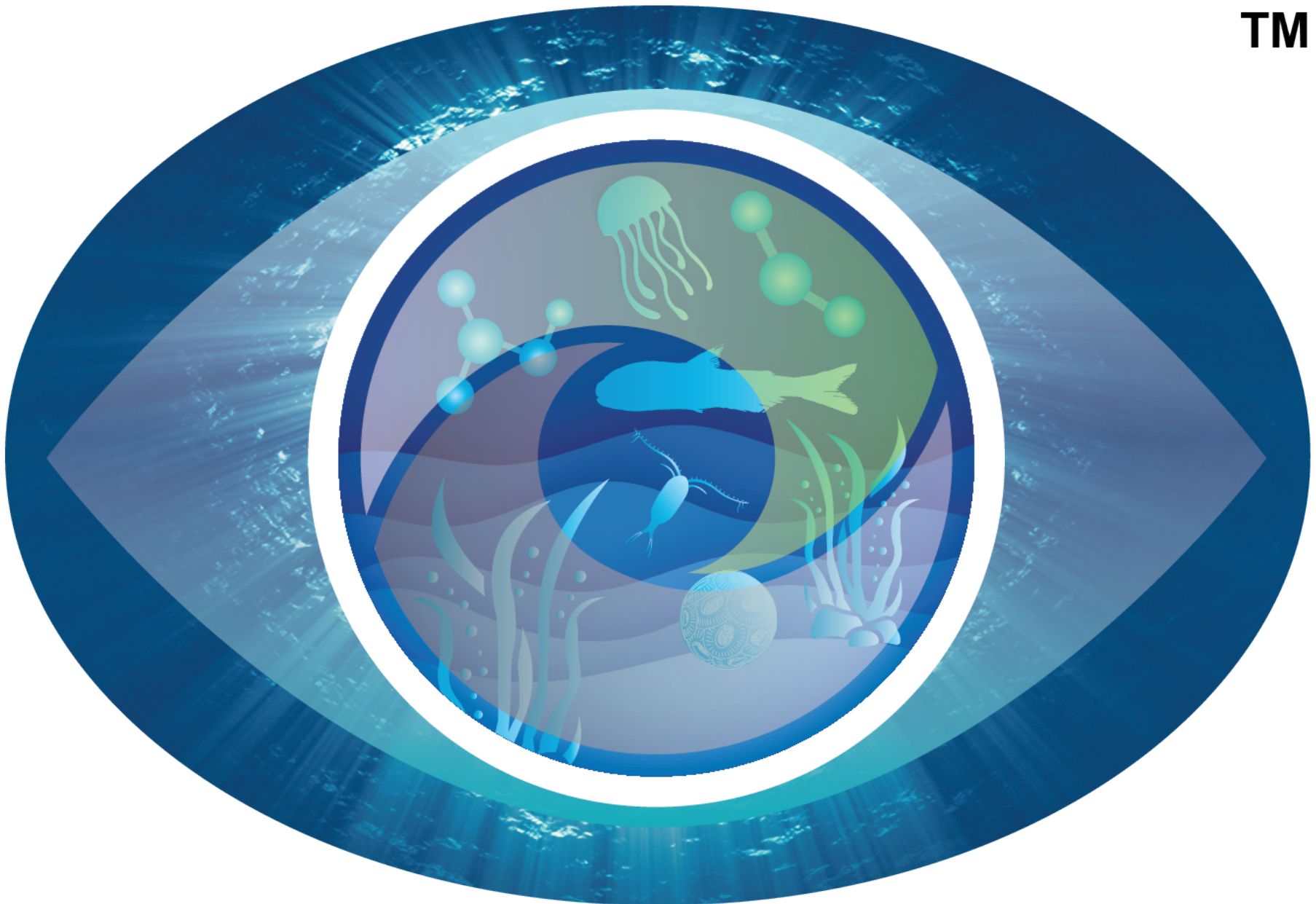


Press Release

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U.S. Department of Energy Announces \$36 Million to Advance Marine Carbon Dioxide Removal Techniques and Slash Harmful Greenhouse Gas Pollution

Funding for 11 Projects Across 8 States to Develop Marine Carbon Capture Technologies, Accelerating Novel Climate Solutions while Supporting President Biden's Investing in America Agenda to Achieve a Net-Zero Economy by 2050

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WASHINGTON, D.C. — The U.S. Department of Energy (DOE) today announced \$36 million for 11 projects across 8 states to accelerate the development of marine carbon dioxide removal (mCDR) capture and storage technologies. Funded through DOE's Sensing Exports of Anthropogenic Carbon through Ocean Observation (SEA-CO2) **program**, these projects will support novel efforts to measure, report,

and validate mCDR and identify cost-effective and energy efficient carbon removal solutions. Advancing innovative approaches like mCDR to slash greenhouse gas pollution is critical to the Biden-Harris Administration's efforts to tackle the climate crisis and achieve a net-zero emissions economy by 2050.

"Reaching President Biden's ambitious decarbonization goals and avoiding the worst impacts of climate change will require a wide range of innovative climate solutions, from common-sense approaches like improving energy efficiency to novel applications like utilizing the ocean's natural carbon removal abilities to reduce greenhouse gas pollution from the atmosphere," **said U.S. Secretary of Energy Jennifer M. Granholm**. "With critical funding from DOE, project teams from across the country will develop groundbreaking new technologies to cut emissions that will help combat the climate crisis while reinforcing America's global leadership in the clean energy industries of the future."

mCDR techniques take advantage of the ocean's natural carbon capture and storage processes and, together with other carbon dioxide removal methods, have the potential to mitigate and remove hundreds of millions of tons of harmful carbon dioxide emissions per year. mCDR takes place across large surfaces or volumes of the ocean over comparatively long periods of time. The SEA-CO2 program recognizes that scalable, cost-effective technologies to measure, report, and validate various mCDR approaches are critical to developing this growing industry and supporting President Biden's clean energy and climate goals.

Managed by DOE's **Advanced Research Projects Agency-Energy (ARPA-E)**, the teams announced today—including small and large businesses, national labs, and universities—will play a critical role in creating new and appropriately scaled sensors and models that will quantify the effectiveness of mCDR techniques. Selected projects include:

- **atdepth MRV (Cambridge, MA)** will develop an ocean modeling system that utilizes graphical processing units, dramatically improving simulation modeling speed compared with traditional approaches that use central processing units. (Award amount: \$2,524,964)
- **Bigelow Laboratory for Oceanic Sciences (East Boothbay, ME)** will develop a biogeochemical computer model that improves estimates of how the vast population of ocean zooplankton—tiny marine animals—move and lock away carbon in the deep ocean. (Award amount: \$2,279,867)
- **[C]Worthy (Boulder, CO)** will develop a community framework for model building and data assimilation that would provide the structure and processes necessary to incorporate observations, manage model complexity, and meet the needs for accurate carbon accounting for mCDR. (Award amount: \$3,884,825)
- **GE Research (Niskayuna, NY)** will develop a fiber optic sensor cable that would span multiple kilometers of ocean volume and measure chemical ocean carbon parameters over large areas when towed from marine vessels. (Award amount: \$4,274,658)
- **Pacific Northwest National Laboratory (Seattle, WA)** will develop a model and mesocosm experiments to evaluate the effectiveness and impact of the marine carbon dioxide removal technique Ocean Alkalinity Enhancement throughout major coastal areas in the United States. (Award amount: \$2,080,715)
- **University of Colorado (Boulder, CO)** will develop a system of optical underwater sensors utilizing broad-band lasers to sense and measure dissolved carbon compounds. (Award amount: \$5,904,233)
- **University of Pittsburgh (Pittsburgh, PA)** will develop buoy-based optical fiber sensors for measuring pH and carbon dioxide in seawater from the ocean's surface to the seafloor. (Award amount: \$2,274,859)
- **University of Texas at Austin (Austin, TX)** will develop an acoustic sensor network to quantify ecosystem activity and how effectively carbon is stored in shallow seagrass beds, an important sink in the coastal blue carbon cycle. (Award amount: \$2,034,903)
- **University of Utah (Salt Lake City, UT)** will develop a micro-optical, micro-electronic seafloor probe that would extend the longevity and persistence of current-day seafloor carbon storage measurement tools. (Award amount: \$2,004,554)
- **Woods Hole Oceanographic Institution (Woods Hole, MA)** will develop a system-on-a-chip for ocean carbon flux monitoring that would integrate the capabilities of several existing commercial sensors into a single miniature sensor chip, lightening the power requirements on ocean gliders and floats and significantly reducing costs. (Award amount: \$3,738,960)
- **Woods Hole Oceanographic Institution (Woods Hole, MA)** will develop a natural thorium decay sensor that would attach to gliders, autonomous vehicles, and profiling floats to quantify the flux rates of particulate organic carbon to the deep ocean for marine carbon dioxide removal. (Award amount: \$4,802,245)

More information and complete project descriptions for the teams announced today can be found on the **[ARPA-E website](#)**.

ARPA-E advances high-potential, high-impact energy technologies across a wide range of technical areas that are too early for private-sector investment. **[Learn more](#)** about these efforts and ARPA-E's commitment to ensuring the United States continues to lead the world in developing and deploying advanced energy technologies.

Reinforcing President Biden's Whole-of-Government Approach to Developing Next-Generation Climate Technologies

Earlier this **[month](#)**, the White House Office of Science and Technology Policy (OSTP) announced a new **[Fast-Track Action Committee on Marine Carbon Dioxide Removal](#)**. Under the authority of OSTP's National Science and Technology Council, the Committee will evaluate the merits of and concerns about different types of mCDR and shape relevant policy and research on safe and effective marine carbon dioxide removal and carbon sequestration. The committee includes experts from more than a dozen federal departments and agencies and it fulfills one of the recommendations of the U.S. Ocean Climate Action Plan (OCAP) released earlier this year.

In September, the NOAA Ocean Acidification Program on behalf of the National Oceanographic Partnership Program (NOPP) announced \$24.3M of funding aimed at bringing together academic researchers, federal scientists and industry to advance research in marine carbon dioxide removal. Funding supports research that expands understanding of various aspects of marine carbon dioxide removal approaches, risks and co-benefits including ocean acidification mitigation, and science needed to build regulatory frameworks for testing and scaling of mCDR.

Selection for award negotiations is not a commitment by DOE to issue an award or provide funding. Before funding is issued, DOE and the applicants will undergo a negotiation process, and DOE may cancel negotiations and rescind the selection for any reason during that time.

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