

National and Regional Collaborative Efforts to Develop Carbon Capture and CO₂ Pipeline Infrastructure Projects

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Overview

- Background on federal Carbon Capture Coalition
- Reform of federal 45Q tax credit for CO₂ storage and beneficial use
- Additional federal policy priorities
- Background on State Carbon Capture Work Group
- Policy recommendations from states
- Governors' Partnership for Carbon Capture
- Forthcoming Regional Carbon Capture Deployment Initiative for the Midwest and the Northern Plains/Rockies regions





- Launched in 2011 as the National Enhanced Oil Recovery Initiative.
- Convened by Great Plains Institute and the Center for Climate & Energy Solutions.
- Unprecedented diversity:
 - Coalition includes leading coal, oil, electric power, ethanol, industrial and technology companies, labor unions, and environmental, energy and agricultural organizations.
- Funded by grants from charitable foundations and private sector contributions.
- **Goal:** Accelerate deployment of carbon capture at industrial facilities and power plants through financial incentives and other policies that drive private investment, innovation and cost reductions in CO₂ capture technology and pipeline transport.



Carbon Capture Unites Diverse Interests as Reflected in 50+ Membership of the Carbon Capture Coalition

- AFL-CIO
- Air Liquide
- Air Products
- American Carbon Registry
- 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
- NET Power
- New Steel International, Inc.
- NRG Energy
- Occidental Petroleum Corporation
- Peabody Energy
- 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
- Third Way
- Thunderbolt Clean Energy LLC
- United Mine Workers of America
- Utility Workers Union of America
- White Energy
- Wyoming Outdoor Council

And Bipartisan Political Support is Growing: Reform of Federal 45Q Tax Credit for CO₂ Storage Passed in 2018 Budget Deal

H. R. 1892

One Hundred Fifteenth Congress of the United States of America

AT THE SECOND SESSION

*Begun and held at the City of Washington on Wednesday,
the third day of January, two thousand and eighteen*

An Act

To amend title 4, United States Code, to provide for the flying of the flag at half-staff in the event of the death of a first responder in the line of duty.

*Be it enacted by the Senate and House of Representatives of
the United States of America in Congress assembled,*

SECTION 1. SHORT TITLE.

This Act may be cited as the “Bipartisan Budget Act of 2018”.



**CARBON CAPTURE
COALITION**

Unparalleled Bipartisan Support for Reform of the 45Q Tax Credit

- S. 1535, the FUTURE Act (**F**urthering carbon capture, **U**tilization, **T**echnology, **U**nderground storage, and **R**educed **E**missions), was introduced with one quarter of Senate co-sponsoring.
- Lead sponsors: Heitkamp (D-ND), Capito (R-WV), Whitehouse (D-RI), Barrasso (R-WY), Graham (R-SC) and Kaine (D-VA).
- Other original co-sponsors:
 - Republicans—Cochran (MS), Portman (OH), and Blunt (MO)
 - Democrats—Schatz (HI), Manchin (WV), Casey (PA), Duckworth (IL), Franken (MN), Brown (OH), Durbin (IL), Booker (NJ), Coons (DE), Klobuchar (MN), Peters (MI), Donnelly (IN), Warner (VA), Bennet (CO) and Tester (MT)
 - Independent—King (ME)
- House Agriculture Committee Chairman Conaway (R-TX) introduced H.R. 3761, the Carbon Capture Act, which garnered 50 co-sponsors (35 Rs and 15 Ds):
 - Co-sponsors from 23 states and every region; spanned entire political spectrum in Congress.
- Highlights path forward on energy policy, even in current polarized political environment.

Key Provisions of 45Q Reform

Bipartisan Budget Act of 2018 incorporated S. 1535, the FUTURE Act, without revisions:

- Increases the value of the tax credit over ten years from:
 - \$10 to \$35 for every metric ton of CO₂ stored through enhanced oil recovery;
 - \$20 to \$50 per ton for CO₂ stored in other geologic formations; and
 - \$10 to \$35 per ton of CO₂ emissions reduced through beneficial use.
- Extends the tax credit for any project commencing construction within six years, with a 12-year period to claim the credit once operational;
- Expands credit beyond geologic storage to include beneficial use of CO₂ to make fuels, chemicals, products, etc. while reducing lifecycle emissions.
- Lowers eligibility threshold for industrial facilities to 100,000 tons of CO₂ captured annually so more industries (e.g. ethanol) and regions (e.g. Upper Midwest) can participate effectively.
- Increases flexibility so tax-exempt electric cooperatives, municipal utilities and project developers that lack tax appetite can monetize the credit.

Next Steps: Pass the USE IT Act

- Utilizing Significant Emissions with Innovative Technologies (USE IT) Act introduced by Senators John Barrasso (R-WY), Sheldon Whitehouse (D-RI), Shelley Moore Capito (R-WV) and Heidi Heitkamp (D-ND):
 - Provides federal funding for demonstration of direct air capture technology and for federal research and development of beneficial uses of CO₂ captured from industrial facilities and power plants; and
 - Facilitates planning and permitting of CO₂ pipeline infrastructure.
- Passed Senate Environment and Public Works Committee unanimously in May.
- Goal of Senate and House passage yet this year.

Next Steps: Incorporate the Carbon Utilization Act into Federal Farm Policy

- The Carbon Utilization Act introduced by Senators Michael Bennet (D-CO) and Sheldon Whitehouse (D-RI) and by Representatives David Young (R-IA) and Scott Peters (D-CA) would expand eligibility for biorefinery loan guarantees and for Rural Utility Service loans and loan guarantees to include carbon capture and utilization.
- These key carbon capture provisions stripped out prior to passage of Senate Farm Bill, despite no additional cost to U.S. taxpayers.
- Efforts now focused on Farm Bill in House-Senate conference and in USDA appropriations bills.



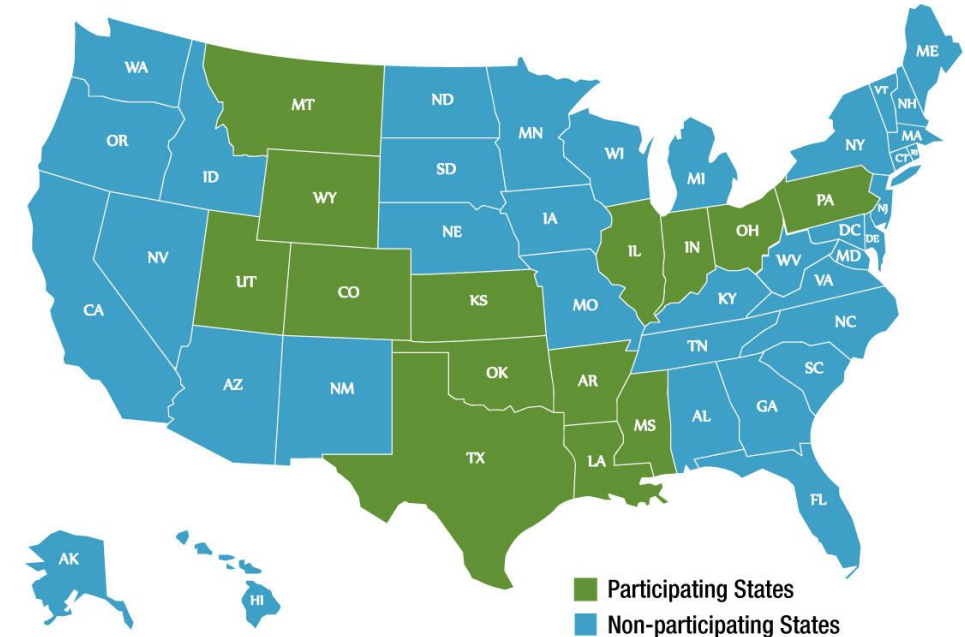
Additional Elements of Federal Policy Agenda to Complement Reform of the 45Q Tax Credit

- The Carbon Capture Coalition's other federal priorities include:
 - Ensuring effective implementation of 45Q by Treasury to provide financial and investment certainty and business model flexibility intended by Congress;
 - Incorporating federal financing of CO₂ pipeline infrastructure into national infrastructure legislation, potentially through tax-exempt private activity bonds, DOE loan guarantees, and other tools; and
 - Support robust DOE budget and appropriations for carbon capture, utilization and storage RDD&D, including supporting the Fossil Energy Research & Development Act introduced by Representatives David McKinley (R-WV) and Marc Veasey (D-TX) to update and expand DOE's program.

Collaborative State and Regional Efforts: The State Carbon Capture Work Group (formerly CO₂-EOR Deployment Work Group)

- Co-convened by Governor Matt Mead (R-WY) and Governor Steve Bullock (D-MT). Staffed by Great Plains Institute.
- Launched in 3Q 2015:
 - Officials from 15 states*
 - Leading industry and NGO stakeholders
 - Experts
- Work Group has issued series of reports with analysis and recommendations.

State CO₂-EOR Deployment Work Group: Participating States

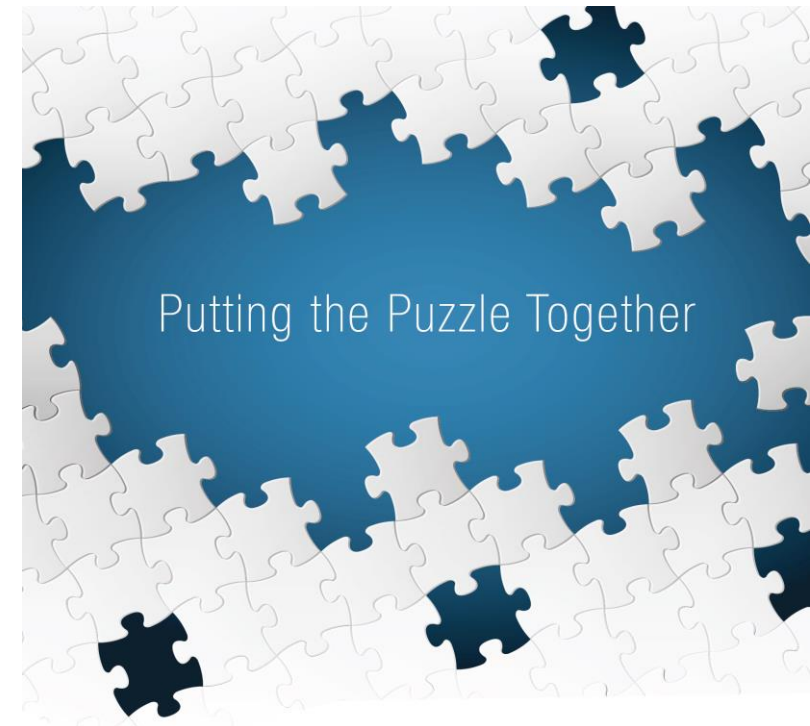


*State participation varies and includes governors' staff, cabinet secretaries, utility commissioners and agency and commission staff.



Putting the Puzzle Together: State & Federal Policy Drivers for Growing America's Carbon Capture & CO₂-EOR Industry

- Major report (<http://www.betterenergy.org/EORpolicy>) released by State Carbon Capture Work Group in 2016 .
- Recommends that states optimize existing state taxes to support carbon capture and storage deployment:
 - Sales taxes on equipment purchased to build a carbon capture facility;
 - Property taxes on the carbon capture facility;
 - Sales taxes on equipment acquired to adapt an oilfield to CO₂-EOR operations; and
 - Oil and gas taxes, such as production and severance taxes.



STATE & FEDERAL POLICY DRIVERS FOR GROWING
AMERICA'S CARBON CAPTURE & CO₂-EOR INDUSTRY



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

- In February 2017, State Work Group released its white paper on CO₂ pipeline infrastructure: (http://www.betterenergy.org/American_CO2_Pipeline_Infrastructure) with three key recommendations:
 1. **Make CO₂ pipelines a priority component of a broader national infrastructure agenda;**
 2. **Leverage private capital with federal financing for large-volume, long-distance trunk CO₂ pipelines; and**
 3. **Support CO₂ pipeline corridor planning and permitting** in consultation with states, tribal governments and stakeholders.
- These recommendations informed pipeline provisions of the bipartisan USE IT Act that just passed U.S. Senate Environment and Public Works Committee.



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

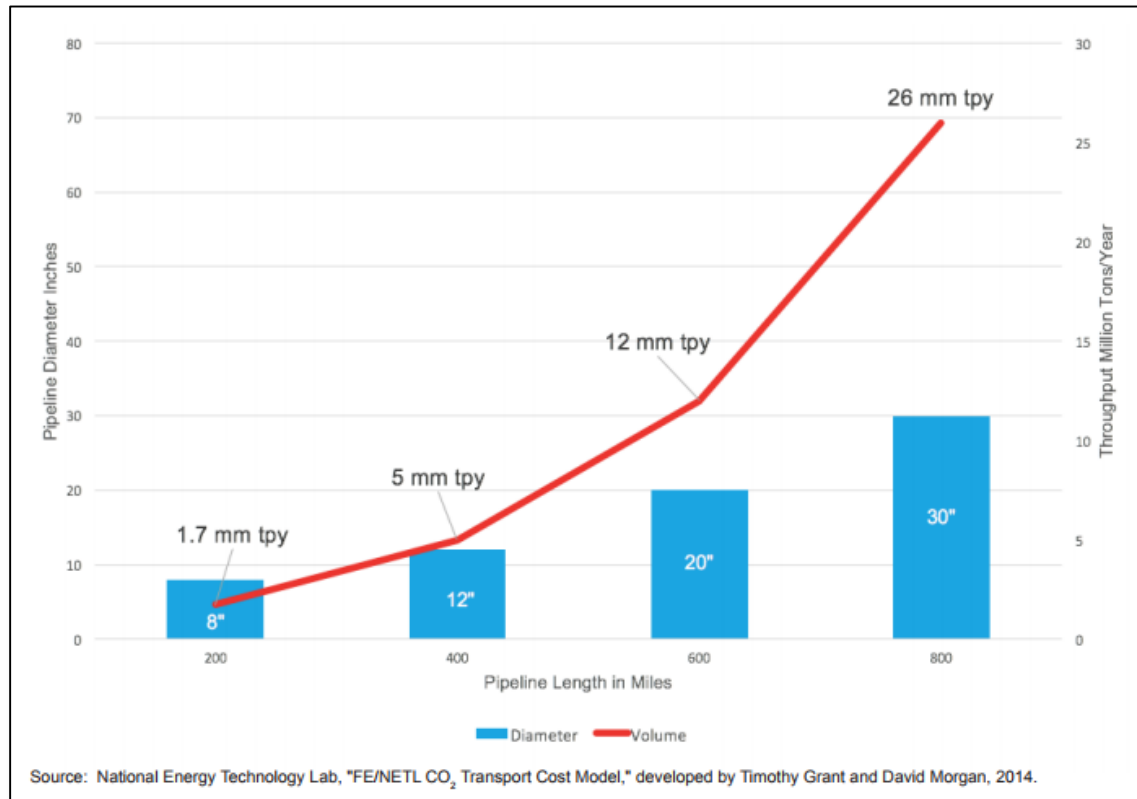


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Supersizing CO₂ Pipelines: State Work Group Recommends Federal Financing of Extra Capacity

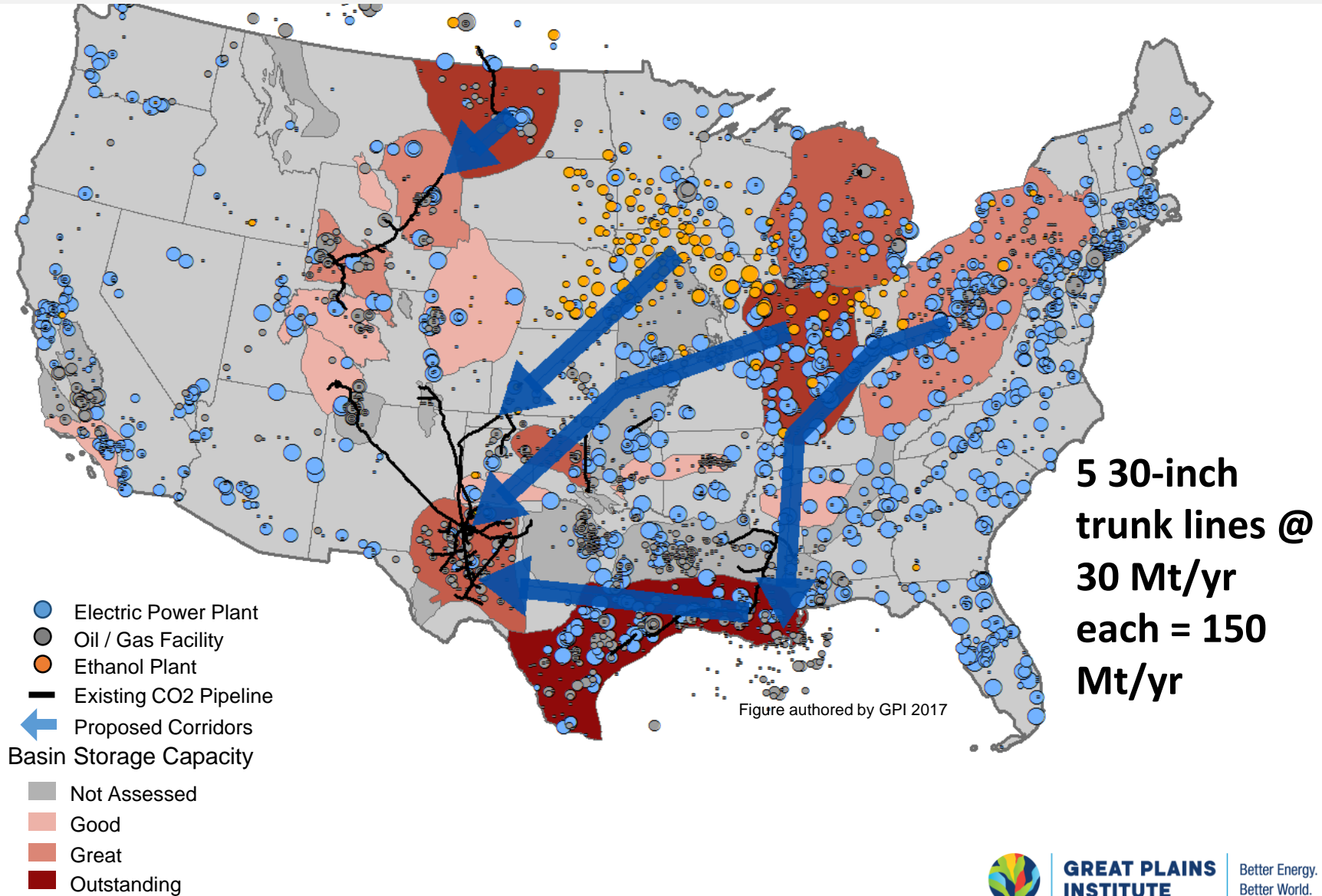
CO₂ volume transported for \$10/ton for different pipeline diameters



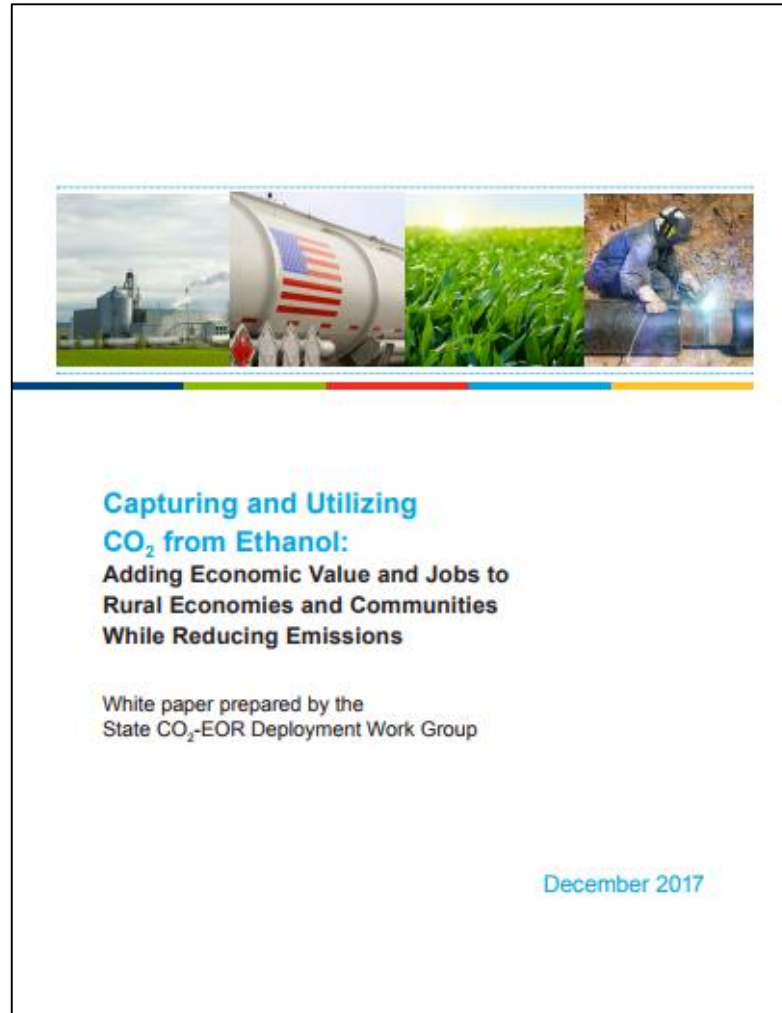
- Economy of scale opportunity: Doubling diameter quadruples pipeline capacity for additional 10-20% of total installed cost.
- Costs on previous slides represent minimum pipeline diameter for 4-10 Mt CO₂/year.
- If ethanol CO₂ capture is to support deployment of a larger national pipeline network, initial trunk pipelines must be built with extra capacity.
- Additional pipeline capacity up front would lower long-term CO₂ transport costs.
- Federal government financing could support marginal cost of incremental pipeline capacity.



Linking CO₂ Sources and Sinks with Five Proposed Trunk Pipeline Corridors and Existing Pipeline Networks to Create Networked National System



State Work Group's White Paper on Capture, Transport and Utilization of Biogenic CO₂ from Ethanol Production



- Provided modeling of CO₂ pipeline deployment scenarios illustrating early mover deployment potential of biogenic CO₂ capture from ethanol production.
- More details can be found in white paper released in December 2017:
<http://www.betterenergy.org/news-press>



Launch of Governors' Partnership for Carbon Capture

- The Governors' Partnership for Carbon Capture will provide leadership, focus and stronger state voice for carbon capture policy and deployment priorities.
- **Governors Matt Mead (R-WY)** and **Steve Bullock (D-MT)** launched the effort last month in Jackson Hole, WY and will serve as co-chairs.
- **Governors Jeff Colyer (R-KS), John Bel Edwards (D-LA), Mary Fallin (R-OK),** and **Gary Herbert (R-UT)** are also participating. Other governors are being approached to join the effort.
- Partnership objectives:
 - Elevate carbon capture and its beneficial utilization and storage as a national priority for American energy independence, job creation, environmental stewardship and global technology leadership;
 - Encourage action to expand federal policies to put carbon capture on an equal 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 will coordinate and staff the Partnership at the Governors' direction.



Regional Cooperation to Support Carbon Capture and CO₂ Pipeline Projects: Regional Carbon Capture Deployment Initiative

- Development of two cooperative regional efforts aimed at harnessing the federal 45Q tax credit for carbon capture and CO₂ pipeline deployment:
 - Focus on Northern Plains/Rockies and Midwest regions.
 - Governor Mead has invited 17 governors to have their states participate.
 - Governors Mead and Bullock announced the Initiative in Jackson Hole, WY this June, together with officials from Kansas and other states.
 - State Carbon Capture Work Group developing and coordinating the effort with participation of Kansas officials.

REGIONAL
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CAPTURE
DEPLOYMENT
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Regional Carbon Capture Deployment Initiative (cont.)

Phase I scoping under auspices of 15-state Work Group (Q1-2 2018):

- Baseline mapping of sources and sinks;
- Cost analysis to identify early mover capture project opportunities and better understand policy and infrastructure needs for potential priority power sector projects;
- Pipeline modeling based on source mapping and cost analysis;
- Direct outreach to governors staff and state officials; and
- Identification of state, industry, and other stakeholder participation.

Phase II (Q3 2018)

- Convene regional deployment initiatives, drawing on baseline analyses and modeling.

Phase III (Q4 2018 and beyond)

- Modeling and planning support of project deployment (deeper analysis and public-private engagement around specific project opportunities identified); and
- Identification of federal and state policy options for closing remaining costs gaps for specific capture and pipeline projects after accounting for value of the 45Q credit.

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Thank You

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