

2025 AMERICAS FORUM ON CARBON CAPTURE & STORAGE

Canada 



GLOBAL CCS
INSTITUTE



8 APRIL 2025



WASHINGTON DC

AGENDA

9:00 - 10:00	Registration and Networking Coffee
10:00 - 10:15	Welcome
10:15 - 10:45	Jarad Daniels, CEO of Global CCS Institute
10:45 - 11:00	Jared Polis, Governor of Colorado
11:00 - 11:30	Networking Coffee
11:30 - 12:15	Data Center Decarbonization
12:15 - 1:15	Networking Lunch
1:15 - 2:00	CCS Business Models in Canada
2:00 - 3:00	State Updates
3:00 - 3:30	Networking Coffee
3:30 - 4:15	Enabling Policies and Market Mechanisms for Global Deployment of CCS
4:15 - 4:45	Justin Reimer, CEO at Emission Reduction Alberta
4:45 - 5:00	Closing Remarks
5:00 - 6:30	Networking Reception

WELCOME



Johanna Kruger

Counsellor & Head of Program, Environment & Energy at the Embassy of Canada

THE GLOBAL STATUS OF CARBON CAPTURE AND STORAGE



Jarad Daniels

CEO at the Global CCS Institute

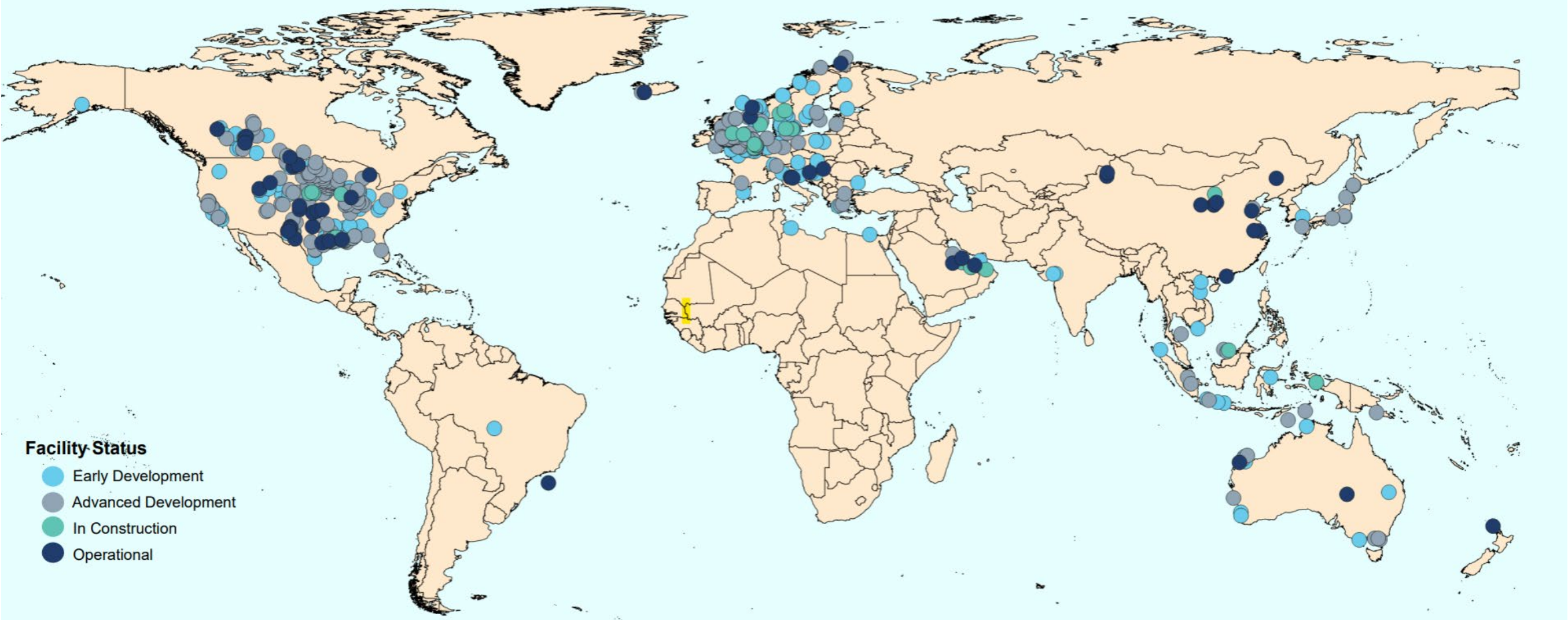
GLOBAL STATUS OF CCS

Jarad Daniels
Chief Executive Officer



GLOBAL CCS
INSTITUTE

Global Commercial CCS Facilities

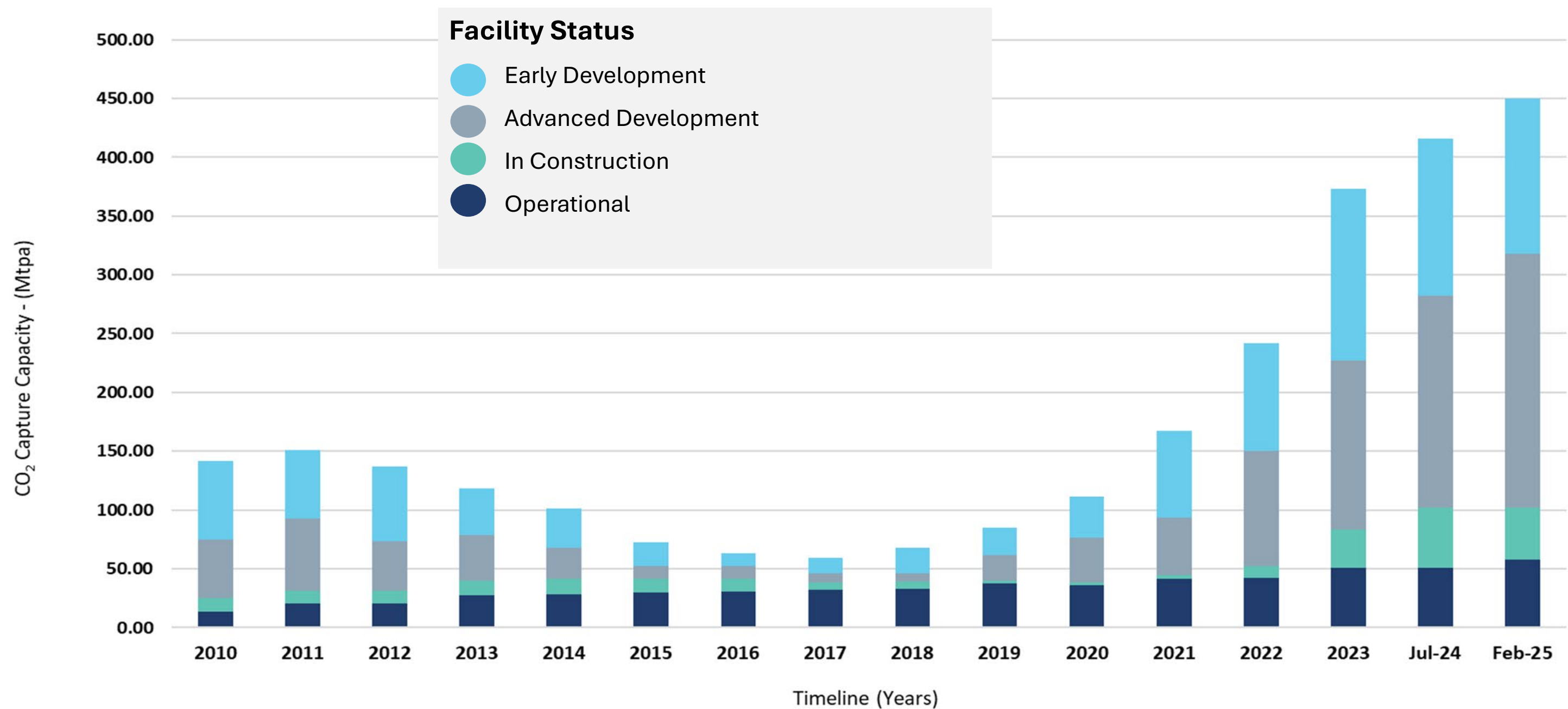


Global CCS Facility Pipeline (Feb 2025)

	Number	Capture Capacity (Mtpa)
Operational	65	57
Under construction	42	44
Total project pipeline (including under development)	715	450



Capture Facility Pipeline Continues to Grow



Only commercial projects are included; projects in the announced, canceled, or completed stages are excluded.



Source: GCCSI CO₂RE Database CCS Facilities as of February 2025.

Current CCS Outlook

- CCS is deploying in some regions, but progress is slow in others.
- Knowledge built from decades of research and lessons from operating projects can shorten the CCS deployment window in new regions.
- There are near-term opportunities for advancing CCS in Latin America, Africa, the Middle East and Asia.
- Increasing attention to carbon management under the UNFCCC, including in Nationally Determined Contributions and through the Carbon Management Challenge shows government interest and ambition to deploy CCS.
- Government policy frameworks, funding and financial incentives are still insufficient.



CCS Business Models & Financing

Project derisking remains key to CCS investment

Long-term government support is essential. This includes financial assistance, public-private partnerships, streamlined permitting and approval processes, and long-term liability assurances.

Policy-improved financing prospects partially offset by multiple factors

- Cost inflation
- High interest rates
- Permitting challenges
- Political uncertainty

Potential tailwinds for CCS

- Need for reliable baseload power
- Demand for high-quality carbon credits including removal credits – started with DACCS & evolved to include BECCS
- Increasing Multilateral Development Bank interest in CCS – could fund critical activities
- Momentum in equity investments and M&As – could be a positive for debt financing of CCS projects

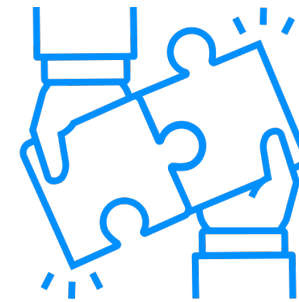


Collaborating for a Net-Zero Future



International collaboration platforms

- Clean Energy Ministerial
- Mission Innovation
- Carbon Management Challenge
- Asia CCUS Network



Public-private partnerships

- **Langskip** : Norwegian Government, Equinor, Shell, Total, and Heidelberg
- **Porthos**: Dutch Government, the Port of Rotterdam Authority, Gasunie and EBN
- **Jubail CCUS Hub**: Saudi Arabia, Saudi Aramco, SLB and Linde
- **Shepherd CCS Project**: Malaysia & South Korea, Lotte Chemical, Petronas, Samsung E&A, Samsung Heavy Industries, SK Eathon, KNOC, Hanwa Corporation, Air Liquide and Shell
- **Louisiana CDR Hub**: US DoE, Climeworks, Heirloom, Batelle, and Gulf Coast Sequestration



Government bilateral agreements

>50 bilateral agreements or MOUs between governments executed since 2020 that include CCS within their scope



Carbon Management Challenge

Global carbon management initiative aligned with the Paris Agreement and high-level ministerial at COP, building on existing global collaborations (i.e. CEM CCUS, MI CDR), with a stakeholder mechanism launching soon.

Advancing projects by 2030 to manage

1 gigaton of CO₂ annually

Workstream 1

Developing Country Project Finance

Co-Leads
Kenya
Indonesia
US

Workstream 2

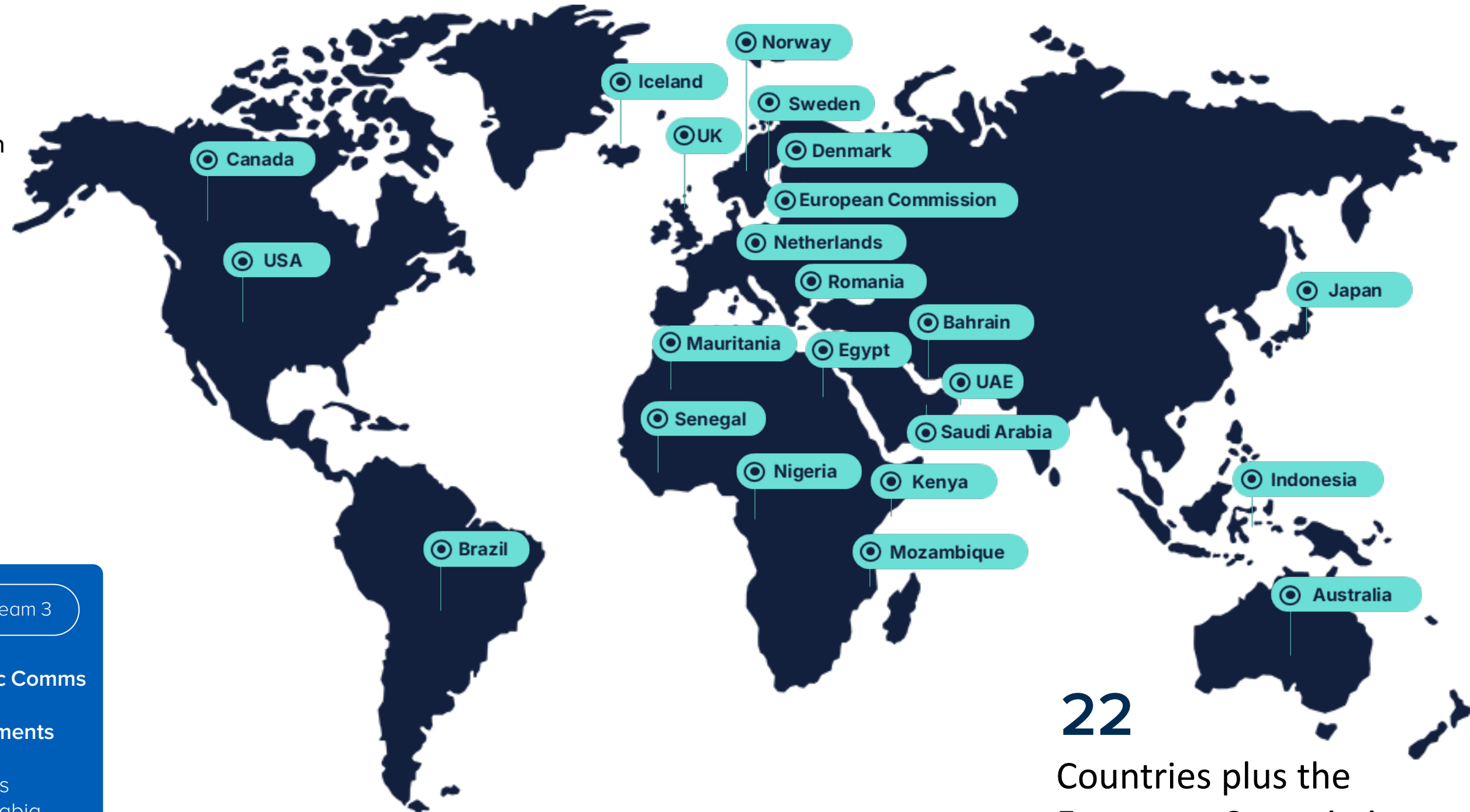
Project Deployment and Tracking

Co-Leads
Brazil

Workstream 3

Strategic Comms and Engagements

Co-Leads
Saudi Arabia
UK



22

Countries plus the European Commission



CCS Progress: the United States

US continues to lead global CCS facility count

26 Operational projects in the US

11 In construction in the US

Federal and state policy incentives are sustaining CCS investment

45Q, 45V federal tax credits are in place

Bipartisan Infrastructure law and Inflation Reduction Act

- >US\$12 billion investment for carbon management & hydrogen hubs (**funding under review**)
- IRA increased 45Q tax credit for geologic storage of CO₂, lowered capture thresholds to qualify for tax credits, and added provisions for direct pay & tax credit transferability

Various state tax incentives, loans, offtake agreements, carbon markets, and standards (e.g. LCFS) are in effect

Emerging data center business models include CCS

- ExxonMobil, Baker Hughes with Frontier, and Chevron with Engine No. 1 and GE Vernova have announced plans to invest in natural gas power facilities with CCS to supply data center facilities

Queue of Class VI applications growing

- 54 projects with 165 applications under review across 14 US states*
- Additional 26 projects with 96 applications under review in states with Class VI primacy (WY, LA, ND)

*WV primacy approved, but permit applications still sit w/EPA as of 20 Mar2025



CCS Progress: Canada & Brazil

Combination of mandates & policies drive development in Canada

7 Operational CCS facilities in Canada

6 Facilities in construction in Canada

Investment tax credit for CCUS projects released

- Qualified expenditures between 2022 and 2030 for direct air capture (DAC) are eligible for a 60% credit, capture other than DAC are eligible for a 50% credit, and carbon transportation, storage, and use are eligible for a 37.5% credit.

Canada Growth Fund - \$15B public investment vehicle

- Independent and arm's length from government to attract private capital and invest in Canadian projects and businesses
- Focus areas include CCS and low carbon hydrogen
-  ○ Federal entity that issues CCFDs – up to \$7 billion

CCS legislation in Brazil a milestone for South America

- **Fuels of the Future Bill signed into law on 8 October 2024** provides foundation for CCS regulations in Brazil

Petrobras continues successful CCS operations at its Santos Basin pre-salt reservoirs

- 13 Mt CO₂ injected in 2023

CCS Progress: Asia Pacific & India

Storage hubs & cross-border CCS projects a major focus & dominant trend

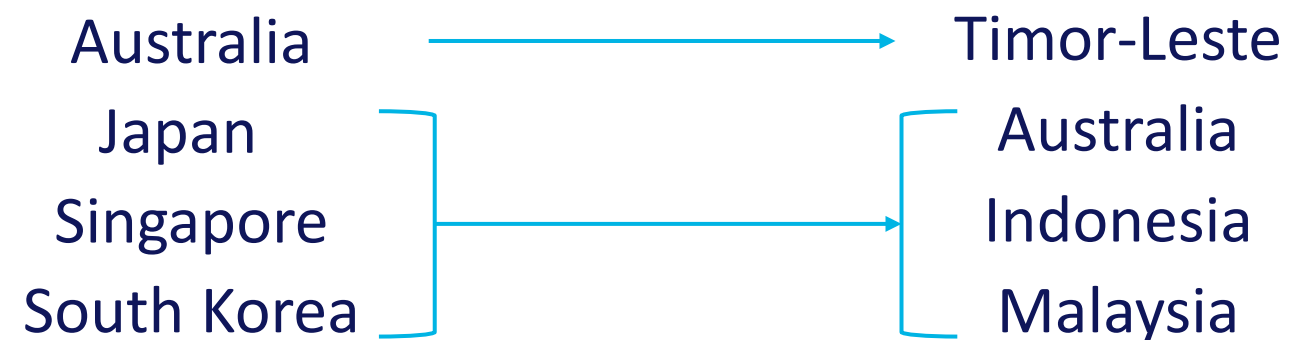
3 Operational CCS facility in Asia Pacific

2 Facilities in construction in Asia Pacific

Standalone CCS legislation released

- Indonesia
- Japan
- Malaysia
- South Korea
- Western Australia (Australia)

Transboundary transport & storage of CO₂ in discussion



CCS potential remains strong in India

Four interministerial CCUS taskforces collectively working on range of issues including development of technical standards



Gorgon LNG facility incorporating CCS system, Western Australia. Image courtesy of Chevron.

CCS Progress: Europe & the UK

Decarbonisation policies & robust CCS market anticipation drive new projects

9 Operational CCS facilities in Europe

13 Facilities in construction in Europe

CCS a key focus in climate & industrial policy agendas

- Net-Zero Industry Act
- EU Industrial Carbon Management Strategy
- EU Clean Industrial Deal
- £21.7 billion support for UK East Coast (Teesside) and West Coast (Hy-Net) clusters

Roadmaps for CCS deployment make significant progress

- **10 countries**, in addition to the EU, introduced or announced industrial carbon management strategies or roadmaps for CCS deployment

CO₂ transport & storage facility development surged

- Across Europe, the number of transport & storage facilities in development reached 84 – **doubling** in a year



Brevik CCS facility in Brevik, Norway. Image courtesy of SLB Capturi.

Update from Europe

- GCCSI's Europe Policy Forum was attended by 300 participants, and the Multi-Government Working Group Meeting hosted 24 different jurisdictions – record numbers for both events.
- Significant momentum and optimism in Europe for Carbon Management; conversations have evolved from the need to deploy CCS to choosing and implementing specific policy and regulatory frameworks.
- Project FIDs continue – Northern Lights Phase II and Stockholm Exergi took FID in March '25.
- European countries leaning forward internationally; UK Government taking a more active role in the CMC by co-leading the WG on Communication and Engagement.



CCS Progress: China

CCUS forging ahead in China

CCUS prominent in climate policies

- **Implementation Plan for Green and Low-Carbon Technology Demonstration Program**
- selected 6 CCUS projects for grants & low-cost financing

Plan released to reduce emissions from coal-fired power plants – includes 3 main strategies

- CCS
- Co-firing with low carbon ammonia
- Co-firing with biomass

Central Government leading international collaboration

- Sunnylands Statement with the US
5 large scale CCUS projects each by 2030
- Research exchange with France

Projects scaling-up and setting records

World's largest oxy-fuel project in cement sector now operational

- 200,000 ktpa capacity

Huaneng coal power on track for completion

- 1.5 Mtpa capacity – world's largest

Phase 1 of Xinjiang Oilfield coal power project under construction

- 1 Mtpa capacity - Phase 2 will add another 1Mtpa



Huaneng Longdong CCUS project under construction.
Image source: [China Energy Engineering Corporation](#).

CCS Progress: Middle East & Africa

Decarbonisation & low-carbon fuel development shift focus for CCS in MEA

3 Operational CCS facilities in MEA

6 Facilities in construction in MEA

CCS policy in region advancing quickly

- **UAE** Industrial Decarbonisation Roadmap includes CCS
- **Saudi Arabia** outlining ambitious targets

Carbon markets being established to support deployment

- **UAE's** Air Carbon Exchange
- **Saudi Arabia's** carbon crediting scheme

Collaboration at fore of development

- Advancing technology & DAC projects
- Establishing cross-border projects & CCS hubs

Notable developments move CCS forward in Africa

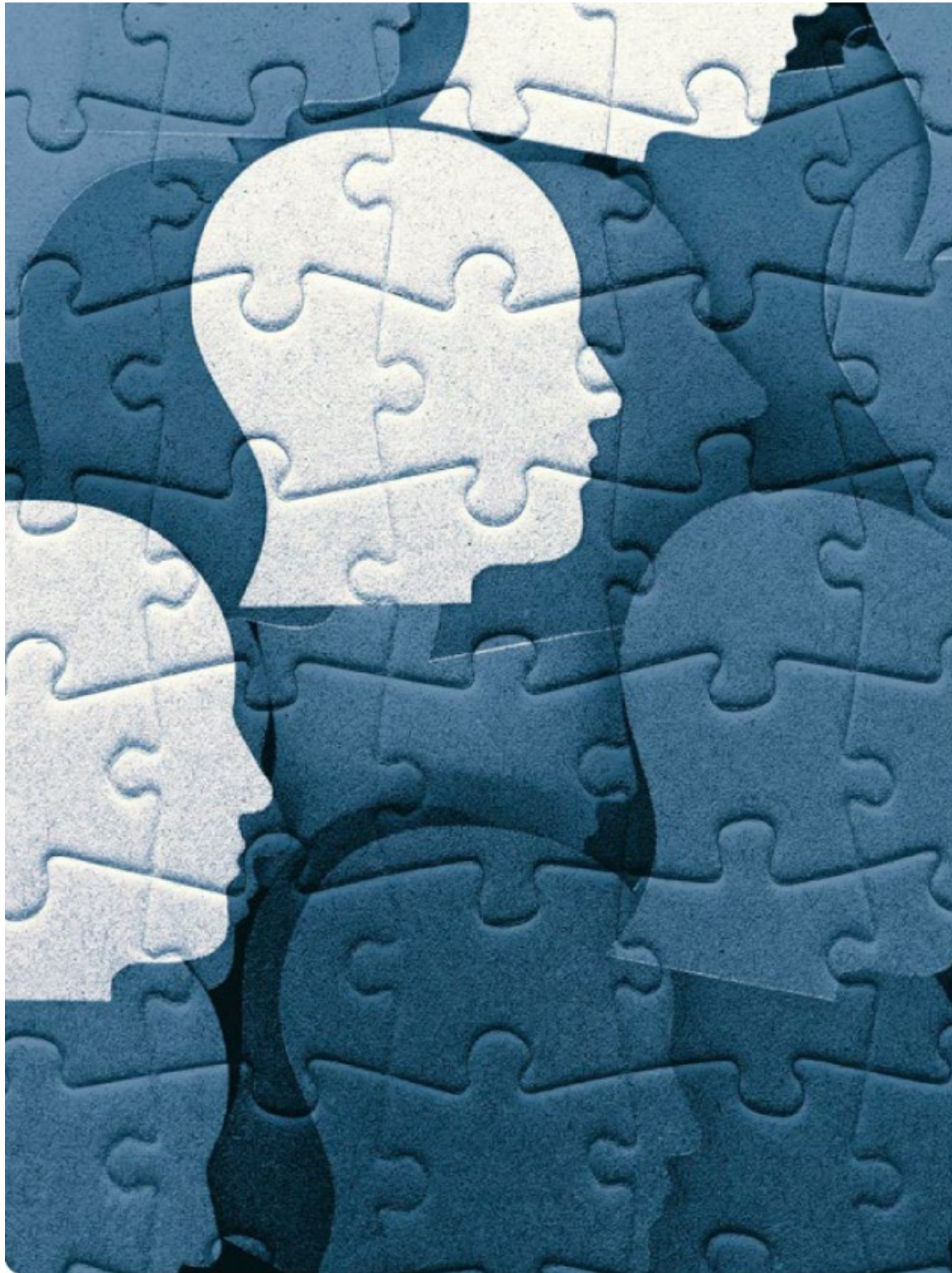
- Identification of storage sites progressing in **Egypt**
- CCUS pilot well drilled in **South Africa**
- Small-scale DAC project launched in **Kenya**



CycloneCC Industrial Demonstration Unit in the UAE. Image courtesy of Carbon Clean.



Looking Ahead



1- Outlook is positive for CCS

With governments to put in place supportive policies, finance sector to channel capital and private sector to build, own and operate new projects, the outlook remains positive for CCS.

2- There are still challenges to overcome

Difficult investment settings, community concerns, regulatory barriers remain ahead.

3- Collaboration is key to global CCS deployment

Governments, industry, and research community must work together to remove barriers, lower costs and drive investment.

4- Invitation to engage

For carbon management to scale up to gigaton level, it is imperative that we all remain involved and supportive.



Thank You

THE GLOBAL CCS INSTITUTE

WHO WE ARE

International CCS think tank with offices around the world.

Over 200 members from national and sub-national governments, global corporations, private companies, research bodies and NGOs, all committed to a net-zero future.

Team of experts across the entire CCS value chain.

WHAT WE DO

Fact-based influential advocacy, catalytic thought leadership, authoritative knowledge sharing.

www.globalccsinstitute.com/global-status-report/



OPENING KEYNOTE



Governor Jared Polis

Governor of Colorado

BREAK



We'll be back at
11:30am ET

Next session



DATA CENTER DECARBONIZATION



Brian George

Global Energy Market
Development and
Policy at **Google**



Danny Rice

CEO at
NETPower



Ian MacGregor

Executive Chair at
**North West Digital
Power**



Lisa Berry

Decarbonization
Technology Director,
Americas at
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BREAK



We'll be back at
1:15pm ET

Next session



CCS BUSINESS MODELS IN CANADA



Craig Frenette

SVP at **Brookfield**



Erin Flanagan

Senior Director at
**Canada Growth
Fund Investment
Management**



Sanjay Bishnoi

CEO at **Entropy**



Brett Henkel

SVP of Business
Development at
Svante



Errol Pinto

+ MODERATOR +
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STATE UPDATES



Nick Tew

State Geologist and
Oil and Gas
Supervisor in
Alabama



Carolyn Lozo

Chief, Oil and Gas
and GHG Mitigation
Branch at California
Air Resources Board
in **California**



Julie Murphy

Director, Colorado
Energy and Carbon
Management
Commission in
Colorado



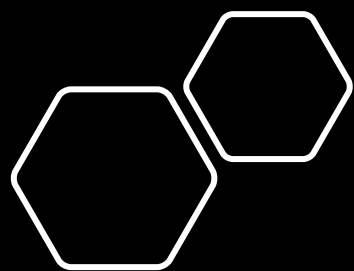
Jessica Moore

Director, West Virginia
Geological and
Economic Survey and
State Geologist in
West Virginia



Lily Barkau

Groundwater Section
Manager at Wyoming
Department of
Environmental Quality
in **Wyoming**

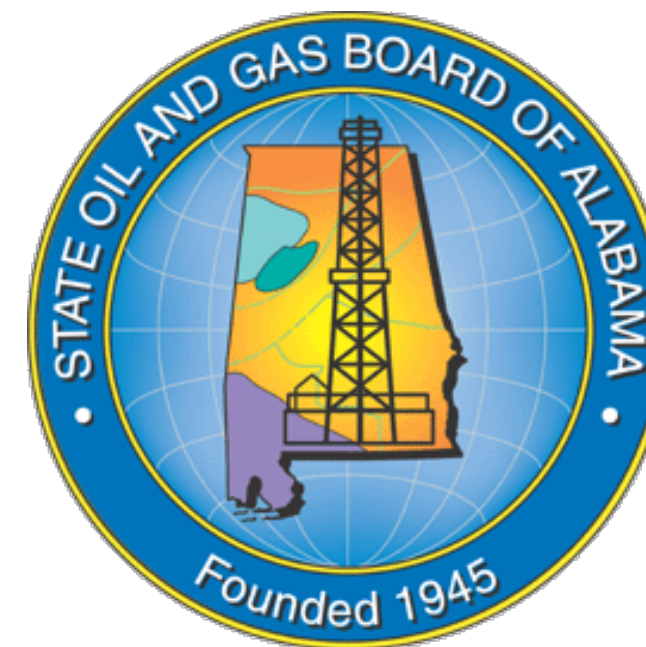


Geologic CO₂ Storage in Alabama: Overview and Regulatory Development

Nick Tew, PhD

State Geologist of Alabama/Oil and Gas Supervisor

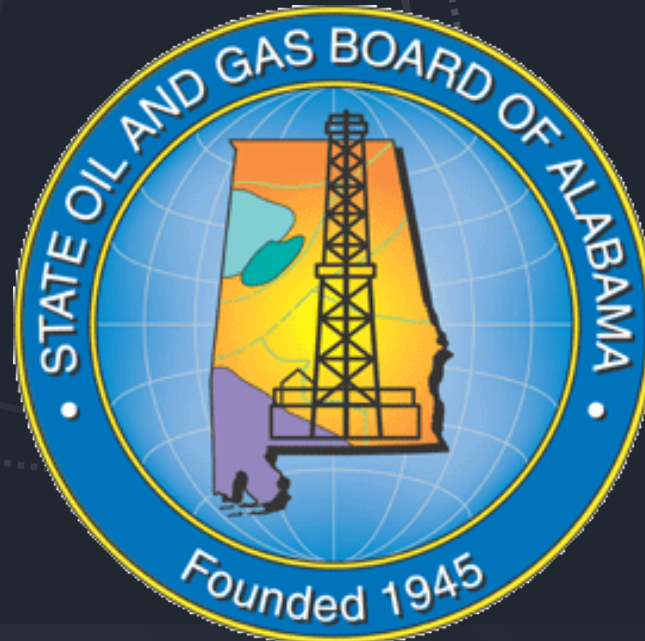
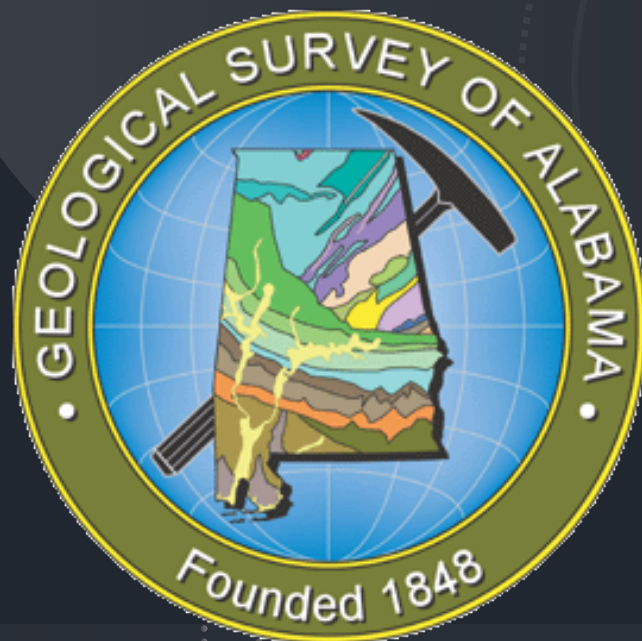
Geological Survey of Alabama and State Oil and Gas Board



2025 AMERICAS FORUM ON CARBON CAPTURE &
STORAGE

Washington, DC
April 8, 2025

Geological Survey of Alabama & State Oil and Gas Board of Alabama



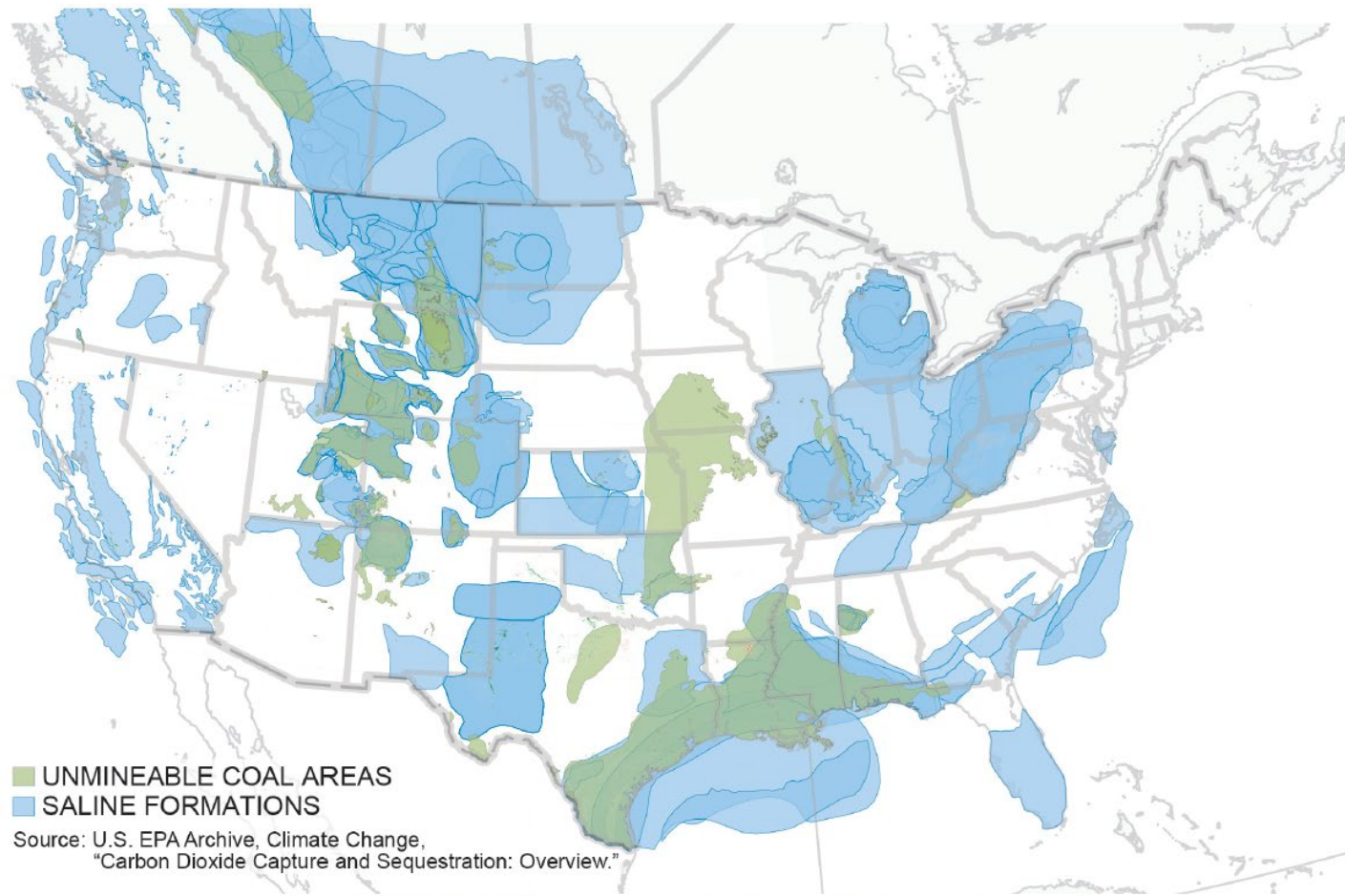
Geological Survey of Alabama

- Established in 1848
- Natural resource investigation, characterization, and development
 - Fossil-fuel Mineral, Nonfuel Mineral, Water, and Biological Resources
 - Significant research into Alabama's CO₂ storage potential over the past 2 decades

State Oil & Gas Board of Alabama

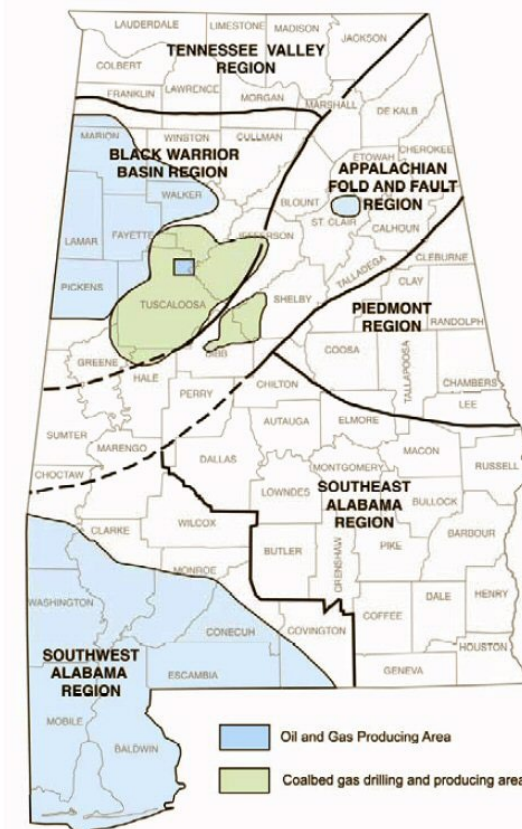
- Established in 1945, grew out of activities of GSA
- Oil and Gas Conservation and Regulation
 - Prevent waste of resources, protect correlative and coequal rights, protect ground water
- Underground storage of gases, including natural gas, CO₂, hydrogen, nitrogen, etc.

Staff of about 70 across the two agencies

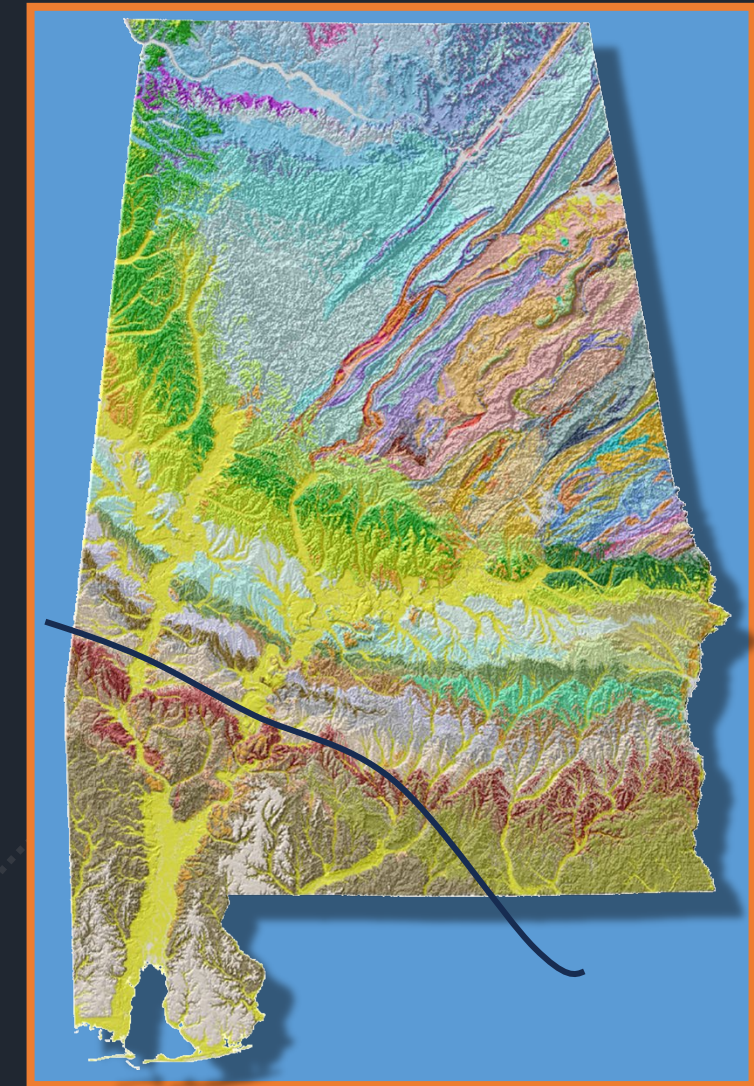


U.S. Assessment of Geologic CO₂ Storage Potential

Geologic Storage Potential in Alabama



Significant Oil and Gas Activity Areas in Alabama



Geologic Map of Alabama

Owing to O&G exploration and development, we have a wealth of subsurface data in SW Alabama

- Hypothetical well will encounter this stratigraphic section

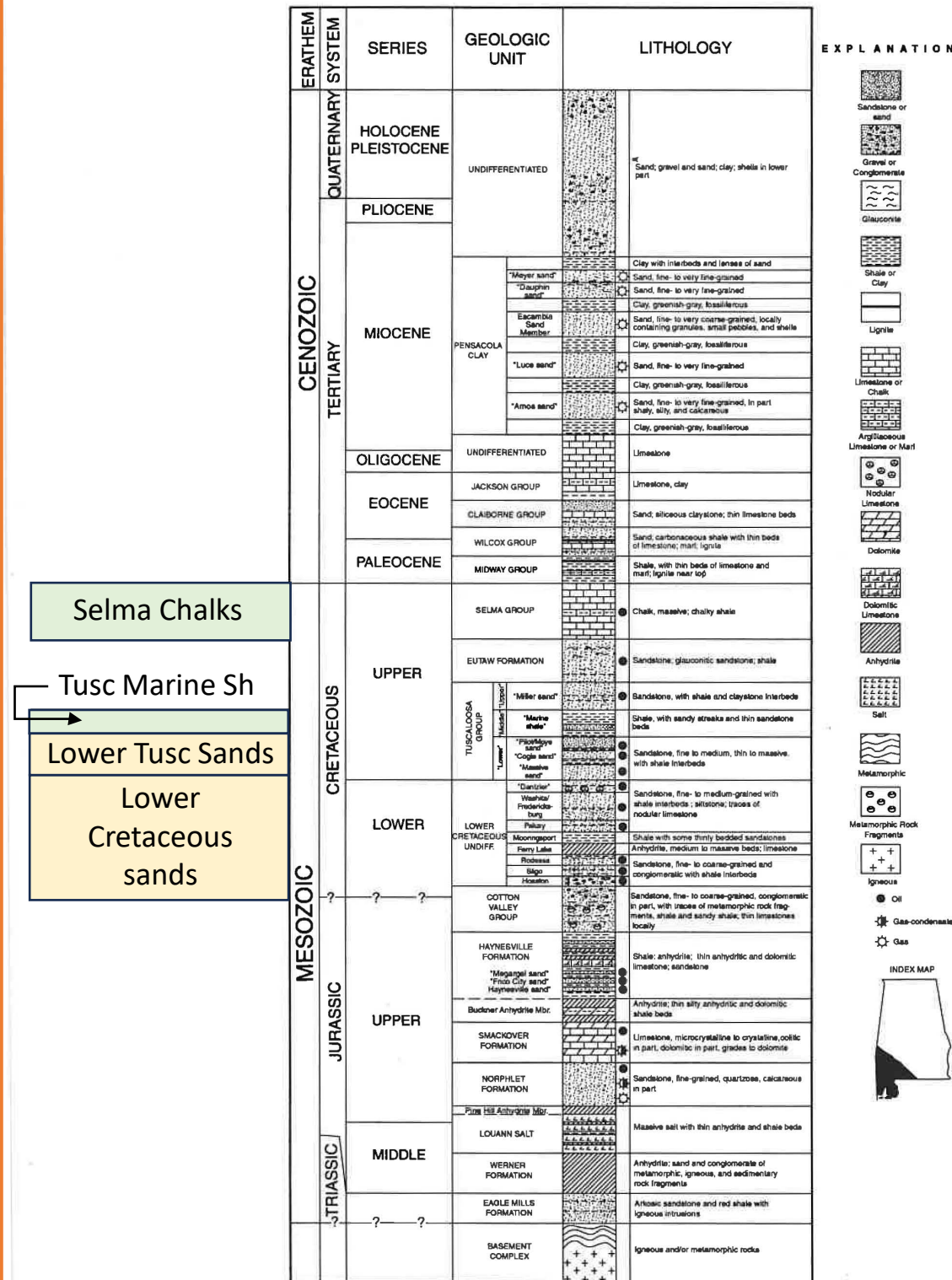
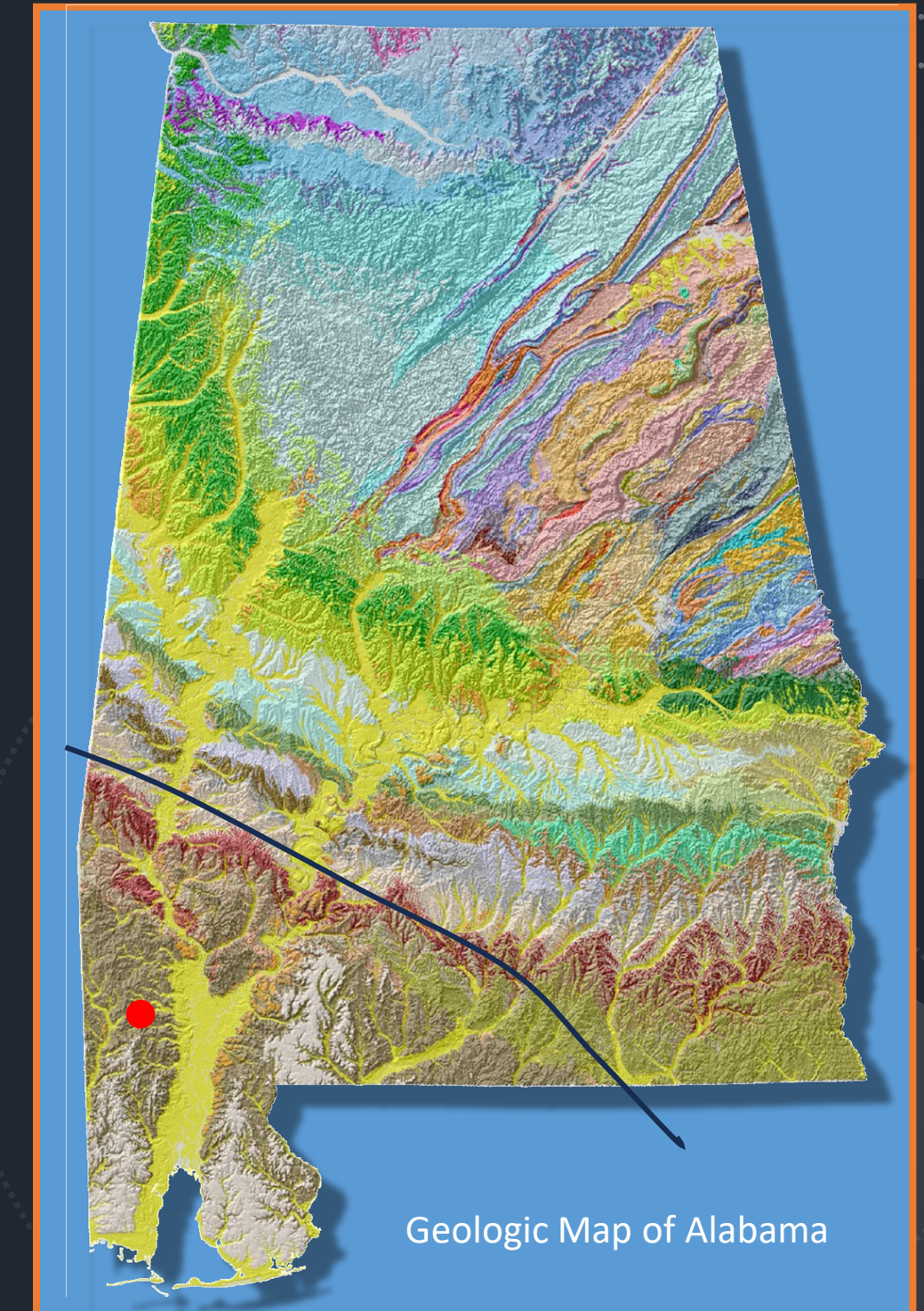


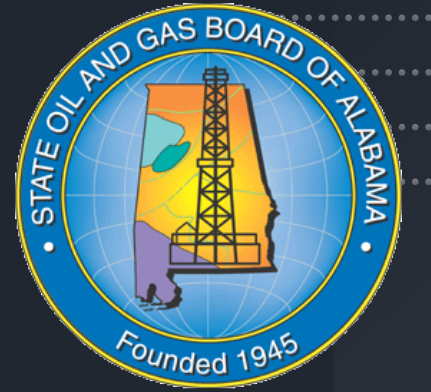
Figure 13.--Generalized stratigraphic column for oil and gas producing areas in the Southwest Alabama Region.

Excellent geologic setting for CO₂ storage, with significant capacity



Southwest Alabama CO₂ Storage Potential

Regulatory Development for Geologic Storage of CO₂ in Alabama



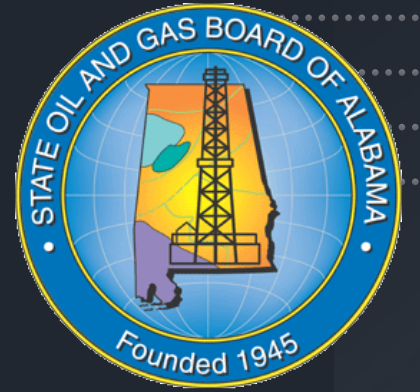
- Act 2022-40 amended OGB's natural gas storage statute to include "...carbon oxides, ammonia, hydrogen, nitrogen, noble gases..." and stated that this "... is in the public interest and welfare of this state and is for a public purpose."
- Provided that OGB "...shall have jurisdiction and authority to regulate the operation and abandonment of underground storage facilities."
 - Promulgate regulations and establish fees to defray expenses in exercising jurisdiction
 - Require bonds or other financial surety

ACT #2022 - 40

1 SB36
2 215758-3
3 By Senators Albritton and Reed
4 RFD: Governmental Affairs
5 First Read: 11-JAN-22
6 PFD: 01/06/2022



Regulatory Development for Geologic Storage of CO₂ in Alabama



- Act 2024-325 further enabled OGB's regulatory authority and provided clarity to encourage development of a geologic storage industry in the State of Alabama.
 - Defined ownership of pore space storage rights.
 - Surface owner
 - Provided for the “amalgamation” of storage rights-analogous to unitization for O&G.
 - Established two funds:
 - For use during active operations
 - For long term care
 - Provided parameters for ultimate closure of a storage facility.

HB327 ENROLLED

1 HB327

2 A3AXQQS-3

3 By Representative Baker

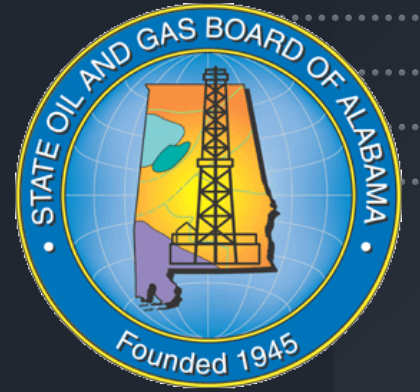
4 RFD: State Government

5 First Read: 19-Mar-24

ACT #2024 - 325

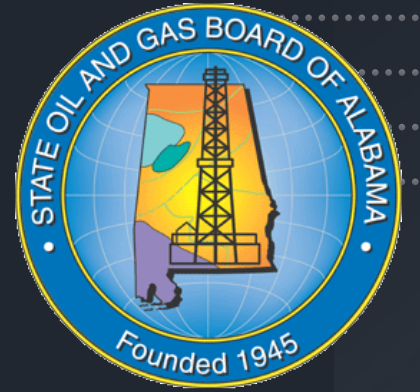
MAY -2 2024
RECEIVED
GOVERNOR'S OFFICE

Regulatory Development for Geologic Storage of CO₂ in Alabama



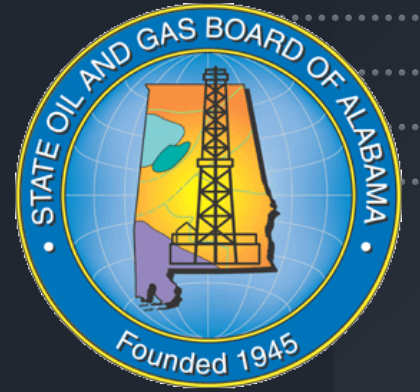
- OGB legal and technical staff drafted proposed regulations for geologic storage of CO₂ in Alabama
 - Significant interaction with other states that have promulgated or are in the process of promulgating regulations (ND, WY, LA, TX, others).
 - Very actively involved with several Groundwater Protection Council (GWPC) and Interstate Oil and Gas Compact Commission (IOGCC) CO₂ initiatives.
 - Early engagement with U.S. EPA to begin discussions on the process for gaining Class VI UIC well primacy.
 - Cooperation with the Alabama Department of Environmental Management
 - Discussions with industry groups and other interested parties

Regulatory Development for Geologic Storage of CO₂ in Alabama



- The draft CO₂ regulations were presented to the Board for review and were adapted.
 - There was significant opportunity for public review and comment as the process moved forward.
- The regulations have now been through the Alabama Administrative Procedures process and became effective in January.
- Next step, the development of a Primacy Application to EPA, has been initiated. Should have results of crosswalk soon and will make necessary changes to regulations.
- We received an EPA Class VI grant to assist in standing up our program.
- In the meantime, OGB will co-regulate CO₂ operations with EPA

Summary



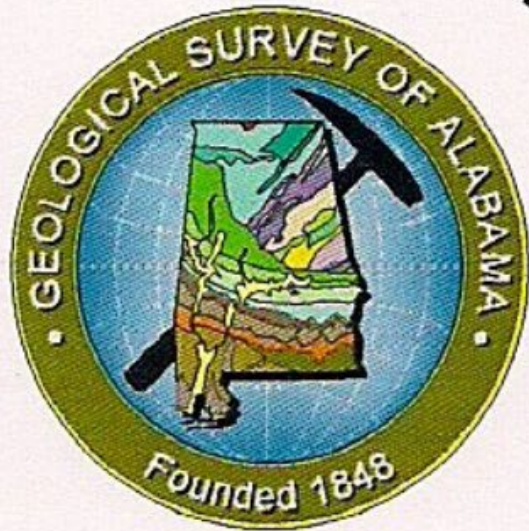
- SW Alabama has ideal geology for underground storage of carbon dioxide.
- The State Oil and Gas Board of Alabama has regulatory authority over this activity and has developed regulations for CO₂ storage.
- The Board will be applying for Class VI UIC primary from EPA.
- We anticipate the development of a robust CO₂ storage industry Alabama.
- The Board will ensure the safe and proper regulation and oversight of this industry while protecting the correlative rights of all owners and citizens.



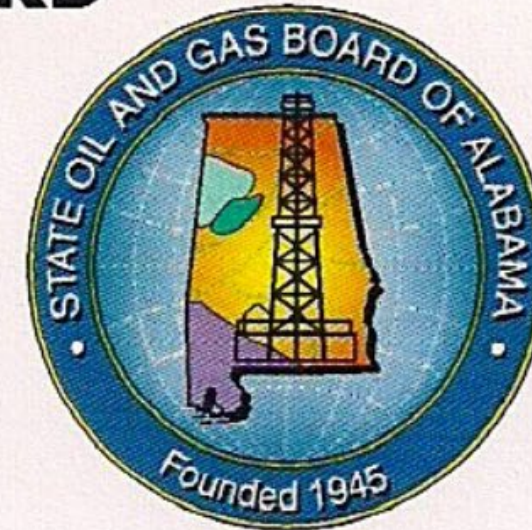
CO₂ Injection Well

CONTACT

GEOLOGICAL SURVEY OF ALABAMA **STATE OIL AND GAS BOARD**



Nick Tew, Ph.D., P.G.
State Geologist and Director
State Oil and Gas Supervisor



Phone (205) 247-3679
Fax (205) 349-2861
ntew@gsa.state.al.us
www.gsa.state.al.us

420 Hackberry Lane
P.O. Box 869999
Tuscaloosa, AL 35486
www.ogb.state.al.us

California's Programs and Policies: Carbon Capture, Removal, Utilization and Storage



April 2025

Global CCS Institute

2025 Americas Forum on Carbon Capture and Storage, Washington D.C.

California's Climate Policy Framework



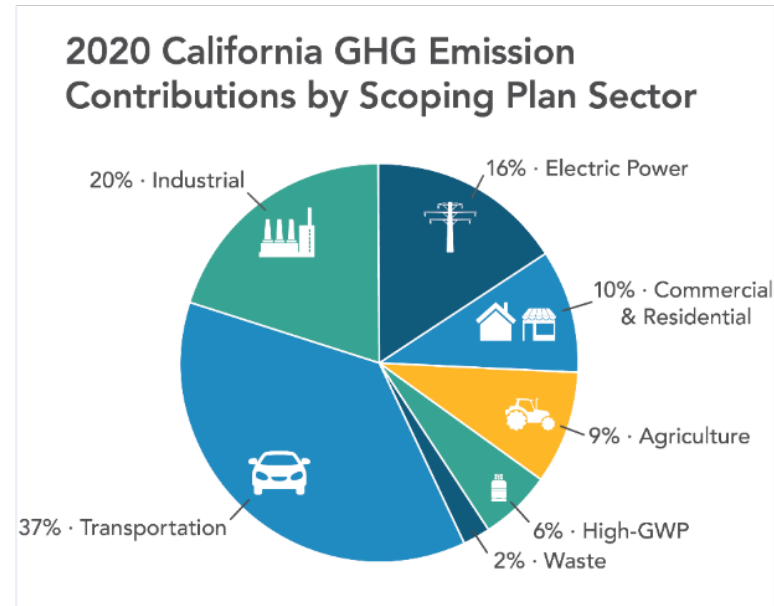
GHG Targets & Goals

Legislation & Executive Orders: Total GHGs (AB 32/SB 32/AB 1279) or sector targets (SB 1383/SB 100), etc.



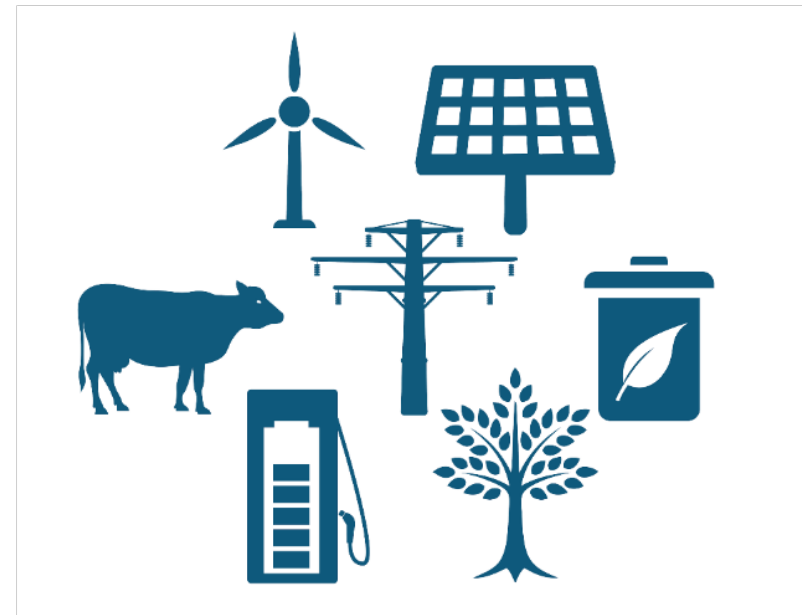
Scoping Plan

Actionable plan across all sectors



Action

Regulations & Incentives: Advanced Clean Cars, climate change investments, etc.



Projects

Examples: Zero-emission trucks, energy infrastructure and renewables, compost facilities, digesters, etc.

Achieving Carbon Neutrality in California

The path to build our way out of over a 100 years of existing fossil energy and the built environment landscapes



AB 32 GHG
Inventory Sectors

Carbon neutrality by 2045, deploy a broad portfolio of existing and emerging fossil fuel alternatives and clean technologies, and align with statutes and Executive Orders

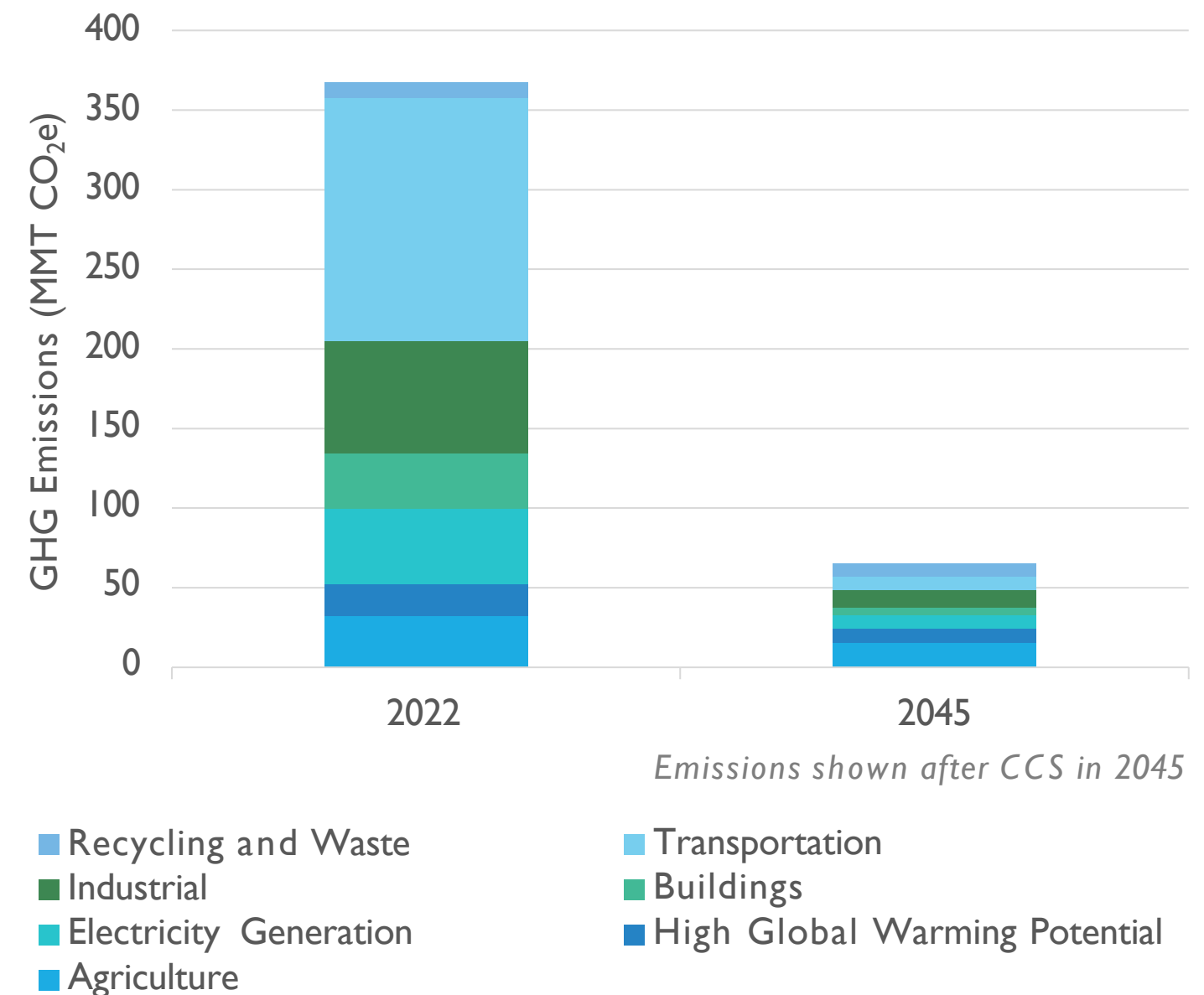


Natural and
Working Lands
(NWL)

Land management activities that prioritize restoration and enhancement of ecosystem functions to improve resilience to climate change impacts, including more stable carbon stocks

Target 2045

- AB 1279
 - Carbon Neutral by 2045
 - 85% GHG reduction by 2045
 - CARB to implement policies/strategies to support deployment of CCUS/CDR
- SB 905
 - CCUS Program at CARB, support from CNRA/DOC
- LCFS
 - Existing CCS Protocol for permanence certification
 - Allows crediting for CCS/DAC projects
- Need to start today to deploy and scale in this decade



Policy-based Role of Carbon Dioxide Removal

- Governor Newsom has called for:
 - 20 MMT CO₂e removal by 2030
 - 100 MMT CO₂e removal by 2045
- 2022 Scoping Plan showed need for CCS/CDR to achieve AB 1279
- Nature-based solutions, in addition to mechanical, are necessary

Storage & Utilization

- Storage – geologic sequestration in underground reservoirs (see image)
 - Onshore - estimated 149 - 843 Gt storage potential in CA (mostly saline reservoirs)
 - Offshore – estimated 100 Gt storage potential
 - Enhanced oil recovery (EOR) - prohibited in CA under SB 905
- Utilization
 - Cement and concrete
 - Chemicals
 - Fuels
 - Materials

Image source: [*Getting to Neutral: Options for Negative Carbon Emission in California*](#), January 2020, LLNL

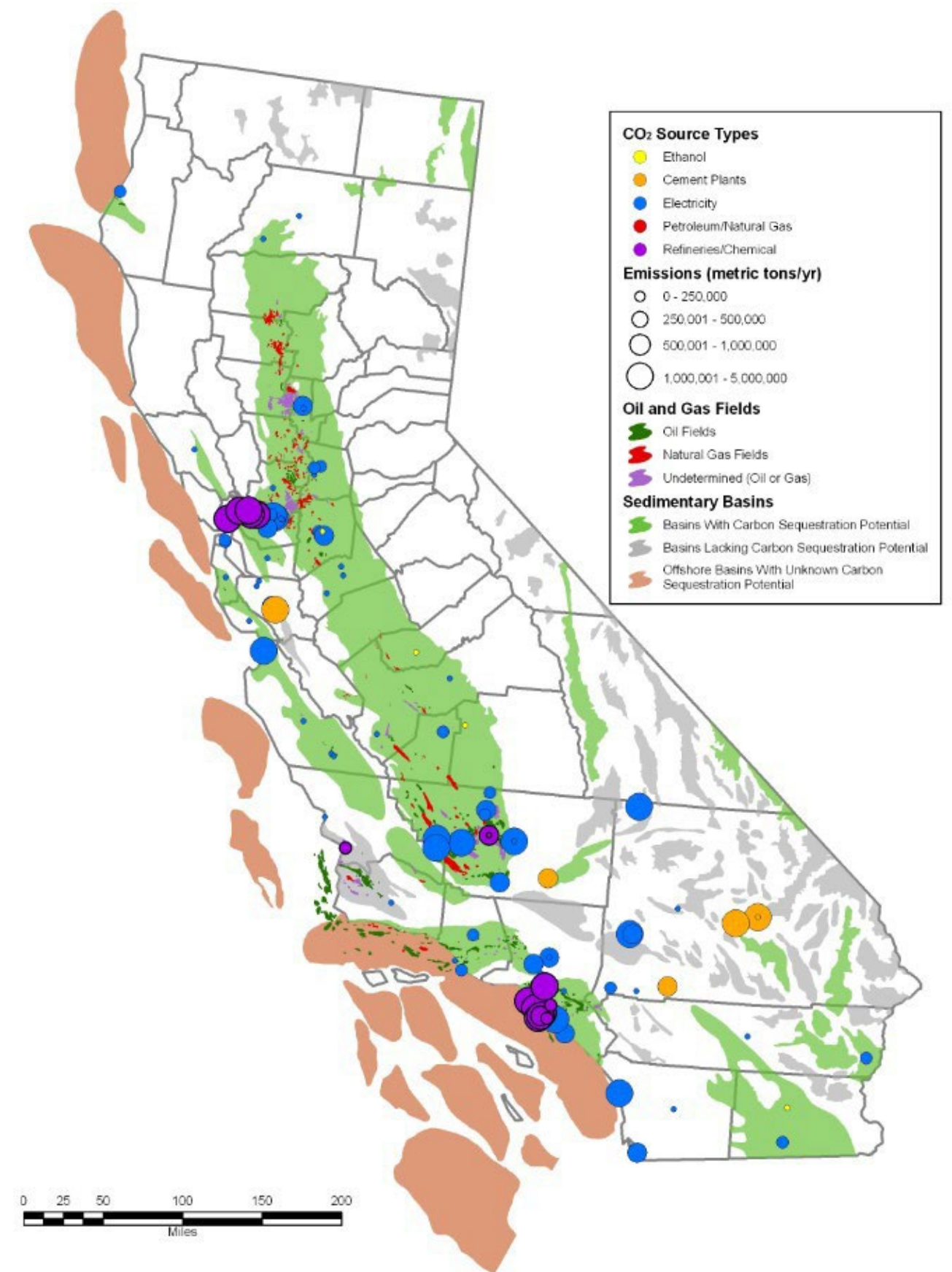


Locations of CO₂ Sources and Geologic Reservoirs

- Many CO₂ emission sources in the Bay Area, Central Valley, and LA Area are in close proximity to geologic sequestration reservoirs

Image source:

http://gif.berkeley.edu/westcarb/images/maps/CA_basins_status_point.jpg



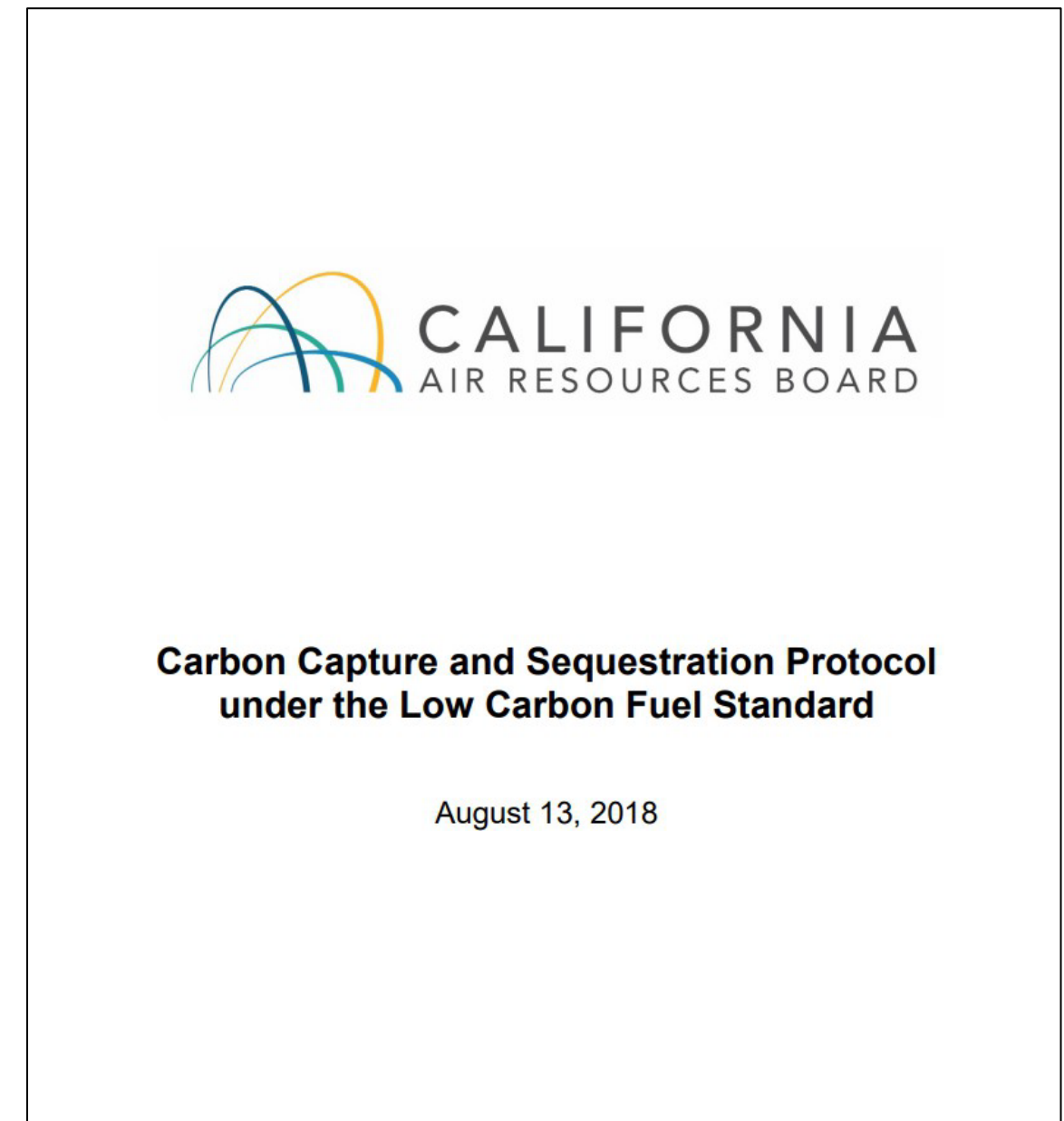
California Incentives for CCS and CDR

- CARB - Low Carbon Fuel Standard program provides crediting opportunities for carbon dioxide capture from alternative fuels production and direct air capture with geologic sequestration
 - Requires Permanence Certification under CARB's Carbon Capture and Sequestration Protocol and fuel pathway/project approval
- California Energy Commission - Carbon Removal Innovation Support Program (CRISP) provides grant funding for direct air capture technologies that use mechanical and chemical processes
 - Of the up to \$18M available in grant funds, \$16.3M has already been committed:
 - \$3.3M in federal cost-share projects to support research on direct air capture hubs
 - \$13M in proposed awards for R&D and demonstration projects
 - Funds must be encumbered by 7/30/2027 and spent by 7/30/2030
 - Projects benefitting petroleum or gas production, processing or refining, such as enhanced oil and gas recovery, are not eligible



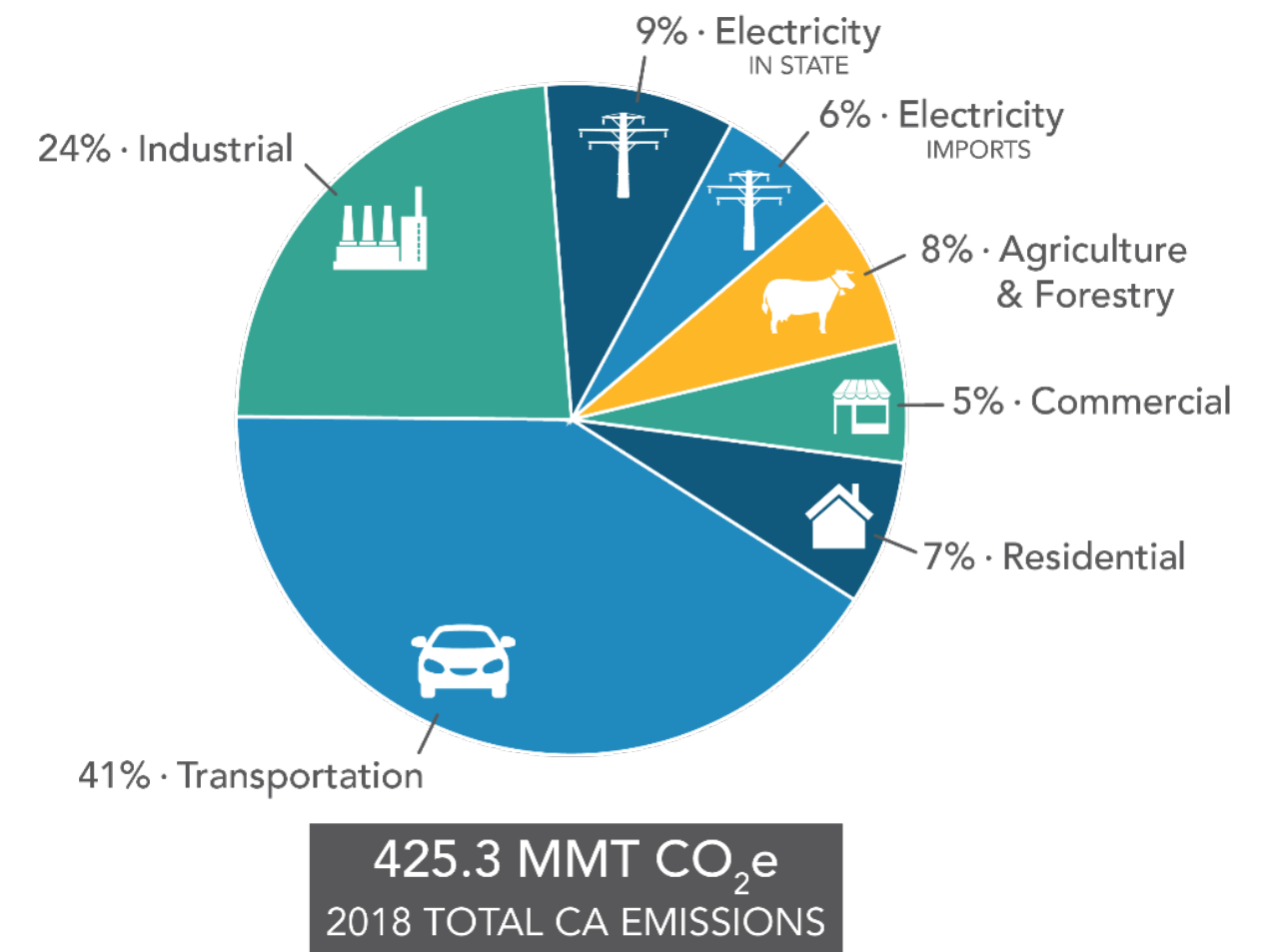
Carbon Capture and Sequestration Protocol: Main Elements

- Main sections of CARB's CCS Protocol
 - Section A: Applicability - eligible reservoirs
 - Section B: Accounting methodology for CCS projects under LCFS - how GHG reductions are estimated
 - Section C: Permanence requirements – ensure safe, permanent sequestration of injected CO₂



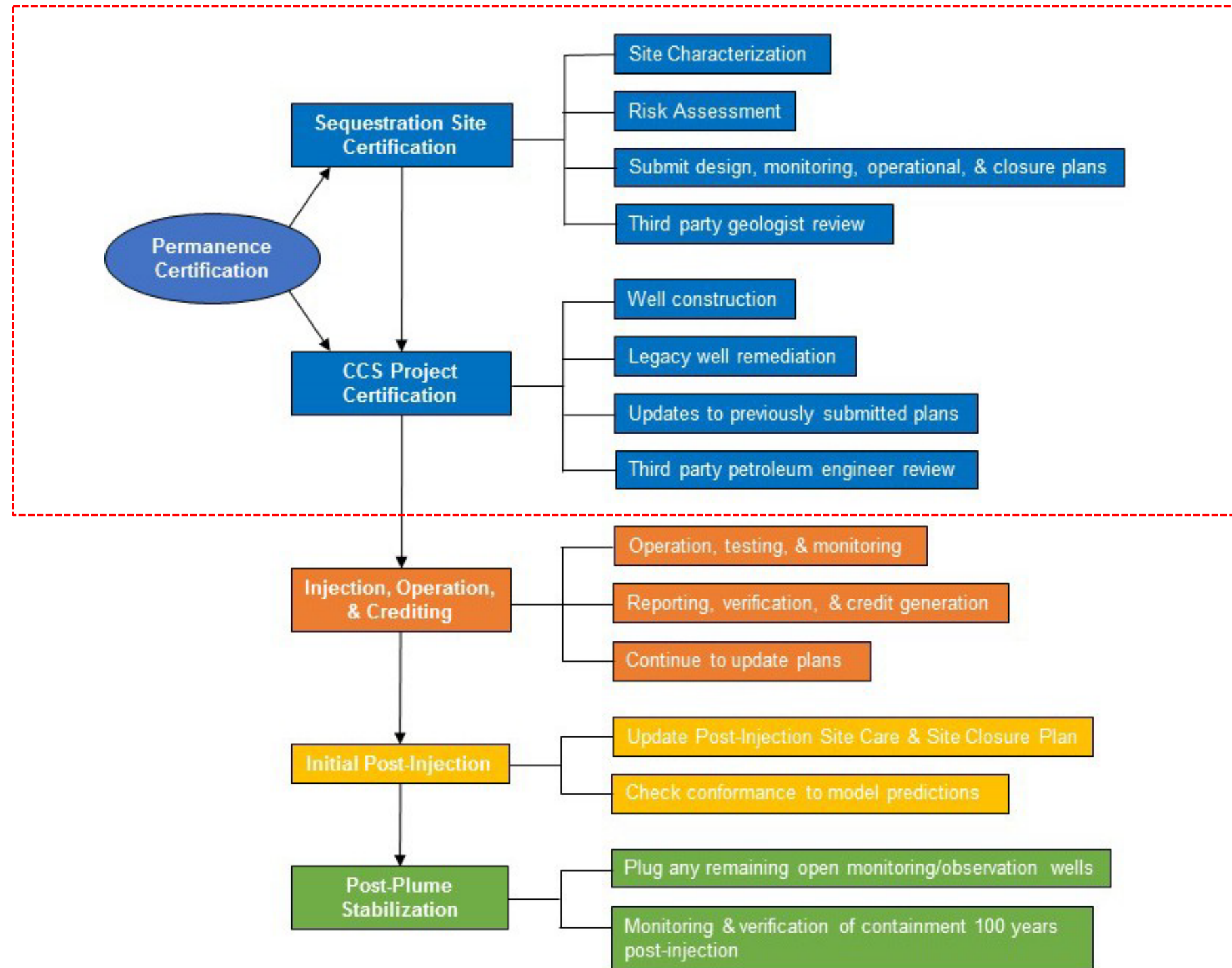
Carbon Capture and Sequestration Project Eligibility

- Types of CCS projects that may be certified for LCFS credit generation:
 - Low carbon fuel pathways (e.g. ethanol or biogas)
 - Refinery investment (e.g., steam reforming)
 - Innovative crude (e.g., co-gen at oilfield)
 - Direct air capture projects
- Eligible reservoirs (all on-shore)
 - Saline formations
 - Depleted oil and gas reservoirs
 - Enhanced oil recovery reservoirs



Source: 2020 Edition, California Greenhouse Gas Emission Inventory: 2000-2018

CCS Project Stages & Protocol Provisions



Overview of CARB SB 905 Responsibilities

- Establish a Carbon Capture, Removal, Utilization, and Storage (CCUS) Program
- Adopt protocols to support additional CCUS and CDR approaches
- Adopt CCUS/CDR regulations, including for a voluntary-use unified permit application, financial risk management, and monitoring requirements for project operators
- Support transparency, via a public database of projects and public reporting



2025 Update on SB 905 Implementation

- Conduct CCUS/CDR technology assessment (contract)
- Collect CCUS/CDR permit data requirements and create library (contract)
- Best practices for community action plan development (contract)
- State of California control-agency approvals for the permit portal IT project
- Information collection to support regulatory development
- Public workshop held in February 2025, comments received and posted

Progress in Establishing California Projects

- First commercial DAC facility operating in Tracy
- First CO₂ Class VI injection permit awarded to Kern County project
- Four DOE DAC hub awards: feasibility and engineering studies

Project Operator	Project Location	Award Type	DOE Funding
CarbonFrontier/Aera	Kern County	Feasibility study	\$2.8 million
Chevron	Kern County	Feasibility study	\$3 million
California Resources Corporation	Kern County	FEED study	\$11.8 million
University of California	Southern San Joaquin Valley	Feasibility study	\$3 million

Resources

- CARB, 2018: [Carbon Capture and Sequestration Protocol](#)
- CARB, 2018: [Low Carbon Fuel Standard regulation](#) (CCS provisions are in section 95490 beginning on page 186)
- SB 905 Carbon Sequestration: Carbon Capture, Removal, Utilization and Storage Program:
https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220SB905

ECMC Class VI Timeline

Greenhouse Pollution Reduction Roadmap
CCUS Task Force convened

First of three ECMC CCS reports - [Primacy Study](#)

Third ECMC CCS report - [CCS Safety Study](#)
HB24-1346

- Addressed pore space ownership
- Created a unitization process
- Defined cumulative impacts
- Other items

- **Submit primacy application**
- CEO CM Roadmap released
- HB25-1165 - Long Term Stewardship

2021

2022

2023

2024

2025

CCUS Task Force recommendations

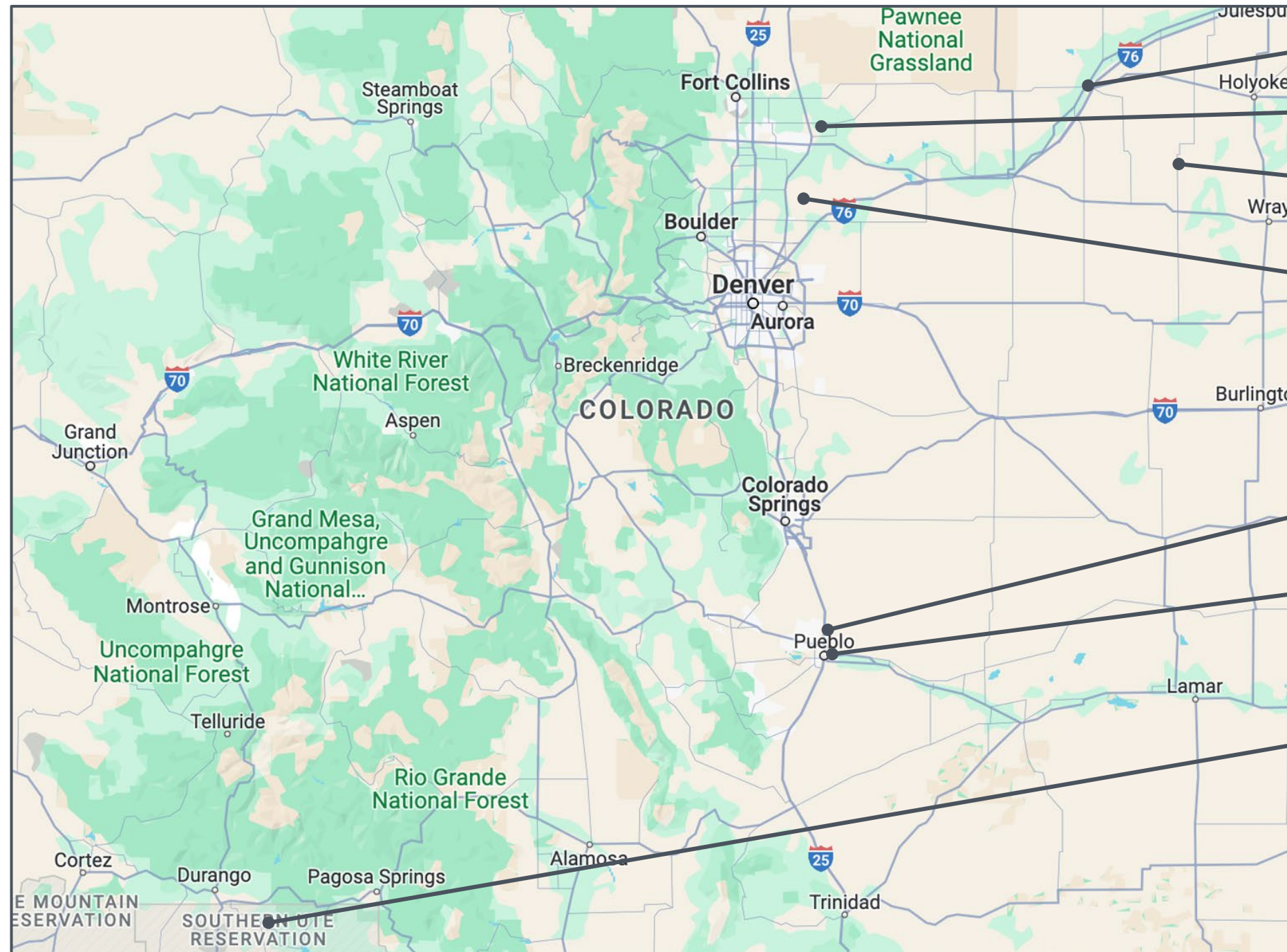
Second of three ECMC CCS reports - [Legislative Proposal](#)
SB23-016

- Granted ECMC authority to pursue Class VI primacy
- Required Cumulative Impacts Analysis
- Gave local governments option to regulate the surface siting
- Established 2,000' setback

- Stakeholder sessions
- **Class VI Rulemaking**

CCS and CDR Projects

Currently in Development



Sterling Ethanol Plant

Front Range Energy Ethanol Plant

Yuma Ethanol Plant

Charm Industrial - Biochar

Cement Plant

Project Eos - CarbonSAFE Award

Southern Ute Gas-fired CC Plant

* The Colorado State Land Board also has at least 3 exploration leases for CCS projects.

Carbon Management Roadmap

- **HB23-1210**
 - “Identify the carbon management, climate, and economic opportunities available in Colorado that best draw on Colorado's natural resources, industry, talent, labor force, and economic development capabilities.”
- **Key Findings & Themes**
 - The final, 250-page Carbon Management Roadmap makes **68 recommendations**, spanning 15 state agencies.
 - **Key themes:**
 - ◆ Durability & supporting high-quality carbon removal
 - ◆ Community education & project transparency
 - ◆ Strategic market support to enable deployment

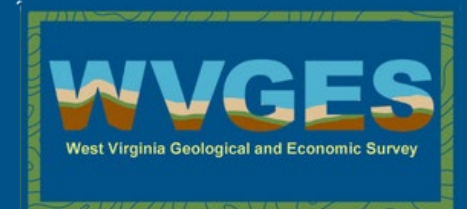
West Virginia CCS Policy Updates

Jessica Moore
Director and State Geologist

West Virginia
Geological and
Economic Survey

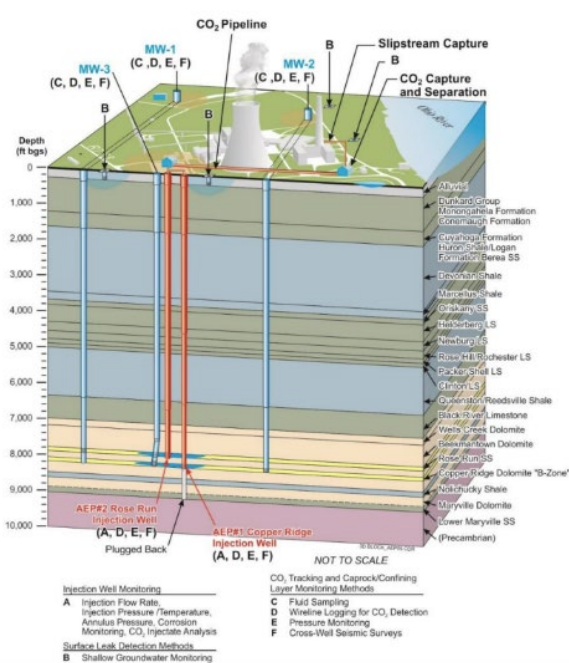


GCCSI DC Forum 2025



WV CCS Policy Timeline

20+ Years of Carbon Storage Research in Appalachia



2003-2011

AEP Mountaineer CCS Test Wells

*Permitted by WVDEP as Class V
Experimental Tests;
27k tonnes CO₂ injected in Copper Ridge Dolomite + 10k into Rose Run Sandstone*

2022

HB 4491 clarifies policy; UIC revisions add Class VI

Pore space owned by surface estate, cannot be severed, may be leased. 75% owners in unit; long-term liability transfers to state 10 yrs. from closure

2023

SB 161 & 162; Class VI Primacy App at EPA; ARCH2 Hub

State gains authority to purchase land & lease public pore space; Hydrogen projects increase need for CCS

2024

UIC Rules Bill Passes; Awaiting Primacy Determination

HB 5045 finalizes regulations; increases time for Certificate of Completion to 50 yrs. w/waiver possibility; GES and DEP sign MOA for Class VI permit reviews

2025

CarbonSAFE projects ongoing/announced; Class VI Primacy application approved by EPA; Fidelis and Tenaska permits in review

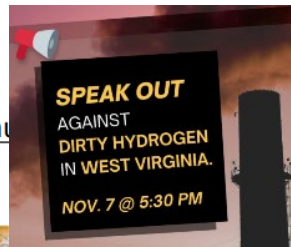
November 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
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3	4	5				8
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

 Public Comments

 **FEDERAL REGISTER**
The Daily Journal of the United States Government

 **2024 AMERICAS MEMBER MEETING**
NOVEMBER 7TH 2024

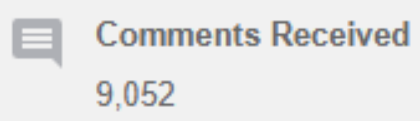


December 2024

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	29	30	31			

 Public Comments

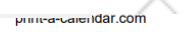
 **FEDERAL REGISTER**
The Daily Journal of the United States Government



January 2025

Sun	Mon	Tue	Wed	Thu	Fri	Sat
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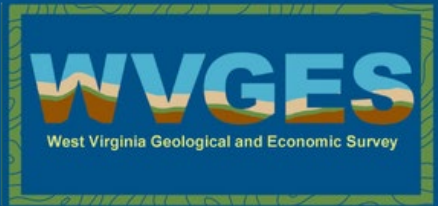




On January 17, 2025, the U.S. Environmental Protection Agency (EPA) issued a final rule under the Safe Drinking Water Act (SDWA) to grant primacy to West Virginia for Class VI wells. Class VI wells are injection wells used for the disposal of CO₂ (carbon dioxide) in carbon capture and storage (CCS). The final rule had not yet been published by the time Donald Trump was inaugurated on January 20, 2025, but new EPA Administrator Lee M. Zeldin signed the final rule on February 18, 2025, signifying the Trump administration's intent to follow through on publishing the final rule in the Federal Register. The grant of primacy will be effective thirty days after the rule is published in the Federal Register.



[EPA Issues Final Rule to Grant Primacy to West Virginia for Class VI Wells](#) | EMLF



EPA Gives W.Va. Primacy for Permitting CCS Injection Wells

Zeldin Hails Approval as Example of ‘Cooperative Federalism’ with States



EPA Administrator Lee Zeldin (seated) signs the approval granting West Virginia primacy for permitting Class VI injection wells used for carbon capture projects. | EPA



[Home](#)

GOVERNOR MORRISEY AND WVDEP SECRETARY WARD ANNOUNCE EPA'S APPROVAL OF WEST VIRGINIA'S CLASS VI WELL PRIMACY APPLICATION

January 21, 2025

West Virginia becomes just the fourth state in the country to achieve this milestone.

CHARLESTON, WV – Governor Patrick Morrisey and West Virginia Department of Environmental Protection (WVDEP) Cabinet Secretary Harold Ward today announced the U.S. Environmental Protection Agency (EPA) has officially granted Class VI Underground Injection Control (UIC) primacy to West Virginia. Class VI primacy gives the state authority to oversee the permitting and regulation of Class VI wells, which are used to inject carbon dioxide (CO2) deep underground for long-term storage—a vital component of carbon capture and storage (CCS) technology.

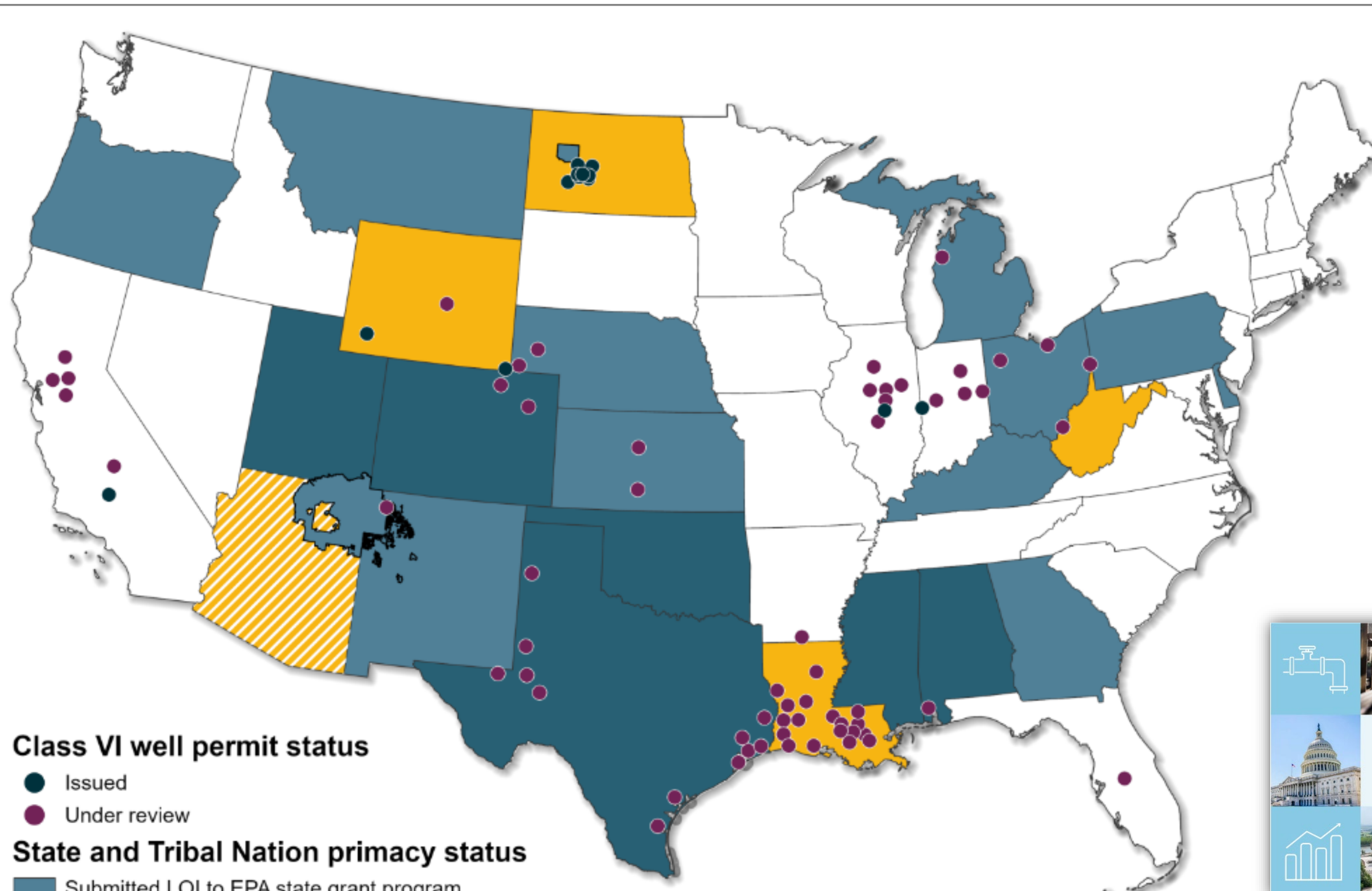
West Virginia becomes just the fourth state in the country to achieve this milestone.

“West Virginia continues to lead the nation in energy innovation,” said Governor Morrisey. “Securing Class VI primacy opens the door for new investment and job creation in our energy, manufacturing, and petrochemical sectors, while significantly reducing emissions. I commend our WVDEP staff for their tireless efforts to help secure this approval, as well as the members of the West Virginia Legislature and the Attorney General’s Office for their work in establishing a legal framework and ensuring the state’s authority to enforce Class VI regulations.



Governor Morrisey and WVDEP Secretary Ward Announce EPA's Approval of West Virginia's Class VI Well Primacy Application





Class VI well permit status

- Issued
- Under review

State and Tribal Nation primacy status

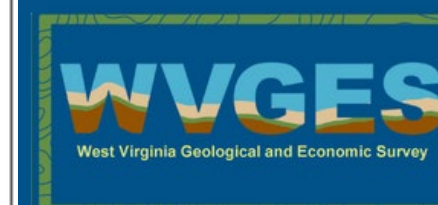
- Submitted LOI to EPA state grant program
- Pre-application activities
- Application in process
- Granted primacy
- No action taken

Sources: US EPA, WY DEQ, ND OGD, LA DENR. Accessed January 22, 2025. All permit locations are approximate.

*Alaska is in pre-application activities.



**CARBON CAPTURE
COALITION**



Proposed Project

Work Starts on \$2B West Virginia Hydrogen Plant to Power Data Megasite

By Mary B. Powers



Planned \$2B West Virginia complex is set to include four blue hydrogen production plants using biomass and natural gas to power an associated data center megasite.

Image: Fidelis New Energy

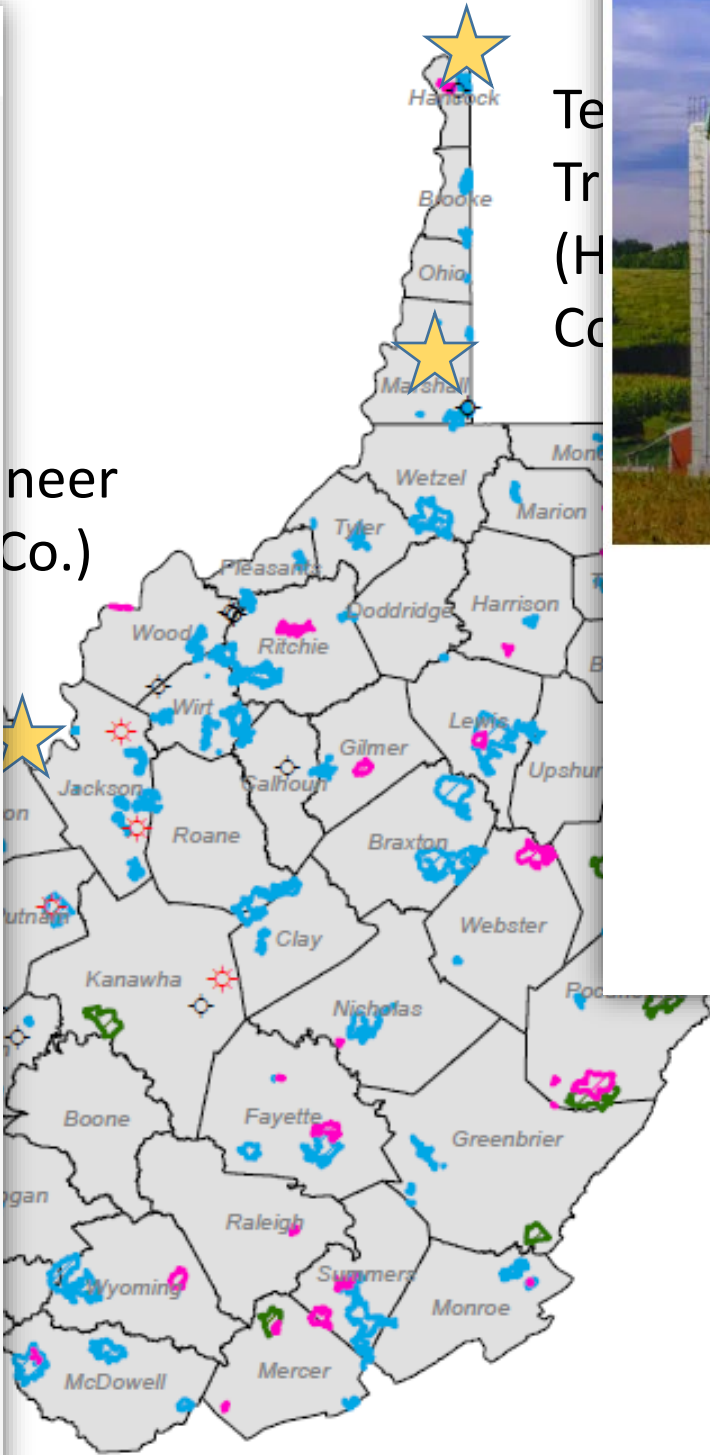
September 20, 2023



Houston-based Fidelis New Energy has started development and launched permitting for a \$2-billion hydrogen production plant in West Virginia. It will power an associated data center megasite as well as industrial manufacturers, transportation companies and utilities. The energy company said the Mountaineer GigaSystem in Mason County would produce blue hydrogen from natural gas and store CO2 emissions underground on state-owned property, with its first phase to open in 2028.

Fidelis has finalized with state officials an operating agreement for sequestration pore space and targeted storage capacity. It selected Battelle Carbon Services in early September to drill and collect test well data and submit sequestration permit applications, and has a letter of intent with Babcock & Wilcox to evaluate, develop and deliver four hydrogen production plants at the site using biomass and natural gas.

PUBLIC LANDS of WEST VIRGINIA



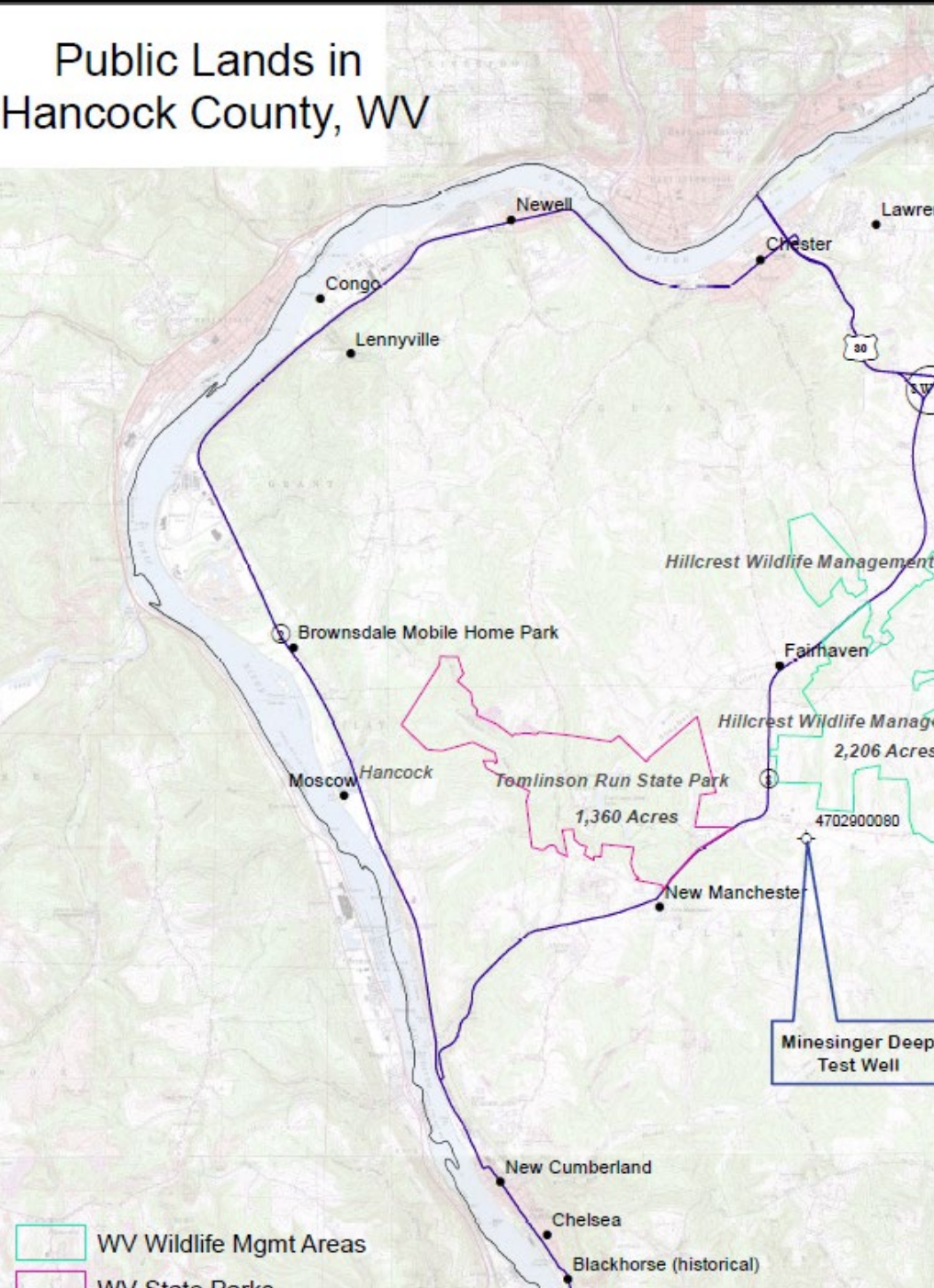
neer Co.)

Tenaska is developing a carbon capture and storage (CCS) project in Hancock County, West Virginia.



A New Project in the Tri-State.

Public Lands in Hancock County, WV



Tenaska is developing a carbon capture and storage (CCS) project in Hancock County, West Virginia. The project would be captured and transported to geologic storage in the area.

CCS projects like this help businesses add value to their operations, create regional employers, while also bringing economic benefits to the community.

Our team looks forward to working with the community on a CCS project that is safe and mutually beneficial.

- WV State Parks
- WV State Forests
- WV Wildlife Mgmt Areas

WV_Deep_Wells_ Well Type

- Service
- Dry
- Oil - Gas
- Oil
- Gas
- Unknown

SB 162 (2023) vs. SB 627 (2025)

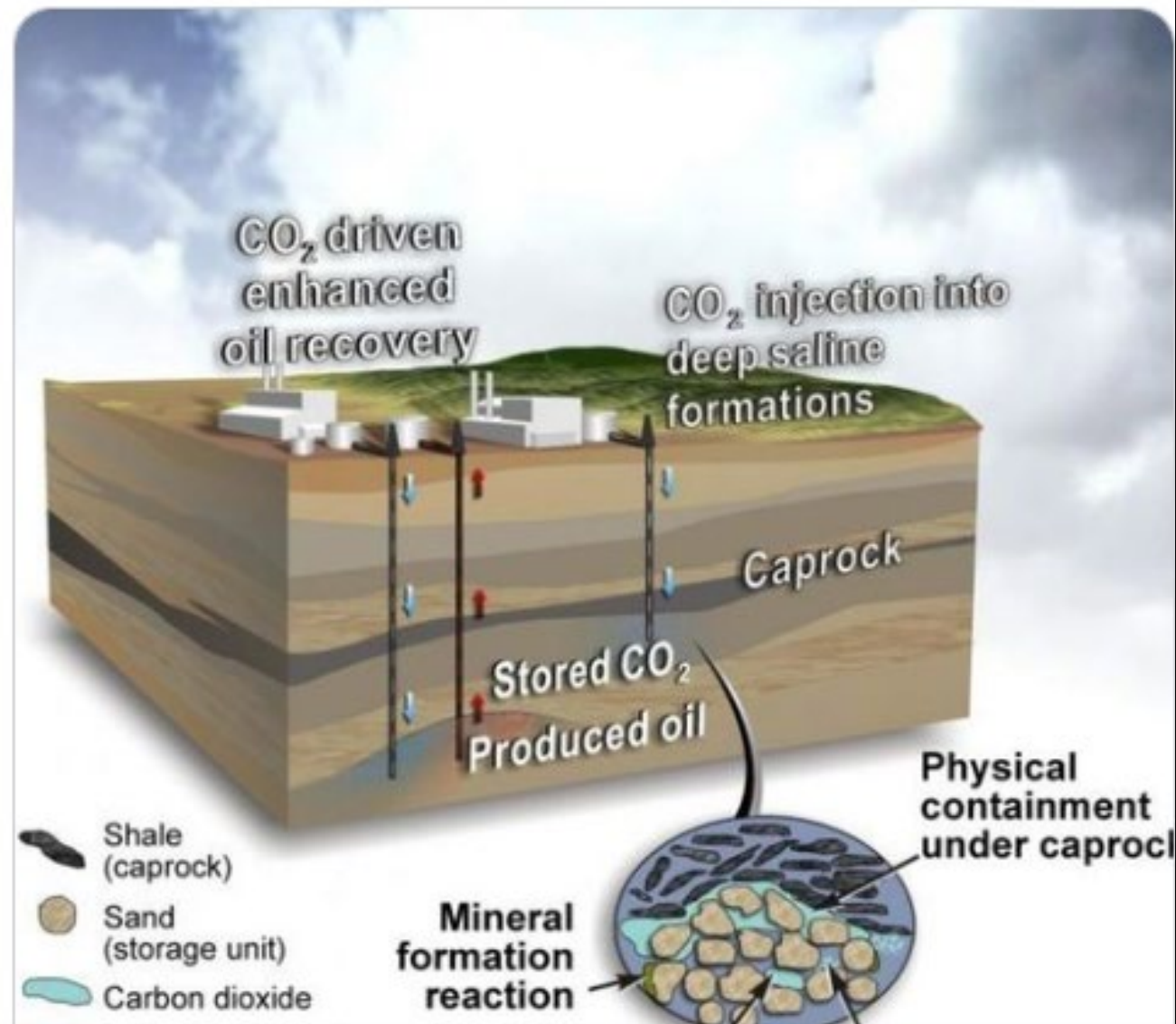


West Virginians for Public Lands

January 16 · 🌐

Carbon capture might be a good idea... BUT this bill SB 162 whizzed through the Senate with no hearings, no committees, no debate, no public input. WV DNR can lease out your public lands to inject carbon in the "pore area" (that's where ground water is stored in the soil!) under YOUR public lands.

Why the rush? We have questions about the impacts on our state forests, wildlife management areas, or other public lands. New roads? Heavy truck traffic? Noise from the process? C... See more



WEST VIRGINIA
ENVIRONMENTAL COUNCIL

WVEC Action Alert Protect WV State Parks – Reject SB 627!

WV Rivers Coalition March 4, 2025 📁 Action Alerts 💬 Comments

From our Partners at WV Rivers Coalition

Two years ago, we secured an important victory by protecting our State Parks from underground carbon sequestration. **Now, with the introduction of Senate Bill 627, these protections are at risk.**

If passed, [SB 627](#) would allow carbon sequestration in our State Parks, putting our beloved public lands and recreational spaces in jeopardy.

Imagine the peaceful atmosphere of Watoga disturbed by constant truck traffic, or the natural beauty of Blackwater Falls interrupted by a pipeline. Injection stations at Tomlinson Run, Chief Logan, and Babcock would alter the tranquility that so many enjoy.

Our State Parks are a sanctuary — places where we can hike, explore, and experience nature in its purest form. We cannot sacrifice these irreplaceable spaces for undefined economic development.

We need your help today. [Please get in touch with the members of the Senate Committee on Economic Development and urge them to reject SB 627.](#) Let them know you value our State Parks as they are — wild and wonderful.

Thank you for standing with us to protect the heart of West Virginia's natural beauty.

[Take action now!](#)





Thank You!

jessica.p.moore@wv.gov

STATE UPDATES – WYOMING

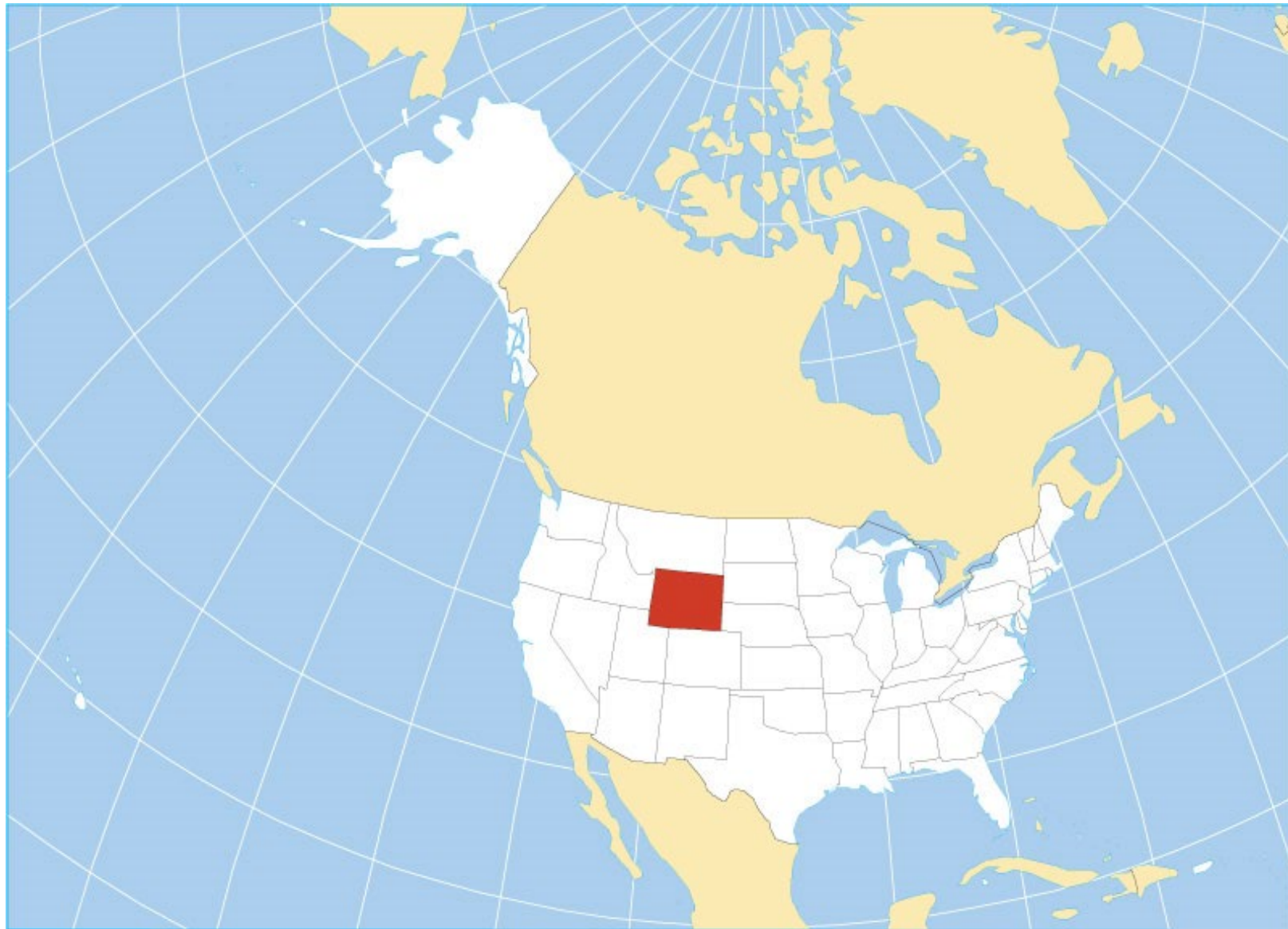
2025 AMERICAS FORUM ON CARBON CAPTURE & STORAGE

Hosted by the Global CCS Institute & Embassy of Canada

April 8, 2025

Presented by: *Lily R. Barkau, P.G., Water Quality Division,
Groundwater Section Manager*

Overview



- ◆ Wyoming Carbon Sequestration Regulations
- ◆ Project Updates – Challenges, Successes, and Opportunities

Wyoming's Geologic Sequestration History

- 2007 – Carbon Sequestration Working Group
- 2008 – 2023 Statutes and regulations in place for permitting, unitization, pore space, the title of CO₂, long-term stewardship, and transfer of liability. The Federal UIC program does not speak to unitization, pore space, the title of CO₂, long-term stewardship, and liability
- Wyoming received primacy of UIC Class I through V wells in 1983. Primacy of UIC Class VI wells was issued in September 2020.



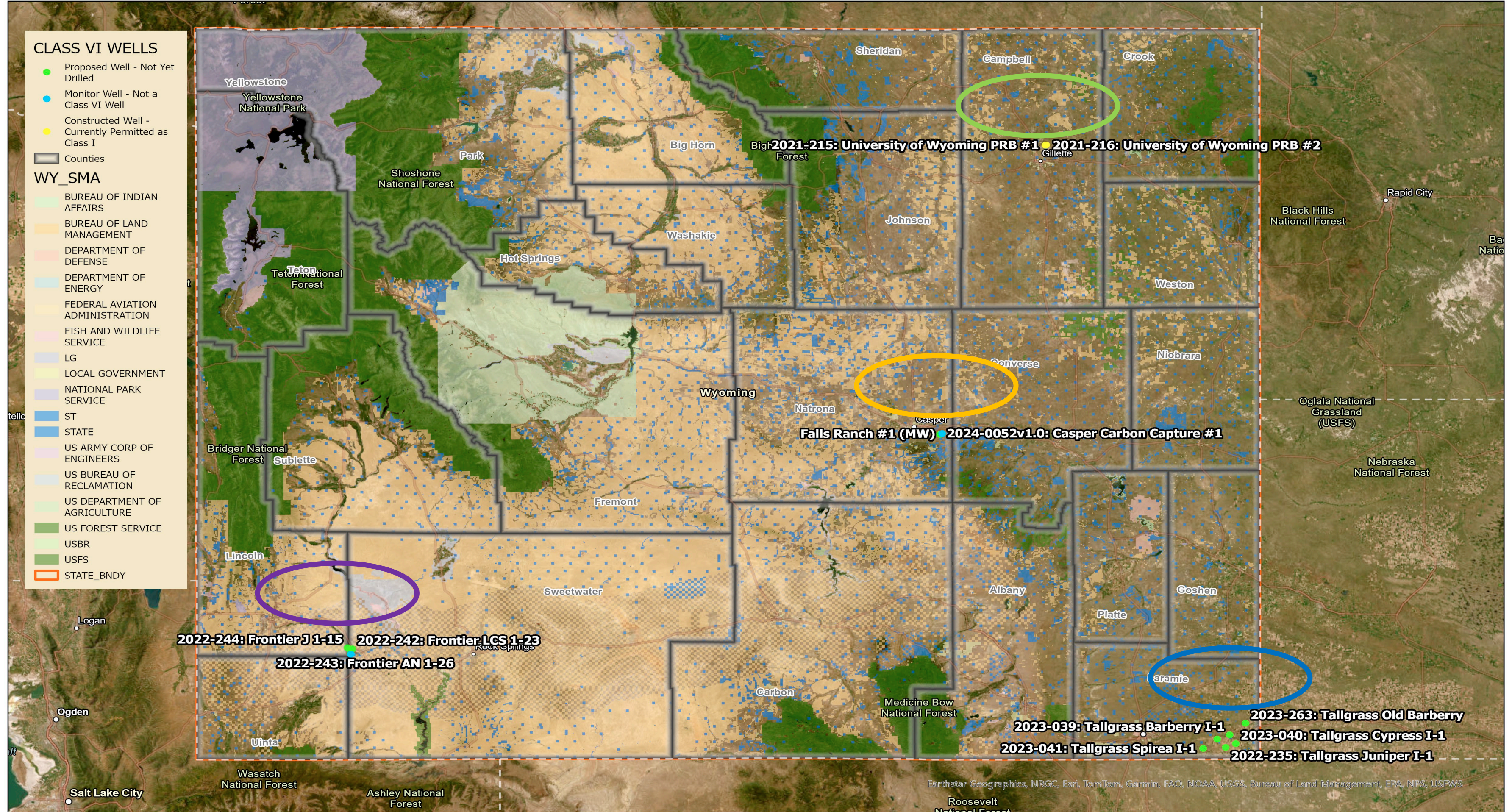
Class VI Permit Applications

Current Status
Project Challenges

Wyoming's UIC Class VI Permitting Process

- Informational Meeting
- Pre-application Meeting
- Application
- Completeness/Technical Adequacy Review
- Public Notice Draft Permit
- **Permit to Construct**
- Well Construction and Pre-injection Testing
- Permit Modification Application
- Completeness/Technical Adequacy Review
- Public Notice Draft Permit
- Unitization Order (if applicable)
- **Permit - Authorization to Inject**

Wyoming Class VI wells and Federal Land Ownership



Summary

- ◆ Challenges outside of regulatory framework currently exists:
 - Project vs. Individual Well Permitting – continue to evaluate permitting efficiencies
 - Pore Space: Private, State, and Federal Land Ownership – MOU with BLM on roles, responsibilities, and collaboration
 - Interstate Permitting Collaboration - MOU with neighboring states to address

Notification and Sharing Information

Permit to Construct, Stratigraphic or Science Wells,
Authorization to Inject

Property Rights/Pore Space; Unitization

Financial Assurance

Emergency and Remedial Response

Cross-boundary Infrastructure

Long-term Stewardship

- Aquifer Exemption



Class VI

Home > Water Quality > Groundwater > Underground Injection Control > Class VI



Contact

Electronic Documents Submittal

Forms and Guidance

GEM Database

Rules and Regulations

Abandoned Mine Land

Administration

Air Quality

Industrial Siting

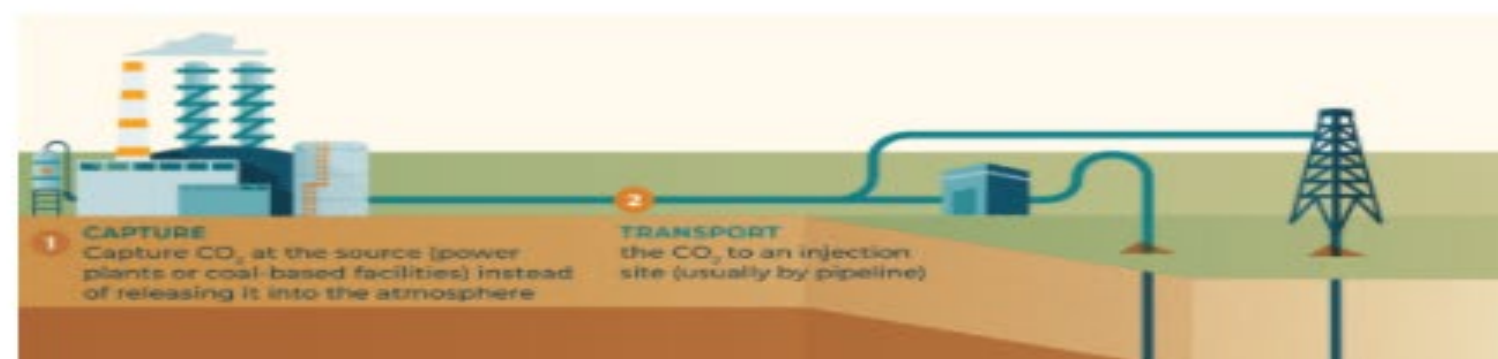
Land Quality

Solid & Hazardous Waste

Water Quality

Class VI Carbon Capture, Utilization & Storage (CCUS) refers to the process in which carbon is captured from industrial processes and either utilized by turning the carbon into a new product or stored by injecting the carbon into a storage site, usually underground in a geologic formation.

[Click here to Sign up for the Class VI listserv](#)



Related Programs

[Underground Injection Control](#)

[Class I](#)

[Class V](#)

[Class VI](#)

[Public Notices](#)



BREAK



We'll be back at
3:30pm ET

Next session 

ENABLING POLICIES AND MARKET MECHANISMS



Jessie Stolark

Executive Director at
**Carbon Capture
Coalition**



Isabela Morbach

Cofounder and
Director at **CCS
Brasil**



James Fann

President and CEO at
**International CCS
Knowledge Centre**



Noah Deich

Climate Fellow at
Stripe



Poh Boon Ung

+ MODERATOR +
General Manager,
Business Development
**Global CCS
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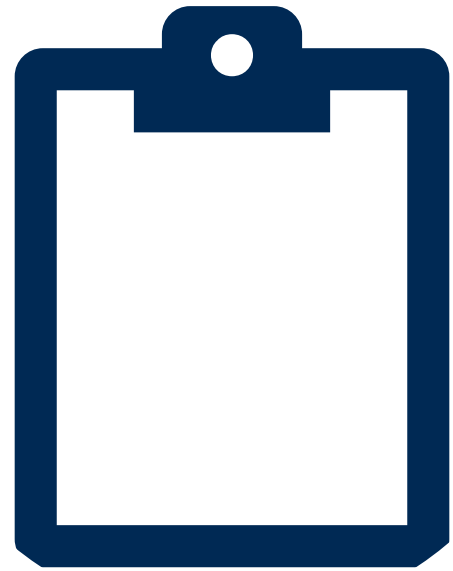
CLOSING KEYNOTE



Justin Riemer

CEO at Emissions Reduction Alberta

THANK YOU



Take our survey!

Scan this QR code for a simple 5 question survey to help us improve next year's forum

