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3. Pennsylvania Geological Survey

Addressing the Challenges of Infrastructure Development for Carbon Capture, Utilization, and Storage

www.midwestccus.org

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Innovations in Climate Resilience Conference

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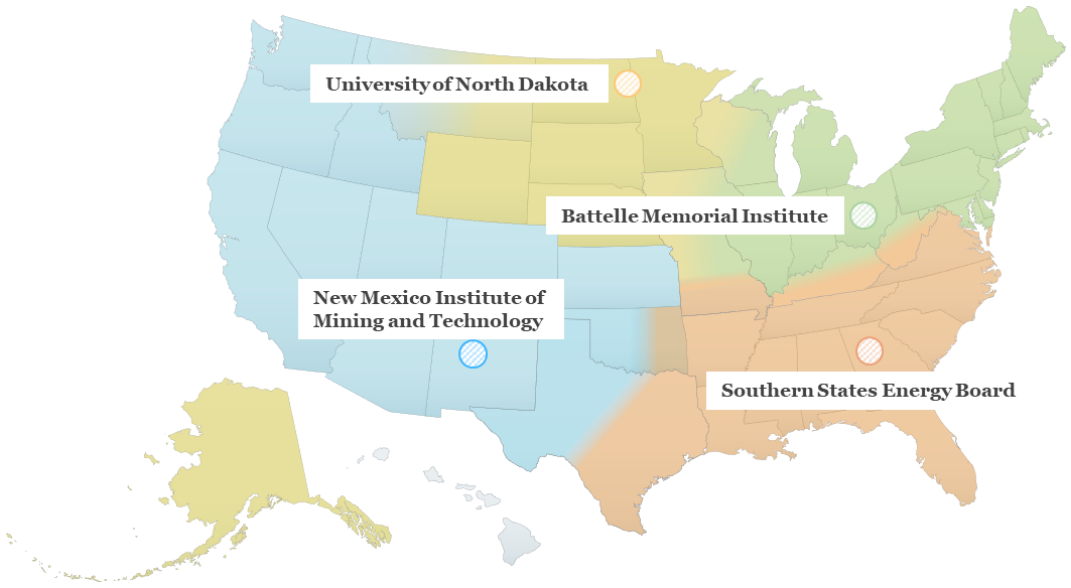
Columbus, Ohio

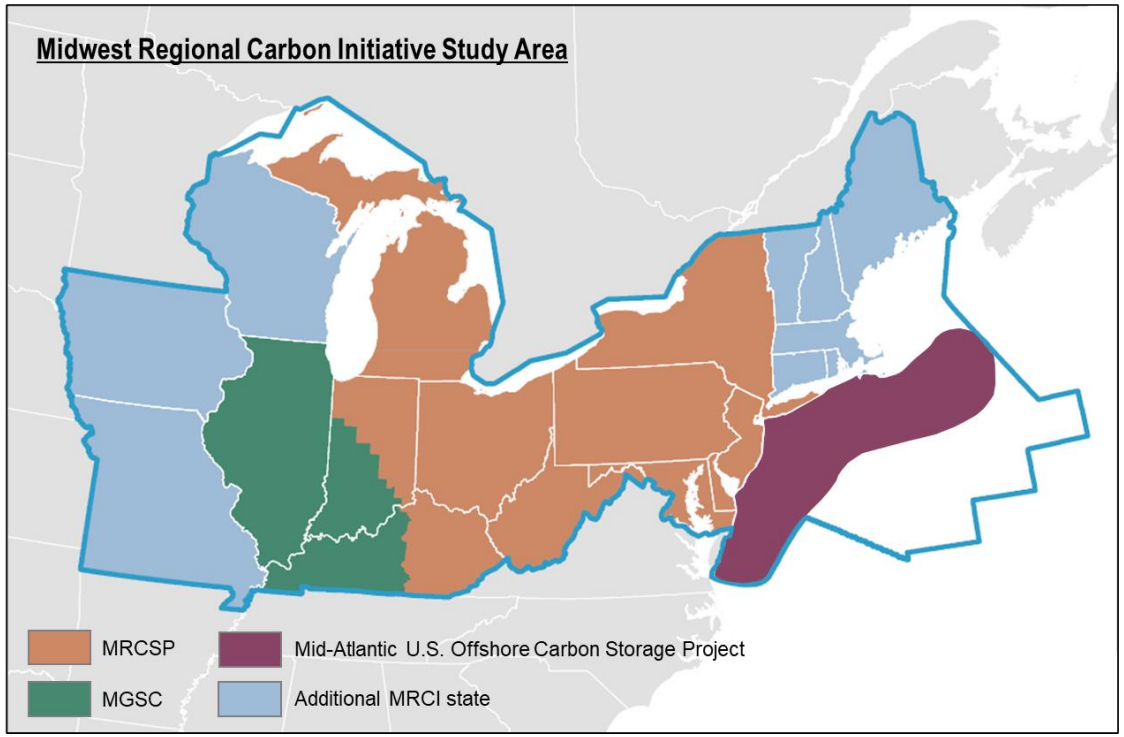
MRCI Midwest Regional Carbon Initiative

U.S. DEPARTMENT OF ENERGY | NATIONAL ENERGY TECHNOLOGY LABORATORY | BATTELLE | ILLINOIS

MRCI – Covering 20 States in Midwest, Northeast, and Mid-Atlantic

- Battelle and Illinois State Geo. Survey combine expertise from MRCSP and MGSC
- Work with Regional State Geological Surveys and Universities to Accelerate CCUS deployment





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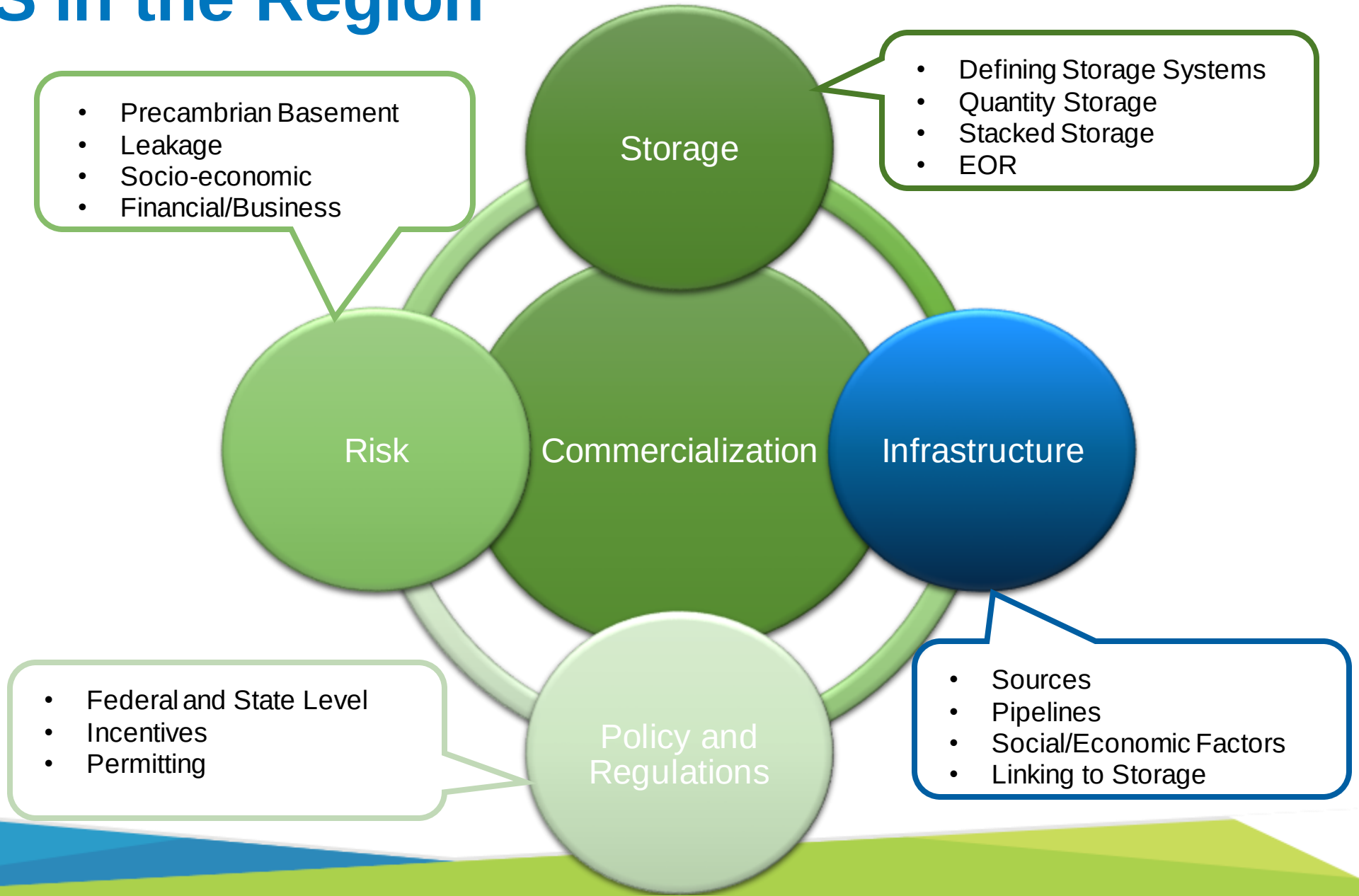
MRCI Aims to Tackle Challenges to Pave Way for CCUS in the Region



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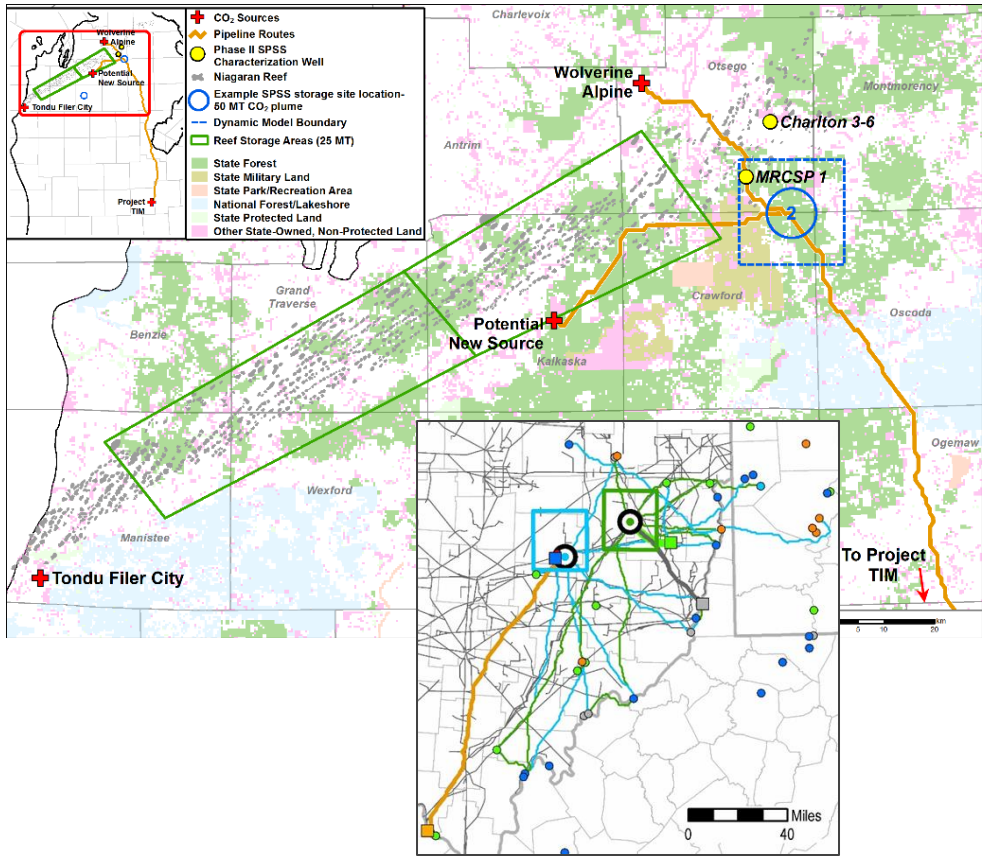
Rethinking infrastructure for Carbon Capture, Utilization, and Storage (CCUS)

Researching the infrastructure of CCUS is more than just the physical equipment that enables CCUS; it also includes the policy, economics, and people that make CCUS work.

- 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**



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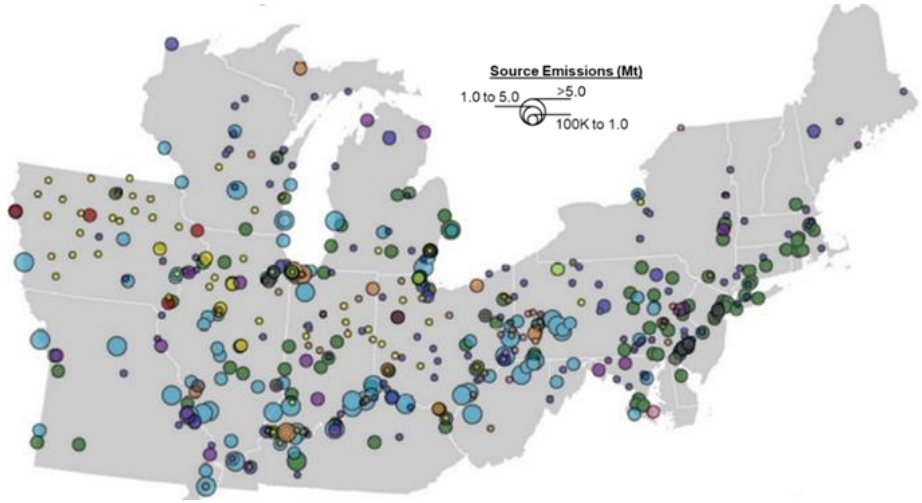
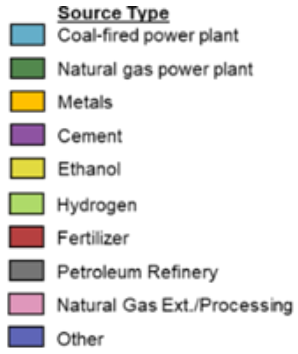
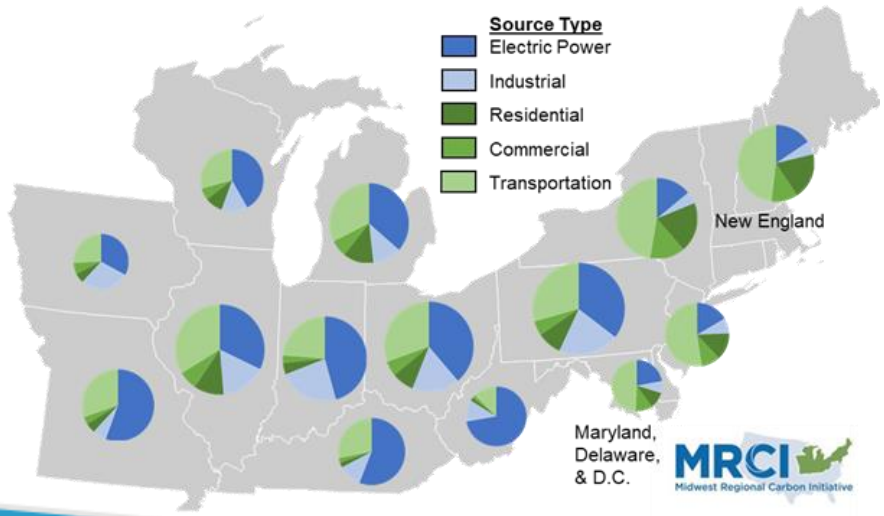
Evaluating Regional Infrastructure Progress

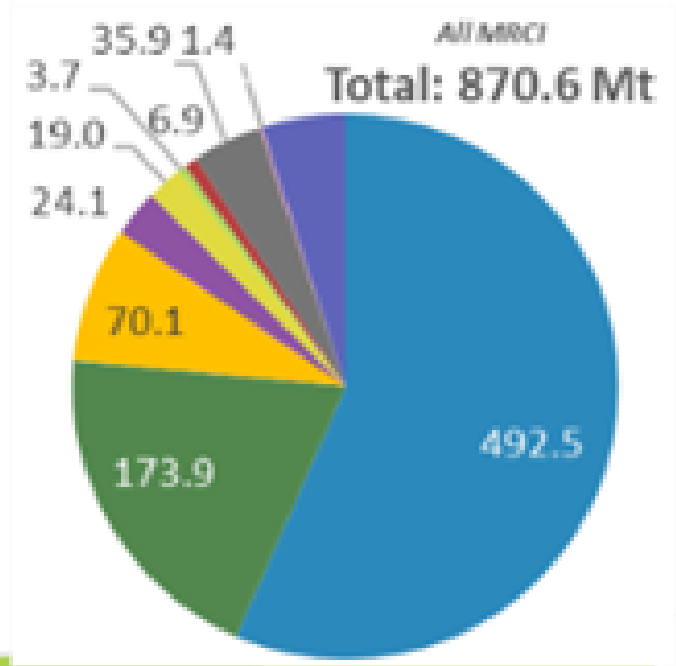
Sources of CO_2 and industry in the MRCI region are shifting







- Shift in sources of power
- New industry: hydrogen, bioenergy with CCS, and direct air capture
- State CO_2 emissions profiles



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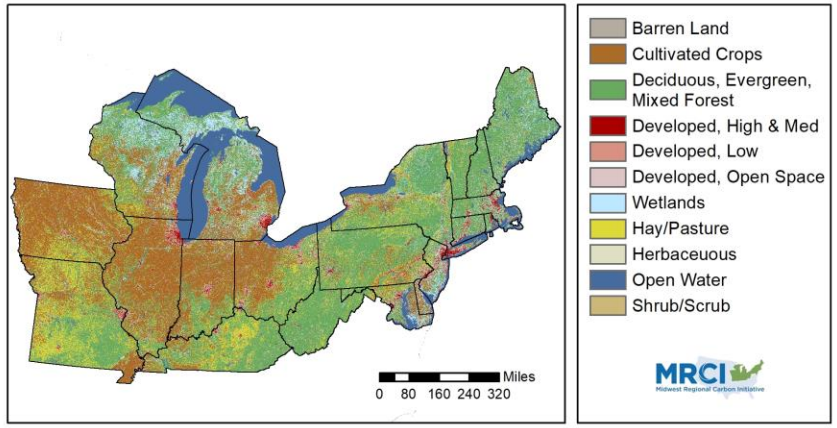
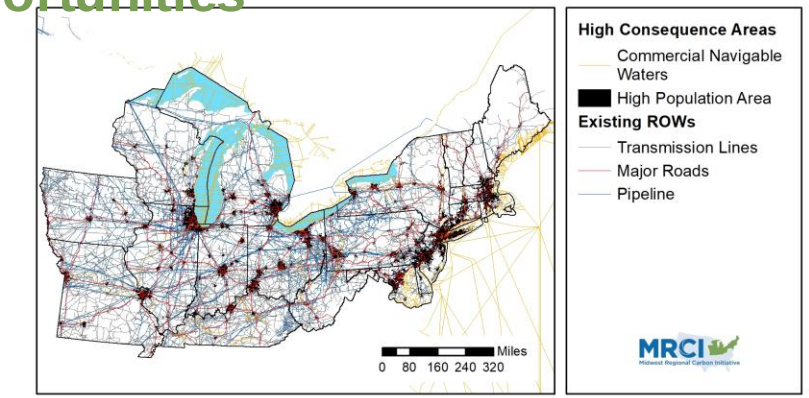
Evaluating Regional Infrastructure Progress

Transport and storage infrastructure must consider more than sources and sinks

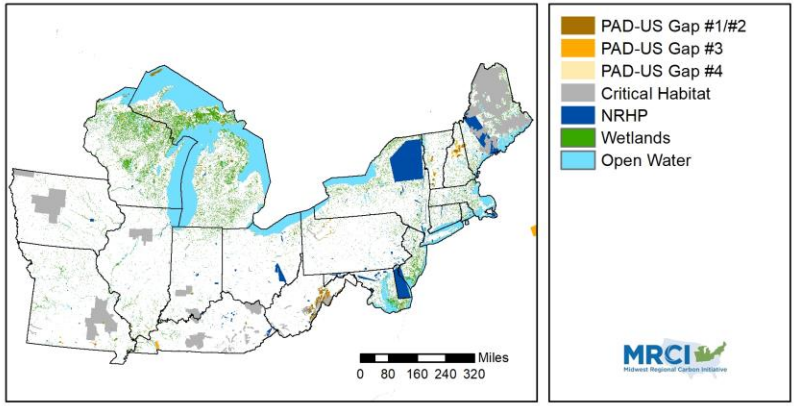
Land cover data = project feasibility



Existing infrastructure = obstacles or opportunities



Sensitive areas = potential project pitfalls



- Land cover and sensitive areas
- Existing infrastructure
- Development scenarios (local, hub, distributed)

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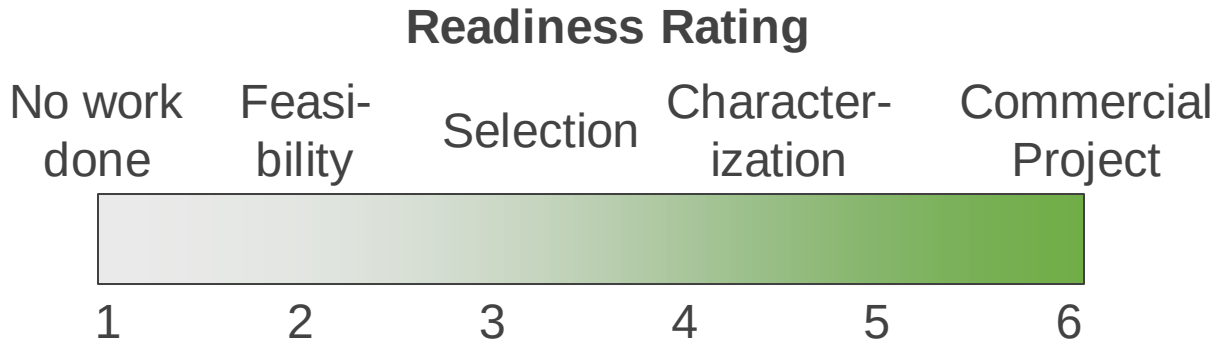
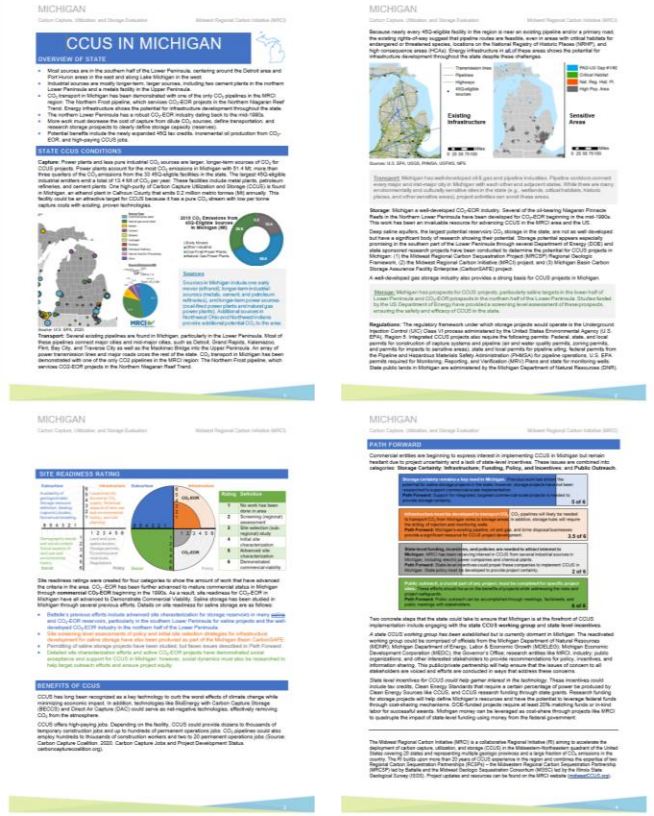
Site and State Readiness for CCUS

Readiness ratings were estimated to show where more work is needed



Criteria for Readiness Assessments:

(1) Subsurface Readiness
(2) Infrastructure Readiness
(3) Regulations, Permitting, Incentives
(4) Social Dynamics



Factsheets present results and suggestions for future efforts.

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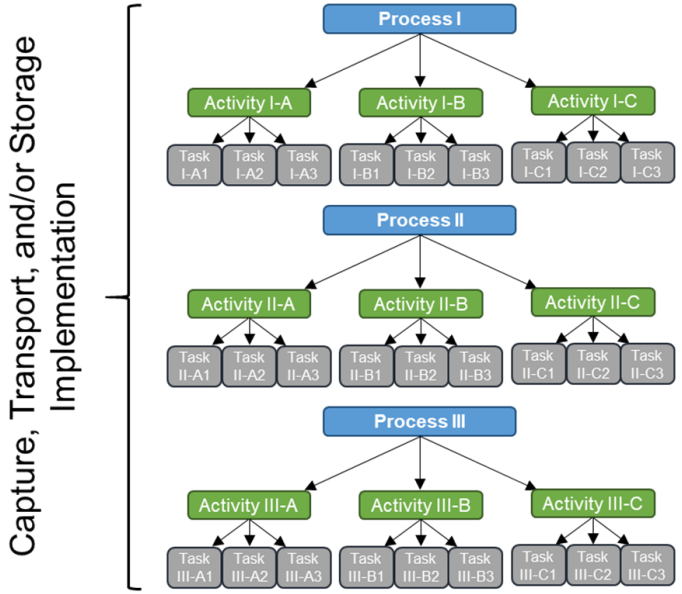
Jobs and economic impacts

An important part of implementation is equitable sharing of benefits

Jobs and Economic Impact



- Evaluating jobs
- Calculating expenses and benefits

Social Characteristics

United States® Census Bureau

2020 Census Results

EPA United States Environmental Protection Agency

EJScreen

- Conducting community characterization
- Researching environmental justice and sustainability
- Working with outreach task

Workforce Development

United States® Census Bureau

Quarterly Workforce Indicators

NCES National Center for Education Statistics

CIP THE CLASSIFICATION OF INSTRUCTIONAL PROGRAMS

- Determining workforce characteristics and needs
- Identifying training institutions

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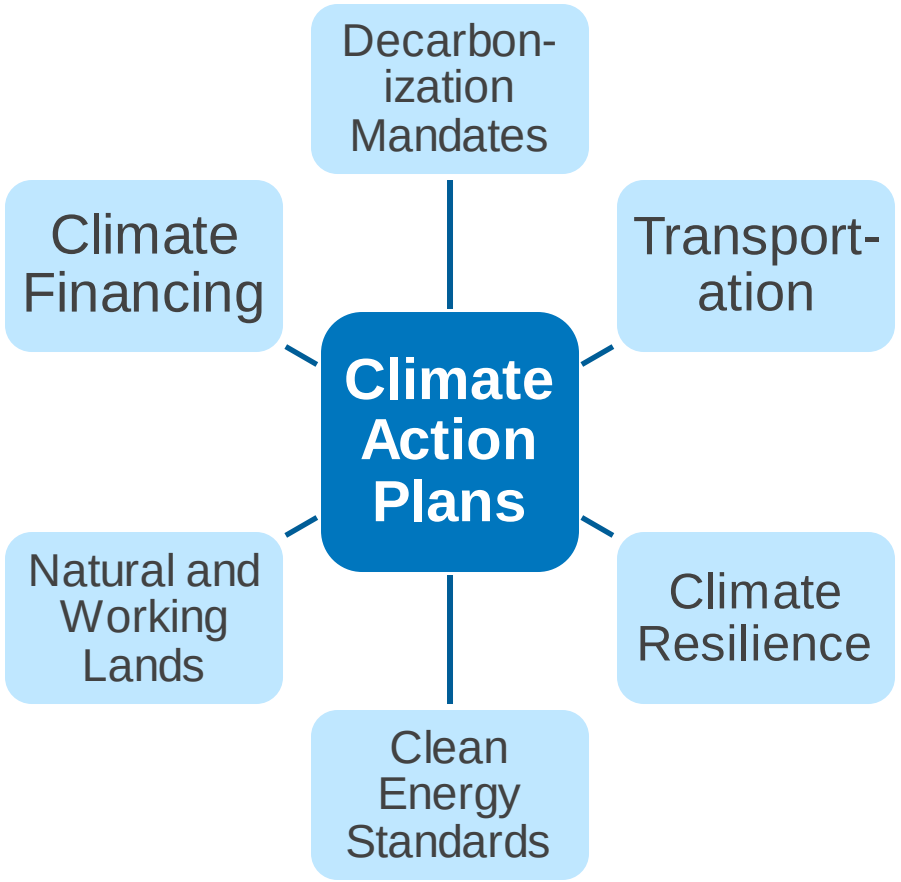
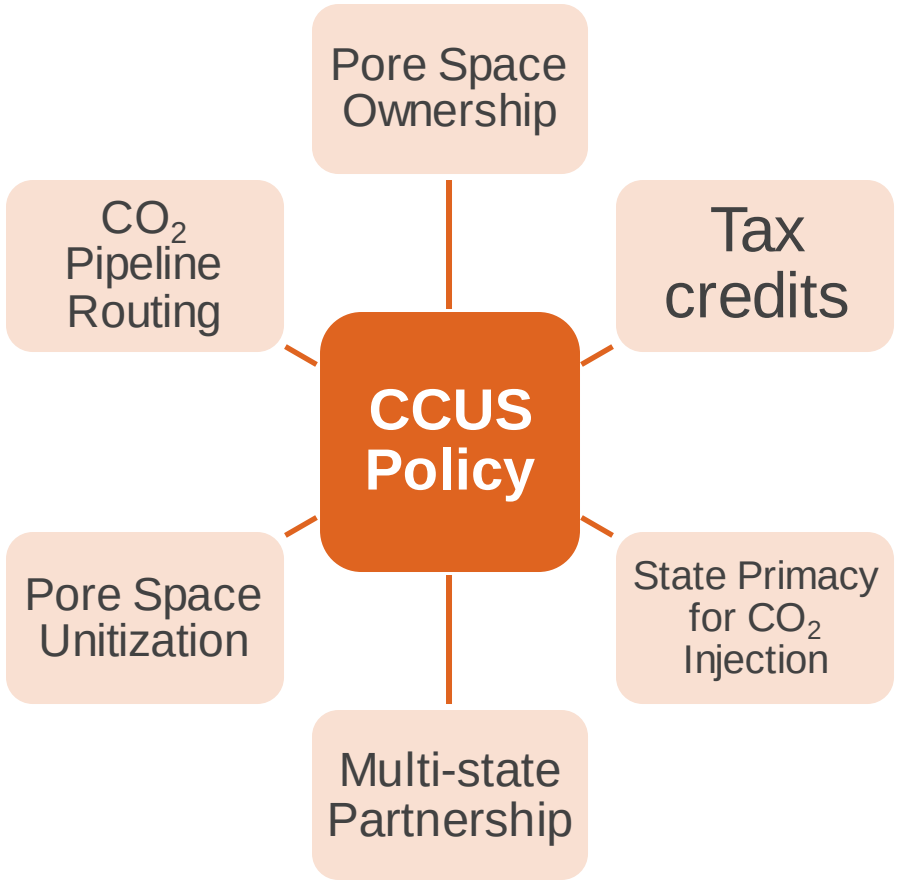
Regulations and Policy

Researching two policy approaches that affect CCUS

Codifying state/regional climate goals



Rules directly influencing CCUS



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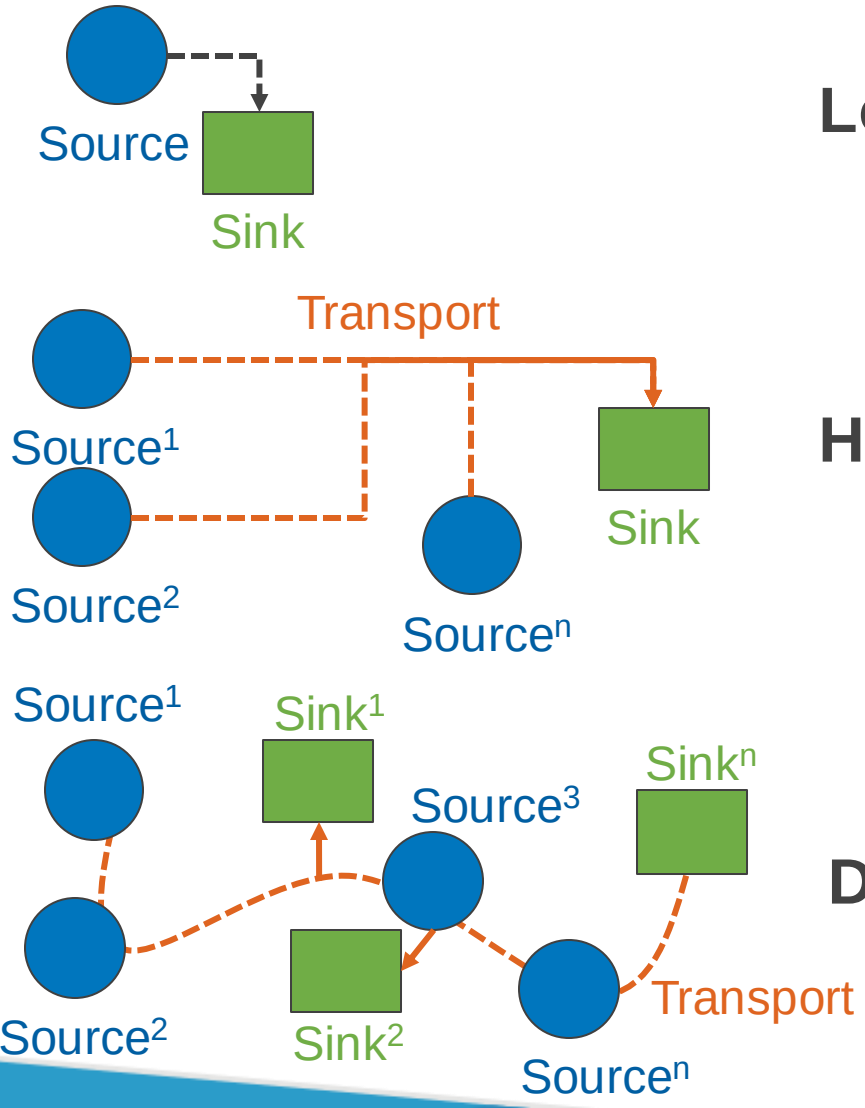
Big picture assessment of infrastructure

- Large scale infrastructure development needed
- Unique opportunity to provide jobs in emerging industries
- Meaningful engagement with communities required
- Community dynamics, and regulations and policy.

Next steps on infrastructure task

Investigate infrastructure development strategies onshore and offshore

Emerging Industry: Blue Hydrogen, Bioenergy with CCS (BECCS), and direct air capture (DAC)



Local

DAC

- Heat
- Low-carbon power
- Storage

Hub

H_2

- Blue to green H2
- Natural gas feedstock
- Demand for H2
- Storage

Distributed

BECCS

- Energy crops
- Land use considerations

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