



Key Carbon Management and Industrial Decarbonization Provisions in Fiscal Year (FY) 2021 Energy Package

In December 2020, Congress passed the bipartisan Consolidated Appropriations Act, 2021. This massive year-end omnibus included fiscal year (FY) 2021 appropriations, COVID-19 relief measures and a comprehensive energy and climate package. On the carbon capture front, the spending bill includes a two-year extension of the 45Q tax credit and historic increases to authorization levels for carbon capture, removal, use and storage RD&D. The bill also includes key provisions from the USE IT Act and establishes interagency efforts around the responsible planning, siting, and permitting of CO₂ transport and storage infrastructure. More broadly, it also includes a cross-cutting program at the Department of Energy (DOE) to carbon intensive industrial and manufacturing sectors.

The FY2021 omnibus lays the groundwork for a more ambitious RD&D policy framework and federal investment in carbon capture, a crucial strategy to achieving midcentury climate goals, while preserving and creating high-wage domestic energy, industrial and manufacturing jobs. As lawmakers draft and consider appropriations packages for FY2022, Congress must continue its bipartisan commitment to carbon management and fully fund carbon capture provisions as authorized in the FY2021 omnibus. It is imperative that Congress follows through on its commitment and fully fund these authorizations.

Carbon Capture Technology Program

Establishes a program for the development of transformational technologies to significantly improve the efficiency, effectiveness, cost, emission reductions and environmental performance of coal and natural gas use, including in manufacturing and industrial facilities. It also authorizes and encourages support for large-scale pilot projects.

- **Authorization levels for program projects:**
 - **R&D (\$910 million)**
 - \$230 million for each FY 2021 and 2022
 - \$150 million for each FY 2023-2025
 - **Large scale pilot projects (\$1 billion)**
 - \$225 million for each FY 2021 and 2022
 - \$200 million for each FY 2023 and 2024
 - \$150 million for FY 2025
 - **Demonstration projects (\$2.6 billion)**
 - \$500 million for each FY 2021-2024
 - \$600 million for FY 2025
 - **Front-end engineering and design (FEED) program (\$200 million)**
 - \$50 million for each FY 2021-2024

Carbon Capture Test Centers

Establishes a grant program for the operation of carbon capture test centers to advance RD&D of carbon capture technologies.

- **Authorization levels:**
 - \$25 million for each FY 2021-2025 (\$125 million)

Carbon Storage Validation and Testing Program

Establishes an inter-agency program to assess the capacity of CO₂ geologic storage in the U.S. and identify potential demonstration sites to scale-up to commercial storage sites.

- **Authorization levels:**

- \$200 million for FY 2021
- \$200 million for FY 2022
- \$150 million for FY 2023
- \$150 million for FY 2024
- \$100 million for FY 2025

Carbon Utilization Program

Establishes a Department of Energy (DoE) RD&D program authorizing research to identify and evaluate novel uses for carbon and includes a program to demonstrate applications of carbon utilization for a variety of sectors. Additionally, the section includes a national **Carbon Utilization Research Center** to focus on early-stage R&D activities.

- **Authorization levels:**
 - \$54 million for FY 2021
 - \$55,250 million for FY 2022
 - \$56,562,500 million for FY 2023
 - \$57,940,625 million for FY 2024
 - \$59,387,656 million for FY 2025

Carbon Removal Program

Establishes an inter-agency program to test, validate, or improve technologies and strategies to remove carbon dioxide from the atmosphere on a large scale. Additionally, establishes a Direct Air Capture Prize for CO₂ captured directly from ambient air that is measured at the source of capture and verified at the point of disposal, injection or utilization.

Direct Air Capture Test Centers

Establishes a grant program for the operation of direct air capture test centers to advance RD&D of direct air capture and storage technologies.

- **Authorization levels:**
 - \$175 million for FY 2021:
 - \$15 million to carry out the prize competition for pre-commercial carbon dioxide capture from dilute media, available until expended; and
 - \$100 million to carry out the prize competition for commercial applications of direct air capture technologies, available until expended
 - \$63,500 million for FY 2022
 - \$66,150 million for FY 2023
 - \$69,458 million for FY 2024
 - \$72,930 million for FY 2025

Carbon Dioxide Removal Task Force and Report

Directs the Secretary of Energy to prepare a report identifying tools the federal government may use to advance deployment of carbon dioxide removal projects along with a Carbon Dioxide Removal Task Force to advise the Secretary on matters pertaining to carbon dioxide removal, identify barriers to the advancement of carbon dioxide removal projects, and tools for advancing and deploying such projects.

Industrial Emissions Reduction Technology Development Program

Establishes a cross-cutting program to further development and commercialization of economic and competitive technologies that reduce emissions from nonpower industrial sectors. The program focuses on several areas, including reducing emissions from production processes for iron, steel, aluminum, cement, and chemical production, as well as from high temperature heat generation. The program also encourages leveraging smart manufacturing and sustainable manufacturing; increasing energy efficiency; using alternative materials and developing net-zero emissions fuels. It further focuses on reducing emissions from shipping, aviation, and long-distance transportation; using industrial carbon capture; and harnessing high-performance computing to develop technologies in these focus areas.

- **Authorization levels:**

- \$20 million for FY 2021
- \$80 million for FY 2022
- \$100 million for FY 2023
- \$150 million for FY 2024
- \$150 million for FY 2025

Industrial Technology Innovation Advisory Committee

Authorizes a Federal Advisory Committee composed of members from relevant federal agencies, labor groups, academia, national labs, nonprofit organizations, State government, and industry to develop missions and goals of the Industrial Emissions Reduction Development Program, as well as to develop a strategic plan on how to achieve those goals.

Department of Energy Loan Program

Reforms the DOE loan program expands project eligibility to allow for carbon capture projects to access existing federal financing options, including approximately \$8 billion remaining for Advanced Fossil Energy Projects, including carbon capture, storage, use and direct air capture.

- **Authorization levels:**

- \$32 million for each FY 2021-2025 (\$160 million) to cover administrative expenses
- For FY 2021, in addition to amounts authorized for administrative expenses, \$25 million to cover fees for existing projects

Key Carbon Management Provisions in the FY 2021 Environmental Package

Direct Air Capture

Directs the Environmental Protection Agency (EPA) to establish a competitive prize program that awards funds to direct air capture research projects, to reduce CO₂ from stationary sources. It also establishes a Direct Air Capture Technology Advisory Board of experts to advise the Administrator.

- **Authorization levels:**

- \$35 million, available until expended

Deep Saline Formation Report

Directs EPA Administrator to submit report to Congress that includes a comprehensive identification of potential risks and benefits to project developers associated with increased storage of CO₂ captured from stationary sources in deep saline formations, along with recommendations for federal policy makers to address to mitigate any potential risks.

Government Accountability Office (GAO) Report

Requires the GAO to submit a report which identifies a comprehensive list of all federal grant programs which a purpose of the grant is to perform research on carbon capture and utilization technologies, including direct air capture, and examine the extent to which the grant programs overlap or are deemed duplicative.

Carbon Utilization Program

Authorizes the Secretary of Energy, in consultation with the EPA Administrator, to carry out the carbon utilization program to identify and evaluate the novel uses for carbon that, on a full lifecycle basis, achieve a permanent reduction or avoidance of a net increase in CO₂ for use in commercial and industrial products.

- **Authorization level:**

- \$50 million, available until expended

Study on Barriers and Opportunities Relating to the Commercial Application of CO₂ to the Commercial Application of CO₂ in the United States

The DOE, in consultation with the EPA Administrator and in agreement with the National Academies of Science, will conduct a study that assesses the technical feasibility, challenges and impacts relating to the commercial application of CO₂ in the U.S.

Amendment of the FAST Act

The FAST Act is amended to include infrastructure for carbon capture that includes construction of any facility, technology, or system that captures, utilizes or sequesters carbon dioxide emissions, including projects for direct air capture, and construction of carbon dioxide pipelines.

Development of Carbon Capture, Utilization and Sequestration Report, Permitting Guidance and Regional Permitting Guidance and Regional Permitting Task Force

Requires a cross-cutting, inter-agency report to be submitted to the Congressional Committees on Environment and Public Works, Energy and Commerce, and Natural Resources and Transportation by the Chair of the Council on Environmental Quality which compiles all existing relevant federal permitting and review information and resources for project applicants, agencies and other stakeholders interested in the deployment and impact of carbon capture, utilization and sequestration projects and carbon dioxide pipelines. Additionally, the Chair is responsible for submitting guidance to all relevant agencies to support their efficient, orderly and responsible development of carbon capture, utilization and sequestration projects and CO₂ pipelines. Furthermore, the Chair will establish at least two regional task forces to identify successes and challenges faced by developers and operators of CCUS projects and CO₂ pipelines, and make recommendations to improve the permitting and regional coordination for efficient, orderly and responsible development of such projects.

Relevant Tax Extenders in the FY 2021 Omnibus

Energy Tax Extenders

FY 2021 Omnibus included the extension of the carbon oxide sequestration credit and importantly, an extension of the 45Q tax credit for facilities that begin construction by the end of 2025.

Energy Efficient Commercial Buildings Deduction

Makes permanent the deduction for energy efficiency improvements to building envelope, lighting, heating, cooling, ventilation and hot water systems of commercial buildings.

Additional Provisions Relevant to Broader Decarbonization of Industrial and Power Sectors in the FY 2021 Omnibus

Nuclear Energy Research, Development, Demonstration and Commercial Application Program

Reauthorizes the Department of Energy's nuclear energy research, development, demonstration and commercial application (RDD&CA) activities, including advanced fuel, R&D for advanced reactors, used fuel technologies and integration of nuclear energy systems for both existing plants and advanced nuclear concepts. Focus areas of the program may include RD&D or commercial application of nuclear integrated energy systems with respect to hydrogen or other liquid and gaseous fuel or chemical production, heat for industrial processes, heat or electricity generation and storage and carbon capture, use, utilization and storage, among others.

- **Authorization levels:**
 - o \$20million for FY 2021
 - o \$30 million for FY 2022
 - o \$30 million for FY 2023
 - o \$40 million for FY 2024
 - o \$40 million for FY 2025

Energy Storage Technology and Microgrid Assistance Program

Establishes an energy storage and microgrid grant and technical assistance program at the Department of Energy for rural electric cooperatives and public utilities to assist with designing and demonstrating energy storage and microgrid projects that use energy from renewable energy sources.

- **Authorization levels:**
 - o \$15 million for each fiscal year 2021 through 2025
 - o Not more than ten percent of the amount appropriated is to be used for administrative expenses

High Efficiency Turbines

Establishes a Department of Energy RD&D program to improve the efficiency of turbines used in power generation and aviation with a significant focus on turbines using hydrogen and other renewable gas fuels. It also aligns RD&D activities with recommendations from the National Academies on decarbonizing the power and aviation sectors.

- **Authorization levels:**
 - o \$50 million for each fiscal year 2021 through 2025

Study on Blue Hydrogen Technology

Requires the Secretary of Energy to conduct a study on the benefits of blue hydrogen technology and how that can further enhance the deployment and adoption of carbon capture and storage.

Development of National Smart Manufacturing Plan

Requires the Secretary of Energy, in consultation with the National Academies, to develop a national plan for smart manufacturing technology development and deployment to improve domestic manufacturing sector productivity and efficiency. Until completion of the plan, the Secretary is to submit an annual report to Congress on progress made in developing the plan.

Innovation in Renewable Energy, Energy Efficiency and Storage Establishment of Technology Performance and Cost Targets

Requires the Secretary to establish technology performance and cost targets to address existing gaps in technologies, including advanced renewable power technologies such as large-scale, novel renewable power plants, renewable hydrogen power plants, including plants for which the hydrogen comes from renewable natural gas or biogas, biomass power and advanced renewable energy manufacturing techniques, among others.

- **Authorization levels:**
 - o With respect to advanced renewable energy technologies projects, \$2 billion for each fiscal year 2021 through 2025
 - o With respect to the energy storage technologies projects, \$400 million for each fiscal year 2021 through 2025
 - o With respect to the transmission technologies and projects, \$600 million for each fiscal year 2021 through 2025