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The geography of
climate tech

There can be no effective response to climate change without technology. We need technologies to help generate energy, produce food, manufacture goods, construct and operate buildings, and move people and materials—all while emitting few or no greenhouse gases or even removing greenhouse gases from the atmosphere. This imperative—and the commercial opportunity it represents—has contributed to a recent surge in investment in technologies for tackling climate change—at least US\$80 billion since 2021, according to Deloitte analysis based on Pitchbook and Deloitte GreenSpace Navigator data.

Enterprises, entrepreneurs, investors, and policymakers with an interest in climate tech would do well to familiarize themselves with the shifting geographic patterns of climate tech entrepreneurship and investment. Enterprises seeking to source a particular decarbonization technology, for instance, may wish to consider geographies that have fostered entrepreneurship and investment in that technology; information exchange and competition may enrich their options. Climate tech entrepreneurs and investors may want to consider where clusters of similar or complementary technologies are located as they make founding or investment decisions.

The United States has been a global leader in climate tech entrepreneurship and investment for at least twenty years. But the geography of climate tech is changing. In 2000-2004, just three countries—the United States, Canada, and China—accounted for two-thirds of climate tech company formations globally. In 2020-2023, a similar share of company formations spanned six countries. In 2000-2004, companies based in the United States received

76% of all climate tech investment while from 2020 to 2023, the amount declined to just under 50%. Today, eight countries together account for the majority of climate tech entrepreneurship and investment. But in recent years, activity in the rest of the world has accelerated (see **Figure 3**).

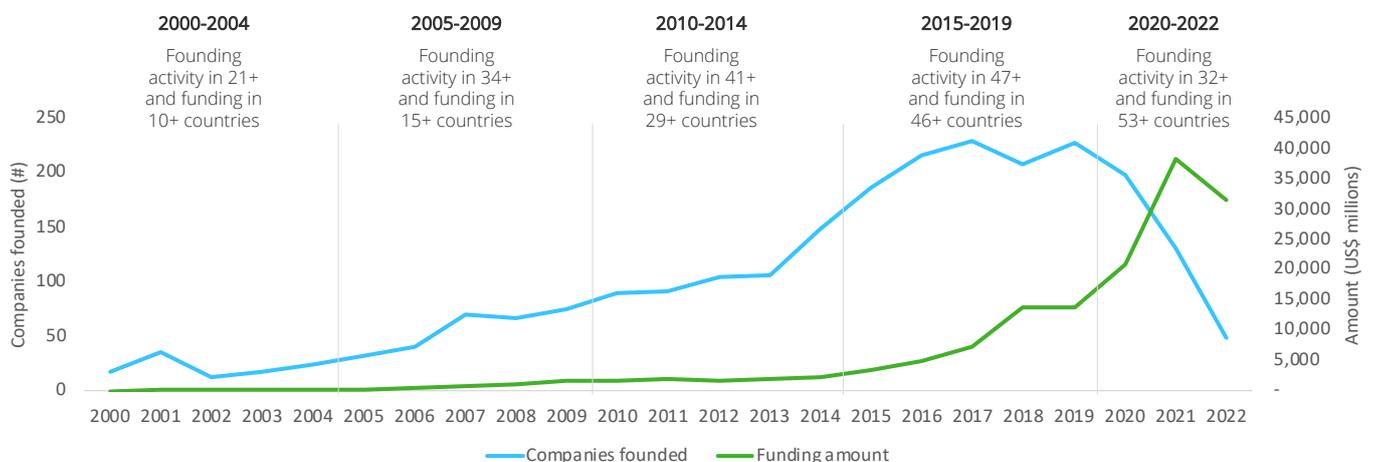
Look closely at global climate tech development and you will see clear patterns. Some climate tech categories, such as recycling and low-emission passenger road vehicles, are being commercialized in dozens of countries; others, such as agri-genomics and lower carbon emission pulp and paper manufacturing, are geographically concentrated. Some countries specialize in a handful of climate technologies; others have highly diverse climate tech landscapes.

The analysis presented here draws upon data on more than 2,600 climate tech companies around the world. For more information about how Deloitte conducted this research, including how we define “climate tech,” see **About this research** below.

Climate tech activity has surged in recent years

Climate tech entrepreneurship and investment have intensified in the last ten years. According to the data set, from 2000 to 2022, approximately 2,400 climate tech companies were founded, 9,000 funding deals were made, and US\$148 billion was invested, with activity picking up markedly after 2013 (see **Figure 1**).

Figure 1. World climate tech activity from 2000 to 2022



Note: Countries are unknown for select enterprises and funding

Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

Recently, due in part to the pandemic and economic and geopolitical challenges, climate tech activity has slowed; this is generally in line with wider startup founding and funding activity.¹ But investment in climate tech has not slowed as much as the market overall.² And new climate tech venture capital (VC) and private equity funds continue to be launched with billions of dollars ready to be deployed.³

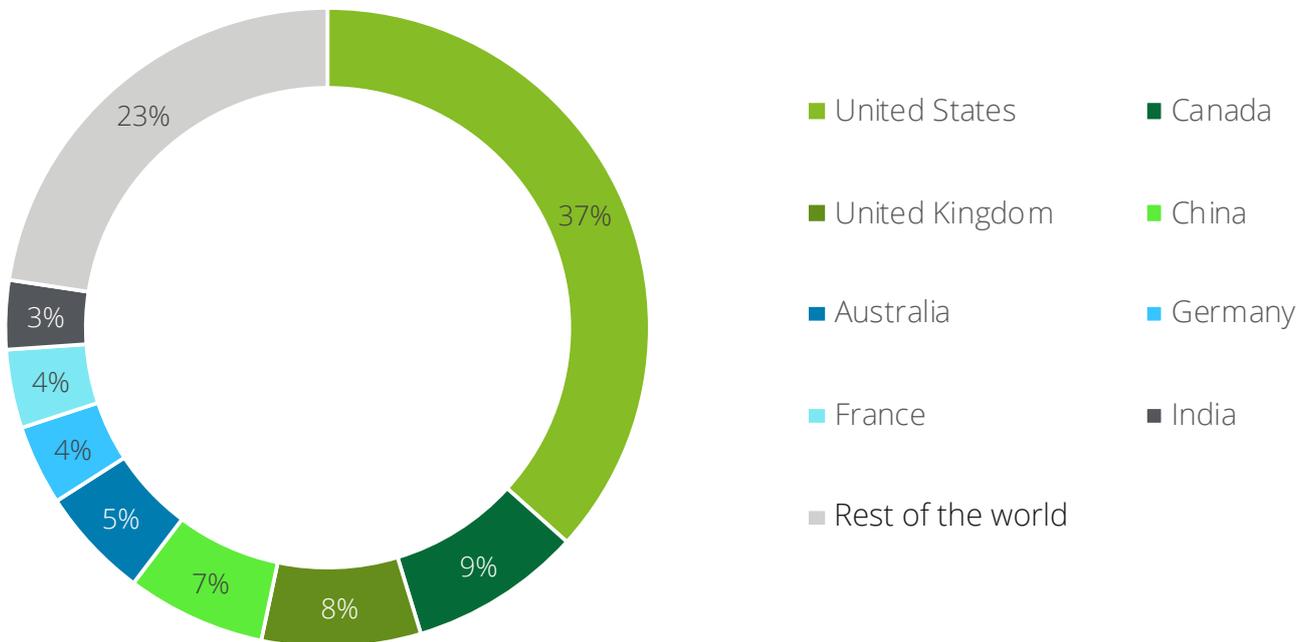
Eight countries lead

Climate tech entrepreneurship and investment appears to be a global phenomenon; Deloitte analysis shows that climate tech companies are established across more than 65 countries. But they are concentrated in eight countries whose economies are among some of the world's largest: Australia, Canada, China, France, Germany, India, the United Kingdom (UK), and the United States (US). The dominant eight have influence on the trajectory and velocity of climate tech development.

Collectively, they are the headquarters for approximately **three-fourths of global climate tech companies** (see **Figure 2**). Despite this geographic concentration, climate tech entrepreneurship is somewhat more distributed geographically than the market overall: a similar share of the corporate entities tracked by Pitchbook, a data provider, are headquartered in just six countries—Canada, France, Italy, Spain, the United Kingdom, and the United States. The geographic diversity of climate tech has increased over the last 20 years.

“The increasing geographic diversity of climate tech is a long-term trend.”

Figure 2. Percentage share of global climate tech companies by country



Note: Climate tech companies irrespective of the year of founding

Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

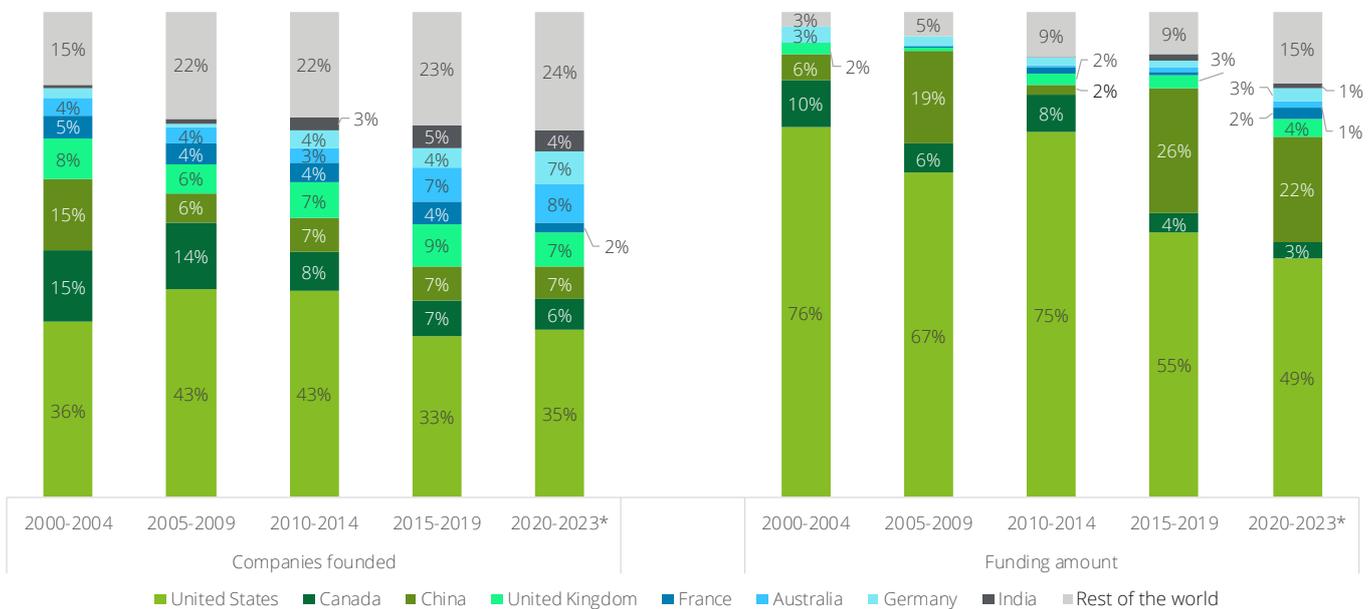
Geographic diversity is increasing

The United States is the center of climate tech entrepreneurship. It is home to more than one-third of all climate tech companies globally. And since 2000, US-based climate tech companies have received one and a half times the funding amount compared to climate tech companies in Australia, Canada, China, France, Germany, India, and the United Kingdom combined. But climate tech is diversifying geographically (see **Figure 3**). For instance, while the US share of the number of companies founded has declined slightly from 36% in 2000-2004 to 35% in 2020-2023, Germany's has risen from 2% to 7% and Australia's has doubled to 8%. US companies' share of investment slipped from 76% in 2000-2004 to 49% in 2020-2023 while that of Chinese companies grew from 6% to 22%. Activity in the rest of the world—countries beyond the dominant eight—is increasing rapidly. Their share of founding activity grew from 15% in 2000-2004 to 24% in 2020-2023 and their share of investment jumped from 3% to 15%. While eight countries, especially the United States, continue to dominate in company formation and investment, it appears that other markets have increasing appeal for investors who may be seeking lower valuations and the potential for higher returns.

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These trends match the “rise of the rest” in overall startup activity (beyond climate tech) that has been observed for some years now.⁴ In climate tech, the “rise of the rest” may also reflect the emergence of climate solutions developed for or adapted to local contexts. Localized solutions may be more functional and effective, according to one non-governmental organization.⁵ Consider, for example, an Indian innovator makes vegan leather using floral waste, preventing it from being deposited in and contaminating rivers,⁶ or an innovator enabling peer-to-peer power trading in rural Bangladesh, giving many their first access to power without involving a large central grid.⁷

Figure 3. Percentage share of global climate tech activity by year and country



*Until July 31, 2023

Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

Generalists and specialists

Just as a few countries lead in global climate tech entrepreneurship, some technologies dominate within each country (see Table 1). The top five technologies in each country account for at least a third of climate tech companies in that country.

Table 1. Top-five climate techs by percentage share of companies within dominant countries

United States	Recycling and waste management (9.4%)	Short-duration energy storage (7.5%)	Alternative proteins (7.2%)	Carbon capture, utilization, and sequestration (6.3%)	Long-duration energy storage (6.2%)	
Canada	Recycling and waste management (14.8%)	<i>Bioenergy (7.0%)</i>	Alternative proteins (6.6%)	Carbon capture, utilization, and sequestration (6.6%)	Electricity management in buildings (5.3%)	
United Kingdom	Recycling and waste management (15.1%)	Carbon capture, utilization, and sequestration (8.0%)	Passenger road vehicles (6.7%)	Long-duration energy storage (6.7%)	Alternative proteins (6.2%)	
China	Short-duration energy storage (41.7%)	Recycling and waste mgmt. (13.1%)	Passenger road vehicles (11.2%)	Long-duration energy storage (7.8%)	Solar (4.4%)	
Australia	Recycling and waste management (10.5%)	Electricity management in buildings (7.8%)	Passenger road vehicles (7.2%)	Electric vehicle charging (6.5%)	Long-duration energy storage (6.5%)	
France	Recycling and waste management (14.4%)	Short-duration energy storage (8.0%)	<i>Hydrogen production (8.0%)</i>	Passenger road vehicles (7.2%)	Long-duration energy storage (6.4%)	Alternative proteins (6.4%)
Germany	Passenger road vehicles (10.3%)	LDES (8.6%)	Electric vehicle charging (8.6%)	Recycling and waste mgmt. (7.8%)	Short-duration energy storage (7.8%)	
India	Passenger road vehicles (25.0%)	Recycling and waste management (13.0%)	Electric vehicle charging (11.0%)	<i>Commercial road vehicles (9.0%)</i>	Short-duration energy storage (6.0%)	Solar (6.0%)
Where the fifth and sixth technologies are tied for share of companies, both are shown.						

Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

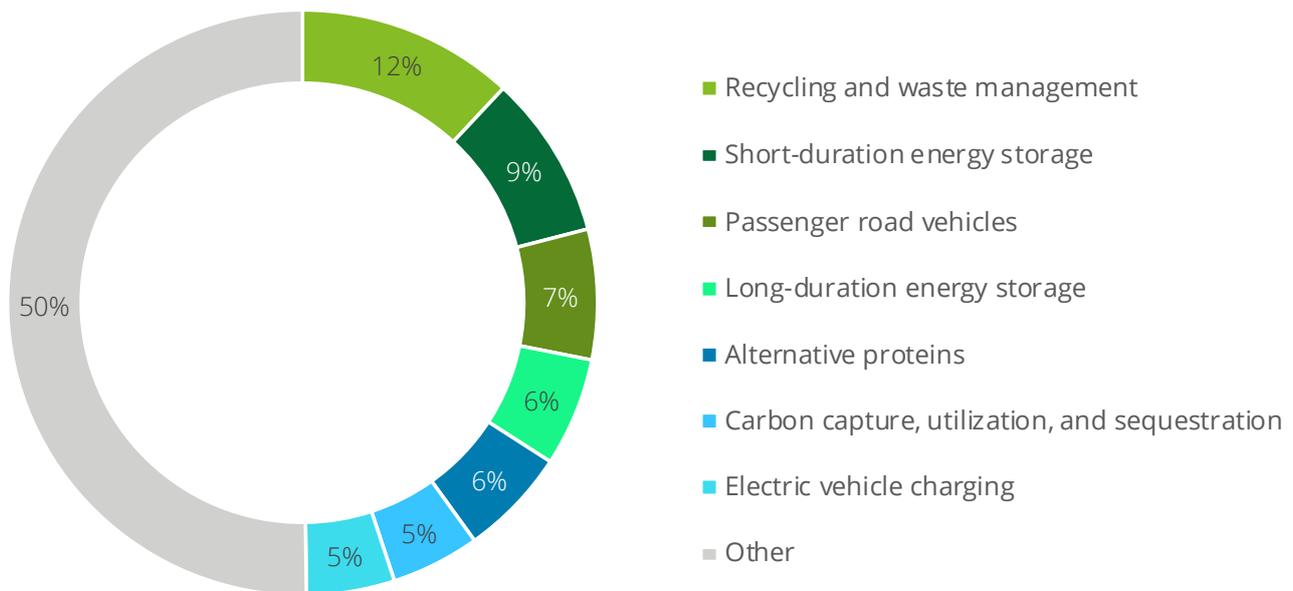
Looking at the top five climate technologies in each country reveals that some countries tend to specialize in a small number of key technologies, while others have a more diverse climate tech landscape. The United States and Australia are the most diversified, with the top five technologies accounting for less than two-fifths of all climate tech firms in these countries. In China and India, by contrast, the top technologies account for nearly three-fourths or more of climate tech entrepreneurship and cluster around the automotive sector, with road vehicles, electric vehicle (EV) charging, or short-duration energy storage (SDES) that includes varied lithium batteries. China and India are international automotive hubs; the sector contributes significantly to the economies of both countries.^{8,9} Solar is the other top-five climate tech common to both countries. This reflects China’s leading global position and India’s growing prominence as a producer of solar equipment.¹⁰

A few technologies are common among the dominant eight countries' top five (more on this below). But some technologies bubble to the top in just one country or another. Take bioenergy and hydrogen production. The fact that Canada has the highest per capita biomass, due to its forestry and agricultural resources, may have something to do with bioenergy being one of its leading climate tech categories.¹¹ It also has an established bioenergy industry with federal and state policies supporting biofuel production and use for at least 15 years.¹² France, meanwhile, formulated a national hydrogen plan in 2018 and views hydrogen production powered by its abundant nuclear capacity pivotal to achieving energy independence goals.¹³ Regional governments have also launched their own initiatives, with projects emerging since 2016.¹⁴ Large enterprises and national agencies have supported hydrogen innovation for several years and a value chain ecosystem has formed.¹⁵

Half of all climate tech companies are working on one of seven technologies

If you meet a climate tech CEO, their company is working in one of seven climate tech categories. Recycling and waste management, short-duration energy storage (SDES), passenger road vehicles, long-duration energy storage (LDES), and alternative proteins are some of the leading technologies globally, accounting for two-fifths of all climate tech companies. Carbon capture, utilization, and sequestration (CCUS) and EV charging appear to be the next most common (see **Figure 4**).

Figure 4. Percentage share of top technologies in climate tech companies worldwide



Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

Each of these seven technologies is widely distributed, with innovators located in two dozen or more countries across multiple continents. The focus on these technologies is likely a function of the opportunity they represent. Their wide geographic distribution is likely due to the diversity of approaches possible and their applicability in varied settings. For instance, recycling is possible for diverse products (e.g., batteries, electronics, plastic, and textiles) using varied techniques with applicability to several industries. Similarly, passenger road vehicles are not limited to lithium-ion battery electric cars but include fuel cell vehicles to micro-mobility e-bikes. Consumer behavior may also explain why recycling and passenger road vehicles along with complementary technologies of EV charging and SDES are as prominent. According to a Deloitte 2023 survey of more than 22,000 consumers across 23 countries, nearly one-half had purchased something sustainable. Being made of recycled or repurposed materials is one of the top attributes that buyers associate with sustainable offerings. In the survey, food and transport were the first and third-most common sustainable purchases.¹⁶

Megadeals drive funding surge

As noted above, VC investment broadly, and investment in climate tech specifically, has surged in recent years. And two-thirds of the funding since 2021 has come in megadeals of US\$100 million or greater compared to 58% from 2000 to 2020.¹⁷ In line with overall climate tech funding, climate tech megadeals have diversified geographically. Prior to 2021, mega rounds went to companies in 12 countries. From 2021 through 2023 they went to 19 countries (see **Table 2**). Megadeals tend to be viewed as validating technologies and markets.

Table 2. Contribution of megadeals in climate tech funding

	2000-2020	2021-2023*
Deal value: ≥US\$100 million		
Number of countries with deals	12	19
Number of companies with deals	74	125
Number of deals	147	161
Amount invested (US\$ billion)	45	53
Deal value: ≥US\$1,000 million		
Number of countries with deals	2	3
Number of companies with deals	6	6
Number of deals	9	8
Amount invested (US\$ billion)	13	16

* Until July 31, 2023

Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

From a tech point of view, since 2021, megadeals accounted for a disproportionate share of funding in five climate tech categories: passenger road vehicles, SDES, nuclear power, farming in vertical or controlled environments, and low greenhouse gas (GHG) farming inputs (see **Table 3**). Seventy percent of megadeals across these five climate techs are later-stage venture funding raised mainly to help support the expansion or establishment of commercial-scale production and continued product development.

Table 3. Megadeal funding details since 2021*

Technology	Megadeals share of total funds	Number of megadeals		Funds via megadeals US(\$B)	Highlights
		≥US\$100M	≥US\$1,00M		
Passenger road vehicles	90%	23	3	13.6	China and the United States led with eight and seven deals, respectively, and all US\$1 billion deals for lithium battery-powered four-wheeler makers. Australia, Croatia, Germany, India, and Sweden were other recipients.
Nuclear	85%	3	1	2.1	The United States received all the deals in this space, including a US\$1.8 billion deal for a nuclear fusion innovator, US\$162 million for another fusion player, and US\$152 million for a small modular reactor developer.
Short duration energy storage (SDES)	83%	36	3	14.7	China and the United States led with 19 and nine deals, respectively. Other recipients include France, Sweden, Taiwan (China), and the United Kingdom . The US\$1 billion+ deals went to China and Sweden. SDES deals are mainly for lithium-ion batteries with a few for solid-state and hydrogen fuel cell batteries.
Vertical or controlled environment farming	80%	5	-	1.2	The United States and Indonesia received three and two deals, respectively, for pesticide-free vertical farming and hi-tech aquaculture.
Low GHG farming inputs	71%	5	-	1.3	The United States received all deals in this space for bio-based crop yield enhancers.

* From January 1, 2021 to July 31, 2023

Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

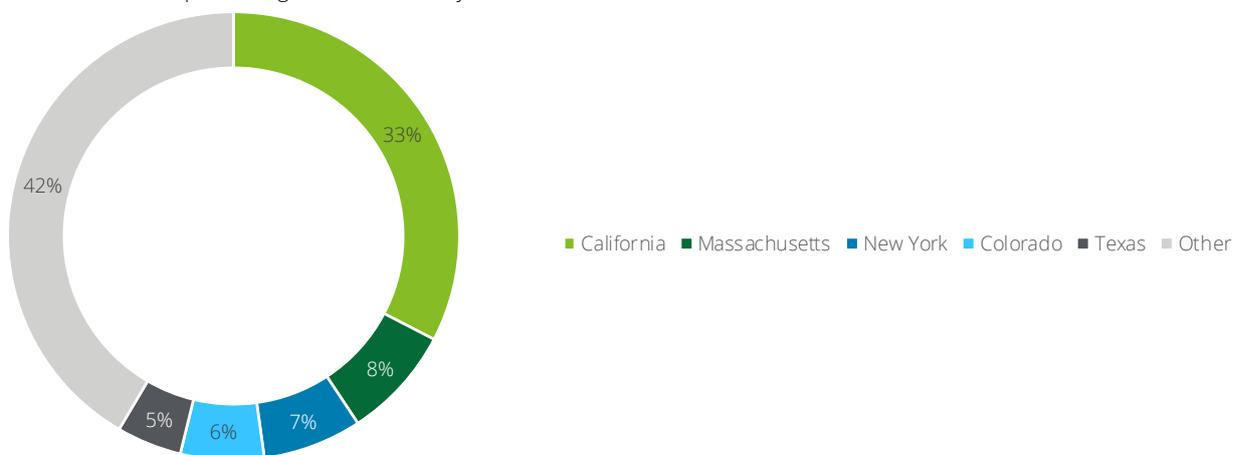
Notably, the megadeal activity includes countries other than the dominant eight: Croatia, Indonesia, and Sweden. The Croatian megadeal involved a company that makes electric “hypercars” and supplies EV technology to leading global automakers.¹⁸ In Indonesia, a sensor-controlled fish-feeding system received funding.¹⁹ Meanwhile, Sweden has had eight megadeals since 2021 covering not only passenger road vehicles and SDES, but also commercial road vehicles and steel. The country is home to innovators of 23 types of climate technologies. Government support, a history of academic research, inventor-favoring patent laws, and a vibrant auto industry promote green innovation here.²⁰

Within the United States, five states lead

Climate tech entrepreneurship in the United States is concentrated in five states. California, Colorado, Massachusetts, New York, and Texas account for more than one-half of the climate tech companies in the country (see **Figure 5**). This appears to be somewhat more concentrated than the wider market, where the top five states—California, Texas, and New York along with Florida and Illinois—account for 40% of all US company headquarters according to Pitchbook data

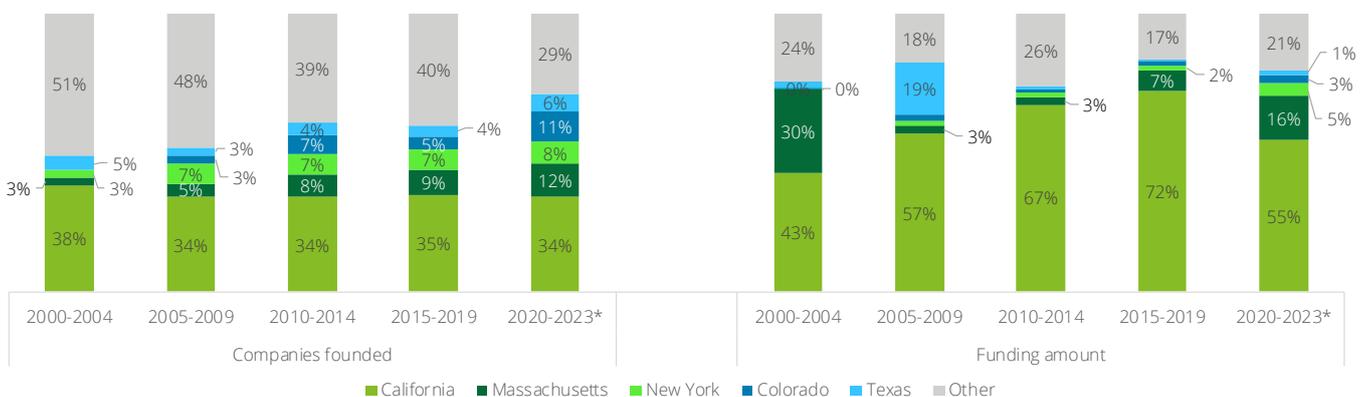
Figure 5. Percentage share of US climate tech companies

Source: Pitchbook, GreenSpace Navigator/Deloitte analysis



California has remained a leader by far in hosting climate tech company headquarters and garnering funding (see **Figure 6**). This mirrors the state’s entrepreneurial lead as home to 15% of US companies and the destination for 44% of US venture funding since 2000.²¹ California has had emissions-related policies since the 1960s.²² It funds climate action via one of the world’s largest carbon emissions trading systems (ETS) established in 2013, which requires utilities and other industrial organizations to purchase permits for their emissions, generating funds for climate projects.^{23,24} Furthermore, California has a strong talent base, with renowned universities and a well-established technology hub.²⁵ Since 2021, the state has accounted for 35 of the country’s 77 megadeals, covering nearly a dozen technologies—further highlighting California’s robust and diverse climate tech environment.

Figure 6. Percentage share of US climate tech activity by state and year



* Until July 31, 2023

Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

California, here we come

Though California leads, Massachusetts and Colorado are emerging as centers of climate tech entrepreneurship.²⁶ Each state's share of the number of climate tech companies founded has risen to 11%-12% since 2020, up from 0%-3% in 2000-2004. Both states have significant scientific research capabilities, qualified talent, and innovation supporting infrastructure. Massachusetts is home to several climate-focused investors and Colorado has a relatively business-friendly tax regime.²⁷ Both have also had climate-related policies for many years.²⁸ In terms of funding, since 2021, Massachusetts has drawn the second-highest number of megadeals in the United States—16 across 12 technologies. Colorado captured just three megadeals.

In terms of top technologies, the leading states in the United States have much in common with leading countries at the global scale, as well as some divergent characteristics (see **Table 4**). For instance, alternative proteins, CCUS, LDES, recycling and waste management, and SDES remain prominent globally and in the leading states. Alternative proteins, recycling and waste management, and SDES have also captured some of the highest number of megadeals in the country since 2021. Meanwhile, grid/energy management, while not a top-five climate tech worldwide or in the United States overall, appears to be significant across three US states. The United States supports grid modernization and smart grids via the Energy Independence and Security Act of 2007 and multibillion-dollar funding.²⁹

Table 4. Top-five climate techs by percentage share of companies within key US states

California	Alternative proteins (11%)	Carbon capture, utilization, and sequestration (7%)	Grid/energy management (7%)	Long-duration energy storage (7%)	Passenger road vehicles (7%)	Short-duration energy storage (7%)	
Colorado	Recycling and waste management (10%)	Grid/energy management (8%)	<i>Construction tech (6%)</i>	<i>Hydrogen production (6%)</i>	Alternative proteins (5%)	Carbon capture, utilization, and sequestration (5%)	Short-duration energy storage (5%)
Massachusetts	Long-duration energy storage (13%)	Recycling and waste management (9%)	Short-duration energy storage (9%)	<i>Hydro (9%)</i>	Alternative proteins (7%)	<i>Solar (7%)</i>	
New York	Recycling and waste management (12%)	Alternative proteins (12%)	Carbon capture, utilization, and sequestration (12%)	Long-duration energy storage (8%)	<i>Heating, ventilation, and cooling (8%)</i>		
Texas	Recycling and waste management (14%)	Short-duration energy storage (12%)	Passenger road vehicles (9%)	Carbon capture, utilization, and sequestration (7%)	Long-duration energy storage (7%)	<i>Electric vehicle charging (7%)</i>	Grid/energy management (7%)

Where multiple technologies are tied for share of companies, all are shown.

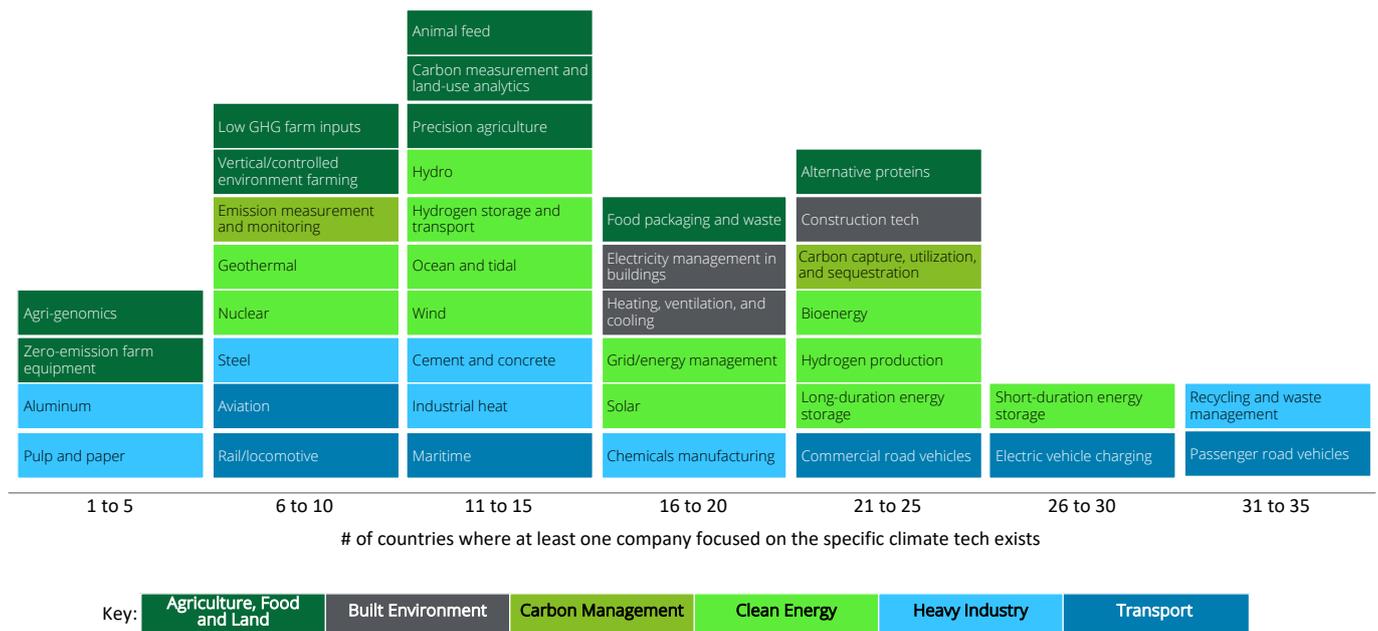
Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

Some standout technologies in these states include construction technology and hydrogen production in Colorado, hydro and solar in Massachusetts, heating, ventilation, and cooling (HVAC) in New York, and EV charging in Texas. Colorado hosts multiple startups focused on low-emission building materials and techniques such as three-dimensional (3D) printed and modular construction.³⁰ The state has also been supporting clean hydrogen, such as by working toward a multi-state hydrogen hub and passing a bill to help define and subsidize clean hydrogen.³¹ In Massachusetts, the Massachusetts Clean Energy Center (MassCEC) has supported the climate tech sector since 2009.³² From 2010 to 2020, MassCEC has provided US\$360 million in funds and attracted US\$2 billion of federal and private investments.³³ New York has multiple policies and incentives for building energy efficiency and HVAC, including supporting retrofits.³⁴ Texas has had an EV charging vendor ecosystem for more than a decade, along with financial incentives and guidelines for technology adoption.³⁵

The geography of climate tech and comparative advantage

The impact of climate change is global. Yet, climate tech entrepreneurship and investment are concentrated in eight countries, with the United States accounting for the biggest share. Climate tech innovation is occurring around the world, however, and as noted above, the share of activity occurring in the “rest of the world” seems to be growing. Some technology variants are being commercialized in dozens of countries (See **Figure 7**). Others are the object of special attention in certain countries. Such specialization may be the result of policy choices, comparative advantage, or some combination of the two.

Figure 7. Climate tech prevalence by number of countries



Source: Pitchbook, GreenSpace Navigator/Deloitte analysis

The increasing globalization of climate tech raises interesting questions about comparative advantage. Since the advent of commerce, production hubs have tended to emerge in various regions based on the economic comparative advantages of each region. Could climate change, and the responses to it, become a factor in comparative advantage? Some academics suggest that regional climate policies such as carbon taxes could make it so.³⁶ So could buyer preferences, whether driven by policy or not. For instance, steel production is currently dominated by China’s large, lower-cost coal-fired mills. But with global demand for green steel on the rise, US-based electricity-powered mini-mills may have an edge in certain markets.³⁷

In this context, countries in diverse regions such as South America, the Middle East, Africa, and East Asia are implementing policies to help encourage climate tech innovation, including the use of financial incentives.³⁸ Entrepreneurs can seek to benefit from these policies by developing novel solutions or adapting existing ones to local contexts. They could also collaborate with local academic and other research establishments to help gain access to intellectual property relevant to local markets. For funding beyond government aid, entrepreneurs can draw on climate-focused VC or private equity investments. Multiple such climate funds targeting specific regions, such as Africa, the Caribbeans, India, Latin America, and Southeast Asia have emerged.³⁹ For investors, climate innovators outside the more established regions could present untapped potential at relatively lower valuations. Investors can consider collaborating in areas such as opportunity identification and due diligence to help spread costs and mitigate risks.⁴⁰

Awareness of the geographic trends in climate tech can be useful for climate tech entrepreneurs, investors, enterprise buyers, and policymakers, whether they seek to exploit geographic comparative advantage or to shape it.

About this research

The analysis presented here draws on data on more than 2,600 climate tech companies compiled by GreenSpace Tech by Deloitte in a tool known as the GreenSpace Navigator (GSN) as of 25 August 2023. GSN data is continuously updated and currently includes information on nearly 3,000 innovators working on one or more of some 400 climate technologies across more than 40 technology categories. It covers announced investment deals completed from 1 January 2000 to 31 July 2023, and of type pre-seed/seed, early-stage VC, or later-stage VC. The investment data is from Pitchbook.

Although the data in GSN can never be exhaustive, it is rigorously vetted and classified, and broad enough to allow for directionally valid analysis of the type Deloitte presents here. Only companies offering technologies that help reduce or remove greenhouse gas emissions are included in the GSN database, and only those where climate tech is the sole or significant focus, in other words, accounting for at least 20% or more of process, production, or revenue, are included in this analysis. Most of the technologies in the database could be called “hard tech” that deals with atoms, rather than bits. For example, technologies for energy storage, carbon capture, or low-emissions cement manufacture are included; enterprise software for accounting and reporting on emissions, are not. Software that is used specifically to help operate or optimize hard tech assets is also included.

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GreenSpace Tech by Deloitte

GreenSpace Tech by Deloitte helps clients navigate the rapidly changing climate tech landscape and identifies opportunities for organizations to both decarbonize and help create a sustainable competitive advantage. The service is underpinned by a global research team and network of subject matter specialists; privileged access to the climate tech ecosystem via over 150 collaborations; and AI-powered research tools such as Deloitte’s proprietary GreenSpace Navigator, which helps to analyze and organize data from more than 18,000 sources to provide fast insight on a rapidly evolving market.

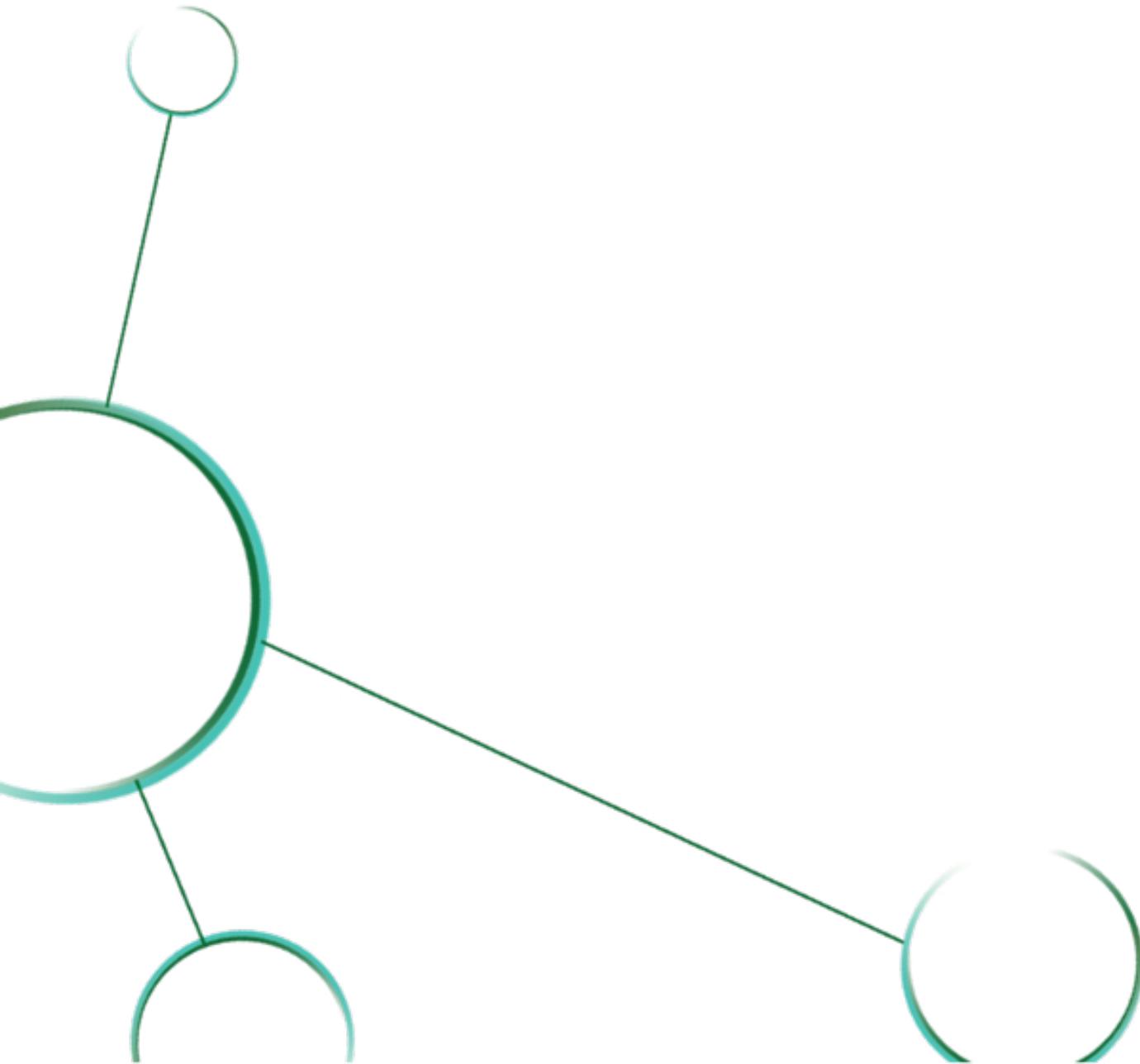
To learn more about GreenSpace Tech by Deloitte, [click here](#).

In GSN, each technology category comprises multiple technologies. For instance, the recycling and waste management category includes more than 20 technologies, from chemical recycling of plastic using depolymerization to multiple methods for recycling electric vehicle batteries. The analysis in this paper was done at the technology category level, though for simplicity, we refer here to tech categories simply as “technologies.”

Endnotes

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