

# CUSP

## The Carbon Utilization and Storage Partnership of the Western US

DE-FE0031837

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U.S. Department of Energy

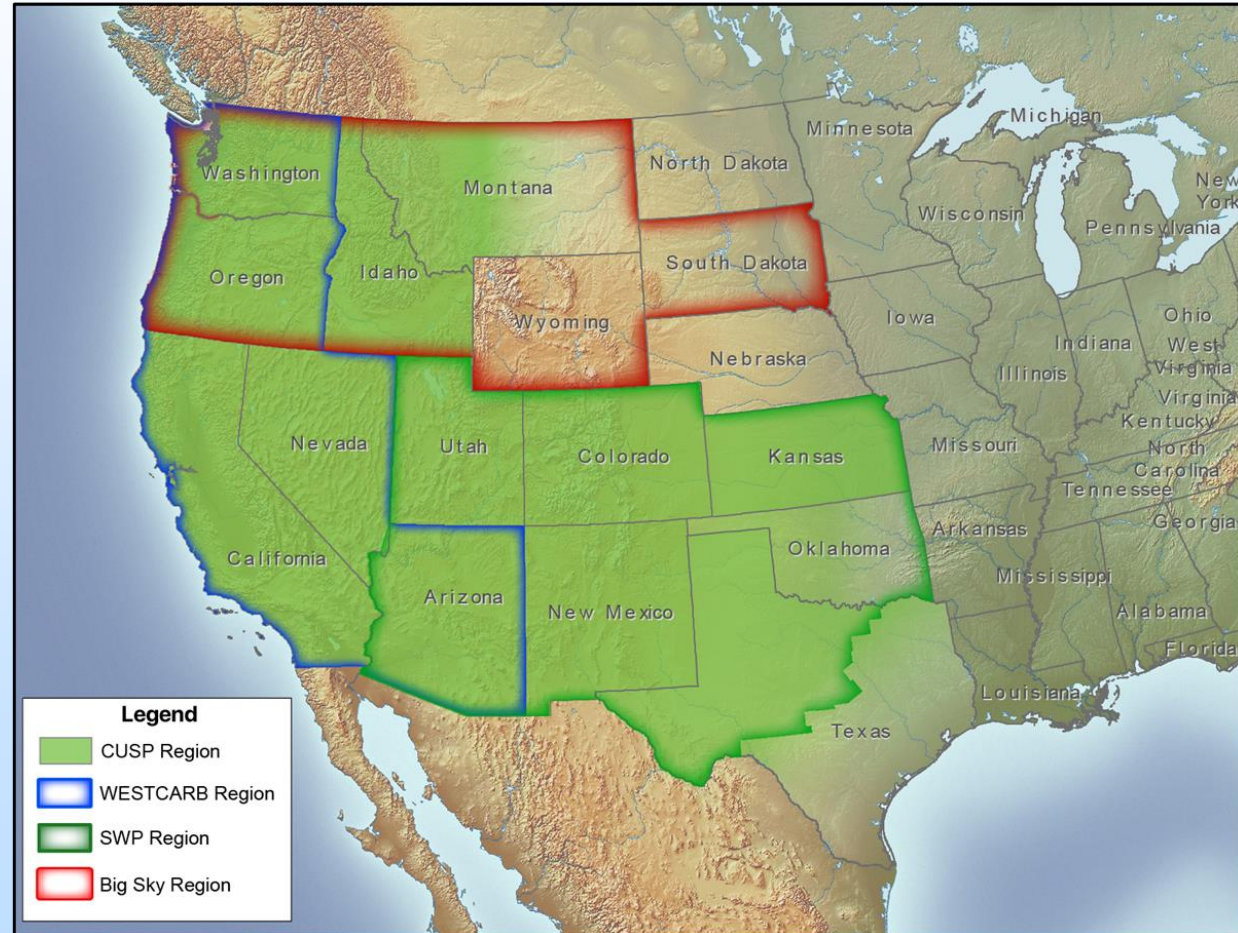
National Energy Technology Laboratory

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

August-17-19 2020

# Who is the CUSP?

- Parts of three of the original RCSPs: SWP, WESTCARB, and Big Sky
- States represented - through a survey, a university, or a research institute: AZ, CA, CO, ID, KS, NM, NV, MT, OK, OR, TX, UT, WA
- National Laboratories - Los Alamos, Pacific Northwest, and Sandia
- Additional collaboration with Indiana University for technical support (SIMCCS)
- Industry engagement: Schlumberger, Bright Energy, EDP, Lucid, and Enchant NM. Other states will be bringing in more interested parties



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# Program Overview

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- Funding (\$10,million DOE and ~\$2,000,000 Cusp cash and in-kind cost-share)
- Performance Dates: November 2019-October 2024
- The CUSP is following all programmatic goals of the Regional Initiative Program and has evolved its goals in response to the additional funding added in FY20

# CUSP Original Scope

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- Focus is on collecting, synthesizing, and using existing data sets.
- Data will be incorporated into analytical and optimization models to evaluate CCUS potential and readiness. Goals include:
  - Identifying best prospects for commercial CCUS
  - Quantifying potential economic impacts
  - Developing Readiness Indices (w/ SimCCS) to identify best areas for short-term, mid-term, and long-term CCUS projects
- State organizations will assess, update, augment, and verify data used in data analysis and modeling
  - geological storage complexes (saline, stacked storage, ROZs)
  - CO<sub>2</sub> emission sources
  - existing infrastructure
- Strong emphasis on technology transfer

# CUSP Expanded Scope

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- Working on a modification to the budget to reflect an additional \$5 million DOE funds
- While maintaining original scope and duration (3 years) we will be adding additional funds to each organization to cover tech transfer and education in the subsequent 2 years
- A portion of the new funds are set aside to support the Smart Initiative
- Additional funds will be set aside to jumpstart 45Q ready projects in the Western US
  - Early low hanging fruit is Lucid acid-gas and zero emissions strategy
  - Mid term plan to support some additional studies and work on the NW basalts
  - Other projects as they occur. Already evaluating projects in Kansas, Oklahoma, and Montana

# Regional Storage is Diverse

Basalts



Saline Aquifers

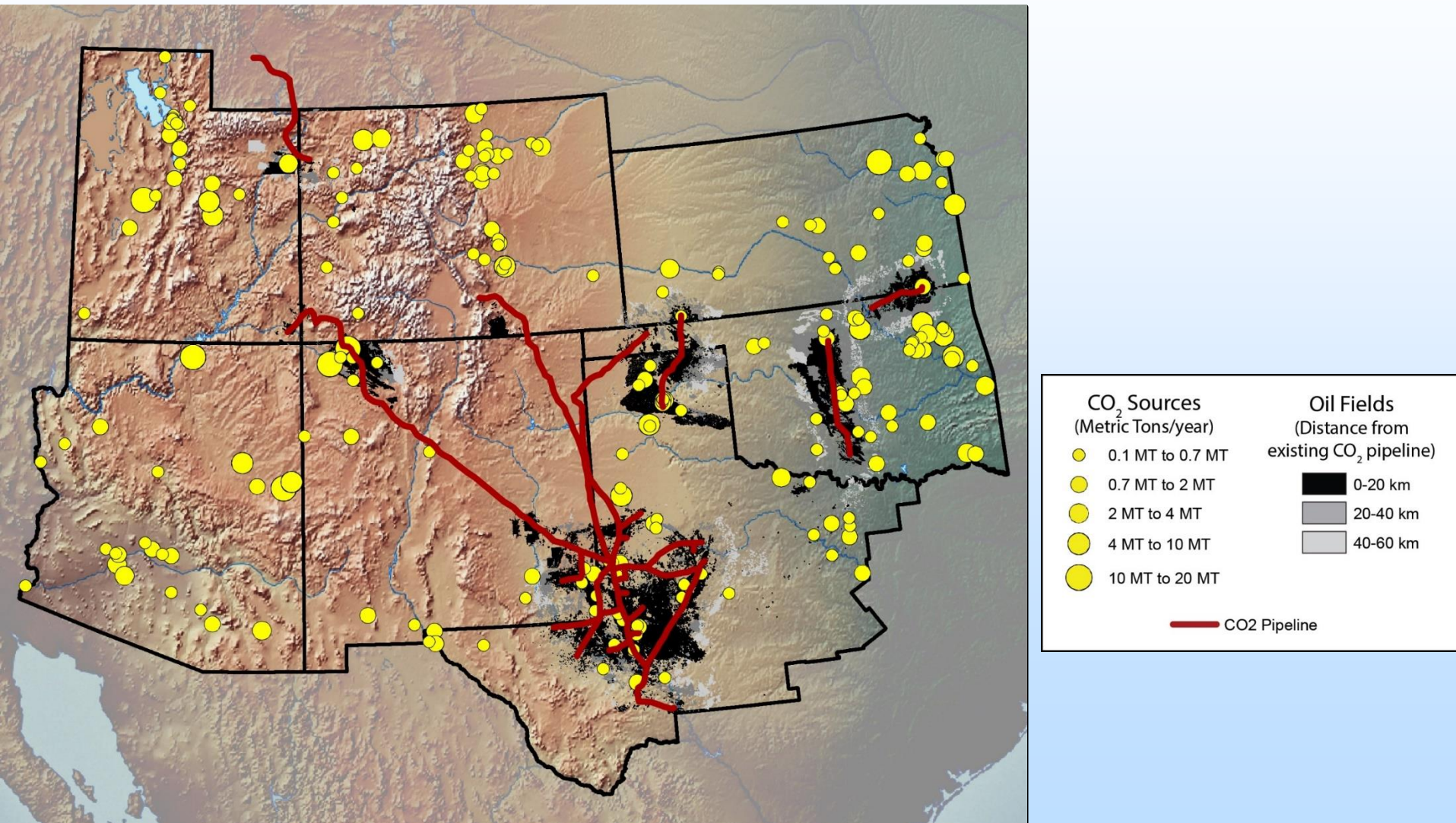
Oil and Gas basins



\* NatCarb Atlas V



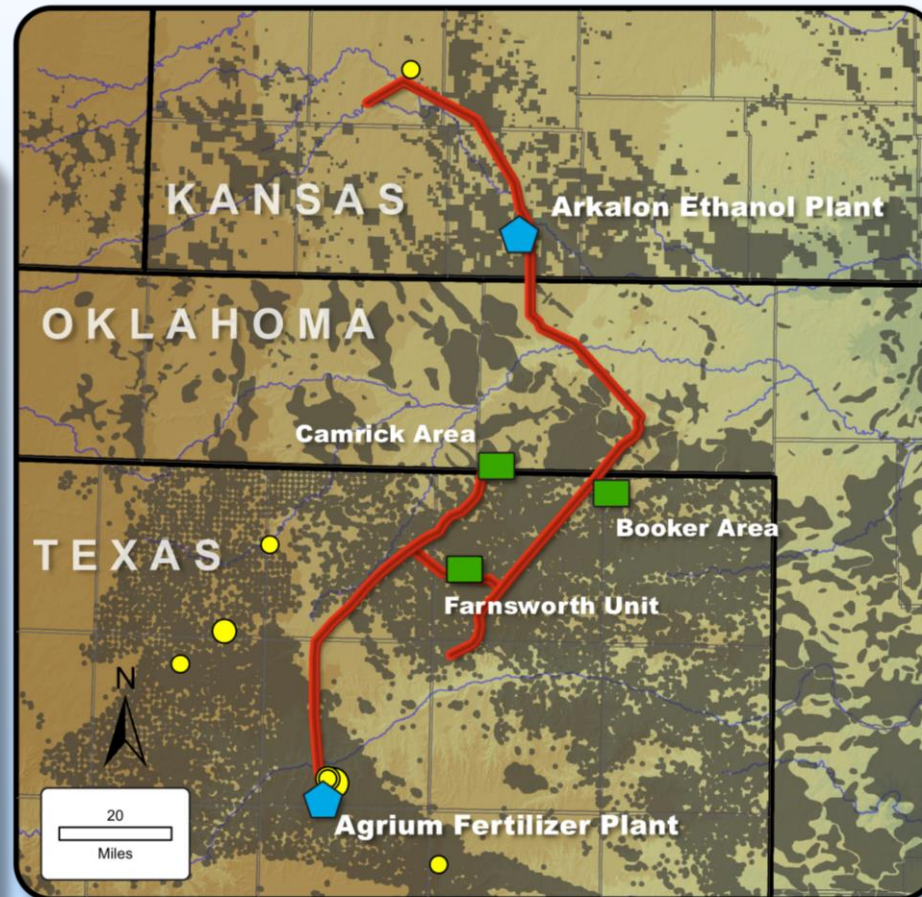
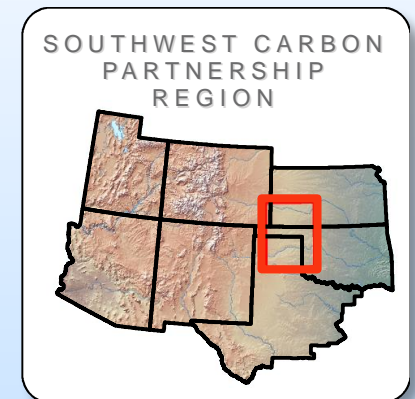
# Proven EOR Potential and Extensive Infrastructure





# The SWP and Farnsworth Unit

Anthropogenic Supply:  
500-600,000  
Metric tons  
CO<sub>2</sub>/year supply



# Progress and Current Status of Project

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- a. The project team has done an initial survey of the region for opportunities and issues related to those opportunities
- b. Looking at Sources, Sinks, transportation pathways both existing and potential
- c. Have identified existing regional hubs
- d. Beginning process of refining Atlas style data
- e. Working towards integrating machine learning tools to analyze results.

# In the Midst of Down-selecting Sites for 45Q Support

<b>Arizona</b>	Stacked storage in Paleozoic rocks of Colorado Plateau with possible EOR (northeastern AZ) Deep saline storage in several basins (south central AZ)
<b>California</b>	Numerous potential opportunities for EOR/stacked storage in Central Valley - possible using CO2 captured from steam generation EOR Seismicity and public perception remain challenging
<b>Colorado</b>	No specific targets yet identified but numerous opportunities on both western and eastern parts of state Already a significant supplier of natural CO2 so McElmo Dome could potentially take in TCF of CO2 if pipeline were reversed
<b>Kansas</b>	EOR using CO2 from ethanol plants in southwestern KS Several potential reservoirs (EOR and deep saline) in the area around midstream facilities in central KS
<b>Montana</b>	Significant point source at Colstrip power plant with good proximity to numerous oilfields Oxy-fuel Combustion-CCUS near Cutbank (northern MT)
<b>Nevada</b>	Low potential for EOR, some potential for deep saline storage primarily northwestern NV Alternative CO2 storage potential in deep evaporite deposits in southern NV
<b>New Mexico</b>	Stacked storage in Mesozoic rocks of San Juan Basin – Midstream operations already storing CO2 in the Permian Abundant opportunities for EOR and associated stacked saline aquifers in Permian Basin
<b>Oklahoma</b>	Conventional CO2 EOR storage in Paleozoic age rocks in oil fields of western OK Sequestration potential in unconventional shale gas systems in central OK (Woodford, Anadarko Basin central OK)



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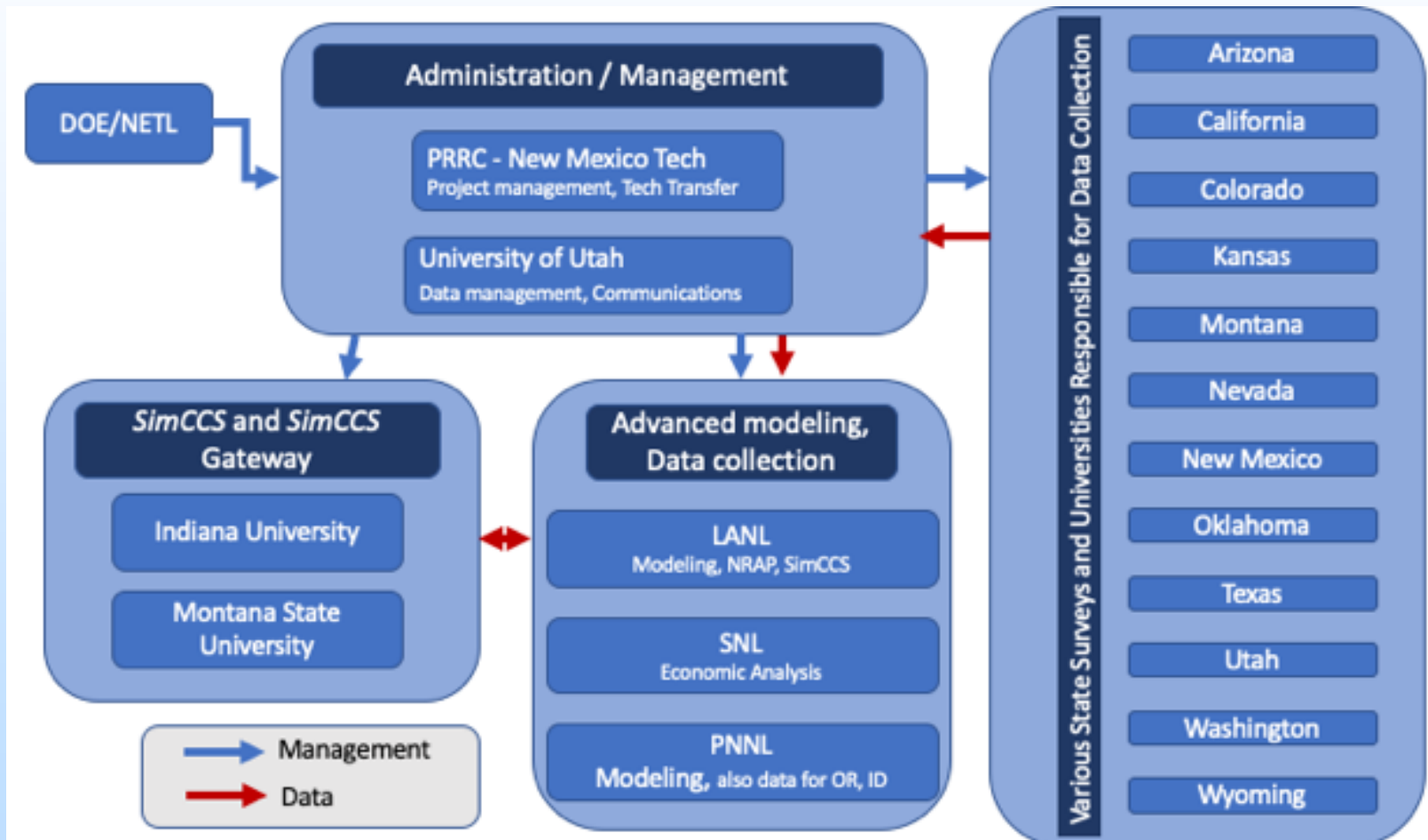
<b>Texas</b>	Too many opportunities to count for conventional EOR in Permian Basin ROZs in San Andres and other formations has excellent potential for CCUS
<b>Utah</b>	CO2 EOR potential in Paradox and Uinta basins of eastern UT Possible saline storage in Uinta basin
<b>Washington</b>	Columbia River basalts in eastern part of state for geological storage Eocene sandstones and coals in western WA (Bellingham basin, Kummer anticline, Chehalis basin)
<b>Wyoming</b>	Focused on source ID and economic analysis region-wide
<b>Indiana</b>	Working on SimCCS part of project
<b>PNNL</b>	Identification of deep saline reservoirs unique to the Pacific Northwest (basalts) Application the NRAP tools to reservoirs selected by various states
<b>SNL</b>	SNL will assist with New Mexico microeconomic and state-scale economic impact analysis as a proof of concept and template for other regions
<b>LANL</b>	Assists with development and application of NRAP tools Leads the SimCCS effort at improving tools, adding data, and technology transfer

# Appendix

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- These slides will not be discussed during the presentation, **but are mandatory.**

# Organization Chart





# Gantt Chart

- Note: this Gantt chart covers years 1-3 which was the original planned performance period

