



U.S. DEPARTMENT OF  
**ENERGY**

Fossil Energy and  
Carbon Management



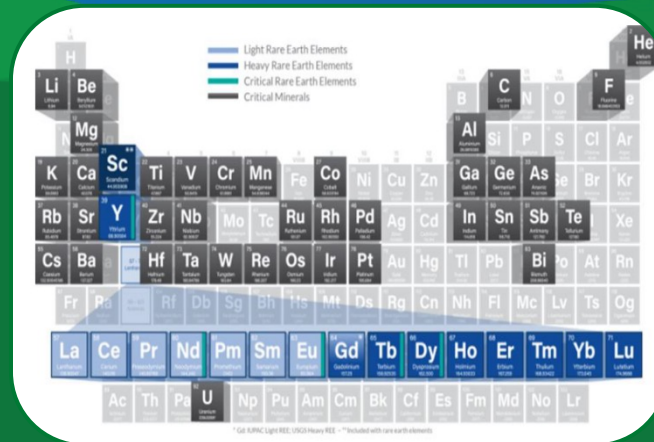
# Carbon Capture Program at DOE

*Progress toward decarbonization of Industrial and Power Sectors*

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FOSSIL ENERGY AND CARBON MANAGEMENT

June 30, 2022



# Carbon Capture Program...Mission



- Mission

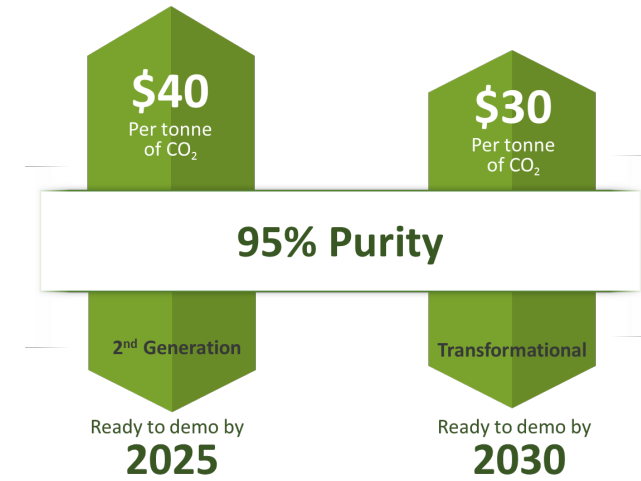
- Develop cost-effective point source capture throughout the **power-generation** and **industrial sectors**
- Ensure the U.S. will continue to have access to safe, reliable, & affordable low-carbon energy generation

- Drivers/Challenges

- Reduce carbon capture CAPEX/OPEX under a **wide range of feed conditions** and **high capture efficiencies**
- Demonstrate first-of-a-kind carbon capture coupled to dedicated carbon storage, that will lead to commercially viable nth-of-a-kind opportunities for widescale deployment

- Goal & Metrics

- Support U.S goal to achieve carbon pollution-free power sector by 2035 and zero-carbon economy by 2050



*DOE's Carbon Capture performance goals for coal-fired power plants*



National Carbon Capture Center

*Photo Source: Southern Company Services*



# Carbon Capture Program...Evolution

## 1<sup>st</sup> and 2<sup>nd</sup> Generation Technologies

2025: \$40/tonne CO<sub>2</sub>

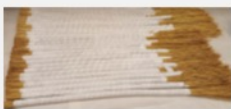


2008 -

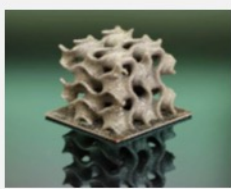
- ✓ Lower CAPEX/OPEX
- ✓ Reduced regeneration energy
- ✓ Increased working capacity

## Transformational Technologies

2030: \$30/tonne CO<sub>2</sub>



Hollow Fibers



3D Print



Biphase Solvent

2015 -

- ✓ Water Lean Solvents
- ✓ Adv. Membranes
- ✓ Hybrid Systems
- ✓ Process Intensification

## Scale-up



TCM

2018 -

- ✓ Engineering Scale testing
- ✓ FEED studies

## Negative Emissions Technologies & Industrial



Carbon Engineering, DAC



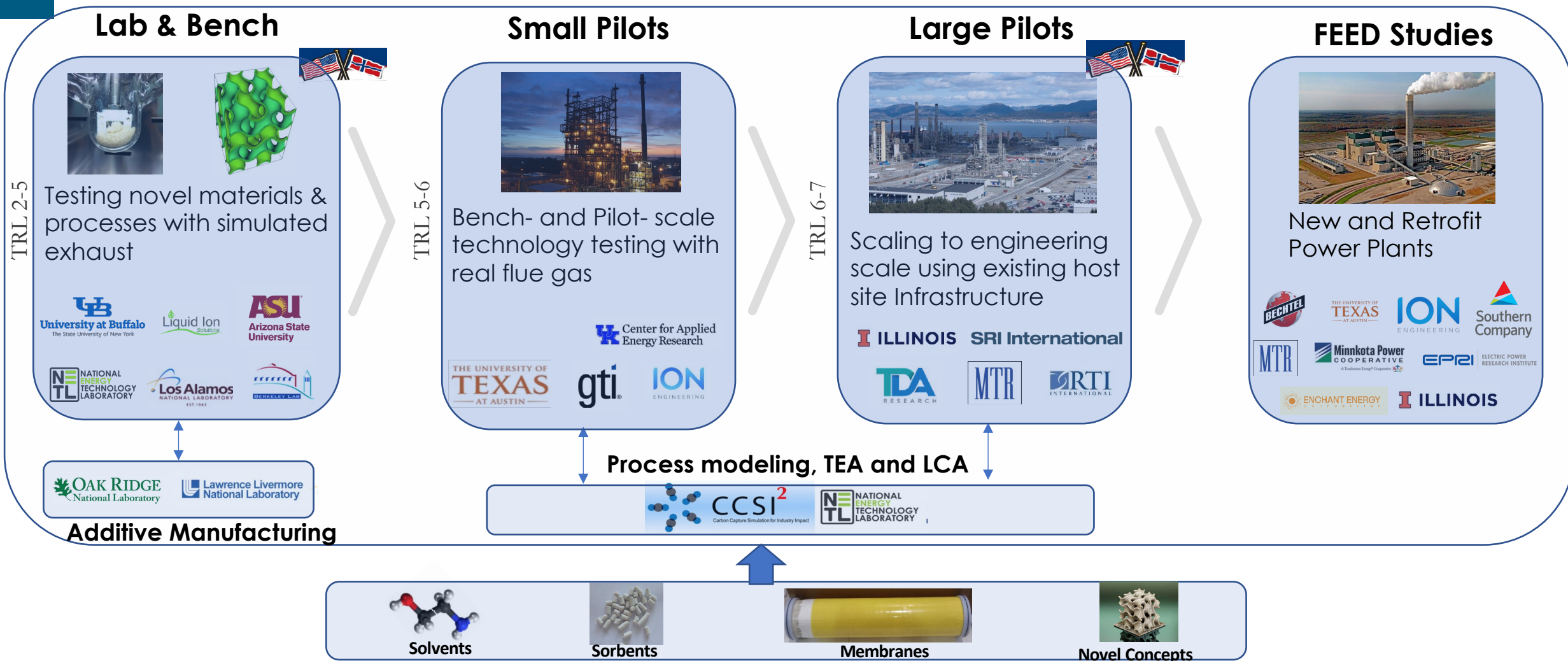
Ethanol Plant

2020 -

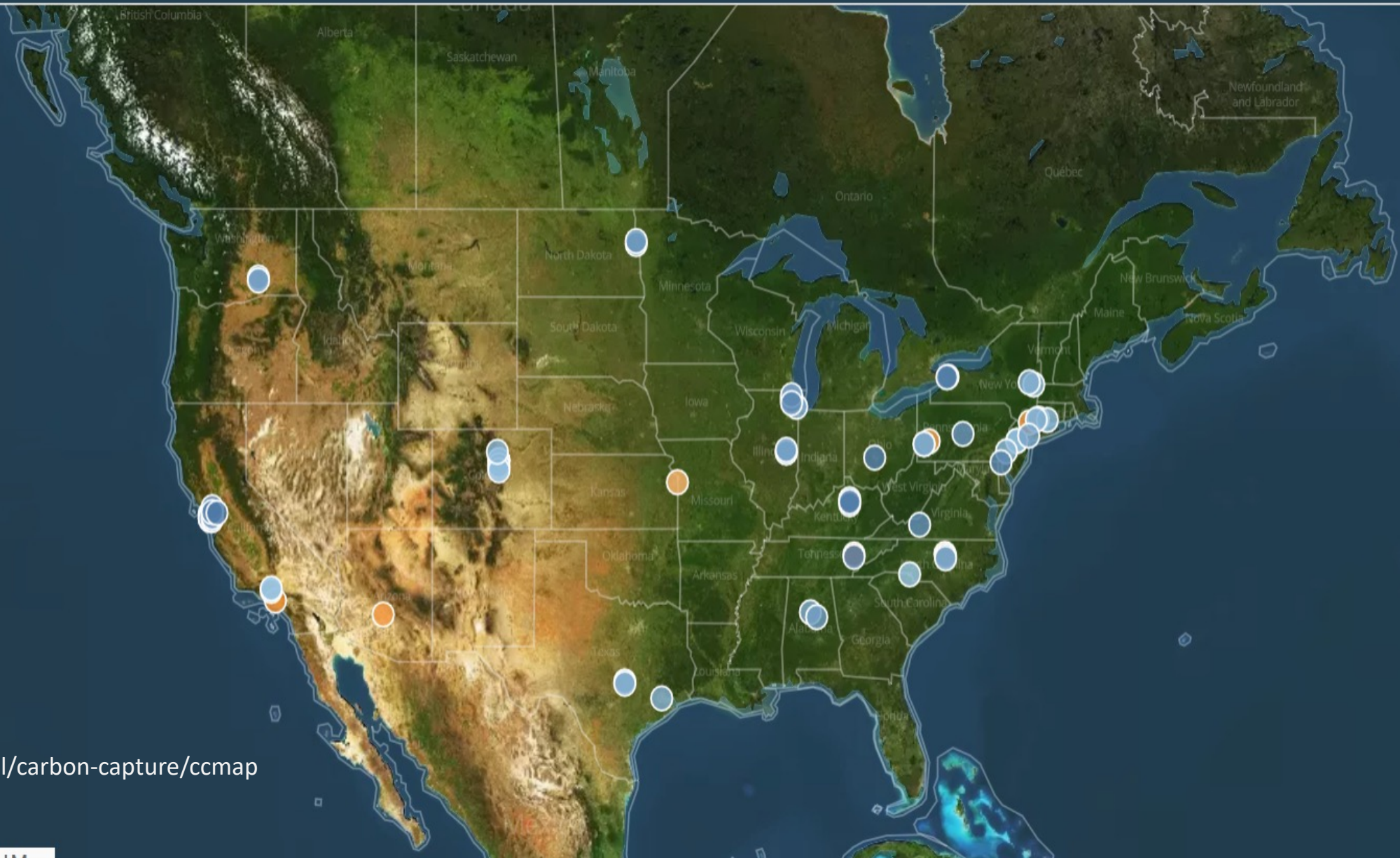
- ✓ DAC & BiCRS
- ✓ Industrial
- ✓ NG



# Point Source Carbon Capture Program



# Carbon Capture Interactive Project Map

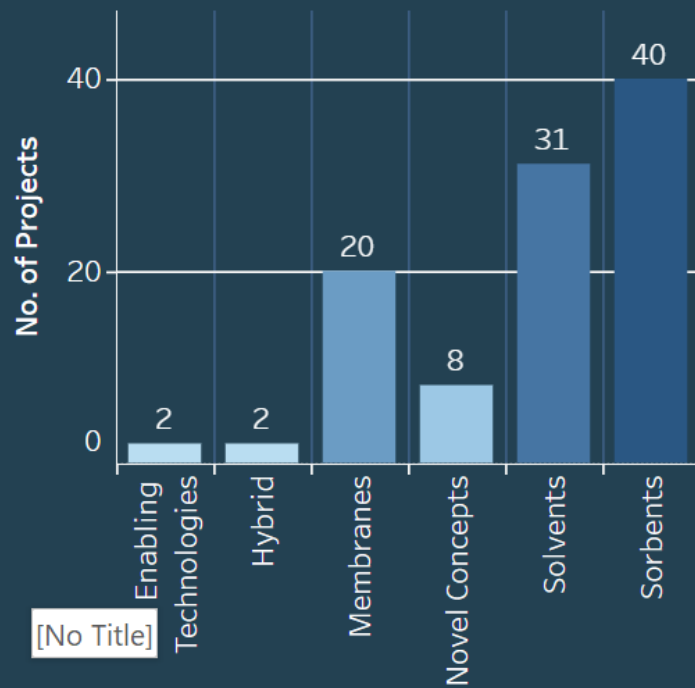


<https://netl.doe.gov/coal/carbon-capture/ccmap>

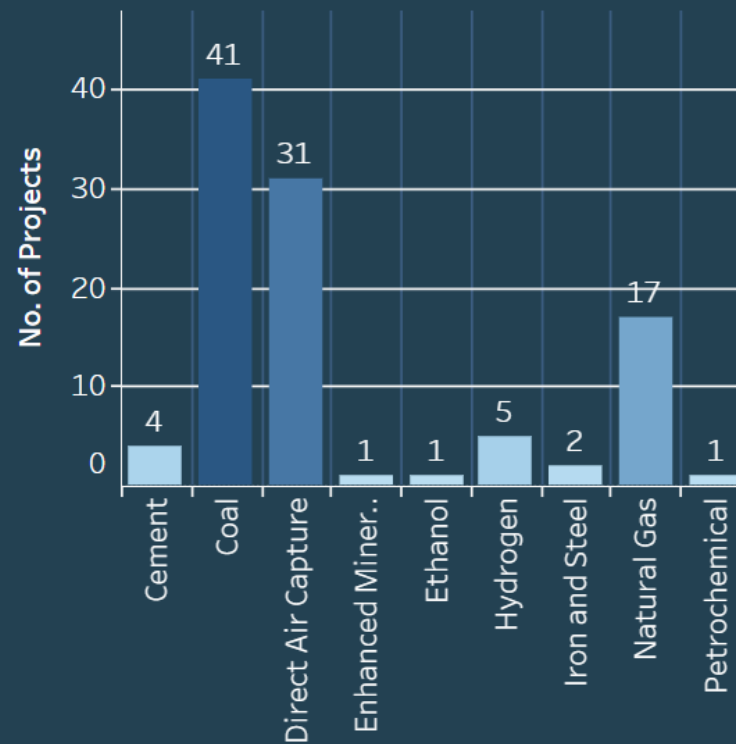
# Point Source Capture Program

## Project Distribution

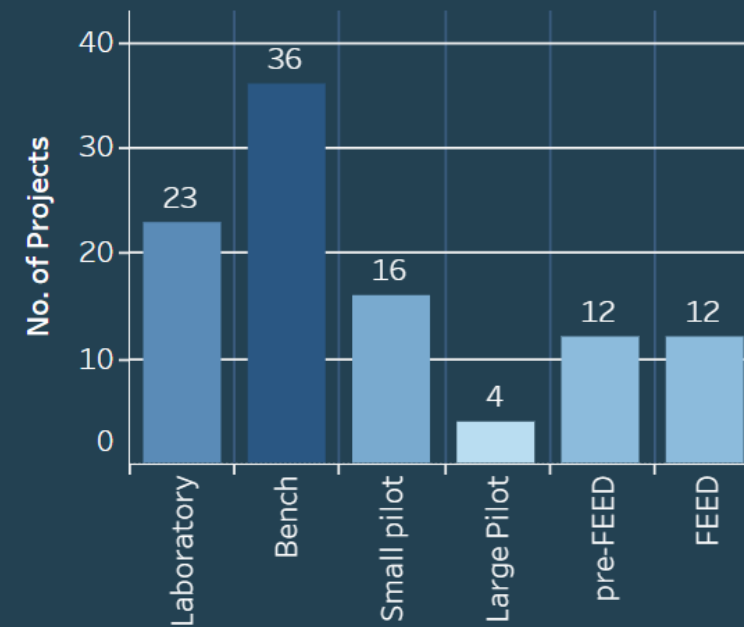
### Key Technology



### Application Type



### Ending Scale



# FOA 2515: 2<sup>nd</sup> Closing

*Carbon Capture R&D For Natural Gas and Industrial Point Sources and FEED Studies for Carbon Capture Systems at Industrial Facilities and Natural Gas Plants*

Area of Interest
AOI 4: Carbon Capture R&D: Laboratory-Scale Testing of Highly-Efficient Materials or Novel Concepts for Natural Gas Combined Cycle (NGCC) Power Plants
AOI 5: Engineering-Scale Testing of Transformational Post-Combustion Carbon Capture Technologies for NGCC power plants
AOI 6: Engineering-Scale Testing of Transformational Carbon Capture Technologies for Industrial Plants and Waste-to-Energy Plants
AOI 7: Front-End Engineering Design Studies for Carbon Capture Systems at Existing (Retrofit) Domestic Industrial Facilities and NGCC Power Plants

# FOA 2400: 2<sup>nd</sup> Closing

*CLEAN HYDROGEN PRODUCTION, STORAGE, TRANSPORT AND UTILIZATION  
TO ENABLE A NET ZERO CARBON ECONOMY*

## Area of Interest

**AOI-8a:** Front-End Engineering Design Studies for Carbon Capture Systems at Domestic Steam Methane Reforming (SMR) Facilities Producing H<sub>2</sub> from Natural Gas

**AOI-8b:** Front-End Engineering Design Studies for Carbon Capture Systems at Domestic Autothermal Reforming (ATR) Facilities Producing H<sub>2</sub> from Natural Gas

[FundOpp DE-FOA-0002400 Amd 000007.pdf](#)



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[fecm.energy.gov](http://fecm.energy.gov)





# Carbon Capture Program.. Outreach



Carbon Capture Newsletter



Carbon Capture Program R&D Compendium

2022 Carbon Management Project Review Meeting  
August 15-19, 2022  
Westin Pittsburgh Hotel  
1000 Penn Avenue  
Pittsburgh, PA 15222  
412-281-3700



Fossil Energy and Carbon Management

fcm.energy.gov



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# Questions?

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Legend:

- Light Rare Earth Elements
- Heavy Rare Earth Elements
- Critical Rare Earth Elements
- Critical Minerals

H																	He
Li	Be											B	C	N	O	F	Ne
Mg												Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	
Fr	Ra	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og	
La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu			
Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr			

\* Ga, In, Sn, Pb, Bi, Po, At, Rn, Fr, Ra, Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr are included with rare earth elements.

