



Removing Forward

Centering Equity and Justice in a
Carbon-Removing Future

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Carbon180

ABOUT CARBON180

Carbon180 is a new breed of climate-focused NGO on a mission to fundamentally rethink carbon.

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GET IN TOUCH

To learn more about any of the recommendations in this report, email policy@carbon180.org.

Section One

Executive Summary

Before many environmental organizations began sounding the alarm on climate change, environmental justice (EJ) groups had been warning the public that pollution was harming Black, Indigenous, and other communities of color and low-income communities.

Activists and researchers have shown how these groups face disproportionate levels of exposure to dangerous chemicals, poorer air and water quality, and greater risk from the devastating impacts of natural disasters. Climate change will only exacerbate these conditions, deepening these inequities locally and globally. Despite this, climate efforts to date have largely ignored legacy pollution and non-climate impacts that harm these communities in favor of a narrow focus on mitigating greenhouse gas emissions.

There's a real risk that carbon removal solutions — a necessary tool to meet climate goals — will follow a similar path of sustaining extractive relationships with disadvantaged communities. It will be incredibly important in the coming years to identify how to scale up carbon removal in a way that aligns with EJ priorities and distributes its benefits. Fortunately, the field is still in an early enough stage to integrate equity and justice into research, development, and deployment.

The Biden administration signaled a strong commitment to EJ by releasing a series of executive orders (EOs), establishing a number of advisory councils, and appointing justice advocates to high-profile positions across the government. Similarly, there has been definitive interest in pursuing carbon removal across land- and technology-based solutions from both Congress and the administration. However, there remains tension within the government on the role of carbon removal as it relates to EJ. To date, many feel that the benefits to disadvantaged communities have not been demonstrated and are therefore not supported. Establishing a coherent and cohesive federal carbon removal strategy that addresses these important concerns will be key to scaling up these technologies and practices in a timely, durable, and sustainable manner.

At Carbon180, we have been thinking deeply about the nexus of carbon removal and EJ. Our Environmental Justice Initiative was founded on 1) the moral imperative that carbon removal not only addresses carbon emissions but also improves the well-being of communities, and 2) a growing recognition of the need to center EJ within the carbon removal field to gain community acceptance and deploy projects that are supported. Ultimately, our goal is to advocate for the integration of equity and justice in the carbon removal field and ensure that we are pursuing policy development and advocacy opportunities that are in line with justice objectives. Through our initiative, we have begun to identify key guiding principles that can begin the work in supporting a more equitable carbon removal field:

Guiding principles for just carbon removal

The graphic consists of five vertical bars of different colors, each containing a numbered principle. The bars are: 1. Green, 2. Blue, 3. Orange, 4. Brown, and 5. Teal.

- 1.** The benefits of carbon removal solutions must be equitably distributed.
- 2.** Public engagement must be robust and involve seeking input from groups throughout the development and deployment of carbon removal solutions.
- 3.** Safeguards are needed to ensure adverse impacts are not borne by disadvantaged communities.
- 4.** The socioeconomic consequences and distributional impacts of carbon removal solutions need to be evaluated alongside their technological and economic attributes.
- 5.** Carbon removal is seeking to address a challenge that is both local and global, and therefore should incorporate justice across temporal and spatial scales.

The greatest opportunity to influence carbon removal is through the federal government. The government can address major information gaps, establish robust safeguards for project implementation, strengthen community-government engagement, and hold actors accountable through legislative and agency actions. This report shares a series of recommendations that span land- and technology-based approaches and are organized by labor and economic opportunities, outreach and engagement, technical and financial assistance, research, development, and deployment (RD&D), and regulations.

Federal policy recommendations to support just carbon removal deployment

LABOR AND ECONOMIC OPPORTUNITIES



- 1.** Increase equitable workforce development opportunities across land- and technology-based carbon removal solutions
- 2.** Direct DOE and EPA to assist in creating revenue streams and co-design strategies for communities housing technology-based carbon removal projects
- 3.** Establish local, safe, and high-quality job opportunities

OUTREACH AND ENGAGEMENT



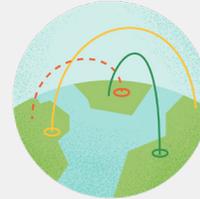
- 4.** Promote local capacity building in underserved communities
- 5.** Strengthen community-government engagement to solicit feedback and input from underserved communities

TECHNICAL AND FINANCIAL ASSISTANCE



- 6.** Address racial and economic disparities in accessing federal assistance programs among producers and forest landowners
- 7.** Leverage federal financial and technical assistance to advance equitable technology-based carbon removal projects that meet community needs

RESEARCH, DEVELOPMENT, AND DEPLOYMENT



- 8.** Strengthen international collaboration on carbon removal RD&D
- 9.** Invest in social science research for technology-based carbon removal
- 10.** Increase carbon removal research collaboration and capacity building with mission-driven universities, two-year institutions, and underrepresented students

REGULATIONS



- 11.** Establish long-term monitoring requirements for geologic storage
- 12.** Establish a pipeline development and permitting task force
- 13.** Improve Class VI wells permitting

These recommendations are just a start to foster stronger dialogue and action on carbon removal and EJ. Central to any effort must be the voices and demands of underserved groups that have long been left out of the benefits from previous policy action, as well as those who will be directly impacted. As Morrow et. al. (2020) shared, “Not all carbon removal is created equal in terms of social, economic, and environmental impacts, and nuanced positions are needed to distinguish better technologies, practices, projects, and policies from worse ones. ... The social, economic, and political contexts in which people implement [carbon removal] will affect its acceptance and impacts.” It’s not just about carbon removal, but also about the broader system and society in which carbon removal will be deployed. It’s not enough to simply transition from fossil fuels into a low-carbon but equally unjust society; we must instead leverage policy to reroute power to the most disenfranchised. That is truly the vision of an equitable society that removes more carbon than it emits.

Section Two

Introduction

Climate change already touches every corner of our lives, from what we eat to how we sleep and where we work. Its impacts are being felt around the world as widespread crop failures and extreme weather events such as wildfires, heat waves, and hurricanes increase in frequency and severity.

Those that are bearing the brunt of these impacts are also the most vulnerable in society: Black, Indigenous, low-income, and other communities on the frontlines of poverty and pollution. The climate crisis has highlighted the disparities across groups that continue to worsen under existing power structures and incremental climate action. However, this crisis can also be viewed as a major economic mobilization opportunity to improve health, environmental, and social outcomes for all. To take advantage of this moment, we need bold, justice-oriented, and immediate policies that support aggressive emissions reductions and carbon removal and also distribute power in a way that builds a more just and equitable society.

GLOSSARY*

Low-income community

Any census block group in which 30% or more of the population has an annual household income up to 80% of the median income of the area or 200% of the federal poverty line, whichever is greater.

Legacy emissions

Historical carbon emissions that have already been emitted and currently exist in the atmosphere. These emissions could have been emitted yesterday or 100 years ago.

*The glossary definitions included throughout this report are part of an evolving discourse and not necessarily exhaustive.

Today’s urgent need for equitable carbon removal

Carbon removal will be a necessary tool for meeting national and international climate goals, alongside substantial emissions reductions efforts. Many reports, including the United Nations Intergovernmental Panel on Climate Change’s (IPCC) “Special Report on Global Warming of 1.5°C” and the National Academies of Sciences’ “Negative Emissions Technologies and Sequestration” report, have highlighted carbon removal’s significant role in limiting global warming temperature increases to 1.5°C and 2°C.^{1,2} Carbon removal can contribute to these goals by decarbonizing difficult-to-abate sectors or drawing down legacy emissions – but reaching necessary deployment levels requires significant investment in carbon removal today. As we scale carbon removal solutions, there is an urgent need to integrate equity and justice into climate policy to ensure fair and effective implementation that supports disadvantaged communities.

To date, little progress has been made on justice-centered climate action, despite the ethical and moral imperatives presented by simultaneous public health, human rights, and climate crises. In 2020, the COVID-19 pandemic and racial justice movements in response to police brutality against Black Americans illuminated institutionalized social, racial, and environmental inequities. Socially and economically disadvantaged groups, including Black, Indigenous, and people of color (BIPOC) communities, will continue to face disproportionate harms until environmental justice (EJ) is centered in shaping and implementing policy. The structures currently in place, including insufficient regulatory frameworks, unjust funding mechanisms, opaque decision-making processes, and colonial North-South dynamics, work to further harm the most oppressed communities in the US and around the world. Depending on the actions and decisions made by carbon removal advocates, the field can continue to reinforce historic injustices or instead play a role in redressing harms and supporting a transition to a just, regenerative society.

In international contexts, addressing potential cross-border impacts and issues around responsibility, liability, monitoring and accounting, and financing requires multilevel governance processes that incorporate climate justice. Applying the United Nations Framework Convention on Change Change’s (UNFCCC) Principle of Common but Differentiated Responsibilities to carbon removal makes clear that the US has an unambiguous international responsibility to amend its historical carbon debt and unmatched contributions to climate change by investing in carbon removal and supporting international equity and justice efforts.

1. National Academies of Sciences, Engineering, and Medicine. (2019). *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda*. National Academies Press. <https://doi.org/10.17226/25259>
2. Intergovernmental Panel on Climate Change. (2018). *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. United Nations. <https://www.ipcc.ch/sr15/>

GLOSSARY

Disadvantaged community

A community that suffers the most from a combination of health, economic, and environmental burdens.

These burdens include high unemployment, air and water pollution, and poverty.

Socially disadvantaged

Those who have been subjected to racial or ethnic prejudice or cultural bias based solely on their identities as members of groups without regard for individual qualities.

Economically disadvantaged

Those whose ability to access credit opportunities and generate capital has been impaired, negatively impacting their standard of living.

At the local level, disproportionate burdens borne by disadvantaged communities across the US could be exacerbated if carbon removal solutions are deployed irresponsibly. Powerful extractive industries, such as oil and gas, are investing in the development of carbon removal solutions. These actors have a long history of anti-climate lobbying and contribute to the existing health and environmental hazards facing these groups. For the US to address its international responsibility and bring benefits to local communities, we must push for a carbon removal field that is justice oriented, community driven, and able to articulate a vision for these solutions alongside demands for their developers.

The nascency of the carbon removal field presents an opportunity for environmental and climate justice principles to shape policies that eliminate existing inequities instead of contributing to them. There is enormous potential for the field to both address legacy emissions and create non-climate benefits that support the livelihoods of frontline communities. Building on recent political and social momentum, the US can realize an equitable future for carbon removal by investing in innovation, establishing robust standards and regulations, and providing necessary technical and financial assistance to project developers, landowners, and communities. This report explores the current political context for carbon removal, provides background on environmental and climate justice, and offers both guiding principles and specific federal policy recommendations to advance just carbon removal development and deployment.

GLOSSARY

Frontline community

A low-income community, community of color, or Tribal community that is already or could be disproportionately affected or burdened by climate change and its impacts.

Current US political context for carbon removal

Carbon removal has quickly gained political traction in recent years. Actions from the Biden administration and the 117th Congress, such as the president's fiscal year 2022 budget request, several executive orders (EOs), and a series of legislative bills, signal an increasing commitment to carbon removal. Contrary to recent years, EJ is now being promoted and pursued with a whole-of-government approach, including interventions for administrative, congressional, and international policy work. There is also burgeoning impetus at the global level, with carbon removal being integrated into international research mechanisms led by the US, as well as climate conversations across the Global North and South. Given the synchronous dedication to both carbon removal and EJ, the US has an extraordinary opportunity to lead in developing a carbon removal field that incorporates justice and equity from its early stages.

However, despite strong federal investment in carbon removal, there is growing tension within Congress and the administration over the role of carbon removal in an equitable climate agenda. EJ advocates within these branches have raised concerns about pursuing carbon removal, categorizing it as a "false solution" that is meant to maintain the status quo and extend the life of polluting industries.

This sentiment has been reinforced by the involvement of the fossil fuel industry in scaling early carbon removal efforts. One iteration of the Green New Deal (GND),³ an important federal legislative effort that is widely supported by EJ advocates and frontline communities, explicitly prohibits funding for direct air capture (DAC) and bioenergy with carbon capture and storage (BECCS) projects. The White House Environmental Justice Advisory Council (WHEJAC) also recommended that DAC and carbon capture, use, and storage (CCUS) projects be excluded from the Justice40 initiative (a mandate that 40% of the benefits from relevant federal investments flow to disadvantaged communities), as they were deemed not beneficial to disadvantaged communities. The distrust of carbon removal projects is not surprising considering that the prominent narrative for carbon removal thus far is dismissive of justice considerations and narrowly focused on mitigating greenhouse gases (GHGs). As a result, carbon removal advocates bear the burden of proof in demonstrating tangible community benefits that are aligned with GND or Justice40 goals.

3. H.R. 2644 - 117th Congress: (2021-2022): Green New Deals for Cities Act of 2021. (2021, April 20). https://bush.house.gov/sites/evo-subsites/bush.house.gov/files/evo-media-document/Bush_GND4Cities.FINAL_.pdf

Administrative momentum and domestic EJ action

Executive Orders

Within its first five months, the Biden administration released a series of executive orders aimed at addressing the climate crisis and promoting EJ.

4. Exec. Order No. 13985, 86 Fed. Reg. 7009 (Jan 25, 2021), <https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government>.

President Biden’s executive orders addressing climate change and EJ

ORDER

DESCRIPTION

13985

Advancing Racial Equity and Support for Underserved Communities Through the Federal Government⁴

- The federal government will pursue a comprehensive approach to advancing equity for all, including BIPOC and other groups that have been historically underserved and adversely affected by persistent poverty and inequality.
- It is the responsibility of the federal government to affirmatively advance equity, civil rights, racial justice, and equal opportunity. Executive departments and agencies must recognize and work to redress inequities in their policies and programs that serve as barriers to equal opportunity. Advancing equity requires a systematic approach to embedding fairness in decision-making processes.
- The federal government’s goal in advancing equity is to provide everyone with the opportunity to reach their full potential. Consistent with these aims, each agency must assess whether and to what extent its programs and policies perpetuate systemic barriers to opportunities and benefits for BIPOC and other underserved groups. Such assessments will better equip agencies to develop policies and programs that deliver resources and benefits equitably to all.

GLOSSARY

Underserved community

A group of people that face barriers and challenges to accessing resources and are underrepresented in decision-making processes.

President Biden’s executive orders addressing climate change and EJ (Continued)

ORDER	DESCRIPTION
<p>13990 Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis⁵</p>	<ul style="list-style-type: none"> • The administration shall listen to science to improve public health and protect our environment; ensure access to clean air and water; limit exposure to dangerous chemicals and pesticides; hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; reduce greenhouse gas emissions; bolster resilience to the impacts of climate change; restore and expand our national treasures and monuments; and prioritize both environmental justice and the creation of the well-paying union jobs necessary to deliver on these goals. • All executive departments and agencies must immediately review and, as appropriate and consistent with applicable law, take action to address the promulgation of federal regulations and other actions during the last four years that conflict with these important national objectives, and to immediately commence work to confront the climate crisis. • Immediate work to confront the climate crisis includes review of agency decisions, restoring national monuments, placing a temporary moratorium on all federal activities in the Arctic Refuge, accurately accounting for the benefits of climate pollution, revoking the permit for the Keystone XL Pipeline, and revoking a set of previous executive orders.

5. Exec. Order No. 13990, 86 Fed. Reg. 7037 (Jan 20, 2021). <https://www.federalregister.gov/documents/2021/01/25/2021-01765/protecting-public-health-and-the-environment-and-restoring-science-to-tackle-the-climate-crisis>

President Biden’s executive orders addressing climate change and EJ (Continued)

ORDER

DESCRIPTION

14008

Tackling the Climate Crisis at Home and Abroad⁶

- The administration shall take a government-wide approach to the climate crisis and put it at the center of US foreign policy and national security. The US government shall:
 - reestablish global leadership in climate change by convening a Leaders Climate Summit and establishing a Special Presidential Envoy for Climate (among other actions),
 - conduct various climate risk analyses across agencies,
 - establish a White House Office of Domestic Climate Policy and National Climate Task Force,
 - create a clean energy procurement strategy,
 - pause new oil and gas development,
 - draft climate action plans across agencies,
 - develop sustainable infrastructure,
 - establish a Civilian Climate Corp,
 - support a just transition for the American workforce,
 - secure EJ, by establishing a White House Environmental Justice Advisory Council and a Justice40 Initiative (with the goal of delivering 40% of the overall benefits of relevant federal investments to disadvantaged communities and tracking performance toward that goal through the establishment of an Environmental Justice Scorecard).

6. Exec. Order No. 14008, 86 Fed. Reg. 7619 (Jan 27, 2021). <https://www.federalregister.gov/documents/2021/02/01/2021-02177/tackling-the-climate-crisis-at-home-and-abroad>

GLOSSARY

Just transition

“Just transition” is a principle, process, and practice. The principle of just transition is that a healthy economy and a clean environment can and should co-exist. The process for achieving this vision should be fair and not cost workers or community residents their health, environment, jobs, or economic assets. The practice of just transition means that the people who are most affected by pollution – the frontline workers and communities – should lead the crafting of policy solutions. (Source: Just Transition Alliance)

Other Administrative Action

In addition to executive orders, the Biden administration has released various plans that promote EJ with implications for carbon removal. The American Jobs Plan is a large-scale infrastructure bill that is expected to create millions of high-quality jobs.⁷ The plan will expand and reform the 45Q tax credit, making it easier for DAC applications to apply in order to accelerate and ensure permanent carbon capture and storage, as well as enable procurement of low-carbon materials for construction and advance research and development for carbon capture and carbon storage technologies.⁸

Building off of the American Jobs plan, the Biden administration's White House Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization released a report detailing recommendations to catalyze economic activity, create high-quality union jobs, and support workers in hard-hit energy communities.⁹ The report reforms and expands the 45Q tax credit to include DAC.¹⁰ Furthermore, President Biden's 2030 Greenhouse Gas Pollution Reduction Target supports US workers by creating high-quality jobs, including engineers and construction workers who can expand carbon capture and green hydrogen to forge cleaner steel and cement, and agricultural producers using cutting-edge tools to make US soil a powerful climate solution.¹¹

The Biden administration has prioritized EJ across departments and agencies through many of its political appointments. Former Environmental Protection Agency (EPA) chief Gina McCarthy is serving as the first White House national

7. The White House. (2021, March 31). *American Jobs Plan*. <https://www.whitehouse.gov/american-jobs-plan/>
8. The White House. (2021, March 31). *FACT SHEET: The American Jobs Plan* [Fact sheet]. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>
9. The White House. (2021, April 23). *FACT SHEET: Biden Administration Outlines Key Resources to Invest in Coal and Power Plant Community Economic Revitalization* [Fact sheet]. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/23/fact-sheet-biden-administration-outlines-key-resources-to-invest-in-coal-and-power-plant-community-economic-revitalization/>
10. Interagency Working Group on Coal and Power Plant Communities and Economic Revitalization. (2021). *Initial Report to the President on Empowering Workers Through Revitalizing Energy Communities*. US Department of Energy, <https://netl.doe.gov/IWGInitialReport>
11. The White House. (2021, April 22). *FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing US Leadership on Clean Energy Technologies* [Fact sheet]. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>

USDA Racial Equity Commission

USDA will create a Racial Equity Commission to identify and address systemic barriers and discrimination across the department.

DOE Energy Justice

DOE recently created a deputy director of energy justice position to examine the country's energy system and its intersection with equity.

Federal Energy Regulatory Commission (FERC) - Environmental Justice and Equity

FERC recently created a senior counsel for environmental justice and equity position to better integrate justice and equity into the Commission's decision-making processes..

climate advisor. Brenda Mallory has been tasked with leading the White House Council on Environmental Quality (CEQ), with support from trailblazer Dr. Cecilia Martinez as the first senior director for EJ. WHEJAC members, advisors to the CEQ branch, encompass a racially, gender, and geographically diverse group of EJ experts who have pioneered the movement throughout their careers.¹² At the Department of Energy (DOE), the Biden administration has appointed several energy and innovation leaders dedicated to integrating and promoting EJ, including Shalanda Baker, Dr. Shuchi Talati, and Dr. Asmeret Asefaw Berhe.¹³ At the Department of the Interior (DOI), President Biden has appointed Deb Haaland as secretary – a long-time justice advocate and the first Native American to serve as a cabinet secretary. Lastly, Michael Regan, an EJ champion, has been appointed EPA administrator.

In addition to these significant political appointments, federal agencies are committing to prioritizing environmental and climate justice within their work while addressing historic discrimination and disparities.

12. The White House. (2021, March 29). *White House Announces Environmental Justice Advisory Council Members* [Press release]. <https://www.whitehouse.gov/ceq/news-updates/2021/03/29/white-house-announces-environmental-justice-advisory-council-members/>

13. Clark, L. (2021, January 21). Biden announces senior DOE staff. *E&E News*. <https://www.eenews.net/stories/1063723115>

Congressional progress and interest in EJ

An increasing number of federal bills promoting land- and tech-based carbon removal solutions include EJ considerations, signaling a growing interest from lawmakers and their constituencies.

Congressional bills centered on EJ

BILL	DESCRIPTION
H.R. 2442 Climate Justice Grants Act ¹⁴	Create and authorize a 10-year Climate Justice Grants program at EPA that provides \$1 billion per year to projects and initiatives proposed by EJ communities.
H.R. 5986 Environmental Justice for All Act ¹⁵	Establish several EJ requirements, advisory bodies, and programs to address the disproportionate adverse human health or environmental effects of federal laws or programs on communities of color, low-income communities, or Tribal and Indigenous communities. The bill would prohibit disparate impacts on the basis of race, color, or national origin as discrimination and establish requirements and programs concerning chemicals or toxic ingredients in certain products. The bill also directs agencies to follow certain requirements concerning EJ and creates an Interagency Working Group on Environmental Justice Compliance and Enforcement.
H.R. 516 S. 101 Environmental Justice Mapping and Data Collection Act of 2021 ^{16, 17}	Establish an Interagency Environmental Justice Mapping Committee that must create a tool to identify EJ communities. The EPA would be required to establish an EJ data repository available to regional, state, local, and Tribal governments.

14. Text - H.R.2442 - 117th Congress (2021-2022): Climate Justice Grants Act. (2021, April 12). <https://www.congress.gov/bill/117th-congress/house-bill/2442/text>
15. Text - H.R.5986 - 116th Congress (2019-2020): Environmental Justice For All Act. (2020, October 1). <https://www.congress.gov/bill/116th-congress/house-bill/5986/text>
16. Text - H.R.516 - 117th Congress (2021-2022): Environmental Justice Mapping and Data Collection Act of 2021. (2021, February 2). <https://www.congress.gov/bill/117th-congress/house-bill/516/text>
17. Text - S.101 - 117th Congress (2021-2022): Environmental Justice Mapping and Data Collection Act of 2021. (2021, January 28). <https://www.congress.gov/bill/117th-congress/senate-bill/101/text>

GLOSSARY

Environmental justice community

Communities with significant representation of people of color, low-income communities, or Tribal and Indigenous communities that experience or are at risk of experiencing higher or more adverse human health or environmental effects.

Congressional bills with carbon removal and equity components

BILL	DESCRIPTION
<p>S. 685 America's Clean Future Fund Act¹⁸</p>	<p>Amend the Internal Revenue Code of 1986 to establish the Climate Change Finance Corporation (C2FC) as an independent federal agency to finance clean energy and climate change resilience activities. C2FC would establish a carbon fee to reduce greenhouse gas emissions and also provide grants, loan guarantees, and carbon fee refunds for eligible CCUS, BECCS, and DAC projects. C2FC would also provide transition assistance to support agricultural decarbonization, clean energy projects, climate resilience, and RD&D.</p>
<p>S. 622 American Jobs in Energy Manufacturing Act of 2021¹⁹</p>	<p>Invest \$8 billion in American clean energy manufacturing and industry, creating jobs that draw on existing skilled workforces from manufacturing, coal mining, or retired coal power plants. The bill would support building or retrofitting facilities to recycle or produce clean energy products, including CCUS products. The bill would also amend the Internal Revenue Code to qualify projects that remove, use, and sequester carbon for advanced energy product credits.</p>
<p>H.R. 2803 S. 1337 Agriculture Resilience Act^{20,21}</p>	<p>This bill would bolster agriculture and climate research programs at the Department of Agriculture (USDA) and the Sustainable Agriculture Research and Education (SARE) program and incentivize adoption of soil health practices through crop insurance discounts, a new soil health grant program for states and Tribes, and new mechanisms such as carbon markets or tax incentives. The bill would also increase funding for the Local Agriculture Marketing Program (LAMP) and Agricultural Conservation Easement Program (ACEP) and amend the tax code to reward the sale of permanent conservation easements and farm property to socially disadvantaged farmers. The bill also has provisions for supporting pasture-based livestock systems, investing in on-farm energy initiatives, and reducing food waste.</p>

18. Text - S.685 - 117th Congress (2021-2022): America's Clean Future Fund Act. (2021, March 10). <https://www.congress.gov/bill/117th-congress/senate-bill/685/text>
19. Text - S.622 - 117th Congress (2021-2022): American Jobs in Energy Manufacturing Act of 2021. (2021, March 9). <https://www.congress.gov/bill/117th-congress/senate-bill/622/text>
20. Text - H.R.2803 - 117th Congress (2021-2022): Agriculture Resilience Act. (2021, April 22). <https://www.congress.gov/bill/117th-congress/house-bill/2803/text>
21. Text - S.1337 - 117th Congress (2021-2022): Agriculture Resilience Act of 2021. (2021, April 22). <https://www.congress.gov/bill/117th-congress/senate-bill/1337/text>

Congressional bills with carbon removal and equity components (Continued)

BILL	DESCRIPTION
<p>H.R. 156 Blue Collar to Green Collar Jobs Development Act of 2021²²</p>	<p>Direct the secretary of energy to establish and carry out a comprehensive, nationwide energy-related industries jobs program, including jobs in CCUS technology. The bill would prioritize training for underserved communities and minority-serving institutions.</p>
<p>H.R. 806 Clean Energy and Sustainability Accelerator Act²³</p>	<p>Establish a Clean Energy and Sustainability Accelerator to invest in clean energy technologies and infrastructure, leveraging public and private funds. The bill would invest directly into projects that support workers and communities negatively impacted by the climate transition, provide grants to support and create green banks, and invest directly into projects that reduce carbon emissions, including agriculture and forestry projects that sequester carbon.</p>
<p>H.R. 4051 S. 2284 Climate Action Rebate Act of 2019^{24, 25}</p>	<p>Impose a carbon fee on the use, sale, or transfer of certain fossil fuels and fluorinated gases that emit GHGs into the atmosphere. The fee is imposed on producers and importers and deposited into a Climate Action Rebate Fund established by this bill. This bill would also rebate up to 70% of net revenues from the fund to low-income individuals as a monthly dividend, and any remaining revenue would be invested in infrastructure, energy innovation, and assistance for workers and communities to transition to a cleaner energy economy. The bill provides economic incentives for land- and technology-based carbon removal solutions.</p>
<p>H.R. 2534 S. 1072 Climate Stewardship Act of 2021^{26, 27}</p>	<p>Support voluntary climate stewardship practices on agricultural lands, forests, and wetlands. The bill calls for increases in funding and expansion of capacity for existing federal conservation, agricultural research, and technical assistance programs. The bill would also reestablish the Civilian Conservation Corps and invest in community food projects in rural and urban communities.</p>

22. Text - H.R.156 - 117th Congress (2021-2022): Blue Collar to Green Collar Jobs Development Act of 2021. (2021, February 2). <https://www.congress.gov/bill/117th-congress/house-bill/156/text>
23. Text - H.R.806 - 117th Congress (2021-2022): Clean Energy and Sustainability Accelerator Act. (2021, March 3). <https://www.congress.gov/bill/117th-congress/house-bill/806/text>
24. Text - H.R.4051 - 116th Congress (2019-2020): Climate Action Rebate Act of 2019. (2019, August 14). <https://www.congress.gov/bill/116th-congress/house-bill/4051/text>
25. Text - S.2284 - 116th Congress (2019-2020): Climate Action Rebate Act of 2019. (2019, July 25). <https://www.congress.gov/bill/116th-congress/senate-bill/2284/text>
26. Text - H.R.2534 - 117th Congress (2021-2022): Climate Stewardship Act of 2021. (2021, April 14). <https://www.congress.gov/bill/117th-congress/house-bill/2534/text>
27. Text - S.1072 - 117th Congress (2021-2022): Climate Stewardship Act of 2021. (2021, April 12). <https://www.congress.gov/bill/117th-congress/senate-bill/1072/text>

Congressional bills with carbon removal and equity components (Continued)

BILL	DESCRIPTION
<p>S. 278 Emergency Relief for Farmers of Color Act of 2021²⁸</p>	<p>Require the secretary of agriculture to provide assistance to socially disadvantaged farmers and ranchers, including improved land access. The bill also includes R&D and pilot projects to understand farmland ownership, technical assistance, financial planning, and land acquisition as they relate to socially disadvantaged land managers.</p>
<p>HR. 5416 S. 2057 National Climate Bank Act^{29,30}</p>	<p>Establish a National Carbon Bank as an independent nonprofit. The bank would be capitalized with \$35 billion in funds over six years to provide financing for low-carbon technologies; agriculture and forestry projects; EJ support and quality job creation in frontline communities; and the creation of green banks.</p>
<p>H.R. 8632 Ocean-Based Climate Solutions Act of 2020³¹</p>	<p>Direct the secretary of commerce to fund ocean-based climate solutions to reduce carbon emissions and global warming, increase coastal resilience, and provide conservation and restoration for ocean and coastal habitats, biodiversity, and marine communities, administered through National Oceanic and Atmospheric Administration (NOAA). The bill would establish a grant program with a goal to restore 1.5 million acres of coastal wetlands over 10 years and authorize \$3 billion to support shovel-ready coastal restoration projects, prioritizing projects that help stimulate economic recovery in low-income, Tribal, and communities of color hit hard by the COVID-19 pandemic.</p>

28. Text - S.278 - 117th Congress (2021-2022): Emergency Relief for Farmers of Color Act of 2021. (2021, February 8). <https://www.congress.gov/bill/117th-congress/senate-bill/278/text>
29. Text - H.R.5416 - 116th Congress (2019-2020): National Climate Bank Act. (2019, December 13). <https://www.congress.gov/bill/116th-congress/house-bill/5416/text>
30. S.2057 - 116th Congress (2019-2020): National Climate Bank Act. (2019, July 8). <https://www.congress.gov/bill/116th-congress/senate-bill/2057>
31. Text - H.R.8632 - 116th Congress (2019-2020): Ocean-Based Climate Solutions Act of 2020. (2020, November 17). <https://www.congress.gov/bill/116th-congress/house-bill/8632/text>

Congressional bills with carbon removal and equity components (Continued)

BILL	DESCRIPTION
H. Res. 104 S. Res. 43 THRIVE Act ^{32,33}	Directs the federal government to develop a holistic agenda to respond to racial injustice, unemployment, the COVID-19 pandemic, and climate change. The bill calls for such an agenda to create opportunities for family farmers and rural communities, including by bolstering regenerative agriculture and investing in lands. The bill also calls for a transformation of the power sector to environmentally just, carbon pollution-free electricity by 2030.
H.R. 8291 S. 4038 TREE Act of 2020 ^{34,35}	Direct the secretary of energy to establish a grant program for states, local governments, Tribes, and other entities to plant a minimum of 300,000 trees annually in residential neighborhoods to reduce energy consumption.
H.R. 2358 S. 487 21st Century Conservation Corps Act ^{36,37}	Establish a Civilian Conservation Corps program and provide supplemental appropriations for certain conservation activities, support for increased reforestation across the US, and incentives for agricultural producers to carry out climate stewardship practices.

32. Text - H.Res.104 - 117th Congress (2021-2022): Recognizing the duty of the Federal Government to implement an agenda to Transform, Heal, and Renew by Investing in a Vibrant Economy ("THRIVE"). (2021, February 18). <https://www.congress.gov/bill/117th-congress/house-resolution/104/text>
33. Text - S.Res.43 - 117th Congress (2021-2022): A resolution recognizing the duty of the Federal Government to implement an agenda to Transform, Heal, and Renew by Investing in a Vibrant Economy ("THRIVE"). (2021, February 8). <https://www.congress.gov/bill/117th-congress/senate-resolution/43/text>
34. Text - H.R.8291 - 116th Congress (2019-2020): TREE Act of 2020. (2020, September 17). <https://www.congress.gov/bill/116th-congress/house-bill/8291/text>
35. Text - S.4038 - 116th Congress (2019-2020): TREE Act of 2020. (2020, June 23). <https://www.congress.gov/bill/116th-congress/senate-bill/4038/text>
36. Text - H.R.2358 - 116th Congress (2019-2020): 21st Century Civilian Conservation Corps Act. (2019, April 25). <https://www.congress.gov/bill/116th-congress/house-bill/2358/text>
37. S.487 - 117th Congress (2021-2022): 21st Century Conservation Corps Act. (2021, February 25). <https://www.congress.gov/bill/117th-congress/senate-bill/487>
38. House Select Committee on the Climate Crisis. (2020). *Solving the Climate Crisis: The Congressional Action Plan for a Clean Energy Economy and a Healthy, Resilient, and Just America*. US House of Representatives, 116th Congress. <https://climatecrisis.house.gov/sites/climatecrisis.house.gov/files/Climate%20Crisis%20Action%20Plan.pdf>

In June 2020, the House Select Committee on the Climate Crisis released a report detailing a congressional plan to transition the country to a clean energy economy and promote resilient and just systems.³⁸ The recommendations outline an approach to climate action that fosters innovation, values workers, and advances EJ.

Congressional committees have also held hearings on topics related to environmental and climate justice, including the state of Black farmers in the US, energy production impacts on rural communities, deploying a just and clean energy future, protecting frontline communities in environmental action, and industrial climate policies to create jobs.

International efforts to equitably address the climate crisis

The Biden administration and 117th Congress are working to advance both carbon removal and EJ internationally. In April 2021, the US released its Nationally Determined Contribution (NDC) in line with Article 4 of the Paris Agreement. The NDC includes land-based carbon removal solutions as part of a commitment to reduce economy-wide greenhouse gas emissions by 50-52% compared to 2005 levels by 2030. Specifically, the NDC pledges federal and state government investments in climate-smart agricultural practices, reforestation, forest protection and management, coastal resilience, and “blue carbon” practices.³⁹ The NDC also pledges to support frontline communities by reducing pollution burdens, enhancing community resilience, and creating high-quality jobs.

President Biden also released two executive orders focused on international climate action: EO 14013 and EO 14027. EO 14013, Rebuilding and Enhancing Programs To Resettle Refugees and Planning for the Impact of Climate Change on Migration, rebuilds the US Refugee Admissions Program (USRAP) to promote stability in regions experiencing conflict and facilitate international collaboration to address the global refugee crisis. As climate change worsens, global migration is expected to rise in the face of increasing resource scarcity and competition, extreme and disastrous weather events, and severity of disease outbreaks.⁴⁰ EO 14027, Establishment of the Climate Change Support Office, creates an office in the Department of State (DOS) to support bilateral and multilateral US engagement in addressing the climate crisis.

In April 2021, President Biden hosted a Leaders Summit on Climate, convening 40 world leaders to establish ambitious, coordinated climate action.⁴¹ During the summit, Secretary of Energy Jennifer Granholm announced that DOE will work with global partners on carbon removal innovation by launching Mission Innovation, a major research initiative, at COP26, the UN’s climate change conference in November 2021.⁴² A similar effort focused on food systems and climate action was also introduced as the “Agriculture Innovation Mission.”⁴³

39. The United States of America. (2021). *Nationally Determined Contribution – Reducing Greenhouse Gases in the United States: A 2030 Emissions Target*. <https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/United%20States%20of%20America%20First/United%20States%20NDC%20April%2021%202021%20Final.pdf>
40. John Podesta. (2019). *The climate crisis, migration, and refugees*. The Brookings Institute. <https://www.brookings.edu/research/the-climate-crisis-migration-and-refugees/>
41. US Department of State. (2021, April 22). *Leaders Summit on Climate*. <https://www.state.gov/leaders-summit-on-climate/>
42. US Department of Energy. (2021, April 23). *DOE Launches International Clean Energy Initiatives to Tackle Climate Crisis* [Press release]. <https://www.energy.gov/articles/doe-launches-international-clean-energy-initiatives-tackle-climate-crisis>
43. US Department of State. (2021, April 23). *Launching Agriculture Innovation Mission for Climate* [Fact sheet]. <https://www.state.gov/launching-agriculture-innovation-mission-for-climate/>

GLOSSARY

Land-based carbon removal
Use of land management practices that can optimize carbon removal processes in terrestrial and coastal ecosystems, including forests, coastal wetlands, and agricultural lands.

Carbon180's Environmental Justice Initiative

Carbon180's Environmental Justice Initiative was founded on 1) a moral imperative to ensure that the carbon removal field not only addresses carbon emissions but also improves the well-being of all communities, and 2) a growing recognition of the need to center EJ within the carbon removal field to gain community acceptance and deploy projects. Our goal is to advocate for the integration of equity and justice in the carbon removal field, reassess how Carbon180 conducts policy development and advocacy, and champion broader EJ efforts and priorities. The North Star for climate action should be solidifying equity and justice as the central consideration when defining a problem and identifying solutions to pursue. We are seeking to internalize this belief and shift our organization to align with the above goals.

To date, we are one of just a few US organizations with a program dedicated to comprehensively integrating EJ into carbon removal policy. Carbon180 has been successful in early efforts to enact policies critical to scaling carbon removal, but reaching large-scale deployment will require a broader coalition of support that includes robust participation from EJ advocates. Aligned with Jemez Principles for Democratic Organizing, our initiative is exploring non-extractive and additive approaches to facilitate this much-needed participation from EJ advocates and frontline communities.

Our work began with outreach to prominent EJ organizations, leaders, and academics across the US for one-on-one conversations to gauge the general level of familiarity with carbon removal and the current priorities of different stakeholders. These initial conversations also provided fundamental insights for building equity into the carbon removal field and helped illustrate remaining gaps that will be important to address in future work.

Following our one-on-one outreach, Carbon180 held a Carbon Removal and Environmental Justice Discussion Forum, where we invited EJ advocates to discuss equity and justice considerations and potential policy levers for land- and technology-based carbon removal. Carbon180 provided background information and held a Q&A session before initiating discussion on interests, concerns, and areas for alignment.

GLOSSARY

Technology-based carbon removal

Use of engineered technologies and chemical processes to draw down carbon dioxide from the atmosphere, including direct air capture and carbon mineralization.

Following our forum, we invited participants to join our newly created Environmental Justice Advisory Council to help us deepen our understanding of the needs of EJ communities and integrate EJ into our policy work. We also published a series of “deep dives” that explore social, economic, and political implications of leading carbon removal solutions in the US.⁴⁴ As our work develops, we will continue to explore how to best center EJ in carbon removal and hope to gain a more profound understanding of labor perspectives and carbon removal’s role in a just transition.

44. Carbon180. (n.d.). *Deep Dives*. <https://carbon180.org/deep-dives>

WE ACT for Environmental Justice

WE ACT for Environmental Justice laid out [eight ways](#) environmental organizations can support the movement for EJ. This was a foundational resource in shaping early efforts of our EJ initiative and we are incredibly grateful for their work.

Section Three

Background on Environmental Justice

History of the EJ movement

The use of the words “environment” and “justice” in “environmental justice” was very intentional. Environment often stirs images of wilderness or nature — the focal point of conventional, usually white-led environmental movements. The EJ movement co-opted and redefined “environment” to intentionally include the built environment most familiar to communities of color, referring to it as a place to “live, work, pray, play, and worship safely.” Its origin traces back to the Civil Rights movement of the 1960s, particularly the passage of the Civil Rights Act, Title VI, which prohibited the use of federal funds to discriminate on the basis of race, color, and national origin, and the work of Dr. Martin Luther King Jr. with Black sanitation workers in the South.⁴⁵ Several other notable cases of environmental injustices followed, including migrant farmworkers’ lawsuits over pesticide DDT exposure in California and protests of landfill and incinerator siting in predominantly Black neighborhoods in Texas.⁴⁶

The EJ movement continued to gain momentum in the 1980s and 1990s. “The Toxic Waste and Race” report, published in 1987, found that race was the greatest determining factor in whether someone lived near a polluting waste facility — the outcome of discriminatory local, state, and federal land-use policies.⁴⁷ Shortly after, the textbook “Dumping in Dixie,” published in 1990 by Dr. Robert Bullard, illuminated the struggle of Black communities against environmental racism and clearly delineated the inherent link between environmentalism and social justice.⁴⁸ The following year, the first National People of Color Environmental Leadership Summit was held in Washington, DC, where the 17 principles for EJ were created and are still used by the field today.⁴⁹ Over the last three decades, EJ has become a global movement for civil rights, environmental health, occupational health and safety, Indigenous land rights, and other social and economic rights.

While reports and studies have exposed the role of institutional racism in environmental and health degradation in Black, Indigenous, and other communities of color, lived experiences reveal even more. The Standing Rock protests put a national spotlight on the long history of threats to Indigenous sovereignty, including treaty violations, land dispossession, and food and water insecurity.⁵⁰ The largest refinery on the East Coast, located in South Philadelphia, was found to be responsible for more than half of the city’s cancer-causing air pollution, leading to 125 premature deaths every year. Black residents make up the majority of this community and have some of the highest rates of asthma in the country — a condition made even more perilous during the COVID-19 pandemic, when Black

45. Carder, Eddy, F. (n.d.). *The American Environmental Justice Movement*. Internet Encyclopedia of Philosophy. <https://iep.utm.edu/enviro-j/>
46. Carder, Eddy, F. (n.d.). *The American Environmental Justice Movement*. Internet Encyclopedia of Philosophy. <https://iep.utm.edu/enviro-j/>
47. Commission for Racial Justice. (1987). *Toxic Wastes and Race in the United States: A National Report on the Racial and Socio-Economic Characteristics of Communities with Hazardous Waste Sites*. United Church of Christ. <https://www.nrc.gov/docs/ML1310/ML13109A339.pdf>
48. Stewart, James. (1991). Dumping in Dixie: Race, class, and environmental quality. *The Review of Black Political Economy*, 20(2), 105-107. https://www.researchgate.net/publication/227582649_Dumping_in_dixie_Race_class_and_environmental_quality
49. EJnet.org. (n.d.). *The Principles of Environmental Justice (EJ)*. <https://www.ejnet.org/ej/principles.pdf>
50. Lopez, German. (2017, March 13). The big, nearly 200-year-old legal issue at the heart of the Dakota Access pipeline fight. *Vox*. <https://www.vox.com/identities/2017/3/13/14854096/dakota-access-pipeline-tribal-sovereignty>

Americans are twice as likely as white Americans to die from the virus.⁵¹ More than 50% of Latinos in the US live in Texas, California, and Florida, three states already experiencing adverse climate impacts. Latinos are more likely to live in low-income communities with less access to green spaces and hold jobs in occupations that expose workers to air and water pollutants, hazardous wastes, pesticides, and other toxic chemicals.⁵²

Climate justice, a more recent movement, frames climate change as a human rights and racial justice issue, rather than a purely environmental or physical problem. The movement acknowledges that climate change disproportionately affects historically marginalized communities, such as communities of color and economically disadvantaged communities, through social, economic, public health, and other adverse impacts.⁵³ Climate justice also brings the conversation to the international level, including the historical responsibility of the Global North, particularly the US, in contributing to climate change, while the Global South bears the disproportionate burden of impacts.⁵⁴

Carbon removal has an opportunity to support climate and EJ priorities. To do so, carbon removal must protect and empower disadvantaged communities, support a just economic transition for workers and their communities, require robust community participation and ownership, and promote global problem-solving.

51 Worland, Justin. (2020, July 9). Why the Larger Climate Movement Is Finally Embracing the Fight Against Environmental Racism. *Time*. <https://time.com/5864704/environmental-racism-climate-change/>

52. Environmental Defense Fund. (n.d.). *Latinos, Communities, and Climate Change: Why we care and what we can do* [Fact Sheet]. https://www.edf.org/sites/default/files/content/latinos_and_climate_change_factsheet_0317_refresh.pdf

53. EJnet.org. (n.d.). *Environmental Justice Leadership Forum on Climate Change*. <http://www.ejnet.org/ej/ejlf.pdf>

54. EJnet.org. (n.d.). *10 Principles for Just Climate Change Policies in the US*. <http://www.ejnet.org/ej/climatejustice.pdf>

Taxonomy of relevant justice types for carbon removal

There are several types of justice that underpin environmental and climate justice efforts – particularly procedural and distributive.^{55, 56} Finding ways to integrate different types of justice into carbon removal can help ensure solutions don't create new harms for frontline communities or exacerbate existing ones while creating space to redress historic injustices and potentially help transform our food and energy systems.

55. Tomlinson, L. (2015). *Procedural Justice in the United Nations Framework Convention on Climate Change: Negotiating Fairness*. Springer, Cham. <https://link.springer.com/book/10.1007%2F978-3-319-17184-5#about>

56. Meyer, L. H. & Roser, D. (2006). Distributive Justice and Climate Change. The Allocation of Emission Rights. *Analyse & Kritik*, 28(2), 223-249. <https://www.degruyter.com/view/journals/auk/28/2/article-p223.xml>

57. The Justice Collaboratory. (n.d.). *Procedural Justice*. Yale Law School. <https://law.yale.edu/justice-collaboratory/procedural-justice>

Types of justice relevant to carbon removal

TYPE	WHAT IT LOOKS LIKE	EXAMPLE
PROCEDURAL Fairness in decision-making processes ⁵⁷	<ul style="list-style-type: none"> • Create transparent and inclusive dialogues where all stakeholders, particularly disadvantaged groups, can discuss priorities and concerns • Empower all stakeholders, particularly disadvantaged groups, to participate in decision-making processes and compensate them for their work. • Place in the hands of disadvantaged stakeholders the power to shape carbon removal development and deployment and provide final approval of a project. 	A developer looking to deploy a large-scale DAC facility would conduct community outreach at project inception, identifying ways to earn societal acceptance for the project. Should the community express strong support, the developer would hold consistent meetings throughout the project until facility closure, providing transportation and compensation to community members for attendance, offering accessible meeting locations, times, and languages, and ensuring participation from BIPOC and low-income communities.

Types of justice relevant to carbon removal (Continued)

TYPE	WHAT IT LOOKS LIKE	EXAMPLE
<p>DISTRIBUTIVE</p> <p>Equitable allocation of resources, risks, impacts, and benefits across society⁵⁸</p>	<ul style="list-style-type: none"> • Ensure harms and adverse impacts from carbon removal solutions don't fall on disadvantaged groups. • Ensure potential benefits and opportunities from carbon removal (e.g., jobs, air and water quality improvements, and wealth creation) are distributed fairly across stakeholder groups, especially disadvantaged groups. 	<p>A developer would co-create a community benefits agreement (CBA) with nearby communities for a planned BECCS facility to legalize the benefits (and any potential mitigation measures) that communities would want to receive from the project, such as guaranteed local hiring and air and water pollution reductions. The burden of monitoring and reporting would fall on the developer to ensure the agreement was being met.</p>
<p>REPARATIVE</p> <p>Repair previous harms committed through violations and crimes⁵⁹</p>	<ul style="list-style-type: none"> • Hold extractive industries and other relevant stakeholders accountable for historic harms through legal action or other steps deemed appropriate by harmed communities and stakeholders. • Ensure historic and continuing harms are openly addressed by offenders and reparations are completed in accordance with the desires or requests of harmed communities and stakeholders. • Return power to harmed communities and stakeholders. 	<p>An oil and gas company that wants to deploy a geologic storage facility would openly address any and all harms that its industry has caused to nearby communities, providing legalized and community-driven reparations before the project begins.</p>

58. Lamont, J. & Favor, C. (2017, Sep 26). Distributive Justice. *The Stanford Encyclopedia of Philosophy*, Winter 2017 edition. Metaphysics Research Lab, Stanford University. <https://plato.stanford.edu/entries/justice-distributive/>

59. Greyl, L., Ojo, G. U., Williams, C., Certoma, C., Greco, L., Ogbara, N. & Ohwojeheri, A. (2013). *Digging deep corporate liability*. Environmental Justice strategies in the world of oil. EJOLT Report No. 9. Environmental Justice Organizations, Liabilities and Trade. http://www.ejolt.org/wordpress/wp-content/uploads/2013/10/131007_EJOLT09-final-Low-resolution.pdf

Types of justice relevant to carbon removal (Continued)

TYPE	WHAT IT LOOKS LIKE	EXAMPLE
<p>TRANSFORMATIVE</p> <p>Spur change in society's current systems and structures⁶⁰</p>	<ul style="list-style-type: none"> Revolutionize the sectors relevant to carbon removal to address structural power imbalances and historic harms. 	<p>DAC installations are carbon negative when powered by renewable energy or low-carbon energy sources instead of fossil fuel applications. This provides an opportunity for carbon removal to play a major role in shifting energy generation toward a low-carbon system. Furthermore, properly scaling soil carbon storage in agricultural systems will require a coordinated system of change that reinforces itself, centers soil health, and integrates robust education, science, and incentives.⁶¹ Thoughtful implementation of soil carbon storage practices that align with regenerative principles can promote significant shifts in our food systems to prioritize environmental and public health.</p>

60. Krause, D. (2018). Transformative approaches to address climate change and achieve climate justice. In T. Jafry (Ed.), *Routledge Handbook of Climate Justice* (pp. 509-520). Routledge. https://www.researchgate.net/publication/331248468_Transformative_approaches_to_address_climate_change_and_achieve_climate_justice

61. Amador, G., Burns, E., Kosar, U., Suarez, V. & Zelikova, J. (2020). *Leading with Soil: Scaling Soil Carbon Storage in Agriculture*. Carbon180. https://static1.squarespace.com/static/5b9362d89d5abb8c51d474f8/t/5eaa30d12c3a767e64c3845b/1588211922979/LeadingWithSoil_Final+Text.pdf

GLOSSARY

Legalized benefits

Legally binding and directly enforceable benefits that are included in a contract or agreement.

Case studies of previous environmental failings in carbon management

There are a number of examples where carbon management projects have failed to meet the needs of frontline communities. The case studies below offer important lessons and highlight mistakes that are all too easy to repeat without adopting equity and justice frameworks.

PROCEDURAL JUSTICE FAILURE

Jamestown Oxy-Coal CCS Project⁶²

In 2004, with support from the New York governor, the Jamestown Board of Public Utilities (JBPU) announced plans to build a “clean coal” project to replace its existing Carlson coal plant. After receiving criticism, the proposed project was discontinued in its initial form and transformed into a CCS demonstration project in 2007.

Community engagement for the original facility consisted of a series of scoping meetings, as required by New York’s State Environmental Quality Review Act. After the project was modified from its initial form to a CCS demonstration project, community engagement efforts consisted of informational meetings sponsored by JBPU, the Oxy-Coal Alliance – which included Praxair, Dresser-Rand, E&E, Ecology and Environment, Foster Wheeler, Battelle Labs, SUNY Buffalo, and AES Corp. – and occasionally the governor’s office. There were also a series of workshops held by the New York State Department of Environmental Conservation.

The governor and other high-level officials supported this project prior to consulting with community members, leaving those who opposed the project feeling blindsided. The community felt that engagement meetings were “promotional” and one-way in nature to avoid public criticism and controversy. Concerns about issues such as higher utility bills, impacts to the local economy, and potential alternatives to the proposed project were never addressed. Unfortunately, accessing this information was difficult and created another barrier to meaningful engagement and input. As a result of how JBPU conducted public engagement, community members felt that, despite their considerable pushback, JBPU would move forward with building the project regardless. After years of united community organizing efforts from the Concerned Citizens Group of the Jamestown Area, Sierra Club, American Lung Association, and the New York Public Interest Research Group, DOE denied the project’s necessary funding and it was eventually dropped by JBPU.^{63,64}

The Jamestown community’s experience showcased the lack of meaningful input of impacted communities in the deployment of industrial-scale projects. First, developers should establish inclusive and open dialogues with community members

62. Forbes, S. M. & Ziegler, M. S. (2010). *CCS and Community Engagement: Guidelines for Community Engagement in Carbon Dioxide Capture, Transport, and Storage Projects*. World Resources Institute. http://pdf.wri.org/ccs_and_community_engagement.pdf

63. Environmental Advocates of New York. (2009, Dec 7). *US Dept of Energy Says 'No' to Jamestown, NY's Dirty Coal Proposal* [Press release]. <http://readme.readmedia.com/US-Dept-of-Energy-Says-No-to-Jamestown-NYs-Dirty-Coal-Proposal/991537>

64. Simpson, W. (2013, Oct 16). *Unified opposition wins 8 year drive to block Jamestown coal plant*. Sierra Club. <https://atlantic2.sierraclub.org/content/unified-opposition-wins-8-year-drive-block-jamestown-coal-plant>

GLOSSARY

Carbon management

Technologies and practices that aim to manage anthropogenic releases and sequestrations of carbon dioxide emissions.

at the outset to raise concerns, discuss priorities, accept criticisms, and identify alternative options. Robust public engagement cannot be promotional and must be structured to facilitate input and feedback. Second, developers and planning officials should conduct research on potential alternatives to a project being pursued, share the results of that study with communities, and understand community preferences before project planning gets underway. Finally, community wishes and concerns must be respected. When a community expresses opposition to a project, project developers should incorporate feedback, explore and pursue alternatives supported by the community, or even terminate the project.

DISTRIBUTIVE JUSTICE FAILURE

REDD+ in Kenya⁶⁵

Reducing emissions from deforestation and degradation (REDD) was conceptualized at UNFCCC in 2007 and is a major mechanism for climate mitigation under the Paris Agreement. Its goal is to financially compensate developing countries for climate-smart forestry practices, including forest carbon removal. The program went through numerous iterations, initially focused on reducing emissions from deforestation to eventually recognizing the importance of conserving existing carbon stocks and implementing sustainable forest management practices. The program is now referred to as REDD+ to reflect this broader scope of forest preservation and management.

A REDD+ project in Kenya highlights the potential discrepancies between project design and implementation. The project design pushed for equitable distribution of benefits for all involved parties, but implementation showed that only a group of elites received the benefits. Although locals received a small portion of project revenue, they were significantly impacted by restrictions imposed by the project. For example, restricted access to land meant local communities were unable to hunt, gather firewood, or produce charcoal. These land restrictions resulted in “leakage” – the clearcutting of forests elsewhere. The project raised issues around unclear or inequitable land tenure, which created disputes (between locals, government officials, and project developers) over who owned, managed, or governed the forests and how benefits were distributed.

It’s imperative to think critically about which stakeholders will benefit from carbon removal policies and which will experience hardship. Despite presumably good intentions, projects can entrench inequities if the legacy of dispossession or inequitable land tenure isn’t addressed. This case study highlights the importance of robust monitoring of project implementation to ensure that efforts to address inequities in project design are actually carried out.

65. Chomba, S., Kariuki, J., Lund, J. F. & Sinclair, F. (2016). Roots of inequity: How the implementation of REDD+ reinforces past injustices. *Land Use Policy*, 50, 202-213. <https://www.sciencedirect.com/science/article/pii/S0264837715002926>

GLOSSARY

Clearcutting

A method of tree removal where all trees in the area are uniformly removed.

REPARATIVE JUSTICE FAILURE

Chevron-Texaco in the Northern Ecuador Amazon⁶⁶

Chevron-Texaco operated in the Ecuadorian Amazon between 1965 and 1992. During this time, the company drilled 339 wells in 15 oil fields, abandoned 627 wastewater pits, and used outdated technologies that contaminated the surrounding environment. Chevron extracted 1.5 billion barrels of crude oil, dumped 19 billion gallons of production water, and burnt 2 million liters of gas per day. Chevron-Texaco's extractive and exploitative actions contributed to devastating harms in the North Ecuadorian Amazon, particularly impacting Indigenous peoples and small farmers. These harms included massive deforestation and contaminated waterways and soil. Research has shown this disaster caused child malnutrition, increased child mortality rates, and increased miscarriage rates among women. Furthermore, egregious human rights violations were committed, including sexual violence, land and cultural loss, and forced displacement of communities.

In 1993, more than 30,000 locals filed a class-action lawsuit against Chevron-Texaco in New York federal court in response to the damages. The plaintiffs demanded that Chevron-Texaco redress environmental contamination, restore public access to clean drinking water, reintroduce native wildlife, and fund medical care and operations. The lawsuit was eventually moved to Ecuador as a result of Chevron-Texaco filing a motion of inadmissibility in the US. Finally, in 2011, the court ruled in favor of the claimants and fined Chevron-Texaco \$8.6 billion, to be doubled if it did not publicly apologize to the claimants, with 10% to be used to create a trust administered by the Amazon Defense Coalition. As of 2021, the case is still being litigated.⁶⁷

Despite the legal ruling, Chevron-Texaco never took full responsibility, and justice for the damages suffered was never attained. This lawsuit highlights why there is deep-rooted distrust between disadvantaged communities and the oil-and-gas industry. It's imperative to openly recognize this history and address harms with community-driven reparations that return power to groups. The lack of acknowledgement from Chevron-Texaco is also important to note, as it continues to rob the affected communities of dignity.

In addition to applying lessons learned from these case studies, carbon removal practitioners must actively work to establish best practice examples that demonstrate success in meeting the needs of frontline communities and meaningfully incorporating equity and justice. Given the nascency of the field, case studies that successfully demonstrate how these justice frameworks can be applied are necessary but sorely lacking. A scarcity of tangible commercial-size projects driven by communities poses a significant barrier in building trust and garnering any support from EJ advocates.

66. Greyl, L., Ojo, G. U., Williams, C., Certoma, C., Greco, L., Ogbara, N. & Ohwojeheri, A. (2013). *Digging deep corporate liability. Environmental Justice strategies in the world of oil.* EJOLT Report No. 9. Environmental Justice Organizations, Liabilities and Trade. http://www.ejolt.org/wordpress/wp-content/uploads/2013/10/131007_EJOLT09-final-Low-resolution.pdf
67. Pellegrini, L., Arsel, M., Orta-Martínez, M., & Mena, C. F. (2020). International Investment Agreements, Human Rights, and Environmental Justice: The Texaco/Chevron Case From the Ecuadorian Amazon. *Journal of International Economic Law*, 23(2), 455–468. <https://academic.oup.com/jiel/article/23/2/455/5878138?login=true>

Section Four

Building an Equitable and Just Carbon Removal Field

Guiding principles

Guided by the historic EJ movement, these case studies, and our own one-on-one listening sessions and discussion forum, we present the following principles for integrating EJ into carbon removal policy development, advocacy, and implementation.

- 1.** The benefits of carbon removal solutions must be equitably distributed.
- 2.** Public engagement must be robust and involve seeking input from groups throughout the development and deployment of carbon removal solutions.
- 3.** Safeguards are needed to ensure adverse impacts are not borne by disadvantaged communities.
- 4.** The socioeconomic consequences and distributional impacts of carbon removal solutions need to be evaluated alongside their technological and economic attributes.
- 5.** Carbon removal is seeking to address a challenge that is both local and global, and therefore should incorporate justice across temporal and spatial scales.

The benefits of carbon removal solutions must be equitably distributed.

The benefits of carbon removal projects should be equitably allocated across communities, particularly in disadvantaged communities that often inherit burdens rather than opportunities. Carbon removal technologies and practices that are effective and provide both climate and non-climate benefits should be prioritized for deployment in overburdened communities, as long as they are also supported by communities. Projects should reflect local concerns and contexts, including racial disparities and the historical exclusion of communities, in deployment strategies.

Example: Before moving forward with a DAC project, both policymakers and developers should identify communities that are interested in DAC and prioritize their needs in planning deployment strategies. The project should aim to incorporate community input and participatory design to create local revenues that may have been lost due to the decline of local fossil-powered industries.

Public engagement processes must be robust and include input from groups throughout the development and deployment of carbon removal solutions.

Public engagement processes need to be inclusive and accessible to all members of the community, provide resources to properly evaluate the carbon removal solution(s) being deployed, and ensure governance structures give communities ownership over decision-making. If communities don't agree to a project, planners should provide adjustments, alternatives, or halt the project altogether.

Example: A proposed project for a geologic storage site should create and execute a public engagement plan that targets disadvantaged local communities and provides transportation access, child care support, financial compensation, and other resources to community members, fostering inclusive and transparent processes.

GLOSSARY

Climate benefits

The benefits created by a project or policy that may contribute to mitigating greenhouse gases, such as emissions reductions or carbon sequestration.

Non-climate benefits

The benefits created by a project or policy that are not directly related to stabilizing the climate, such as employment opportunities or increased water quality.

Safeguards are needed to ensure adverse impacts are not borne by disadvantaged communities.

Carbon removal solutions should not only avoid creating new harms, but also aim to redress burdens already placed on frontline communities, such as unfair labor standards, risks to clean air and water, and public health harms.

Example: An agricultural carbon removal project should implement safeguards to protect the working conditions of farm laborers. Rather than merely avoiding worsening working conditions, the project should strive to improve conditions and include farmworkers as partners across its full life cycle.

The socioeconomic consequences and distributional impacts of carbon removal solutions need to be evaluated alongside their technological and economic attributes.

Research on the social impacts of scaling carbon removal is underdeveloped, but it is important to understand potential impacts and barriers in order to enable well-informed decision-making on the development and deployment of different approaches. Currently, socioeconomic insights do not receive the same weight and attention as techno-economic research in the carbon removal field. However, this is necessary to promote a more holistic understanding of technologies, practices, and projects. Research findings should be accessible so that disadvantaged communities can use them to make timely decisions about local carbon removal projects.

Example: Federal funding to support community-engaged research (such as crowd science) and community-based participatory research can play an important role in identifying and mitigating risks while empowering communities.

Since carbon removal seeks to address a challenge that is both local and global, it should therefore incorporate justice across temporal and spatial scales.

This means that while climate change is a global challenge, international carbon removal efforts cannot be overly prescriptive. The US must support members of the Global South in determining the research and project deployments that take place in their communities.⁶⁸ However, the Global North also has a historical responsibility to reduce emissions while ensuring that carbon removal scale-up does not impose undue hardship on economic growth or access to resources in Global South countries.

Example: The United States and other Global North countries should share information, technology, and monetary resources with Global South countries seeking to research, develop, and deploy carbon removal solutions and meaningfully incorporate Global South countries into any international research to account for historical responsibility and current capabilities.

68. Táíwò, O. O. (2020, Sep 29). An African case for carbon removal. *Africa Is a Country*, <https://africasacountry.com/2020/09/an-african-case-for-carbon-removal>

Federal policy recommendations

There is a timely opportunity to craft and implement policies that can shape an equitable and just carbon removal field. In this section, we provide federal policy recommendations that address various priorities raised throughout our work with justice and labor advocates. These recommendations span land- and technology-based carbon removal approaches and are organized by labor and economic opportunities, outreach and engagement, technical and financial assistance, research, development, and deployment (RD&D), and regulations.

Focus areas for federal policy to support just carbon removal deployment

LABOR AND ECONOMIC OPPORTUNITIES



Central to an equitable climate effort is ensuring a just transition from an extractive economy to one that is regenerative, inclusive, and values workers and communities.

OUTREACH AND ENGAGEMENT



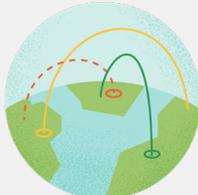
Robust governance structures can promote self-determination, transparency, and inclusion in relationships between communities and the institutions seeking to advance carbon removal.

TECHNICAL AND FINANCIAL ASSISTANCE



Targeted assistance can address disparities in communities' abilities to meaningfully influence decision-making about their food, energy, and economic systems.

RESEARCH, DEVELOPMENT, AND DEPLOYMENT



Investments in RD&D and equity-focused research collaborations can fill crucial knowledge gaps while supporting disadvantaged and underserved groups.

REGULATIONS



Government regulations can not only assess impacts of carbon removal implementation but help establish standards that protect underserved communities.



Labor and economic opportunities

One of the 17 EJ principles affirms the right of all workers to a safe and healthy work environment and the freedom to not have to choose between unemployment and an unsafe livelihood.⁶⁹ Central to an equitable climate effort is ensuring a just transition from an extractive economy to one that is regenerative, inclusive, and appreciative of workers and communities. Several conversations with EJ and labor advocates stressed the importance of supporting fossil fuel workers and economically disadvantaged communities in the clean energy transition, focusing on improving worker salaries and working conditions, addressing impacts to identity, and empowering workers. These conversations also highlighted the historical disenfranchisement and disempowerment of farm and forestry workers, who often work without appropriate safeguards in place and are exploited without receiving fair compensation. Transition efforts are complex, as they require both short-term assistance for workers to address direct and immediate job impacts and long-term assistance for diversification of local economies.⁷⁰

RECOMMENDATION #1

Increase equitable workforce development opportunities across land- and technology-based carbon removal solutions

- Centralize and house workforce development programs under the Department of Labor (DOL). These programs are often hard to navigate across federal agencies, decreasing the chances participants will be able to access all relevant opportunities. In addition to job training and career services, workforce development programs should provide foundational support to pursue burgeoning job opportunities. Often referred to as “wraparound services,” foundational support includes child care, affordable housing, and reliable transportation to help workers overcome barriers that prevent them from completing a program and securing employment.⁷¹

The Need for Field Building

The US should improve climate curricula taught in K-12 education. Curricula should include information about climate change, EJ, and existing efforts to prepare the next generation of climate leaders.

69. EJnet.org. (n.d.). *The Principles of Environmental Justice (EJ)*. <http://www.ejnet.org/ej/principles.pdf>

70. Cha, J. M. (2020). Just Transition: Tools for Protecting Workers and Their Communities at Risk of Displacement Due to Climate Policy. In C. Zabin (Ed.), *Putting California on the High Road: A Jobs and Climate Action Plan for 2030* (pp. 149-168). UC Berkeley Labor Center. <https://laborcenter.berkeley.edu/wp-content/uploads/2020/08/Chapter-4-Just-Transition-Putting-California-on-the-High-Road.pdf>

71. Look, W., Raimi, D., Robertson, M., Higdon, J. & Propp, D. (2021). *Enabling Fairness for Energy Workers and Communities in Transition: A Review of Federal Policy Options and Principles for a Just Transition in the United States*. Resources for the Future, Environmental Defense Fund. <https://www.edf.org/sites/default/files/documents/RFF-EDF%20Fairness%20for%20Workers%20and%20Communities%20Synthesis%20Report.pdf>

- Increase investments in workforce development programs and opportunities, particularly at Tribal colleges and universities (TCUs), minority-serving institutions (MSIs), historically Black colleges and universities (HBCUs), and state community colleges. Key programs to support include DOE’s Early Career Research Program and Bioenergy Careers and Education program, as well as the Department of Agriculture’s (USDA) Agriculture and Food Research Initiative (AFRI) – Education and Workforce Development program.^{72, 73, 74} These and similar programs should establish partnerships and provide funding opportunities for mission-driven institutions.

Workforce development for technology-based carbon removal

- Increase funding for DOE’s Energy Workforce Division under the Office of Economic Impact and Diversity. Additional funding can expand adult education, vocational training, youth workforce development, and other job training opportunities for technology-based carbon removal to support interested fossil fuel workers, their communities, and other underserved groups.⁷⁵ Supporting DOE’s Energy Workforce Division can help build an inclusive workforce while providing transition assistance for fossil fuel workers and other underserved groups to ensure workers are not left unemployed or underemployed and all communities have fair access to opportunities. The Energy Workforce Division can model these efforts after the Hazardous Waste Worker Training program.⁷⁶ It’s important to note these are additive efforts, as job creation or retention in a transition are almost never one-to-one, and workers may not want to transition into carbon management.

Workforce development for land-based carbon removal

- Leverage USDA programs, such as Sustainable Agriculture Research and Education (SARE), Farming Opportunities Training and Outreach (FOTO), and AFRI Education and Workforce Development to build awareness, knowledge, and skills related to soil health and soil carbon storage.^{77, 78} Support for these programs will increase technical knowledge across socially disadvantaged, beginning, and young producers and enable them to implement these practices in their systems.
- Increase funding to USDA’s Urban and Community Forestry program to cultivate diverse and equitable leadership within the urban forestry community. Additional funding should support workforce development opportunities and green job creation in urban and community forestry within underserved communities. Congress should also expand urban agriculture workforce development and job training through USDA’s Urban Agriculture and Innovative Production Competitive Grants, with a similar targeted focus on underserved communities.⁷⁹

72. US Department of Energy. (2021, May 3). *DOE Awards \$17.3 Million for Student and Faculty Research Opportunities and to Foster Workforce Diversity* [Press release]. <https://www.energy.gov/articles/doe-awards-173-million-student-and-faculty-research-opportunities-and-foster-workforce>

73. US Department of Energy. (n.d.). *Workforce*. <https://www.energy.gov/workforce>

74. National Institute of Food and Agriculture. (n.d.). *AFRI Education and Workforce Development*. US Department of Agriculture. <https://nifa.usda.gov/program/afri-education-workforce-development>

75. Office of Economic Impact and Diversity. (n.d.). *Energy Workforce Division*. Office of Minority Programs, US Department of Energy. <https://www.energy.gov/diversity/energy-workforce-division>

76. National Institute of Environmental Health Sciences. (n.d.). *Deep South Center for Environmental Justice / Texas Southern University*. https://www.niehs.nih.gov/careers/hazmat/awardees/tsu_dscej/index.cfm

77. National Institute for Food and Agriculture. (n.d.). *Sustainable Agriculture Research and Education*. US Department of Agriculture. <https://www.sare.org/>

78. Office of Partnerships and Public Engagement (n.d.). *Farming Opportunities Training and Outreach Grant Program* [Fact sheet]. US Department of Agriculture. https://www.usda.gov/sites/default/files/documents/2501_FactSheet.pdf

79. US Department of Agriculture. (n.d.). *Urban Agriculture Grants and Engagement Opportunities*. <https://www.farmers.gov/manage/urban/opportunities>

- Establish the Civilian Climate Corps (CCC) to create equitable work opportunities. The CCC should also address the climate crisis by implementing land-based carbon removal solutions across the US.⁸⁰ The CCC can include:
 - A Green Careers Network (GCN) of new and existing workforce development programs at DOL that provide apprenticeships, on-the-job education, and skills training to help seekers secure long-term employment.⁸¹ Equipped with support staff, a GCN would act as an accessible, central hub where unemployed and underemployed Americans could navigate climate-related workforce development programs, resources, and career opportunities.
 - A grant program to fund local corps to support land-based carbon removal projects, administered by the Corporation for National and Community Service (CNCS). The program should support these projects in existing community corps and also provide seed grants to create new climate-focused corps in underserved communities.
 - Efforts to expand and reorient existing federal workforce development programs, such as the Public Lands Corps, AmeriCorps, and Job Corps, to prioritize land-based carbon removal conservation work and training in underserved and underemployed communities.
- Increase funding for relevant forestry programs at DOI's Bureau of Indian Affairs (BIA). Funding should strengthen collaboration between BIA and Tribal governments to develop a long-term strategic plan to recruit and retain Tribal forestry professionals. BIA should use additional funding to support workforce development efforts that provide competitive salary and benefits packages, provide wraparound services, and are grounded in Indigenous cultures and practices. Despite significant reforestation potential on Tribal lands, Tribal forestry programs are significantly under-resourced and understaffed.⁸²

80. Amador, G., Burns, E., Glicksman, M., Holness, C., Jacobson, R., Kosar, U., Simonelli, L., Steeves, T., Suarez, V. & Tesfaye, M. (2021). *Zero, Then Negative: The Congressional Blueprint for Scaling Carbon Removal*. Carbon 180. <https://static1.squarespace.com/static/5b9362d-89d5abb8c51d474f8/t/609c3255bf-02607c0d3b9591/1620853036140/Carbon180+ZeroThenNegative.pdf>
81. Dolan, T., Ellison, B., Hendricks, B. & Ricketts, S. (2011, April). *Building The Civilian Climate Corps: How New Deal Ambition Can Mobilize Workers For America's Clean Economy*. Evergreen Collaborative. <https://slack-files.com/T26LWP43T-F01V26A62SH-3462bd6f62>
82. Kauffman & Associates. (n.d.). *Workforce Development Strategic Plan, 2018-2022*. Intertribal Timber Council. https://www.itcnet.org/file_download/6e80b72d-7afd-40f3-8bea-ff5b8af6a28e

RECOMMENDATION #2

Direct DOE and EPA to assist in creating revenue streams and co-design strategies for communities housing technology-based carbon removal projects

- Direct DOE and EPA to encourage project developers of technology-based carbon removal projects that capture more than 10,000 tons of CO₂ per year to co-create CBAs for projects that receive federal funding. Furthermore, DOE and EPA should support developers in co-creating CBAs with communities through the publication of best practice documentation on CBAs — including templates for developers — which could later serve to inform future mandated requirements.

Lastly, DOE and EPA should prioritize cost-share and loan guarantees for projects with CBAs. CBAs are legal, enforceable agreements between community groups and a project developer that require a developer to provide specific amenities and/or mitigations to the local community as part of the development.⁸³ These agreement types are often used on a voluntary basis to enable public engagement and address concerns. CBAs are useful for communities and developers alike. CBAs allow communities to dictate the benefits and/or mitigation measures they receive from a project and hold developers accountable to providing agreed-upon benefits. CBAs also give legal and political certainty to developers for community acceptance and buy-in of the proposed project.⁸⁴ New energy and infrastructure projects can provide significant economic opportunities for communities, and CBAs can help ensure benefits are sustained long term, distributed equitably, and maintained locally.⁸⁵ Key topics to incorporate into CBAs include local hiring, pore space revenues, worker protections, and items of particular community interest.

- Increase funding for and direct the Small Business Innovation Research (SBIR) program to prioritize carbon removal proposals.⁸⁶ Increased funding will help diversify the portfolio of small businesses and startups engaging in carbon removal. Congress should explore ways for DOE to lower the barriers for small businesses and early entrepreneurs to access the SBIR program.⁸⁷ Congress should ensure agencies are fostering participation in SBIR by women and socially and economically disadvantaged people, as this is central to its mission.⁸⁸ The number of grants awarded through SBIR is minimal compared to the number of proposals received.⁸⁹ Congress should direct the Government Accountability Office (GAO) to conduct an internal review to identify why the number of awarded SBIR grants is so low, assess the efficacy and accessibility of application processes, and develop actionable steps to increase SBIR participation.

RECOMMENDATION #3

Establish local, safe, and high-quality job opportunities

- Increase funding for relevant agencies, primarily at DOL, to enforce labor protection policies including the Fair Labor Standards Act (FLSA), Worker Adjustment and Retraining Notification (WARN) Act, and Davis-Bacon Act to ensure workers are protected to the fullest extent of the law. The government can also leverage its procurement power to establish domestic supply chains for

83. Office of Minority Business & Economic Development. (2017, August 1). *Guide to Advancing Opportunities for Community Benefits through Energy Project Development*. US Department of Energy. <https://www.energy.gov/sites/default/files/2017/09/f36/CBA%20Resource%20Guide.pdf>

84. Office of Economic Impact and Diversity. (n.d.). *Community Benefit Agreements: Frequently Asked Questions (FAQs)*. US Department of Energy. <https://www.energy.gov/sites/default/files/2017/09/f36/CBA%20Resource%20Guide%20FAQs.pdf>

85. Office of Minority Business & Economic Development. (2017, August 1). *Guide to Advancing Opportunities for Community Benefits through Energy Project Development*. US Department of Energy. <https://www.energy.gov/sites/default/files/2017/09/f36/CBA%20Resource%20Guide.pdf>

86. Office of Science. (n.d.). *Small Business Innovation Research and Small Business Technology Transfer Programs Office*. US Department of Energy. <https://www.energy.gov/science/sbir/small-business-innovation-research-and-small-business-technology-transfer>

87. S.881 - 97th Congress (1981-1982): Small Business Innovation Development Act of 1982. (1982, July 22). <https://www.govinfo.gov/content/pkg/STATUTE-96/pdf/STATUTE-96-Pg217.pdf>

88. Text - S.881 - 97th Congress (1981-1982): Small Business Innovation Development Act of 1982. (1982, July 22). <https://www.congress.gov/bill/97th-congress/senate-bill/881/text>

89. Office of Investment and Innovation. (2018). *Small Business Innovation Research / Small Business Technology Transfer: America's Seed Fund Powered By The SBA, Annual Report 2018*. US Small Business Administration. https://www.sbir.gov/sites/default/files/SBA_SBIR_STTR_FY18_Annual_Report-Final_508.pdf

GLOSSARY

Pore space revenue

A form of financial compensation for using underground pore space to store carbon dioxide.

materials, and incorporate robust labor protections within Buy American provisions.⁹⁰ Establishing and enforcing federal labor standards will be paramount to supporting a just transition and long-term, equitable job retention.

- Expand federal labor standards to end the exclusion of farmworkers from legal labor protections, including overtime pay, the right to organize, and robust child labor laws. Congress should direct USDA to coordinate with DOL's Occupational Safety and Health Administration (OSHA) to establish and enforce federal protections for farm workers against heat-related injuries. Due to the lack of specific heat thresholds under OSHA's federal standards, enforcement is very difficult. OSHA should create processes to anonymously report dangerous heat-related working conditions and conduct timely follow-ups to reportings.⁹¹ Congress should also direct EPA to conduct more rigorous and timely assessments of the impacts of pesticides on farmworker health. EPA should identify where unsafe pesticide handling processes are occurring, conduct targeted training, and ensure comprehensive safety requirements are followed.⁹² Furthermore, EPA should ban pesticides still used in the US that are prohibited internationally for their harmful impacts.⁹³ Through these targeted directions, Congress can better support agricultural farmworkers on the frontlines of dangerous pesticide exposure, excessive heat stress, discrimination, and sexual violence to create a more safe and fair agricultural system.^{94, 95}
- Overhaul the H-2B program, which supports seasonal migrant workers in forestry occupations, to better protect workers' rights and create pathways to citizenship.⁹⁶ H-2B forestry workers provide valuable management services, including seed collection, fuels management, and most tree planting on public and private forestlands.⁹⁷ Despite being integral to meeting reforestation goals,

90. The White House. (2021, Jan 25). *President Biden to Sign Executive Order Strengthening Buy American Provisions, Ensuring Future of America is Made in America by All of America's Workers* [Press release]. <https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/25/president-biden-to-sign-executive-order-strengthening-buy-american-provisions-ensuring-future-of-america-is-made-in-america-by-all-of-americas-workers/>

91. Dahl, K., DeLonge, M., & Ferguson, R. (2019). *Farmworkers at Risk: The Growing Dangers of Pesticides and Heat*. Union of Concerned Scientists. <https://www.ucsusa.org/sites/default/files/2019-12/farmworkers-at-risk-report-2019-web.pdf>

92. Dahl, K., DeLonge, M., & Ferguson, R. (2019). *Farmworkers at Risk: The Growing Dangers of Pesticides and Heat*. Union of Concerned Scientists. <https://www.ucsusa.org/sites/default/files/2019-12/farmworkers-at-risk-report-2019-web.pdf>

93. Pesticide Action Network International. (2018). *PAN International List of Highly Hazardous Pesticides*. http://www.pan-germany.org/download/PAN_HHP_List.pdf

94. Dahl, K., DeLonge, M., & Ferguson, R. (2019). *Farmworkers at Risk: The Growing Dangers of Pesticides and Heat*. Union of Concerned Scientists. <https://www.ucsusa.org/sites/default/files/2019-12/farmworkers-at-risk-report-2019-web.pdf>

95. Southern Poverty Law Center. (n.d.). *Farmworker Sexual Violence Facts*. Global Alliance for Global Justice. <https://cagj.org/food-justice/food-justice-resources/farmworker-sexual-violence-facts/>

96. Office of Joaquin Castro, Congressman for the 20th District of Texas. (2020, Dec 15). *Castro Introduces Legislation To Overhaul Guest Worker Program* [Press release]. <https://castro.house.gov/media-center/press-releases/castro-introduces-legislation-to-overhaul-guest-worker-program->

97. Blinn, C. R., O'Hara, T. J. & Russell, M. B. (2021, Apr 27). H-2B Guest Workers and the Critical Role they Play in US Forests. *Journal of Forestry*, *fvab022*. <https://academic.oup.com/jof/advance-article-abstract/doi/10.1093/jofore/fvab022/6255284?redirectedFrom=fulltext>

H-2B workers are often underpaid, separated from their families, and abused by their employers.⁹⁸ Similarly, the H-2A program for temporary agricultural workers needs stronger enforcement and oversight. Workers in the H-2A program often suffer human rights abuses and health and safety violations, but violating companies are allowed to continue hiring because there is a lack of mechanisms to ban them from participating.^{99,100} There have been several protests and lawsuits in response to offenses, demonstrating a pattern of unfair labor conditions and a lack of adequate action to rectify violations.^{101,102,103} Congress should direct DOL to better enforce labor standards for H-2A and H-2B programs, including rigorous oversight, random employer audits, and bans for employers that violate labor and employment laws.^{104,105} Additionally, the H-2A and H-2B programs must center migrant worker protections through guaranteed wages and overtime pay, access to legal services, pathways to citizenship for workers and their families, and employer accountability for recruitment and labor abuses.

H-2A and H-2B Programs

These programs allow employers to hire temporary nonimmigrant workers to come to the US. H-2A is designed for agricultural labor and H-2B is aimed at all non-agricultural work.

98. Costa, D. (2016, June 2). *Frequently asked questions about the H-2B temporary foreign worker program* [Fact sheet]. Economic Policy Institute. <https://www.epi.org/publication/frequently-asked-questions-about-the-h-2b-temporary-foreign-worker-program/>

99. Kline, A., (n.d.). *H-2A Workers in Ohio: Trends and Patterns* [White paper]. Department of Geography, Ohio State University. https://omec.nwoesc.org/ewExternalFiles/Kline_whitepaper_final.pdf

100. Costa, D. (2016, Feb 8). *Temporary work visa programs and the need for reform: A briefing on program frameworks, policy issues and fixes, and the impact of COVID-19*. Economic Policy Institute. <https://www.epi.org/publication/temporary-work-visa-reform/>

101. Bernton, H. (2018, June 15). *Lawsuit alleges blacklisting of Mexican farmworkers who joined 2017 orchard strike*. *Seattle Times*. <https://www.seattletimes.com/seattle-news/northwest/lawsuit-alleges-blacklisting-of-mexican-farmworkers-who-joined-2017-orchard-strike/>

102. Hiruko, A. (2018, Sep 5). *Farmworkers' protest eased at Crystal View*. *Lynden Tribune*. https://www.lyndentribune.com/news/farmworkers-protest-eased-at-crystal-view/article_36d10bfc-a727-11e8-a4e6-e7b9d5f70f46.html

103. Vongkiatkajorn, K. (2018, Feb 1). *These Foreign Workers Say They Were Told to Pick Blueberries Unless They Were on Their 'Death Bed.'* *Mother Jones*. <https://www.motherjones.com/food/2018/02/blueberry-pickers-guest-worker-visas-threats-lawsuit/>

104. Costa, D. (2019, June 20). *Immigration enforcement is funded at a much higher rate than labor standards enforcement – and the gap is widening*. *Working Economics Blog*. Economic Policy Institute. <https://www.epi.org/blog/immigration-enforcement-is-funded-at-a-much-higher-rate-than-labor-standards-enforcement-and-the-gap-is-widening/>

105. Costa, D. (2016, Feb 8). *Temporary work visa programs and the need for reform: A briefing on program frameworks, policy issues and fixes, and the impact of COVID-19*. Economic Policy Institute. <https://www.epi.org/publication/temporary-work-visa-reform/>



Outreach and engagement

Robust governance structures can promote self-determination, transparency, and inclusion in relationships between communities and the institutions seeking to advance carbon removal. Conversations with justice and labor advocates have illustrated the importance of community-driven project development and deployment and community ownership of solutions. Through these comprehensive processes, the carbon removal field can be scaled to align with and address the priorities of communities on the frontlines of climate change.

RECOMMENDATION #4

Promote local capacity building in underserved communities

- Establish an Environmental Justice Grants program that significantly expands the current EJ Small Grants program. The new program should aim to bolster local capacity and public participation by providing individual grants of at least \$500,000 per year over multiple years to underserved communities.¹⁰⁶ Congress should direct EPA to invest in local capacity and bolster public participation opportunities for underserved communities. In particular, EPA should cultivate community leaders through training on EJ tools and resources, such as EJSCREEN, and provide assistance in navigating the grant application process.¹⁰⁷ When communities are able to develop more long-term capacity to solve and manage challenging social and environmental issues, more well-informed and transparent decisions are made.
- Codify and expand EPA's Interagency Working Group on Environmental Justice (EJ IWG) to 1) strengthen coordination across federal agencies, 2) promote meaningful involvement and due process in new and existing environmental laws, 3) coordinate with and provide technical assistance to underserved communities, and 4) identify areas to improve direct public engagement with underserved communities. The EJ IWG was established to coordinate efforts between federal agencies to collectively advance EJ principles. Through their participation in the working group, federal agencies build solutions to EJ issues into their programs.
- Codify EPA's EJSCREEN tool as an "equity screen" for federal decision-making and actions, such as carbon removal project deployment, at all relevant federal agencies. EPA should optimize EJSCREEN to build profiles of underserved communities and their burdens, expand its database to include nationally

106. The Equitable and Just National Climate Forum, the New School's Tishman Environment and Design Center, and the Center for American Progress. (2021). *Justice40 Recommendations*. <https://cdn.americanprogress.org/content/uploads/2021/03/16083513/Justice40-Recommendations.pdf>

107. The Equitable and Just National Climate Forum, the New School's Tishman Environment and Design Center, and the Center for American Progress. (2021). *Justice40 Recommendations*. <https://cdn.americanprogress.org/content/uploads/2021/03/16083513/Justice40-Recommendations.pdf>

consistent data on environmental pollution and demographic information relating to race, ethnicity, and income, and add the capability to generate reports by geographic area. Burden indicators should include low birth weights, housing burdens, language isolation, Tribal membership, pesticide exposures, crime and incarceration rates, noise pollution, walkability scores, relative food insecurity, and estimated threats of climate change, such as sea level rise. EJSCREEN should remain publicly available online and receive yearly updates to include the most current data available. The ability to accurately identify underserved communities and their public and environmental health burdens is critical for promoting informed, transparent, and honest public engagement and decision-making processes.

RECOMMENDATION #5

Strengthen community-government engagement to solicit feedback and input from underserved communities

- Direct DOE and EPA to establish minimum public engagement guidelines for technology-based carbon removal projects, including DAC, that receive federal funds and resources across relevant programs, such as the Regional Carbon Sequestration Partnerships Initiative and the Underground Injection Control (UIC) program. These public engagement standards should encourage regular developer and agency meetings with local communities from project inception through closure.^{108, 109} Meetings should be an honest and transparent forum for communities to co-design projects and accessible based on community needs (e.g., transportation, language, child care), with developers providing resources and aid as needed to ensure proportional representation from historically underrepresented groups. Although DOE and EPA have published online best practice guides for public engagement that may be applicable to technology-based carbon removal, these guides typically aren't comprehensive in promoting different variations of justice in engagement processes, don't contain equitable and enforceable public engagement requirements, and vary by program across agencies, resulting in a lack of uniformity and standards for engagement.^{110, 111, 112}

108. National Energy Technology Laboratory. (n.d.). *Regional Carbon Sequestration Partnerships (RCSP) Initiative*. US Department of Energy. <https://www.netl.doe.gov/coal/carbon-storage/storage-infrastructure/regional-carbon-sequestration-partnerships-initiative>
109. US Environmental Protection Agency. (n.d.). *Protecting Underground Sources of Drinking Water from Underground Injection (UIC)*. <https://www.epa.gov/uic>
110. National Energy Technology Laboratory. (n.d.). *Best Practices Manuals*. US Department of Energy. <https://www.netl.doe.gov/coal/carbon-storage/strategic-program-support/best-practices-manuals>
111. Office of Water. (2011). *Geologic Sequestration of Carbon Dioxide – UIC Quick Reference Guide: Additional Considerations for UIC Program Directors on the Public Participation Requirements for Class VI Injection Wells*. US Environmental Protection Agency. https://www.epa.gov/sites/production/files/2015-07/documents/uic-quick-reference-guide_public-participation_final-508.pdf
112. Federal Interagency Working Group on Environmental Justice NEPA Committee. (2019, March). *Community Guide to Environmental Justice and NEPA Methods*. Office of NEPA Policy and Compliance, US Department of Energy. <https://www.energy.gov/sites/prod/files/2019/05/f63/NEPA%20Community%20Guide%202019.pdf>

- Authorize a pilot program within the USDA’s Natural Resources Conservation Service (NRCS), in coordination with SARE, the National Institute of Food and Agriculture (NIFA), and Climate Hubs, to create and test community and landowner mediation processes with the goal of developing new land management implementation plans on agriculture and forestry operations. While there is a growing trend of engagement between landowners and community groups, conversations are sporadic and varied. It’s beneficial for communities to communicate to landowners how certain practices may be impacting their public and environmental health and better understand why landowners are employing these practices. For landowners, it’s useful to communicate to communities why they use certain practices over others and better understand how the practices they implement impact their neighbors and surrounding communities. An NRCS representative can facilitate these conversations, listen to the priorities and concerns of both sides, and, if of interest to the producer, provide alternate practices that producers could adopt to both maintain their bottom lines and maximize community well-being. NRCS could also help support the implementation of these practices through the NRCS Conservation Technical Assistance Program (CTA).



Technical and financial assistance

As a result of systematic disenfranchisement, underserved communities lack the resources and political capital to meaningfully influence decision-making about their food, energy, and economic systems. Historic discrimination has led to unequal access to the benefits and opportunities afforded by federal programs and carbon removal projects. Targeted technical and financial assistance from the government can address these disparities, foster diversity among practitioners, and support underserved communities.

RECOMMENDATION #6

Address racial and economic disparities in accessing federal assistance programs among producers and forest landowners

- Increase funding for USDA's Economic Research Service (ERS) and US Forest Service (USFS) research stations to conduct research into the economic, social, behavioral, and cultural factors affecting land managers, paving the way for equitable and accessible policy design. When making decisions, socially disadvantaged forest landowners and farmers consider unique values, interests, and challenges. Economic and social science research can establish a baseline consisting of quantitative and qualitative data – including landowner recommendations – needed to make forest and agriculture assistance programs accessible and inclusive. This includes information on administrative barriers, cost analyses, technical assistance barriers and needs, and other barriers specific to socially disadvantaged land managers.¹¹³ NRCS can leverage these findings in its outreach to producers facing roadblocks to practice change and operations.
- Reform USDA federal programs that provide technical and financial assistance for agricultural and forested lands, such as CTA and the Cooperative Extension programs, to address the systemic barriers and discrimination faced by socially disadvantaged producers and forest landowners.¹¹⁴ Congress should also increase funding for USDA's Outreach and Assistance for Socially Disadvantaged Farmers and Ranchers Program and the Beginning Farmer and Rancher Development Program, which provide outreach and technical assistance to socially disadvantaged producers.^{115, 116}
- Enact legislation that protects and increases inherited wealth of Black farming families by preventing forced sales and expanding access to USDA programs.¹¹⁷ Approximately 60% of Black farmers are operating on heirs' property or land passed between generations without a formal title.¹¹⁸ Although the 2018 Farm Bill

113. Amador, G., Burns, E., Glicksman, M., Holness, C., Jacobson, R., Kosar, U., Simonelli, L., Steeves, T., Suarez, V. & Tesfaye, M. (2021). *Zero, Then Negative: The Congressional Blueprint for Scaling Carbon Removal*. Carbon 180. <https://static1.squarespace.com/static/5b9362d89d5abb8c51d-474f8/t/609c3255bf-02607c0d3b9591/1620853036140/Carbon180+ZeroThenNegative.pdf>

114. Natural Resources Conservation Service. (n.d.). *Conservation Technical Assistance Program (CTA)*. US Department of Agriculture. <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/technical/>

115. US Department of Agriculture. (n.d.). *Socially Disadvantaged Farmers and Ranchers*. <https://www.usda.gov/partnerships/socially-disadvantaged-farmers-and-ranchers>

116. Rural Coalition. (2018, Sep 7). *Farmer Opportunity Training and Outreach (FOTO) Program: Background Information*. <https://www.ruralco.org/farm-bill/2018/9/7/farmer-opportunity-training-and-outreach-foto-program-background-information>

117. Castro, A. & Willingham, Z. (2019, Apr 3). *Progressive Governance Can Turn the Tide for Black Farmers*. Center for American Progress. <https://www.americanprogress.org/issues/economy/reports/2019/04/03/467892/progressive-governance-can-turn-tide-black-farmers/>

118. Boyanton, M. U. & Elkin E. (2020, Dec 3). 'Jim Crow' Land Ownership Spurs Black Farmers' Appeals to Biden. *Bloomberg*. <https://www.bloomberg.com/news/articles/2020-12-03/-jim-crow-land-ownership-spurs-black-farmers-appeals-to-biden>

provided some protections for heirs' property, these operations are still vulnerable to forced partition sales when a family member or outside investor goes to court to force a sale. Congress can protect Black farmers and prevent further land loss by enacting federal legislation similar to the Partition of Heirs Property Act.¹¹⁹

- Authorize a dedicated and permanent technical assistance fund for Tribal governments, Indigenous organizations, and Indigenous landowners and producers to successfully implement conservation practices. Furthermore, Congress should direct USDA to increase set-asides in existing conservation programs, such as the Environmental Quality Incentives Program (EQIP) and Conservation Stewardship Program (CSP), for projects that are Tribal-run, developed by Indigenous communities, and also provide alternative funding arrangements to individual Tribal governments.¹²⁰

RECOMMENDATION #7

Leverage federal financial and technical assistance to advance equitable technology-based carbon removal projects that meet community needs

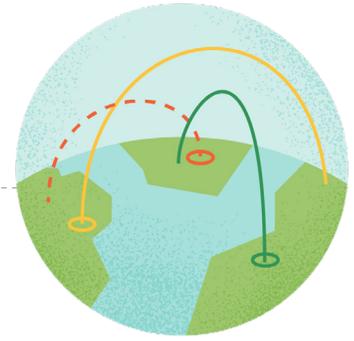
- Direct USDA, DOE, EPA, DOI, the National Oceanic and Atmospheric Administration (NOAA), and other relevant federal agencies to prioritize providing financial and technical assistance for land- and technology-based carbon removal projects that exercise high standards for achieving equity. This includes complying with all labor, environmental, and civil rights statutes, signing CBAs and project labor agreements, and performing robust public engagement. Federal funding and financial assistance for both land- and technology-based carbon removal projects is paramount, as many require high upfront capital or investments to commence.^{121, 122} Therefore, the federal government can leverage its position and resources to embed equity considerations across the field.
- Direct DOE's Offices of Science, Fossil Energy, and Energy Efficiency and Renewable Energy to prioritize grant funding for technology-based projects that are powered by zero-carbon sources and have robust public engagement and project monitoring plans. When considering a carbon removal project's full life cycle of emissions, the energy source is a significant variable in achieving net-negative emissions.

119. Uniform Law Commission. (2010). *The Uniform Partition of Heirs Property Act*. <https://www.uniformlaws.org/committees/community-home?CommunityKey=50724584-e808-4255-bc5d-8ea4e588371d>

120. Hipp, J. S. & Duren, C. D. (2017, June). *Regaining Our Future: An Assessment of Risks and Opportunities for Native Communities in the 2018 Farm Bill*. Indigenous Food and Agriculture Initiative, Seeds of Native Health. https://seedsofnativehealth.org/wp-content/uploads/2017/06/Farm-Bill-Report_WEB.pdf

121. Amador, G., Burns, E., Kosar, U., Suarez, V. & Zelikova, J. (2020). *Leading with Soil: Scaling Soil Carbon Storage in Agriculture*. Carbon180. https://static1.squarespace.com/static/5b9362d89d5abb8c51d474f8/t/5eaa30d12c3a767e-64c3845b/1588211922979/LeadingWithSoil_Final+Text.pdf

122. National Academies of Sciences, Engineering, and Medicine. (2019). *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda*. National Academies Press. <https://www.nap.edu/read/25259/chapter/1>



Research, development, and deployment (RD&D)

Investment in RD&D is essential for the advancement and improvement of carbon removal solutions. As the basis of innovation, RD&D can fill crucial knowledge gaps and make breakthroughs in life cycle analysis, cost reduction, monitoring and verification, and project implementation.¹²³ Equity-focused research collaborations can support historically disadvantaged and underserved groups, including Global South countries and mission-driven universities. Furthermore, integration of equity into carbon removal RD&D can drive sorely needed social science research into technology-based carbon removal solutions to support sustainable scale-up of these solutions.

RECOMMENDATION #8

Strengthen international collaboration on carbon removal RD&D

- Direct DOS to work with USDA, DOE, and other relevant agencies to include carbon removal solutions in formal international collaborations on climate change, with an emphasis on RD&D collaboration with the Global South. These efforts can be modeled after programs such as Mission Innovation, Agriculture Innovation Mission for Climate, and the Carbon Sequestration Leadership Forum to promote meaningful participation from the Global South if and when there is interest. This can be accomplished by establishing robust mechanisms for the transfer of technology, information, and funds, defining sustainability guidelines for global supply chains, and supporting local expertise by investing in monitoring and verification efforts at universities and academic institutions. Currently, global transfer processes of climate and clean energy technologies are opaque due to concerns over intellectual property rights, causing roadblocks to technological progress in Global South countries.¹²⁴ To promote transparent technology sharing and innovation in the Global South, international collaborations should facilitate the sharing of intellectual property rights between Global North and Global South countries. To date, the United States has contributed the most out of any single country to anthropogenic climate change, and it bears a moral and ethical responsibility to advance carbon removal solutions in order to meet climate goals.^{125, 126}

123. Climate Policy Menu. (n.d.). *Carbon Removal RD&D*. <http://climatepolicy-menu.org/policies/carbon-removal-research-development-demonstration/>

124. Ockwell, D. & Mallett, A. (2012). Introduction. In Ockwell, D. & Mallett, A. (Eds.), *Low-Carbon Technology Transfer - From Rhetoric to Reality*. Routledge. https://www.researchgate.net/publication/261946547_Low_Carbon_Technology_Transfer_From_Rhetoric_to_Reality

125. Ritchie, H. (2019, Oct 1). *Who has contributed most to global CO₂ emissions?* Our World in Data. <https://ourworldindata.org/contributed-most-global-co2#:~:text=The%20USA%20has%20emitted%20most,over%20the%20last%2026%20years.>

126. Fyson, C.L., Baur, S., Gidden, M. & Schleussner, C. (2020). Fair-share carbon dioxide removal increases major emitter responsibility. *Nature Climate Change*, 10, 836–841. <https://www.nature.com/articles/s41558-020-0857-2>

RECOMMENDATION #9

Invest in social science research for technology-based carbon removal

- Fund cross-agency research across DOE offices, including the Office of Fossil Energy and Carbon Management’s Carbon Capture and Carbon Storage programs, Office of Science’s Established Program to Stimulate Competitive Research (EPSCoR), National Science Foundation’s (NSF) Directorate for Social, Behavioral, and Economic Sciences (SBE), and EPA’s Air and Energy, Safe and Sustainable Water Resources, and Sustainable and Healthy Communities research programs. Collectively, these programs should examine the public health impacts of DAC, carbon mineralization, and geologic storage, including air and water quality, seismic activity, and biodiversity, as well as the social and environmental impacts of industry expansion to support technology-based carbon removal.^{127, 128, 129} Investments should also focus on robust, transparent, and inclusive community-based participatory research for deploying technology-based carbon removal projects, prioritizing projects by community-based organizations, nongovernmental organizations, land-grant universities, Tribal colleges and universities, and related institutions. Carbon removal technologies are primarily evaluated on their technical and economic attributes, and a thorough understanding of their social impacts is severely lacking.¹³⁰ Investment in social science research is greatly needed to anticipate the myriad impacts of scaling carbon removal technologies and can help avoid perverse incentives that may result in worse outcomes.

RECOMMENDATION #10

Increase carbon removal research collaboration and capacity building with mission-driven universities, two-year institutions, and underrepresented students

- Increase funding for USDA’s Office of Partnerships and Public Engagement’s mission to develop partnerships with minority-serving higher education institutions and create equitable opportunities for the communities they serve to access USDA programs, services, and resources.¹³¹ Congress should also increase financial and technical assistance for MSIs, community colleges, and underserved students through DOE’s Minority Educational Institutions Division.¹³² MSIs and other mission-driven universities — including HBCUs, Hispanic-serving institutions (HSIs), Tribal colleges, two-year institutions, and vocational schools — play an integral role in reshaping the fields of academia and increasing access to higher education and employment opportunities for historically underserved communities.¹³³ These institutions also contribute to cutting-edge research and innovation relevant for the various sectors and fields of carbon removal.

127. National Academies of Sciences, Engineering, and Medicine. (2019). Table 6.3: Carbon Mineralization Research Agenda Budget. In National Academies of Sciences, Engineering, and Medicine, *Negative Emissions Technologies and Reliable Sequestration: A Research Agenda*, (pp. 314–315). National Academies Press. <https://www.nap.edu/read/25259/chapter/8#314>
128. National Science Foundation. (n.d.). *Social, Behavioral and Economic Sciences (SBE)*. <https://www.nsf.gov/dir/index.jsp?org=SBE>
129. US Environmental Protection Agency. (n.d.). *Research*. <https://www.epa.gov/research>
130. Buck, H. J. (2016). Rapid scale-up of negative emissions technologies: social barriers and social implications. *Climate Change*, 139, 155–167. <https://link.springer.com/article/10.1007/s10584-016-1770-6>
131. US Department of Agriculture. (n.d.). *Minority-Serving Higher Education Institutions*. <https://www.usda.gov/partnerships/higher-education-initiatives>
132. Office of Economic Impact and Diversity. (n.d.). *Minority Educational Institutions Division*. US Department of Energy. <https://www.energy.gov/diversity/minority-educational-institutions-division>
133. Lomax, M. (2015, Dec 14). *Six Reasons HBCUs Are More Important Than Ever*. UNCF. <https://uncf.org/the-latest/6-reasons-hbcus-are-more-important-than-ever>



Regulations

Government regulations provide opportunities to assess the impacts of carbon removal implementation and institutionalize stakeholder input on projects. However, today's regulations are inadequate to ensure carbon removal projects are deployed safely, sustainably, and equitably, representing a significant barrier to full-scale deployment. Regulatory levers developed with EJ advocates can help establish standards that address the needs of underserved communities, such as access to clean air and water. Robust regulations for carbon removal can safeguard public and environmental health and ensure safe and long-term removal.

RECOMMENDATION #11

Establish long-term monitoring requirements for geologic storage

- Increase funding for DOE's Carbon Storage Program and EPA's UIC program to develop long-term monitoring methodologies and requirements for technology-based carbon removal projects that store captured CO₂ in geologic formations. Technology-based solutions are unlikely to develop at scale without policy support for geologic storage of CO₂. Therefore, EPA must expand expertise and capacity to regulate the safe, effective, and permanent geologic storage of carbon.^{134, 135}
- Direct EPA to strengthen enforcement and protections under the Clean Air Act (and other relevant legislation) to regulate air and water pollutants from technology-based carbon removal, especially combustive methods (i.e., BECCS). Regulations of non-CO₂ pollutants should extend to emitting industrial sites that integrate with carbontech or carbon removal.¹³⁶ Additionally, Congress should direct EPA to strengthen Safe Drinking Water Act protections for the UIC program, especially in regards to Class VI wells and ex situ carbon mineralization approaches.

134. Aines, Roger, et al. (2018). *Building a New Carbon Economy: An Innovation Plan*. Carbon180. https://static1.squarespace.com/static/5b9362d89d5abb8c51d474f8/t/5b98380721c67ca6485cf282/1536702476202/ccr02_innovationplan.FNL.pdf
135. Carbon180. (n.d.). *Direct air capture*. <https://static1.squarespace.com/static/5b9362d89d5abb8c51d474f8/t/602b5c61fcd7254f1bd13f9f/1613454437930/Carbon180+Ed+Packet+DAC.pdf>
136. US Environmental Protection Agency. (n.d.). *Regulatory and Guidance Information by Topic: Air*. <https://www.epa.gov/regulatory-information-topic/regulatory-and-guidance-information-topic-air>

GLOSSARY

Carbontech

A wide variety of commercial products made with captured CO₂ emissions (does not include enhanced oil recovery).

RECOMMENDATION #12

Establish a pipeline development and permitting task force

- Establish an interagency task force that includes DOE, EPA, DOI, and others in collaboration with industry, Tribal governments, and civil society stakeholders to determine where CO₂ transport pipelines may be ideally sited, how public participation would function, and the resulting labor and economic impacts. Full-scale carbon removal will require a robust system of pipelines to transport large amounts of CO₂ from capture sites to storage and/or use sites. For public health and safety, this pipeline network must be safe, secure, and carefully sited.¹³⁷ For more details, see page 55 of “Zero, Then Negative.”¹³⁸

RECOMMENDATION #13

Improve Class VI wells permitting

- Increase permitting capacity for EPA’s Class VI well program to ensure protection of ground and drinking water during demonstration or deployment of technology-based carbon removal projects and enforce infractions under EPA’s UIC program. To access the full potential of geologic storage and ensure carbon removal can develop at scale, the EPA’s Class VI program will require additional funds, more technical expertise, and a faster standard permitting process. For more details, see page 53 of “Zero, Then Negative.”¹³⁹

137. Fowler, S. (2020, Feb 27). 'Foaming at the mouth': First responders describe scene after pipeline rupture, gas leak. *Clarion Ledger*. <https://www.clarionledger.com/story/news/local/2020/02/27/yazoo-county-pipe-rupture-co-2-gas-leak-first-responders-rescues/4871726002/>

138. Amador, G., Burns, E., Glicksman, M., Holness, C., Jacobson, R., Kosar, U., Simonelli, L., Steeves, T., Suarez, V. & Tesfaye, M. (2021). *Zero, Then Negative: The Congressional Blueprint for Scaling Carbon Removal*. Carbon180. <https://static1.squarespace.com/static/5b9362d-89d5abb8c51d474f8/t/609c3255b-f02607c0d3b9591/1620853036140/Carbon180+ZeroThenNegative.pdf>

139. Amador, G., Burns, E., Glicksman, M., Holness, C., Jacobson, R., Kosar, U., Simonelli, L., Steeves, T., Suarez, V. & Tesfaye, M. (2021). *Zero, Then Negative: The Congressional Blueprint for Scaling Carbon Removal*. Carbon 180. <https://static1.squarespace.com/static/5b9362d-89d5abb8c51d474f8/t/609c3255b-f02607c0d3b9591/1620853036140/Carbon180+ZeroThenNegative.pdf>

Section Five

Conclusion

As the carbon removal field emerges and develops, we must work to ensure that the price of progress is distributed equitably. The climate justice movement teaches us that climate change disproportionately burdens BIPOC and economically disadvantaged groups who simultaneously receive the fewest benefits from policies designed to address the crisis.

To be truly a part of the solution, carbon removal advocates and legislators must step up to ensure that, in the transformation of laws, economies, and geographies to come, disadvantaged communities are protected and enriched. The scale-up of carbon removal represents an unprecedented opportunity to address legacy pollution, deliver non-climate benefits, and support livelihoods. The recommendations in this report outline steps the federal government can and should take to advance a progressive carbon removal platform at the local, state, national, and international levels.

Listening and learning from EJ advocates, community leaders, and academics over the last year has made clear how much more there is to do to expand our understanding on the nexus of carbon removal and EJ priorities. We've outlined a set of guiding principles and recommendations to develop robust regulations, improve technical and financial assistance, and invest in innovation and disadvantaged communities. However, this is just the start to what will be an important time for carbon removal scale-up. We need to better identify how and which carbon removal solution(s) will address the priorities of local communities, be it pollution-loading or poor water quality. We need a greater understanding of the social impacts of these technologies and practices at scale. And most importantly, we need to equip our communities with the tools and resources they will need to help shape our transition to a more just and equitable society.

Section Six

Appendix

APPENDIX

The Principles of Environmental Justice



Source: EJnet.org

Jemez Principles for Democratic Organizing



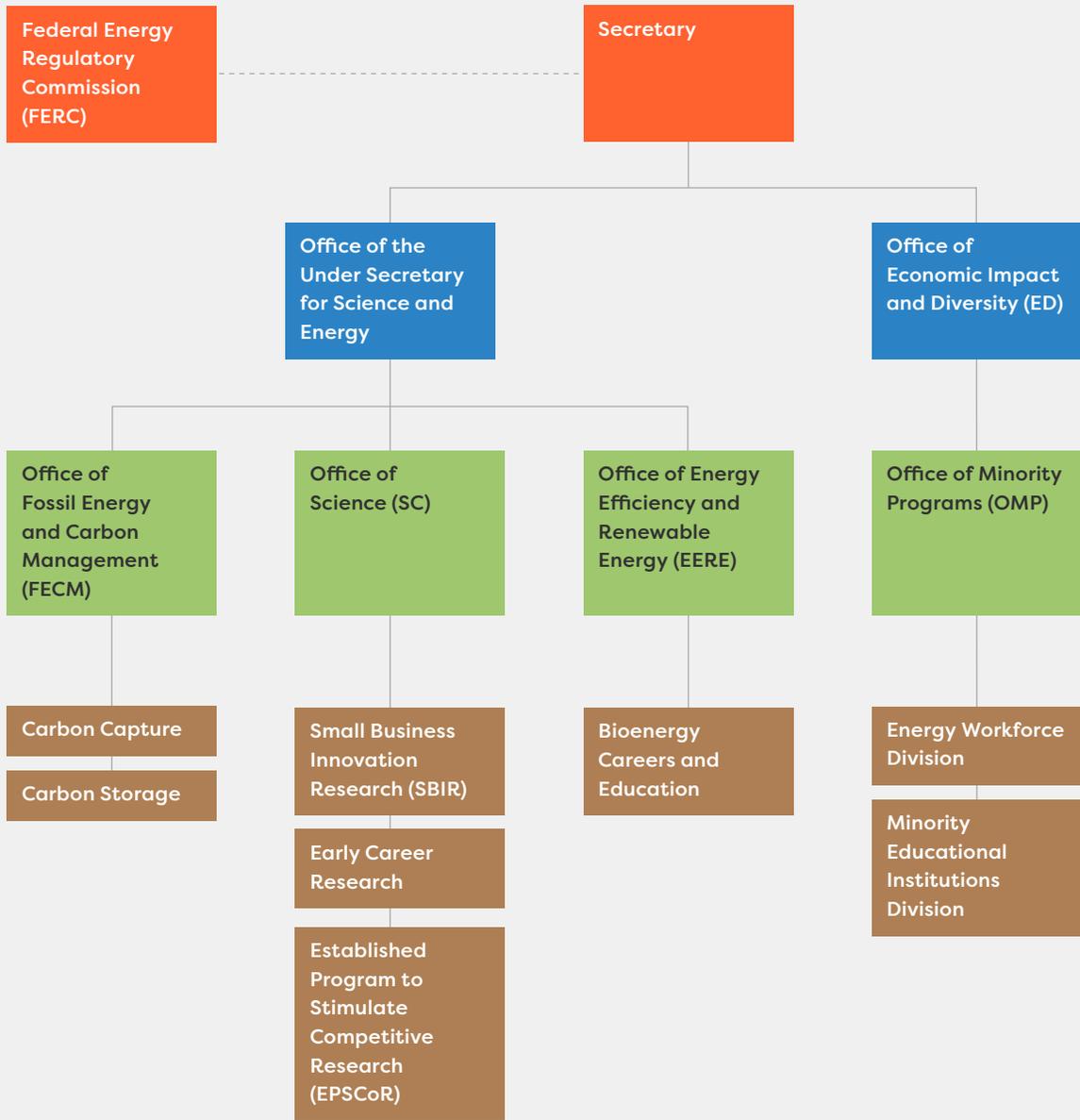
Source: EJnet.org

IAP2 Spectrum of Public Participation



Source: International Association for Public Participation

Map of relevant DOE programs mentioned in this report



Map of relevant USDA programs mentioned in this report



To learn more, visit Carbon180.org.