PitchBook

EMERGING TECH RESEARCH

Carbon & Emissions Tech Overview

Industry and taxonomy update with latest VC activity

2024

REPORT PREVIEW
The full report is available through the PitchBook Platform.

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Analysis

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Data

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Carbon & emissions tech landscape

1. Carbon tech
2. Industry
3. Built environment
4. Land use

Carbon & emissions tech VC ecosystem market map

This market map is an overview of venture-backed or growth-stage companies that have received venture capital or other notable private investments. Click to view the full map on the PitchBook Platform.

1 Carbon tech

Biological carbon removal

Carbon utilization

Point source carbon capture

Carbon accounting/analytics

DAC

VCM infrastructure

Carbon fintech & consumer

2 Industry

Green mining

Recycling metals

Lithium battery recycling

Green chemicals & materials
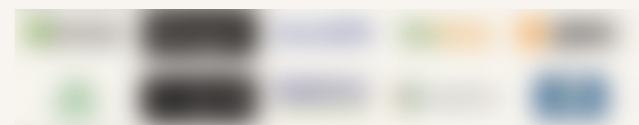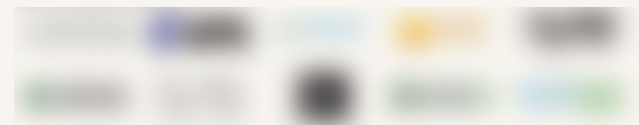
Recycling analytics

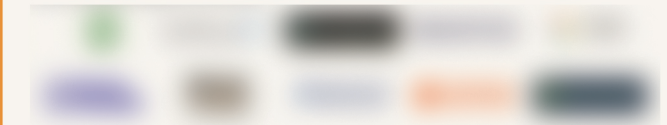**Low-carbon manufacturing & industrial processes**
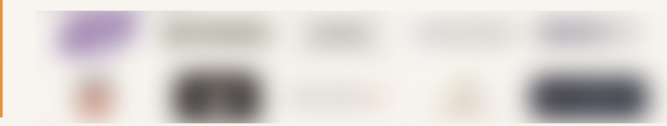
Recycling polymers

3 Built environment

Building energy efficiency

Green construction

Heating & cooling
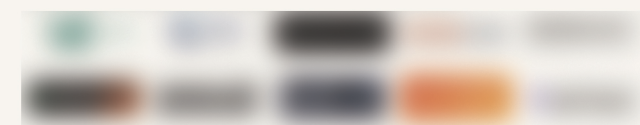
4 Land use

Climate/Earth data

tomorrow · semios · UMBRA · one concern · ON X

INSIGHT M · Climavision · CIBO · KAYRROS · Clobotics

Ecosystem health & monitoring

BETTER PLACE FORESTS · AIDASH · ceres · Terraformation · NCX

NATURE METRICS · dendra SYSTEMS · Anomera · Hydrosat · vibrant planet

Fertilizer alternatives

PIVOT BIO · Ynsect · ATLAS AGRO · Sound · Agronutris

APHEA bio · Terramera · DUCTOR · concentric · KULA BIO

VC activity

Following our alterations to the carbon & emissions tech segmentation, the figures for VC deal activity are slightly different than those of our previous reports, particularly given the addition of companies in the low-carbon manufacturing & industrial processes category. VC deal activity in the space reached a new high in 2023, with $17.7 billion across 1,133 deals, compared with 2021's $15.8 billion and 2022's 1,017 deals. The carbon & emissions tech vertical has been resilient to the challenging market conditions in overall VC investment since 2022, as discussed in previous reports. Exit activity shows a strong peak of $3.8 billion in 2021, which then fell to $2.0 billion in 2022 and $1.9 billion in 2023—following similar trends of high 2021 exit value in other sectors due to strong overall exit conditions. Median pre-money valuations for carbon & emissions tech companies remained fairly flat from 2021 to 2023, varying between $13.6 million and $15.0 million. 2024 data currently shows a similar median pre-money valuation of $14.0 million, though the sample size is relatively small because data is restricted to one quarter. The Q1 2024 median deal size is $4.2 million—higher than the peak annual median deal size of $4.0 million in 2022. Exit activity in the vertical shows a significant peak in 2021, with $3.8 billion, falling to $2.0 billion in 2022 and then remaining flat in 2023, with $1.9 billion.

Q1 2024 saw $2.7 billion in VC deal value—the lowest quarterly VC deal value since Q1 2021, partially driven by the relative lack of large deals in the vertical, with only four deals above $100.0 million. The category with the largest Q1 2024 VC deal value was lithium battery recycling, with $771.0 million. DAC was also in the top five categories in terms of VC deal value, with $200.2 million. The other categories in the top five by VC deal value were all three categories from the built environment segment, with:
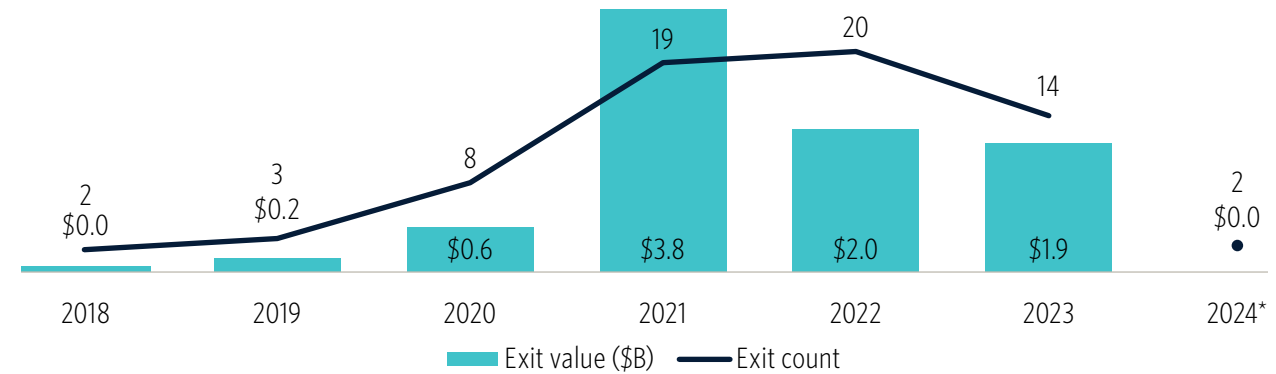
- Green construction: $352.0 million
- Heating & cooling: $242.9 million
- Building energy efficiency: $193.7 million

Carbon & emissions tech VC deal activity
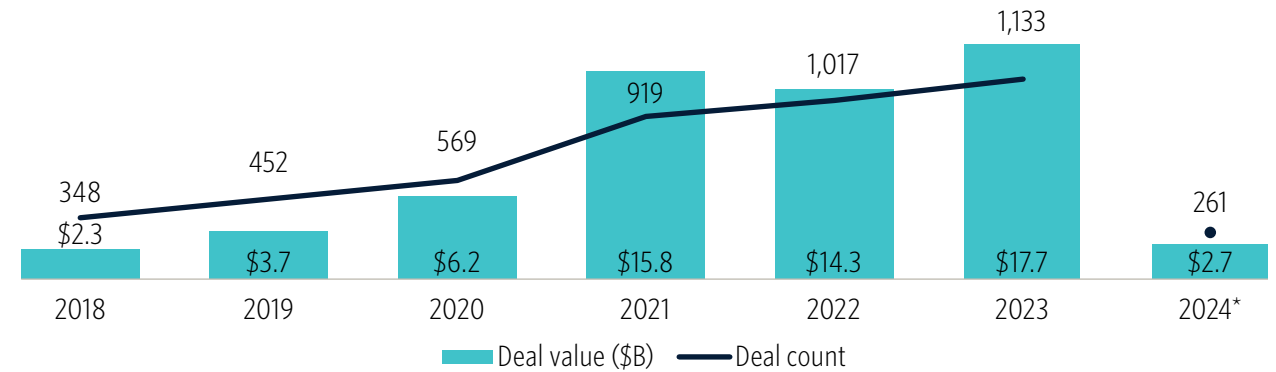
Source: PitchBook • Geography: Global • *As of March 31, 2024

Carbon & emissions tech VC exit activity

Source: PitchBook • Geography: Global • *As of March 31, 2024

Carbon tech

Overview

The carbon tech segment contains seven technology categories that cover several applications, including physically capturing and managing carbon dioxide, allowing entities to measure and offset their carbon emissions, and integrating carbon and sustainability into financial products and services.

Carbon tech categories include:

- **Direct air capture:** Technologies to directly capture CO_2 that has already been released into the atmosphere. This includes technologies based on solvent or sorbent capture using some form of airflow management to maximize exposure to CO_2-laden air to compensate for the lower concentration relative to exhaust gas streams. Some rock weathering approaches are also generally placed in this category—specifically those that expose crushed rock or mine tailings to the atmosphere to passively capture CO_2.
- **Point source carbon capture:** Often similar technological approaches to DAC but applied to exhaust/flue gas streams rather than atmospheric air. The significantly higher concentration of CO_2 in exhaust gases increases capture rate relative to DAC.
- **Biological carbon capture:** Biological approaches to carbon capture, including sequestration of biochar and other biologically derived high-carbon products in soils, deep oceans, or deep subsurface locations. The category also includes technologies that incorporate biologically captured carbon into long-lived products and materials, and approaches that increase uptake of carbon into soils via biological pathways.
- **Carbon utilization:** Technologies to use captured CO_2 as a feedstock to produce materials and goods. Includes base chemicals, fuels, polymers, and construction materials.

- **Carbon accounting & analytics:** Software platforms to monitor and analyze an entity's carbon emissions. Some platforms also recommend decarbonization options. Most platforms focus on sector-agnostic carbon accounting, though some are industry-specific.
- **VCM infrastructure:** A new category containing platforms that manage voluntary carbon products by acting as trading platforms, aggregating carbon credits, carrying out MRV processes, and integrating credits into other offerings.
- **Carbon fintech & consumer:** Technologies to integrate sustainability and decarbonization into financial products and banking.

Industry drivers

Several factors drive investment into carbon-capture, utilization, and storage (CCUS) technologies. In some regions such as the US, tax incentives are available per ton of CO_2 captured, with the value of the credit varying with the type of carbon capture, and whether carbon utilization is involved. For DAC specifically, $3.5 billion in funding from the US Bipartisan Infrastructure Law is being used to fund the creation of DAC hubs.[5] VC-backed companies such as Climeworks are already involved with these hubs, which shows the desire of the US to be a global leader in carbon-capture technology.

For DAC and biological-carbon-removal-based carbon credits, the recent shift toward high-integrity, easy-to-verify carbon credits benefits removal-based credits, which have comparatively straightforward integrity verification. Despite indications that overall markets for voluntary carbon credits contracted significantly in 2023,[6] VCM technologies in general are still in high demand—particularly those that support accurate measurement and verification of credits. Many buyers of

5: "Regional Direct Air Capture Hubs," Office of Clean Energy Demonstrations, n.d., accessed June 15, 2024.
6: "2024 State of the Voluntary Carbon Market (SOVCM)," Ecosystem Marketplace, n.d., accessed June 15, 2024.

Top carbon & emissions tech VC investors by deal count since 2018*

Investor	Deal count	Pre-seed/seed	Early-stage VC	Late-stage VC	Venture growth	Investor type
Climate Capital	95	48	25	20	2	VC
Lowercarbon Capital	72	22	36	14	0	VC
SOSV	58	34	9	15	0	VC
EIT InnoEnergy	50	7	17	22	4	Impact investing
ImpactAssets	43	14	12	15	2	Impact investing
MCJ Collective	39	13	15	9	2	VC
Neglected Climate Opportunities	37	13	17	6	1	Impact investing
Collaborative Fund	36	15	14	6	1	VC
Energy Impact Partners	33	7	10	12	4	VC
Antler	31	24	6	1	0	VC
Unreasonable Impact	30	2	5	17	6	Impact investing

Source: PitchBook • Geography: Global • *As of March 31, 2024

About PitchBook Industry and Technology Research

Independent, objective, and timely market intel

As the private markets continue to grow in complexity and competition, it's essential for investors to understand the industries, sectors, and companies driving the asset class.

Our Industry and Technology Research provides detailed analysis of nascent tech sectors so you can better navigate the changing markets you operate in—and pursue new opportunities with confidence.

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