

# Western Governors Association – CO<sub>2</sub>-EOR Initiative: *Putting the Puzzle Together*

State & Federal Policy Drivers For  
Growing America's Carbon Capture &  
CO<sub>2</sub>-EOR Industry

December 6, 2016

# Why Incentivize Carbon Capture and CO<sub>2</sub>-EOR?

- Market forces, federal policies and some state policies are driving the energy industry to reduce carbon dioxide emissions.
- Capturing carbon dioxide from fossil fuel emissions streams remains cost-prohibitive, and is being implemented only with governmental assistance.
- Geologic storage of carbon dioxide is also costly, and sites have not be made ready.
- CO<sub>2</sub>-EOR compares cost-effectively with other forms of zero- or low-emission generation.

# Why Incentivize Carbon Capture and CO<sub>2</sub>-EOR?

- Issues to address include:
  - ✓ High capital costs of facilities,
  - ✓ Low revenues from CO<sub>2</sub> sales due to low oil prices,
  - ✓ Limited availability of debt and equity for projects due to policy uncertainty and market risk.
- The State CO<sub>2</sub>-EOR Deployment Work Group composed the report – *Putting the Puzzle Together: State & Federal Policy Drivers for Growing America's Carbon Capture & CO<sub>2</sub>-EOR Industry* – to address solutions to these and other issues.



## Discussion Items

1. WGA CO<sub>2</sub>-EOR Initiative
2. Role UW – SER Plays in CO<sub>2</sub>-EOR
3. Steps Forward





# WGA CO<sub>2</sub>-EOR Initiative



# WGA State CO<sub>2</sub>-EOR Deployment Work Group

- › Co-convened by WY Governor Mead (R) and MT Governor Bullock (D)
- › Launched in 3Q 2015
  - Representatives from 14 states\*
  - Leading private sector stakeholders
  - CO<sub>2</sub> Experts

Arkansas	Colorado	Indiana
Kansas	Kentucky	Mississippi
Montana	New Mexico	Ohio
Oklahoma	Pennsylvania	Texas
Utah	Wyoming	

\*state participation varies by state and includes governors' staff, cabinet secretaries/deputy secretaries, utility commissioners and agency and commission staff.

# Putting the Puzzle Together: State & Federal Policy Drivers for Growing America's Carbon Capture & CO<sub>2</sub>-EOR Industry (Deliverable)

- › Includes detailed analyses and recommendations
- › Represents research, study and collaboration of the CO<sub>2</sub> EOR State Deployment Work Group, including private sector stakeholders and CO<sub>2</sub>-EOR experts



# State CO<sub>2</sub>-EOR Deployment Work Group Objectives

- Help policy-makers and stakeholders better understand states' potential for CO<sub>2</sub>-EOR, & evaluate which strategies and state and federal policies can best achieve that potential;
- Make recommendations to states & federal government;
- Support state policy-makers in implementing strategies and policies developed through Work Group analysis and deliberations, including multi-state efforts; and
- Encourage enactment of federal policies that complement state priorities through coordinated efforts of governors, other state policy-makers and stakeholders.

# Growing State Support for CO<sub>2</sub> EOR

- State officials that have signaled growing state support for CO<sub>2</sub>-EOR

Year	Organization	Resolution Highlight(s)
2015	<b>Western Governor's Association (WGA)</b>	Recognized economic and environmental benefits of CO <sub>2</sub> -EOR; called on Congress to extend and strengthen 45Q tax credit.
2015	<b>Southern States Energy Board (SSEB)</b>	Emphasized need for federal incentives and state policy measures.
2016	<b>National Association of Regulatory Utility Commissioners (NARUC)</b>	Highlighted the economic, energy production and carbon mitigation benefits of CO <sub>2</sub> -EOR, and the importance of state and federal action.

# The Case for Federal, State Support for CO<sub>2</sub>-EOR

- › CO<sub>2</sub>-EOR offers extraordinary benefits for our nation
- › Market forces, federal policies and some state policies are driving industry to reduce emissions
- › Carbon capture with CO<sub>2</sub>-EOR compares cost-effectively with other forms of zero- or low-emission generation



Increases  
US Oil  
Production



Captures  
Carbon &  
Reduces  
Carbon  
Emissions



Creates  
Jobs,  
Investment  
&  
Economic  
Activity

CO<sub>2</sub>-EOR enhances our nation's energy and economic security

# The Case for Federal, State Support for CO<sub>2</sub>-EOR

- › Turns CO<sub>2</sub> from a liability into a **valuable commodity**
- › US has the potential to produce an estimated **28 billion barrels of economically recoverable oil** with today's industry best practices
- › Provides **fiscal benefits** at a time when the federal government and many states face budget challenges.
- › Directly supports **high-paying jobs** across a range of sectors.

# WGA Recommendations for Federal Incentives

› **A targeted package of federal incentives would help mitigate risk & uncertainty for carbon capture projects. Working Group recommendations:**

- 1. Extend, reform and expand** the existing **Section 45Q Tax Credit** for Carbon Dioxide Sequestration to increase its value, make it financially certain and provide for greater flexibility for carbon capture project developers;
- 2. Establish federal price stabilization contracts**, or contracts for differences (CfD), for the CO<sub>2</sub> sold from capture facilities to EOR operators in order to eliminate the risk of price volatility that deters private investment in carbon capture projects; and
- 3. Make carbon capture eligible for tax-exempt private activity bonds (PABs) and for master limited partnerships (MLPs)** in order to provide debt and equity, respectively, on more favorable terms.

# WGA Recommendations for Federal Incentives

- › Section 45Q Carbon Storage Tax Credit Reforms:
  - **Extend and uncap the program**, so that CCUS project investors have the financial certainty and confidence that the tax credit and associated revenue would be available to them;
  - **Increase the value of the tax credit** to a level of \$30/ton or more to help close the cost gap and justify private investment in commercial carbon capture projects;
  - **Specify that the entity claiming the credit is the owner of the carbon capture equipment**, giving developers flexibility to involve outside investors that can utilize the tax credits; and
  - **Reduce the facility eligibility threshold** to 100,000 tons of CO<sub>2</sub> captured annually.

# WGA Recommendations for Federal Incentives

- › States have implemented three broad categories of policies to provide financial support to CO<sub>2</sub>-EOR deployment:
  - Changes in state taxes that provide incentives for the capture of CO<sub>2</sub> from power plants and industrial sources, and/or for the use of captured CO<sub>2</sub> to produce oil through EOR;
  - State portfolio requirements and mandatory power purchases or offtake agreements for facilities that capture carbon; and
  - State regulatory and other policies and strategies to facilitate CO<sub>2</sub> storage, project development and pipeline transport.

# WGA Recommendations for State Incentives

- › Analysis suggests that states, in conjunction with improved federal policy, can positively affect the overall feasibility of CCUS projects by optimizing a suite of traditional taxes common to most oil and gas-producing states.
- › The work group reviewed:
  - 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 CO<sub>2</sub>-EOR operations; and
  - Oil and gas taxes, such as production and severance taxes.

**Based upon life-of-project modeling of the carbon capture and oil recovery portions of integrated CCUS projects, it appears that certain targeted reductions in state taxes can have a beneficial impact on project economics that is equivalent to roughly an \$8 per barrel increase in the price of oil, which is significant compared to existing federal incentives.**



# Role Wyoming – UW – SER Plays



# WYOMING – UW – SER – EORI

- › Operators in Wyoming have practiced CO<sub>2</sub>-EOR since the late 1980's. CO<sub>2</sub> is derived from gas separation plants and transported by pipeline to fields.
- › The University formed the Enhanced Oil Recovery Institute (EORI) in the 1990's to conduct techno-economic studies of CO<sub>2</sub>-EOR for Wyoming fields.
- › The state of Wyoming designated EORI as a state agency overseen by a governor-appointed commission in 2004. The mission is to facilitate increased production of oil and natural gas in Wyoming through transfer of technology, information and knowledge.
- › The School of Energy Resources (SER) was established at the University of Wyoming in 2006, and EORI was affiliated.
- › SER formed the Carbon Management Institute (CMI) to pursue research in all areas of CCUS. CMI has been very successful in winning grant funding for field studies.



# Next Steps

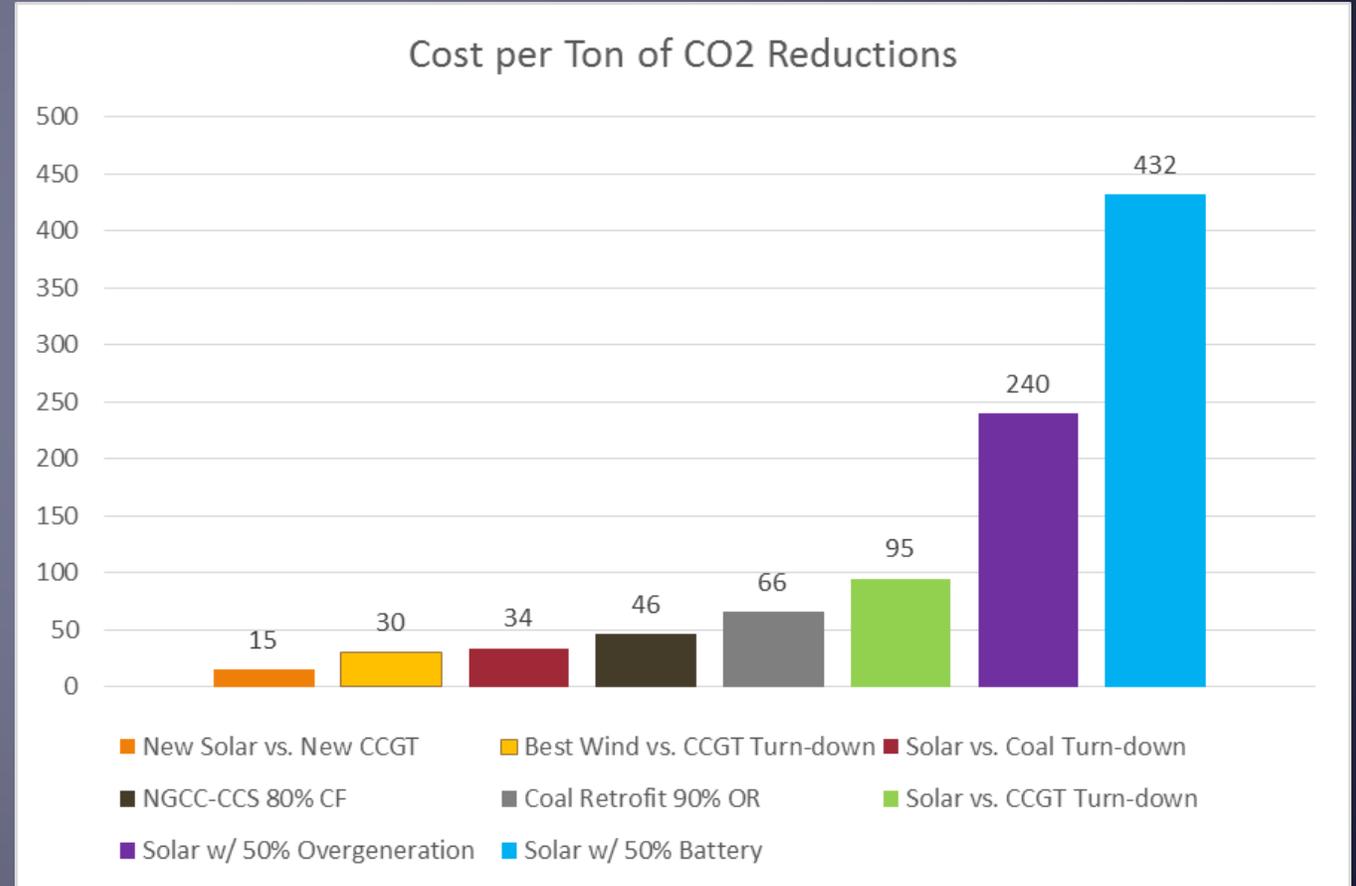


# NEED FOR A BALANCED, COST-EFFECTIVE APPROACH: ACCELERATING CCUS DEPLOYMENT IS THE OTHER PIECE OF THE PUZZLE

- › In recommending a framework of complementary federal and state incentives to help carbon capture projects achieve financial feasibility, the Work Group maintains that **CCUS merits federal and state policy support to accelerate its commercial deployment, as has been done successfully for other energy technologies.**
- › As public policy and market conditions drive industry to look for ways to reduce emissions, **CCUS deserves equivalent support as a critical component of a broader, cost-effective portfolio of carbon mitigation options.**

# NEED FOR A BALANCED, COST-EFFECTIVE APPROACH: ACCELERATING CCUS DEPLOYMENT IS THE OTHER PIECE OF THE PUZZLE

- › On the basis of cost per ton of CO<sub>2</sub> emissions avoided, carbon capture at power plants with EOR already compares cost-effectively with other options, especially at higher levels of emission reductions. The retrofit of an existing coal plant for carbon capture and EOR lands in the middle of the cost curve for a number of low- and zero-carbon power generation options.



# Conclusion – Next Steps

- › CO<sub>2</sub>-EOR offers extraordinary benefits for our nation
- › State officials from across the nation support capture CO<sub>2</sub> from power plants and industrial facilities for use in EOR.
- › State officials have also endorsed the need for federal action to provide incentives to spur CCUS deployment
- › Complementary federal and state incentives will narrow the gap between the cost of carbon capture and revenue received from the sale of CO<sub>2</sub> for EOR and increase additional commercial deployment.



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# Thank You

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