

# The Importance of Industrial to Establishing CO<sub>2</sub> Pipeline and Storage Site Networks

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Carbon Sequestration Leadership Forum

Workshop Session  
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John Thompson  
Director, Fossil Transition Project

# CATF's CCS Mission

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The Fossil Transition Project's goal is to establish a "critical mass" of CCS projects globally by 2035.

We believe this critical mass creates a new and powerful policy option for deep, mid-century CO<sub>2</sub> cuts that can prevent the worst aspects of climate change.

Focus on China and United States:

- Policy
- Analysis
- Workshops
- Business-to-Business Partnerships

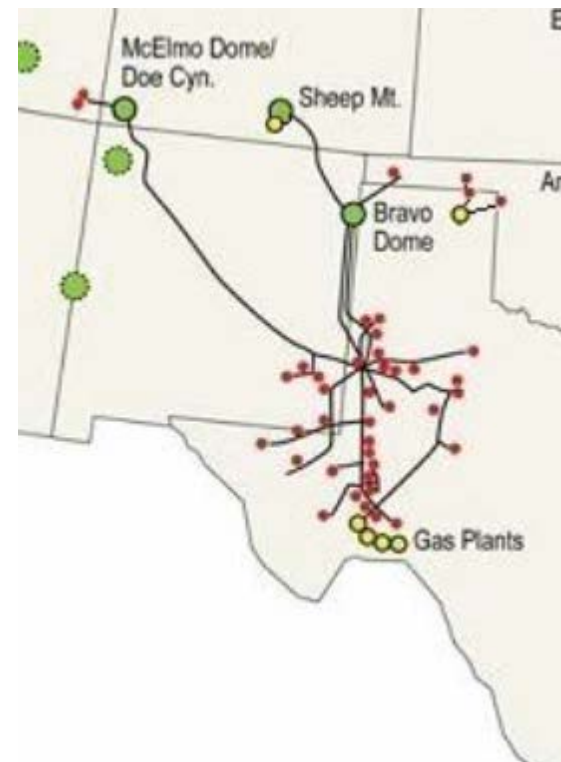
# Outline

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- Describe what CATF means by the term “hub.”
- Describe the importance the importance of hubs and how industrial CO<sub>2</sub> is key to their development.
- Suggestions/Requests to CSLF to drive hub advancement.

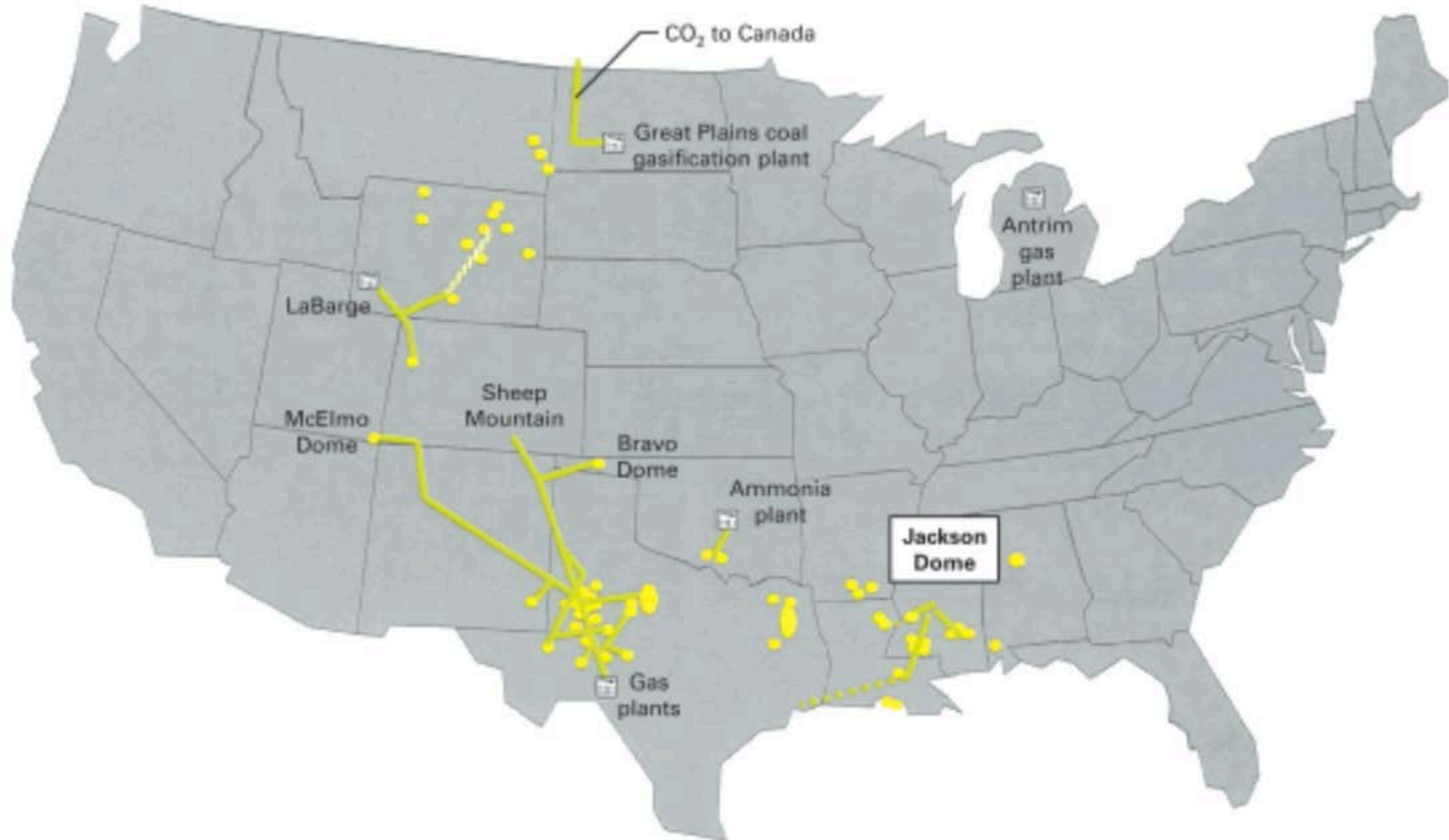
# How Can CCS Grow Large Enough to Address Climate Change?

- Premise: Growth of “hubs” today enables deep CO<sub>2</sub> reductions tomorrow.
- “Hubs” are interconnected CO<sub>2</sub> sources and sinks
  - CO<sub>2</sub> Source (power plant, fertilizer plant, refinery, coal to chemical plants)
  - CO<sub>2</sub> Pipelines
  - Enhanced Oil Recovery
- High-purity (low-cost) industrial CO<sub>2</sub> is key to building hubs.

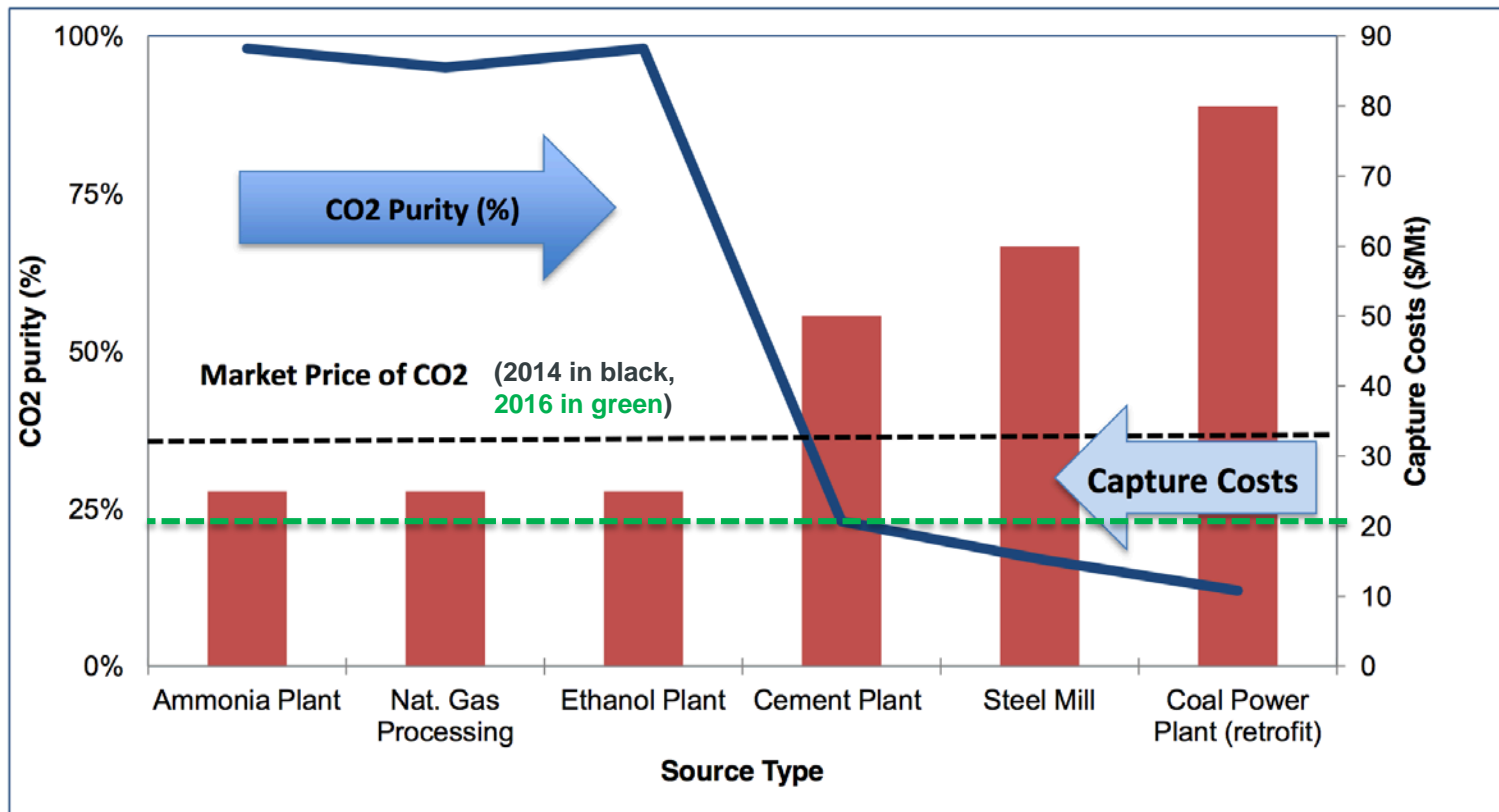


Example: Permian Basin West Texas Hub

# US CCS Hubs



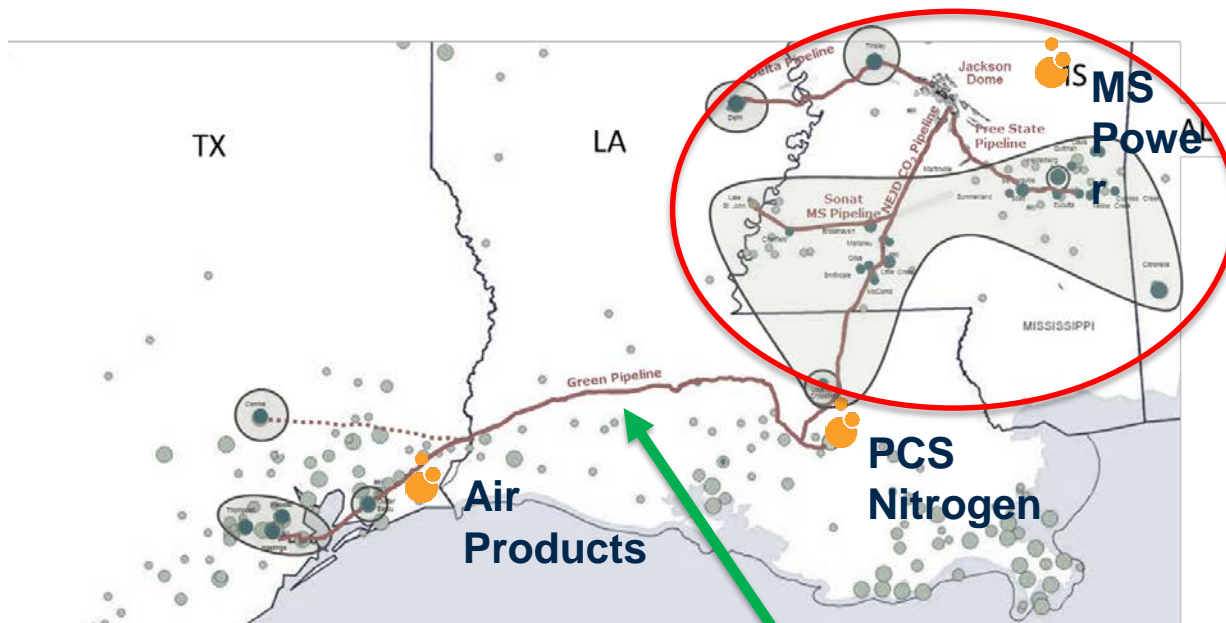
# Build Hubs with Industrial CO<sub>2</sub>



Slide Credit: Clinton Foundation

# How Hubs Enable Deep CO<sub>2</sub> Reductions

- Low-cost CO<sub>2</sub> lowers the first EOR project's risks.

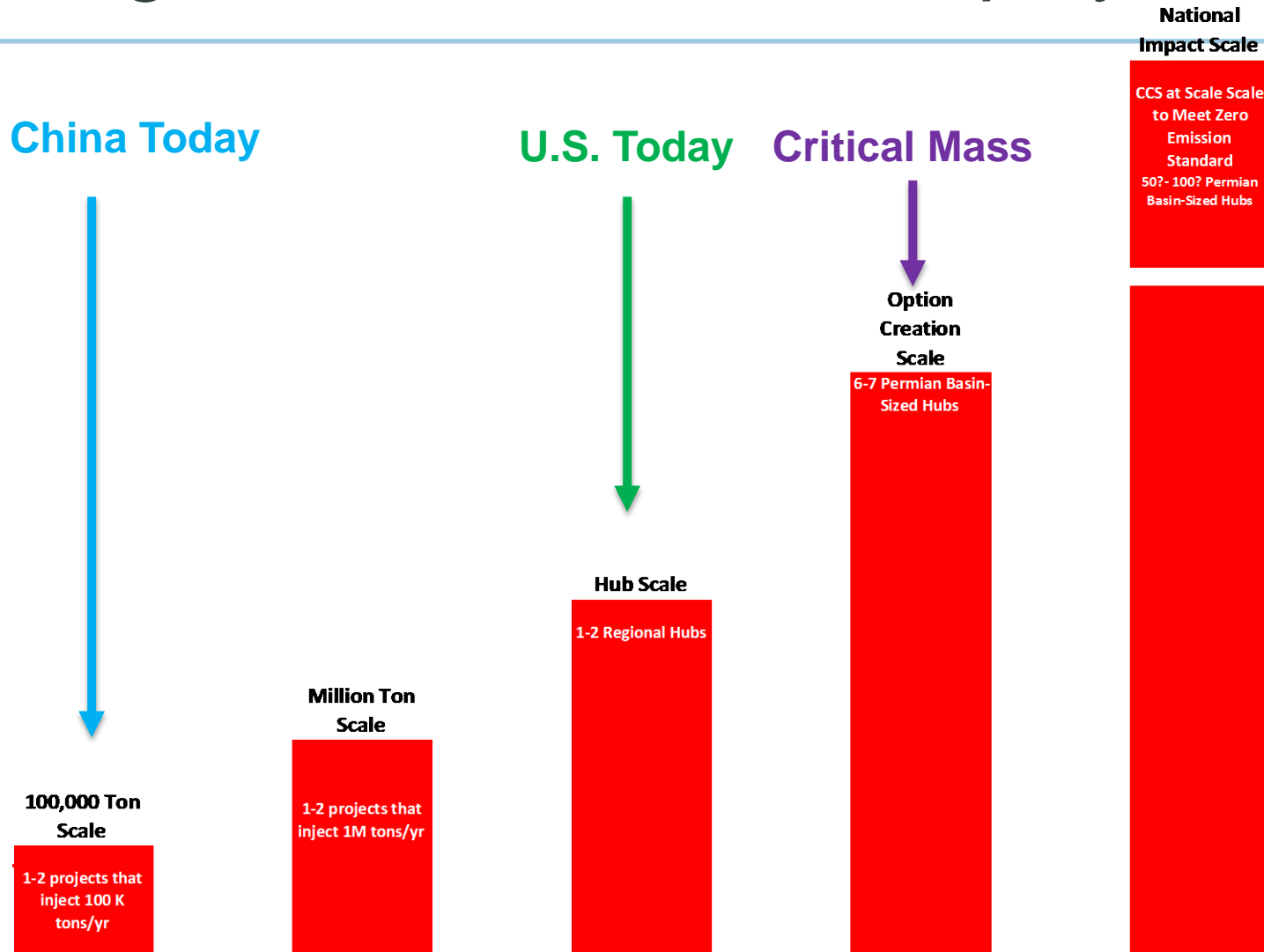


- Hubs de-risk high-cost CO<sub>2</sub> capture projects because CO<sub>2</sub> storage site is certain.

Green Pipeline

- As hubs expand and capture occurs on more types of plants, government can require CCS to meet mid-century, deep carbon reduction goals.

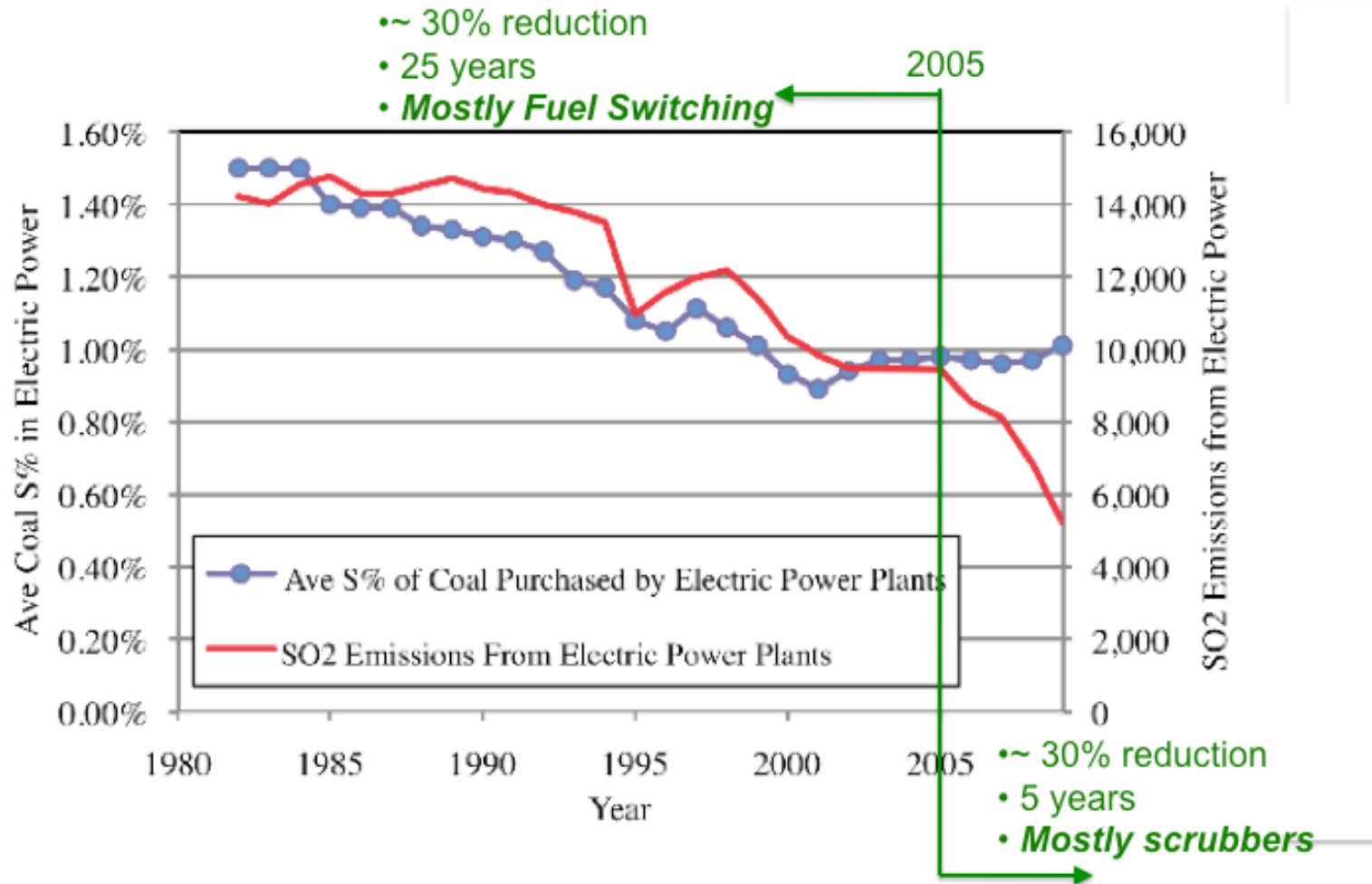
# Stages of CCS- CCUS Deployment



These bars are not to scale. This is illustrative of the concept



# CO<sub>2</sub> Analogous to US Power SO<sub>2</sub> Emissions



Source: Adapted from "Anthropogenic Sulfur Dioxide Emissions: 1850-2005 Supplementary Material" S.J. Smith et. al

# Suggestions/Requests

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- In the “refreshed” Technology Road Map report, please consider adding hubs to your revision.
- As the new web site is launched, please consider how a description of hubs might be incorporated to describe their role in advancing CCS.
- Consider options to promote “Counter-Facing Hubs.”

# Counter-Facing Hubs

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- Idea is an outgrowth of “Counter-Facing Projects” approach that has guided U.S. DOE’s CCS relationship with China over a number of years.
  - Pairing CCS projects and/or companies on both sides of the Pacific to advance CCS projects in both countries.
  
- “Counter-Facing Hubs” extends this concept to the pipeline, storage site and CO<sub>2</sub> sources.

# Barriers

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- Establishing Hubs is hard.
  - Importance not widely recognized outside expert circles.
  - Need special policies (more on that Friday)
  
- Establishing “Counter-Facing Hubs” has unique challenges.
  - Who do you contact?
  - How best to share information?

# CATF's Hub Work

## China

- Establish 3 hubs- Xinjiang, Ordos, Guangdong
- Expand efforts to potential other hubs.
- Create Provincial demand for enabling CCUS policy from Central government

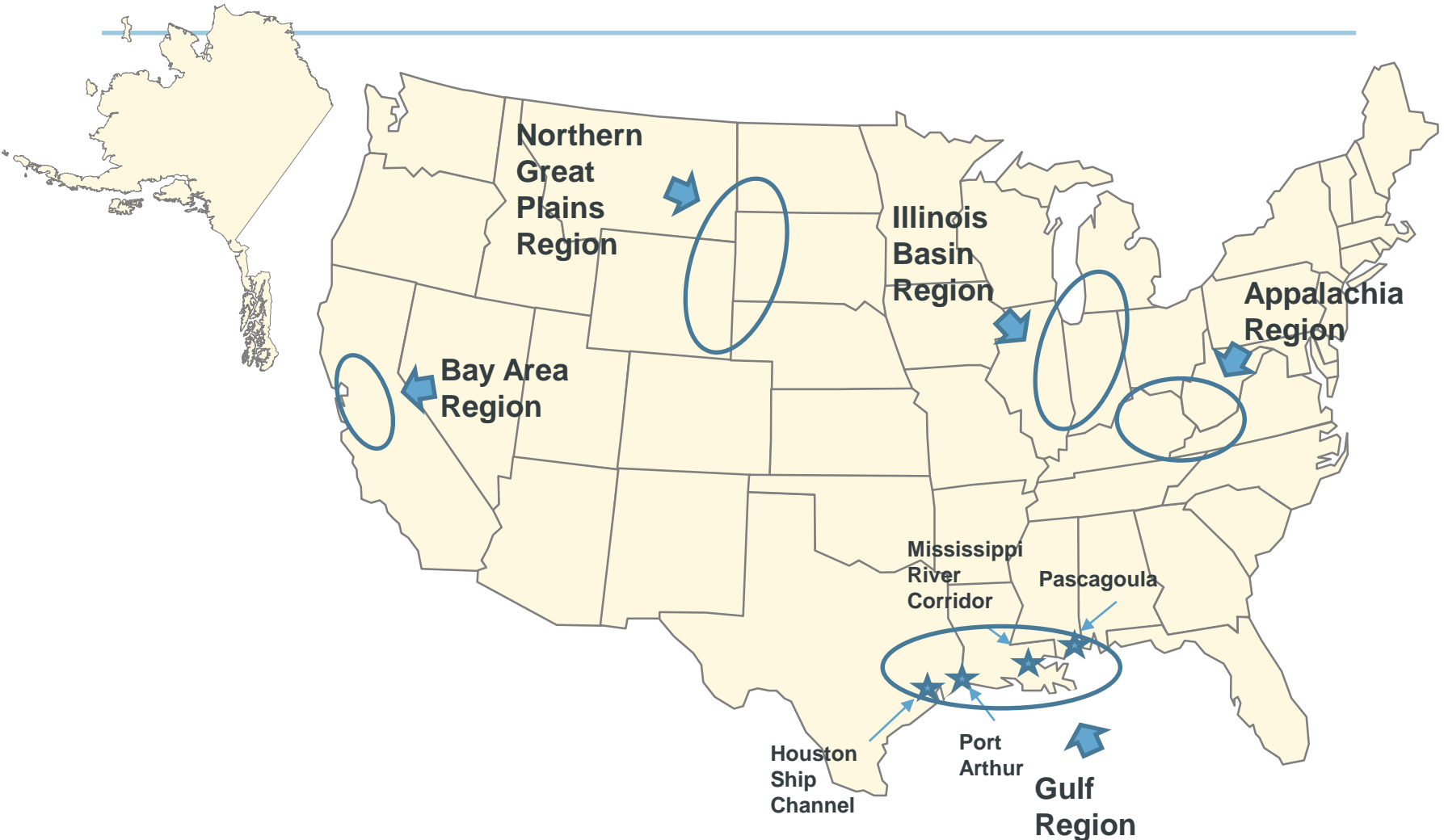


## US

- Achieve “Option Scale” by expanding/adding 3-4 hubs
- - Federal Policy (CPP, Incentives)
  - State Engagement (TX, CA, ND, Midwest) based on EOR and Climate Policies



# Regional Engagement Areas and Points of Focus FY16 & FY17



# Options for Counter-Facing Hubs

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- Match one hub in one region with a hub in a different region or country.
- Gather several hubs together to discuss common barriers and solutions.