To our supporters

As 2021 comes to a close, the challenges we face feel as daunting as ever.

But there's optimism in the fact that we have the people, the tools, and the momentum to make progress, when we find the right way to put the pieces together.

Much of our work this year was about shining a light on solutions that aren't working. We revealed systematic over-crediting in California's multi-billion-dollar forest offsets program by combining the skills that make our team unique — policy foresight, scientific rigor, and data transparency. Our tracking of fires intersecting offset projects made an abstract policy concern immediate and tangible. We doubled down on these efforts because the mere presence of magical thinking becomes a barrier to progress when the choice is between action that's hard and costly versus action that's easy, cheap, and ineffective.

Elsewhere we found opportunities to elevate new ideas. We helped produce the CDR Primer, an open educational resource, to inspire a generation of scientists, entrepreneurs, and advocates. We expanded our CDR Database, revealing what transparent, scientifically rigorous carbon removal might look like. We released new data products on forest risks and emissions, and we built foundational open datasets and software tools that are accelerating our own work and enabling others.

These efforts are changing the narrative. Compared to just 8 last year, we had 83 media stories cover our work, including in the Los Angeles Times, New York Times, Financial Times, Bloomberg, ProPublica, NPR, and more. Serious journalism helps hold climate solutions accountable to scientific reality. And across the public and private sector, organizations are increasingly asking questions about what's working and what's not — drawing on, or responding directly to, our work.

None of this would be possible without our incredible team. And none of this would be possible without your support. Whether as funders, partners, or collaborators, you have signaled confidence in our growing organization, and for that we express our deepest gratitude.

We have so much more in our sights for next year — carbon removal, offsets oversight, open data platforms, climate risks, financial regulation, and more.

We can't wait to share more with you, and we thank you truly for your support.

Sincerely,

JEREMY FREEMAN
Executive Director
What we do

Addressing the climate crisis requires scientifically rigorous solutions that support just outcomes — and we no longer have time for approaches that don’t work. CarbonPlan is a non-profit research organization that analyzes climate solutions based on the best available science and data.

We work collaboratively to build open tools and resources that guide robust climate programs.

We share learnings through public communication and collaboration with journalists.

We help organizations in the public and private sector make better decisions to advance their climate goals.
Who we are

Team

BECKY HURST
Operations Manager

CINDY CHIAO
Data Scientist

DANNY CULLENWARD
Policy Director

FREYA CHAY
Program Associate

GRAYSON BADGLEY
Research Scientist

JEREMY FREEMAN
Executive Director

JOE HAMMAN
Technology Director

KATA MARTIN
Software Engineer

ORIANA CHEGWIDDEN
Research Scientist

RAPHAEL HAGEN
Data Engineer

SADIE FRANK
Program Manager

Board

JEREMY FREEMAN
CarbonPlan

KELLY GANNON
NDWA Labs

GERNOT WAGNER
New York University

TRACY TEAL (starting 2022)
RStudio

ARJUNA DIBLEY (starting 2022)
Pollination / Oxford University / CPD
By the numbers

7 PROJECT GRANTS
19 DONATIONS $1K+
5 DONATIONS $100K+
7 RESEARCH ARTICLES
8 BLOG POSTS
45k VISITORS
115k PAGEVIEWS
83 MEDIA STORIES

BUILT BY 11 TEAM MEMBERS
Press highlights

A core part of our strategy is building momentum in the media around key issues in climate science and policy. These efforts help shift public narratives and ensure solutions pursued in the public and private sector are held accountable to the realities of climate science.

This year 83 stories covered our work — up from just 8 last year. Media coverage spanned print, radio, and television across 50 unique venues and featuring 6 members of our team.

Visit carbonplan.org/press for a complete up-to-date list of our media coverage.
What we did

Research

Forest offsets ➔
We identified systematic over-crediting in California’s multi-billion-dollar forest offsets market. PAGE 08

Forest risks ➔
We built a statistical model to predict future risks to US forests under different climate scenarios. PAGE 09

Fires and offsets ➔
We built a map that automatically detected wildfires that burned through forest offset projects. PAGE 09

Soil carbon depth sampling ➔
We used a meta-analysis to show why sampling depth is critical for soil carbon accounting. PAGE 10

Soil carbon protocols ➔
We systematically analyzed and evaluated 17 protocols for measuring and crediting soil carbon. PAGE 10

Engagements

Stripe ➔
We helped design a revamped, open-source application for carbon removal procurement and independently evaluated project proposals. PAGE 11

Resources

CDR Primer ➔
We helped edit, write, and produce the first-ever foundational textbook on carbon dioxide removal. PAGE 11

CDR Database ➔
We analyzed 150+ carbon removal project proposals and expanded our database of evaluations. PAGE 11

Biomass emissions ➔
We assembled a dataset of forest-related emissions — and are now building a next-generation version. PAGE 12

Mapping toolkit ➔
We developed a new open-source tool for rendering interactive, data-driven maps in the web browser. PAGE 13

Comment letters

Taskforce on Scaling Voluntary Carbon Markets ➔
We explained why a coordinated effort to scale voluntary carbon offsets is not confronting the real problems.

USDA Climate-Smart Agriculture and Forestry ➔
We argued for strictly separating public funding from offset projects in the USDA’s new program.
Forest offsets

Carbon offsets are widely used by individuals, corporations, and governments to mitigate their greenhouse gas emissions. To work, they need to reflect real climate benefits. We analyzed California’s multi-billion-dollar forest carbon offsets program, which plays a significant role in the state’s climate policy and serves as a model for other carbon markets. We leveraged public data to perform a comprehensive assessment of this program, using ecological analysis to identify a large-scale financial arbitrage that generated 30 million tCO₂ and over $410 million in bad credits. To document these findings, we produced a web article summarizing our analysis, and released all the data and code needed to fully reproduce our findings. We released this work as part of a major story published jointly by ProPublica and MIT Technology Review, which, along with subsequent investigative reporting, has started to shift the public narrative around forest offsets. Three California Senators then sent a detailed memo to the state’s climate regulator, citing our work and the broader national press coverage, and our policy director testified at a legislative hearing on carbon neutrality. Near the end of the year, our study completed peer review and was published in Global Change Biology.
Fires and offsets

Climate change is exacerbating the wildfires, insect outbreaks, and drought conditions that already threaten forests in the United States. Alongside devastating impacts to communities and ecosystems, these risks raise serious questions around the role of forests and forest offsets in climate policy. This year we developed two major efforts around forest risks. First, we used the latest generation of climate change models to map future forest risks and project them through time, releasing the work as a preprint (with a manuscript under review) with open source software and public datasets. Second, we built a live-updating map during the fire season to track ongoing fires and their impacts on active forest offset projects. These "offset fires" were covered extensively in the media, including CNN, USA Today, and the New York Times. We also leveraged our in-depth knowledge of fires and offsets to support investigative reporting from the Los Angeles Times, leading to a front-page story documenting major crediting errors and regulatory failures that we hope will encourage reforms to California's program — and related markets now under development around the world. Finally, we brought these threads together in a partnership with Grist, which reported on the flawed methods existing offset programs use to account for fire risks. In addition to our expert analysis, we also provided interactive graphics that were used in Grist's story.

Wildfire risk in the Pacific Northwest projected under different future climate scenarios.
Soil carbon

Interest in soil carbon as a climate solution increased dramatically this year, bringing with it a lot of hype and no small amount of magical thinking. We addressed the surge in attention with two major projects. First, in collaboration with a Lawrence Livermore National Laboratory researcher, we investigated how soil management practices affect carbon storage across depth. Our work showed that robust soil carbon crediting requires sampling that is much deeper than typical practices, which look only at the top soil layers. Second, we systematically reviewed 17 protocols that measure and credit soil carbon. Our analysis revealed that no protocol guarantees high-quality outcomes, but it did reveal a handful of protocols that employ robust measurement methods. This work earned praise from the scientific community and a few high-ranking protocols, as well as interest from governments exploring soil carbon management programs; it also led to dialog with developers whose methods fell short. Finally, we built on this work by submitting comments to the U.S. Department of Agriculture on the design of their Climate-Smart Agriculture and Forestry program, emphasizing the importance of public funding for soil and forest carbon programs that are strictly separated from problematic carbon offsets.
Carbon removal has been a focus for us from the start — it’s a rapidly accelerating and scientifically diverse area that must be grounded in transparency and integrity in order to ensure robust outcomes. At the start of this year, we were excited to help release the CDR Primer, the first textbook on carbon removal. The project was led by Jennifer Wilcox with more than 40 contributors; our team helped write, edit, and produce the resource as an open source web book generating more than 20k users and 100k pageviews, with a print version coming soon that 1k people have signed up to get. We also expanded our CDR Database this year, by analyzing 161 projects from Microsoft’s RFP (request for proposals) and 34 projects from 2 rounds solicited by Stripe. In addition, we helped Stripe design the application for their RFP this year, incorporating our experience from past evaluations. We saw carbon removal companies use positive evaluations from us as a badge of quality, and we heard from organizations across the public and private sector that used our data and insights to inform their programs. In an article in Nature, leaders from Microsoft, Columbia University, and the Environmental Defense Fund summarized the state of the CDR ecosystem, cited our CDR Database, and made arguments about key market design and policy issues that align with our advocacy.
Understanding the climate problem requires understanding and tracking different sources of emissions, and this is especially challenging in the land sector. In 2020 the Climate TRACE coalition formed to bring together a diverse set of groups using satellite data to track emissions across several different sectors. This year, as a contribution to the coalition, we worked on methods for estimating global biomass and emissions related to forest disturbances. We contributed an initial data product to the Climate TRACE launch in September 2021, largely based on existing methods but updated to use the most recent data and to better enable fast reproduction and extensions. We also made progress on a novel method for global biomass mapping that we plan to release next year. With this work, we aim to better enable tracking of global forest-related emissions, as well as support broader science and policy questions that involve forest carbon accounting.
Open source tools

Open science is a core part of our mission, and part of open science is creating reusable tools that the community can build on and benefit from. For each of our major research stories this year, we made the code and data available, ensuring every number in every report could be generated from source materials. We published our articles as preprints alongside submission to academic journals, ensuring early and open access. This year we also bolstered our cutting-edge web stack for building rich, interactive articles and graphics, including new open source libraries for our design system and for our charts. Given the importance of maps in our work, we developed a new toolkit for making data-driven interactive web maps that builds on the strengths of the existing web mapping ecosystem while also solving new problems. We’ve seen lots of interest in this new tool — ranging from Mapbox to NASA — and are excited to engage this growing community interest next year. As part of our Pangeo-ML grant, we’ve also been using and building out tools in the scientific Python ecosystem, including new ways to work with large, gridded datasets for machine learning use cases.
We are committed to financial transparency, and to maximizing the impact of our generous donors. Here we list our 2021 revenue and expenses by category. This information will also be released as part of our public 2021 tax filings. Note that a fraction of our 2021 revenue was for work that continues into 2022.

### Revenue

$2,939,050

- Project-specific (contracts) (28.7%)
- Project-specific (grants) (4.4%)
- Unrestricted (individuals) (19.5%)
- Unrestricted (foundations + corporations) (46.9%)
- Consulting (0.5%)

### Expenses (by type)

$1,662,822

- Staff (salary + benefits) (75.0%)
- Services (legal + design + consulting) (16.5%)
- Operations (computing + SaaS) (8.5%)

### Expenses (by area)

$1,662,822

- Program work (76.2%)
- Administration and fundraising (22.6%)
- Decision support (1.2%)
Thank you

Our work would not be possible without the generous support of our donors and partners. Here we list funding sources in 2021 greater than $1,000, all of which are included in the totals listed previously. Some funding in 2021 supported projects that were not completed or announced in 2021. Those sources are included in our 2021 revenue totals, but not listed below, and will instead be featured in next year’s annual report. See carbonplan.org/funding for an up-to-date list reflecting all funding sources.

Unrestricted donations

ILYA VOLODARSKY + EMILY O’BRIEN + MIKE VOLODARSKY
SHAWN LIU
ROSS A. GARON + HONG K. SUH
ZEGAR FAMILY FUND
VENKATESH SRINIVAS + BALAJI SRINIVAS
SPENCER ADLER
ERNEST J. MCNABB
NEW CLIMATE VENTURES
HAMPUS JAKOBSSON
JACOB TREFETHEN

INCITE LABS
COLIN RUST + JEANNIE TSENG
FTX FOUNDATION
JOHN WOLTHUIS
LIONEL DRIPPS + REBECCA RICE
EUTOPIA FOUNDATION
SBFF
CHAN ZUCKERBERG INITIATIVE
JASON JACOBS + ALLISON PINCUS-JACOBS
AMBROSE CARR + SHARONMOYEE GOSWAMI
CALVIN FRENCH-OWEN

Project-specific funding

WATTTIME
CLIMATEWORKS
stripe
MICROSOFT
MICROSOFT AI FOR EARTH
NASA
PRESTON-WERNER FOUNDATION
LOWERCARBON CAPITAL + RIOVISTA FOUNDATION + CLIMATEWORKS

Climate TRACE
Evaluation of technological CDR proposals
Development of CDR procurement application
Review of soil carbon offset protocols
Forest carbon risk mapping
Pangeo ML
Soil- and forest-based carbon accounting
CDR Primer
Heading into next year, we will continue the momentum on efforts we have underway. We also plan to grow into new areas where the approaches we have developed in our work thus far are likely to have significant impact. Here's a preview.

Carbon removal and offsets
Interest in carbon offsets is only growing, with many government policies and corporate pledges relying heavily on them. Building on our existing efforts, we want to evolve into a primary source of guidance on quality and scientific integrity in this ecosystem, enabling journalists, civil society organizations, companies, and government regulators to react to market trends and set standards that produce a race to the top, not the bottom.

Climate risks
In the coming decades, the changing climate will pose risks to every corner of natural and built environments. We have just started building a next-generation open dataset of future climate scenarios to provide a foundation for sector- and region-specific modeling. Looking ahead, we will be developing specific use cases that leverage these data for the public interest, and in the process learn how to improve their accessibility for all.

Financial regulation
Investors and regulators around the world are increasingly looking to understand how climate change could cause financial and economic harm across all aspects of the economy. Financial regulation, in turn, could become a critical point of leverage for climate action. These issues are interwoven with much of our other work, including offsets and carbon removal, emissions tracking, and physical climate risks, and we will be looking for new ways to put these pieces together.

And more!