

Carbon Management Bipartisan Infrastructure Law Roadmap

The [Infrastructure Investment and Jobs Act](#), or Bipartisan Infrastructure Law (BIL) was signed into law by President Biden on November 15, 2021. It includes groundbreaking, widely supported, bipartisan provisions needed to commercialize carbon management, industrial decarbonization technologies and associated infrastructure at the scale required to meet midcentury climate goals, foster domestic energy and industrial production, and protect and create skilled jobs in local communities that consistently pay family-sustaining wages.

The historic package contains \$12.1 billion in federal funding over five-years for commercial deployment, large-scale demonstrations, and activities to enable deployment of carbon capture, removal, transport, utilization, and storage technologies, as well as direct air capture and hydrogen hubs. While these are unparalleled increases to federal investments in carbon management technologies, these funding levels mark a course correction towards building an even more ambitious foundation of federal policy support for carbon management technologies similar to the historic support that has been provided to help de-risk and commercialize other zero- and low-emissions energy technologies over the last several decades. The increased investment and ambition provided by the BIL is essential to ensure that carbon management technologies fulfill their key role in reaching net-zero emissions economywide and midcentury climate goals. The administration has aggressively worked to stand up new offices and programs funded by BIL in 2022, with several funding opportunity announcements (FOAs) released in the fall of 2022, and initial deadlines at the end of the year.

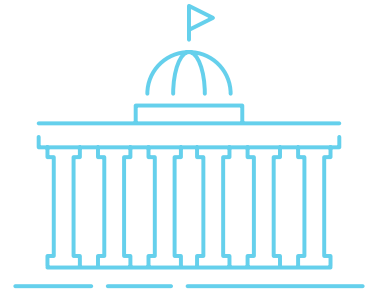
Bipartisan Infrastructure Investment and Jobs Act: Carbon Management Provisions

Program	Funding	Status	Deadlines
Carbon Capture Demonstration Projects Program	\$2.54 B	September 2022 FOA	Letter of Intent Deadline: 10/21/22 Application Deadline: 12/5/22
Carbon Capture Large-Scale Pilot Projects	\$937 M	January 2022 RFI	FOA not yet released
Carbon Capture Technology Program, Front-End Engineering and Design (FEED)	\$100 M	September 2022 FOA	Response Due: 11/28/22
Carbon Dioxide Transportation Infrastructure Finance and Innovation (CIFIA)	\$2.1 B	October 2022 FOA	Rolling
Carbon Storage Validation and Testing	\$2.5 B	September 2022 FOA	Response Due: 11/30/22
Carbon Utilization Program	\$310 M	Initial \$16.5 million FOA released August 2022	Seven projects selected
Commercial Direct Air Capture Technologies Prize Competitions	\$100 M	January 2022 RFI	FOA not yet released
Regional Clean Hydrogen Hubs	\$8 B	September 2022 FOA	Concept Paper Deadline: 11/7/22 Application Deadline: 4/23/23
Regional Direct Air Capture Hubs	\$3.5 B	May 2022 NOI	FOA not yet released

The Federal Role in Financing Carbon Management Deployment

In the same way that other low- and zero-carbon energy technologies were largely developed and commercialized through public-private partnerships, such as wind and solar, the federal government has played a key role in the development of some of the first carbon capture and storage projects, where the cost and risk of deploying these technologies at commercial scale remained prohibitive for private industry to shoulder alone.

The Department of Energy investments in commercial demonstration of carbon capture and storage technologies at industrial facilities have been highly successful and include hydrogen and ethanol carbon capture projects, respectively, which were both funded through the American Recovery and Reinvestment Act and continue to operate effectively today. However, much more investment is needed in the deployment of less commercially available technologies, to ensure that the U.S. remains not only a global leader in the development and deployment of these technologies, but that we can meet both net-zero emissions targets and midcentury climate goals. The funding provided in the BIL for carbon management remedies this by making a significant course correction in the federal investment to realize economies of scale.



Carbon Management's Role in Meeting Midcentury Climate Goals

Economywide deployment of the full value chain of carbon management technologies is essential if we are to meet ambitious but necessary midcentury climate goals. The International Energy Agency estimates that carbon management technologies will contribute 15 percent of emissions reductions to meet net-zero by 2070. Moving the goalposts from 2070 to 2050 would require 50 percent more carbon capture deployment, globally.

Since the foundational 45Q tax credit was reformed in 2018, there have been nearly [120 publicly announced](#) projects in the industry, power and direct air capture sectors that are in various phases of development. Additionally, approximately 70 percent of these announced projects intend to store captured CO₂ deep underground safely and permanently in secure geologic formations. The potential for geologic storage in the U.S. is enormous and represents a long-term, scalable climate solution. Coupled with the enhancements to the 45Q tax credit made in the recently enacted Inflation Reduction Act, these historic investments provide the most transformative and far-reaching policy support for the economywide deployment of carbon management technologies in the world, making a critical down payment on the investments in American innovation required to achieve net-zero emissions and midcentury climate goals.



Carbon Management Programs Funded through the BIL

- **Carbon Capture Demonstration Projects Program**

Under the newly formed Department of Energy's Office of Clean Energy Demonstrations, the Carbon Capture Demonstration Projects Program allocates \$2.54 billion to establish a carbon capture technology program for the development of at least six facilities to demonstrate transformational technologies that will significantly improve the efficiency, effectiveness, costs, emissions reductions, and environmental performance of carbon capture at power generation, industrial and manufacturing facilities. This program has a specific focus on integrating carbon capture, transport and storage technologies.

Demonstrating carbon management projects at commercial scale in key sectors including heavy industry and manufacturing are central to achieving our emissions reduction objectives and to driving near-term job creation and economic activity, while spurring additional project development. This is the first such investment in carbon management demonstrations since the funding provided under the American Recovery and Reinvestment Act, more than a decade ago.

- **Carbon Capture Large-Scale Pilot Projects**

The Carbon Capture Large-Scale Pilot Programs allocates \$937 million to establish a carbon capture technology program at the Office of Clean Energy Demonstrations. Pilot-scale projects are those that demonstrate these technologies beyond laboratory scale but are not yet ready for commercial scale demonstration and testing under real-world operating conditions. Pilot-scale projects are of significant scale so that projects can eventually advance to commercial scale demonstration or application.

- **Carbon Capture Technology Program, Front-End Engineering and Design**

For the first time, the BIL provides \$100 million for the Department of Energy's Carbon Capture Technology Program's Front-End Engineering and Design (FEED) program, to specifically provide funds for the buildout of carbon dioxide transport infrastructure necessary to deploy carbon capture utilization and storage technologies at commercial scale.



- **Carbon Dioxide Transportation Infrastructure Finance and Innovation**

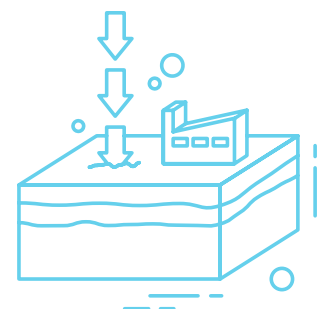
Under the Department of Energy's Loan Program Office, the Carbon Dioxide Transportation Infrastructure Finance and Innovation Program (CIFIA) allocates \$2.1 billion to help establish an interconnected, regional CO₂ transport system. CIFIA will provide flexible, low-interest loans and grants to cover a portion of the cost of common carrier CO₂ transport infrastructure development, lowering the risk of private sector investment. The Loan Program Office estimates that the funding available through CIFIA could support up to \$40 billion in CO₂ transport infrastructure investments across the country.

To deploy carbon capture at levels sufficient to meet midcentury climate goals, we must responsibly scale up an interconnected, nationwide network for transporting CO₂ captured from multiple industrial facilities, power plants and direct air capture plants to locations around the country where it can be put to beneficial use or safely and permanently stored in appropriate geologic formations. Available financing for large-scale, common carrier CO₂ transport mechanisms will allow capture and storage facilities to be connected cost-effectively, leading to significant build out of carbon management technologies.

- **Carbon Storage Validation and Testing**

The Carbon Storage Validation and Testing Program, established under the Office of Clean Energy Demonstrations, allocates \$2.25 billion to expand DOE's program of research, development, and demonstration for developing commercial scale carbon storage locations through the CarbonSAFE program. While industry has decades of commercial experience safely storing CO₂ geologically at large scale, only one dedicated geologic storage project exists in the U.S. today.

Nevertheless, over half of the current 120-plus announced carbon capture projects in development have declared their intent to store CO₂ in dedicated geologic storage sites. Additionally, at least a dozen projects have filed applications at the U.S. Environmental Protection Agency for Class VI well permits, which regulate the storage of CO₂. By specifically funding those CarbonSAFE activities that are focused on characterizing sites, FEED studies for storage, and construction, DOE is ensuring that the appropriate geologic storage sites and associated infrastructure are developed to meet the anticipated demand for secure geologic storage from carbon management projects.



- **Carbon Utilization Program**

BIL allocates \$310 million to the carbon utilization program at DOE and establishes a new grant program for state and local governments to purchase and use products derived from captured carbon oxides, such as low-embodied carbon building materials, fuels and other products. New carbon utilization technologies and business models are emerging rapidly to make economic use of captured CO₂, and this federal support will continue to accelerate purchasing of these materials at the state and local level.

- **Regional Clean Hydrogen Hubs**

The Regional Clean Hydrogen Hubs program allocates \$8 billion to support the development of at least six regional clean hydrogen hubs to improve clean hydrogen production, processing, delivery, storage, and end use. H2Hubs will create networks of hydrogen producers, consumers, and local connective infrastructure to accelerate the use of hydrogen as a clean energy carrier. This will facilitate the production, processing, delivery, storage, and end-use of clean hydrogen, including innovative uses in the industrial sector.



- **Regional Direct Air Capture Hubs**

The Regional Direct Air Capture Hubs program allocates \$3.5 billion to establish four regional direct air capture hubs capable of capturing, storing and/or utilizing at least one million metric tons of CO₂ from either a single unit, or multiple interconnected units. Ideally, these DAC hubs will help facilitate regional “carbon hubs,” helping to provide the infrastructure backbone needed for economywide deployment of carbon capture at the necessary scale. Post-2050, direct air capture and other negative emissions technologies will play an increasing role in offsetting any remaining anthropogenic emissions in particularly hard-to-abate sectors such as aviation, as well as in reducing the concentration of CO₂ remaining in the atmosphere.

Conclusion

The BIL provides a critical down payment on the investments required to scale technologies across industries to achieve net-zero carbon emissions, meet midcentury climate goals and to drive near-term jobs creation and economic activity. In tandem with the historic investments made in the [Inflation Reduction Act of 2022](#), if properly implemented, the portfolio of complementary policies included in this package will deliver an estimated 13-fold scale-up of carbon management capacity and 210-250 million metric tons in annual emissions reductions by 2035. Ensuring that these critical investments in carbon management are implemented by the administration in a timely and efficient manner is crucial to ensuring that carbon management technologies can fulfill their full emissions reduction potential.

Timeline of BIL Implementation

