



Federal and State/Regional Initiatives to Advance Carbon Capture Policies & Deployment

IOGCC Annual Conference

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Medora, ND

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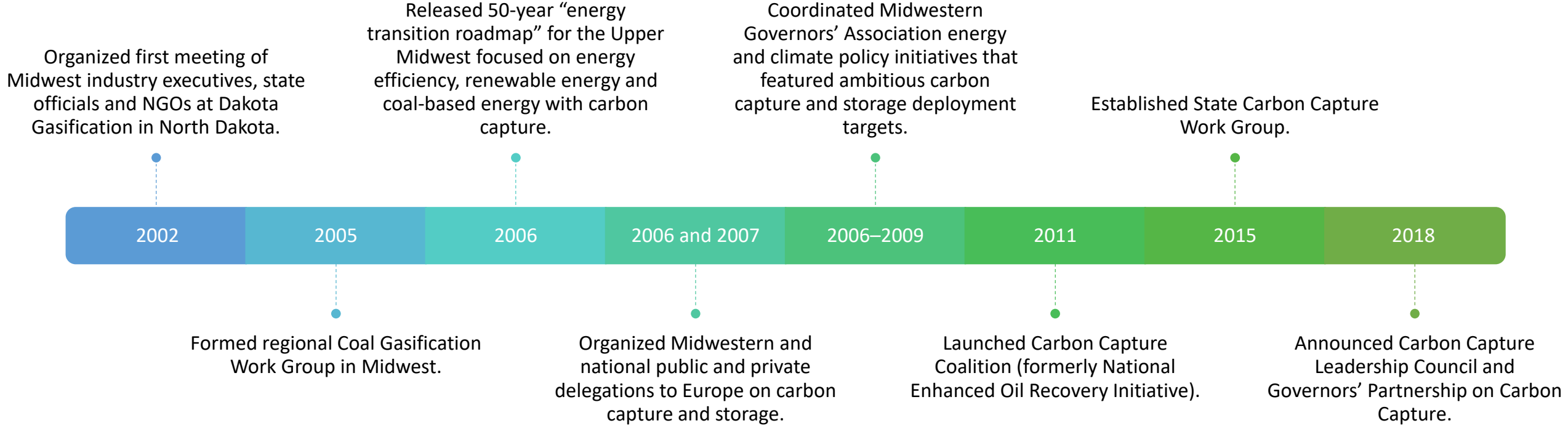
Great Plains Institute




**GREAT PLAINS
INSTITUTE**

Better Energy.
Better World.

GPI: Nearly Two Decades Working on Carbon Capture, Utilization & Storage




Coordinated Federal and State/Regional Initiatives to Advance Carbon Capture Policy and Deployment



CARBON CAPTURE COALITION

A diverse partnership of 60+ energy, industrial and technology companies, labor unions, and environmental, clean energy and agricultural organizations dedicated to fostering economywide deployment of carbon capture.




STATE CARBON CAPTURE WORK GROUP

Convened by former Gov. Matt Mead (R-WY) and Gov. Steve Bullock (D-MT), the Work Group brings together officials from 15 states to support carbon capture and CO₂ pipeline infrastructure deployment.



Carbon Capture Leadership Council

Brings together top industry, government, labor, NGO and philanthropic leaders to advance a national technology, policy and deployment agenda.



REGIONAL CARBON CAPTURE DEPLOYMENT INITIATIVE

Initiatives of state officials and stakeholders to promote regional-scale deployment of carbon capture and CO₂ pipeline infrastructure in Midwestern and Western states.



GOVERNORS' PARTNERSHIP FOR CARBON CAPTURE

Bipartisan initiative of governors to provide leadership, focus and a stronger state voice for mutual carbon capture policy and deployment priorities.

Carbon Capture Coalition: 60+ Industry, Labor & NGO Membership Unites Diverse Interests

- AFL-CIO
- Air Liquide
- Air Products
- AK Steel
- American Carbon Registry
- ArcelorMittal
- Arch Coal
- Archer Daniels Midland Co.
- Baker Hughes, a GE Company
- Bipartisan Policy Center
- Carbon Wrangler LLC
- Center for Carbon Removal
- Clean Air Task Force
- ClearPath Foundation
- Cloud Peak Energy
- Conestoga Energy Partners
- Core Energy LLC
- EBR Development LLC
- EnergyBlue Project
- Energy Innovation Reform Project
- Glenrock Petroleum
- Great River Energy
- Greene Street Capital
- Impact Natural Resources LLC
- ION Engineering LLC
- International Brotherhood of Boilermakers
- International Brotherhood of Electrical Workers
- Jackson Hole Center for Global Affairs
- Jupiter Oxygen Corporation
- Lake Charles Methanol
- LanzaTech
- Linde LLC
- Mitsubishi Heavy Industries America, Inc.
- National Audubon Society
- National Farmers Union
- National Wildlife Federation
- NET Power
- New Steel International, Inc.
- NRG Energy
- Occidental Petroleum Corporation
- Peabody
- Prairie State Generating Company
- Praxair, Inc.
- Renewable Fuels Association
- Shell
- SMART Transportation Division (of Sheet Metal, Air, Rail and Transportation Workers)
- Summit Power Group
- Tenaska Energy
- The Nature Conservancy
- Third Way
- Thunderbolt Clean Energy, LLC
- United Mine Workers of America
- United Steel Workers
- Utility Workers Union of America
- White Energy
- Wyoming Outdoor Council

Observers

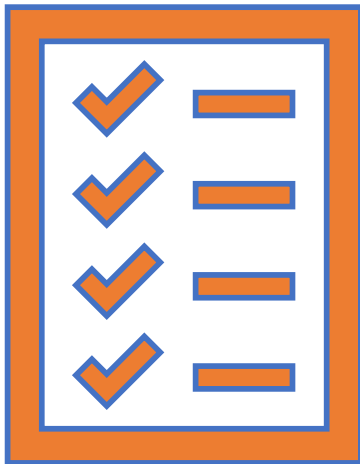
- Algae Biomass Organization
- Carbon Engineering
- Carbon Utilization Research Council
- Cornerpost CO₂, LLC
- Enhanced Oil Recovery Institute, University of Wyoming
- Institute for Clean Air Companies
- Melzer Consulting
- Tellus Operating Group
- World Resources Institute

Carbon Capture Coalition and Partners Marshaled Unparalleled Bipartisan Support for Reform of the 45Q Tax Credit

- Increases the value of the tax credit over ten years to:
 - \$35 for every metric ton of CO₂ stored through enhanced oil recovery;
 - \$50 per ton for CO₂ stored in other geologic formations; and
 - \$35 per ton of CO₂ emissions reduced through beneficial use.
- Authorizes tax credit for any project beginning construction by end of 2023, with a 12-year period to claim the credit once operational.
- Expands credit beyond geologic storage to include emissions reductions achieved through beneficial use of CO₂ to make fuels, chemicals, products, etc. while reducing emissions, subject to lifecycle analysis.
- Allows for direct air capture to qualify in addition to power plant and industrial capture.
- Makes carbon monoxide capture eligible, enabling CO utilization projects.
- Lowers eligibility threshold for industrial facilities to 100,000 tons of CO₂ captured annually so more industries and regions can participate effectively (e.g. ethanol production in the Midwest and Great Plains).
- Establishes eligibility range for non-EOR carbon utilization projects of 25,000-500,000 tons.
- Increases flexibility so tax-exempt electric cooperatives, municipal utilities and project developers that lack tax appetite can monetize the credit.



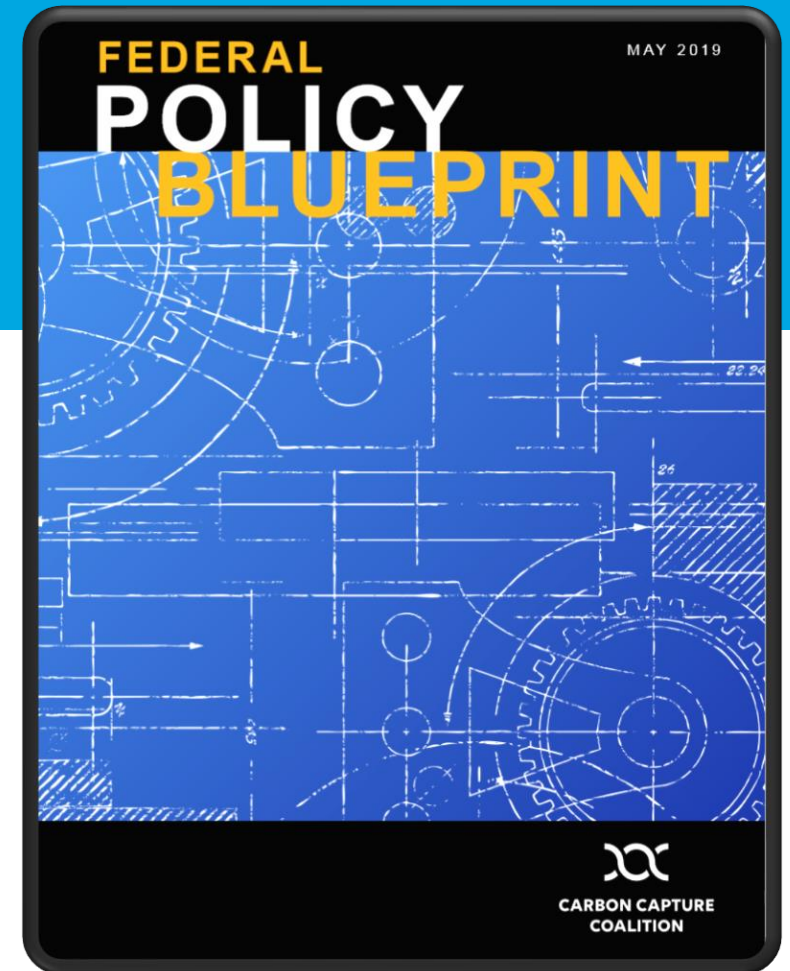
Federal Policy Agenda Building on 45Q



- Ensure effective implementation of 45Q by the U.S. Treasury to provide the investment certainty and business model flexibility intended by Congress;
- Provide a portfolio of federal carbon capture policies to complement 45Q, similar to wind and solar;
- Incorporate CO₂ pipeline infrastructure into national infrastructure legislation, including measures for federal financing of extra capacity; and
- Support a robust U.S. Department of Energy budget for carbon capture, utilization, removal and storage R&D, demonstration and deployment to ensure that lower-cost next-generation technologies enter the market.

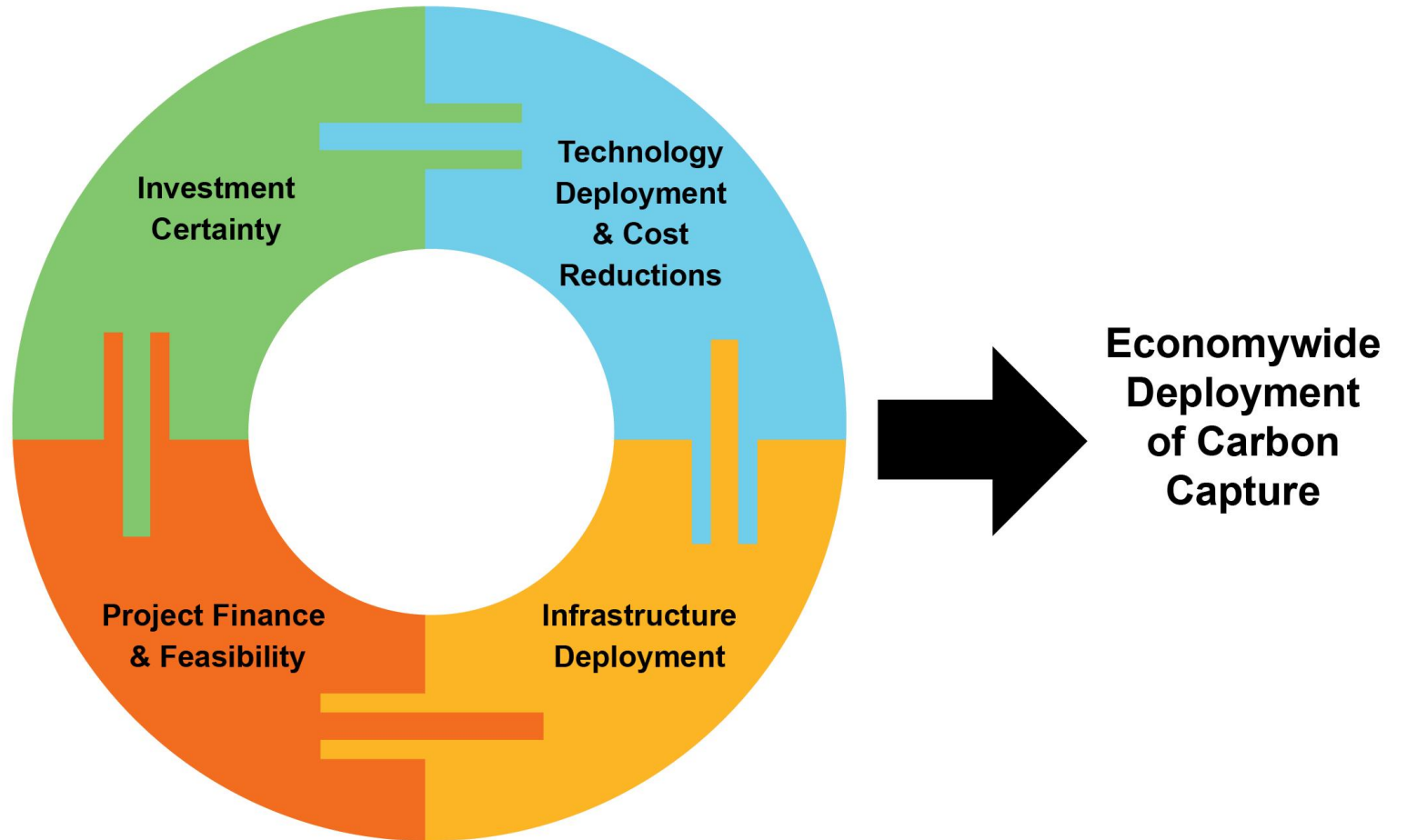
Carbon Capture Coalition Federal Policy Blueprint

- ✓ **First-ever policy blueprint on federal carbon capture policies**
- ✓ **Promotes economywide deployment of carbon capture technologies**
- ✓ **Represents consensus of Coalition's more than 60 energy, industrial and technology companies, labor unions, and conservation, environmental, clean energy and agricultural organizations**

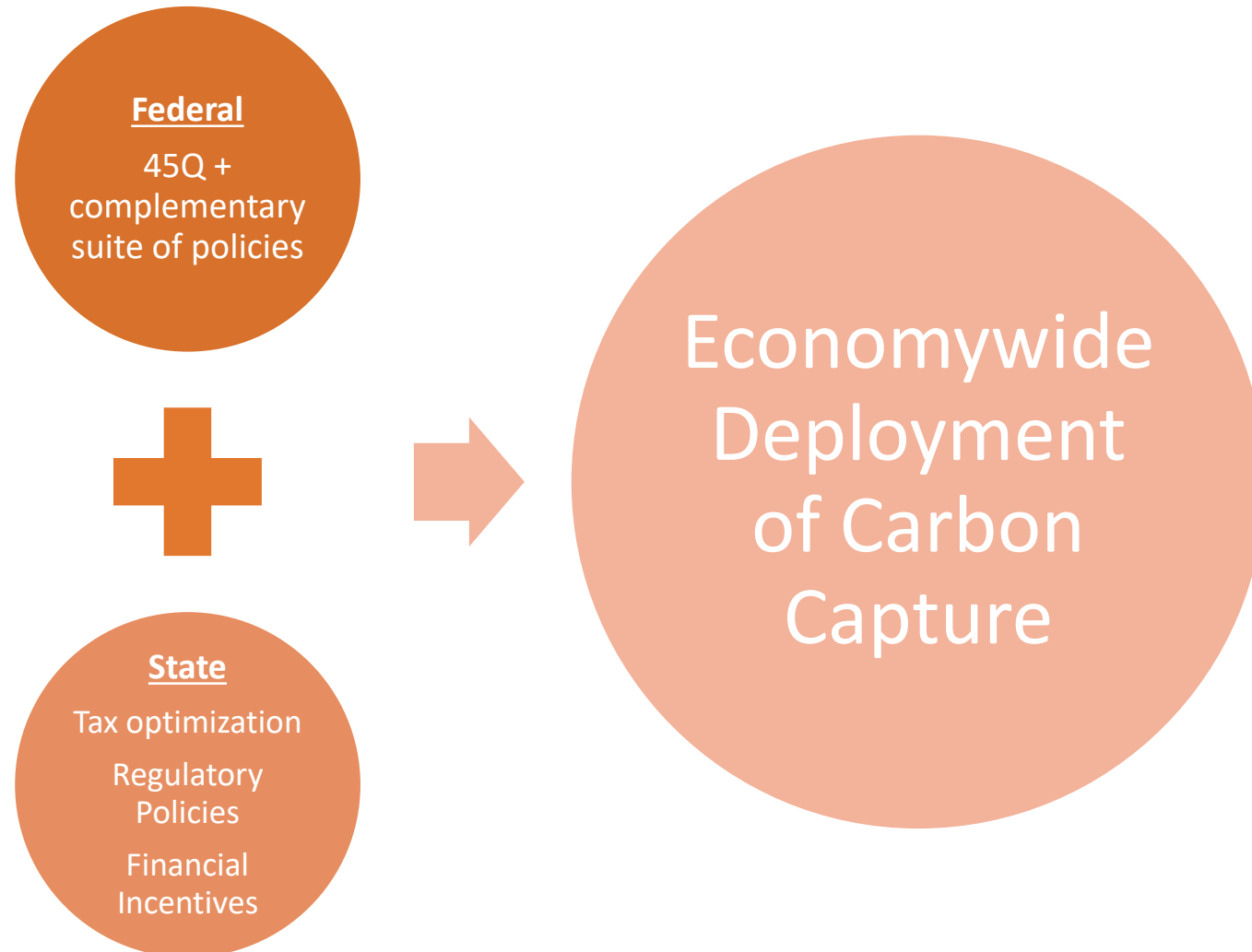


Next Ten Years for Carbon Capture: How do we reach critical mass for economywide deployment?

Reform of the 45Q tax credit is a significant accomplishment and provides a foundation for the broader suite of policies needed to scale commercial deployment of carbon capture, similar to what has benefitted other low and zero-carbon technologies.

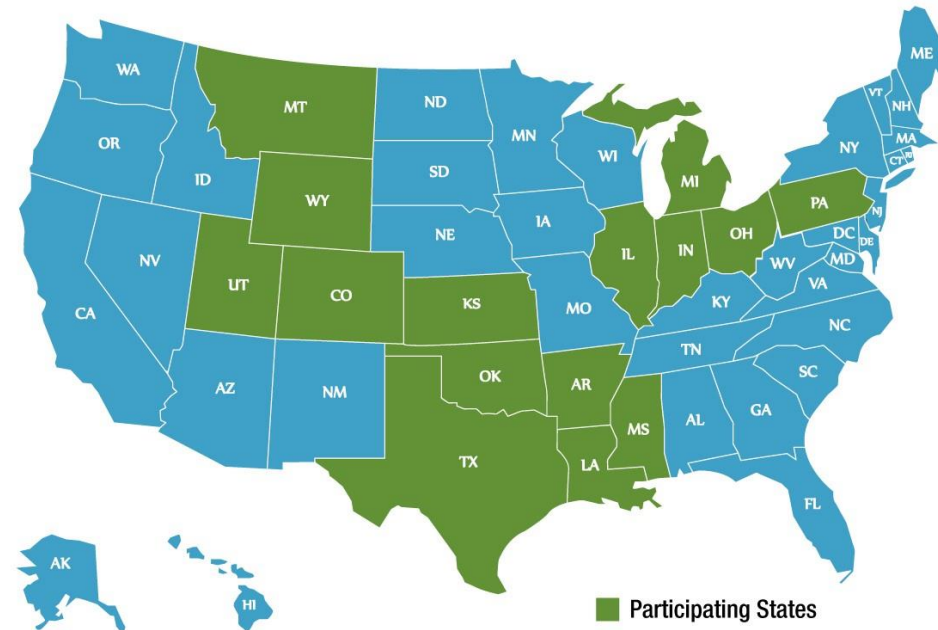


Integrated Federal & State Policy are Key to Success



STATE CARBON CAPTURE WORK GROUP

- Co-convened by former Governor Matt Mead (R-WY) and Governor Steve Bullock (D-MT). Staffed by Great Plains Institute.
- Launched in 2015:
 - Officials from 15 states*
 - Leading industry and NGO stakeholders and experts
- Objectives:
 - Help policymakers better understand states' potential for carbon capture, CO₂-EOR and other storage and utilization;
 - Recommend state and federal policies;
 - Support implementation of policy recommendations and project deployment.

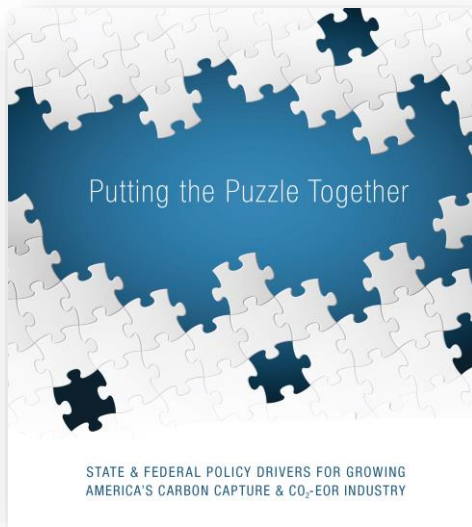


*State participation varies and includes governors' staff, cabinet secretaries, utility commissioners and agency and commission staff.

- **Launched by former Gov. Matt Mead (R-WY) and Gov. Steve Bullock (D-MT)** last year in Jackson Hole, WY.
 - Former Gov. Colyer (R-KS), Gov. Edwards (D-LA), former Gov. Fallin (R-OK), and Gov. Herbert (R-UT) also joined.
- **Current Governors: Bullock (D-MT), Edwards (D-LA), Gordon (R-WY) and Herbert (R-UT).** New governors being approached to replace governors who have left office and to add new states to the effort.
- Objectives:
 - Elevate carbon capture, beneficial utilization and storage as a national priority;
 - Put carbon capture on an equal policy footing with other low and zero-emission energy technologies; and
 - Foster carbon capture and CO₂ pipeline infrastructure deployment in states and regions.
- State Carbon Capture Work Group coordinates the Partnership at Governors' direction.



Four Major Work Group Deliverables To Date



- [*Putting the Puzzle Together: State and Federal Policy Drivers for Growing America's Carbon Capture and CO₂-EOR Industry*](#)
- [*21st Century Energy Infrastructure: Policy Recommendations for Development of American CO₂ Pipeline Networks*](#)
- [*Electricity Market Design and Carbon Capture Technology: The Opportunities and the Challenges*](#)
- [*Capturing and Utilizing CO₂ from Ethanol: Adding Economic Value and Jobs to Rural Economies and Communities While Reducing Emissions*](#)



21st Century Energy Infrastructure: Policy Recommendations for Development of American CO₂ Pipeline Networks

White paper prepared by the State CO₂-EOR Deployment Work Group

February 2017



Electricity Market Design and Carbon Capture Technology: The Opportunities and the Challenges

The Opportunities and the Challenges

White paper prepared by the State CO₂-EOR Deployment Work Group



Capturing and Utilizing CO₂ from Ethanol: Adding Economic Value and Jobs to Rural Economies and Communities While Reducing Emissions

White paper prepared by the State CO₂-EOR Deployment Work Group

December 2017

Harnessing 45Q for State and Regional Carbon Capture and CO₂ Pipeline Infrastructure Deployment

- Former Governor Mead (WY) invited 17 governors to work together to capitalize on the 45Q tax credit.
- Governors Mead and Bullock (MT) announced the Regional Deployment Initiative in Jackson Hole, WY in June 2018.
- State Carbon Capture Work Group coordinating Midwestern and Western regional efforts.
- Modeling and policy development underway for 2020 state legislative sessions.



REGIONAL
CARBON
CAPTURE
DEPLOYMENT
INITIATIVE

The logo for the Regional Carbon Capture Deployment Initiative is displayed on the right side of the slide. It consists of the words "REGIONAL", "CARBON", "CAPTURE", "DEPLOYMENT", and "INITIATIVE" stacked vertically in a bold, blue, sans-serif font. The text is enclosed within a thin blue rectangular border.

Where We are in the Process

Phase I – Preliminary Analysis (January-September 2018)

- Mapping of industrial facilities and power plants and CO₂ storage opportunities, initial cost analysis, and preliminary pipeline modeling.

Phase II – Regional Convening of State Officials and Stakeholders (Oct 2018)

- Launched Midwest effort in Columbus, OH and Western states in Salt Lake City, UT.

Phase III – Supporting State Policy Development and Projects (Underway)

- Identify priority feasible projects and state policies to complement 45Q tax credit.
- Prepare for 2020 state legislative sessions.

EPA GHGRP & eGRID
US DOE EIA
ABB / Energy Velocity

CO2 Supply
Industrial & Power

Stanford
NETL, IEA
National Petroleum Council

Capture Costs

Advanced Resources
International

EOR
Potential Demand

NETL & USGS
Los Alamos National Lab
Indiana University
Ohio State

Saline
Storage Potential
SCO2T

NETL
Los Alamos
Princeton
Industry Consulting

Pipeline Costs

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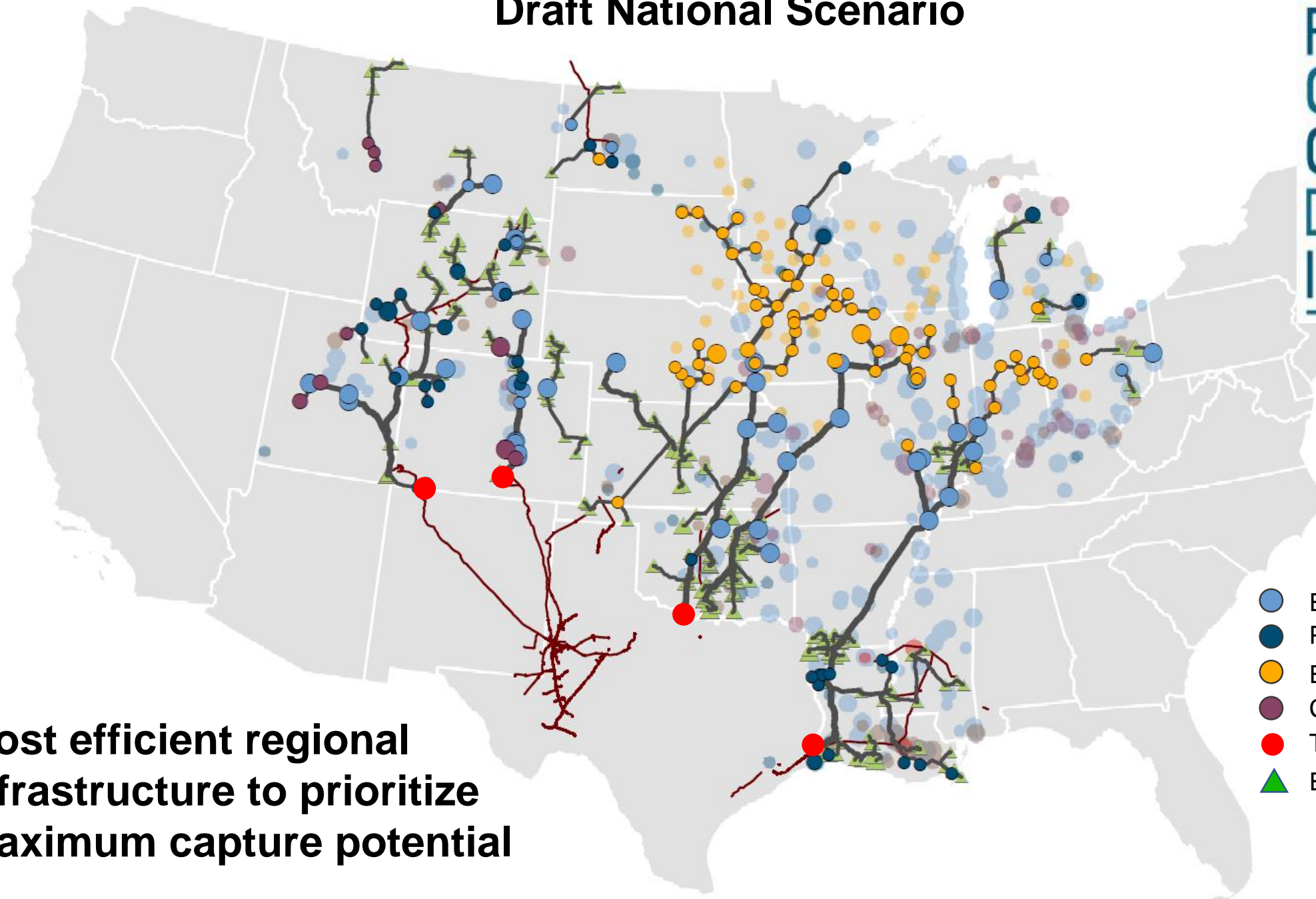
SimCCS
Los Alamos

Economic
buildout at break
even – **identify
early mover
capture projects**

Regional scale
transport
infrastructure to
**maximize
utilization** with
financing support

Draft National Scenario

REGIONAL CARBON CAPTURE DEPLOYMENT INITIATIVE



Most efficient regional infrastructure to prioritize maximum capture potential

- Electricity
- Petro-chem/NG Refining
- Ethanol
- Cement
- Texas Interconnection
- ▲ EOR Sink

Goals for 2019

- In preparation for 2020 legislative sessions:
 - Complete modeling and analysis,
 - Identify potential candidate carbon capture projects by state (industrial and power sector);
 - Prepare policy checklist for states to be “carbon capture ready,” and
 - Recommend specific policies state-by-state to leverage the 45Q tax credit.
- Marshal state, industry, labor, and NGO support to help carbon capture projects meet 2023 45Q deadline and advance regional CO₂ trunk line projects.
- **We would welcome your involvement!**

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Thank You

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