Conduct **sub-regional** analysis for selected areas
 - Evaluate **risk factors** for potential commercial-scale storage complexes



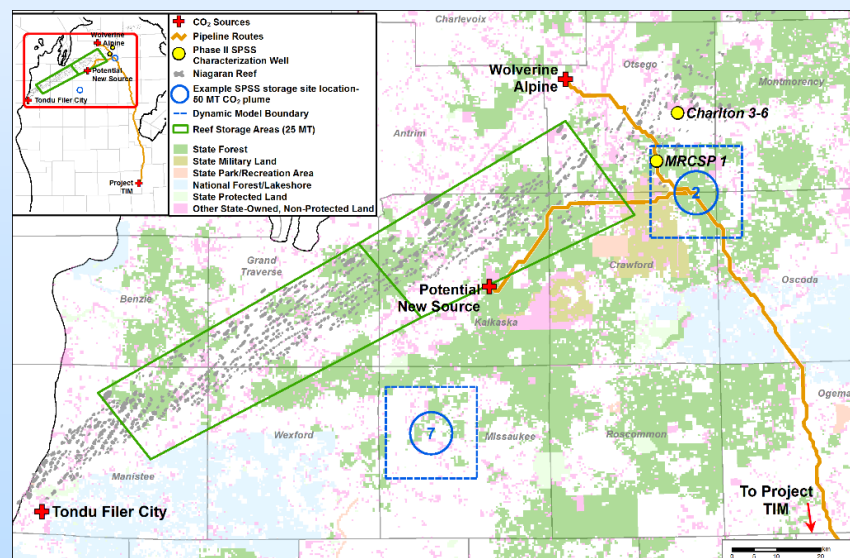
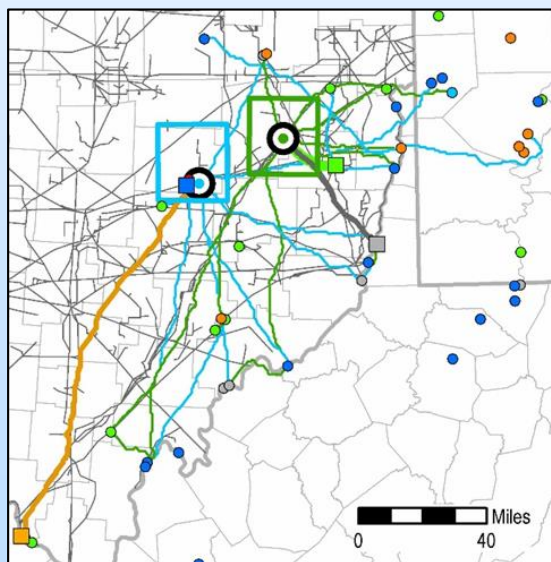
Facilitating Data Collection, Sharing, Analysis – Task 3

- **GOAL:** Collect and share data, screen tools and Machine Learning, and assess CCUS sites, operations, and monitoring.
 - Build **inventory** existing data and analyses
 - Coordinate data **sharing** throughout the RI
 - Review available data to determine **data gaps**
 - Engage with the **National Laboratory** network—including NETL
 - Evaluate **NRAP** tools to determine the best applications within the study region
 - Determine how **machine learning** can be used to extract additional insights



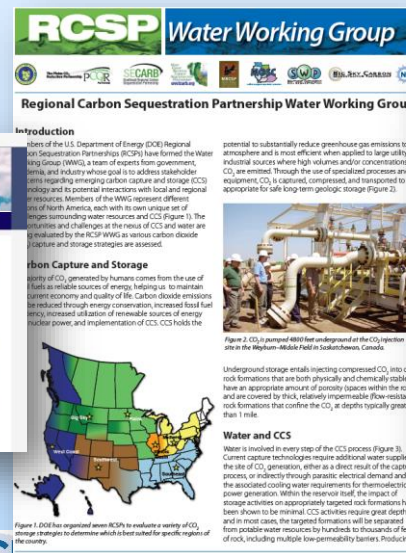
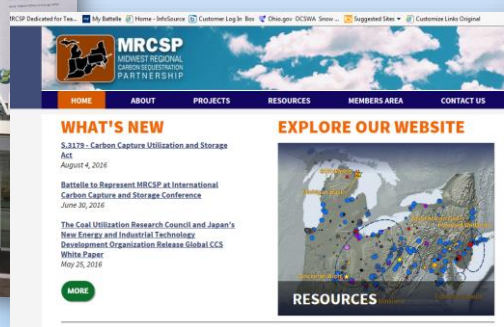
Evaluating Regional Infrastructure - Task 4

- **GOAL:** Evaluate current infrastructure and future needs to accelerate CCUS deployment
 - Conduct a screening level assessment of surface and subsurface infrastructure
 - Assess **site readiness** to rank areas
 - Conduct analysis of **social, economic, and workforce** development factors
 - Analyze current **regulatory, pore space** issues, gaps, policy and tax incentives
 - Convene multiple **regional deployment** workshops



Promoting Regional Technology Transfer – Task 5

- **GOAL:** Leverage existing and new relationships with critical CCUS stakeholders within the RI and globally and become a key resource for CCUS development.
 - Promote acceleration of CCUS deployment by providing general **support for commercialization and technology transfer**
 - Compile and **communicate information** from previous tasks to interested stakeholders
 - **Engage** with federal and state governments, industry consortia and NGOs
 - Engage with **global institutions**



Carbon Capture and Storage in Illinois Basin

