



 EMERGING TECH RESEARCH

Climate Tech Report

VC trends and emerging opportunities

Q1
2022



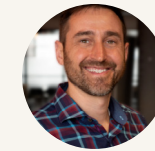


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Vertical overview

The climate technology vertical consists of solutions across various industries that seek to help countries and businesses reduce carbon emissions. In alignment with the Paris Agreement, more than 120 nations—comprising close to 50% of the world’s GDP—have set or are proposing to set a net-zero carbon emission target before 2050. This worldwide effort to limit global temperature increases to 1.5°C relative to pre-industrial levels is likely to drive sustained focus on the climate tech industry.

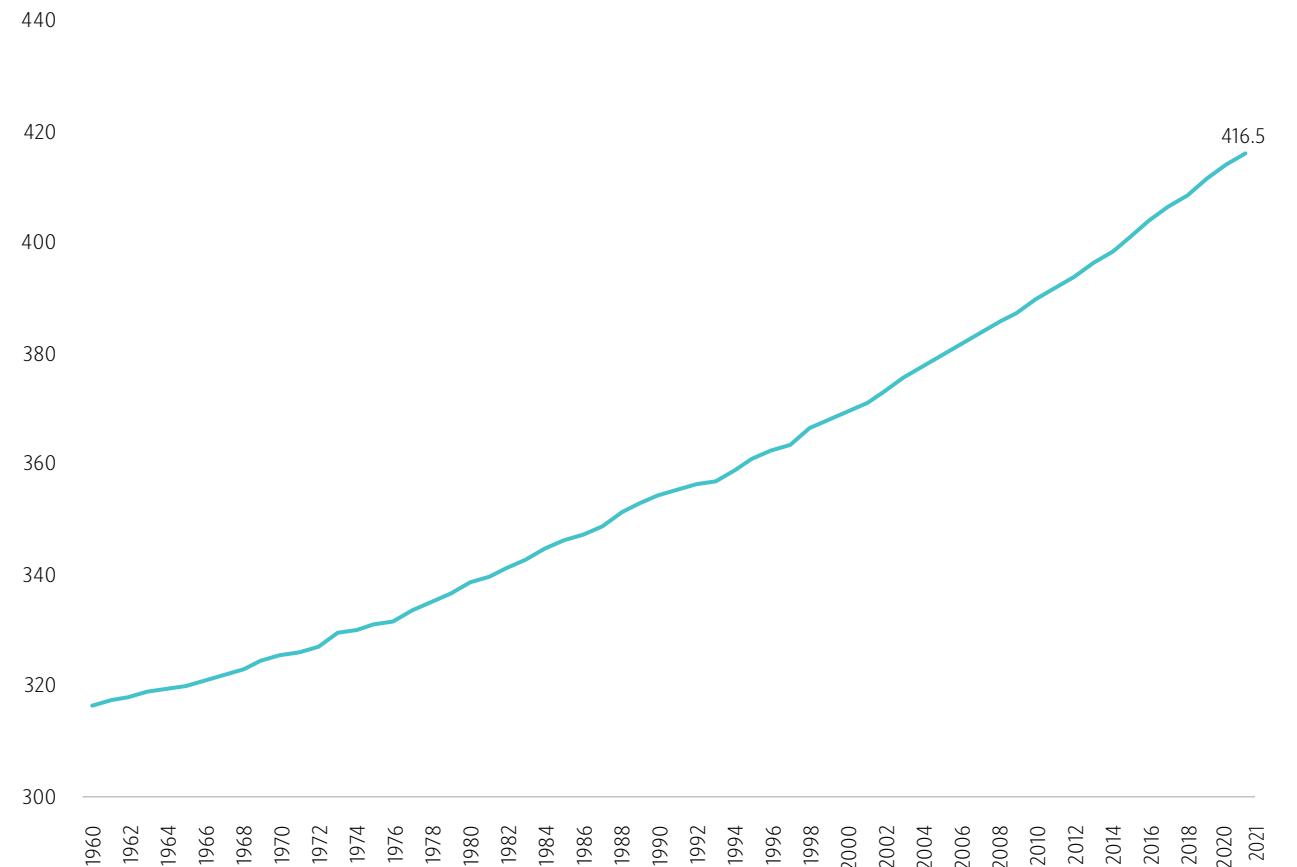
Emerging climate tech startups are targeting a broad range of industries as they seek to decarbonize the economy, including the energy sector, transportation, building, food systems, and industrial processes. This represents an important shift from the ill-fated Clean Tech 1.0 trend between 2006 and 2011, which focused primarily on the energy sector and ultimately caused investors to lose nearly 50% of the roughly \$25 billion of venture capital invested. This time around, startups are focused on the broader global climate change emergency in an effort to decarbonize across all sectors of the economy.

Given this new approach to the problem, it is not surprising that the climate tech vertical is highly fragmented and encompasses a diverse ecosystem of disparate providers at different stages of technological maturity. The industry encompasses technologies focused on reducing GHG emissions created by energy generation and storage, sustainable transport, the built environment, industrial processes, food systems, land use, and carbon technologies. It is estimated that existing technologies can reduce up to 65% of emissions needed to reach net zero by 2050, but the remaining 35% will require new technological breakthroughs that could provide opportunities for enormous growth.

Investment growth has already begun. Between 2013 and 2019, capital deployed in climate tech grew at 5 times the venture capital overall growth rate, even though climate tech only made up 6% of the total venture capital invested in 2019.¹

1: [“Climate Tech Investment Grows at Five Times the Venture Capital Market Rate over Seven Years,” PwC, September 23, 2020.](#)

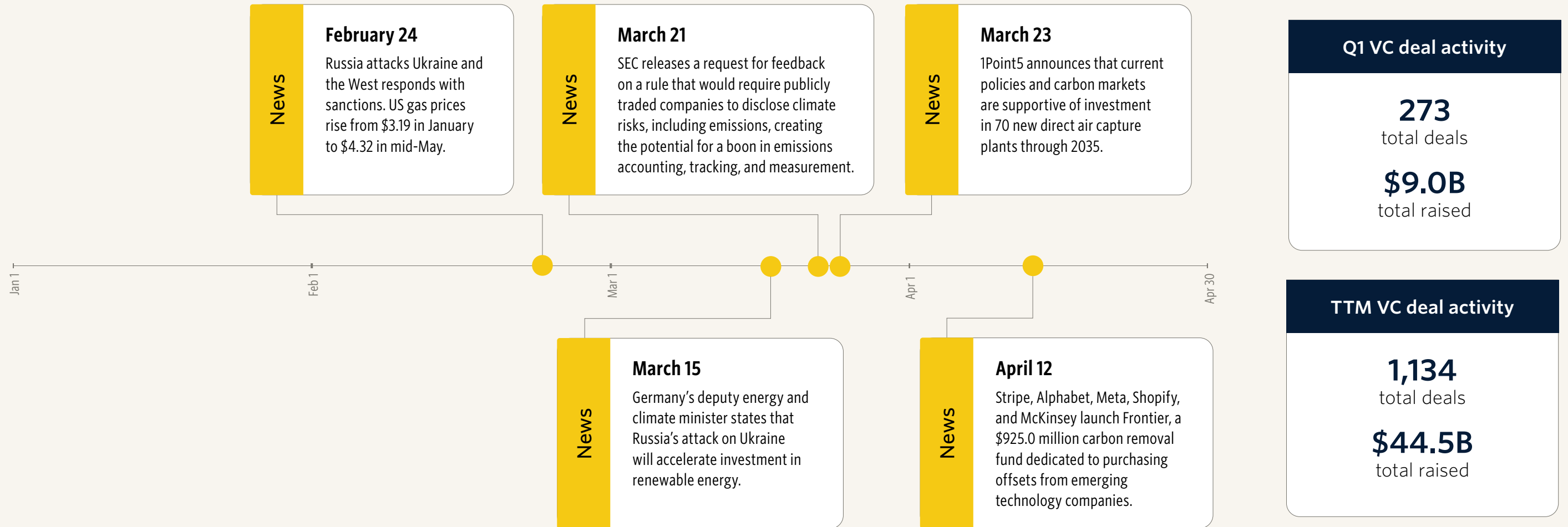
Figure 1. Atmospheric CO₂ at Mauna Loa Observatory (ppm)



Source: Scripps Institution of Oceanography



Q1 2022 timeline

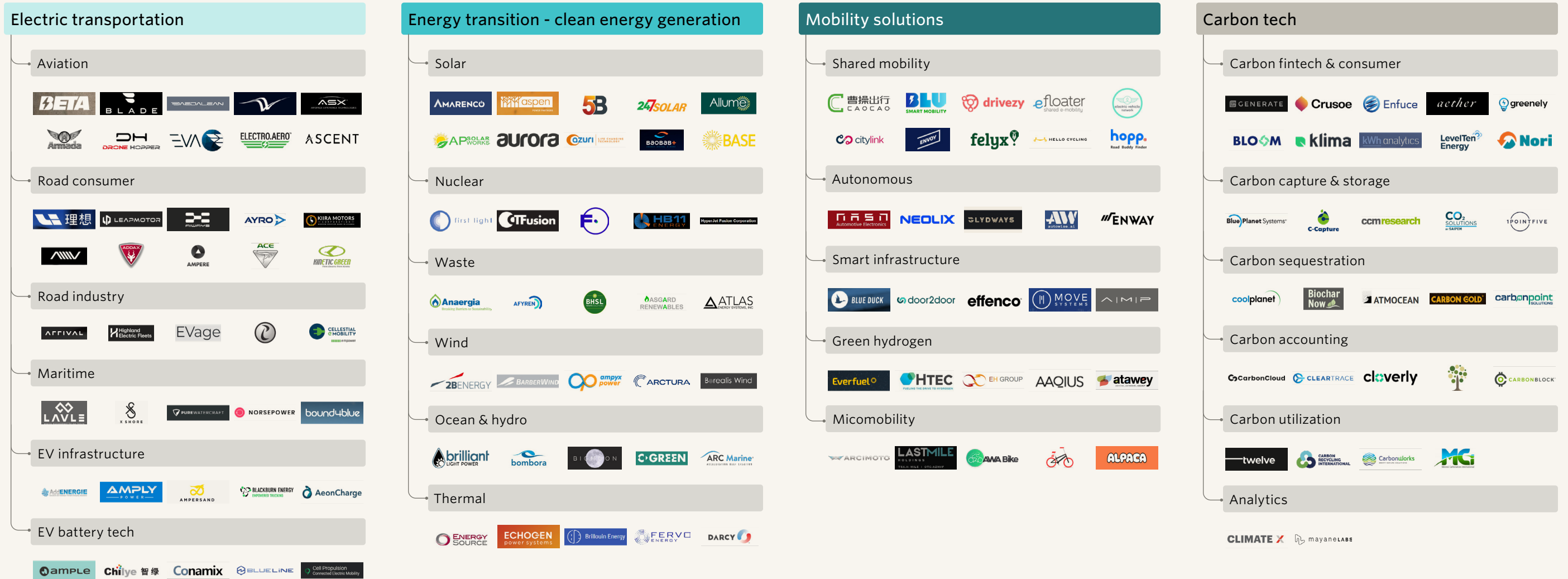




Climate tech VC ecosystem market map

Click to view the interactive market map on the PitchBook Platform.

Market map is a representative overview of venture-backed or growth-stage providers in each segment. Companies listed have received venture capital or other notable private investments.

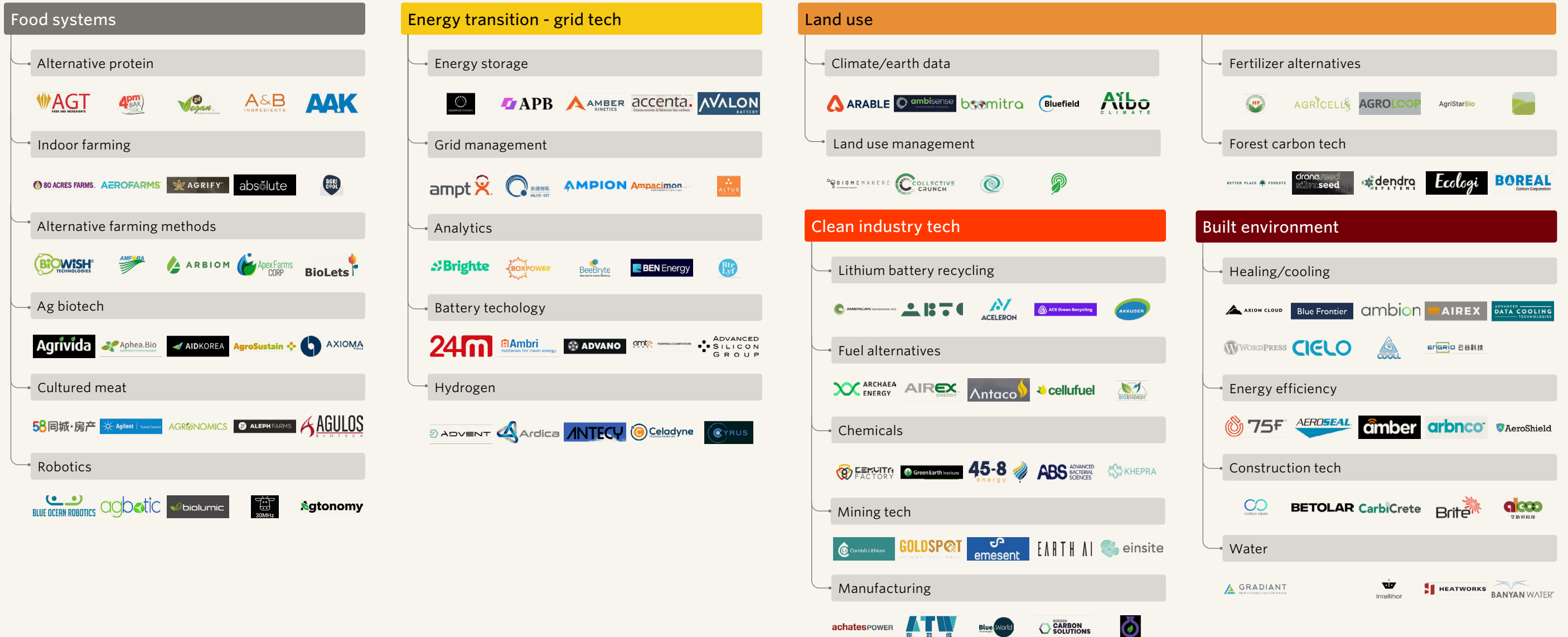




Climate tech VC ecosystem market map

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VC activity

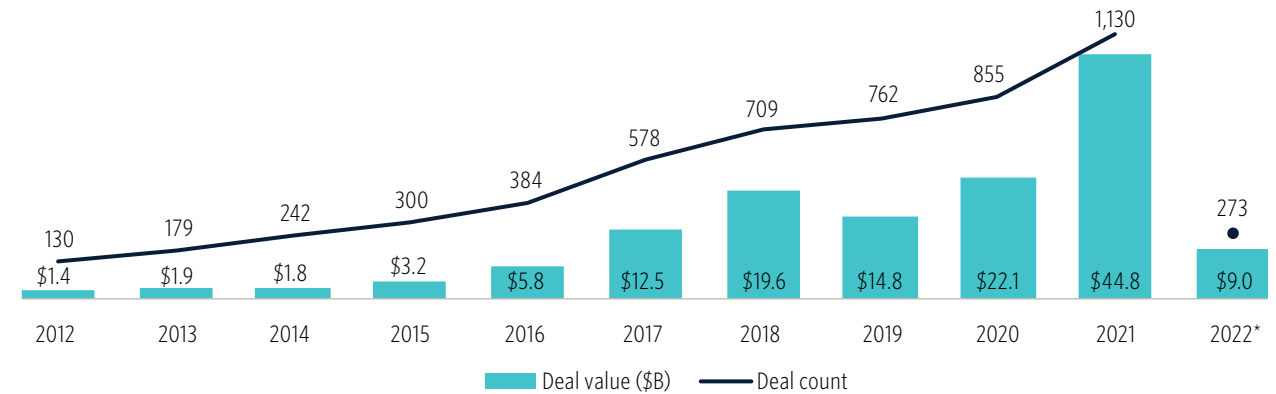
In Q1 2022 there were 273 VC-backed climate tech rounds worth \$9.0 billion. This compares to 283 rounds and \$11.2 billion per quarter, on average, in 2021, 214/\$5.5 billion per quarter in 2020, and 191/\$3.7 billion per quarter in 2019. Climate tech venture capital (VC) deals and dollars invested slowed modestly in Q1 relative to 2021's average rate, but angel & seed dollars invested in Q1 2022 were strong at \$283.3 million compared to \$700.4 million in all of 2021 and \$652.5 million in 2020. We observed the same trend in most spaces, with angel, seed, and early stages holding up while valuations of late-stage startups recalibrated downward.

Q1 2022 saw less investment than the average quarterly rate in 2021, but the quarter was still strong, potentially because the market had not begun to decline until after early January when many deals were already underway, and the attack on Ukraine did not occur until February 24. Climate tech investment (and other venture categories) could fall further in Q2 due to volatility and lower market valuations; however, in the long-term, the attack on Ukraine and resulting calls for energy independence in Europe are likely to accelerate climate tech investment, namely hydrogen, solar, batteries, nuclear, and wind.

We anticipate greater interest in hydrogen as Germany searches for alternatives to Russian gas. Germany powers much of its important manufacturing sector with natural gas, and a handful of German hydrogen companies are already working with companies in France and Luxembourg.

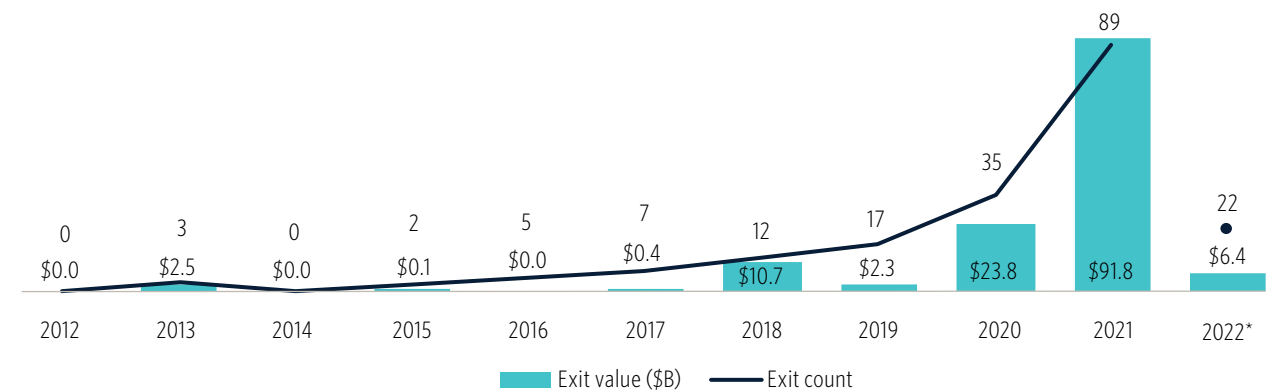
Callouts in Q1 2022 include an increase in dollars financed in PitchBook's "built environment" category (low-carbon cement, heating & cooling, and building efficiency). Q1 2022 saw \$503.8 million of investment in built environment compared to \$905.7 million in all of 2021, and \$351.2 million in 2020.

Figure 2. Climate tech VC deal activity



Source: PitchBook | Geography: Global | *As of March 31, 2022

Figure 3. Climate tech VC exit activity



Source: PitchBook | Geography: Global | *As of March 31, 2022



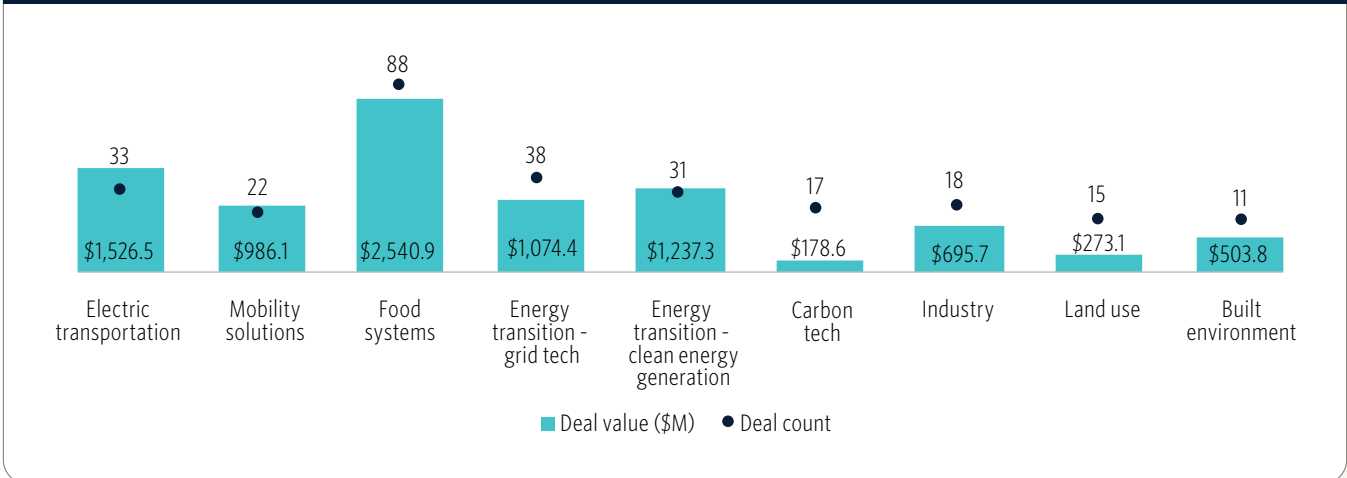
VC ACTIVITY

For the rest of 2022, we expect accelerating investor interest in the battery supply chain (the West is working to in-source battery production to pivot away from China), including lithium/metals exploration, mining, and extraction.

Separately, in the US, the Securities and Exchange Commission (SEC) announced it is seeking comment from the public to inform a proposed set of rules requiring publicly traded firms to disclose climate risks, including emissions. The rule has not been finalized, but if it is, the change would be a windfall for startups in carbon accounting, tracking, and reporting.

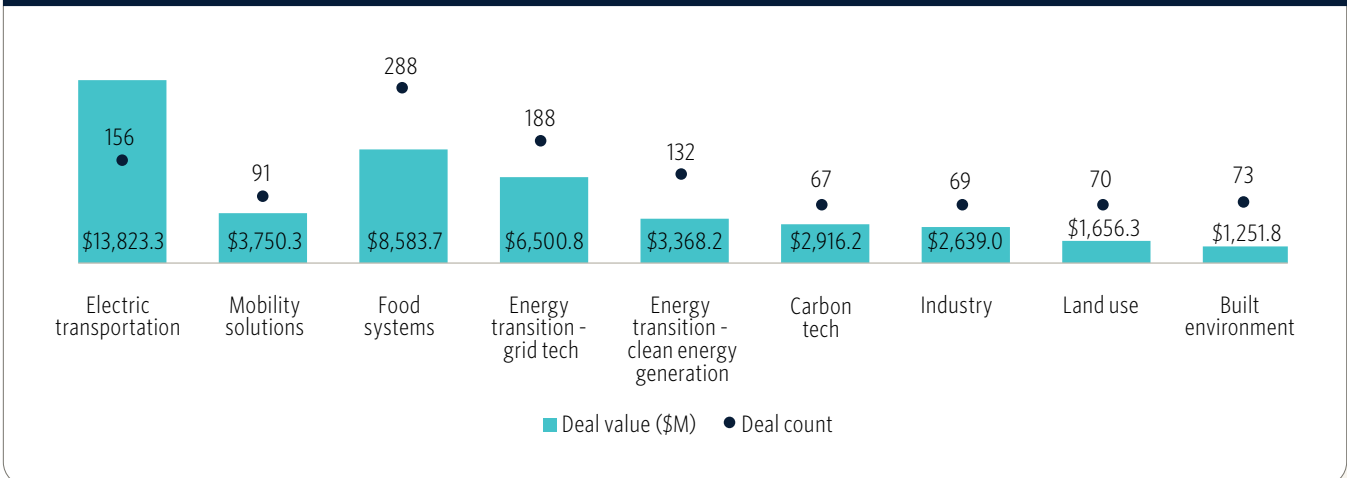
Last, we anticipate VC exits to slow in 2022 given the decline in valuations of high-growth, pre-profit special purpose acquisition companies (SPACs) and IPOs. At present, public company investors have little appetite for low/medium quality SPACs and IPOs. This could easily continue for the remainder 2022 as the Federal Reserve (Fed) raises rates, if inflation persists, and if public stock prices rest below their peak.

Figure 4. Climate tech Q1 2022 VC deal flow and count by segment



Source: PitchBook | Geography: Global | *As of March 31, 2022

Figure 5. Climate tech TTM VC deal flow and count by segment

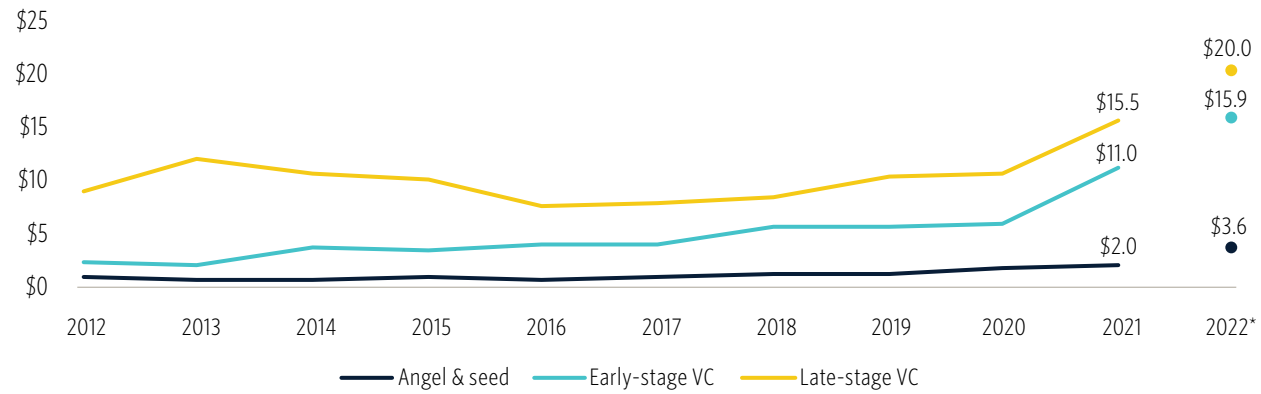


Source: PitchBook | Geography: Global | *As of March 31, 2022



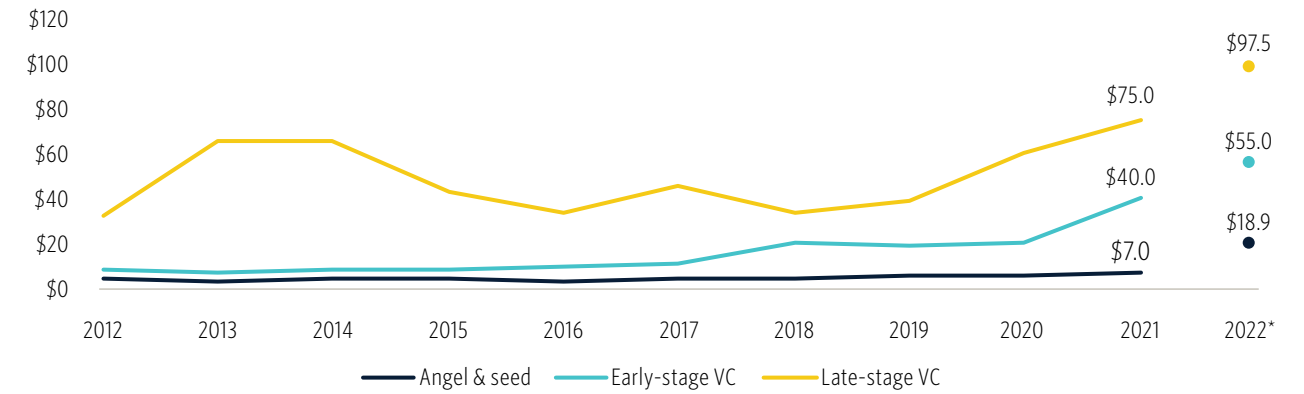
VC ACTIVITY

Figure 6. Median climate tech VC deal value (\$M) by stage



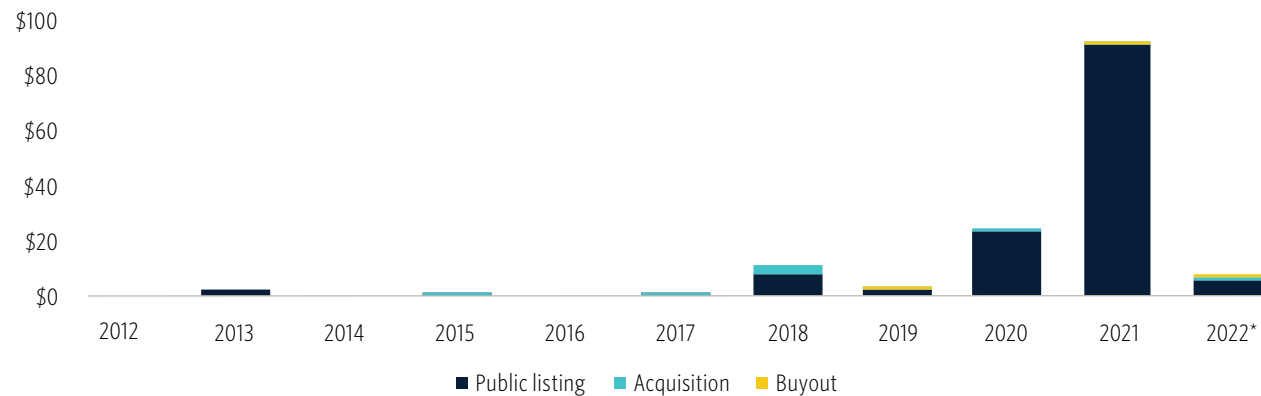
Source: PitchBook | Geography: Global | *As of March 31, 2022

Figure 7. Median climate tech VC pre-money valuation (\$M) by stage



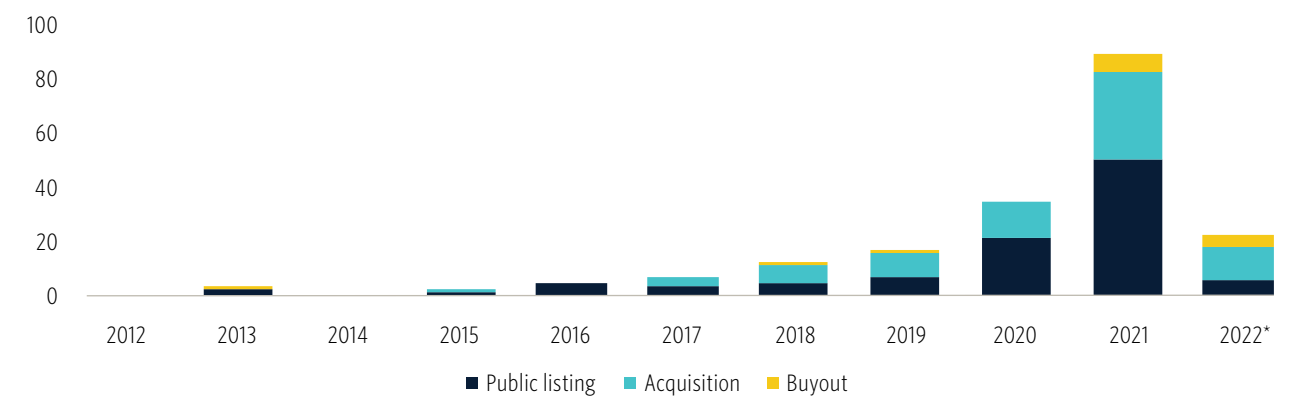
Source: PitchBook | Geography: Global | *As of March 31, 2022

Figure 8. Climate tech VC exit value (\$B) by type



Source: PitchBook | Geography: Global | *As of March 31, 2022

Figure 9. Climate tech VC exit count by type



Source: PitchBook | Geography: Global | *As of March 31, 2022



VC ACTIVITY

Figure 10. Key climate tech early-stage VC deals*

Company	Close date	Subsegment	Stage	Deal size (\$M)	Lead investor(s)	Valuation step-up
Dott	February 1, 2022	Micro mobility	Series B	\$155.0	Abrdn, Sofina	N/A
Redefine Meat	January 23, 2022	Alternative protein	Series B	\$135.6	Hanaco Venture Capital, Synthesis Capital	5.2x
Remilk	January 4, 2022	Alternative protein	Series B	\$130.0	Dancap Family Investment Office	10.8x
Bavaria Natural Environment	March 14, 2022	Water	Series A	\$120.0	Sequoia Capital	N/A
Aspen Power Partners	February 24, 2022	Solar	Early-stage VC	\$120.0	N/A	N/A
Starfield Food Science Technology	January 10, 2022	Alternative protein	Series B	\$100.0	Primavera Capital Group	N/A
Next Gen Foods	February 15, 2022	Alternative protein	Series A	\$100.0	N/A	N/A
Electric Hydrogen	March 10, 2022	Hydrogen	Series B1	\$100.0	N/A	2.4x
Beam	February 25, 2022	Micro mobility	Series B	\$93.0	Affirma Capital	N/A
Span	March 8, 2022	Energy storage	Series B	\$90.0	Fifth Wall, Wellington Management	3.1x

Source: PitchBook | Geography: Global | *As of March 31, 2022



VC ACTIVITY

Figure 11. Key climate tech late-stage VC deals*

Company	Close date	Subsegment	Stage	Deal size (\$M)	Lead investor(s)	Valuation step-up
Plenty	January 25, 2022	Indoor farming	Series E	\$400.0	JS Capital Management, One Madison	1.4x
UPSIDE Foods	March 22, 2022	Cultured meat	Series C	\$387.0	Abu Dhabi Growth Fund, Temasek Holdings	1.6x
Palmetto	February 24, 2022	Solar	Series C	\$375.0	N/A	5.2x
Hozon	February 20, 2022	Road consumer	Series D3	\$314.5	N/A	N/A
Volta Trucks	February 21, 2022	Road industry	Series C	\$260.5	Luxor Capital Group	0.4x
Sunfire	March 24, 2022	Fuel alternatives	Series D	\$215.6	Lightrock, Planet First Partners	N/A
Factorial	January 20, 2022	Battery technology	Series D	\$200.0	Mercedes Benz, Stellantis	N/A
DNAexus	March 8, 2022	Ag biotech	Series I	\$200.0	Blackstone	2.2x
Aurora Solar	February 15, 2022	Solar	Series D	\$200.0	Coatue Management, Energize Ventures	2.0x
Volocopter	January 3, 2022	Aviation	Series E	\$153.0	WP Investment	1.4x

Source: PitchBook | Geography: Global | *As of March 31, 2022



VC ACTIVITY

Figure 12. Key climate tech VC exits*

Company	Close date	Subsegment	Exit size (\$M)	Exit type	Acquirer(s)/index	Post-money valuation (\$M)
SES	February 1, 2022	EV infrastructure	\$3,049.0	Reverse merger	Ivanhoe Capital Acquisition	\$3,049.0
Tritium	January 13, 2022	EV infrastructure	\$1,200.0	Reverse merger	Decarbonization Plus Acquisition II	\$1,200.0
Voltus	January 13, 2022	Grid management	\$955.0	Reverse merger	Broadscale Acquisition	\$955.0
Sunseap	February 24, 2022	Solar	\$679.4	Merger/acquisition	EDP Renováveis	N/A
Driivz	February 8, 2022	EV infrastructure	\$200.0	Merger/acquisition	Vontier	\$200.0
Faradion	January 5, 2022	Battery technology	\$133.4	Merger/acquisition	Reliance Industries	N/A
Clean Power Hydrogen	February 16, 2022	Hydrogen	\$120.3	IPO	West Hill Capital	\$120.3
Lithium Werks	March 15, 2022	EV battery tech	\$61.0	Merger/acquisition	Reliance New Energy	N/A
Lithium	March 21, 2022	Aviation	\$0.7	Buyout/LBO	EverSource Capital	N/A

Source: PitchBook | Geography: Global | *As of March 31, 2022



VC ACTIVITY

Figure 13. Top strategic acquirers of climate tech companies since 2019

Name	Deal count*
Chart Industries	3
Superpedestrian	2
Ideanomics	2
Shell	2

Source: PitchBook | Geography: Global | *As of March 31, 2022

Figure 14. Top VC investors in climate tech companies since 2019

Name	Deal count*
SOSV	66
CPT Capital	42
Alumni Ventures	41
Climate Capital	37
Unovis Asset Management	27
Prelude Ventures	25
AgFunder	24
Gaingels	24
Siddhi Capital	23
S2G Ventures	23

Source: PitchBook | Geography: Global | *As of March 31, 2022



VC ACTIVITY

Figure 15. Key climate tech VC-backed companies*

Company	VC raised to date (\$M)*	Segment	Subsegment
Northvolt	\$4,410.1	Electric transportation	EV battery tech
Weltmeister	\$4,372.5	Electric transportation	Road consumer
Hello Inc.	\$4,159.9	Mobility solutions	Micro mobility
SVOLT	\$3,258.8	Electric transportation	EV battery tech
Generate	\$3,252.1	Carbon tech	Carbon fintech & consumer
Ofo	\$2,247.4	Mobility solutions	Micro mobility
Hozon	\$2,189.7	Electric transportation	Road consumer
BAIC BJEV	\$2,112.2	Mobility solutions	Micro mobility
Commonwealth Fusion Systems	\$2,063.6	Energy transition	Analytics
Impossible Foods	\$1,862.5	Food systems	Alternative protein

Source: PitchBook | Geography: Global | *As of March 31, 2022



Emerging opportunities

Mining tech

Mining Tech includes companies developing emerging technologies to reduce the carbon footprint of mining processes, such as lithium mining.



Mining tech

The efficient mining and extraction of lithium

Lithium and metals mining, extraction, and refining will see a resurgence in the US and abroad due to growth in electric vehicles and as politicians seek to in-source the battery supply chain and pivot away from China. The events of Ukraine and potential for additional conflict are accelerating this trend.

Long-term lithium demand

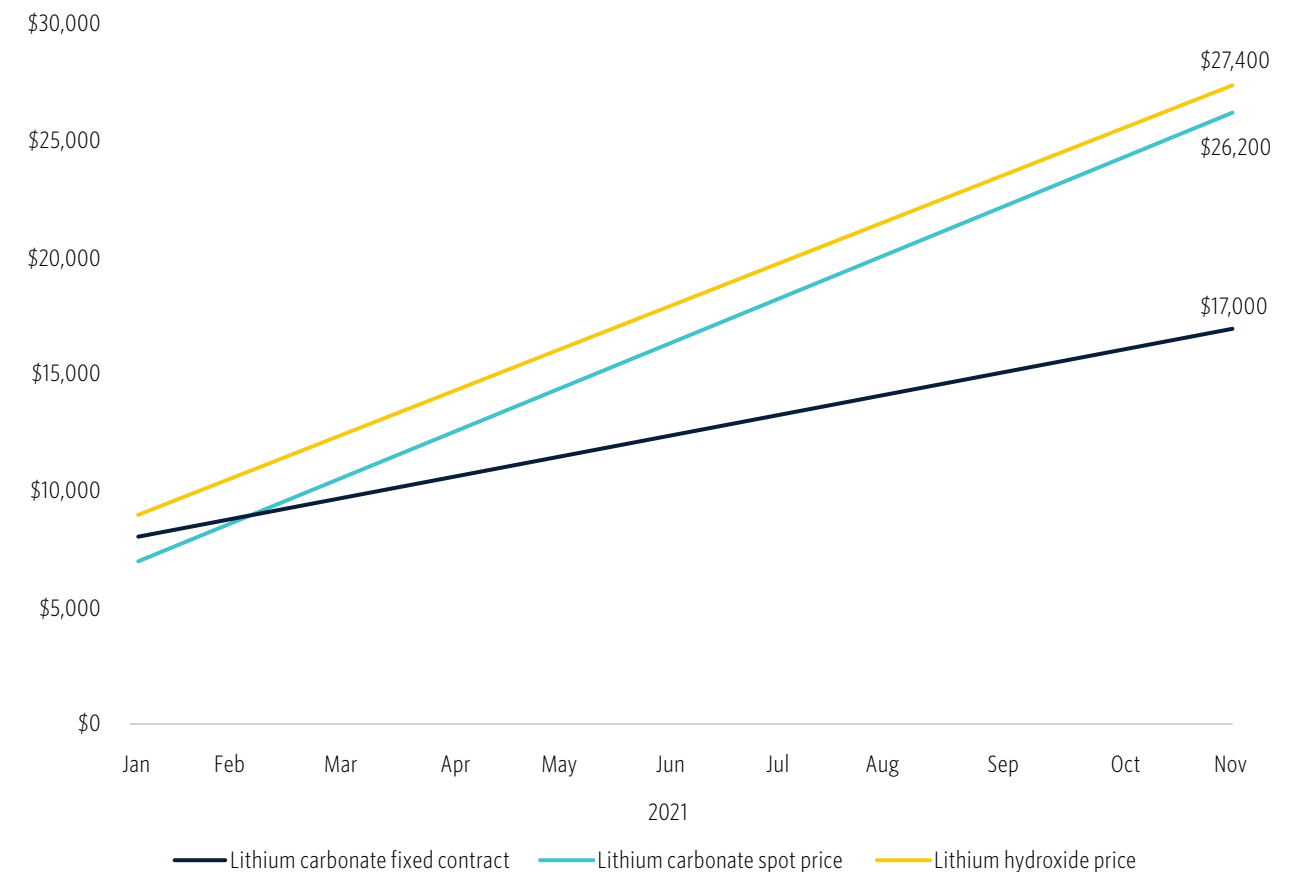
Demand for lithium is growing rapidly to support electric vehicle batteries. McKinsey estimates that lithium demand will rise from approximately 500,000 metric tons of lithium carbonate equivalent in 2021 to 3-4 million metric tons in 2030.² In the US, the largest active lithium deposit, at Thacker Pass in Nevada, just received final government approval, and Piedmont Lithium in North Carolina is working toward full operations. As a result of new mines coming online, global lithium startups should garner significant attention. In 2021 we observed growing investment in the UK lithium ecosystem, as shown in the table of recent capital raises, and we expect similar phenomena in the US, Canada, Mexico, and Latin America.

Demand temporarily outstripping supply in 2021

The US geological survey shows that lithium prices rose dramatically in 2021. The profitability of miners has surged as well, and this will attract investment to the space.

2: "Lithium Mining: How New Production Technologies Could Fuel the Global EV Revolution," McKinsey & Company, Marcelo Azevedo, et al., April 12, 2022.

Figure 16. Lithium prices



Source: US Geological Survey



MINING TECH

Figure 17. Lithium startups

Company	Description	Location	Total capital raised (\$M)	Last round (\$M)	Last round date	Most recent valuation (\$M)	Select investors
Lilac Solutions	Lithium extraction from brine	Oakland, US	\$173.6	\$150.0	September 8, 2021	\$575.0	BMW i Ventures, Breakthrough Energy Ventures, E8, Earthshot Ventures, Harbor Street Ventures, iCatalysts, Lowercarbon Capital, MCJ Collective, Mercuria Energy Trading, One World, Presidio Ventures, PRIME Coalition, T. Rowe Price, The Grantham Foundation
Cornish Lithium	Tech-enabled lithium mining	Penryn, UK	\$50.0	\$24.3	November 25, 2021	\$75.0	Innovate UK, Mineral Securities Operations
Summit Nanotech	Direct lithium extraction (DLE) technology	Calgary, Canada	\$17.4	\$14.0	December 23, 2021	\$36.0	Alliance of Angels, BHP Ventures, Capricorn Investment Group, CleanTech North, Creative Destruction Lab, The51 Ventures, Third Derivative, Wisdom Venture Capital, Xora Innovation
British Lithium	UK-based lithium extraction	Roche, UK	\$4.7	\$4.0	March 17, 2021	N/A	EarlyMarket, Innovate UK
Green Lithium	Lithium hydroxide refinery	London, UK	\$3.1	\$2.3	May 9, 2022	N/A	Advanced Propulsion Centre, Ikigai Capital, Trafigura Group
Novalith	Lithium extraction using carbon dioxide	Sydney, AUS	\$1.8	\$1.8	October 25, 2021	N/A	Clean Energy Finance, The Grantham Foundation, Virescent Ventures

Source: PitchBook | Geography: Global | *As of March 31, 2022



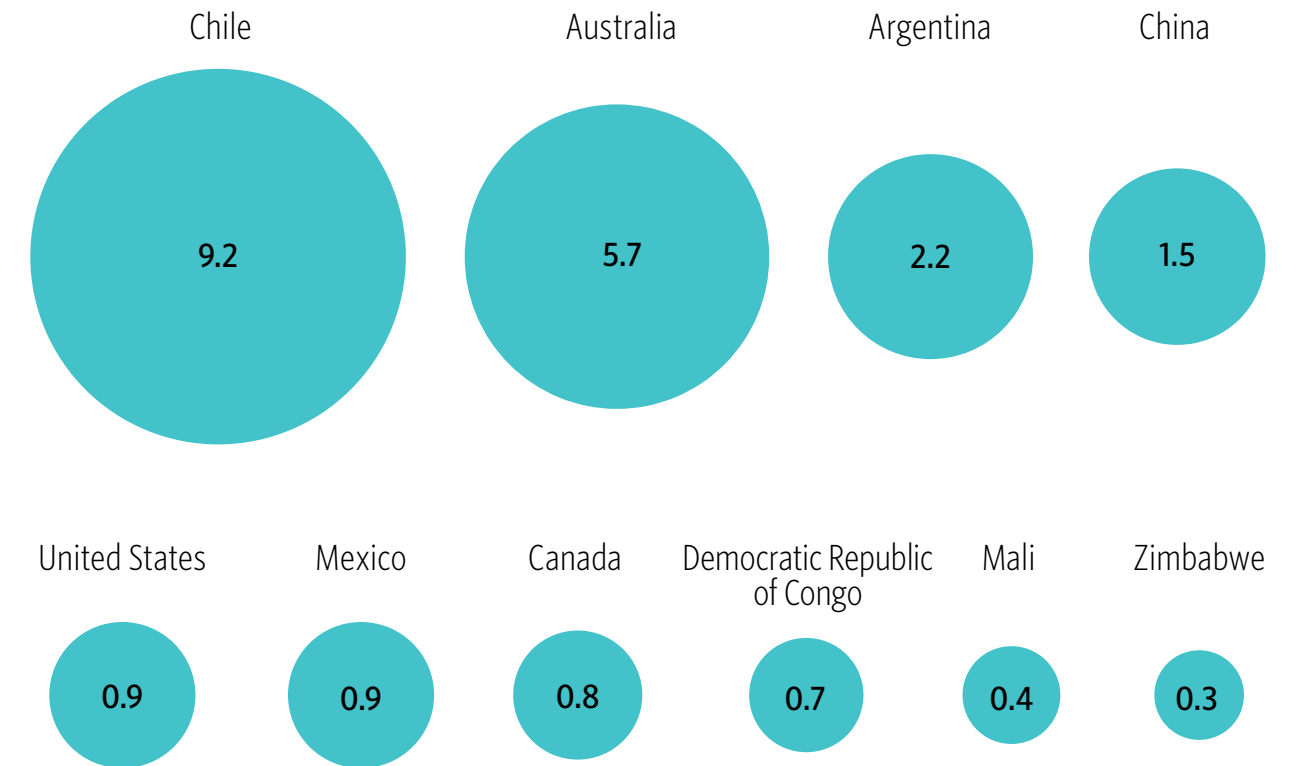
MINING TECH

Geographic locations

Current miners focus most of their efforts on South America, Australia, China, and Africa, but technology and economics are improving such that more deposits in the US, Canada, and Mexico can be mined profitably.

Lithium mining is dominated by five large corporations, but we believe that startups could add value through new extraction and refining technologies. The lithium price more than doubled in 2021, elevating miner profits and attracting capital to the space. Miners and lithium end-users are also looking for ways to decarbonize the battery supply chain, lending support to technologies that mine more efficiently.

Figure 18. Top 10 countries with largest lithium reserves (million metric tons)



Source: United States Geological Survey; MineSpans



MINING TECH

Figure 19. Incumbent lithium miners

Public lithium companies	Mines/developments	Employees	2021 Revenue	Market cap	Headquarters
Jiangxi Ganfeng Lithium Co. Ltd	Australia, Argentina, Mexico, Mali, China, Ireland	7,870	\$1.8 billion	\$25.6 billion	China
Sociedad Química y Minera	Chile	6,000	\$2.9 billion	\$27.2 billion	Chile
Albemarle	US, Chile, Germany, China, Australia	5,900	\$3.2 billion	\$29.7 billion	US
Tianqi Lithium	China, Australia, Chile	1,600	\$1.2 billion	\$23.2 billion	China
Mineral Resources	Australia	1,000	\$2.9 billion	\$8.2 billion	Australia

Source: PitchBook | Geography: Global | *As of March 31, 2022



Select company highlights



SUMMIT NANOTECH



Founded
2018

Total raised:
\$17.4M

Last financing valuation:
\$36.0M

Last financing:
Raised \$14.0M Series A

Lead investors:
BHP Ventures, Capricorn
Partners, and Xora
Innovation

Overview

Summit Nanotech is developing a new direct lithium extraction technology, called denaLiTM, to help lithium miners efficiently extract lithium from brine. They seek to offer lithium extraction as a service for mine and land owners who then sell into the market. In 2022 they shipped a \$7.0 million pilot extraction unit to Chile in a 40 feet shipping container. The shipment will serve as their first test case, and they plan to run the technology 24 hours a day for three weeks. Summit hopes to capitalize on the increasing demand for lithium (30%+ growth per annum) due to the torrid expansion in electric vehicles. Successful mining IP is likely to earn outsized margins over time versus pure commodity players whose revenue and profit are more volatile, as they are subject to the balance of supply and demand for lithium.

Leadership

Founder and CEO Amanda Hall is a Canadian geophysicist with more than 20 years of experience in mining and exploration. Her background is in machine learning, analytics, potash, seismic data, and physics. She serves on the Advisory Board for the Canadian Energy & Climate Nexus.

Financing history

Summit Nanotech raised a \$14.0 million early-stage Series A round in December 2021 for a \$36.0 million post-money valuation and \$17.4 million in total capital. The company intends to use the capital to advance its denaLiTM DLE technology from the current pilot-scale stage to a larger demonstration-scale stage. Hall seeks to land contracts with six major lithium companies in the next five years and generate \$1.0 billion of annual revenue. Prior to Summit Nanotech’s Series A, they were awarded multiple grants from Women in Cleantech Challenge, Energy New Ventures Competition, and Sustainable Development Technology Canada. Hall states that Summit Nanotech is targeting a significant Series B in the near-future. Prior to their Series A they raised a \$1.0 million grant in November 2021, a \$2.5 million grant in June 2021, a \$1.13 million angel round in September 2020, a \$0.74 million accelerator/incubator investment in July 2020, and a \$1.5 million angel investment in May of 2020. They have raised from BHP Ventures, Capricorn Partners, and Xora Innovation. The angel was Third Derivative; the accelerators were Cleantech North, Wisdom Venture Capital, and 51 Ventures.



SUMMIT NANOTECH

Intellectual property

The startup's process entails pre-treating raw brine, and then using a concentration swing absorbent to extract lithium, after which they use a membrane filter for a second step. At the source, they use automated sensors to identify changes in brine composition. Summit's fee structure to the client is dynamic to the composition of a customer's brine. Given the importance of brine composition and the current economics of lithium, Summit works on brine with lithium concentrations greater than 200 parts per million. Their technology is modular, so they can remove and upgrade key components of the greater system as technology improves. A future stretch goal is to process lithium from petroleum-produced water brines.

About PitchBook Emerging Tech 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 Emerging Tech 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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