

2022

Climate Report



Contents

Introduction

3

1. Climate solutions

4

Renewable energy

5

Clean fuels

5

Carbon removal

6

- Buying Carbon Removal, Explained
- Frontier
- State of the carbon removal market
- Summary
- Technology
- Finance
- Commercialization

7

8

9

9

10

11

12

2. Company sustainability

13

Carbon-neutral operations

14

- Energy and emissions
- Observations

15

15

Carbon-neutral platform

16

3. Merchants and buyers

17

Planet app

18

Black Friday Cyber Monday (BFCM)

21

Shop Pay

23

- Restoring the Casamance mangroves
- Funding a suite of carbon removal solutions

23

23



Introduction

Shopify is the entrepreneurship company.

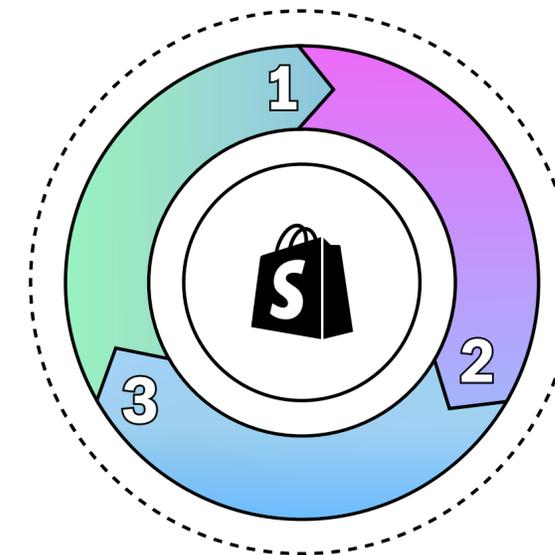
Shopify allows anyone – regardless of technical ability and experience – to start, scale, market, and run a retail business of any size. Millions of merchants across more than 175 countries turn to us to power their commerce offerings online, in store, and everywhere in between. But commerce can only thrive in the long-term if our planet thrives too. That’s why scalable climate solutions are critical to building a 100-year company.

In late 2019, we launched Shopify’s Sustainability Fund, which houses all of our environmental investments and initiatives. We committed to spending a minimum of \$5M annually on the most promising, impactful technologies and projects fighting climate change globally.

Here’s how we’re doing:

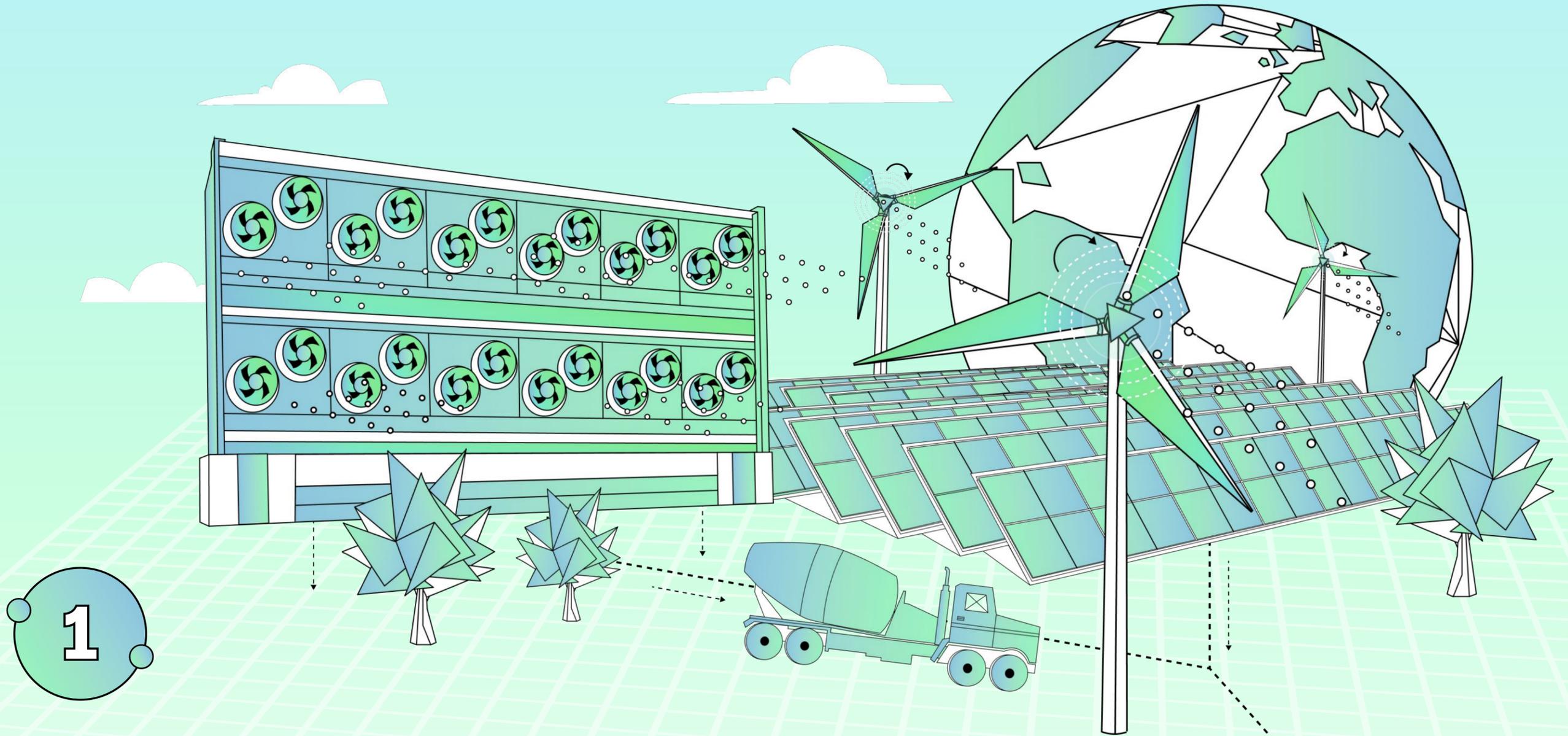
Area	2019 Commitment	2020	2021	2022
All	> \$5M spent annually		✓	✓
Climate solutions	> \$1M on Carbon removal	✓	✓	✓
Company sustainability	Carbon-neutral operations	✓	✓	✓
	Carbon-neutral platform	✓	✓	✓
Merchants and buyers	Merchants can participate - <i>Offset app and Planet app</i>	✓	✓	✓
	Buyers can participate - <i>Black Friday Cyber Monday (BFCM)</i>	✓	✓	✓
	Buyers can participate - <i>Shop Pay</i>	✓	✓	✓

This report provides an update on our 2022 Sustainability Fund solutions and how we continue to evolve our initiatives to meet the needs of the climate, our business and our merchants’ businesses.



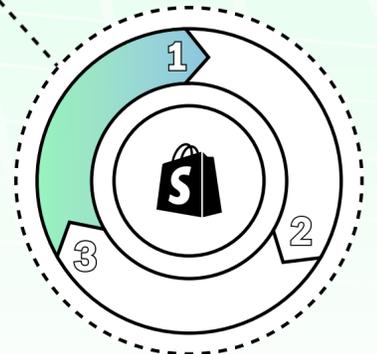
- 
Climate solutions
 We kickstart climate solutions, and buy a minimum of \$1M of permanent carbon removal annually at any price
- 
Company sustainability
 We leverage these solutions to future proof Shopify, and maintain carbon-neutral operations and a carbon-neutral platform
- 
Merchants and buyers
 We help merchants future proof their businesses, too, which makes it easier for merchants and buyers to take climate action, and creates more demand for carbon removal and other climate solutions





Climate solutions

We leverage solutions available at scale to reduce our emissions, including renewable energy projects. We go even further by backing promising climate solutions, including clean fuels and carbon removal, with funding and additional support now, to make sure they are available in the long-term to help reverse climate change.



Renewable energy

Rattlesnake Ridge Wind PPA

Our Power Purchase Agreement (PPA) with Berkshire Hathaway Energy Canada helped enable the new 130MW Rattlesnake Ridge Wind Power project to come online in June 2022 near Medicine Hat, Alberta. A clean grid is essential for a net-zero future: we need it to power everything, including carbon removal technologies.

We retire the renewable energy certificates (RECs) that we receive as part of this deal against the energy usage of Shopify's North American buildings and home offices. While the energy from this project doesn't directly power our North American buildings and home offices, it counteracts our electricity use by adding the equivalent amount of green electricity to the energy grid.

Since completion, the project has generated more than 12,000MWh of clean energy from Berkshire Hathaway Energy Canada due to Shopify's involvement.

[Read more about the Rattlesnake Point Wind Power project](#) →

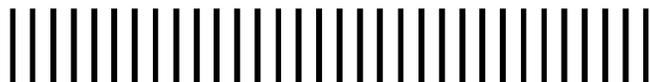
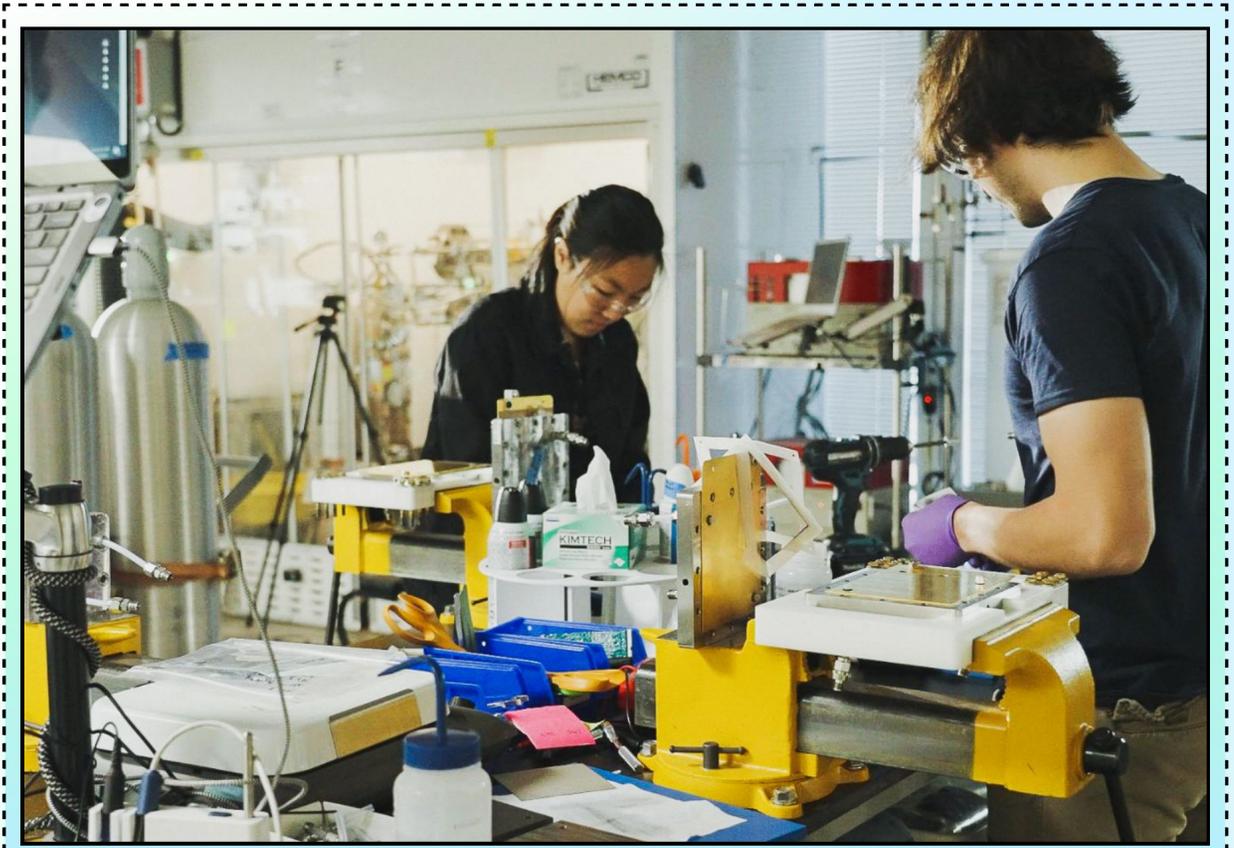


Clean fuels

Twelve

Shopify pays the green premium for clean fuels to help accelerate transportation decarbonization to create a more sustainable future of commerce.

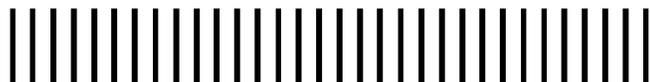
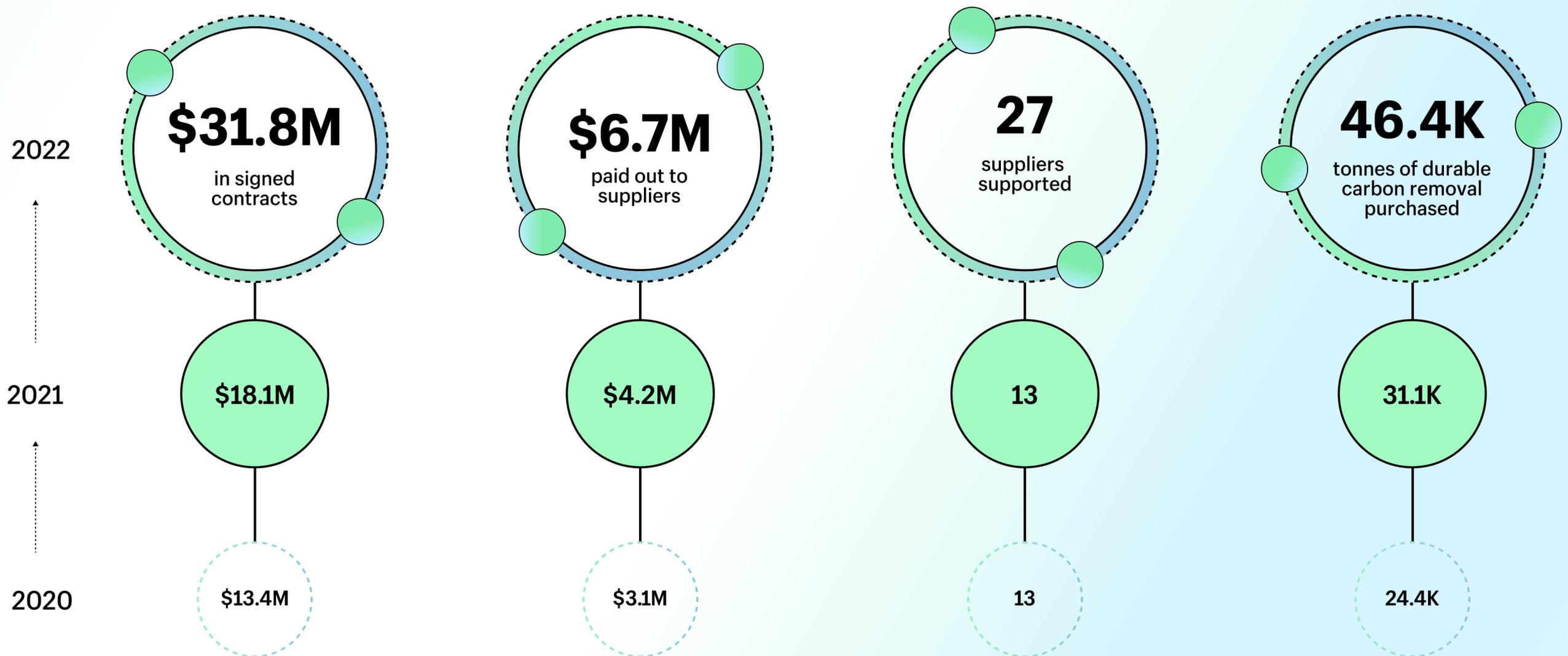
In 2022, Shopify signed its first agreement in the clean fuels space with the company Twelve, at a total contract value of \$2.5M. Twelve transforms captured CO₂ to produce E-Jet®: aviation fuel with an 80%+ lower carbon footprint than jet fuel made from fossil fuels. Through this first-of-its-kind agreement, Shopify is supporting Twelve as it scales, accelerating future adoption by commercial airlines and freight carriers, and helping bring more E-Jet® to market.



Carbon removal

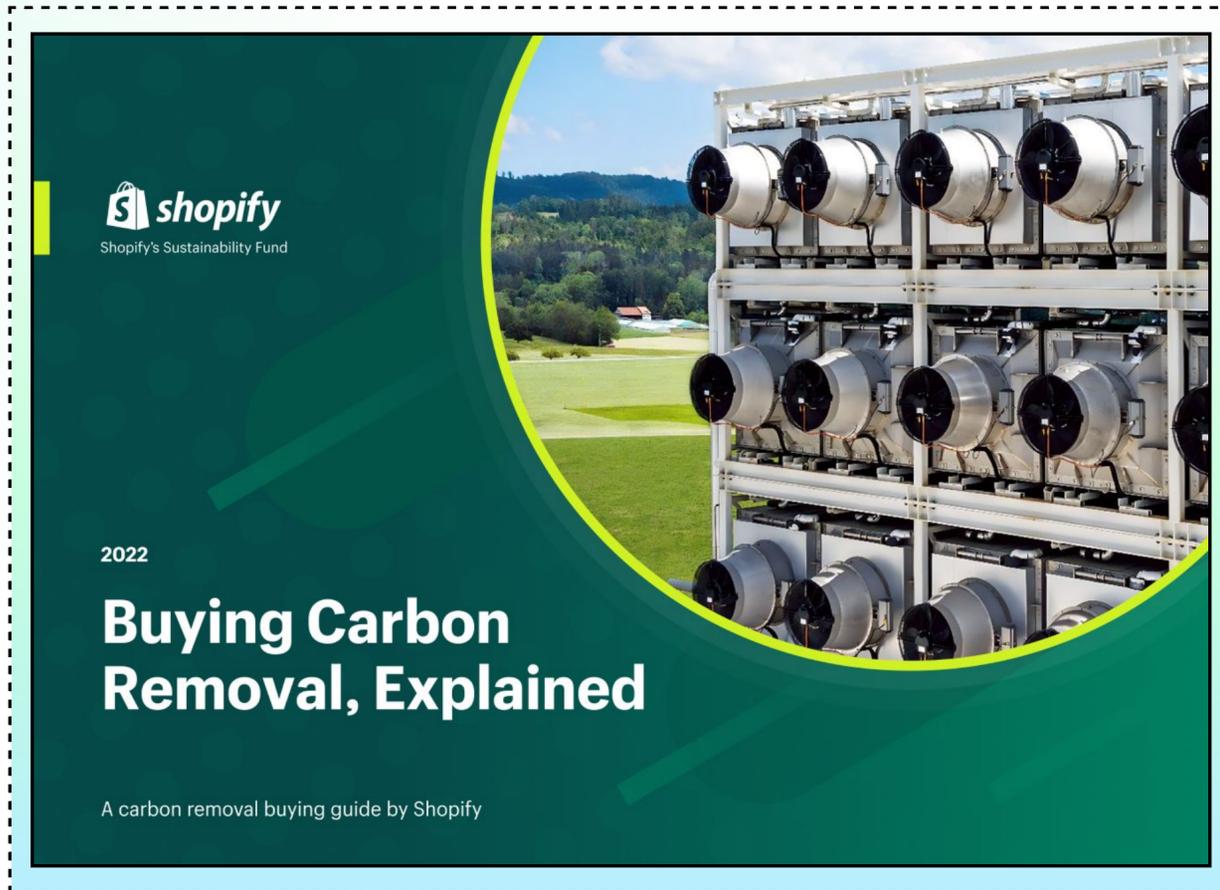
Another goal of our Sustainability Fund is to kickstart the carbon removal market, which is where we've allocated the majority of our capital to date. As of the end of 2022, we have signed contracts worth a total of \$31.8M with 27 carbon removal suppliers.

We take a portfolio approach by funding companies that develop durable carbon removal technologies (atmospheric capture with 100+ year storage), and also supporting some high-volume, shorter-term storage solutions like reforestation and soil carbon storage, to buy us precious time while durable carbon removal technologies develop and scale.

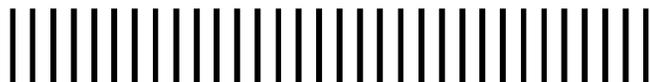
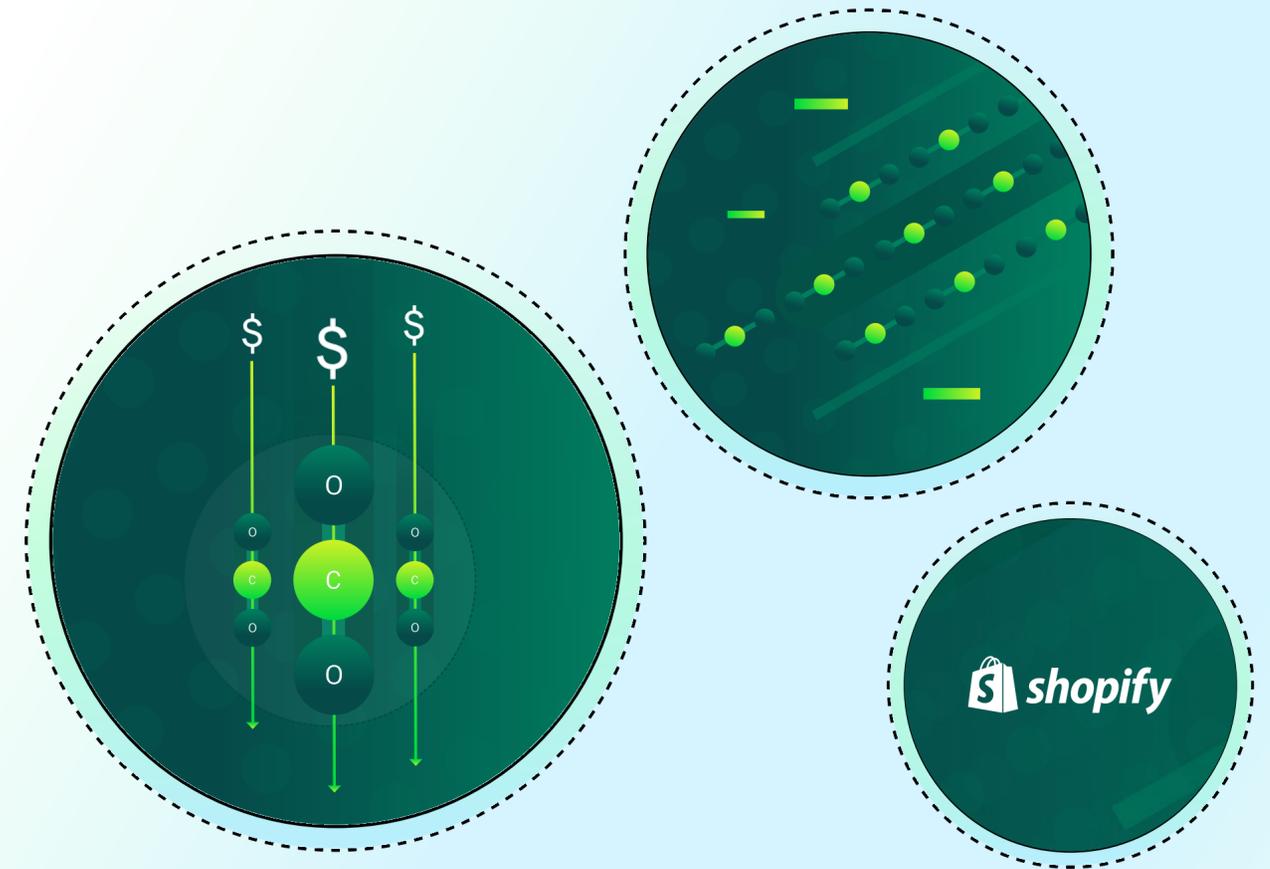


Buying Carbon Removal, Explained

Buying carbon removal doesn't have to be complex or time-consuming. In 2022, we published a buyer's guide to share what we've learned as a major purchaser of carbon removal, like how to get buy-in from internal stakeholders, construct your portfolio, retire the credits you receive, and more.



[Read our carbon removal buyer's guide](#) →



Frontier

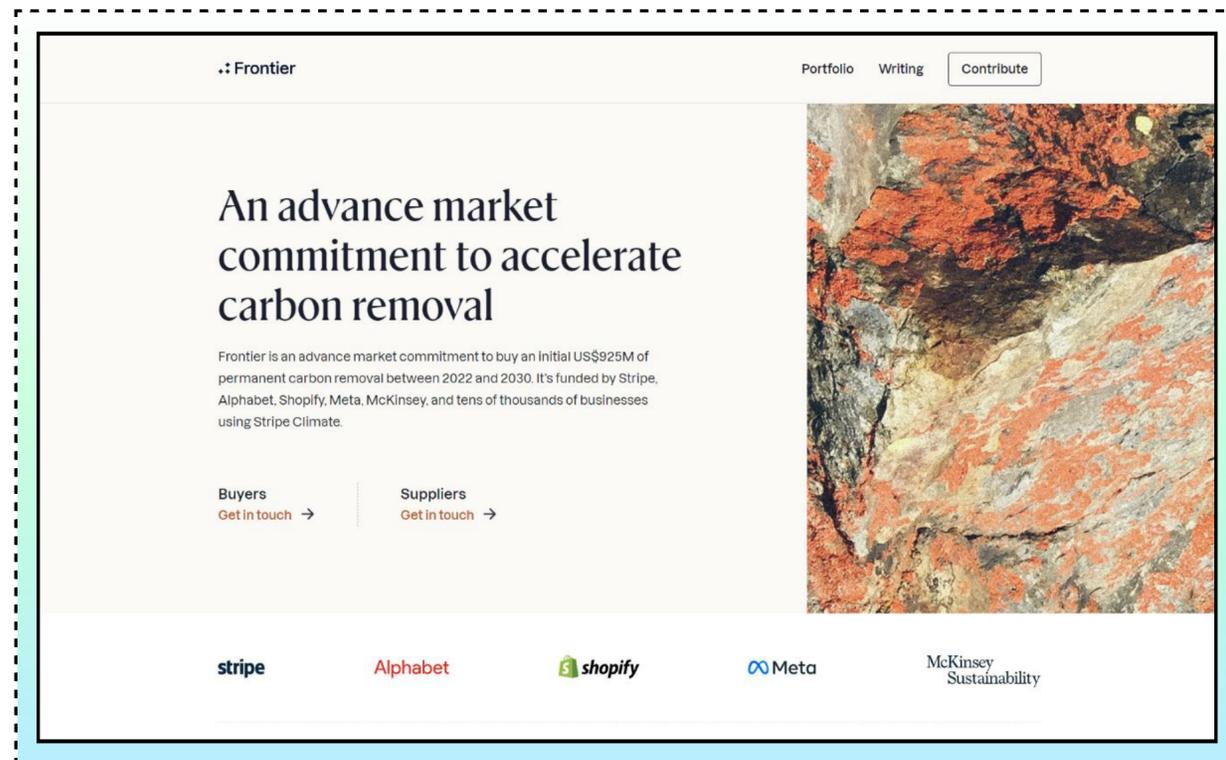
We know we can't scale carbon removal alone. In 2022, we founded Frontier, an advance market commitment to buy an initial \$925M of permanent carbon removal by 2030, alongside Stripe, Alphabet, Meta, and McKinsey Sustainability. Frontier aims to accelerate the development of permanent carbon removal technologies by guaranteeing future demand.

In 2022, Shopify and Stripe committed to spend a combined \$11M as members of Frontier. With these purchases, Shopify is supporting six early-stage suppliers developing mineralization, biomass, and ocean carbon removal solutions.

Frontier members combined

\$11M / \$925M

allocated in signed contracts



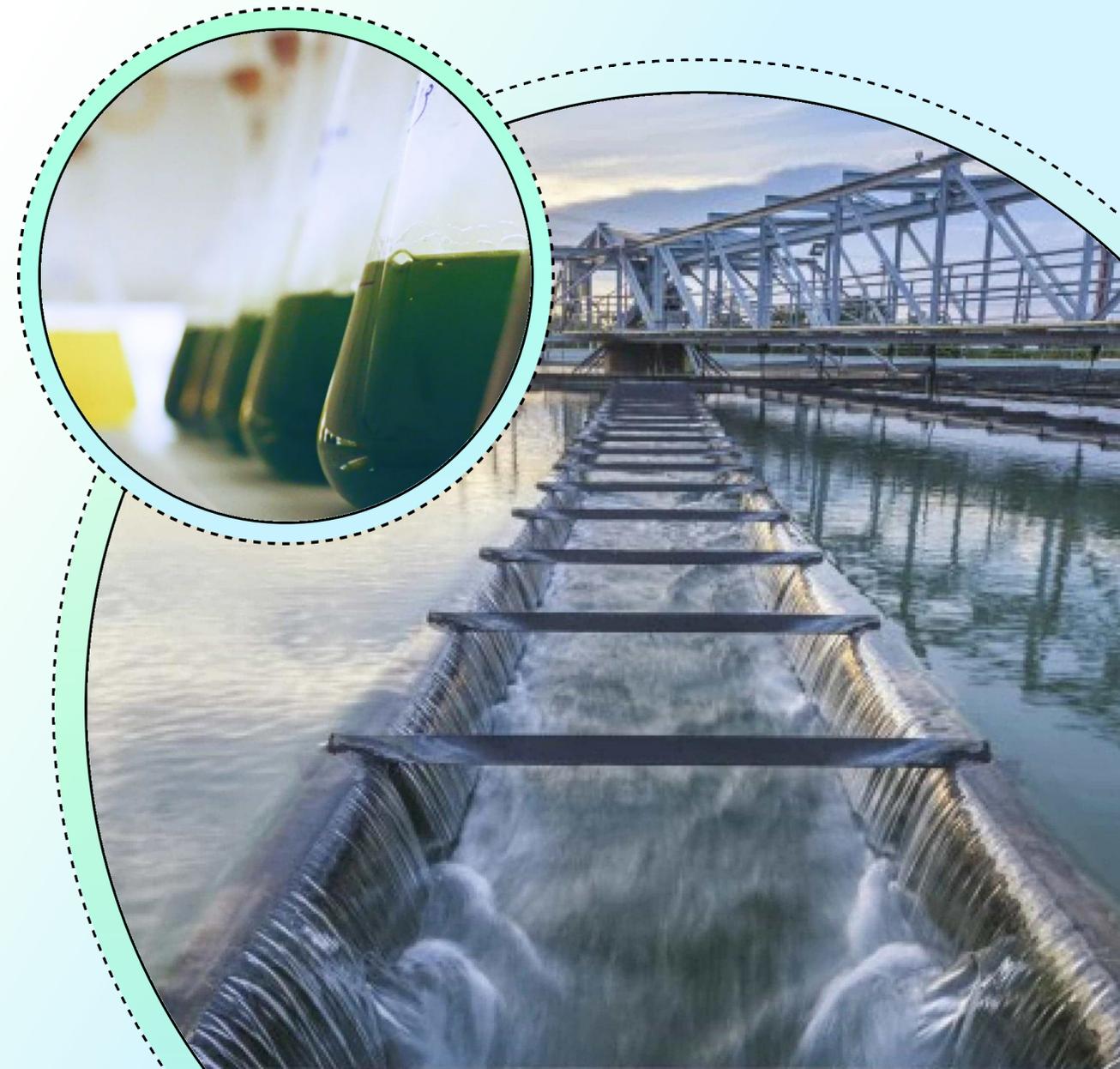
State of the carbon removal market

Shopify’s thesis for purchasing carbon removal is that by creating demand for carbon removal as a buyer of credits, we can help suppliers scale, which in turn will decrease their costs and reduce the price of carbon removal credits over time.

A number of development areas will determine the supply and cost of carbon removal in the long-term. Shopify is one of the largest corporate buyers globally, and the following is our assessment of the state of the carbon removal market based on data we’ve collected from the carbon removal suppliers in our portfolio. Only durable carbon removal suppliers were included in the assessment, and suppliers without complete data were excluded from any metrics.

Summary

Category	Development area	Status of progress
Technology	New market entrants	Progressing well
	Technology development	Progressing well
	Deployment	Current challenges
Finance	Pre-seed and seed funding	Needs critical attention
	Venture funding	Progressing well
	Project finance	Needs critical attention
Commercialization	MRV	Current challenges
	Public policy	Current challenges
	Corporate buyers	Needs critical attention
	Talent acquisition	Progressing well



Technology

New market entrants Progressing well

To scale the best possible carbon removal solutions for the long-term, we need many entrepreneurs developing different technologies at the same time.

- In 2022, entrepreneurs flooded the market with innovation, pursuing new ideas or improvements to technologies already under development. Frontier’s latest request for proposals saw twice as many applications as the previous round.

Technology development Progressing well

Suppliers need to prove their technologies work at lab and bench scale before they’re ready to scale up.

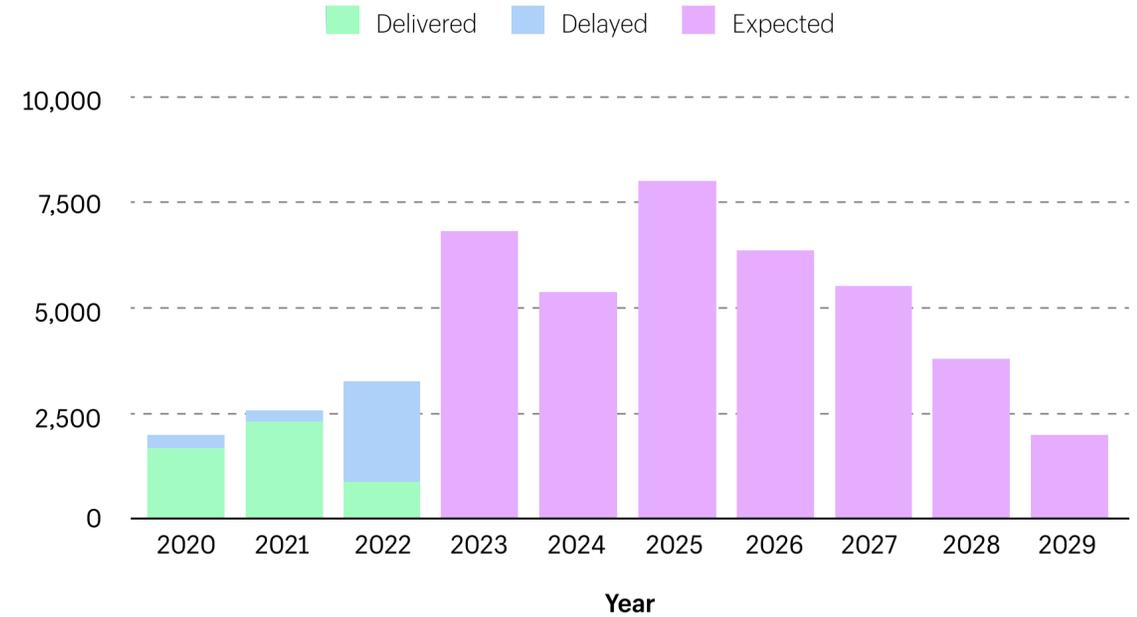
- In 2022, we saw the early-stage suppliers in our portfolio achieve key technical milestones and successfully pivot elements of their solutions when they met roadblocks.

Technology deployment Current challenges

Once a supplier de-risks their technology at a smaller scale, it’s time to deploy it in the real world.

- Some of our suppliers who entered this stage in 2022 faced supply chain issues, the need to conduct further testing, higher costs than expected, or public acceptance issues. In some cases these barriers slowed deployment, delayed credit deliveries, and caused suppliers to miss cost targets, but most are temporary hold-ups and aren’t unexpected in a nascent market with new technologies. Through all of this, 53.3% of the suppliers in our portfolio increased their carbon removal capacity in 2022.

Delivery status of credits purchased by Shopify



Technology deployment: Durable carbon removal supply is increasing slower than anticipated, which is reflected in the delivery status of Shopify’s credits.

Capacity

53.3%

of the suppliers in our portfolio grew their carbon removal capacity in 2022, as they built prototypes and worked toward their first pilots.



Financing

Pre-seed and seed funding Needs critical attention

These funding rounds help suppliers make their first few hires and prove key components of their technologies work at a small scale.

Tito Jankowski, AirMiners

AirMiners is an organization that has the best vantage point on this stage of funding, running Launchpad, a 6-week program with XPRIZE and Creative Destruction Labs that has graduated 100 carbon removal teams and has helped these teams raise \$25M.

“Carbon removal teams with great ideas struggle to access pre-seed and seed funding. Investors are confident there will be a big market for carbon removal, but they don't know how quickly it will grow, how profitable it will be, and how much dilution there will be. Once a team makes their first corporate carbon removal sale, they generally have an easy time getting funded, but meeting the criteria set by buyers is hard and takes capital. We have to figure out other ways to incentivize pre-seed and seed-stage investors.”

Venture funding Progressing well

Venture funding enables suppliers to hire engineers and others, and progress from prototyping to pilot phase.

- In 2022, venture funding was available for startups that had secured a first purchase from an early corporate buyer with a reputable carbon removal program, and needed funding for their first pilot. This was reflected in our portfolio, where venture funding was a driver of a 2.7x jump in funding per supplier from 2021.

Project finance Needs critical attention

This is the low-cost capital that suppliers usually acquire to fund their first large-scale deployment and beyond.

- Almost no suppliers needed project finance in 2022, but we anticipate that this will change in 2023. To bring lenders to the table, suppliers need to sell significant volumes of credits in advance, well beyond what any company has sold to date. This will require many more corporate buyers to participate in the market.

Financing

2.7x

increase in financing for suppliers in our portfolio in 2022, largely driven by additional seed funding and initial venture funding.



Commercialization

Measurement, reporting and verification (MRV) Current challenges

Suppliers use methodologies to quantify how much carbon dioxide they're removing from the air, and following verification and reporting processes to give buyers confidence to make a purchase.

- In 2022, the lack of existing third-party methodologies for durable carbon removal pathways forced suppliers that were nearing their first credit deliveries to spend time developing their own rigorous methodologies. Climeworks created their DAC+Storage methodology and had it validated by DNV, and Charm Industrial worked with Carbon Direct and EcoEngineers on a proto-protocol for bio-oil sequestration. Beyond that, suppliers also struggled to know who to use for verification, or whether any existing registry was a fit for their credits. At the end of 2022, only 27.3% of the durable carbon removal suppliers in our portfolio had some form of public MRV plan, largely inflated by those using Puro's biochar carbon removal methodology. We need existing standard bodies to step up, or new third parties to step in, to create methodologies for durable carbon removal pathways, and fill other roles like verification.

Public policy Current challenges

Governments can support carbon removal suppliers through policies that fund technology development or generate demand for credits.

Anu Khan, Deputy Director of Science and Innovation, Carbon180

Carbon180 is the first and only US federal policy NGO focused exclusively on carbon removal. They design and champion equitable and science-based policies to bring the CDR sector to scale quickly and responsibly.

“The carbon removal policy landscape has changed dramatically, going from \$2M in federal funding in 2019 to billions of dollars in programs in 2022. Recent wins include \$3.5B for regional Direct Air Capture Hubs in the Bipartisan Infrastructure Law, \$1B for research and development in the CHIPS and Science Act, and an expanded 45Q tax credit for secure geologic storage of carbon dioxide in the Inflation Reduction Act. Now, we need to deploy funds and implement programs in ways that generate real climate and community benefits. Federal MRV standards should be introduced to hold project developers accountable to buyers, community members and taxpayers. We also need federal procurement of carbon removal to enable a future where we're removing gigatons of carbon dioxide annually, and we're seeing exciting movement here as well.”

Corporate buyers Needs critical attention

Securing project finance requires carbon removal suppliers to sell out the majority of the credits they will produce over many years. Corporate buyers can sign large, long-term offtake agreements, like those we sign, to unlock project finance for suppliers.

- While carbon removal buyers made several billion dollars worth of purchases or purchase commitments in 2022, many of them were made by the same early carbon removal buyers that kickstarted the industry and few were from heavy-emitting sectors. We need other sectors to spend their voluntary dollars on carbon removal instead of offsets, or be required to for compliance.

Corporate buyers

2.0x

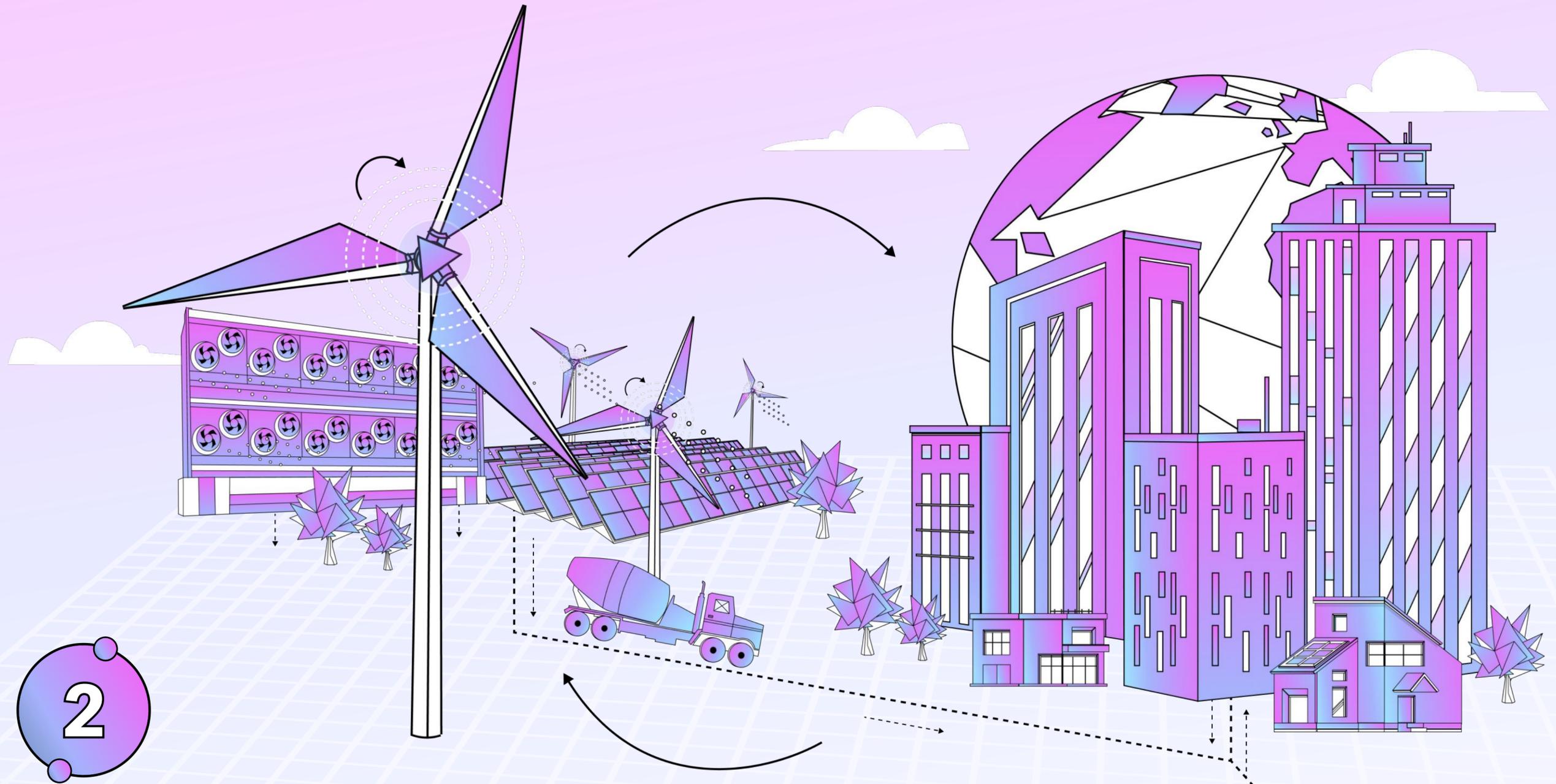
increase in corporate buyers from suppliers in our portfolio in 2022, as the carbon removal buyer base continues to grow, but remains insufficient to secure project finance.

Talent acquisition Progressing well

Carbon removal suppliers need people to build technology, test it, and bring it to market.

- In 2022, talent flowed into carbon removal from academia, oil and gas, and tech sectors. With new seed and venture funding and to support expanding operations, our portfolio of suppliers grew headcount significantly in 2022, by 2.6x per supplier from 2021. One observation? The ease of finding engineers can differ substantially by geography.

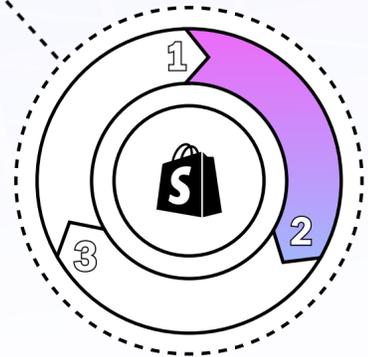




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Company sustainability

We leverage the climate solutions funded by Shopify's Sustainability Fund to future proof our business, so that we can support our merchants for years to come.



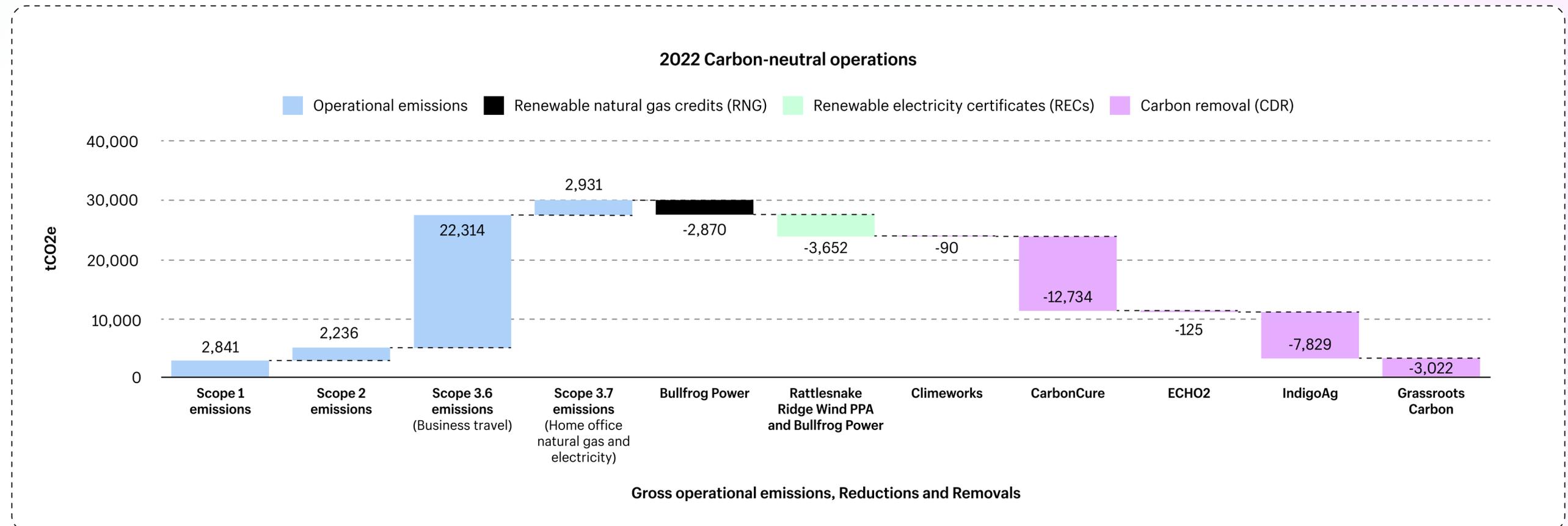
We are a carbon neutral company

Carbon-neutral operations

Our carbon-neutral operations commitment means we reduce or remove all emissions from our building and home office energy usage, and business travel, including transportation and accommodations energy.

To maintain our carbon neutral operations in 2022, Shopify:

- Reduced emissions with renewable energy from our Rattlesnake Ridge Wind PPA, and other renewable energy projects
- Purchased renewable natural gas credits (RNGs), and
- Removed remaining operational emissions with carbon removal



Methodology and public registry of carbon removal (CDR) credits: Climeworks (DAC+S methodology, no public registry), CarbonCure (VM0043 methodology, CarbonCure Registry), ECHO2 (Puro.earth's Biochar methodology, ECHO2 Retirement statement), IndigoAg (U.S. Soil Enrichment Protocol, Climate Action Reserve), Grassroots Carbon (Regenerative Standard v1.0 09292022, no public registry)



Energy and emissions

	Unit	2019	2020	2021	2022	Change (2021-2022)
Energy use - Buildings						
Natural gas	m3	700,323	592,715	308,219	1,286,561	317.4%
Electricity	MWh	7,610	6,770	5,083	18,310	260.2%
Energy use - Home offices						
Natural gas	m3	112,513	345,292	418,673	666,489	59.2%
Electricity	MWh	1,023	3,139	6,382	7,479	17.2%
Operational emissions						
Scope 1	tCO2e	1,706	1,447	701	2,841	305.3%
Scope 2	tCO2e	369	493	356	2,236	528.1%
Scope 3.6 Business Travel	tCO2e	4,402	1,715	4,183	22,314	433.4%
Scope 3.7 Home office natural gas and electricity	tCO2e	488	1,302	2,105	2,931	39.2%
Gross operational emissions	tCO2e	6965	4,957	7,345	30,322	312.83%
Gross operational emissions intensity	tCO2e / revenue	0.0000044	0.0000017	0.0000016	0.0000054	239.98%
Gross operational emissions intensity	tCO2e / employee	1.39	0.71	0.73	2.61	255.88%
Gross operational emissions	tCO2e	6965	4,957	7,345	30,322	
Renewable natural gas credits (RNGs)	tCO2e	1108	924	1,199	2,870	
Renewable electricity certificates (RECs)	tCO2e	179	795	1,382	3,652	
Carbon removal credits retired	tCO2e	5,678	3,238	4,764	23,800	
Net operational emissions	tCO2e	0	0	0	0	

Methodology

Buildings: includes offices/ports, warehouses and merchant spaces.

Home office: includes employee home offices.

Business travel: includes flight, rail, automobile and hotel emissions.

Employee commuting: emissions reported here is home office natural gas and electricity emissions.

2020 and 2021 emissions estimates in this table include electricity transmission and distribution loss and natural gas leakage, whereas 2019 and 2022 do not.

Observations

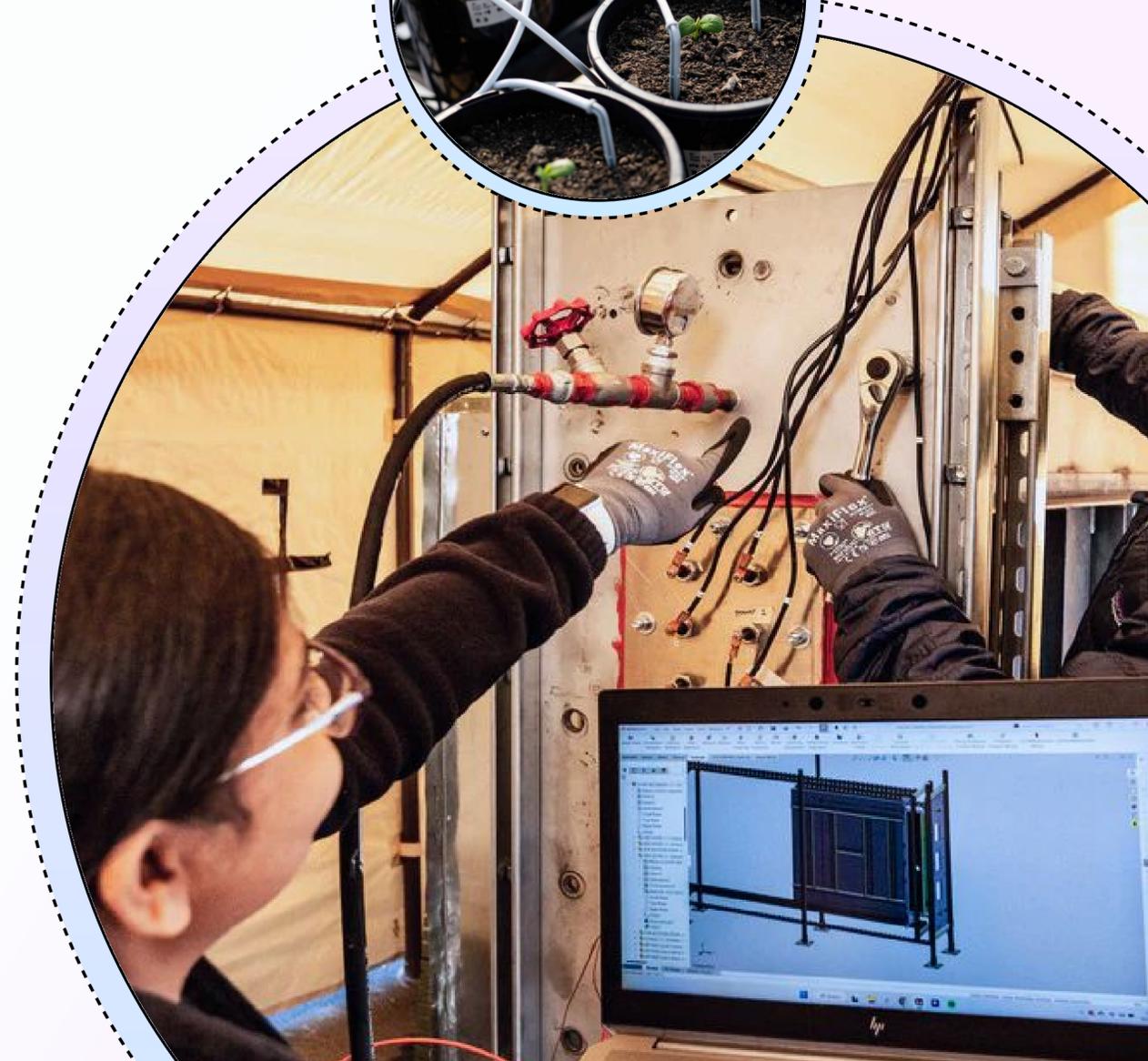
Buildings: For 2020 and most of 2021, our buildings were conserving energy because they were closed due to the COVID-19 pandemic. As they became operational again, their energy consumption and Scope 1 and 2 emissions increased. We also added warehouses to Shopify Logistics in 2022, which meant an increase in building energy consumption and Scope 1 and 2 emissions.

Business Travel: As we began our Burst program, where employees meet in our offices and other locations several times annually, business travel and resulting emissions increased. This was amplified by company growth from 2021 to 2022.



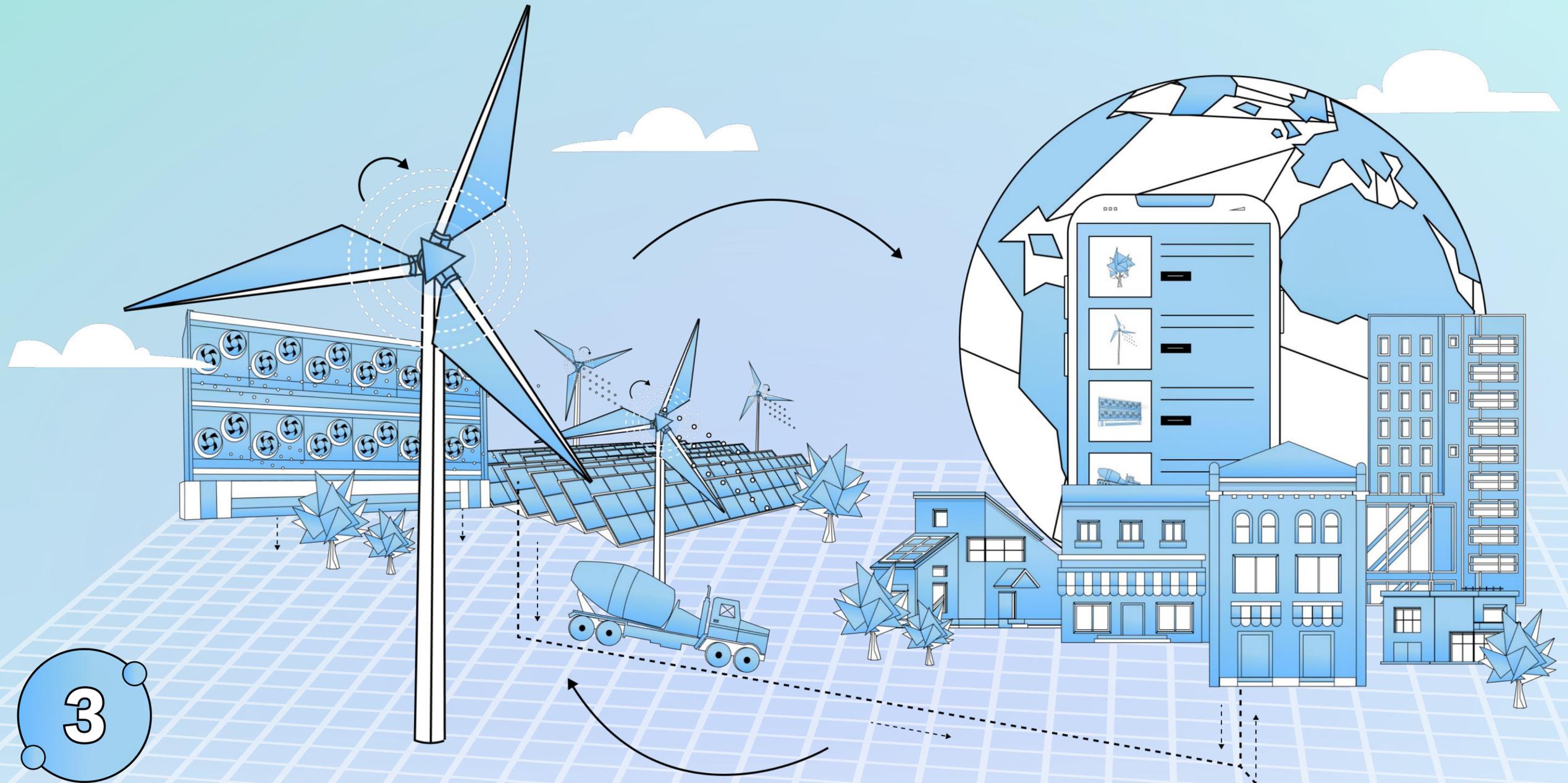
Carbon-neutral platform

Our platform operates on Google Cloud, which runs on 100% renewable energy. With the acquisition of Deliverr in 2022, a small component of our platform operates on an alternate cloud service. Shopify purchased and retired 171 tCO₂e of carbon removal to cover the resulting emissions.



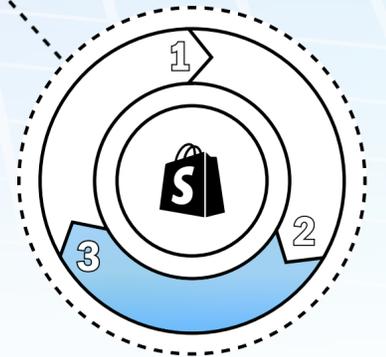
Google Cloud





Merchants and buyers

We help our merchants future proof their businesses by giving them access to the same high-quality climate solutions Shopify uses, and make it easier for buyers to take climate action, too.



Planet app

In June 2022, we introduced the Planet app, which replaced our first merchant offering, the Offset app. The Planet app estimates merchants' shipping emissions and allows them to make their shipments carbon neutral by funding innovative companies that pull carbon dioxide out of the atmosphere and store it.

At the end of 2022:

6,500+

merchants installed Planet

4300+ in Americas

1500+ in EMEA

600+ in APAC

7M+

carbon neutral orders

5M+ in Americas

1.7M+ in EMEA

300K+ in APAC

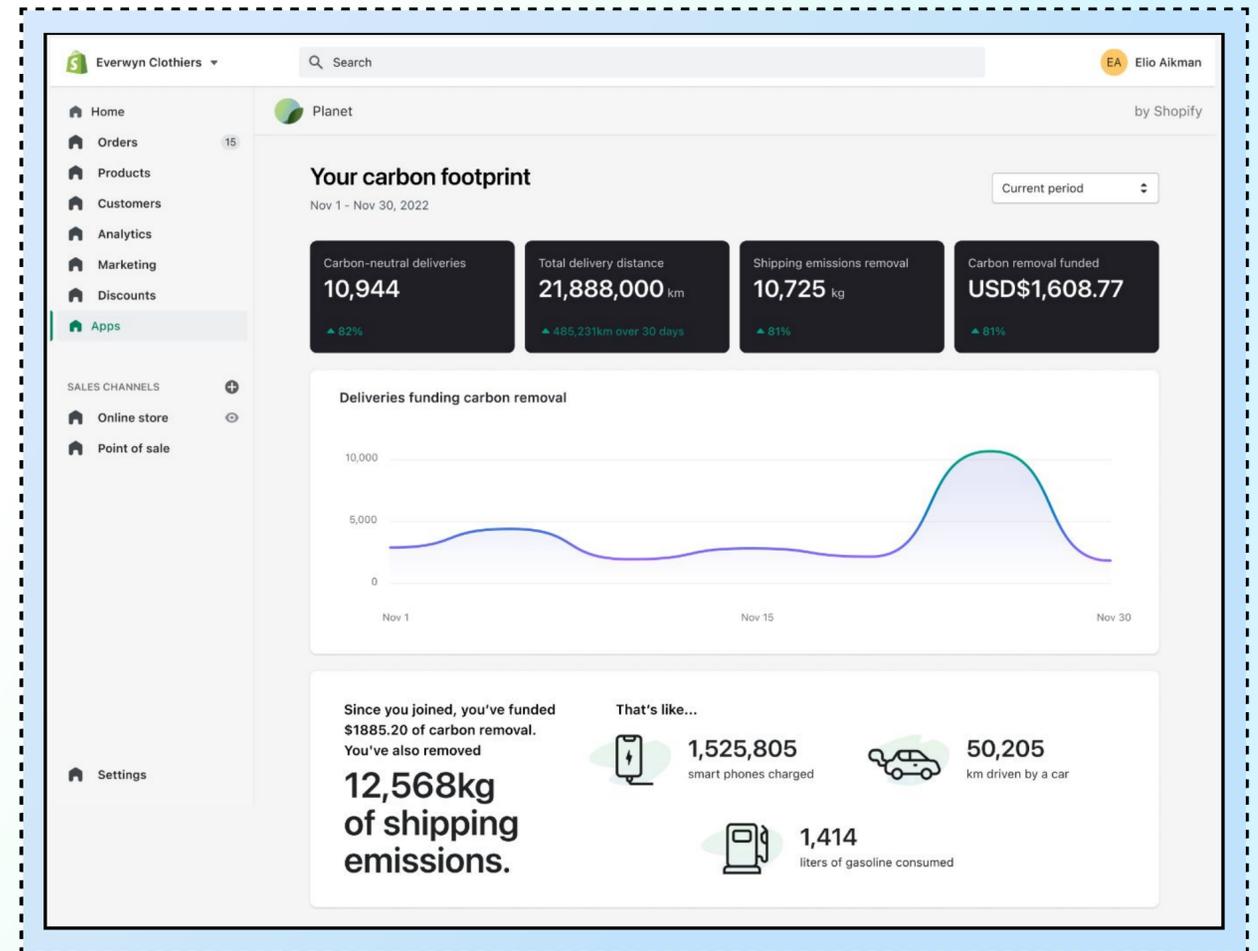
6,040

tCO2e delivery emissions removed

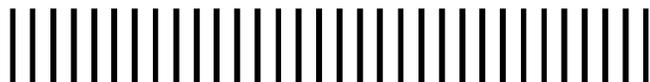
Download the Planet app for Shopify merchants →

Merchant: Ora Cacao

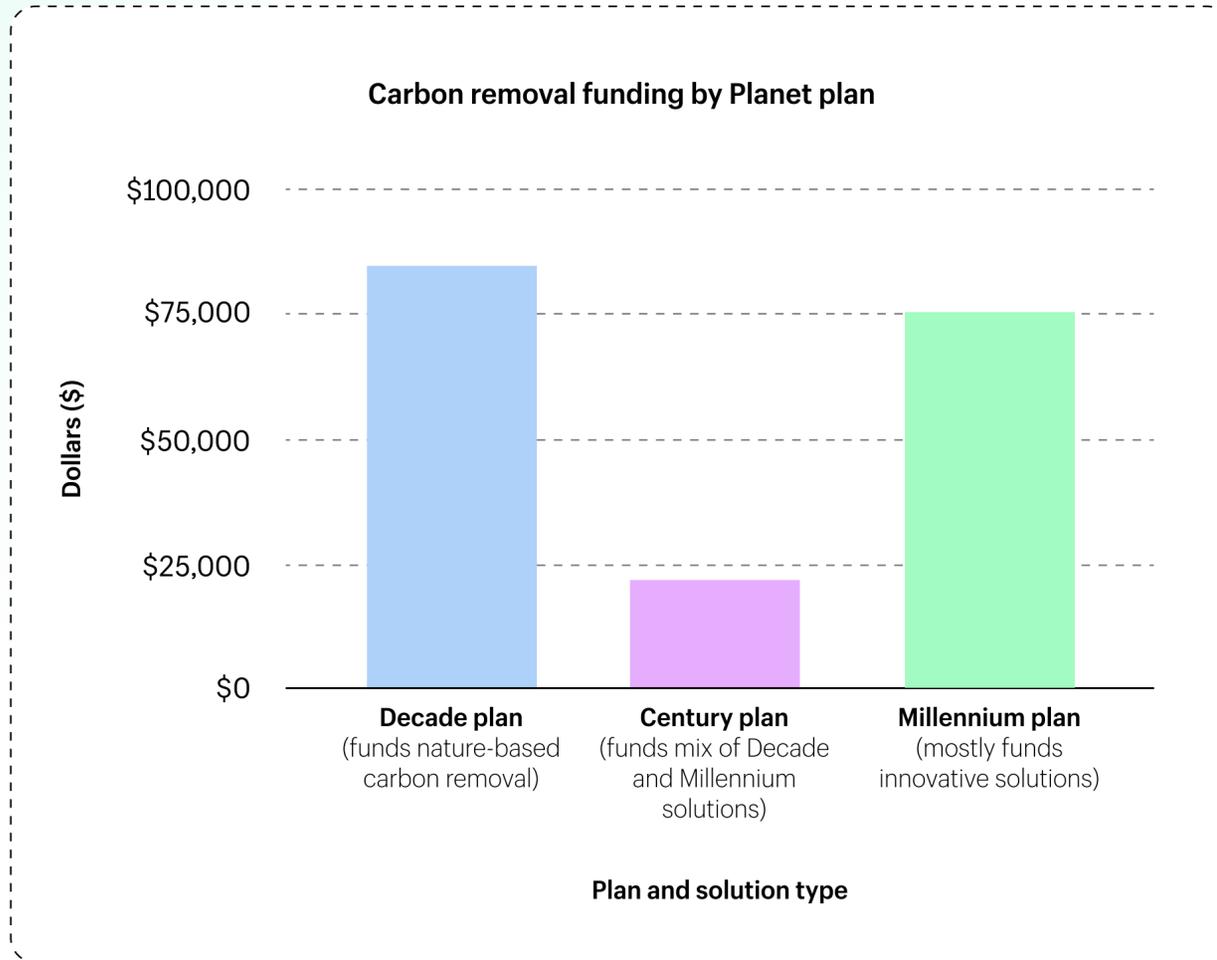
“ Love that we can buy carbon removal for all of our shipments with this app. [...] This is the real solution we've been waiting for.”



Planet app: Merchants using Planet get access to analytics such as their carbon footprint, total delivery distance, and how much carbon they've removed. They can also add a Planet badge to their storefront to share their carbon-neutral commitment with their buyers.



Merchants choose a subscription plan – Decade, Century, or Millennium – which costs an average of 0.035 USD to 0.15 USD per order and funds a mix of carbon removal suppliers.



Choose how you want to contribute

Cart
All deliveries are carbon neutral
Powered by Shopify Planet

<p>Decade plan</p> <ul style="list-style-type: none"> • Ship carbon neutral • Remove atmospheric carbon • Store carbon for 10+ years • Solutions like reforestation and soil carbon storage 	<p>Century plan</p> <ul style="list-style-type: none"> • Ship carbon neutral • Remove atmospheric carbon • Store carbon for 10-1000+ years • Mix of Decade and Millennium plan solutions 	<p>Millennium plan Highest impact</p> <ul style="list-style-type: none"> • Ship carbon neutral • Remove atmospheric carbon • Store carbon for primarily 1000+ years • Solutions like ocean-based removal and direct air capture
<p>\$0.035 /order Subscribe</p>	<p>\$0.08 /order Subscribe</p>	<p>\$0.15 /order Subscribe</p>
<p>Estimated cost Based on your average volume (500 orders/month)</p> <p style="text-align: right;">\$17.50 /month</p>	<p>Estimated cost Based on your average volume (500 orders/month)</p> <p style="text-align: right;">\$40.00 /month</p>	<p>Estimated cost Based on your average volume (500 orders/month)</p> <p style="text-align: right;">\$75.00 /month</p>

Merchant: Bright Candle Co

“A simple and easy way to make our shipping carbon neutral. We are committed to the Millennium plan to have the greatest impact, which costs more but is 100% worth it to our small business.”



Planet app featured suppliers

Grassroots Carbon

Decade plan

Soil



Dr. Henk Mooiweer, Co-founder Grassroots Carbon

Grassroots Carbon's carbon credit approach helps ranchers modify land management practices to improve soil and ecological health, which captures and stores more carbon in soil.

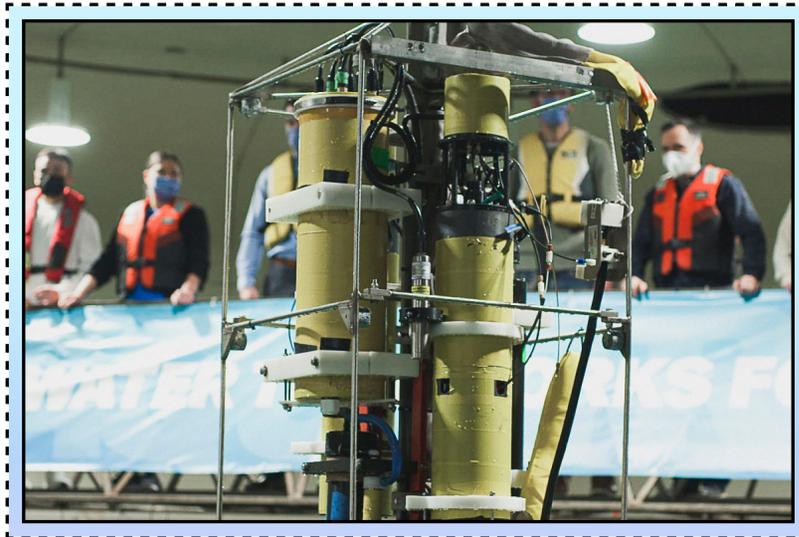
“ We are excited to be featured as a nature-based solution in the Decade Plan of Shopify's Planet app. The app helps businesses take climate action by offering a menu of solutions to remove their emissions and help reverse climate change.”

Planetary Technologies

Century plan

Millennium plan

Ocean



Mike Kelland, CEO Planetary Technologies

Planetary Technologies' process adds alkalinity to the ocean to enhance the ocean's natural ability to capture and store CO₂, which also reduces ocean acidification.

“ This is what it takes to lead. Cutting through the greenwash and putting real, science-based removals at the fingertips of global commerce.”

Heirloom

Century plan

Millennium plan

Direct air capture



Shashank Samala, CEO Heirloom

Heirloom's technology speeds up the rate at which naturally occurring minerals capture CO₂ with a process that relies on these minerals passively contacting air rather than using energy-intensive fans to draw air in.

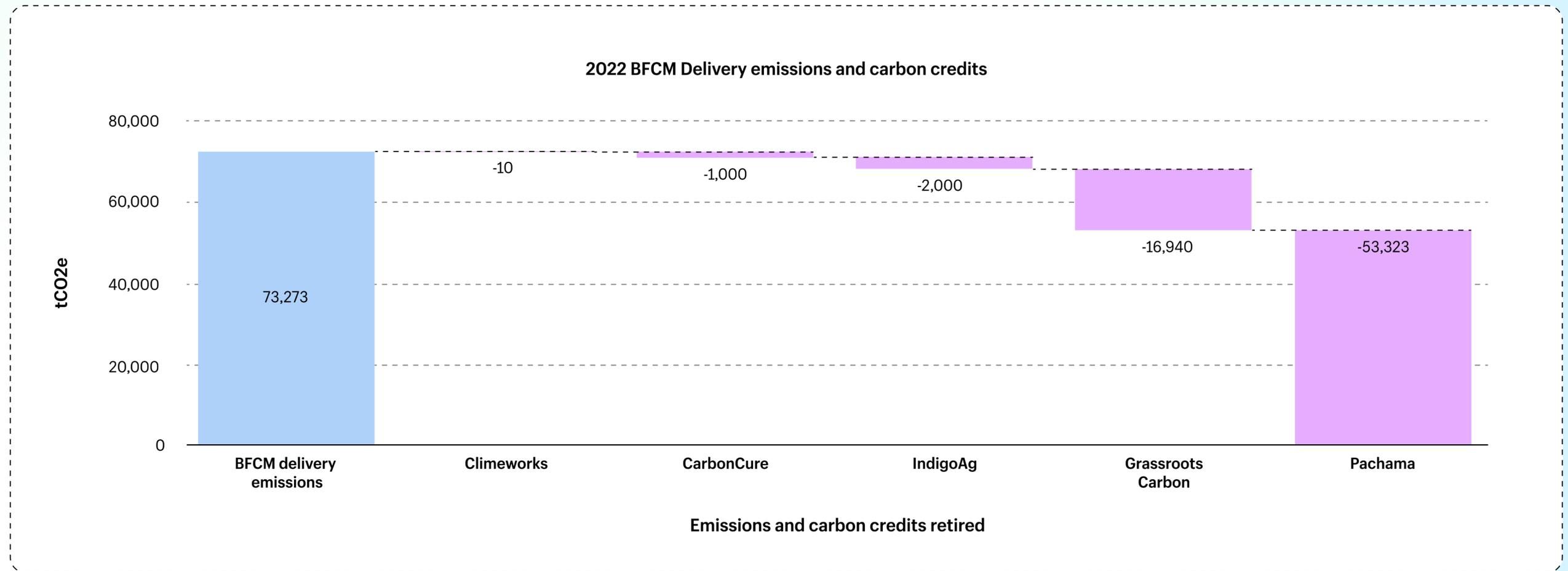
“ Amazing to see Shopify expand the carbon removal ecosystem through their core platform. We're excited to be an early supplier!”



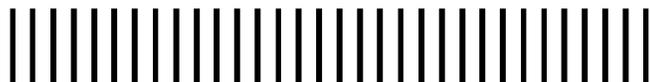
Black Friday Cyber Monday (BFCM)

For the last three years, Shopify purchased enough carbon removal and credits to counteract the estimated carbon emissions from the delivery of every single order placed on our platform during commerce’s biggest weekend – BFCM.

Shopify purchased **73,273 tCO₂e** of credits to cover merchants’ 2022 BFCM delivery emissions, bringing our three-year total to more than **210,000 tCO₂e**.



Methodology and public registry of carbon credits: *Climeworks (DAC+S methodology, no public registry), CarbonCure (VM0043 methodology, CarbonCure Registry), IndigoAg (U.S. Soil Enrichment Protocol, Climate Action Reserve Registry), Grassroots Carbon (Regenerative Standard v1.0 09292022, no public registry), Pachama (VM0015 v1.1 methodology, Verra Registry)*



BFCM featured suppliers

Climeworks

Direct air capture



Climeworks' high quality direct air capture technology removes CO₂ from the air, after which it is destined for permanent storage underground.

CarbonCure

Carbon storage



CarbonCure's technologies inject captured carbon dioxide into concrete, delivering the same high-quality concrete with a lower carbon footprint.



Shop Pay

Shop Pay is the highest converting, accelerated checkout on the internet, and enables buyers to fund carbon removal projects with every order. In 2022, we completed our Casamance Mangroves restoration project, after which we began funding a suite of carbon removal solutions through the Shop Pay program.

Restoring the Casamance mangroves

From January to October 2022, the estimated delivery emissions of all purchases made by consumers who used Shop Pay were carbon neutral, at no additional cost to them. The total estimated emissions from Shop Pay deliveries during this period were 159,095 tCO₂e.

Shopify paid WeForest to plant an estimated 4.6M trees in Senegal, Africa, from 2020 to 2021, to help restore the Casamance mangroves. This project will remove carbon dioxide equivalent to what was produced by Shop Pay deliveries from January to October 2022. It has also rebuilt habitat for endangered species and wildlife, and provided socio-economic benefits to the local communities. We chose this project to support a high-impact reforestation project that wouldn't have happened without the Shop Pay program. This project is eligible for a double certification through Verra's Verified Carbon Standard (VCS) and Climate, Community & Biodiversity Standards (CCB). Credits generated from this project will be retired immediately against the Shop Pay deliveries.

[Read about the Shopify and WeForest partnership](#) →



Rhizophora mangrove tree © NVanIngen

Funding a suite of carbon removal solutions

Following the completion of the Casamance mangrove restoration project in October 2022, the Shop Pay carbon removal program shifted to funding carbon removal solutions. Now, every Shop Pay purchase contributes to funding carbon removal—at no extra cost to merchants or buyers. From October to December 2022, this amounted to about \$100,000, which will be allocated to carbon removal suppliers in our portfolio and retired against Shop Pay delivery emissions.



