

The Carbon Removal and Emissions Storage Technologies (CREST) Act of 2022

On June 16, 2022, Senators Collins (R-ME) and Cantwell (D-WA) introduced the CREST Act, pioneering legislation that directs the Departments of Energy and Interior to establish new research programs and evaluate the feasibility of carbon removal and storage pathways, quantify the net impact of carbon removal solutions, and establish an innovative pilot reverse auction purchasing program to accelerate carbon removal market commercialization. According to a major new report from the United Nations' Intergovernmental Panel on Climate Change, removing carbon dioxide from the atmosphere is essential to meeting international climate goals intended to blunt the worst impacts of climate change.

Background

With increasing private and public sector commitments to reach net-zero emissions by 2050, companies are seeking ways to invest in quantifiable, durable, and verifiable carbon removal solutions. Despite the increased interest, current cost estimates show that private sector investment alone is unlikely to be sufficient to research and deploy carbon removal pathways.

Building off the Energy Act of 2020, which authorized the first comprehensive Federal carbon removal research and development program, and the Infrastructure Investment and Jobs Act (IIJA), which invested \$3.6 billion in direct air capture (DAC), the CREST Act would expand DOE's scope of carbon removal and storage technologies by authorizing the additional research, increased testing, and enhanced public-private partnerships necessary to scale carbon removal technologies, particularly by leveraging natural carbon removal processes such as reforestation, algae cultivation, and enhanced geological mineralization.

What Does It Do?

Title I of the CREST Act builds upon previously authorized carbon removal research and development programs to include biomass, geological, aquatic, and atmospheric carbon removal pathways that can permanently sequester carbon dioxide or use carbon dioxide to produce valuable products such as biofuels. Key areas of focus include:

- **Biomass Carbon Removal.** Expands the scope of the Department of Energy's current carbon capture research to include biological carbon removal from terrestrial and aquatic sources using techniques such as algae cultivation, soil enhancements, and enhanced photosynthesis and root growth. Provisions under this section will enhance our understanding of biomass feedstocks, supplies, and logistics with respect to bioenergy with carbon capture and storage, and thermochemical biomass conversion pathways for carbon removal, including fast pyrolysis.

This section also expands DOE's scope to include biological carbon dioxide conversion. This would improve modeling and understanding of high carbon-absorbing biomass as well as establish an initiative to focus on developing new products from carbon dioxide.

- **Geological Carbon Removal.** Spurs research, experiments, and pilot programs for conducting carbon mineralization that can trap carbon dioxide in solid form. Provisions under this section will

expand DOE's scope to conduct carbon mineralization pilots in consultation with the National Oceanic and Atmospheric Administration (NOAA) and the United States Geological Survey (USGS).

This section also directs the Department of Interior (DOI), working through the U.S. Geological Survey (USGS), to develop a methodology for a national assessment of geological resources, mine tailings, and other alkaline industrial wastes to identify sustainable sources of reactive minerals suitable for mineralizing and durably trapping carbon dioxide. Finally, it directs USGS to conduct field experiments using mine tailings and industrial wastes for carbon mineralization and study the environmental impacts of carbon mineralization.

Aquatic Carbon Removal. Provisions under this section will expand DOE's scope to include ocean carbon removal pathways such as blue carbon management, focusing on coastal and marine biomass, as well as direct ocean capture, which directly removes carbon dioxide from the oceans through engineered or inorganic processes. Also directs DOE to establish a program in coordination with NOAA and the National Aeronautics and Space Administration (NASA) that monitors, researches, and models the ecological impacts of ocean carbon dioxide removal and storage techniques.

This section also expands the CarbonSAFE Initiative to complete a national carbon mineralization assessment examining storage potential for the Outer Continental Shelf. Finally, it directs DOE, in consultation with the Environmental Protection Agency (EPA), NOAA, and DOI, to produce a report describing the results of a nationwide study on the offshore capacity for deep sea carbon storage through activities such as sinking biomass. The report will also include recommendations to improve the security of offshore carbon storage.

- **Atmospheric Carbon Removal.** Directs DOE to research, develop, and demonstrate manufacturing techniques for direct air capture technologies.
- **Carbon Removal Quantification.** Provides grant funding to entities who are seeking financial assistance to complete a techno-economic assessment (TEA) or life-cycle assessment (LCA) of their emissions.

Carbon Removal Purchasing Program. Title II of the CREST Act creates a five-year pilot carbon removal purchasing program which utilizes an innovative reverse auction mechanism to find the least cost pathways for domestic carbon removal solutions meeting specified performance metrics. The purchasing program will be based on two permanence tiers: a medium-term tier for processes that remove and store carbon dioxide between 100 years and 1,000 years, and a long-term tier for processes that remove and store carbon dioxide for 1,000 years or more. 70% of the funding is allocated for long-term tier permanence and 30% is for medium-term tier permanence. Projects that demonstrate outstanding potential for local and regional economic development and use technology that has the potential to eventually remove carbon dioxide below \$100 per ton all-in cost are given priority.