

Report calls for more science to negate CO2 emissions

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Technologies that remove carbon dioxide from the air must play a major role in mitigating climate change, according to a new report from the National Academies of Sciences, Engineering, and Medicine.

According to the report, some technologies can be deployed today, but more is needed. Tiffany Troxler, director of science for FIU's Sea Level Solutions Center, is one of 17 scientists from across the country who served on the National Academies committee that developed the report. She led the subcommittee on blue carbon, which is the conservation of marine ecosystems to aid in carbon sequestration.

"All options should be considered to achieve negative emissions to avert the most significant projected impacts of [climate](#) change and enable the greatest numbers of options to adapt to and manage [climate change impacts](#)," Troxler said.

CO₂ is a greenhouse gas that traps heat in the Earth's atmosphere. According to the National Oceanic and Atmospheric Administration (NOAA), [carbon dioxide](#) levels today are higher than at any point in recorded history, which is a major factor in climate change. Many methods for climate mitigation focus on decreasing the rate by which CO₂ is removed from ecosystems and added to the atmosphere. However, Troxler and the National Academies committee instead study technologies that could do the opposite – absorb CO₂ out of the atmosphere and put it safely back into the planet's ecosystems, where it originated. These processes are termed [negative emissions technologies](#)

(NETs) and could significantly contribute to mitigating [climate change](#).

The committee calls for a substantial research initiative to advance NETs as soon as possible. Although climate mitigation remains the motivation for global investments in NETs, the committee said advances in NETs could also have economic rewards. Intellectual property rights and economic benefits will likely accrue to the nations that develop the best technologies.

There are four main categories of NETs:

- direct air capture, which takes CO₂ directly from the air with a large machine and then injects it into geologic reservoirs where fossil fuels initially come from;
- terrestrial methods, which use plants to harness CO₂ and put it back into the ground or lifecycle of other plant organisms;
- Biomass Energy with Carbon Capture and Storage (BECCS), which captures carbon and permanently stores it underground;
- [blue carbon](#).

"Coastal wetlands are among the lowest cost to implement and scale due to the numerous other benefits they can provide that are more often motivation for restoring or creating them, like coastal protection, erosion control, habitat improvements, and water quality remediation," Troxler said. "However, research on the fate of coastal wetland carbon with high rates of [sea level](#) rise, coastal management practices and social barriers to implementation needs to be accelerated."

All of the negative emissions technologies are at vastly different stages of development, according to the report. Some are close to the deployment stage from a technical standpoint but not in terms of scalability, while others are experimental and need fundamental research in terms of economic sustainability or technical capacity.

More information: Negative Emissions Technologies and Reliable Sequestration. [www.nap.edu/catalog/25259/nega ... on-a-research-agenda](http://www.nap.edu/catalog/25259/nega...on-a-research-agenda)

Provided by Florida International University

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