What is Marine Carbon Dioxide Removal?

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Rainey Center



WHAT IS MCDR?

Marine carbon dioxide removal (mCDR) is a promising solution that will boost local economies while removing harmful greenhouse gas emissions.

The private sector is investing hundreds of billions of dollars to decarbonize, and mCDR could be an essential complement to net zero goals that companies continue to pursue. With greater focus and investment on this emerging sector, mCDR has the potential to bring jobs to communities and protect the environment while producing safe, long-term, and cost-effective carbon removal.

What is Marine Carbon Dioxide Removal?

mCDR, also referred to as ocean-based carbon dioxide removal (oCDR), refers to approaches that aim to harness the ocean's naturally-occurring carbon removal process and safely accelerate it. In theory, this could help us remove billions of tons of excess carbon from the atmosphere and safely store it away — as we simultaneously work to significantly reduce the amount of carbon we emit.

The ocean is the world's largest carbon sink, covering 70 percent of the Earth's surface and naturally absorbing more than a quarter of all carbon emissions per year. It holds 50 times more carbon than the atmosphere.

Even without deliberate mCDR, the ocean will continue to absorb carbon dioxide, but at a much slower rate than carbon dioxide is building up in the atmosphere.

How Does mCDR Work?

There are multiple types of mCDR solutions, including ocean alkalinity enhancement (OAE), ocean fertilization (OF), and blue carbon management (i.e. preserving and supporting coastal ecosystems such as mangroves).

Each of these methods require different amounts of time, money, and resources. The public sector can help scientists explore these methods so that the private sector can invest and create jobs across the United States.

OAE, one specific mCDR approach, has already proven effective in lab and small-scale trials. More research is needed to understand exactly how OAE could potentially work at-scale in the open ocean.

Growing Scientific, Public, and Private Sector Support

Major companies such as Microsoft and Stripe are investing in this technology. This year, Microsoft announced that they will be purchasing 500,000 tons of carbon removal credits over the next six years, in addition to the company's previous $200 million investment in CDR. Stripe has similarly invested $15 million into CDR, helping companies purchase carbon removal credits and bring emerging technologies to the market.

The carbon management industry overall is projected to directly support hundreds of thousands of jobs — in addition to the indirect economic benefits of new businesses.

The world's leading scientific bodies — like the Intergovernmental Panel on Climate Change (IPCC) and the National Academies of Science, Engineering and Medicine (NASEM) — have identified mCDR as a high-potential carbon management solution. OAE in particular has been identified as an mCDR with a "high confidence" for efficacy pathway by NASEM.





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