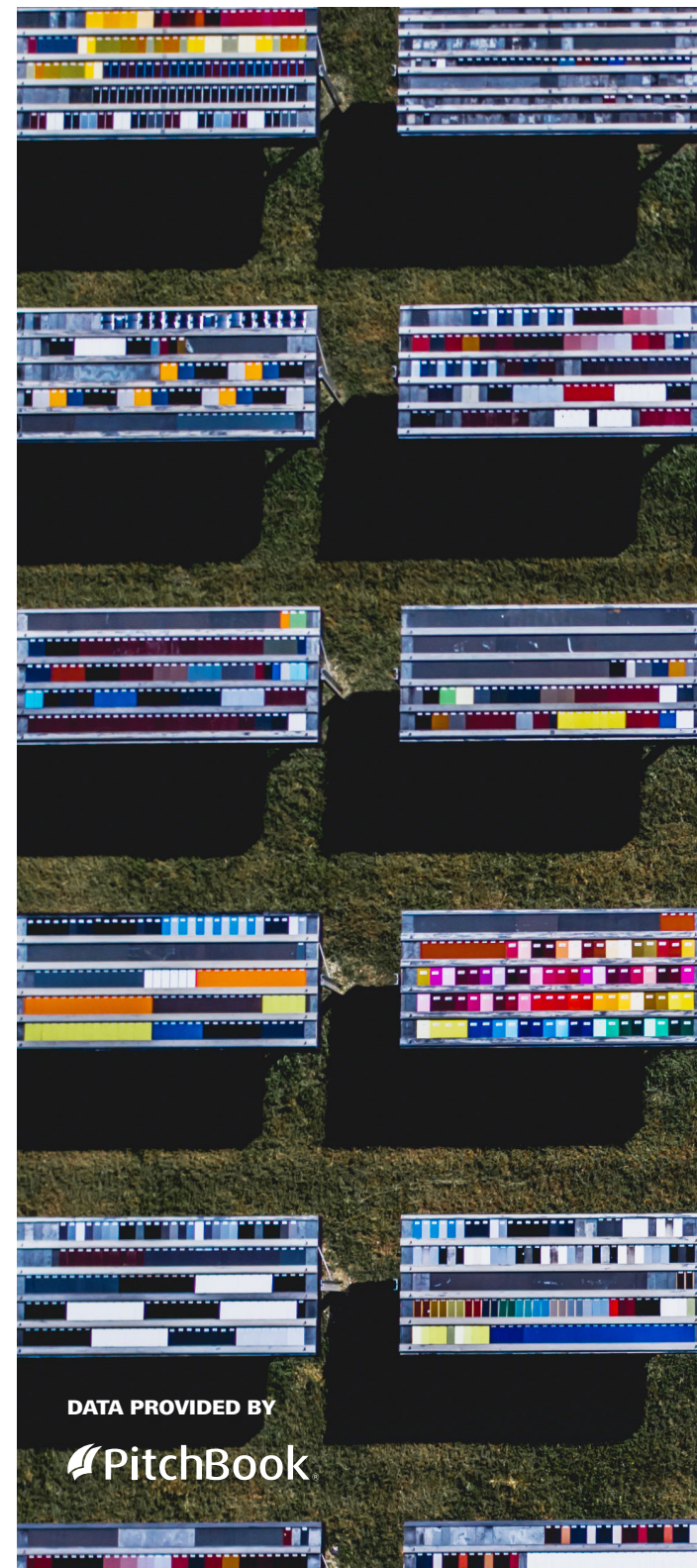


A THREE-PART RESEARCH SERIES

CLIMATETECH

Investment Trends, Market Analysis & Authoritative Commentary



DATA PROVIDED BY





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Executive summary

Venture investment in climatetech surged to new heights in 2021, roaring past \$30 billion across nearly 600 completed transactions and representing a year-over-year (YoY) increase of more than 100% in deal value and close to 18% in deal count. Nontraditional and corporate players participated in major proportions of climatetech deals in terms of both value and count, signifying a broadening base of investors active within the sector. In addition, financing metrics were skewed significantly YoY, with many doubling or more, indicating the degree of investor exuberance and an abundance of capital in the space.

Three themes unify the core underlying drivers in the climatetech industry. First, there has been an increasing diversification of the types of investment firms active in climatetech, with nontraditional

investors (such as hedge funds and sovereign wealth funds) joining traditional venture firms already active in the industry. Second, we are seeing an expanding array of climatetech subsegments experiencing success thanks to slow but steady technical advances throughout the 2010s. Lastly, support of climatetech innovation has led to the accelerated deployment of related technologies by public financial institutions, asset managers, governments, consumers, and others.

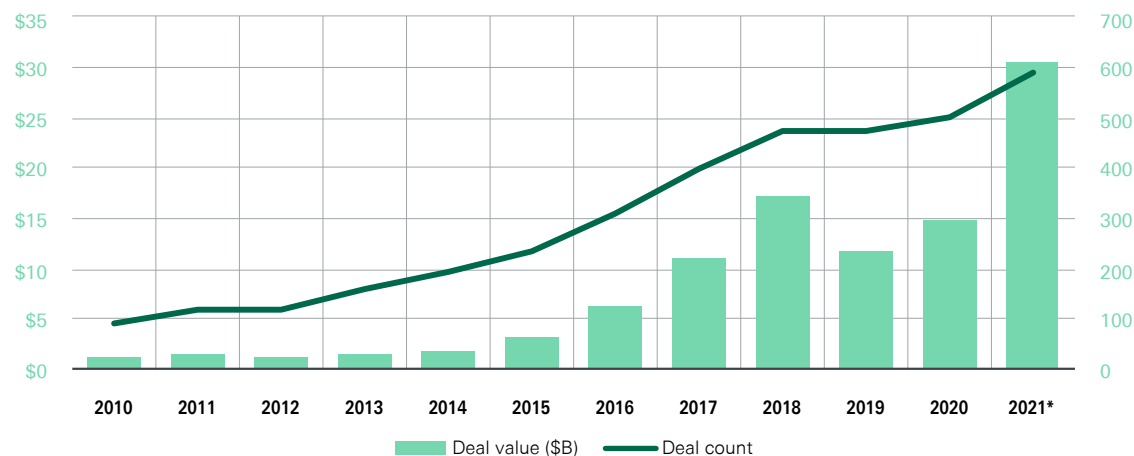
While remarkable, the record surge in liquidity in 2021 remains predicated on unique market environments and mechanisms—primarily reverse mergers via SPACs. It will take some time to see if the success of the 2021 exit market helps bear fruit for financial backers and entrepreneurs within climatetech.

Investment trends

Venture investment in climatetech is at an all-time high

Even in the context of prior climatetech booms, such as past large deals for solar and wind power-focused startups, 2021 set an all-time high in venture financing across the space. Just shy of 600 transactions were completed worldwide for an aggregate deal value of more than \$30 billion. Moreover, those annual tallies came after a four-year period of double-digit billions of dollars invested annually, with yearly deal counts ranging between 400 and 500. The YoY surge in financing metrics between 2020 and 2021 indicates the degree of investor exuberance, highlighted by the median late-stage VC deal size doubling from \$10 million to \$20 million. The early stage saw a similar percentage increase, from \$4.5 million to \$10.1 million. Valuations followed suit, with one striking disparity: The early-stage median pre-money valuation nearly doubled from \$26 million to \$50 million YoY, but the corresponding late-stage figure shifted much less, from \$77.5 million to \$84.5 million

Climatetech VC deal activity



Source: PitchBook Geography: Global
*As of December 31, 2021

in the same timeframe. This more modest increase is likely because this cohort of late-stage companies ramped up between 2018 and 2020, nearly tripling from \$27 million to \$77.5 million, thanks to a sizable population of outliers. These concurrent trends illustrate the significant bump in capital raised by both extant and newly mature incumbent private companies within climatetech, while the early stage became packed with relatively newer entrants.

Three primary engines of this rising tide of investment unify many confluent trends

The sheer array of factors underpinning this surge in climatetech investment is challenging to unpack concisely, but a focused examination reveals three primary unifying themes: diversification in the types and sizes of investment firms active in the space; an expansion of climatetech subsegments predicated on critical, if slow-moving, technical advances; and rapidly broadening macro support across financial, policy, and regulatory arenas.

Diversification is growing in many forms

Beyond the burgeoning efforts by the largest institutional allocators and asset managers on the planet, such as CalPERS or BlackRock, nontraditional firms have leapt into more climatetech deals in the past two years than ever before, with 2021 seeing a mammoth aggregate tally of participating transactions. Nontraditional firms joined in 338 completed venture financings worth \$28.2 billion in 2021. Although to a much lesser extent, PE growth activity in the space has boomed YoY, with 25 completed transactions for \$3.1 billion in 2021, compared with 12 for approximately \$300 million in 2020. The diversification of investor types within an ecosystem signals its growing allure to multiple fund strategies, from those focused on more mature opportunities closer to liquidity, to fledgling, promising startups that may prove more capital-intensive. Corporate venture arms joined in a record 209 venture financings in 2021 worth an aggregate of \$23 billion.

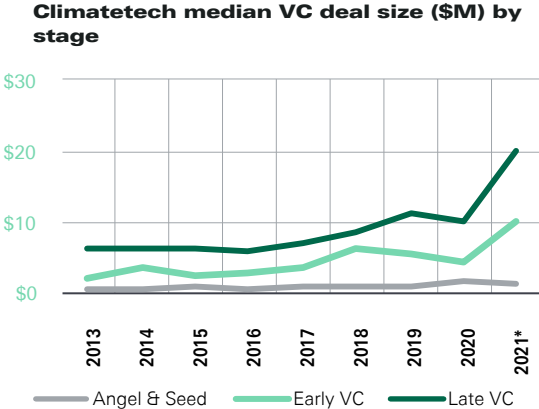
“We are starting to see more pragmatic solutions to decarbonization, like balancing the increase of renewables in the energy mix with clean baseload energy, such as small modular reactors.”

Elina Teplinsky
Partner, Deputy Leader of Pillsbury’s Energy Industry Group

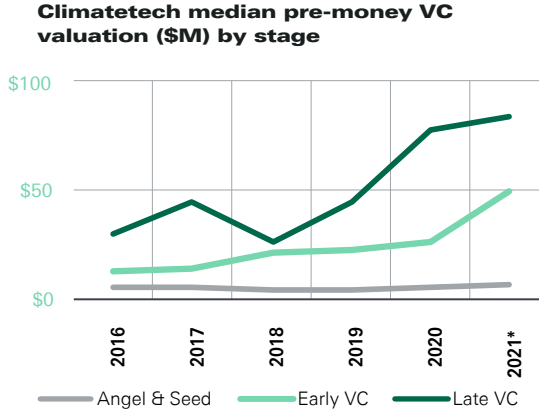
Climatetech’s growth in niche subsegments has created a greater pool of investment opportunities

The climatetech space itself has experienced a profusion of segments beyond the more traditional breakouts of alternative energy producers, product recyclers, and incremental tech advances in major energy-consuming sectors such as transportation. Throughout the 2010s, led by the audacious advent of Tesla, mobility tech solutions saw an explosion in both venture financing volume and value. However, beyond business models looking to plug into extant transportation producers and value chains, independent carmakers and platforms saw a significant uptick in investor interest. At the same time, food-related startups, from tech platforms to tech-enabled producers, experienced significant investment growth over the last decade as the role of agriculture in global emissions and waste production became more publicized and better understood.

This proliferation of subsegments and novel, niche launches enabled a greater array of investment opportunities across potentially more fruitful technologies that could have a greater eventual impact and significant business success. Highlights among these include the steady, if slow, progress made in nuclear fusion and nuclear waste recycling, more efficient fertilizers and non-polluting biopesticides, scalable desalination systems, and more. According to projects that Pillsbury partners are working on, the diversification of subsegments includes commercial development of clean hydrogen, in which investors from multiple sectors are devoting a considerable amount of resources.

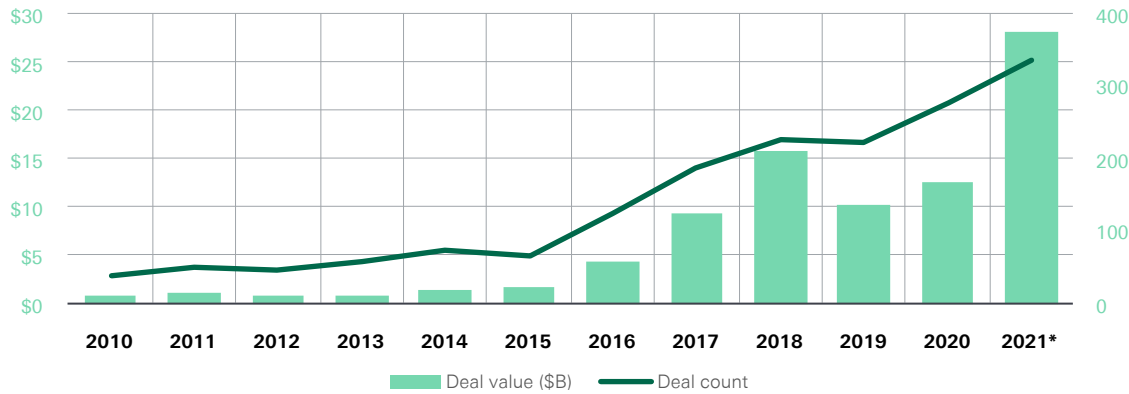


Source: PitchBook Geography: Global
*As of December 31, 2021



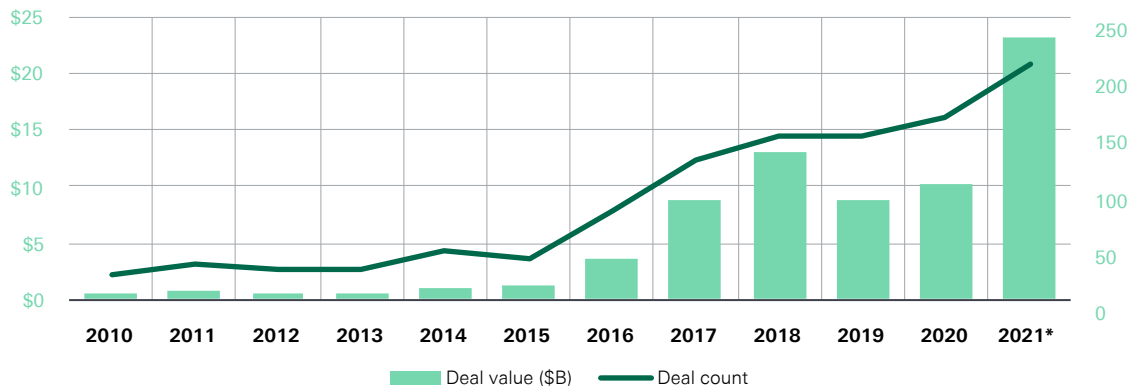
Source: PitchBook Geography: Global
*As of December 31, 2021

Climatetech VC deal activity with nontraditional investor participation



Source: PitchBook Geography: Global
*As of December 31, 2021

Climatetech VC deal activity with corporate participation



Source: PitchBook Geography: Global
*As of December 31, 2021

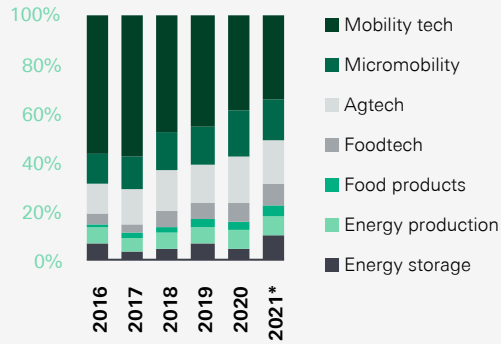
Climatetech’s role in combating climate change is growing

Private and public financial markets are seeing significant impetus to adopt sustainability goals that will result in greater demand for private and public companies to embrace climatetech solutions in their sustainability profiles.

Pillsbury’s 2021 [Sustainable Finance report](#) projected that 2021 global green bond issuance would reach \$400 to \$450 billion, oustripping 2020’s \$269.5 billion. The full-year figure actually topped that prediction, reaching \$481.8 billion.¹ In addition, nearly 2,400 companies are currently setting emissions reduction targets via the Science-Based Targets initiative.² It remains to be seen if many of these commitments translate into action, especially in the face of growing geopolitical volatility. Current models involving tax credits are not necessarily the most efficient method to support companies, as fledgling climatetech companies often do not have the necessary income to offset credits and must seek out third-party investors to be part owners for monetization. However, at a bare minimum for financial allocators, research indicates that financial returns are not compromised by including high-scoring ESG companies in portfolios.³ These findings have been key drivers of growing venture investment globally, as well as significant increases in the number of venture rounds sized at \$25 million or more.

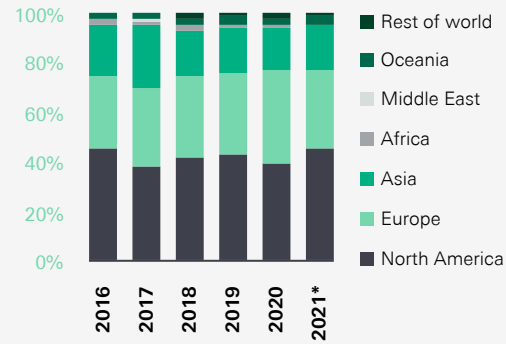
1: “Global Issuance of Sustainable Bonds Hits Record in 2021,” Reuters, Patturaja Murugaboopathy, December 23, 2021.
 2: “Companies Taking Action,” Science Based Targets, n.d., accessed January 25, 2021.
 3: “How Does Investing in ESG Companies Affect Returns?” Morningstar, Madison Sargis and Patrick Wang, February 19, 2020.

Share of climatetech VC deal count in top select verticals



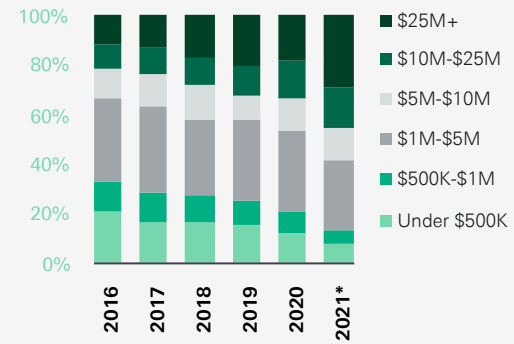
Source: PitchBook Geography: Global
*As of December 31, 2021

Share of climatetech VC deal count by region



Source: PitchBook Geography: Global
*As of December 31, 2021

Share of climatetech VC deal count by size



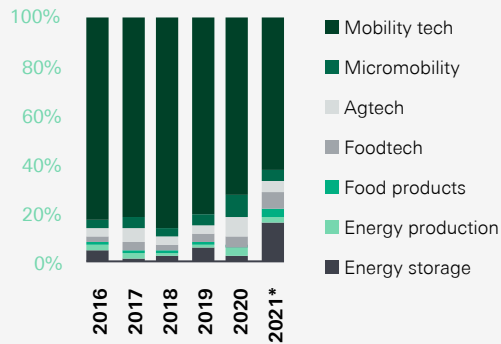
Source: PitchBook Geography: Global
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“Newer technologies and new applications of existing technologies, as well as the incorporation of different metals and novel processes, still need to mature and prove out for costs to be competitive and for scale to be achieved.”

Jorge Medina

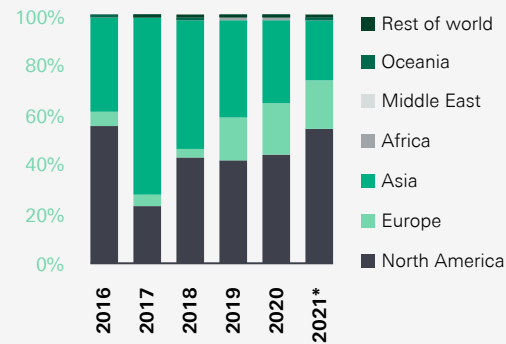
Partner, Co-leader of Pillsbury’s Renewable Energy Practice

Share of climatetech VC deal value in top select verticals



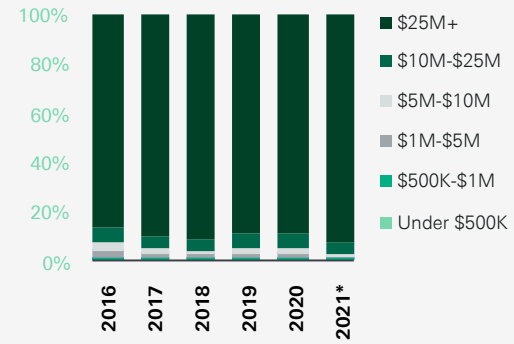
Source: PitchBook Geography: Global
*As of December 31, 2021

Share of climatetech VC deal value by region



Source: PitchBook Geography: Global
*As of December 31, 2021

Share of climatetech VC deal value by size



Source: PitchBook Geography: Global
*As of December 31, 2021

What shift in your own practice have you seen in terms of an increase in startups in this space that are trying to make a positive impact on climate change?

PEARSON: I work with clients in a wide array of technology industries but have noticed a heightened focus by entrepreneurs on climate change-related technologies in recent years. I think more people, particularly younger entrepreneurs, are looking for ways to make a positive difference on our planet and leverage technology to make the world a better place. Additionally, corporations are increasingly making strategic investments in new energy technologies as they look for ways to expand their environmental stewardship programs.



Christina Pearson
Partner, Head of Pillsbury's
Silicon Valley Corporate and
Securities Group

TEPLINSKY: It is a realization that we are not just heading toward a crisis, we are already in a crisis, and that there's very little time to avert irreversible disaster. We are seeing devastating effects, from wildfires in California and Australia, to floods on the Gulf Coast and across Asia, to mud slides in Brazil. People's lives and livelihoods are being significantly disturbed. We need policies and solutions today. Governments are responding, committing to fairly aggressive decarbonization targets, and large companies are doing the same—including in sectors that have traditionally been reluctant to do so, like oil and gas. Decarbonization is necessary, but it requires innovation in new technology, new deployment methods, and new materials.



Elina Teplinsky
Partner, Deputy Leader of
Pillsbury's Energy Industry Group

There is a newfound sense of urgency around the amount of investment that must happen, and investors and rating agencies are getting on board. The pressure to incorporate ESG frameworks is no longer just an altruistic thing; it's a practical thing.

Are there, either from an investor or a startup point of view, specific climate technologies that you are seeing start to gain some momentum in the marketplace?

PEARSON: I am seeing a little bit of everything from a technology perspective. There are many different ways to address climate change through technology, whether it's through alternative energy sources like solar and wind, renewable energy storage technology like flow



Jorge Medina
Partner, Co-leader of Pillsbury's
Renewable Energy Practice

batteries, AI technologies to monitor energy usage, or carbon capture projects, just to name a few. There is a lot of interest in this space, and I think that interest will continue for the foreseeable future.

MEDINA: In the battery space, the focus is on lithium ion. That's the more tested, tried-and-true technology. The issue is the limited amount of lithium and cell production that exists, and now with the advent of electric vehicles, there is a tug-and-pull effect as to where the cells go. There is competition for lithium, so the question becomes how do you expand the use of energy storage with those supply constraints?

What excites you most from an innovation perspective in the climatetech space?

PEARSON: I love the idea that entrepreneurs, investors, and corporations from all over the world are creating or investing in technologies that will help us solve our energy crisis. I am seeing U.S.-based strategic investors investing in foreign climatetech startups, and foreign investors investing in U.S.-based climatetech entrepreneurs. Climate change is a global issue, and knowing that these technologies are being pursued globally is exciting.

MEDINA: What is most exciting to me is how these advancing technologies—and the diminishing costs associated with them—create so much more opportunity to scale. We saw this happen with solar. For example, in 2010, residential solar systems cost in excess of \$10 per watt. Now, they cost as little as \$2 per watt just a decade or so later. Solar technology has gotten exponentially better as resources have been allocated to the space. Now, we are starting to see that same trend in other areas at a quicker pace, such as in the e-mobility and electric vehicle market.

TEPLINSKY: We are starting to see more pragmatic solutions to deep decarbonization. We have a lot of analysis done by reputable organizations, from the IEA to the IPCC, that have given us a roadmap to achieve deep decarbonization. These are not the areas where we still have a low technology readiness level, but rather spaces where we need cost reduction and new technology innovation. For example, we need to reduce the cost of electrolyzers, and we need new electrolyzer technology. I am excited to see industry participants investing in technologies that will have an impact on decarbonization.

Talk to us about the types of tax incentives available for investors and emerging growth companies.

MEDINA: Unlike most other countries, the U.S. supports energy policy at the federal level primarily through tax incentives. Wind and solar projects have taken advantage of these tax incentives for years, but we are seeing those same tax credit financing transactions in the broader market now that electric vehicles are maturing. Similarly, a new hydrogen production tax credit (PTC) that is being proposed as part of the Build Back Better legislation could help spur investment in hydrogen.

Ultimately, we predict there will be government policy that expands these credits, which will help more technologies scale. Some projects are going to work economically regardless of tax credits, but tax credits help expand the range of projects that can be economically viable. Understanding how tax credits work and the way deductions, depreciation, and so on fit into the economics is an important part of energy investment. We spend time with clients to help them understand those issues and how credits are monetized in the market.

TEPLINSKY: We are seeing two types of credits at the state level: Zero-Emissions Credits or Certificates (ZECs) and Renewable Energy Credits or Certificates (RECs). ZECs provide a credit to existing producers of clean energy for the environmentally sustainable attribute of that energy. RECs are credits that utilities are required to buy by legislation and can be traded, with the goal of adding renewable generation to the energy mix. At the federal level, you have production tax credits (PTCs) and investment tax credits (ITCs). PTCs are given for the production of clean electricity at facilities once they are in operation, while ITCs are provided to offset up-front capital investment costs.

From a macro policy perspective, which developments in regulations and legislation are you watching most closely right now?

TEPLINSKY: We are closely watching what various jurisdictions are doing with their hydrogen strategies, policies, and roadmaps. Some countries have national plans with a federal, top-down approach—setting specific targets for kilograms of hydrogen to be produced, hydrogen fueling stations to be installed, pipelines to be developed, and providing incentives to support these goals. Other governments are providing funding to research and development and backing demo projects. The U.S. is a good example of this. The U.S. does not currently have a national hydrogen roadmap. While the Department of Energy is now mandated by the 2021 Bipartisan Infrastructure Bill (BIL) to create one, the focus of the \$9.5 billion of hydrogen-related funding under the BIL is to develop hydrogen hubs and improve technological capability—getting companies to form commercial partnerships to bring real projects and infrastructure online, while also getting technologies that can reduce the cost of clean hydrogen to commercialization.

Exit trends

A recent and rapid rise in VC exits could portend good news for climatetech, but market volatility remains a factor to be monitored

The recent increase in climatetech venture investment worldwide has been striking. However, global venture-backed exit activity saw an even steeper increase than deal activity in terms of both volume and exit value. In 2019 and 2020, global exit value in climatetech reached \$19.2 billion and \$19 billion, respectively, across 17 and 25 exits. 2021 notched 58 completed exits worldwide for a mammoth tally of \$79 billion, outstripping any prior year with ease. When comparing the rate of increase in private investment with this jump in liquidity, we see that the rising tide of venture investment fueled a cohort of climatetech companies to sufficient maturity and success, allowing them to achieve liquidity. That said, these companies also capitalized on a historic market environment. 2021 posted many remarkable trends for public equities: The S&P 500 marked 68 consecutive all-time highs, the most in a single calendar year since 1995. Nearly the entirety

of the gargantuan aggregate in exit value was due to public listings (including SPACs and direct listings) in 2021. The same trend held true in 2019 and 2020 as well.

Looking at the array of companies that drove such record valuations, outlier debuts still exert a major impact on aggregate valuations, with Rivian's public listing of nearly \$12 billion in November 2021 yielding a majority of the aggregate. However, from there, a slew of other companies notched multibillion-dollar post-money valuations, such as electric vertical jetmaker Lilium and charging network ChargePoint. In fact, battery tech- and transportation-related companies predominate the largest debuts, which stands to reason given their almost immediately applicable commercial viability even in the face of significant incumbent challenges. Furthermore, much of the underlying tech for those two segments has enjoyed the most impressive advances over the 2010s. Nearly all the largest listings were SPACs, a nascent if roaring trend over the past two years that has come increasingly into question given the potential of greater regulatory scrutiny.

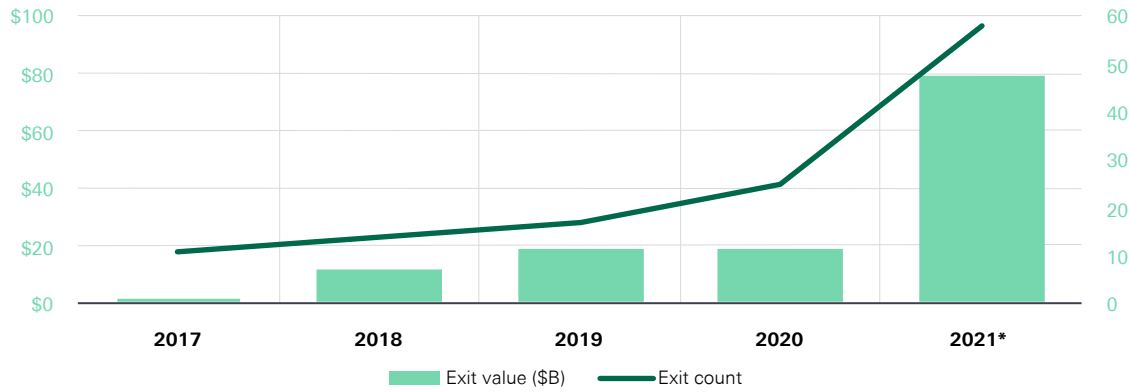
All that said, it is common in venture investment cycles for a period of years of heavy capital influx to precede a subsequent period of lucrative exits. Thus far, a uniquely favorable public market arena has helped fuel a slew of climatetech exits, but the volatility of public markets is well-known, especially just a couple months into 2022. Depending on how valuations in climatetech evolve given any markdown in public comparables, M&A by adjacent incumbent companies in transportation, industrial manufacturing, and other categories could occur. Technically, the bulk of climatetech acquisitions were through public pools of capital formed in the SPAC frenzy, which could turn out well or poorly for many investors, depending on these businesses' longer-term prospects. It remains to be seen whether this recent flood of liquidity ends up netting venture firms' significant sums to encourage similarly robust levels of investment.

“We are heading to an inflection point in the energy transition. Significant resources have been invested, which has allowed for the escalation of technologies to happen at a faster pace.”

Jorge Medina

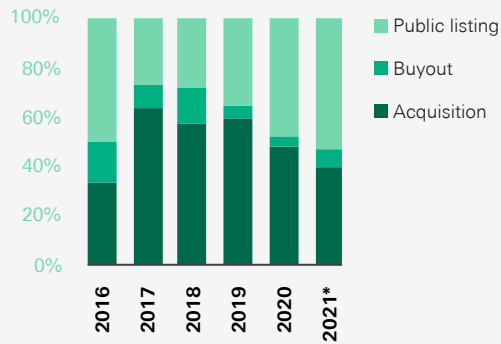
Partner, Co-leader of Pillsbury's Renewable Energy Practice

Climatetech VC exit activity



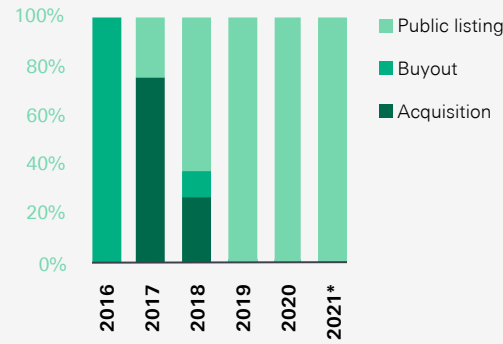
Source: PitchBook Geography: Global
*As of December 31, 2021

Share of climatetech VC exit count by type



Source: PitchBook Geography: Global
*As of December 31, 2021

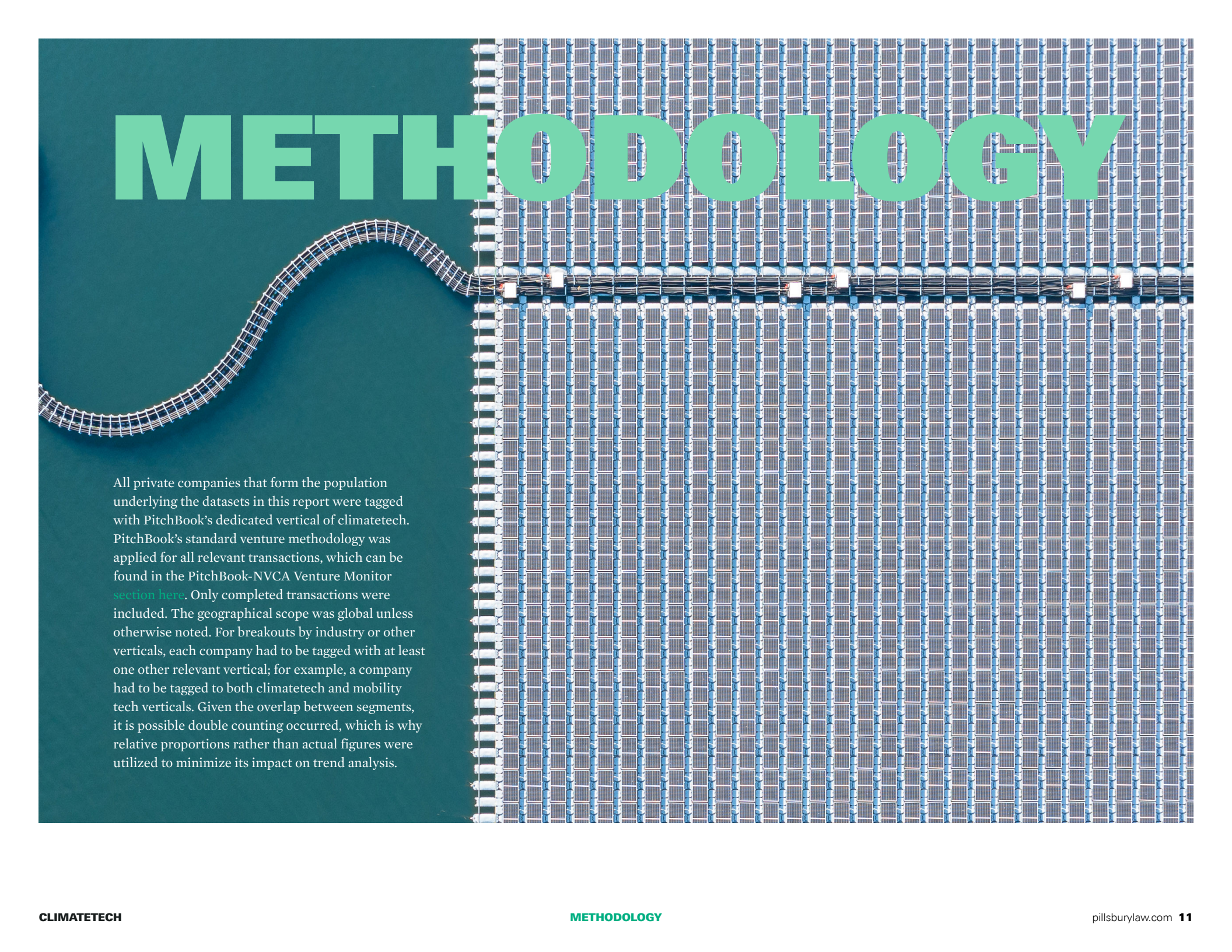
Share of climatetech VC exit value by type



Source: PitchBook Geography: Global
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Christina Pearson
Partner, Head of Pillsbury's Silicon Valley Corporate & Securities Group



METHODOLOGY

All private companies that form the population underlying the datasets in this report were tagged with PitchBook's dedicated vertical of climatetech. PitchBook's standard venture methodology was applied for all relevant transactions, which can be found in the PitchBook-NVCA Venture Monitor [section here](#). Only completed transactions were included. The geographical scope was global unless otherwise noted. For breakouts by industry or other verticals, each company had to be tagged with at least one other relevant vertical; for example, a company had to be tagged to both climatetech and mobility tech verticals. Given the overlap between segments, it is possible double counting occurred, which is why relative proportions rather than actual figures were utilized to minimize its impact on trend analysis.



ABOUT PILLSBURY

Pillsbury Winthrop Shaw Pittman LLP is an international law firm with a particular focus on the technology & media, energy, financial, and real estate & construction sectors. Recognized as one of the most innovative law firms by Financial Times and one of the top firms for client service by BTI Consulting, Pillsbury and its lawyers are highly regarded for their forward-thinking approach, their enthusiasm for collaborating across disciplines, and their authoritative commercial awareness.

Pillsbury's energy insights inform companies around the world and across industries as they evolve and adapt to the challenges of the energy transition. From advancing new technologies to developing strategies for established companies to meet decarbonization goals, we provide energy stakeholders with comprehensive guidance based on vast industry experience and a track record of innovation and success. Visit our [Energy industry page](#) to learn more about our capabilities.