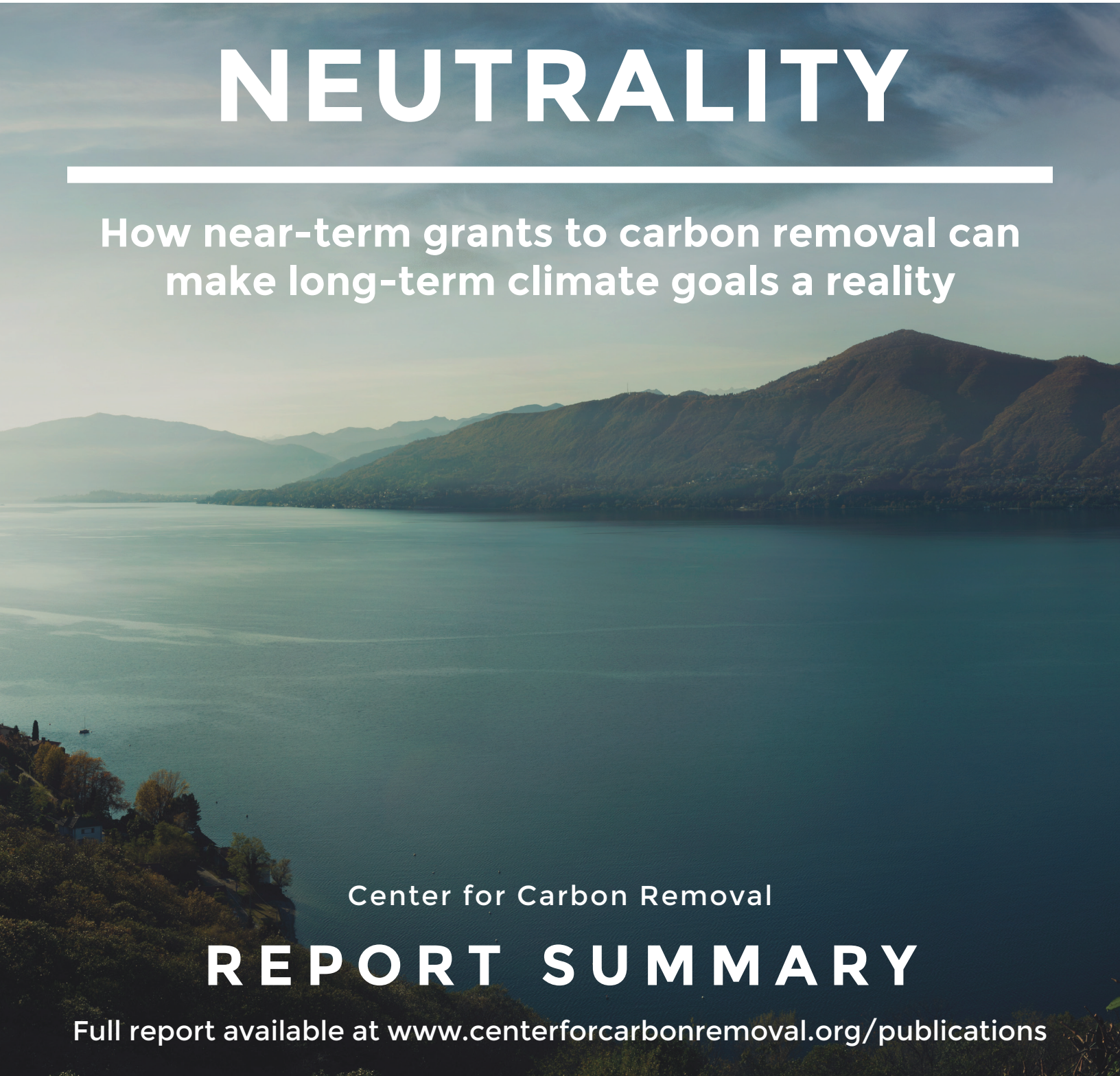
PHILANTHROPY BEYOND CARBON NEUTRALITY



How near-term grants to carbon removal can make long-term climate goals a reality

Center for Carbon Removal

REPORT SUMMARY

Full report available at www.centerforcarbonremoval.org/publications

ABOUT US

The Center for Carbon Removal is a non-profit initiative of the Berkeley Energy and Climate Institute dedicated to curtailing climate change. Our mission is to accelerate the development of scalable, sustainable, and economically viable carbon removal solutions. To accomplish this mission, we lead industry and policy collaborations to unlock the potential of carbon removal solutions by conducting research and analysis, convening events, and curating an online hub for information and discussion about carbon removal.

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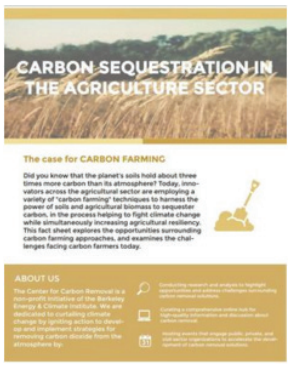
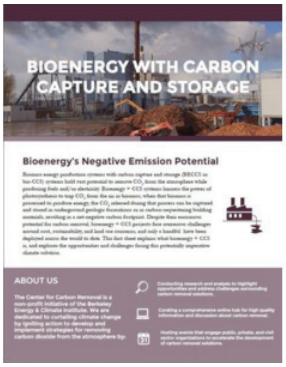


Carbon Farming Fact Sheet



Direct Air Capture Fact Sheet

Please visit www.centerforcarbonremoval.org/publications to access these documents.

REPORT IN BRIEF

Carbon removal is a critical but missing piece of the climate solutions portfolio.

Achieving the long-term goal of the U.N. Paris Agreement will not only require drastic emissions reductions, but will also likely require efforts to clean up excess CO_2 from the atmosphere. Although these carbon removal (or "negative emissions") strategies can also offer myriad co-benefits in addition to meeting climate targets — from new opportunities for growth in a low-carbon economy to enhanced ecosystem services and climate resiliency for communities around the world — governments and businesses have provided negligible support for the carbon removal field to date.

The lack of policy and industry support for carbon removal opens the door for philanthropies to ignite the development of the field.

In the past, philanthropies have been successful in catalyzing greater public and private sector support for important, under-the-radar issues — exactly what the carbon removal field needs today. Yet, high technology costs and uncertainties, alongside an exclusive focus on emission reduction goals, have historically driven philanthropic funders away from carbon removal projects. While our research shows that less than one percent of climate-related grant-making has supported carbon removal solutions over the past decade, interviews conducted with 50 climate and philanthropy experts show that the climate philanthropy community has begun to recognize the increased urgency for developing carbon removal solutions.

How can philanthropy move beyond carbon neutrality? 1) elevate the issue, 2) spur science and innovation, 3) build markets and policies to foster commercialization.

More information and conversation on carbon removal are needed to enable government and industry leaders to foster the commercialization of carbon removal solutions in not only swift, but also equitable, sustainable, and economically viable manner. As philanthropies begin to support carbon removal projects, targeted grants to support industry- and policy-relevant research, events, and communication efforts can have high leverage by unlocking orders of magnitude more funding from governments, NGOs, and corporations around the world.

This report explores in detail how near-term philanthropic grants can catalyze the development of carbon removal solutions and make our long-term climate goals a reality.

REPORT SUMMARY

This Agreement…aims to strengthen the global response to the threat of climate change…by a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels…

U.N. Framework Convention on Climate Change. Paris Agreement. Article 2. Page 22. December 12, 2015.

THE CONTEXT

The Paris Agreement on climate change has united the world in the pursuit of an ambitious climate goal. However, goals alone will not be enough to avert catastrophic climate change. Credible commitments to aggressive action are also needed. On this front, the world leaves much to be desired: the collective national mitigation pledges submitted in advance of COP21 fall far short of what is needed to achieve the goals agreed upon in Paris.

In order to curtail climate change, we must dramatically pick up the pace on climate mitigation action. Rapid mitigation will require that we deploy all solutions possible to reduce carbon dioxide (CO_2) emissions. But we cannot stop there. It will also be important to develop solutions to remove excess CO_2 that has accumulated in the atmosphere over the past century of industrial activity.

Here is where the missing piece of the climate solutions puzzle, carbon removal (i.e. "negative emissions"), enters the picture. Carbon removal solutions — including landscape restoration, carbon-sequestering agriculture, and negative-emissions energy technologies — can work alongside traditional emissions abatement strategies (such as renewable energy and ecosystem conservation) to strengthen climate action.

What makes carbon removal solutions particularly valuable is their unique ability to take excess CO_2 out of the atmosphere. Without carbon removal, it will take millennia for natural processes to return atmospheric CO_2 concentrations close to pre-industrial levels — even if we completely eliminate CO_2 emissions.

Pictured: Carbon removal has the ability to create carbon-negative energy systems.

For this reason, scientists expect carbon removal solutions to play a large role in the fight against climate change, as outlined in the latest Intergovernmental Panel on Climate Change (IPCC) Assessment Report. In the report, 87 percent of modeling scenarios consistent with 2°C of warming involve large-scale deployments of carbon removal that, when coupled with aggressive emissions reductions, result in net-negative global emissions by the end of the 21st century.

The scale and speed with which experts expect carbon removal solutions to be deployed is dramatic. Some IPCC scenarios show new capacity additions of negative-emission power plants on the order of 25 gigawatts (GW) (equivalent to about 50 average-sized coal power plants) annually as early as 2040, despite the fact that no such negative-emissions power plants are operational today. As a point of reference, the "solar miracle" (the installation of 25 GW of solar projects in a given year) took over 30 years from the installation of the first solar photovoltaic (PV) project.

87% of IPCC modeling scenarios consistent with 2°C of warming involve large scale deployments of carbon removal

Despite their clear value, carbon removal solutions remain significantly underdeveloped today. Uncertainties around the costs, reliability, sustainability, and/or social acceptability of carbon removal solutions have stymied the investments and dampened the support needed to bring these emerging technologies to market. Delaying action to address these challenges any longer will significantly jeopardize our ability to put the brakes on runaway climate change.

THE OPPORTUNITY

Despite the chorus of scientists calling for urgent action to develop carbon removal solutions, governments and corporations alike have yet to start investing significant amounts into research, development, and demonstration (RD&D) for carbon removal solutions. In addition, existing markets and policies do not create a strong demand for carbon-removing products and services.

The present inaction around carbon removal creates an enormous opportunity for philanthropies to kick-start the development of the field. In the past, philanthropies have succeeded at catalyzing public- and private-sector support for important, off-the-radar social and environmental issues — exactly what the carbon removal field needs today.

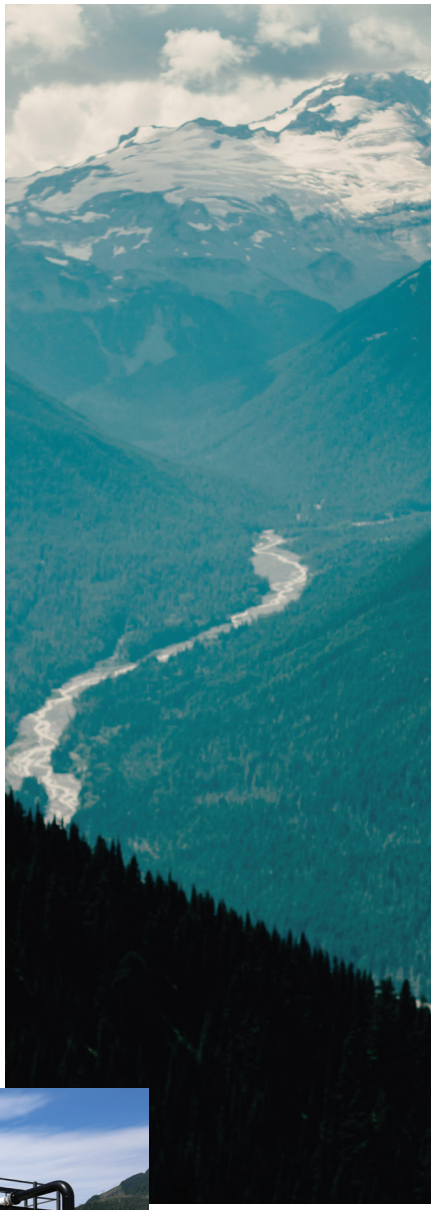
Present inaction around carbon removal creates an enormous opportunity for philanthropies to kick-start the development of the field

This report aims to help:

1) **Philanthropic organizations** understand a) the role that carbon removal can play in their climate change grant-making portfolio, and b) what types of grants can generate the highest impact in the carbon removal field.

2) **NGOs, startups, and academic groups** related to carbon removal understand a) how philanthropies are thinking about carbon removal today, and b) where philanthropic funding opportunities are likely to lie in the near future.

3) **Corporations and government agencies** identify opportunities for philanthropic partnerships around carbon removal.



Pictured: Increasing forest stocks through reforestation can sequester and store large amounts of carbon.

Pictured: Carbon Engineering Direct Air Capture plant
Source: Carbon Engineering

> "It is clear that removing CO_2 from the atmosphere is and can be valuable, especially given the current likelihood that total carbon emissions will exceed the threshold experts believe will produce irreversible environmental effects."
>
> *National Academy of Sciences. Climate Intervention: Carbon Dioxide Removal and Reliable Sequestration.*

Philanthropies do not need to deliver the high financial returns required by early-stage technology investors and they do not face the electoral pressures confronting politicians. Instead, philanthropies can allocate capital for long-term, socially motivated goals that seek to address issues that have yet to gain mainstream interest.

This report explores the role that philanthropies can play in accelerating the development of carbon removal solutions. To understand what actions philanthropies are currently taking around carbon removal, we analyzed a Foundation Center database of philanthropic grant-making in the U.S. from 2008 to 2014 and conducted a series of 50 interviews with philanthropic stakeholders and carbon removal experts to provide deeper insight into philanthropic motivations around carbon removal.

We found that philanthropies provided only minimal funding specifically to carbon removal projects — averaging $0.8 million per year and representing 0.3 percent of total climate-related philanthropy recorded from 2008 to 2014.

Interviews suggest that philanthropies have avoided grants related to carbon removal in the past due to the relatively high complexity, cost, and uncertainty of these projects, especially compared to other mitigation approaches. Funding for carbon removal projects to date has been motivated in large part by the co-benefits these solutions frequently offer. Funding to carbon removal pathway approaches — particularly fossil energy with carbon capture and storage — has largely ignored the potential for these projects to pave the way for negative-emissions projects in the future.

PHILANTHROPY BEYOND CARBON NEUTRALITY

Philanthropies can lead the charge to develop carbon removal solutions in a number of ways, including by funding initiatives that:

- Elevate the conversation on carbon removal among industry and policy leaders
- Build the case and advocate for RD&D and technology innovation across a broad portfolio of carbon removal solutions
- Identify and advocate for appropriate policy mechanisms to support the development of carbon removal.

Pictured: Certain agricultural techniques, coined "carbon farming," can help working lands store carbon.

To maximize the probability of success, philanthropies can co-create grant-making strategies with industry, government, and civil society to build effective coalitions for advancing carbon removal solutions.

It will also be important to measure the impact of grants with metrics beyond simple cost-effectiveness, in order to capture the value of carbon removal as a complement — not a substitute — to other climate solutions.

Developing a portfolio of sustainable, scalable carbon removal systems to deploy alongside emission abatement and climate adaption solutions will be both a monumentally challenging and invaluable undertaking. Public-, private-, and civil-sector actors will all have to collaborate to ensure carbon removal solutions develop as swiftly and appropriately as needed. Philanthropy can play a key role in convening these stakeholders and igniting the action needed to build a global economy that cleans up more CO_2 from the atmosphere than it emits.

REPORT STRUCTURE:

1) Carbon Removal 101: A deep dive into the science behind carbon removal, explaining why carbon removal is so valuable and what challenges need to be addressed to unlock this potential.

2) Help Wanted: An exploration of the current support for carbon removal and the strategic fit for philanthropy in developing carbon removal solutions.

3) Analysis & Results: A discussion of our analytic methods for understanding the role that philanthropies are playing in carbon removal today and the findings of our data analysis and interviews with philanthropies and carbon removal experts.

4) Beyond Carbon Neutrality: A starting point for philanthropies to catalyze the development of carbon removal strategies.

Philanthropy Beyond Carbon Neutrality:

How near-term grants to carbon removal can make long-term climate goals a reality.

For the full report, please visit:
www.centerforcarbonremoval.org/publications

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