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Published on January 20, 2025

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EMERGING TECH RESEARCH

AI in Climate Tech

2025 is a new high-water mark for VC deal value in AI-linked climate tech

PitchBook is a Morningstar company providing the most comprehensive, most accurate, and hard-to-find data for professionals doing business in the private markets.

Key takeaways

- **2025 saw record-high VC investment driven by megadeals.** In 2025, VC investment in AI-linked climate tech surged to a record $6.6 billion, up 59% from 2024, despite a lower deal count—304 versus 377 in 2024. This growth was fueled by a handful of large transactions, indicating increasing concentration of capital in fewer, late-stage deals.

- **Carbon tech applications led segment growth.** The carbon tech segment dominated with $2.6 billion in deal value, heavily influenced by Crusoe's investment, while other segments like built environment and industry trailed at $1.1 billion each.

- **AI integration in climate tech is diverse and multi-layered.** AI adoption spans a wide range of climate tech applications, from deeply embedded capabilities like geospatial analytics and energy optimization platforms to lighter integrations for process improvements in industrial workflows.

- **High-resolution datasets drive AI demand.** Segments reliant on granular, complex datasets—such as geospatial monitoring, weather forecasting, and power grid analytics—are leading AI adoption in climate tech. These use cases highlight AI's role in transforming raw data for risk management, asset monitoring and optimization, and predictive maintenance.

- **Low-carbon datacenter solutions are emerging.** As AI-driven workloads surge, datacenters' carbon footprint is projected to rise significantly. VC-backed startups are responding with innovations in cooling, energy management, and renewable integration, positioning datacenter decarbonization as a critical enabler for sustainable AI growth.

Overview

AI is increasingly becoming an enabler within the climate technology ecosystem. In this note, we focus on both VC-backed climate tech companies that embed AI directly into their core capabilities, and companies developing solutions that support low-carbon datacenter infrastructure, helping to decarbonize AI's adoption in other industries. While AI has been broadly applied across climate tech applications, this note excludes the mobility and foodtech verticals—for coverage of AI applications in these areas, see the relevant analyst workspaces.

Applying AI can bring deeper analysis of highly granular datasets, round-the-clock condition, output, and demand monitoring, and integration of multiple data sources, allowing companies and asset owners to optimize the performance of renewable assets and storage, improve grid integration, and enhance the planning and siting of solar and other clean-energy projects. The number of applications of AI in climate tech means the breadth of AI adoption across the space varies considerably. Some companies have AI deeply integrated into their value proposition, offering products or platforms that would not function without AI capabilities, such as automated geospatial analytics or AI-driven energy optimization software. Other companies integrate AI in a more limited way, using models to optimize individual processes within larger workflows—for example, to optimize industrial facilities. The companies highlighted in this note represent a range of companies with varying AI intensities, reflecting the diverse applications of AI throughout the climate tech space.

The climate tech space includes several segments that are seeing particularly strong AI adoption:

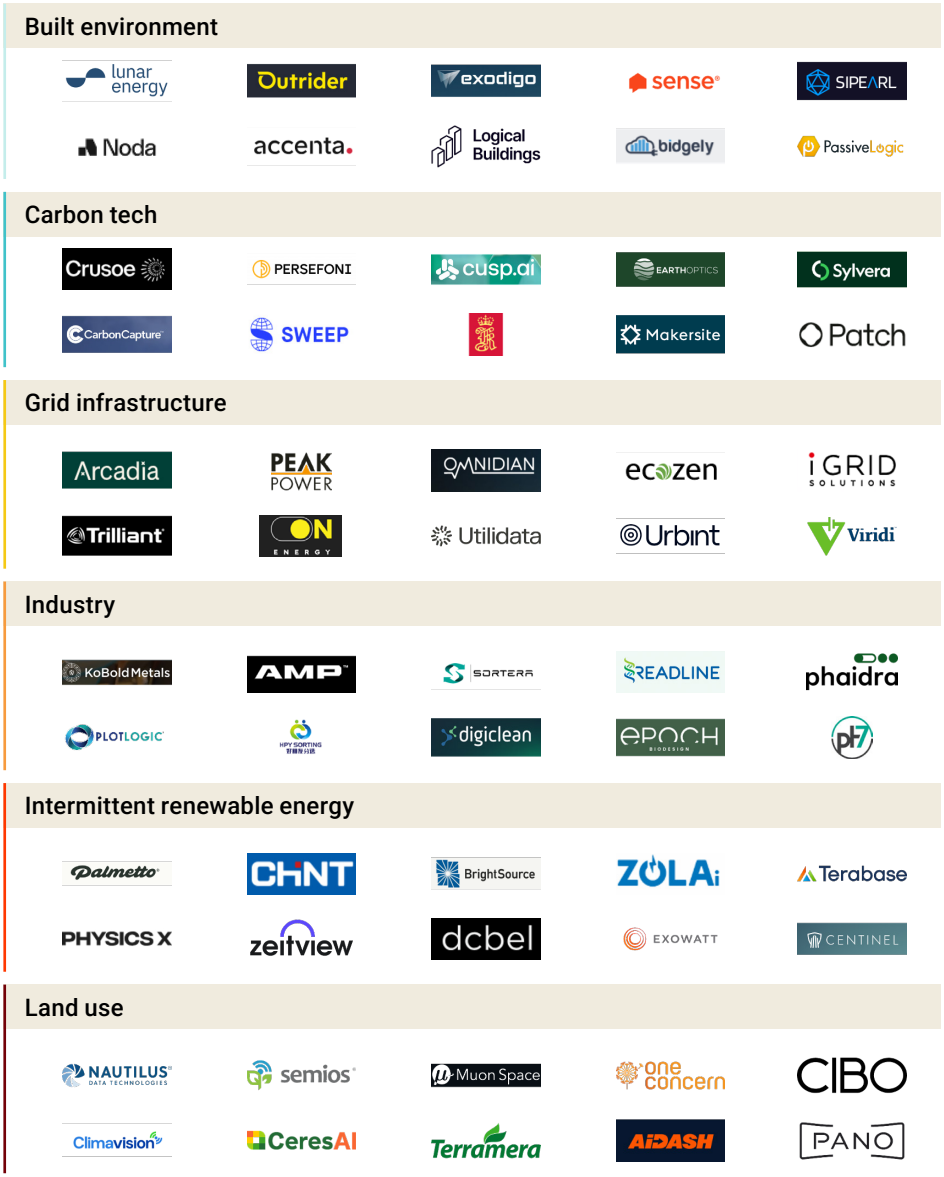
- **Geospatial monitoring**: Companies capturing and interpreting high-granularity spatial datasets covering broad areas. They use technologies like satellite, aerial, or drone imaging, sometimes incorporating hyperspectral data, and other remote-sensing inputs, including ground-based sensing. AI is being applied to these datasets to perform data processing and analysis to monitor wildfire risk, drought and flood conditions, land degradation, or plant health in forestry, conservation, or natural resource management. Some also have dual-use applications in areas such as environmental security or defense.

- **Weather forecasting and analytics**: Startups advancing localized or high-resolution weather prediction models, using AI to anticipate conditions that could affect physical assets. These tools increasingly underpin risk products, including parametric insurance, where accurate and timely data is critical.

- **Energy system and energy asset monitoring**: AI is widely used to process time-series data from energy-consumption devices, distributed energy resources, grid infrastructure, and storage systems. This ranges from utility-scale hardware to household-level sensors, providing real-time insights and responses, anomaly detection, and predictive maintenance.

While many companies in the space remain primarily software-focused, hardware-focused segments—such as renewable energy systems, energy storage technologies, and industrial equipment—are also integrating AI to improve efficiency. As cross-industry AI adoption grows, the climate tech landscape is also expanding to include companies focused on reducing the carbon footprint of AI itself. Datacenters currently account for about 0.5% of the total emissions from fuel combustion and are on track to account for 1% of emissions from fuel combustion by 2030, or 3% of emissions from electricity generation.[1] These solutions include end-to-end low-carbon datacenter design, in addition to specific improved cooling and energy-management technologies, and the integration of renewable power and storage to support AI use.

AI climate tech market map



Note: This market map contains key climate tech segments adopting or supporting AI, excluding segments with fewer than 50 companies. PitchBook subscribers can access the complete market map on the PitchBook Platform.

1: "Energy and AI: World Energy Outlook Special Report," International Energy Agency, April 10, 2025.

VC deal activity

Overall VC deal activity

In 2025, VC investment in AI-linked climate tech saw strong growth driven by several large transactions, reaching a record $6.6 billion as of December 15. Even without deals from the last two weeks of December, this represents a 59% increase over full-year 2024 deal value. From a quarterly deal value perspective, the largest quarter on record is Q4 2025, buoyed by four megadeals exceeding $100 million, including Crusoe's $1.4 billion Series E, KoBold Metals' $163.4 million Series C,[2] Valar Atomics' $130 million early-stage VC, and Exowatt's $120 million Series A1. VC investment in climate tech companies that leverage or support AI has changed significantly over the past decade, reflecting the emergence of AI and its gradual adoption in new sectors. After a slow start, with deal values below $1 billion prior to 2020, the market grew from $0.9 billion in 2019 to $5.1 billion in 2022. However, this momentum stalled in 2023, with annual deal value remaining flat before dropping 19.9% to $4.1 billion in 2024. Quarterly patterns have been volatile, reflecting the relatively small number of companies in this niche—the presence or absence of even one megadeal in any given quarter has a substantial impact on the deal value seen that quarter.

Deal count trends have been somewhat more stable in recent years. From 2017's 86 deals in the space, activity climbed steadily to 347 deals in 2021 and peaked at 377 in 2024, with minimal fluctuation from 2021 to 2024. By December 15, 2025, deal count for the year reached 304—slightly lower than the previous four years. With a record-high deal value but a lower deal count, this means deal value is more concentrated in fewer, larger deals compared with previous years.

Median VC deal value in the space has grown from $1.7 million in 2017 to $7.1 million in 2025. This is higher than the median deal value for the carbon & emissions tech space, which peaked at $5.5 million in 2025, but lower than the 2025 median deal size for clean energy technologies, which peaked at $8.2 million (both as of September 30, 2025). Looking at median pre-money valuations in the space, 2025's median is $26.8 million, similar to that of the carbon & emissions tech and clean energy spaces, which saw medians of $23.4 million and $25.3 million as of the end of Q3 2025, respectively.

Region and deal-stage trends

North America has consistently dominated VC deal value in AI-driven climate tech, accounting for the largest share in every year since 2017—except 2023, when Europe briefly led with $2.8 billion in VC deal value compared with North America's $2 billion. North America's share has ranged from 84.5% in 2017 to 39.6% in 2023, averaging 66.7% over the 2017-2025 period. Europe has maintained the second position throughout (aside from 2023), while Asia is the only other region that has exceeded 10% of the overall deal value in a given year, which was the case in 2021 and 2022.

2: In January 2026, KoBold Metals raised additional funding, bringing this round up to $280 million.

Looking at VC deal value by deal stage, late-stage VC has historically driven the majority of deal value, averaging 48.8% annually since 2017. Exceptions occurred in 2021, when venture-growth deals took the lead, and in 2023, when early-stage VC deal value slightly exceeded late stage by 1.3%.

Segment breakdown

Within climate tech segments incorporating AI, the carbon tech segment has been significantly larger in the past 12 months, with a trailing 12-month (TTM) deal value of $2.6 billion—more than double the next-largest segments, built environment and industry, each at $1.1 billion. Crusoe's $1.4 billion Series E in Q4 2025, however, is a major contributor to carbon tech's dominance, accounting for more than half of the segment's deal value; even without this deal though, the segment is still the largest by a small margin.

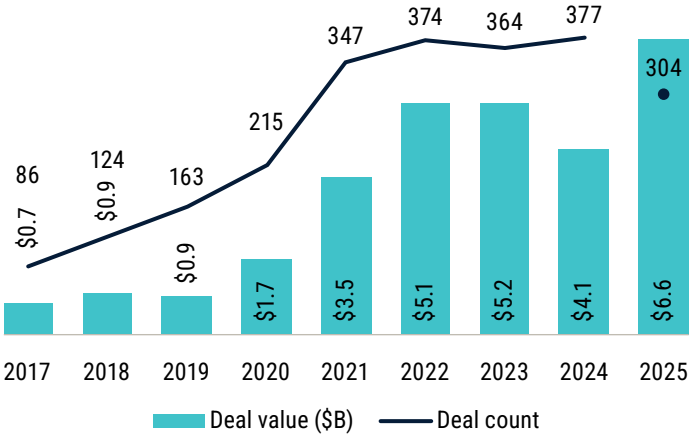
Adoption of AI across subsectors is uneven, with six of the eight segments we map in the climate tech space having TTM deal values above $500 million, while the dispatchable energy sources and clean fuels segments remain below that threshold. The dispatchable energy sources segment, though, is relatively small from a company count perspective, and most of the deal value for the space comes from large investments aiming to develop and commercialize small modular reactors, next-generation nuclear reactors, or geothermal energy, or to develop nuclear fusion technologies. While relatively few companies in this category are incorporating AI into their technologies, the technologies that are being developed are widely considered to be the answer to the problem of growing energy consumption from datacenters and are seen as key components in future AI ecosystems.

Top deals and investors

2025 has been marked by several landmark transactions. Other than Crusoe's Q4 funding, KoBold Metals raised a $537 million Series C and Fermi raised $350 million in Series C funding. Crusoe and Fermi are both focused on developing low-carbon datacenters to meet demand from AI growth, while KoBold Metals has two deals in the top five for 2025 to develop its AI-enabled subsurface resource detection technology.

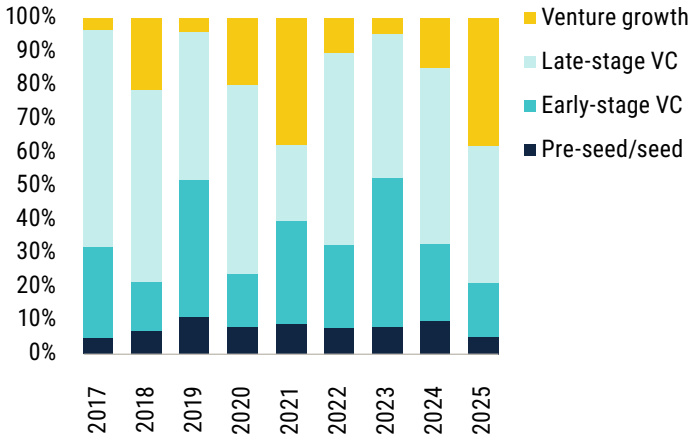
Investment activity is concentrated among a few prolific investors—33 VC and corporate VC (CVC) firms have participated in more than 10 deals since 2019. Climate Capital leads with 60 deals, while MCJ and Lowercarbon Capital follow closely with 35 deals each.

AI climate tech VC deal activity



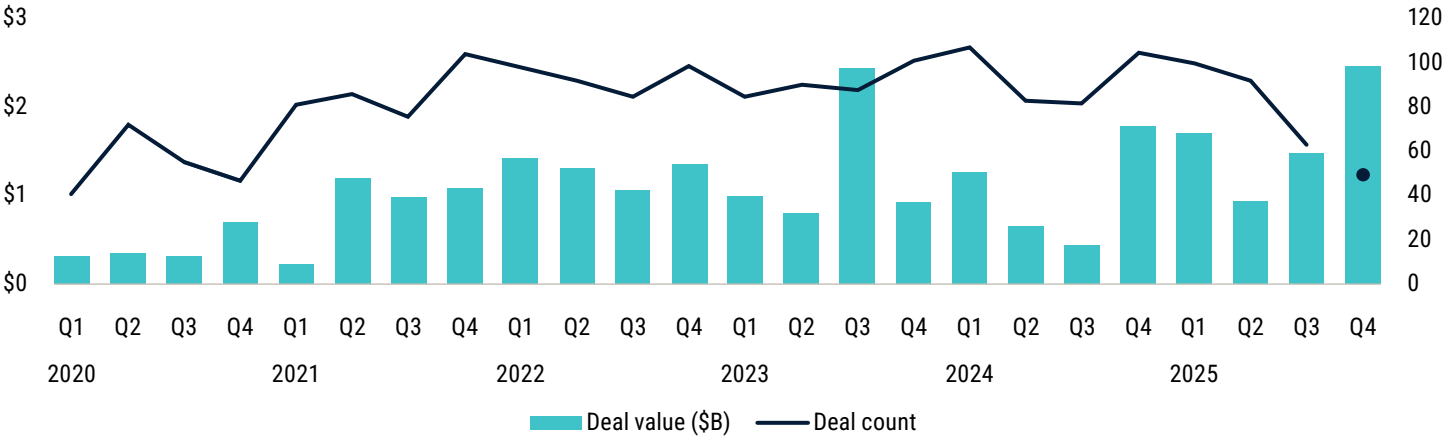
Source: PitchBook • Geography: Global • As of December 15, 2025

Share of AI climate tech VC deal value by stage



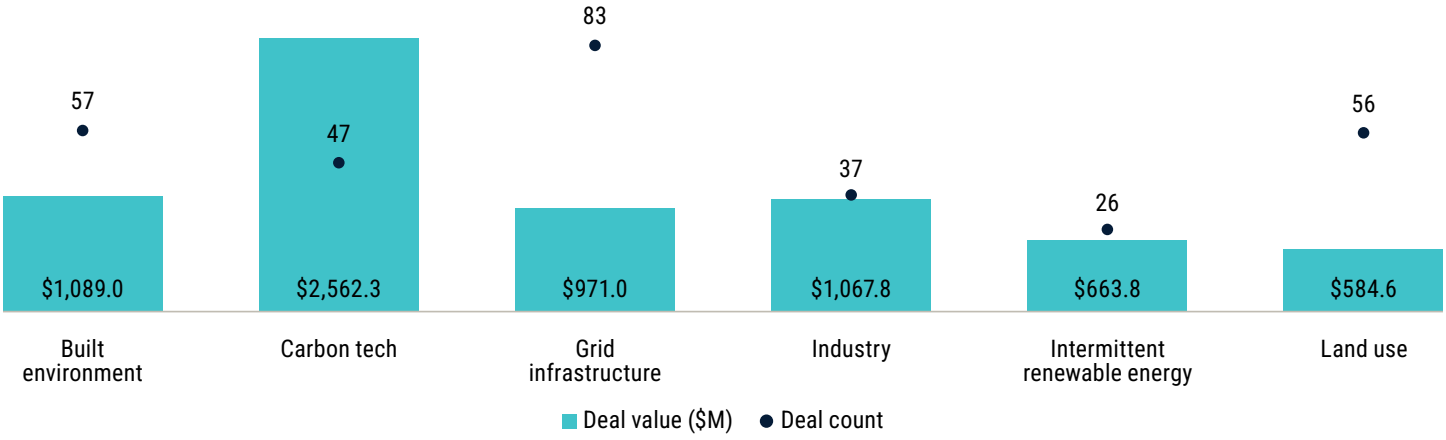
Source: PitchBook • Geography: Global • As of December 15, 2025

AI climate tech VC deal activity by quarter



Source: PitchBook • Geography: Global • As of December 15, 2025

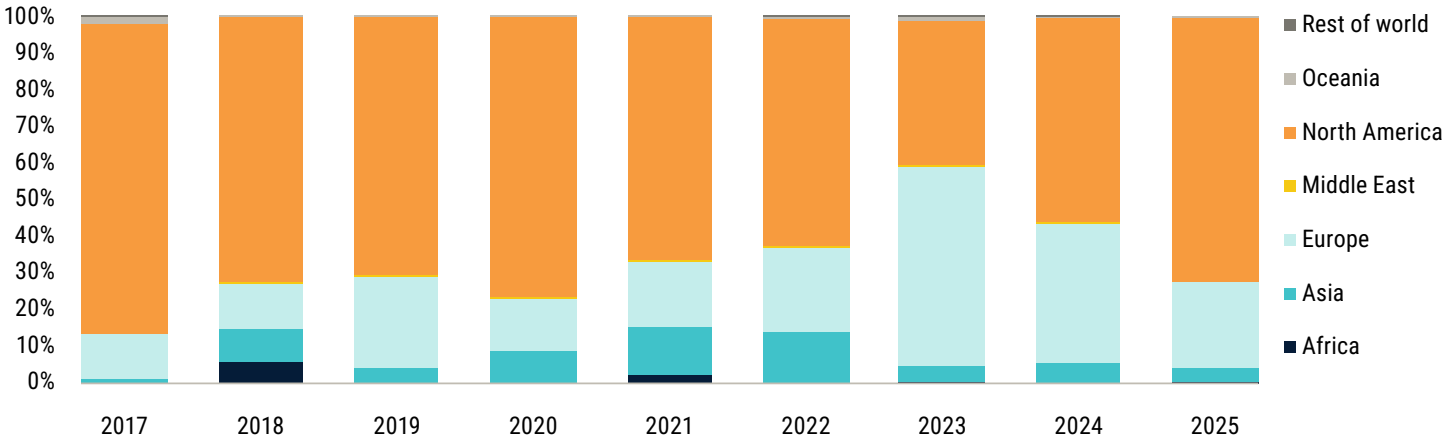
TTM AI climate tech VC deal activity by segment



Source: PitchBook • Geography: Global • As of December 15, 2025

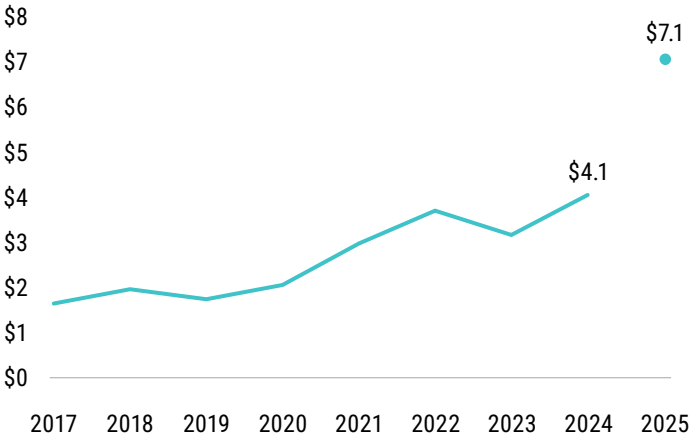
Note: Only segments with over $500 million in TTM VC deal value are included.

Share of AI climate tech VC deal value by region



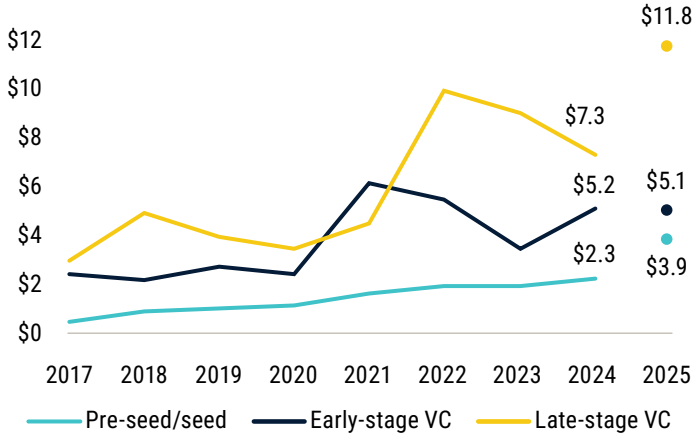
Source: PitchBook • Geography: Global • As of December 15, 2025

Median AI climate tech VC deal value ($M)



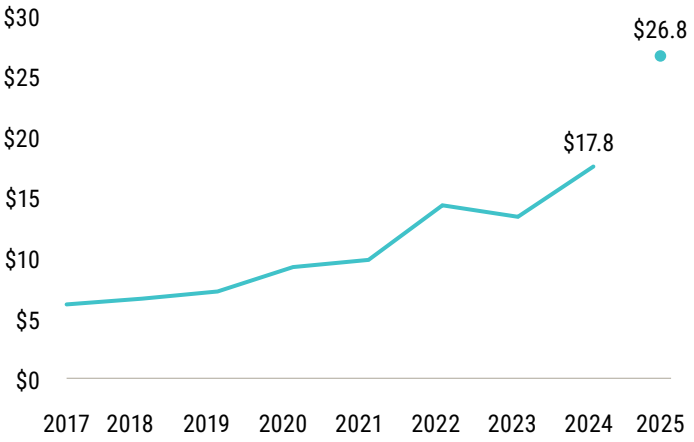
Source: PitchBook • Geography: Global • As of December 15, 2025

Median AI climate tech VC deal value ($M) by stage



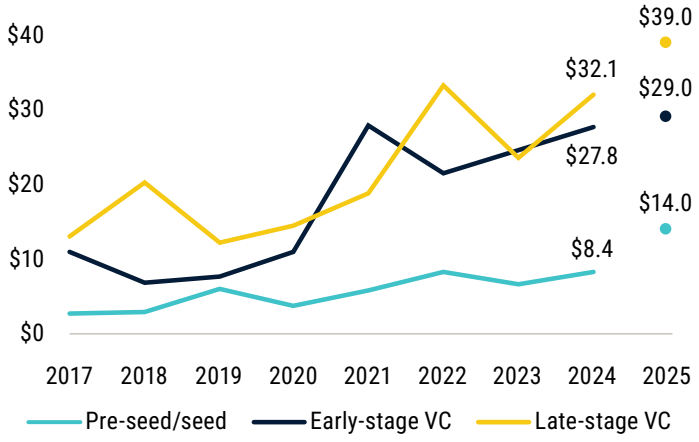
Source: PitchBook • Geography: Global • As of December 15, 2025
Note: Venture growth was excluded due to low data count.

Median AI climate tech pre-money valuation ($M)



Source: PitchBook • Geography: Global • As of December 15, 2025

Median AI climate tech pre-money valuation ($M) by stage



Source: PitchBook • Geography: Global • As of December 15, 2025
Note: Venture growth was excluded due to low data count.

Top VC investors in AI climate tech VC companies since 2019

Investor	Investor type	Early-stage VC	Late-stage VC	Pre-seed/seed	Venture growth	Total deal count
Climate Capital	VC	21	10	27	2	60
MCJ	VC	13	7	12	3	35
Lowercarbon Capital	VC	11	11	12	1	35
Energy Impact Partners	VC	3	19	2	5	29
Alumni Ventures	VC	4	14	6	3	27
Congruent Ventures	VC	7	10	7	1	25
Antler	VC	4	3	15	0	22
True Ventures	VC	5	6	9	1	21
Speedinvest	VC	4	4	11	0	19
National Grid Partners	VC	4	12	2	0	18
Powerhouse Ventures	VC	4	2	12	0	18
Shell Ventures	CVC	1	13	0	3	17
Pale blue dot	VC	4	1	12	0	17
Blue Bear Capital	VC	1	11	4	0	16
DCVC	VC	6	4	5	1	16
Salesforce Ventures	VC	5	7	1	2	15
Union Square Ventures	VC	5	6	2	2	15
Future Energy Ventures	VC	3	10	1	1	15
Collaborative Fund	VC	4	3	7	0	14

Source: PitchBook • Geography: Global • As of December 15, 2025

Key segments adopting AI

The climate technology landscape encompasses a broad spectrum of solutions, many of which can be enhanced through the integration of AI. While AI can provide value across nearly all segments of climate tech, certain applications are particularly well suited due to their dependence on high-resolution data, complex operating environments, and the need for predictive or real-time management and optimization. Some of the most prominent opportunities for AI integration are expanded on below, though other use cases have also seen strong use of AI, including:

- **Green mining**: Where AI can support subsurface mineral detection, with further applications in geothermal and oil & gas exploration.
- **Water technologies**: Used for management systems and leak detection.
- **Green construction**: Supports the design of thermally efficient buildings.
- **Carbon markets**: Used to improve monitoring, reporting, and verification through aerial and satellite monitoring and analytics.
- **Recycling analytics**: For AI-enhanced waste stream identification and sorting.

Carbon accounting

Applications in the space. Companies in the carbon accounting space provide solutions for both corporate and individual use cases, and are incorporating AI into their value chains in several ways. Using AI as an interface to allow users to query the carbon accounting platform allows them to view details of their emissions profile, including the factors that contribute most heavily toward their overall emissions profile. Using this information, the carbon accounting platform can also give bespoke advice about adjusting processes to reduce carbon emissions and potentially identify any discrepancies in emissions reporting that could be caused by errors in measurement or problems in value chains. Platforms can also use AI to view emissions data, converting raw data into more accessible dashboards, and potentially report data to other entities.

AI benefits. Although AI applications come with their own carbon footprint due to their energy consumption, AI can also allow more in-depth analysis and reporting of companies' carbon footprints—in some cases, the carbon footprint of carbon accounting activities can be included within Scope 3 emissions calculations. Core benefits of AI for carbon accounting mostly center around automation of data capture and integration—which involves integrating datasets from a wide range of sources that are sometimes very time-consuming to access—and the creation of dashboards containing analysis of this data. These dashboards can simplify carbon accounting for nontechnical internal stakeholders and potentially generate reports for C-suite and

board-level employees. Since carbon accounting often relies in part on questionnaires for data capture, automating these can result in significant timesaving where possible. Furthermore, by automating data capture for carbon accounting, real-time or higher-frequency data capture becomes possible, providing a clearer picture of the company's carbon profile.

Key startups. Persefoni is one of the largest AI-enabled carbon accounting platforms in the VC-backed ecosystem, focusing on corporate and financial services carbon accounting. The company offers two different access plans, both of which include AI integration for anomaly detection and for analysis and querying of data. The company is also developing natural language-based emissions factor mapping, and raised $101 million in Series B funding in October 2021, followed by a more recent $52.7 million in Series C1 funding in January 2024. Sweep incorporates AI into its carbon accounting platform, with similar aims in mind, to simplify carbon accounting processes for nontechnical users and enable faster, more granular data capture. The company's largest VC funding round was its $71.3 million Series B from April 2022, though it also raised further VC funding in 2024.

Building energy efficiency

Applications in the space. Improving the energy efficiency of buildings can focus on several target segments, including residential and commercial & industrial buildings. Building energy monitoring and management systems are used throughout the built environment, and developers are increasingly adding AI capabilities to improve coverage or for optimization. These systems are also commonly used to integrate and optimize local solar energy generation and energy storage technologies, and AI can be used to optimize the use of this hardware and potentially also optimize buildings' connection to power grids. Outside of incorporating AI into building energy systems, building energy management is also being incorporated into datacenters, supporting the expansion of AI by reducing both carbon emissions and energy costs. Since operational costs for datacenters are dominated by energy usage and heat management, increasing the efficiency of the datacenter built environment is key to increasing profitability for datacenter owners.

AI benefits. For building energy management systems, AI's key benefit is automating management of energy usage while incorporating real-time data, potentially learning usage patterns to either suggest changes that can reduce energy usage and costs or to directly control hardware to make these changes automatically. Without AI capabilities, management systems are somewhat limited to relatively simple rules and schedules, which may function well during periods of typical usage, but are less optimal during unusual and hard-to-predict use. AI can also be useful for generating dashboards to report on building energy use and suggesting changes that cannot be directly controlled by the energy management system—although, these can be generated to some extent by systems that are not AI-enabled. AI can also act as a monitoring system for anomalies and maintenance cases by detecting hardware that is performing outside of its typical range, potentially allowing predictive maintenance that reduces costs and downtime relative to conventional maintenance.

Key startups. Energy-efficient datacenter developers such as Fermi are among the startups that have raised the most VC funding, driven by surging demand for datacenters and the availability of low-cost energy sources like solar and wind to provide energy. Fermi raised $350 million in Series C funding in August 2025—one of the largest rounds in the segment—before its IPO in October 2025. GridPoint develops building energy management technologies, using multiple automated processes to optimize building energy usage and monitor physical assets down to the appliance level, while also allowing participation in demand response mechanisms and cost-saving scheduling. The company raised $45 million in Series C1 funding in March 2025, following a $75 million Series C in March 2022.

Power grid analytics and management

Applications in the space. VC-backed power grid management technology companies are adopting AI for multiple reasons, including managing the integration of renewables into power grids, forecasting energy demand, and predictive maintenance. Grid-connected battery energy storage system developers are also adopting AI to manage and optimize usage of their battery systems, controlling when to charge and discharge to either maximize revenue, most effectively balance power grids, or ensure business continuity. Predictive maintenance is increasingly being applied to solar and wind installations, which cover large areas and consist of many individual energy generation units that can wear and require maintenance at differential rates. Additionally, many solar and wind installations are now starting to approach the end of their life, making maintenance increasingly important.

AI benefits. One of the core benefits of AI for power grid management is data analysis of the large datasets used in the space. As intermittent renewable energy sources like solar and wind account for larger percentages of the overall power mix, the need to monitor and forecast power generation becomes more critical. The factors behind this are highly complex, incorporating granular weather and climate data over large geographical areas. In addition to forecasting power generated by renewable energy sources, load forecasting is important for power grid management regardless of the percentage of renewables in the overall mix. As with renewable energy generation forecasting, load forecasting requires analysis of multiple large and granular datasets, including historical energy usage data, local weather patterns, economic data, and data concerning calendar events.

Key startups. Peak Power develops and offers energy and battery management and optimization technology aimed at commercial & industrial use cases, incorporating AI to predict grid peak events and allowing users to reduce their power consumption during these times or use battery energy storage systems. Peak Power has raised multiple rounds of VC funding, including $35 million in Series A funding in 2023 and further Series B funding in April 2025, as well as $200 million in debt financing in 2023. Utilidata produces AI modules that can be integrated into electricity meters and other grid edge devices to manage their use and to provide real-time data on energy usage and hardware health. Utilidata raised $60.3 million in Series C funding in April 2025, following $30.5 million in Series B1 funding from October 2024.

Climate data and ecosystem monitoring

Applications in the space. In addition to weather data analysis for load forecasting and renewable energy integration, a broad spectrum of climate data is used for other climate tech purposes. VC-backed companies in this space commonly use a combination of drone or satellite monitoring, with AI enablement to analyze the large datasets involved. Many of the companies developing these approaches are targeting multiple industries, since high-granularity geographic monitoring has applications in so many industries: agriculture, forestry, defense, environmental protection, insurance, energy, and construction. Depending on the application, satellite and aerial sensing can involve one or more types of hyperspectral imaging, which further increases the size of the datasets, making AI enablement even more important. For specific use cases like agriculture, these datasets are frequently combined with ground-level sensing data for a more complete view of the conditions for crops and livestock.

AI benefits. The core benefit of AI in climate and Earth data technologies is in the data management and analysis. Datasets in the space commonly include high-resolution datasets, both spatially and temporally, and sometimes cover large areas. AI can allow users to query these large datasets, making them much more accessible, and can also integrate these with operational and economic data to give information not just about Earth systems but impacts to the user's specific operations. It can also allow automated monitoring and reporting of large areas of land, notifying asset holders about potential concerns, generating regular reports, and sometimes predicting future concerns.

Key startups. VC-backed companies like AiDASH are developing AI capabilities that analyze satellite data for a range of industries, including products that provide infrastructure monitoring and threat detection for utilities' physical assets, such as vegetation, wildfire, and weather hazard monitoring. The company raised $58.5 million in Series C funding in March 2024, following a Series A and B in 2020 and 2021, respectively. Other companies focus on a specific application, like Pano, which develops AI-enabled wildfire detection, incorporating ground-based sensing via monitoring stations, plus third-party data, such as satellite imaging. Pano uses AI for continuous monitoring of data from its imaging stations—which is particularly important for applications like wildfire detection that require a fast response to minimize impacts—and raised $43.6 million in Series B funding in June 2025.

Renewable energy

Applications in the space. In addition to many AI-enabled grid management technologies benefiting the integration of intermittent renewables into power systems, AI is increasingly being applied specifically to optimize renewable energy technologies. Solar and wind technologies are commonly sited on challenging terrain—with sites chosen based on wind speed and consistency, sunlight hours, low cost, and limited alternative use—such as uneven ground, areas with structures nearby that could shade solar panels, or on roofs with geometry designed to shed rain.

AI-enabled planning and design technologies simplify the pre-installation process, finding optimal layouts for renewable energy installations to optimize output via the reduction of solar panel shading, changing module height, or adjusting module spacing.

AI benefits. AI-enabled planning tools for renewable energy projects use AI to analyze data from satellite and aerial data, plus GIS data, ground-based imaging, and building documentation. These datasets can be used to simulate multiple configurations for solar or wind installations, and identify the optimal designs, considering differing wind and sunlight angles, shading from trees, buildings, and other solar panels, and potential construction challenges associated with steep or rocky terrain.

Key startups. Companies offering AI-enabled solar and wind design optimization technologies are less common than other solar and wind energy enablers, but VC-backed companies in the space include Glint Solar, which uses machine learning for solar energy site discovery, screening large geographic areas to identify those with the best potential for installations. Glint raised $8 million in Series A funding in November 2024. Scanifly focuses on rooftop solar design, using drone data and AI to analyze rooftops and obstructions; the company raised $10 million in Series A funding in February 2022.

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Additional research:

Q4 2025 Analyst Note: Climate Risk Analytics & Management

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2025 Climate Tech Funds Report

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