



NARUC

National Association of Regulatory Utility Commissioners

Coal and Carbon Capture Provisions in the Inflation Reduction Act

September 1, 2022, 2-3 PM ET

Moderator: Hon. Ellen Nowak, Wisconsin

Panelists:

Anne Loomis, Troutman Pepper

Jessie Stolark, Carbon Capture Coalition

Adam Banig, United Mine Workers of America

Opening Remarks

Hon. Ellen Nowak,
Wisconsin



Panelists

- **Anne Loomis**, Troutman Pepper
- **Jessie Stolark**, Carbon Capture Coalition
- **Adam Banig**, United Mine Workers of America



Coal and Carbon Capture Provisions in the Inflation Reduction Act

September 1, 2022

Extension and Modification of Carbon Capture Tax Credit

- **Section 45Q of the Internal Revenue Code provides an income tax credit for the capture and utilization or sequestration of carbon oxide.**
- **Key modifications to the Section 45Q credit under the Inflation Reduction Act:**
 - Higher credit amounts (subject to prevailing wage and apprenticeship requirements described below) for projects placed in service after 2022
 - Extended “beginning of construction” period for qualification – extended from end of 2025 to end of 2032
 - Lower minimum capture requirements for projects placed in service after enactment (Aug. 16, 2022)
 - Direct pay and credit transferability for taxable years beginning after 2022
- **Prevailing wage and apprenticeship requirements:**
 - Laborers and mechanics must be paid prevailing wages during construction and for alteration and repair of project during 12-year credit period
 - Applicable percentage of labor hours of construction, alteration, and repair must be performed by apprentices
 - Taxpayer, contractor, or subcontractor employing 4 or more individuals to perform construction must employ at least one qualified apprentice

Higher Credit Amounts

	Pre-IRA (reflects 2027 amounts)	IRA*: Industrial and Electricity Generation	IRA*: Direct Air Capture
Secure geological storage	\$50/metric ton	\$85/metric ton	\$180/metric ton
Carbon utilization projects (conversion to useful products or enhanced oil recovery)	\$35/metric ton	\$60/metric ton	\$130/metric ton

*If prevailing wage and apprenticeship requirements are not met and construction on project does not begin before 60 days after guidance on labor requirements is issued, credit amounts are 20% of values listed.

Lower Minimum Capture Requirements

	Pre-IRA (metric tons per year)	IRA (metric tons per year)
Direct air capture	100,000	1,000
Non-EOR utilization (if emitting less than 500,000 metric tons/yr)	25,000	Based on project type
Industrial facilities	100,000	12,500
Electric generating units	500,000	18,750 with capture design capacity of at least 75% of baseline carbon oxide production

Direct Pay and Transferability

Taxpayers can receive direct payment for the full value of the credit for the first 5 years after the equipment is placed in service.

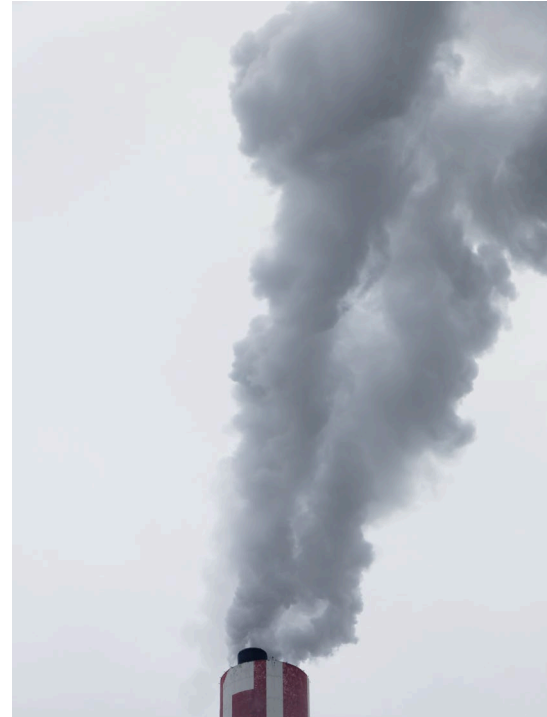
Tax-exempt entities can receive direct payment for the full 12-year credit period.

Taxpayers can transfer the 45Q credit to an unrelated party for cash

- Inevitable haircut of the credit
- No ability to transfer depreciation

Remaining Uncertainties

- **IRS guidance needed:**
 - Prevailing wage and apprenticeship requirements
 - Timing and mechanics of direct pay
 - 75% of baseline carbon oxide production
- **Development of tax credit transferability market**
- **Involvement of tax equity investors**
- **Permitting**





Anne Loomis

Partner

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Coal and Carbon Capture Provisions in the Inflation Reduction Act

*Jessie Stolark, Public Policy & Member Relations Manager
Carbon Capture Coalition*

Great Plains Institute: Leading Federal and State Initiatives in Carbon Management and Industrial Decarbonization



**CARBON CAPTURE
COALITION**

**STATE
CARBON
CAPTURE
WORK
GROUP**



**Industrial
Innovation
Initiative**

a partnership between Great Plains Institute and
World Resources Institute



**Carbon Management
Action Network**

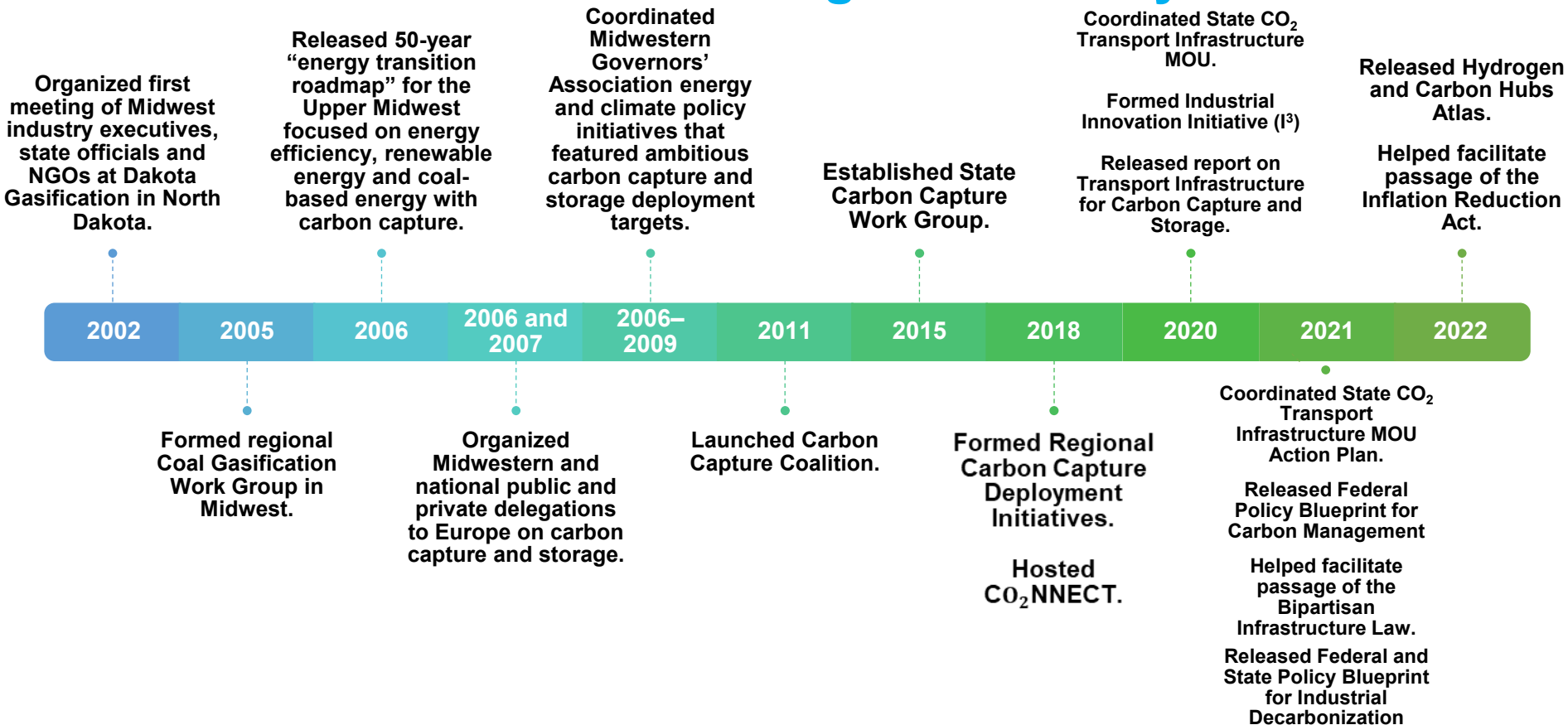
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Better Energy.
Better World.

Great Plains Institute: Nearly Two Decades Working on Carbon Management Policy





CARBON CAPTURE COALITION

Unprecedented National Coalition in U.S. Energy & Climate Policy

Goal: Economywide deployment of the full suite of carbon management options—carbon capture, removal, transport, utilization and storage—to reduce emissions, foster domestic energy and industrial production, and support high-wage jobs.

Climate, jobs and energy/industrial benefits **unite diverse interests in a common purpose**

Over 100 members, including companies, unions and conservation and environmental policy organizations.



To learn more and view our
complete membership list, visit
www.carboncapturecoalition.org

Federal Investments for Carbon Management



Infrastructure Investment and Jobs Act: Key Carbon Management & Industrial Decarbonization Provisions

For more information, see our [IIJA Factsheet](#)

CARBON MANAGEMENT

Large Scale Carbon Capture Pilot Projects	\$937 M over four-year period
Carbon Capture Demonstration Programs	\$2.54 B over four-year period
Direct Air Capture Technologies Prize Competitions	a) Precommercial: \$15 M for fiscal year 2022 b) Commercial: \$100 M for fiscal year 2022
Carbon Utilization Program	\$310 M over five-year period
Carbon Capture Technology Front-end engineering and design program	\$100 M over five-year period
SCALE Act financing for CO ₂ transport and storage infrastructure	\$4.6 B over five-year period to carry out the SCALE Act
4 Direct Air Capture Hubs	\$3.5 B over five-year period
Total funding over five-year period	\$12.1 Billion

ENERGY EFFICIENCY

Industrial Research and Assessment Centers	\$550 M over a five-year period
Smart Manufacturing Leadership	\$50 M over five-year period
Total funding over five-year period	\$600 Million

HYDROGEN

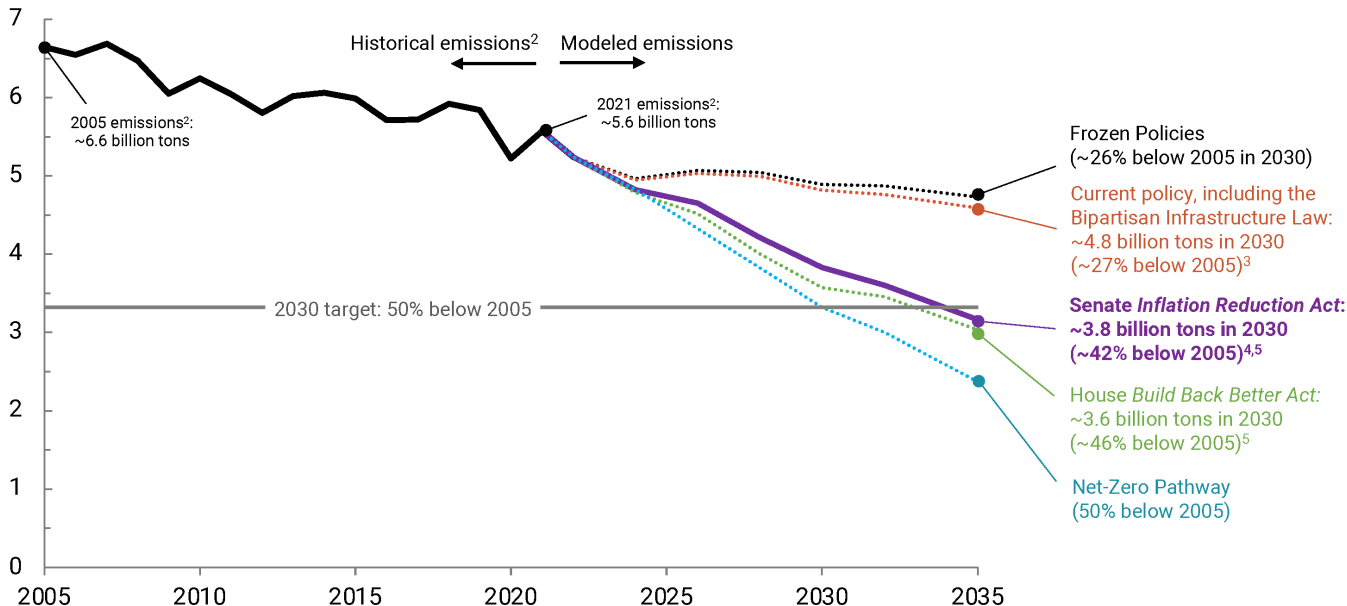
Regional Clean Hydrogen Hubs	\$8 B over a five-year period
Clean Hydrogen Manufacturing and Recycling Program	\$500 M over a five-year period
Green Hydrogen Demonstration, Commercialization, and Deployment Program	\$1 B over a five-year period
Total funding over five-year period	\$9.5 Billion

OTHER INDUSTRY PROVISIONS

Industrial Emissions Demonstration Projects	\$500 M
Advanced Energy Manufacturing and Recycling Grant Program	\$750M
Total funding over five-year period	\$1.25 Billion

Historical and Modeled Net U.S. Greenhouse Gas Emissions (Including Land Carbon Sinks)

billion metric tons CO₂-equivalent (Gt CO₂-e)¹



The Senate *Inflation Reduction Act* could:

- **cut annual emissions in 2030 by an additional ~1 billion metric tons** below current policy (including the Bipartisan Infrastructure Law)
- **close two-thirds of the remaining emissions gap** between current policy and the nation's 2030 climate target (50% below 2005)
- **get the U.S. to within ~0.5 billion tons** of the 2030 climate target
- **reduce cumulative GHG emissions by about 6.3 billion tons over the next decade** (through 2032), ~80% of the cumulative reductions under the House-passed *Build Back Better Act*

1 - CO₂ equivalent emissions calculations use IPCC AR4 100 year global warming potential as per [EPA Inventory of Greenhouse Gas Emissions and Sinks](#). All values should be regarded as approximate given uncertainty in future outcomes.

2 - Historical data from [US EPA Inventory](#) for 2005-2030; 2021 preliminary emissions estimate assumes total net emissions change in proportion to 6.7% year-on-year change in CO₂ emissions from energy and industrial processes estimated by [Global Carbon Monitor](#).

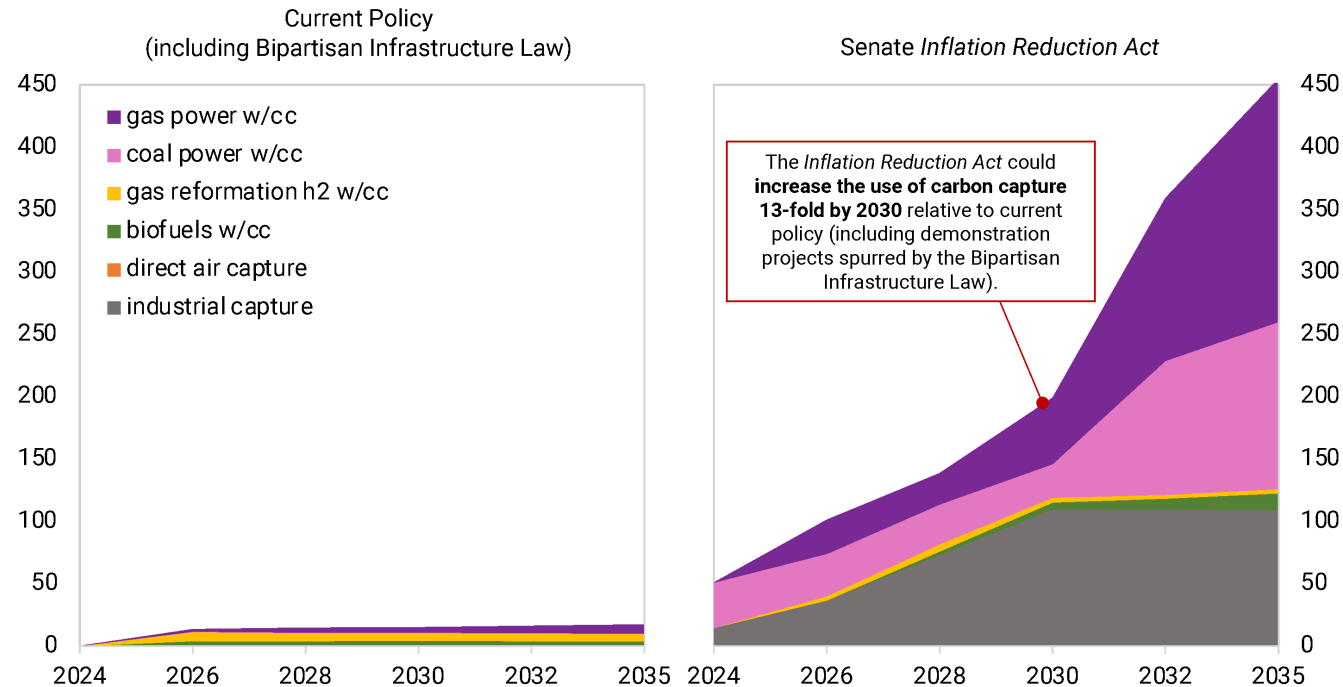
3 - Modeled emissions exclude any changes in passenger and freight miles traveled due to surface transportation, rail, and transit investments in IIJA. [According to the Georgetown Climate Center](#), emissions impact of these changes depend heavily on state implementation of funding from IIJA, which could result in anywhere from -14 Mt to +25 Mt change in CO₂ emissions from transportation in 2030.

4 - Results reflect preliminary modeling based on the [July 27, 2022 draft legislation](#).

5 - Results reflect average of estimated high and low oil & gas production scenarios, which span +/- 20 Mt CO₂-e in 2030 (see p. 13-14). Impact on land carbon sinks based on analysis by [Energy Innovation](#).

Annual Carbon Dioxide Captured for Transport and Geologic Storage

million tons per year (Mt/y)



Incentives for carbon capture, storage, and use in the *Inflation Reduction Act* would build on demonstration funding in the Bipartisan Infrastructure Law to **make carbon capture a viable economic option** for the most heavily emitting industries, such as steel, cement, and refineries, as well as power generation from coal and natural gas.

The total volume of CO₂ captured for transport and geologic storage across energy and industry could reach **200 million tons per year** by 2030, if sufficient investment in transport networks and storage basins can be deployed.¹

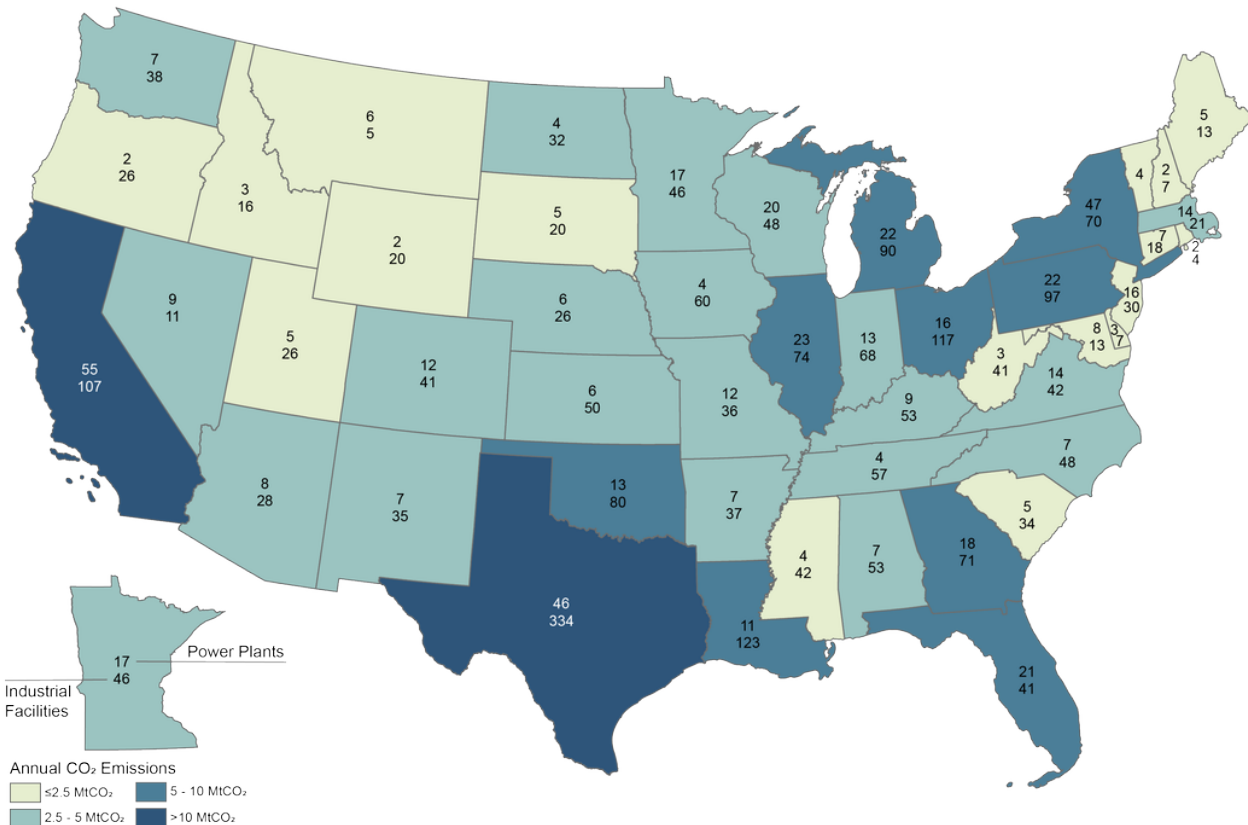
That includes roughly 110 million tons across industries and 90 million tons in power generation.² Modeled results include 6 gigawatts of carbon capture retrofits at existing coal-fired power plants and 18 gigawatts of gas power plants with carbon capture installed by 2030.

1 – Growth in annual CO₂ injection capacity in storage basins is likely to constrain the pace of carbon capture deployment. This modeling assume maximum annual CO₂ injections increase to 200 Mt CO₂/y by 2030 based on expert input and Princeton *Net-Zero America* study.

2 – Industrial CO₂ capture volumes are fixed exogenously based on analysis in Larson et al., 2021, “[Capturing the Moment: Carbon Capture in the American Jobs Plan](#),” Rhodium Group, April 2021. Carbon capture in fuels conversion (biofuels, hydrogen, ammonia) and power generation are optimized in RIO modeling, constrained by remaining available annual injection volume limit.

45Q Newly Eligible Facilities

- The Inflation Reduction Act expands the number of facilities which are eligible for the 45Q tax credits by significantly lowering the per ton capture thresholds.
- Approximately 54 percent of power plants and 75 percent of industrial facilities fall below the pre-IRA threshold.



Facility Type	Total Facilities	Total Annual Emissions (MtCO ₂)	Average Annual Emissions per Facility (tCO ₂)
Power Plants	597	90.5	151,664
Industry	2,453	110.3	44,980

*Table values include Alaska and Hawaii. Data from U.S. Environmental Protection Agency Office of Atmospheric Programs, Greenhouse Gas Reporting Program (GRGHP), 2020. Data accessed August, 2022. MtCO₂ = million metric tons of CO₂; tCO₂ = metric tons of CO₂.

Carbon and Hydrogen Hubs

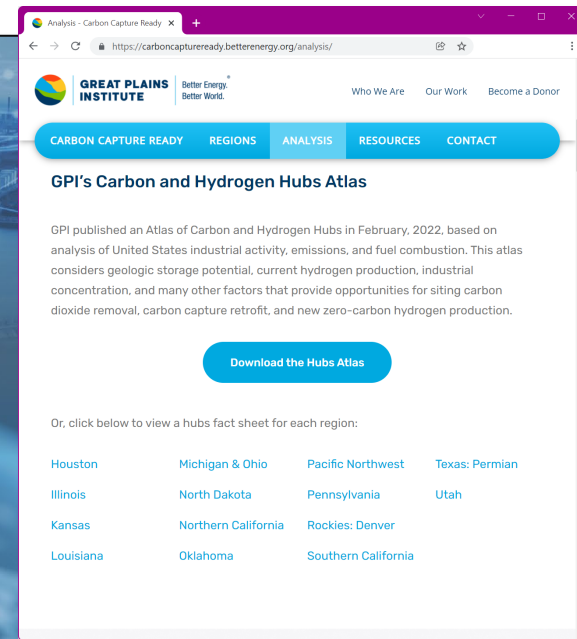


An Atlas of Carbon and Hydrogen Hubs for United States Decarbonization

February 2022



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Download the atlas at:
carboncaptureready.org

Potential US Carbon and Hydrogen Hubs

Guiding Criteria

- High concentration of large industrial emitters
- High quantities of fossil fuel use for on-site industrial energy production
- Presence of 45Q tax credit qualifying facilities for carbon capture retrofit, as well as identified near- and medium-term capture opportunities
- Current reported production of hydrogen and ammonia (optional)
- Large geologic saline and fossil formations for permanent CO₂ storage
- Existing multi-modal commodity distribution infrastructure such as freight railroads, barge waterways and ports, and freight truck interstate highway routes
- Existing conventional fossil fuel distribution infrastructure for hydrogen blending and established right-of-way that minimizes impact of CO₂ transport infrastructure

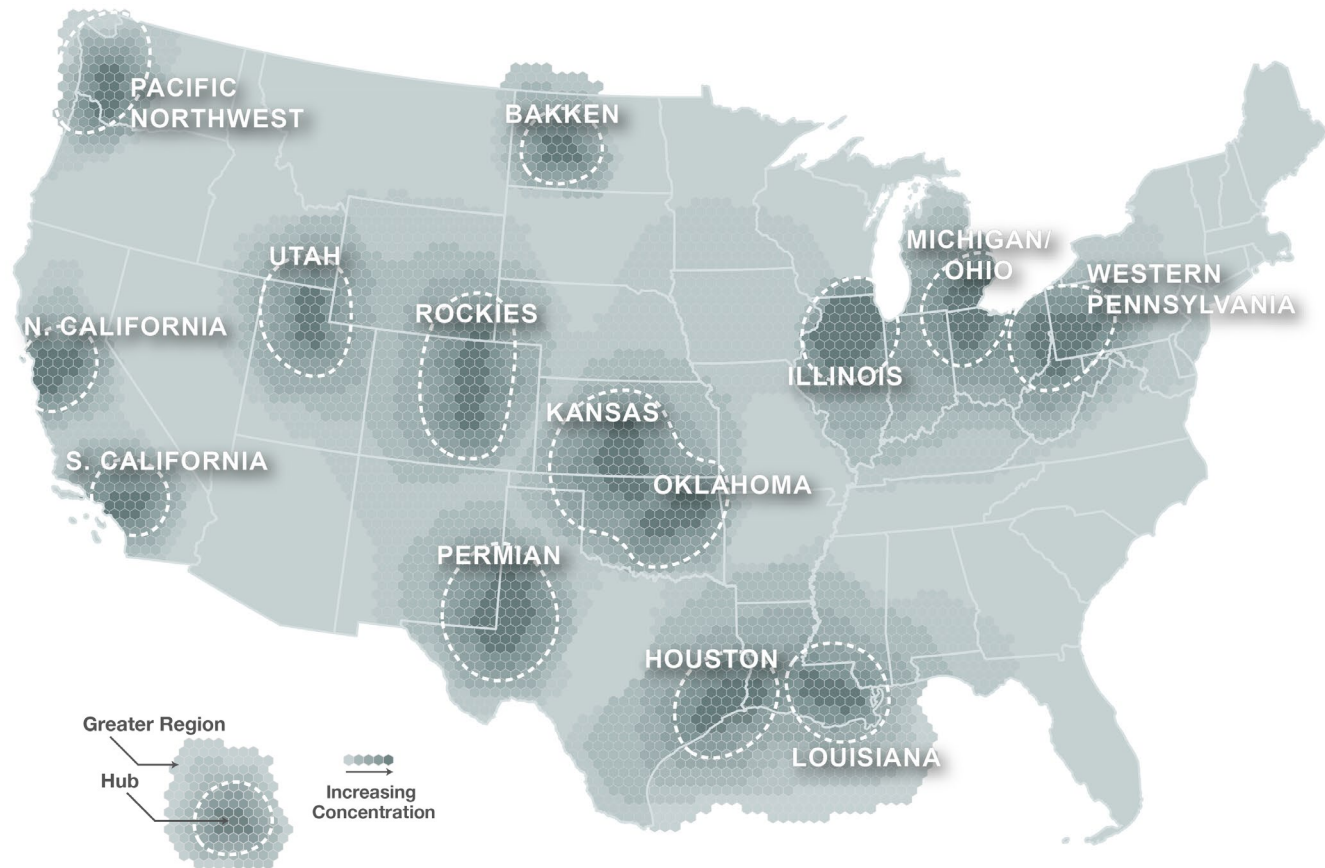


Figure authored by Elizabeth Abramson, GPI, 2021
Source: Carbon and Hydrogen Hubs Atlas, GPI 2022

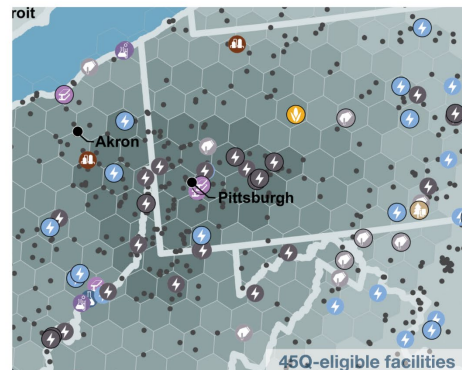


Western Pennsylvania

Carbon capture and storage is an essential tool for achieving midcentury climate goals, maintaining the competitiveness of US industry, and protecting and creating high-wage jobs. Carbon capture is crucial in decarbonizing key carbon-intensive industries where CO₂ emissions are inherent to the chemistry of production processes and cannot be eliminated solely by switching to low-carbon electricity. The US has capacity to safely and permanently store thousands of years of carbon emissions in geologic saline formations.

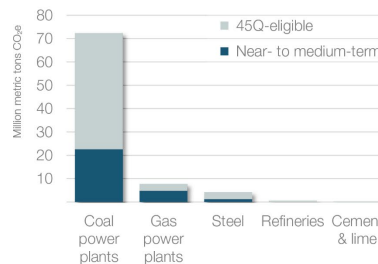


Carbon Capture and Storage

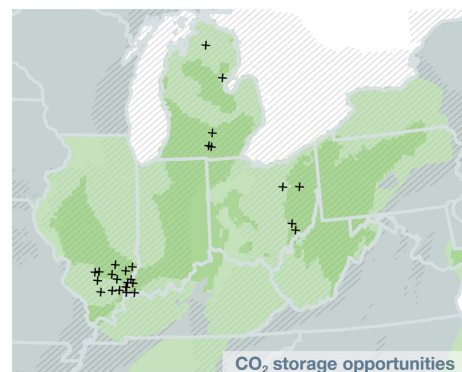


The Section 45Q tax credit lowers cost barriers to carbon capture and storage. Among the 20 industrial and power facilities in the Western Pennsylvania hub that meet emissions thresholds for Section 45Q eligibility, nine have been identified as near- to medium-term candidates for capture retrofit over the next 10 to 15 years.

Carbon capture opportunities

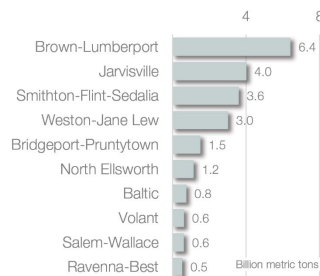


- Industrial and power facilities emit **115.7 Mt CO₂e per year**
- 45Q-eligible** facilities emit **85.5 Mt CO₂e per year**
- 28.6 Mt CO₂ per year** are **capturable** in the near- to medium-term

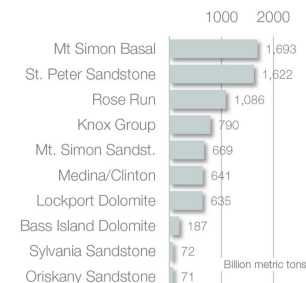


Western Pennsylvania has potential to act as a major carbon storage destination for capture facilities and carbon removal. The state of Pennsylvania has potential to store 18 billion metric tons of CO₂ in secure geologic saline formations, and also has extensive capacity for carbon storage in geologic fossil basins.

Fossil storage formations by CO₂ storage capacity



Saline storage formations by CO₂ storage capacity



Hub Atlas – Future Research

Study Components

1. Identify near-term opportunities for CO₂ capture retrofit within the context of an updated 45Q tax credit
2. Model areas of CO₂ storage and use
3. Expand modeling of optimized CO₂ transport infrastructure to describe capture and storage opportunities.

Primary Partners:

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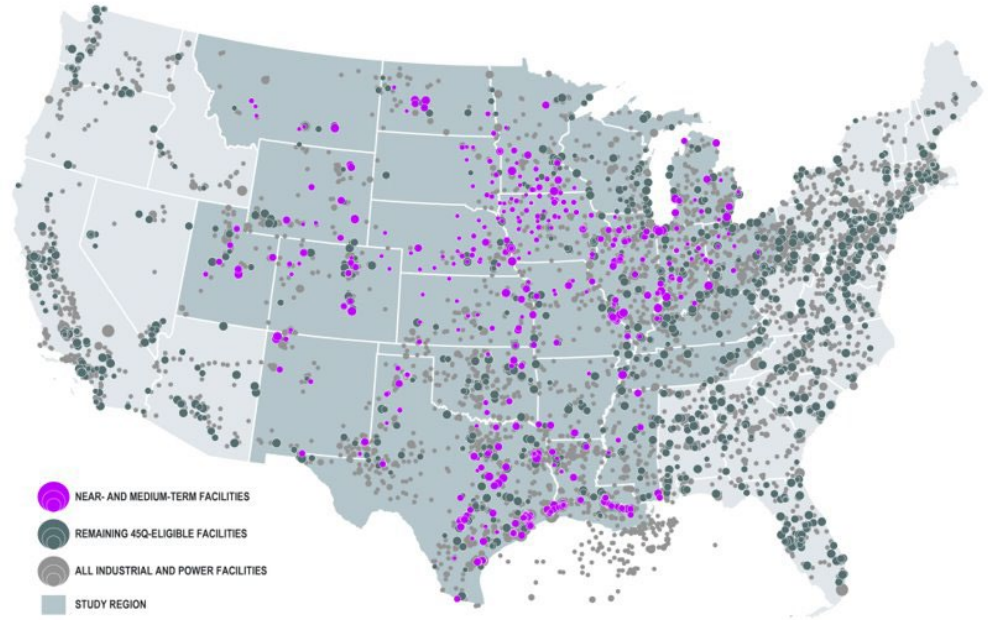


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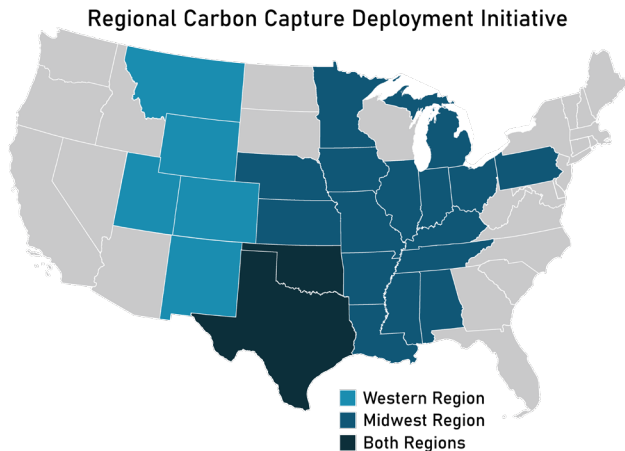
CO₂ Emissions Sources



Ensuring that States are Carbon Capture Ready



Regional Carbon Capture Deployment Initiative / State Advocacy



- Announced at the first [national leadership conference](#) on carbon capture - *CO₂NNECT 2018: Carbon Capture Pathways to Clean Energy* - held June 17-19 in Jackson Hole, WY.
- Over 800 state officials, companies, NGOs, and unions from two dozen states interested in supporting state and federal policy development
- 24 states
- Work Group and RDI coordinating state policymaker and stakeholder engagement, development of policy recommendations, and regional deployment modeling and jobs analysis.



State policies to enable hubs development

State policy will play a complimentary role to federal policy by:

- ✓ Increasing project feasibility
- ✓ Bridging remaining project gaps
- ✓ Enabling shared infrastructure systems, and;
- ✓ Creating economies of scale

States should consider:

- ✓ Regulatory policies and planning
- ✓ Financial incentives
- ✓ Market development policies



Carbon Management 2022 Policy Trends

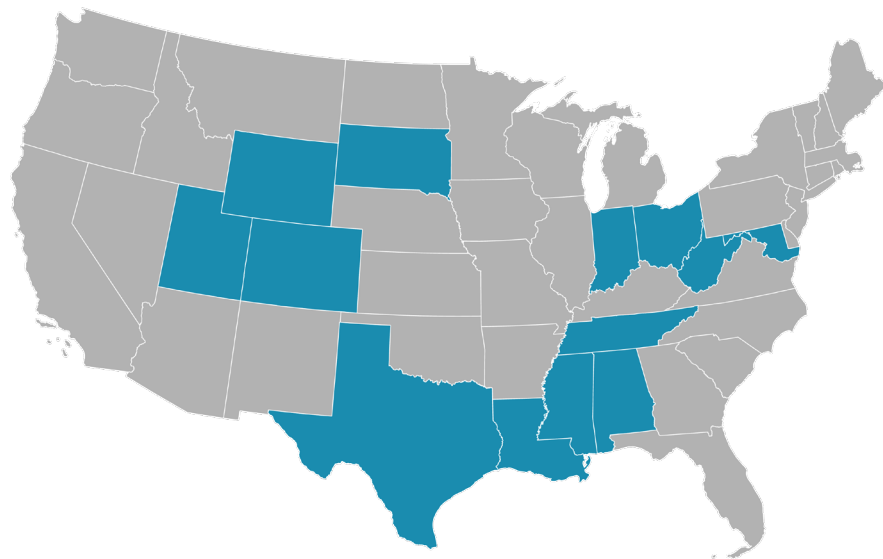
60+ bills were introduced in **26 state houses** in 2022 relating to carbon management

Topics include:

- Industrial Grant programs
- Task Force Development
- Underground Storage
- Class VI

At the state level, legislators enacted bills related to:

- Regulatory Policies and Planning.
- Financial Incentives.



*States with **signed** legislation relating to **carbon management** in 2022.*

Carbon Capture Ready Website

Regional Carbon Capture Deployment Initiative (RDI) Homepage

- State carbon capture fact sheets
- Jobs and economic impact fact sheets
- Analytical white papers
- Policy briefs
- Other carbon capture resources

REGIONAL CARBON CAPTURE DEPLOYMENT INITIATIVE

JOBS AND ECONOMIC IMPACT OF CARBON CAPTURE DEPLOYMENT Texas

TOTAL JOBS POTENTIAL
Project Jobs 15,010 Operations Jobs 9,230 Infrastructure Jobs 2,850

Texas has the opportunity to create an annual average of up to 17,860 project jobs over a 15-year period and 9,230 ongoing operations jobs through the deployment of carbon capture at 95 industrial and power facilities. The retrofit of equipment at these facilities has the potential to capture nearly 161 million metric tons of carbon dioxide (CO₂) per year. Along with the development of CO₂ transport infrastructure, this would generate up to over \$59 billion in private investment.

CREATING JOBS & CAPTURING CARBON

Carbon capture is essential to meeting mid-century emissions reduction goals while retaining and growing a domestic base of high-wage energy, industrial, and manufacturing jobs. Carbon capture retrofits require facilities to be outfitted with capture technologies such as amine scrubbers to remove CO₂ from exhaust gas and compressors to make the CO₂ transport-ready, that are dependent upon the type of industrial plant and vary across industries and facilities. There are jobs associated with the equipment, materials (e.g. cement and steel), engineering, and labor required to install the capture technology, as well as ongoing jobs to operate and maintain the retrofits. These are referred to as project jobs and operations jobs.

Rhodium Group performed an economic analysis based on the Regional Carbon Capture Deployment Initiative's near- and medium-term capture potential scenario.¹ The Rhodium analysis quantifies the economic impact and employment opportunities of carbon capture retrofit projects by deploying state-specific data in the IMPLAN economic model. The analytical results measure the impact of project investment and operation costs through expected annual jobs. Average annual project jobs were calculated assuming deployment of all projects within the 15-year period from 2021-2035. The jobs reported are in-state jobs, directly associated with carbon capture retrofits. They do not include other jobs at the facilities, nor indirect and induced jobs.

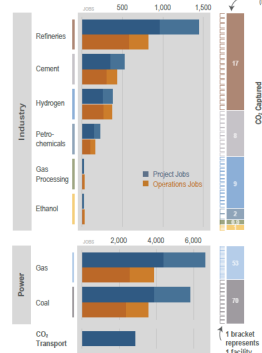
CARBON CAPTURE JOBS AND ECONOMIC IMPACT SUMMARY

Industry	Number of Facilities	Total Capture Target Metric Tons	Private Investment Million Dollars	Annual Average Project Jobs 2021-2035	Annual Operations Jobs
Cement	11	8,000,000	\$1,200 - \$1,800	350 - 520	310 - 430
Coal Power	11	70,000,000	\$14,000 - \$20,000	3,870 - 5,800	2,360 - 3,540
Ethanol	4	1,000,000	\$60 - \$90	15 - 25	20 - 30
Gas Power	28	53,000,000	\$15,000 - \$25,000	4,400 - 6,600	2,570 - 3,850
Gas Processing	6	900,000	\$70 - \$100	20 - 25	20 - 30
Hydrogen	14	9,000,000	\$900 - \$1,300	260 - 380	270 - 370
Petrochemicals	2	2,000,000	\$500 - \$700	150 - 220	110 - 160
Refineries	19	17,000,000	\$2,600 - \$3,900	950 - 1,440	590 - 820
CO ₂ Transport Infrastructure	-	-	\$7,000,000,000	2,850	-

¹ Rhodium Group analytical results: rhg.com/research/

For more information, visit carboncaptureready.org

ANNUAL PROJECT AND OPERATIONS JOBS



Mt = million metric tons.

This figure depicts the low and high range of estimated annual average project jobs, transport infrastructure jobs, and ongoing operations jobs that could be created through carbon capture retrofits at industrial and power facilities in Texas. The potential amount of CO₂ captured and the number of potential near- or medium-term capture facilities in each industry are shown on the right.

carboncaptureready.org

Carbon Capture and Storage Infrastructure for Midcentury Decarbonization

This report provides data sources, details the analytical methodology, and identifies potential capture facilities throughout the Western and Midwestern regions, as well as primary modeling scenarios and conclusions on regional CO₂/font capture, transport, and storage opportunities.

Download the report below.

[Download Whitepaper](#)

Jobs and Economic Growth Fact Sheets

The Regional Deployment Initiative has released a series of state fact sheets on potential jobs creation and economic impact of carbon capture deployment, based on collaborative analysis by Rhodium Group. The Rhodium analysis quantifies the economic impact and employment opportunities of carbon capture retrofit projects by deploying state-specific data in the IMPLAN economic model.

Download each state fact sheet below:

Midcontinent Region →

Arkansas	Louisiana	Montana	Oklahoma
Colorado	Michigan	North Dakota	South Dakota
Iowa	Minnesota	Nebraska	Texas
Illinois	Missouri	New Mexico	Utah
Indiana	Wisconsin	Ohio	Pennsylvania

Thank you!



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Better World.

Remarks

Adam Banig,
United Mine Workers of America



Q & A

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Adam Banig, United Mine
Workers of America



- Upcoming: tour of NETL facilities in Morgantown, WV and Pittsburgh, PA
- Registration open for NARUC Annual Meeting
- Check www.naruc.org/cpi for information on upcoming activities



Thank you!

Visit www.naruc.org/cpi for more resources

Contact Kiera Zitelman
(kzitelman@naruc.org) and
Kathryn Kline (kkline@naruc.org)
with questions

