



# Carbon Capture and Storage in New Mexico

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# Why CCS/DAC?: Challenges for Decarbonization

**Four major categories provide significant challenges to reaching climate goals on a global scale:**

1. Energy Demand vs. Supply
2. Critical Building Materials
3. Strategic Minerals
4. Geopolitics

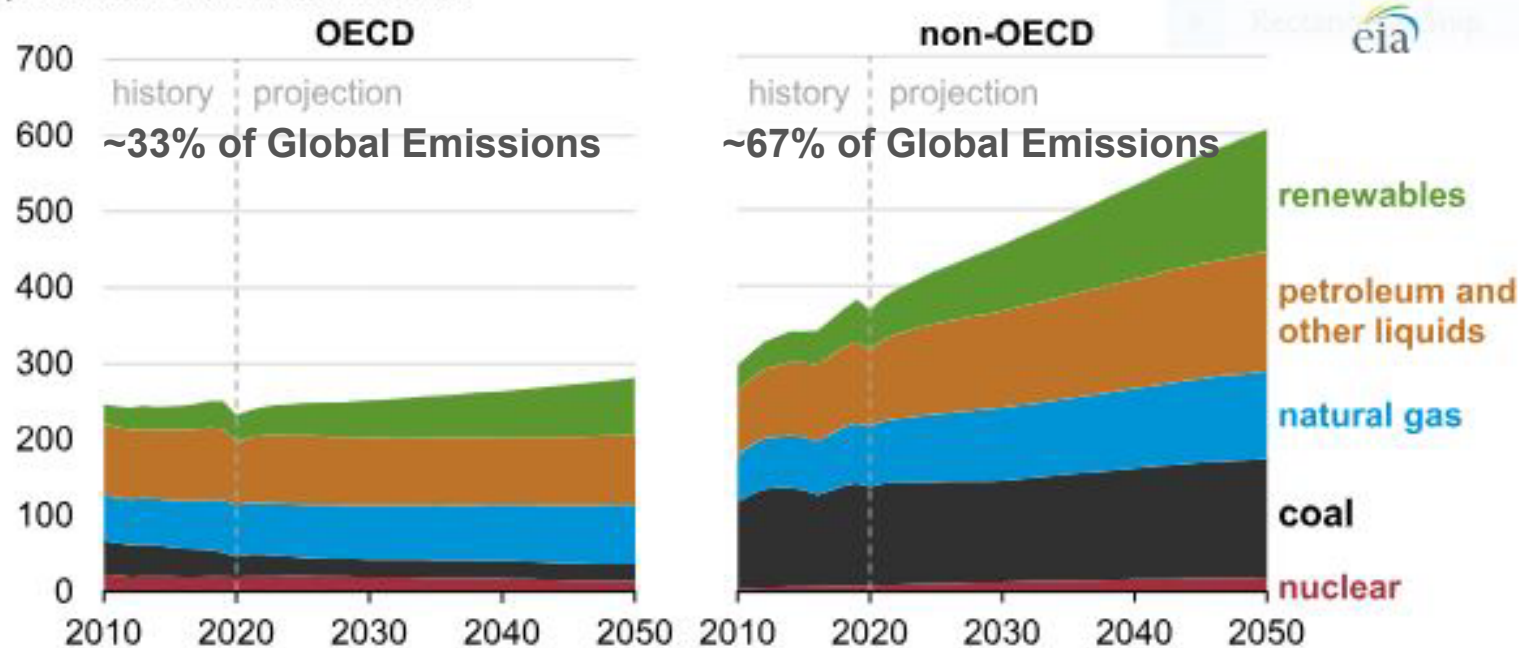
**And two other categories requiring DAC also needs to be addressed**

5. Unmitigated future emissions from the developing world
6. Legacy Emissions – more than 1 trillion tonnes since 1750

# 4. Geopolitics Plays a Large Role...

# 5. Unmitigated Future Emissions

Primary energy consumption by source, OECD and non-OECD countries (2010–2050)  
quadrillion British thermal units



Source: U.S. Energy Information Administration, *International Energy Outlook 2021*

**OECD Countries:**  
Primarily Europe, North America, Far East Asia are expected to slightly reduce Hydrocarbon use by 2050, and have modest growth in demand covered by renewables

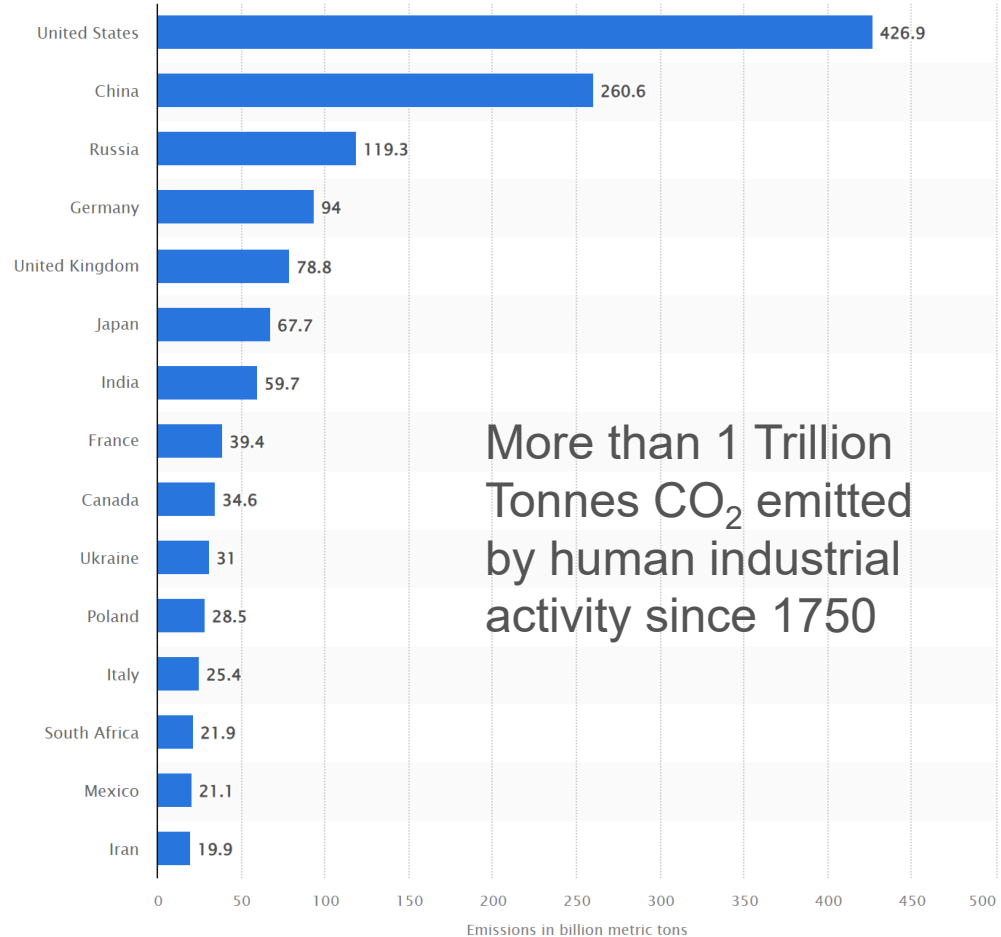
**Non-OECD Countries:**  
See rapid growth in every energy category, leading to a net increase in hydrocarbon use worldwide in 2050

# 6. Legacy Emissions

**The problem is not just current emissions...**

While China and ultimately India will surpass US total emissions, at present OECD Countries represent over 75% of all the CO<sub>2</sub> that has been emitted by human activities since the beginning of the industrial revolution (1750 to present)

**CO<sub>2</sub> molecules resides in the atmosphere for an average of 990 years**

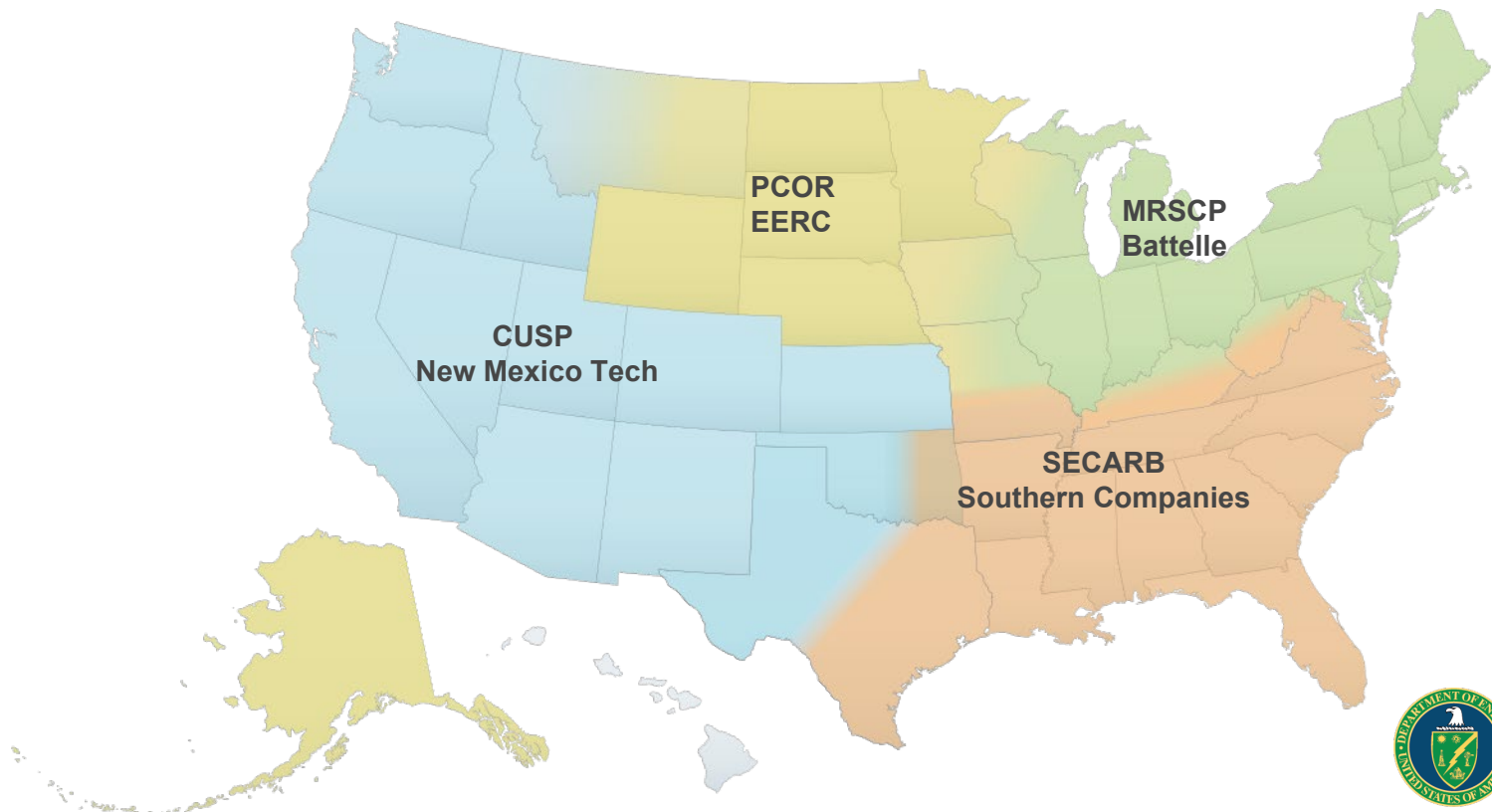


# How Do We Effectively Reduce Atmospheric Carbon?

Simply stated this is an immense challenge

- **Hydrocarbon Energy:** Is pervasive and impacts every aspect of modern life
  - Coal-fired power (~30% of world CO<sub>2</sub> emissions)
  - Natural gas (~22%)
  - Vehicle Fuel (~9%)
- **Critical Building Materials:** Drive economic development
  - Cement (~8% world emissions)
  - Steel (~9%)
  - Glass (~2.5%)
- **Strategic Minerals are Scarce:** Relative to new demands we lack sufficient supplies to meet demand for renewables, renewable power storage, and 0 emissions vehicles
- **In the next two decades we need to mitigate (store) emissions while new technologies catch up both technology and infrastructure**
- **CCS/CCUS needed at scale of 6-8 Gt/year... Starting last year**
- **Also need to manage legacy CO<sub>2</sub> that has already been emitted (Direct Air Capture)**

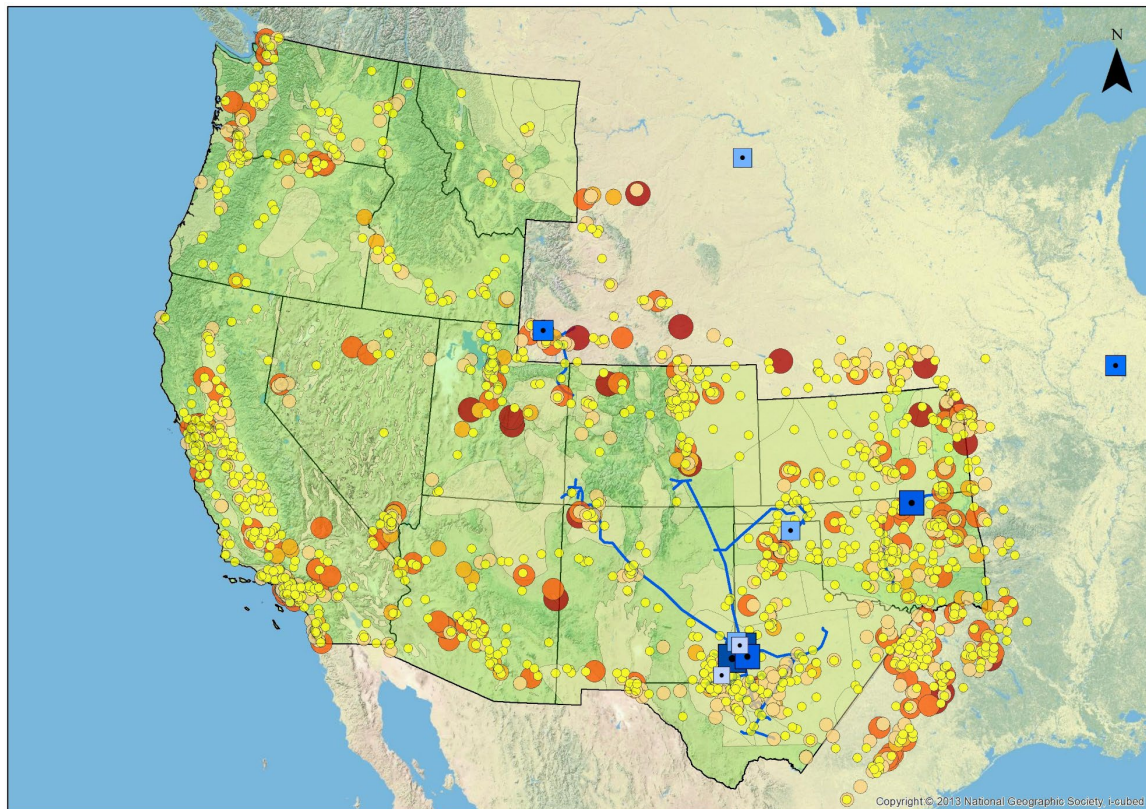
# Department of Energy Regional Initiatives to Accelerate CCUS Deployment (2019)





# CUSP – Sources, Sinks and Transport

## CO<sub>2</sub> emitted and sequestered (EPA GHGRP)



### Legend

#### CO<sub>2</sub> Sequestration GHGRP

EPA GHGRP Total CO<sub>2</sub> sequestered (MMTCO<sub>2</sub>)

- 0.0 - 0.025
- 0.025 - 0.1
- 0.1 - 0.5
- 0.5 - 1.0
- 1.0 - 3.0

#### EPA GHGRP 2022

Total reported direct emissions (MMTCO<sub>2</sub>e)

- 0 - 0.1
- 0.1 - 0.5
- 0.5 - 1
- 1 - 5
- 5 - 14

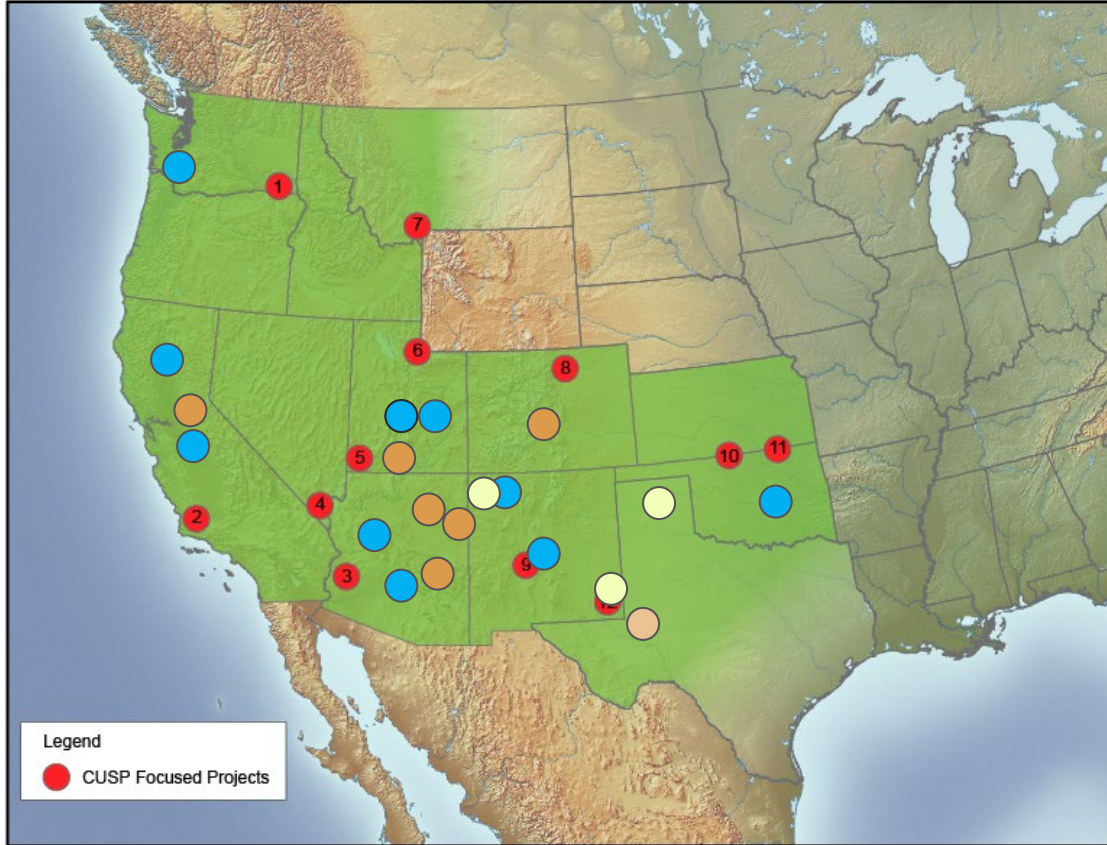
CO<sub>2</sub> Pipeline (approx.)

CUSP

Adapted from  
CCUS Map  
EPA GHGRP



# CUSP 2024 Regional Footprint



## Current footprint of CUSP related projects

- 2020 – 3 Projects CUSP funded
- 2021 – 12 Projects CUSP funded
- 2022-2023 – Associated projects Funded
- 2023 – Associated projects pending

- Includes development of five regional Storage Hubs
- **For a total of 39 CUSP related projects and 4 additional projects in contracting**

