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December 2024

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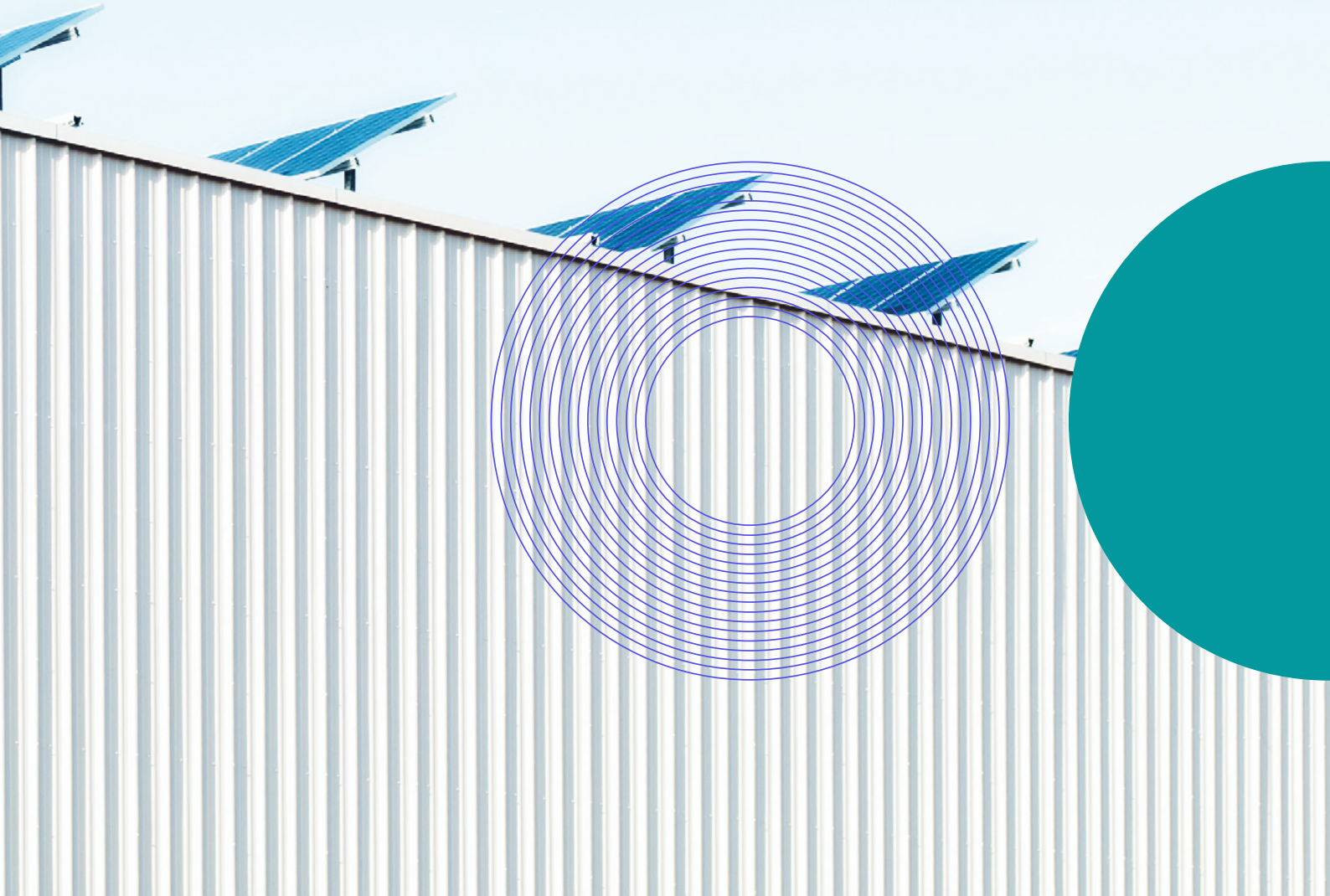
# The Climate Capital Stack and New Funds

## Climate tech capitalization trends in dry powder and fund formation in 2024



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## ABOUT SIGHTLINE CLIMATE

All of the funds data behind this report is live and updating on the Sightline Climate platform. If you're interested in learning how investors, banks, and corporates leverage Sightline's data and insights to power their investment and strategic decisions, you can request a demo from sales@sightlineclimate.com

Sightline Climate accelerates the deployment of climate tech solutions through industry leading data, analytics, and research.

Sightline's subscription-based intelligence platform gives investors, banks, corporates, and governments the insights they need to confidently build and finance the new climate economy. Sightline Climate also produces CTVC, the industry-leading newsletter read by 60,000 climate leaders. Notable clients include Southern Company, BHP, Galvanize Climate Solutions, and the US Department of Energy. For more information, visit www.sightlineclimate.com

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# From *the Founders*

**Kim Zou**
CEO, Co-Founder

**Mark Taylor**
CPO, Co-Founder

The climate tech ecosystem is growing up. Without a favorable policy environment or macro zero interest rate policy tailwinds, it'll need to grow up even faster. This moment in particular is critical, especially as whispers of "Cleantech 1.0" abound amid recent investment contractions and policy uncertainty. In particular, a new US administration, with different priorities to its predecessor, potentially sets the stage for an uncertain environment for climate tech in the US and abroad.

Political leadership and priorities matter, but they're not the only factor. Under President Trump's first term, more wind capacity was installed than any other term, and coal capacity declined more than under President Obama's second term. The shift towards cleaner, better, and cheaper is already underway globally and the underlying competitiveness of climate tech will continue to prevail in the long run. In the near term, we'll likely see some choppy waters and consolidation, but just like in Cleantech 1.0, what doesn't kill only makes these sectors stronger.

On the other side we'll be in a new era for climate tech – one where founders and funders prioritize real market fundamentals over policy incentives and build the right capital stacks to drive progress.

Because as the industry matures, so too does the capital stack. Gone are the days when venture capital was the only game in town – today's players can tap into a sophisticated capital stack that's as diverse as the solutions they're building. But with this maturity comes complexity, and in today's environment, understanding what capital is available – and how and when to access it – has never been more critical.

Despite market uncertainties and policy flux, one thing remains clear: momentum is there. The name of the game is matching the right money with the right solutions at the right time, blending financing options for the best outcomes. For key stakeholders in climate tech – companies, investors, financial institutions, and governments – understanding this new financial ecosystem isn't just helpful; it's essential for winning.

**- Kim Zou and Mark Taylor**

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# From *the Market*

## Hunkering down for scale efficiencies

Across climate tech and Growth Equity markets, 2024 was a year of hunkering down – shoring up balance sheets, managing opex and getting "fit" for more sustainable growth. 2025 may prove to be the year when scale efficiencies kick in for market leaders. Buying cycles in climate markets are long, and though we may have some political headwinds, the cost down curves realized over the past several years are set to become even clearer. We think companies with clear ROI for customers and a distribution advantage should do well in the new year. Across more established climate technologies, it's increasingly clear to us that "soft" costs are the next frontier, and we are focusing on the tools for bringing these down. We anticipate some public market exits and consolidation, especially in the energy software and grid management market.

**Lila Preston, Head of Growth Equity, Generation**

generation

Growth / Private equity

## Offtakes to potential exit takeoffs

The fundraising sentiment from LPs feels like it has bottomed out and is starting to improve again. For companies, our engagement has been on unit economics, building resilience, and executing on all levers of profitability. Looking towards 2025, we are tracking several companies that will sign their first large-scale, long-term offtake contracts – this is really exciting for infrastructure players like ourselves. The fact that big EPC firms and traditional Project Finance banks are participating in the larger transactions reminds me of how the solar and wind industries took off 10-15 years ago. While consolidation seems inevitable in many sub-sectors, it will hopefully build much more robust businesses over the medium-term. We also think the US M&A and public markets will see higher transaction volumes in 2025, which should be a net positive for overall sentiment in the space.

**Stephan Feilhauer, Partner, Antin Infrastructure Partners**

ANTIN INFRASTRUCTURE PARTNERS

Infrastructure

## The power play

2024 was the year where climate tech collided with general tech in the form of electricity load growth, interconnection and energy supply chains. AI companies are now energy companies, and energy companies are, at a minimum, AI enablement companies. The investment world took notice. The availability, price, and emissions impact of power will permeate nearly every conversation (both in climate tech and in AI) in 2025. This will be a boon for some companies, and a huge challenge for others.

**Shayle Kann, Partner, Energy Impact Partners**

ENERGY IMPACT PARTNERS

Venture Capital

## The dawn of a new grid

The world of 2025 is hungry for electrons. Data centers, EV adoption and mass electrification demand more electricity. And they will be fed by a larger, enhanced and much smarter grid. A grid made larger by more transmission and distribution assets, made smarter through virtual power plants and demand management, and enhanced by power line optimization. Gone are the days of a few electricity sources delivering to the masses. The new grid will be made of diverse new sources and users of electricity with multiple nodes on the grid acting as both.

**Martin Richards, Global Head of Climate Tech and Sustainable Finance Origination, HSBC**

HSBC

Banks

## From FOAK to TOAK

Right now we're in a version of the Squid Games: When it comes to investing in novel cleantech, everyone is ready to be seventh, eighth or ninth; almost no one wants to be first. I think the appetite to grow the clean economy exists. We just need the private sector to get a little bolder, take on a bit more risk in order to scale up cleantech production and adoption, and have a better edge on the accompanying future returns. In 2025, I think we'll get the most bang from the investment buck by shifting from a funding paradigm that considers only First-of-a-Kind (FOAK) to one focused on the first Ten-of-a-Kind (TOAK). TOAK spreads the risk and increases the chance of overall investment profitability for technologies in the demonstration and early deployment phases. All cleantech stakeholders - EPCs, government, philanthropy, publicly traded companies (the offtakers), VCs, traditional banks, insurance - should start applying TOAK in the New Year as they build their investment portfolios.

**Vanessa Chan, Chief Commercialization Officer, U.S. Department of Energy**

U.S. DEPARTMENT OF ENERGY

Government

## The missing middle

In 2024, awareness of the "missing middle" of capital became more pronounced as the climate tech industry continued to mature. There is a noticeable shortage of capital needed for scaling up, which is being partially addressed by growth equity and next-gen infrastructure investors. However, the available funding is still insufficient to fully meet the industry's needs. The sentiment is cautious. The market has generally shifted towards a more risk-averse stance, which particularly affects technologies that depend on regulatory support, government funding, or those with an unclear path to achieving cost-competitive scale. Nonetheless, companies with proven solutions that demonstrate strong unit economics and capital efficiency remain attractive to investors.

**Jeff Johnson, General Partner & Head of Climate, B Capital**

B Capital

Growth / Private equity

# *Highlights*

## Top line stats

# $86bn

**Climate fund dry powder en route to the $100bn mark**
Investable dry powder has hit $86bn across VC (including CVC), Growth Equity / PE, and Infra. Climate fund managers have closed $47bn just this year, with Infra accounting for 59%.

# $164bn

**AUM raised across the Climate Capital Stack since 2021**
$164bn of AUM has been raised for climate from 334 VC, Corporate VC, Growth, Infra, and Private Equity funds since January 2021, with a surge in 2022 thanks to climate mega funds.

# 96

**2024's fund count likely to be par with 2023**
2024 will likely close neck-and-neck with 2023's count. But what's new is the shift towards new mid-sized funds ($126-500m) compared to years past, up 23% from last year.

# +20%

**Rise in new AUM, and the year isn't over**
New assets under management (AUM) focused on climate is up 20% from last year's total of $39bn, almost matching 2022's record. The year opened strong, closing $17.8bn in Q1'24, building on 2023's bumper crop of infra funds. Things are looking better than the market expected, but it's mostly driven by a few climate mega funds like Brookfield and TPG coming back for more.

# $10bn

**Brookfield tops the table with first close of its second Global Transition Fund**
A $10bn first close for Brookfield's second Global Transition Fund marks a growing trend by infra investors who are cozying up to emerging and growth infra climate investments.

# -18%

**Fewer funds invested in a climate deal vs. last year**
In 2023, 2,673 unique investors participated in a climate venture / growth deal. This year, that number is down 18% to 2,197.

## Bottom line takeaways

**Dry powder stacking up from slowing deployment.** As exits grow harder to come by and LPs hold their pocketbooks closer to the chest, investors are upping the bar for deals, emphasizing capital efficiency and business fundamentals. The year-to-date 2024 climate dry powder numbers now illustrate a cool-off, with slower deployment leading to dry powder piling up, to the tune of $86bn total for new climate plays.

**Established platform plays vs. boutique bets.** Investment firms are diverging strategies to align with fee vs carry incentives. Capital agglomerators look to build platforms at grand scale by expanding funds across the climate capital stack (re: Energy Impact Partners) or launching a dedicated climate strategy (re: TPG Rise Climate). Boutique funds with stage and sector specializations size their funds to be nimble for high returns potential, which remains yet to be proven in the category (re: Congruent or Planeteer). Where exits at scale are yet to materialize, it's harder than ever to raise a fund. For first-time managers, exceptionally so.

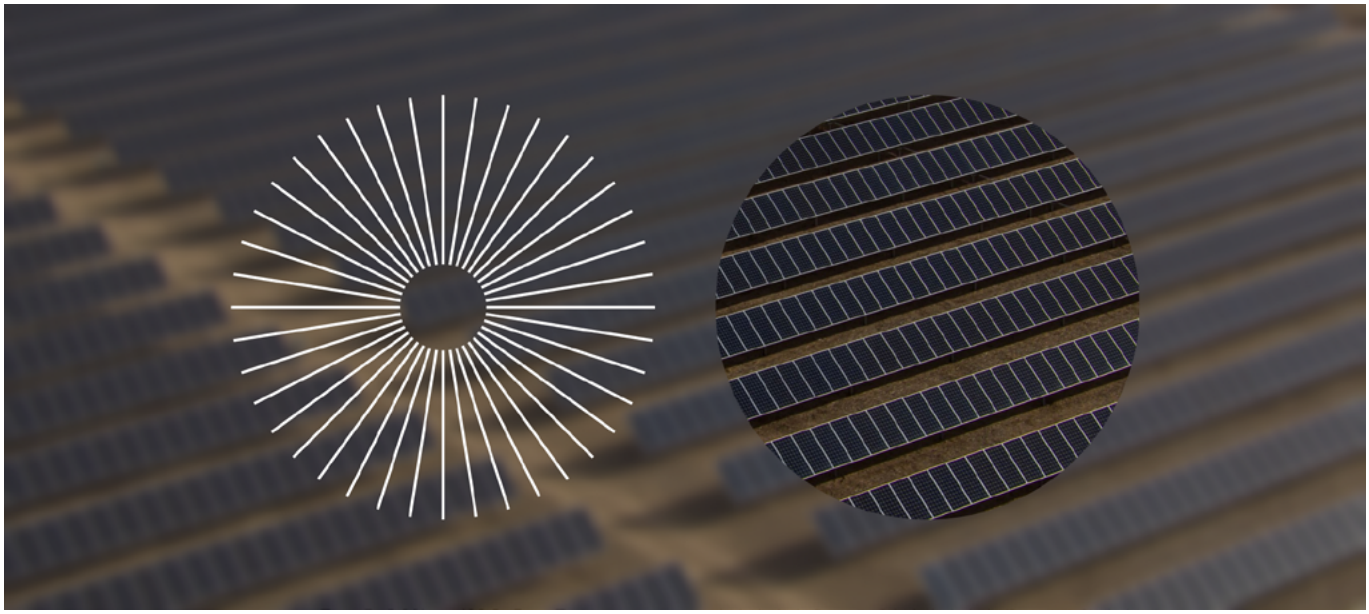
**Mega funds make or break.** 2022-2023 saw the rise of the mega funds (i.e., ≥$500m) making massive bets on climate and transition as a theme, from the Blackrocks, TPGs, Brookfields, and KKRs of the world. Now that their first funds have been majority deployed, these mega funds are back out on the market for their second or third (or fourth) hit – ideally at an even higher target size than the first. The success of these climate mega funds continuing to hit the mark with LPs will serve as a critical bellwether for the scale of future climate tech dry powder.

**Infra funds evolve climate tech preferences.** While Infra funds in the early heydays of climate tech were reluctant to deploy out of their solar and wind comfort zones, the new generation of infra funds spinning up, especially across emerging and growth infra theses, signal a much broader acceptance of climate tech plays outside of the traditional renewables norm. This encompasses everything from a wider outlook spinning out "transition" businesses from existing incumbents, to betting on climate tech coming up the maturity curve (CCS, energy storage, RNG).

**But the scale gap is still real.** Despite the influx of new Private Equity and Infra funds in climate tech, a significant scale gap persists in the capital stack. Even though VC has gone into backing early-stage climate tech innovation, the more mature capital stack layers of Growth / PE and Infra aren't directly filling in the gaps for the next phase (or they're staying in their lane).

**With Growth / PE sticking to well-trodden business models.** PE funds have generally been retreating from riskier hardtech plays and first-of-a-kind (FOAK) scale investments, to gravitate back towards their comfort zones in mature sectors and incremental transition strategies – think electric compressors, industrial heat pumps, or software & services for solar and wind supply chains. Meanwhile, infrastructure funds self-select zero-tech-risk investments, leaving a critical funding void in the climate tech innovation ecosystem, particularly for scaling breakthrough technologies.

**Wait-and-see for deployment.** Dry powder and deployment rates are not linearly correlated. Last year, climate investment slowed as investors played wait-and-see for valuations to risk-adjust, the IPO window to reopen, and interest rate hikes to stabilize. This year the wait-and-see continued as investors watched the outcome of elections across the globe, the situation in Europe and the Middle East, and more immediate factors like Northvolt's bankruptcy. In the interim, last year, many managers re-focused inwards on cushioning their own portfolio companies to bridge market uncertainty, and likely also on their own proactive fundraising.



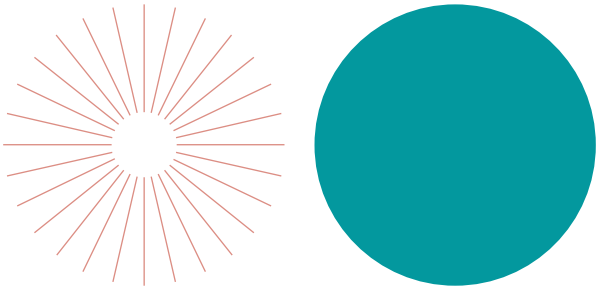
What you'll learn in this report

# Climate tech is transforming. *So is its money.*

In this report we follow this transformation to show you how capital is flowing into climate solutions – who's raising funds, where capital is concentrated, and what it means for players across the climate tech ecosystem.

We'll do this by tracing:

- **The state of climate funds** – the capital raised to invest in climate tech. We'll look at fundraising trends to better understand sentiment and momentum around climate tech. We'll break it down further to get a sense of where investor interest lies – is it in moonshots, or in plain-old solar?
- **Dry Powder** – the undeployed capital looking for the right opportunity. We'll explore how much capital is ready-to-go, and whether that capital is for early or late-stage climate solutions.
- **The Climate Capital Stack** – those who have raised the funds and want to put it to work. We'll outline the types of capital available, at what stage, and from whom – the layers of the Stack. We'll profile the players, the products they offer, and what gets them jazzed about a deal.



## A note for you, if you're a...

**Founder:** Think of this report as a thought partner, or roadmap. We want it to give you a sense of what capital is available, but even more importantly, to give you ideas on what type of capital and what partner – what layer of the Stack – is the best for you, to meet you where you are. Pay attention to the **Appendix**, as it provides a guide to what capital is available at each stage of your journey, and in particular what investors will be looking for.

**Investor:** Think of this report as a view across the climate tech landscape, providing clarity on the investors active before or after your investment stage. It's designed to help you identify gaps, trends, and potential co-investors, giving you an edge in targeting the right companies and deals and secure follow-on capital for your portfolio.

**Corporate investor / strategist:** Think of this report as a compass, aligning capital deployment with your corporate innovation and strategic needs. It's intended to help you identify promising partnerships, integrate external innovation into your roadmap, and position your investments for strategic returns.

**Banker:** Think of this report as a toolkit for building stronger relationships with investors identifying where your financial expertise can unlock value in the climate tech space. Use it to develop targeted strategies backed by market and funding data, identify investor preferences, and put yourself at the center of the deal – from capital raises like private placements, to IPOs and M&A transactions.

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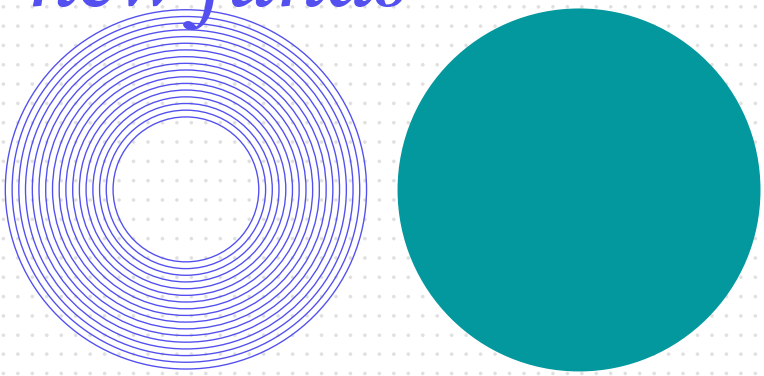
# Climate Tech Dry Powder

## *The state of new funds*



DECEMBER 2024

# A slimming stack of *dry powder*

In a global investment environment marked by rising interest rates and increased scrutiny of tech valuations, the amount of available dry powder and newly launched fund AUM serve as a powerful barometer for the future funding environment.

While **funding in the first six months of 2024 was down 20% from H1'23**, and deal count dropped 26% compared to the same time frame last year, climate-focused funds have still been steadily building up their cash reserves – aka their dry powder, the amount of committed, but unallocated capital on hand.

We've tracked 334 new climate investment funds raised since January 2021 creating fresh stockpiles of capital to deploy into growing companies and projects. We last released updated new fund numbers at the beginning of 2024, and for the first time, we've also included climate-focused infrastructure funds in the dry powder count.

Rallying LPs to raise a new fund takes time, and that means fund announcements are a lagging indicator of real-time fundraising sentiment. Despite the delay, we've started seeing the crossovers and sector tourists retreat to more familiar and AI-powered pastures, but dedicated climate funds remain – especially with Growth, Private Equity, and Infrastructure plays coming onto the scene as the cohort matures.

Most notably, investors are becoming more deployment-shy than ever. As exits grow harder to come by and LPs hold their pocketbooks closer to the chest, investors are upping the bar for deals – a sign that the sector has evolved beyond the frenzied, sometimes indiscriminate funding strategies of the 2020-21 mania, during the height of the ZIRP era. The year-to-date 2024 climate dry powder numbers now illustrate a cool-off, with slower deployment leading to dry powder piling up, to the tune of $86bn total for new climate plays. Still, a more disciplined approach suggests that climate tech has entered a new era where capital efficiency and business fundamentals matter as much as potential climate impact.

Sightline users will be able to access the underlying funds dataset used in this analysis in the "Investment" tab on the Sightline platform. If you're not a Sightline client, request a demo **here**.

## Highlights

**$164bn of private AUM** across 334 new VC, Corporate VC, Growth, Infra, and Private Equity funds with a full or partial climate focus closed since January 2021.

**96 new funds have been raised in 2024 so far – down 6% from 2023's record,** but still maintaining momentum and exceeding 2021 and 2022 despite today's tougher fundraising environment.

**$47bn in fresh capital closed YTD – up 20% from 2023,** when new funds raised $39bn. However, 2024 isn't a record haul ... yet. It hasn't quite hit 2022's record $50bn, but there's still some time left in the year. Either way, this uptick shows that there's still appetite for climate investing, even if it's a thriftier business.

**$86bn of dry powder ready to deploy for climate.** Based on some standard deployment assumptions, almost $90bn of capital from VC, Growth and Infra funds are waiting to be spent with newly-included infrastructure funds making up the bulk of the powder ($56bn). But there are signs that slowing fundraising is filtering through, as dry powder is down 8% from 2023's high of $93bn.

**21 mega-funds (≥$500m) so far this year – down 19% from 2023** but playing an increasingly important role, accounting for 80% of all new AUM.

**23% increase in mid-sized funds ($125-500m).** 38 funds have closed in this bracket, up from 31 funds last year. Funds in this mid-sized AUM bracket have been on a steady rise YoY since 2021.

**Methodology update:** A note on why the new dry powder number is so much bigger this time. In a major change to the methodology, these numbers now include infrastructure funds. We have also included a climate knockdown factor assuming a portion of funds are allocated to climate and included here, unless they are specifically raised for climate. Many generalist funds have renewable energy or climate as one of several target sectors. This means that only some of the total fund will flow to climate technologies, e.g. 20% of Brookfield's Infrastructure Fund V is included, as climate is only one of several sector targets, but its Global Transition Funds are included at 100%. To account for this, we use some general weighting factors, assuming that 20% of generalist Infra, Growth, and CVC funds, and 33% of generalist VC funds go to climate. We've applied these factors to our investment values throughout.

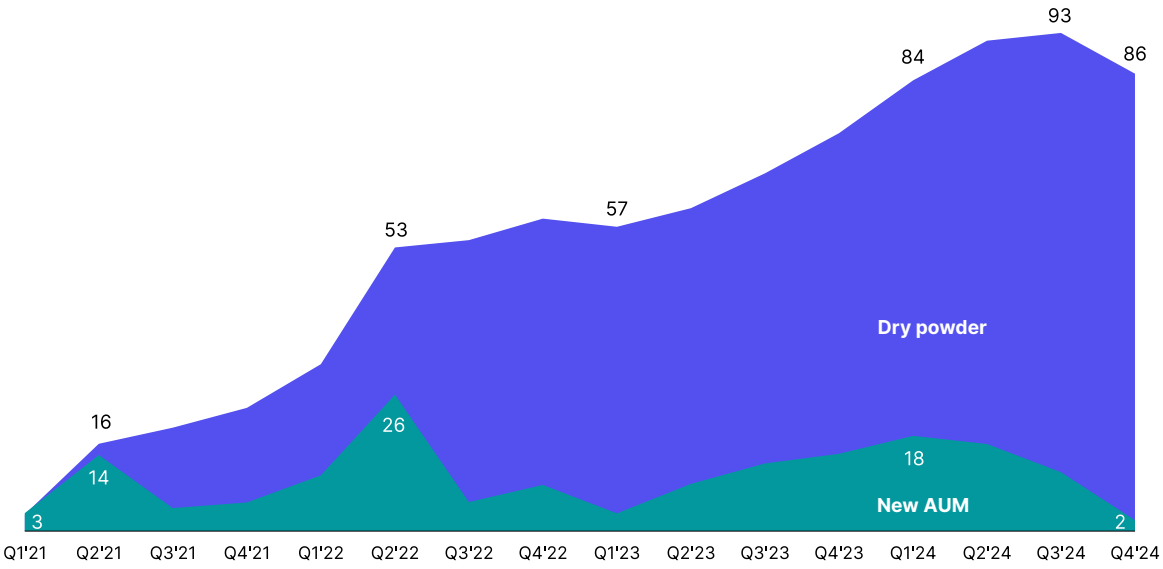
→ Go behind the numbers on our dry powder math in Methodology at the end of this report.
*For Sightline clients, fund data will be accessible on the platform from December.*

## An eroding dry powder stockpile

With the data tallied through 7 November 2024, we're able to see the shape of new capital ready to deploy in climate tech. And in a change from past editions of our **dry powder reports**, we're now including infrastructure funds in this analysis. As the first generation of climate tech matures and commands bigger dollar figures, infrastructure is becoming a crucial (and popular) part of climate investment.

### $86bn of investable dry powder for climate

Dry powder and new AUM by quarter, 2021-2024 YTD ($bn)




Source: Sightline Climate // Note: Based on announced climate VC, Growth / PE, and Infra funds as of 7 November 2024. Corporate VC (CVC) is included under VC. Assumes only a portion of generalist funds are directed to climate tech.

**An unprecedented stockpile starts to erode.** A dramatic increase in climate fund AUM in 2022 (from the likes of Brookfield, TPG, and Temasek GenZero, and Beyond NetZero) helped create an unprecedented capital overhang with fundraising velocity dramatically outpacing investment cadence. A few years later, the cohort of climate mega funds has entered deployment-mode and many are starting to move on to raising their second or third. As a result, dry powder has now started to plateau and even decline in the last few quarters. With the velocity of new funding slowing and existing dry powder being spent down, we could be starting to tap into a finite resource facing a long tail of decline.

**Dry powder has come down from its peak of $93bn in Q3'24** thanks to this acceleration and signs of slowing fundraising filtering through. But investors are also slowing their (deployment) roll to save up on existing powder. According to Carta, the 2020 vintage of funds deployed 60% of its capital within 24 months, whereas the 2022 vintage only deployed 43%, and funds announced this year could be trending towards a 3-4 year investment period.

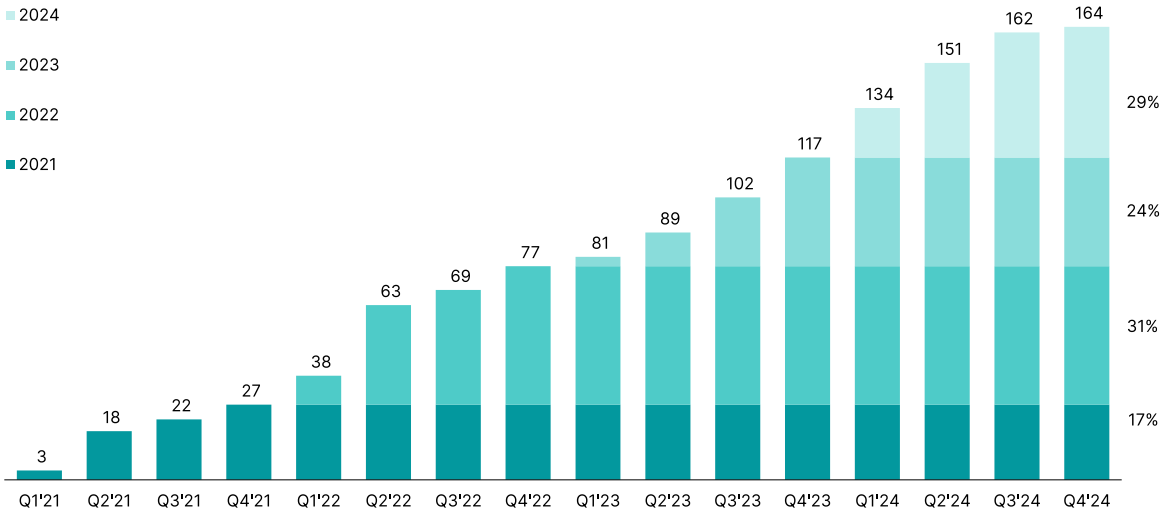
**Slowing deployment creates a funding reality check.** We're not so much entering a funding winter as we are a funding reality check. There's still plenty of dry powder to deploy (an $86bn mountain looming large above the new AUM), but the days of "raise fast, deploy faster" are probably over. Slower deployment could spell better discipline (and returns). A lot of money was spent on climate tech when valuations were high and investors may not have gotten their money's worth. Lesson learned and now everyone is being choosier. We're watching the market navigate from "spray and pray" to "hey, maybe we should actually think about this."

**Or we end up with Zombie VCs.** But slowing deployment is a delicate balance. While holding onto cash and waiting for cheaper and better investments may seem prudent, it can have repercussions. LPs may lose patience and move on, relegating a fund to a "one-hit-wonder" or "Zombie VC" which can never raise again.

**Methodology:** Go behind the numbers on our dry powder math in **Methodology** at the end of this report.

## New funds still haven't topped 2022's high, but AUM is on the upswing

Cumulative new climate AUM by quarter, 2021-2024 YTD ($bn)




Source: Sightline Climate // Note: Based on announced climate VC, Growth / PE, and Infra funds as of 7 November 2024. Corporate VC (CVC) is included under VC. Assumes only a portion of generalist funds are directed to climate tech.

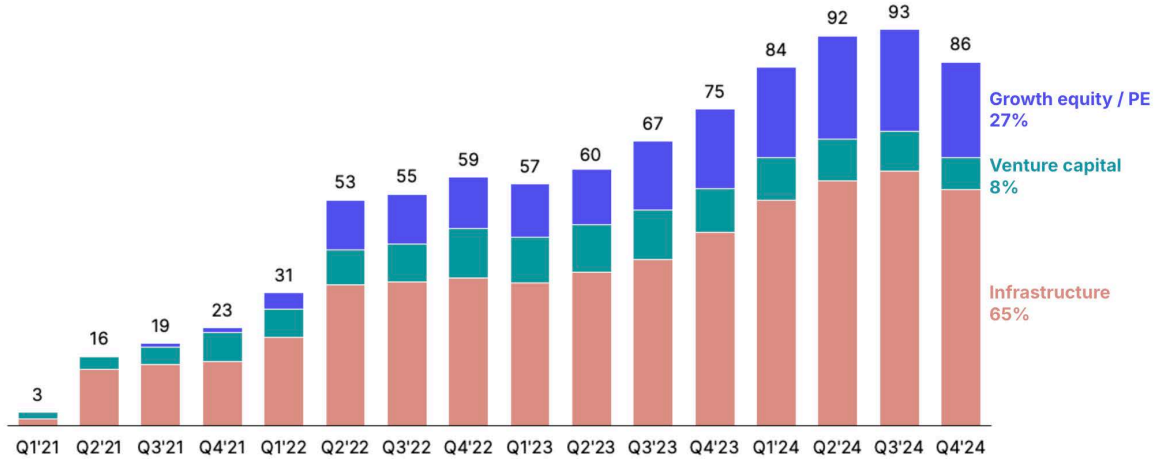
**Reports of fundraising's death have been greatly exaggerated.** Well, maybe not greatly, but 2024's $47bn of new climate AUM are only a little shy of 2022's high of $50bn and the year's not over yet. Of the total AUM earmarked for climate between 2021 and 2024, 31% came in 2022, and 29% from 2024.

### Infra to the rescue?

**Infra funding gives LPs a safe and sustainable place to park their assets.** Since our last analysis in April 2024, climate fund managers have closed $4.5bn in VC (including CVC), $8.5bn in Growth Equity / PE, and $16.3bn in Infrastructure funds. Infrastructure funds are increasingly popular, especially as we wave goodbye to ZIRP. Investing in infrastructure is seen as safer, as it's often limited to mature climate tech sectors (think solar, wind, and increasingly energy storage). It allows LPs and investment firms to bulk up their sustainability cred without taking any tech risk and avoid current woes of tech like hydrogen and CCS, the second generation of climate tech, which faces higher-than-expected costs and permitting struggles.

## Infra funds bring new life and a safe(r) haven to climate investing

**Dry powder by investor type, with % of dry powder, 2021-2024 YTD** ($bn)




Source: Sightline Climate // Note: Based on announced climate VC, Growth / PE, and Infra funds as of 7 November 2024. Corporate VC (CVC) is included under VC. Assumes only a portion of generalist funds are directed to climate tech.

**In an era of tougher raises, infrastructure shines through.** All of Brookfield's last three generalist infrastructure funds have raised more than their targets. Its Fund III raised 50% more than its target of $4bn, and even with increasingly ambitious goals, the funds have outperformed, with Fund IV raising 18% more than target, and Fund V 20%.

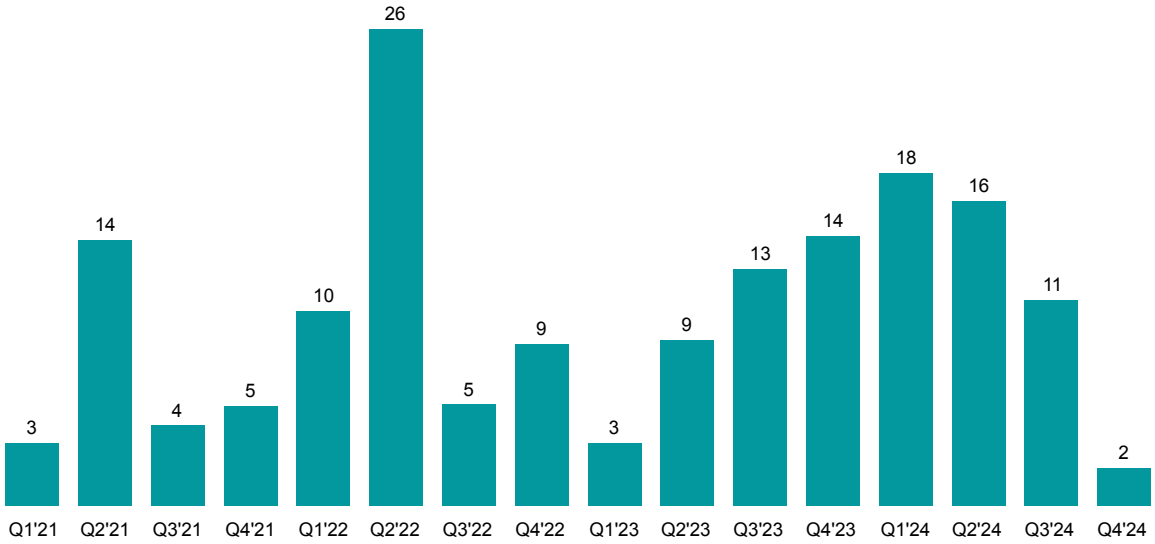
**More conservative investors could have knock-on effects on climate goals.** An increase in transition Infra funds and renewable energy finding a footing in generalist funds point to positive signals for more established industries. But most of today's climate tech startups, which are focused on hard tech in hard-to-abate industries, are struggling to find investors willing to wade in the missing middle (post-Series B). This could delay emissions reductions in these industries and make corporate and government targets much more difficult to hit.

## New money in the game

**Climate funding showing green shoots.** Factoring in the climate knockdown for generalist funds, 2022 was the year with the biggest AUM of $50bn, but it's pretty closely followed by $47bn raised so far in 2024 YTD, providing a ray of hope in what has been a dark few years.

## A strong close in new AUM 2024 YTD

New climate funds raised, 2021 - 2024 YTD ($bn)




Source: Sightline Climate // Note: Based on announced climate VC, Growth / PE, and Infra funds as of 7 November 2024. Assumes only a portion of generalist funds are directed to climate tech.

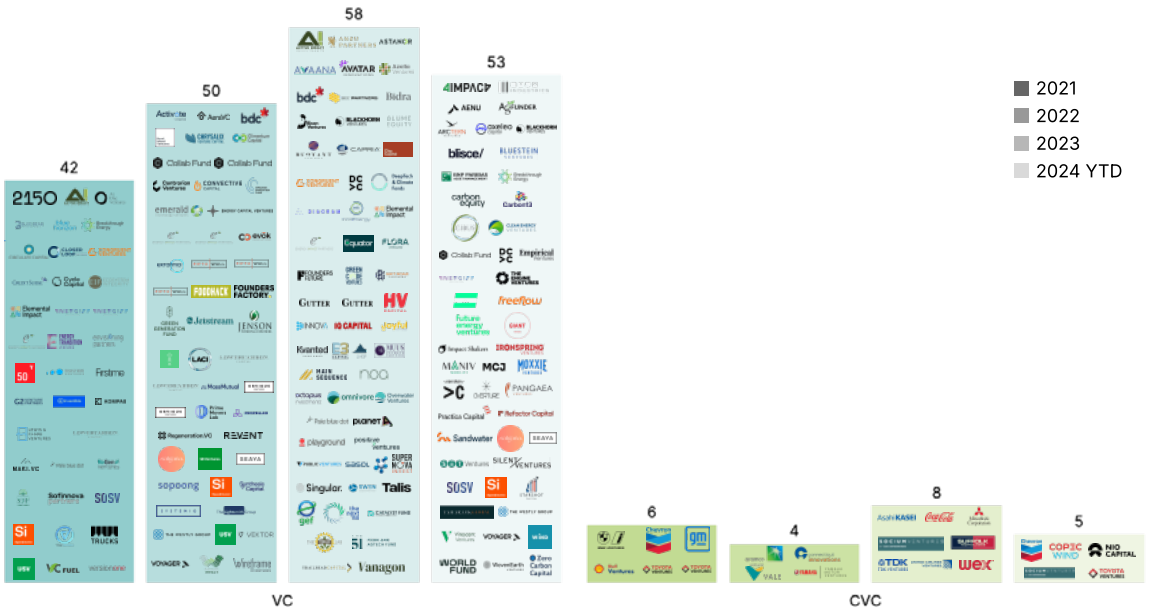
**A flurry of activity led by infrastructure.** Bigger funds investing in more mature climate tech have proven pretty resilient. In Q4'23 Brookfield announced its fifth flagship infrastructure fund with $28bn raised, some of which will go to climate. Macquarie followed up with an $8.8bn European Infrastructure Fund, another generalist fund that indicated it will allocate some funds to climate. The party carried on into Q1'24 with Brookfield's $10bn Transition Fund, entirely dedicated to climate, a KKR Asia Pacific Fund ($6.4bn) and the EQT Future Fund ($3.3bn). These were the headliners of a generally busy quarter, with a raft of smaller VC funds totaling $1.7bn.

**2024 saw a record number of funds announced, particularly Growth and PE funds,** which tend to have a higher AUM than VCs and made large contributions to increasing the total funding. This is still a lagging indicator of how climate tech funds will fare over the next decade, as funds can take years to raise. However, it does mean that the climate tech companies that fit the bill for Growth, PE, and Infra funds should be flush in the near term.

## The Climate Capital Stack sophisticates

# A maturing climate capital stack

New climate funds by type, 2021 - 2024 YTD (no. funds)




Source: Sightline Climate // Note: Based on announced climate VC and CVC funds as of 7 November 2024.

**"The worst time ever" to raise first-time venture funds.** With a 9% decline in new climate-focused VC funds between 2023 and 2024, there's a notable cloud hanging over early-stage finance. The 2021-22 boom was a free-for-all, with even first-time fund managers finding it easy to raise capital. Now LPs looking to back fund managers are keeping to much higher standards, and prioritizing return numbers and deal track record. The drop in VC could also be a sign that climate tech is maturing, that early-stage climate plays are maturing or entering a consolidation phase where Growth Equity and PE become a larger part of the stack.

**Government funding bolstering the EU's climate investing.** This year welcomed the arrival of multiple new European climate funds onto the scene, including Eurazeo's €706m ($763m) Transition Infra Fund, World Fund's €300 ($324m) climate fund, Seaya Ventures's €300m ($322m) climate tech fund. Behind-the-scenes of Europe's new private funds is the European Investment Fund (EIF), which was formed to seed the European private capital markets, with a strong tilt towards climate. The EIF made its first climatetech equity investment in 2006 and since then has channeled over €1bn ($1.1bn) to climate VC and PE funds, making it the largest LP in Europe this decade.

**Investors in Europe can afford to remain optimistic on climate.** European climate funds have remained resilient, while the US and other regions waver. There's a stronger and more stable economic case for decarbonization in Europe than most other regions, thanks to the bloc's longstanding carbon market and new carbon border adjustment mechanism (CBAM). While the IRA would have given the EU ETS a run for its money, the fate of those all-important tax credits now looks bleak, putting many climate tech investments in the US at risk.

## A maturing climate capital stack

New climate funds by type, 2021 - 2024 YTD (no. funds)


Source: Sightline Climate // Note: Based on announced Growth / PE, and Infra funds as of 7 November 2024.

**PE platform plays are popular with LPs.** Major PE platforms like Apollo, KKR, TPG, and General Atlantic are adding climate funds to their arsenal, and LPs are eating it up. The bias towards scale in climate mirrors LPs' preference for platform vehicles, where they can write big checks to trusted platforms with solid track records, while getting exposure to the climate transition through managers they already know and trust.

**Investing in climate can now be for the faint of heart.** Many climate technologies are fully mature, low-risk options. Wind, solar and hydropower are mainstream sources of electricity, the scale-up of EVs have made lithium-ion batteries a safe bet for energy storage, and incumbent automakers are building battery factories to supply their EVs. The potential for large, low-risk deals has led climate-focused infrastructure funds to peak, with Growth Equity and PE funds not far behind their 2022 heights.

**Deglobalization creates new demand for Infra.** A global rise in protectionism could make it easier for infrastructure investors to deploy their capital, according to Brookfield's infrastructure investments arm CEO, Sam Pollock. Government

incentives in the US, Europe, and APAC are funding domestic manufacturing, energy, and infra projects, including clean assets driven by US subsidies and European carbon prices.

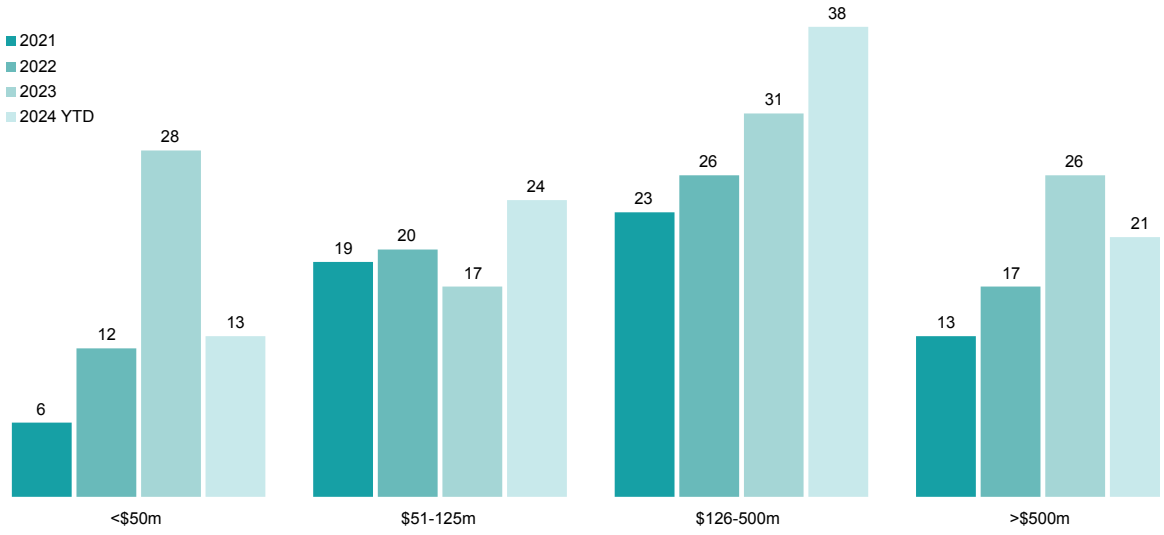
**AI's power surge drives Growth and Infra plays.** New Growth and Infra funds are also tapping into AI's power(ful) infra opportunity by targeting a "picks and shovels" approach to build out the underlying digital infrastructure for AI – from firming the grid to building more sustainable, energy-efficient data centers. Case in point: Copenhagen Infrastructure Partners are **betting on a new strategy** focused on investing in grid infrastructure to meet the rising demands of AI-driven load growth.

**Despite more dollars, the missing middle hasn't gone anywhere.** Growth capital is gravitating toward mature climate tech sectors and proven business models – think software for monitoring energy storage or service providers in solar with $10M+ revenue or positive EBITDA. These deals resemble traditional Private Equity plays in family-owned, bootstrapped businesses, rather than backing climate tech startups navigating the scale gap. And the few funds aiming to bridge the scale gap while achieving market returns may need to stretch deployment timelines 3-5 years to wait for "Goldilocks" companies to emerge. In the interim, expect a rise in bridge rounds, akin to solar's 2007–2012 growing pains, when investors financed high and refinanced post-deployment.

## Sizing up the funds

### Mid-size funds on the rise

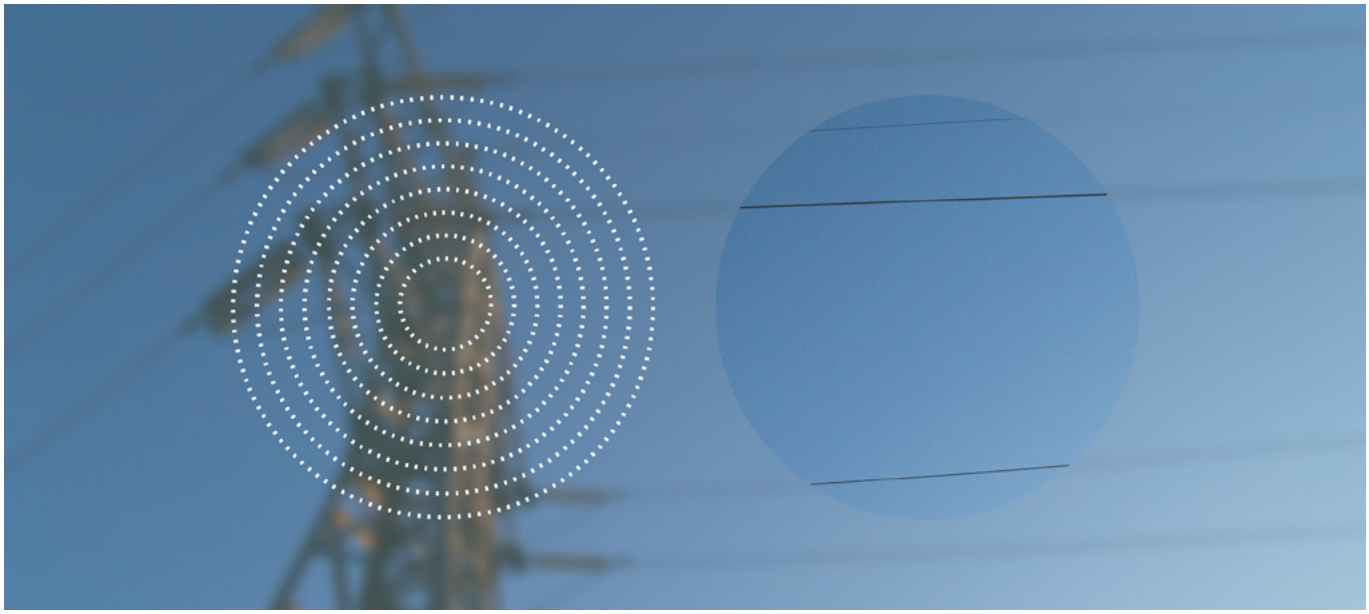
New climate funds by AUM, 2021-2024 YTD (no. funds)




Source: Sightline Climate // Note: Based on announced climate VC, Growth / PE, and Infra funds as of 7 November 2024. Assumes only a portion of generalist funds are directed to climate tech

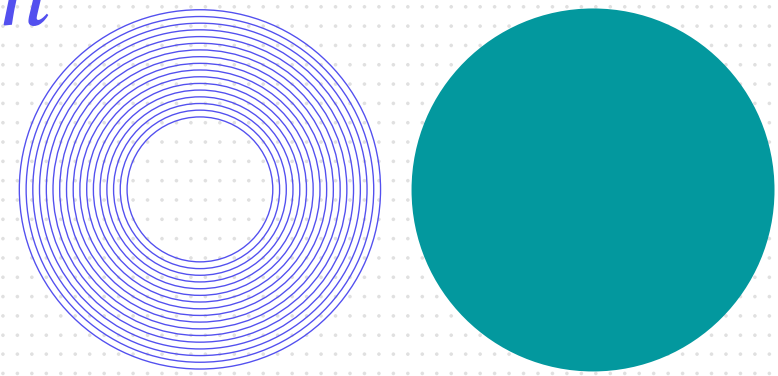
**Mega funds declined in 2024, but it's mostly down from generalist funds,** so don't panic yet. Counting only climate-dedicated funds, there were 18 in 2023 and 19 in 2024 YTD. These are positive signs, but whether the rise of mega-funds for climate becomes a trend will rest on repeated raises. If major players like Brookfield and TPG can continue to outperform their fundraising expectations, there will be a steady flow of capital for major climate companies and projects.

**Mid-size funds on the rise, and <$50m funds facing the dip.** As the environment for emerging fund managers becomes ever tougher, the count of smaller VC funds has dipped significantly. Meanwhile mid-size funds between $126-500m grew 20% YoY, with more than half made up of late-stage venture firms like ArcTern Ventures, World Fund, and Engine Ventures, followed by Growth Equity/ PE firms like Wellington Management and Blue Earth Capital, and a smattering of Infra and CVC funds rounding out the mix.



# The Climate Capital Stack

## *Who is deploying in climate tech*



DECEMBER 2024

# Laying out the layers of *the climate capital stack*

Behind fund data is an entire ecosystem of climate capital. Dry powder, AUM, and deployment numbers show the shape of the capital available, but don't reveal the layers underneath – leave that to The Climate Capital Stack.

As climate tech companies started in the late 2010s have started to mature, so has the capital stack supporting them. Early-stage companies focused on R&D and pilot projects are often capitalized with VC money and grants. But as they progress – depending on their technology, business model, geography, etc. – they need capital that better suits their needs. Luckily, beyond VC, there's a growing emphasis on later-stage and project financing, not to mention banking and insurance.

To truly understand the state of climate tech finance in 2024, we'll take a closer look at the types of investors in the Stack, the types of deals they make, and how they think about these deals. We'll also look at the external factors driving deals from these investor types. And of course none of this exists in a vacuum; this 2024 version comes amid shifting political administrations, market conditions, and investment preferences.

And when it comes to founders, the shape of the Climate Capital Stack has a foundational impact on their business strategy – and vice versa, their business strategy should inform what kinds of capital they take. In any industry, there are different kinds of capital for different kinds of businesses. The cost of capital will ultimately determine ability to scale, and in climate specifically, capital tends to have an outsized influence earlier in journeys to scale.

The capital founders bring on board should either be a) cheap or b) value-add – ideally, both. Most of the challenge is figuring out whether a) or b) are true across stages, structures, and different strategic paths. The best outcomes happen when capital most effectively aligns to a company's scaling needs, and that often involves working across layers of the capital stack.

## Types of financing

### From innovation to deployment

**Pre-Seed / Seed:** You're working on an idea, but have limited clarity into product, commercial strategy, or market

**Early:** You have a product or solution and are going to market

**Late:** You're feeling product-market fit and it's time to hit the gas pedal

**Growth:** You're deploying at scale and optimizing for long-term growth and profitability

→ Go deeper into funding requirements and options for each stage in the funding journey from innovation to deployment.

### Key attributes to evaluate capital

📈 **Expected rate of return:** What are your investors (and their LPs) expecting from you in terms of financial performance? By and large, the degree of risk (early) determines the rate of return (high). If you're pre-revenue, expect to trade potential upside for more expensive capital.

⚖️ **Dilution / ownership:** What will your investors' bet on you cost you in equity ownership? Raising equity funding means giving up a share of your company while raising debt takes on a cost to be repaid in the future. Dilution during fundraising rounds also impacts your ability to issue equity to new hires, advisors, and other key stakeholders during the early days.

⏳ **Complexity:** How much effort does it take to secure and manage the capital? Grants and catalytic capital are simpler but may involve restrictions or heavy reporting. Venture equity can mean more scrutiny but could open doors to investors who can materially impact your success. Project Finance structuring is highly complex but can help finance capital-intensive projects and limit dilution in the topco. Simplicity may be appealing, but as check sizes and business needs grow, financing structures naturally become more complex (which can also unlock benefits like expertise and less dilution).

| | Grant | Venture equity | Venture debt | Growth / Private equity | Commercial debt | Project Finance |
|---|---|---|---|---|---|---|
| Who | Government<br>Foundations<br>Accelerators / Incubators<br>Catalytic capital | Venture Capital<br>Corporate VCs<br>Angel Investors | Banks<br>Venture Debt Funds | Growth / Private Equity<br>Growth / Private Equity<br>Asset Managers | Banks | Banks<br>Infrastructure<br>Private Credit Investors |
| Stage | All | Pre-seed / Seed<br>Early | Early<br>Growth | Growth<br>Mature | Growth<br>Mature | Mature |
| Best for | R&D-focused startups | High-growth startups with scalable business models | High-growth, pre-profit startups looking to extend runway | Mature companies with proven revenue and profitability | Asset-heavy businesses or those with strong credit ratings | Capital-intensive projects with long-term revenue streams |
| Check size | $10K - $10M+ | $500K - $50M+ | $1M - $50M | $10M - $500M+ | $5M - $500M+ | $50M - $1B+ |
| Expected return | 0% | 20-30%+ | 10-20% | 15-25% | 3-10% | 6-15% |
| Dilution | ❌ | ✅ | Minimal | ✅ | ❌ | ❌ |
| Complexity | Low | Medium | Medium | High | Medium | High |

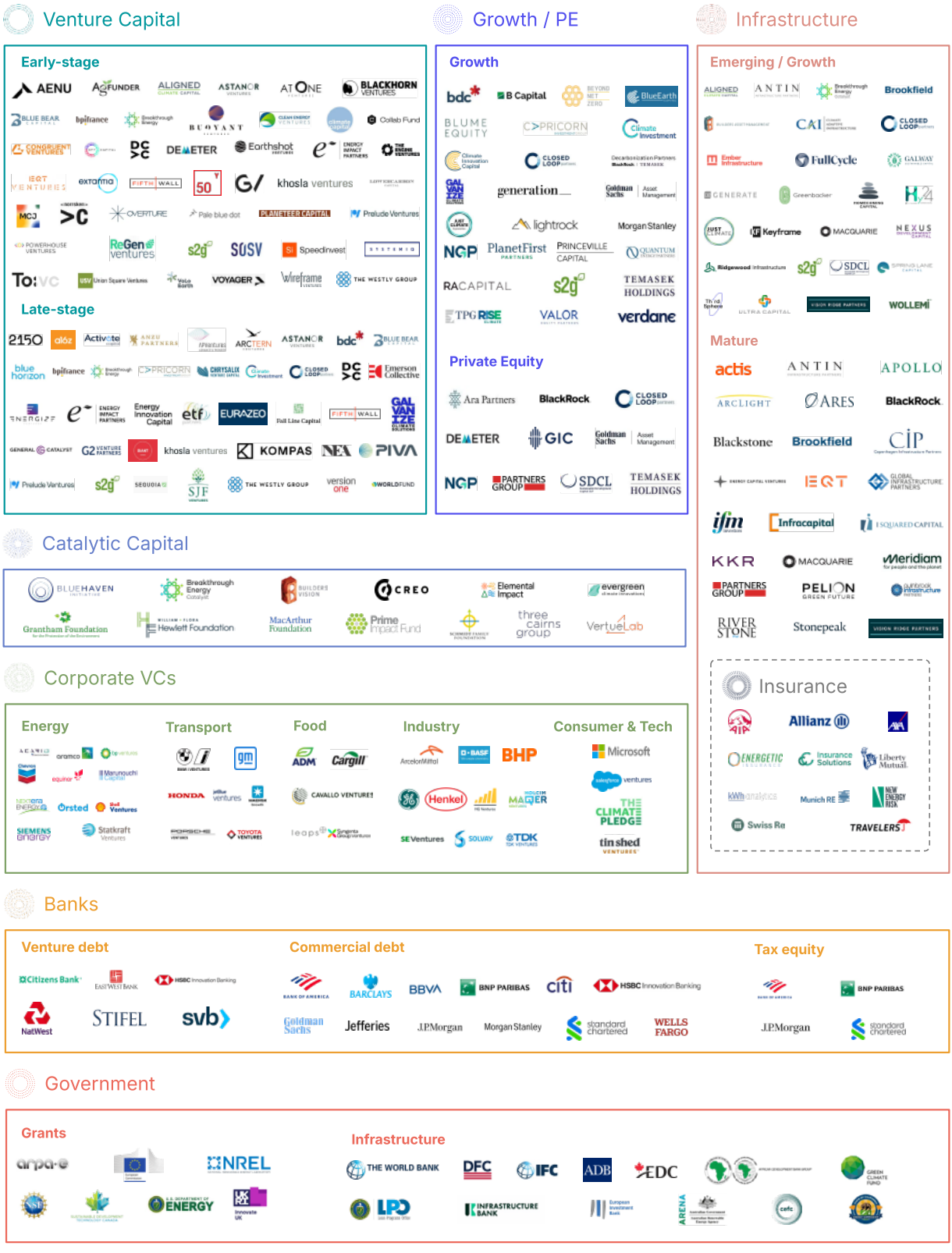
Source: Sightline Climate // Note: colored funding sources correspond to the capital stack chart on the next page

## Who are the climate tech investors?

The investor types and different funds in this section have varied priorities and preferences, but the labels and lines used to differentiate them often blur between categories. The Capital Stack is layered, and investors can slice through the whole thing. We aimed to delineate them as clearly as possible here to give climate tech builders an understanding of capital allocators without splitting too many hairs on definitions. What firms call themselves is less important than the types of investments they're willing to make.

# The Climate Capital Stack

Innovation — Deployment




Source: Sightline Climate // Note: This graphic is meant to be representative and highlights leading players in each layer of the Climate Capital Stack. Sightline Climate clients can leverage the **Investment tool** to access our full climate tech investor dataset, including filtering by investor type, sectors and deal stage preferences, on the Sightline platform. Other readers can find select investors across the Stack on Sightline's public **interactive tool**.

# Catalytic Capital

## Filling the "missing middle" with concessionary capital

**Overview**

Catalytic capital firms finance or enable early climate tech projects with dollars that seek a lower return on investment than typical VC or Growth. These funds have a bias towards impact potential over financial returns; they are more patient and accept disproportionate risk and/or concessionary returns to generate positive impact and support start ups over a funding gap they otherwise might not have been able to traverse. Sometimes called philanthropic or concessionary capital.

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**Good for:**

- High impact
- Those needing flexibility
- Companies with high capex FOAKs. Catalytic may not cover it all, but their concessionary capital can be an unlock for others
- A clear path to commercial viability, there's just a gap they can't pass on their own

**Mindset**

- Impact first, returns second
- Needs to be needed: If the deal is attractive to VCs, let them do it
- Willing to take higher risk for breakthrough potential
- Patient capital with longer time horizons (7-15 years)

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**Challenges in 2025**

**Increased importance as cohort approaches FOAK.** There's a growing recognition of catalytic capital's critical role in scaling climate solutions, particularly for hard tech.

**Opportunities in 2025**

**Now with a playbook**. Only recently have firms like Breakthrough Catalyst developed a playbook (June 2024) for how they can best support start-ups. With this experience under their belt, they may be even more efficient and effective in 2025.

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**Climate Capital Stack**

Innovation — Deployment


**What they offer**

- **Types of finance:** grants, debt (venture and project finance), equity (topco or project)
- **Terms:** revenue-based financing, concessionary capital (guarantees and first-loss
- **Other offerings & benefits:** halo effect.

**Key players**

- Catalytic funds: Breakthrough Energy Catalyst, Prime Coalition, Elemental Impact
- Family offices: Builders Vision, CREO Syndicate
- Foundations: Schmidt Family Foundation, Hewlett Foundation

**Case Study: Rondo Energy <> Breakthrough Energy Ventures (BEV)**

- **Investments**: BEV has three deals with Rondo; led $22m Series A (2022), followed in $60m Series B (2023), and $80m Project Finance (2024) for Rondo's heat battery solution for industrial decarb.
- **Why catalytic:** There's massive potential for impact in industrial decarb, making Rondo eligible. Plus Rondo's the first company to deploy a heat battery for this use case, making its FOAK too risky for many other investors.
- **Result**: BEV's ongoing support for Rondo helped it deliver its FOAK and move from early stage VC financing to Project Finance with the European Investment Bank.
- **Take**: This was one of BEV's first deals of this type and where it developed its playbook for helping companies get past FOAK to start accessing Project Finance. Its ability to offer flexible types of financing (equity + project finance), hands-on support, and guidance seems to be the missing link in bringing Rondo's technology to market.

# Government

## Developing climate tech with public capital

**Overview**

Government funded entities globally, including departments, agencies, and development finance institutions, provide significant non-dilutive capital to support climate technology research, development, and deployment. Ranges from early R&D grants to large-scale Project Finance, often serving as a catalyst for private investment and typically accepts higher risk and/or lower returns.

**Good for:**

- Projects advancing policy goals (e.g. energy security)
- Early-stage R&D and proof of concept (grants)
- Manufacturing facility buildout (debt)
- Large-scale infrastructure deployment (debt)
- Companies able to wait and afford lengthy application processes (debt)

**Mindset**

- Patient and mission-driven vs. purely returns-focused, with higher risk tolerance for strategic technologies
- Emphasis on public benefits like domestic manufacturing and jobs (e.g. US), and meeting national decarbonization goals (e.g. UK and EU)
- Doesn't want to pick winners, but would prefer Tesla to another Solyndra

**Challenges in 2025**

- **Stability of funding in the US.** An unprecedented amount of funding became available through the IRA, IIJA, and CHIPS Act. Much of which the incoming Trump administration opposes and may seek to reduce or limit.
- **Shifting politics and competing priorities in Europe.** The 2024 European elections have seen a rise in populist parties opposed to some of Europe's climate policies and investments, while support for Ukraine comes at high cost.

**Opportunities in 2025**

- **Trump boost for some.** While many sectors stand to lose out in Trump's second term, others, such as nuclear and geothermal, may benefit from continued support coupled with deregulation.
- **UK National Wealth Fund aims to boost climate investment.** The UK's new Government has announced a £7.3bn ($9.2bn) fund to catalyze green infrastructure investments, potentially creating new funding opportunities.

**Climate Capital Stack**

Innovation — Deployment


**What they offer**

- **Types of finance:** grants, debt, equity, tax credit
- **Terms:** Often % of total costs capped, e.g. no more than 50%, and debt repayment often over a longer repayment period than private finance
- **Other offerings & benefits:** loan guarantees, cooperative agreements, contract awards, production incentives, cost-share agreements, advanced market commitments

**Key players**

- For grants: ARPA-E, Innovate UK, National Labs, Horizon Europe, California Energy Commission, Australian Renewable Energy Agency (ARENA)
- For debt: Asian Development Bank, DOE Loan Programs Office, UK Infrastructure Bank, European Investment Bank, Export Development Canada

**Case Study: Lithium Americas <> US DOE Loan Programs Office (LPO)**

- **Investment:** DOE's LPO carved out a $2.3bn loan (2024) to Lithium Americas' Thacker Pack lithium mining and processing project.
- **Why Government:** Aligns with US onshoring goals to reduce supply chain vulnerabilities, strengthen national energy security, and support EV adoption.
- **Result:** The DOE's first critical materials loan will help finance mine construction. With a planned 40,000T output, the mine will cover 40% of US lithium demand and 10 times current domestic supply. GM has signed a 20-year offtake for 100% of the output.
- **Comment:** This is a blueprint for future government support of domestic critical mineral production including environmental and community benefit requirements and an EV supply chain onshoring strategy.

# Venture Capital (VC)
## Investing in early-stage companies

**Overview**

VC typically forms the foundation of the climate capital stack, especially for early-stage companies. VCs buy preferred equity in a company, typically a minority ownership stake, and (ideally) mentor the next generation of Teslas for potential high returns.

**Good for:**

- High risk propositions, comparatively low TRL-companies with an idea that's not yet fully proven
- At early-stage it's as much about the team and the problem as their current solution. Pivots are common, so technical diligence is much lower than for others
- Early-stage companies looking to scale; Asset-light software companies can continue to access VC as they scale

**Mindset:**

- High risk, high reward. VCs are swinging for the fences, where some investments will fail, but a few will return the whole fund, so there needs to be a sizable addressable market
- Solutions that can scale without massive costs. Software, with low capex and high margins, is a favorite
- Returns needed within the VC fund lifecycle. Often this means less than 10 years

**Challenges in 2025**

**The Valley of Death around Series B.** In the first half of the year, deals and even mega-deals were still getting done, and the earlier stages – Seed, Series A, Series B – round sizes are actually healthier compared to post-2021-2022's market mania. However, the amount of time to go from Series A to Series B has crept over the two-year mark. Companies are being asked to meet further goal posts than before to close these rounds.

**Opportunities in 2025**

- **Buyers' market.** With a slowdown in climate VC deals in 2023 after the peak 2021-22 bubble, a market correction was inevitable. VC funds have been able to dictate more favorable financing terms, amid decreased valuations resulting from interest rate hikes and weak public markets. Still, this trend mirrors the general slump in the broader VC market over the same time (excluding AI as a theme).

**Climate Capital Stack**

Innovation — Deployment


**What they offer**

- **Types of finance**: equity (topco)
- **Terms:** board seat (exit pressure)
- **Other offerings & benefits:** comparatively quick and low lift

**Key players**

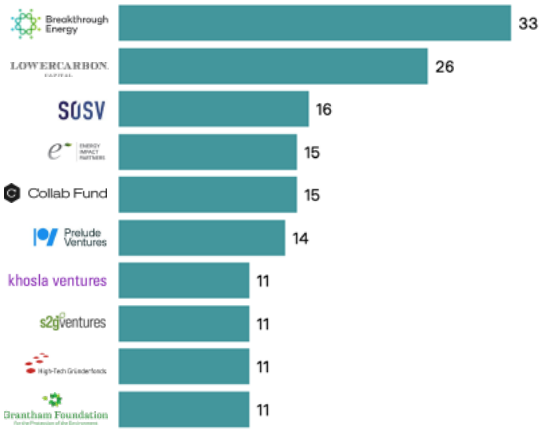
- Pre-seed/seed investors: Wireframe, Volo Earth, Pale Blue Dot
- Early-stage investors: Congruent Ventures, Breakthrough Energy Ventures, Lowercarbon
- Late-stage investors: G2 Venture Partners, Energy Impact Partners, Activate

**Case study: Electric Hydrogen <> Energy Impact Partners (EIP)**

- **Investments**: EIP has made three investments in Electric Hydrogen; co-led $24m Series A (2021), followed on in a $198m Series B (2022), and co-led a $380m Series C (2023)
- **Why VC:** Electric Hydrogen has scaled rapidly, going from founding to gigafactory commercial operations in four years. Government and strategic funding on this scale would struggle to be as fast, while FOAK financing would be too risky for commercial debt and project finance providers.
- **Result:** EIP's continued support enabled Electric Hydrogen to develop its green hydrogen electrolyzer technology and help finance its FOAK factory in Devens, Massachusetts. The 1.2GW capacity site, announced in May 2023, began commercial operations in April 2024.
- **Comment:** Two weeks after opening the Devens manufacturing site, Electric Hydrogen announced a $100m credit facility led by HSBC to support expansion, as well as $50m in equipment financing, showing how a successful FOAK can unlock later stage capital.

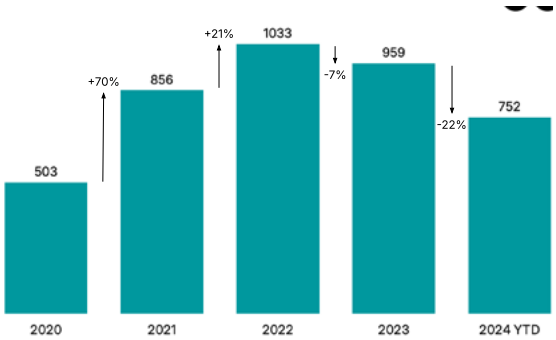
# Venture Capital (VC)

## Top 10 most active VC investors, 2024 YTD




Source: Sightline Climate // Note: Based on investment up to 13 November 2024.

## VC deal count by year, 2020 - 2024 YTD




Source: Sightline Climate // Note: Based on investment up to 13 November 2024.

## VC climate investment breakdown by vertical and sector, 2020 - 2024 YTD


Source: Sightline Climate // Note: Based on investment up to 13 November 2024.

# Corporate Venture Capital (CVCs)

## Strategic capital from corporate innovation groups

**What they offer**

- **Types of finance**: equity (topco)
- **Terms**: board seat, potential tech dependencies
- **Other offerings & benefits**: strategic partnerships, paying for studies/pilot/demonstrations, offtake, supply, site provision, joint development agreements, customer network access, co-investment opportunities, technology validation, corporate R&D collaboration

**Key players**

- Energy/Utilities: Chevron Technology Ventures, Shell Ventures, BP Ventures, NextEra Energy Resources, Equinor Ventures, Orsted Ventures
- Industrial: Microsoft Climate Innovation Fund, Holcim MAQER Ventures, TDK Ventures, Mitsubishi Innovation Fund

**Case Study: X-Energy <> Amazon**

- **Investment:** Amazon Climate Pledge Fund led X-energy's $500m Series C-1 round (2024). Amazon also agreed to be a strategic partner and fund the feasibility study for a project with Energy Northwest.
- **Why CVC:** SMR developers face multiple challenges; finding sites, getting through lengthy licensing processes, and raising sufficient capital. Only a strategic investor could offer this combination of patience, check size, project support, and offtake.
- **Result:** The investment is likely to support X-energy's technology and project development, licensing efforts, and ongoing FOAK in Texas.
- **Comment:** Amazon's investment led to a doubling in the share price of some public SMR startups. This wasn't just the $500m but the strong demand signal when Amazon announced its project level support and plan to deploy 5GW of nuclear by 2039.

**Overview**

CVCs offer a mix of financial, strategic, and operational benefits for startup partners. They often have longer investment horizons and valuable industry expertise and networks, with varying investment strategies. Corporates, aka strategics, can also help finance or acquire facilities or projects from their own balance sheets (rather than through a CVC). Deals can be slower to close due to organizational complexity.

**Good for:**

- Companies looking for more than money. Strategics can be a silver bullet, providing sites, supply, expertise, offtake and more
- Companies in a specific industry, or with clear complementarity to existing business lines and strategic priorities
- Those ready for, and looking for help with, industrial pilots

**Mindset**

- Venture returns in technologies that could disrupt or compliment core businesses
- Looking to leverage existing expertise and assets to offer more than just money
- Technology validation at scale and a portfolio approach to disruption

**Challenges in 2025**

- **Internal corporate budget pressures.** Getting internal buy-in requires signoffs from different departments, with differing views. When priorities shift, so does the CVC's track.
- **Retreat of energy majors.** Historically oil and gas majors have been some of the biggest investors in climate tech. However, with many dropping or slowing their climate goals, the business case for some investments may fall.

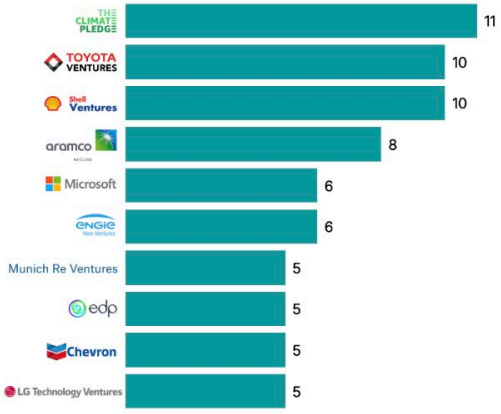
**Opportunities in 2025**

- **As VC funding declines, CVCs are becoming more attractive.** CVCs can appeal to startups near commercialization to by offering more than just capital
- **Big tech's hungry for clean firm power.** In 2024 Google, Microsoft, Amazon, and Meta all demonstrated interest in nuclear and/or next-gen geothermal for data centers. This trend is likely to continue.

**Climate Capital Stack**

# Corporate Venture Capital (CVCs)

## Top 10 most active CVC investors, 2024 YTD

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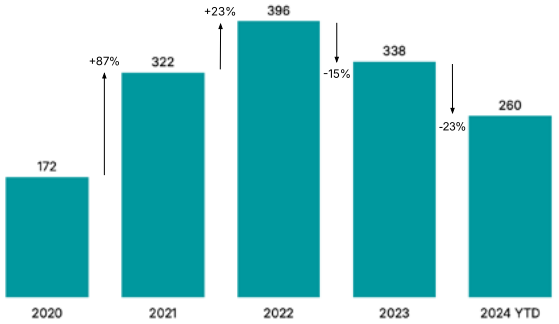


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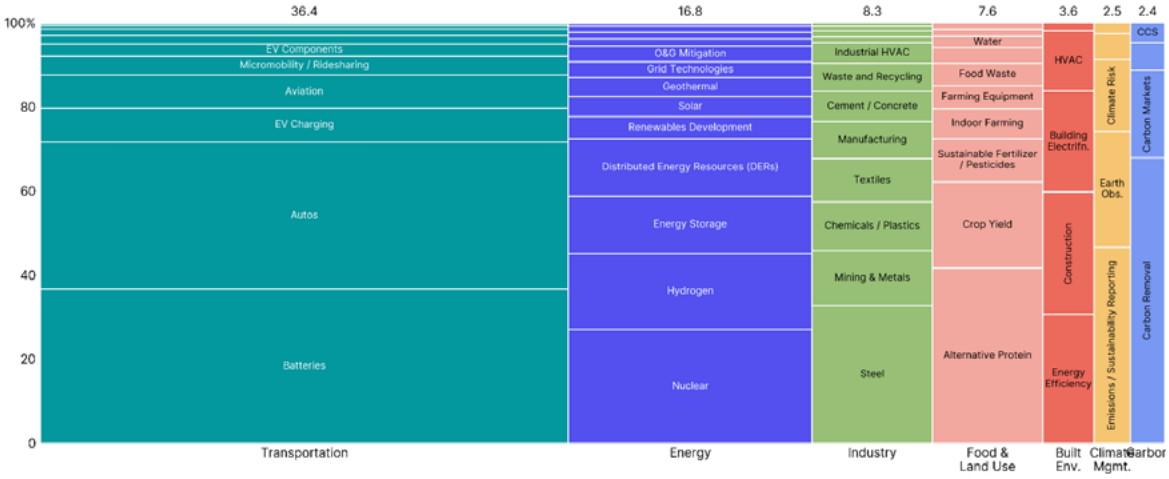


Source: Sightline Climate // Note: Based on investment up to 13 November 2024.

# Growth / Private Equity (PE)

## Investing in growth-stage or mature private companies

**Overview**

Growth Equity, a later breed of VC in the Series B+ stages, invests significant capital for company equity. Private Equity usually acquires controlling stakes in established companies. Backers of growth-stage climate tech companies run the gamut from traditional venture capital funds and CVCs to private equity, public-private crossover funds, and everything in between.

**Asset Managers**
**Overview:** Though different to Growth / PE, asset managers can play a comparable role. This includes hedge funds, mutual funds, endowments, pension funds, and sovereign wealth funds. They manage institutional investments for clients, and deliver risk-adjusted returns to them. Their investment is intended to return its principal plus (often below market-rate) interest.

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**Good for:**

- Later-stage, even public, hardware companies with higher capex needs ($100m+ check sizes)
- Companies with a proven product and clear path to profitability ready for significant scaling
- Businesses looking to rinse and repeat building a portfolio of projects

**Mindset**

- Buy low, sell high, from companies to infrastructure projects to manufacturing facilities
- Long term (years to decades) predictable returns
- Strong focus on risk management and downside protection
- Dual mandate of returns and ESG/impact metrics. Growing pressure from LPs for climate-aligned investments, but preference for proven technologies and business models

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**What they offer**

- **Types of finance**: equity (topco and project), debt (venture)
- **Terms**: board seat, majority shareholder (loss of control)
- **Other offerings & benefits**: potentially non-dilutive (venture debt or project equity) and so more scalable

**Key players**

- Growth investors: Beyond Net Zero, TPG Rise Climate, Generation
- PE investors: Ara Partners, NGP, Ember Infrastructure
- Asset management: Blackrock, Fidelity, T. Rowe Price
- Pension funds/Sovereign wealth: Temasek, Canada Pension Plan Investment Board (CPPIB), Nysno, GIC, CalSTRS, NBIM
- Hedge funds: Coatue, Tiger, D1 Capital Partners

**Case Study: Octopus Energy <> Generation Investment Management (GIM) & Canada Pension Plan Investment Board (CPP-I)**

- **Investments:** GIM has made a series of Growth investments in Octopus Energy; $247m (2020), $655m (2021) and participated with CPP-I in an $800m growth round (2023). CPP-I had also led $300m (2021) and $550m (2022) growth rounds.
- **Why Growth/PE:** Earlier stage investors would be unlikely to be able to sign checks this size.
- **Result:** Octopus has been able to rapidly scale and expand into new business lines (e.g. Kraken, its software platform and Octopus Energy Generation, its renewables portfolio) as well as new markets, especially the US.
- **Take:** Octopus's Kraken platform, with software's high margins and low capex, balances out Octopus's generation assets to make it an appealing investment. Several years and billions in, GIM and CPP-I may be looking for an IPO in the not too distant future.

# Growth / Private Equity (PE)

### Challenges in 2025

- **Stuck in political crosshairs.** Macro headwinds and tailwinds blow through Growth/PE. Sticky inflation, elevated interest rates, and geopolitical tensions have been ongoing in the PE market, dampening fundraising and exit opportunities across the board. Trump's election may lower interest rates, potentially boosting activity. On the other hand, repealing IRA tax credits could deter investors in the US, creating uncertainty in the market.
- **Global supply chains don't love trade wars.** With the incoming Trump administration talking up tariffs, a trade war could be on the cards. Uncertainty strengthens the wait-and-see-ers.
- **High-profile failures.** Northvolt's bankruptcy, having raised billions from a suite of leading pension funds and other asset managers, may cause many to pause before signing the next big battery check.

### Opportunities in 2025

- **Growing maturity.** More and more climate solutions are passing through the FOAK stage and getting ready to raise growth rounds better suited to Growth and PE investors. With more options on the menu, more capital may get deployed.
- **Long term thinking.** Though the path isn't straight, each year the case for the climate transition gets stronger and more countries set climate policies and goals. For investors with a longer-term horizon, like those looking to acquire companies, a growing market is a positive signal.

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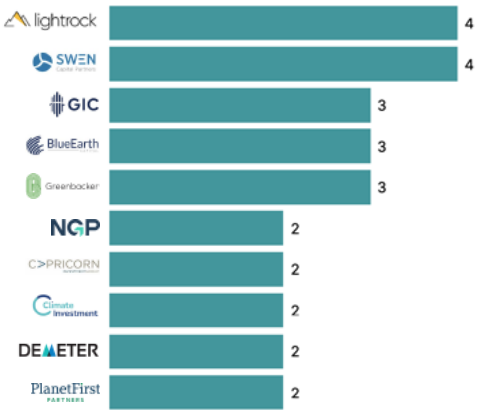
### Climate Capital Stack

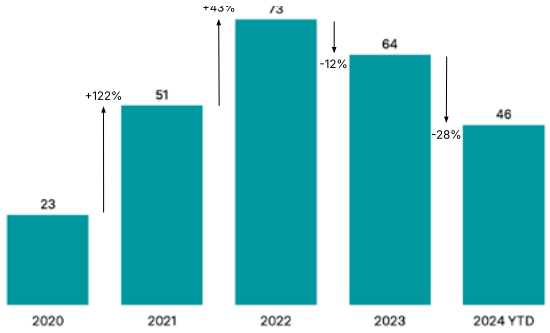
# Growth/PE

## Top 10 most active Growth / PE investors, 2024 YTD



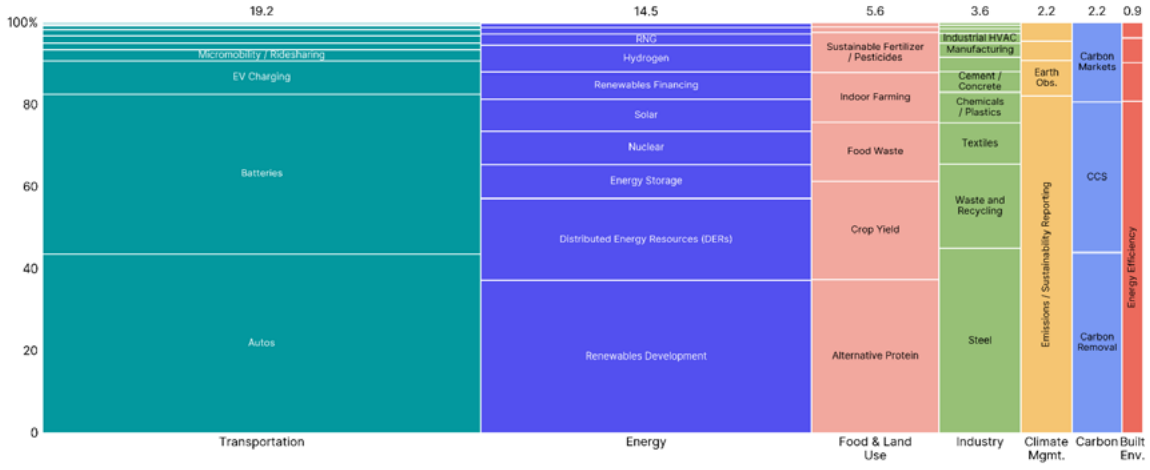

Source: Sightline Climate // Note: Based on investment up to 13 November 2024.

## Growth / PE deal count by year, 2020 - 2024 YTD




Source: Sightline Climate // Note: Based on investment up to 13 November 2024.

## Growth / PE climate investment breakdown by vertical and sector, 2020 - 2024 YTD




Source: Sightline Climate // Note: Based on investment up to 13 November 2024.

# Banks

## Commercial lending and financial services for climate solutions

### Overview

Commercial banks provide debt for climate tech companies and projects as well as advisory and syndication services. Some banks offer venture debt; debt for early-stage, high-growth companies that have typically already raised capital, allowing them to raise additional capital with little dilution. Some also offer tax equity partnerships, which allow banks to invest in projects in exchange for tax credits and other tax benefits.

### Good for:

- Companies with hard assets as collateral and/or strong cash flow
- Projects with contracted revenue streams
- Venture-backed companies seeking non-dilutive growth capital
- Tax equity-eligible renewable energy projects

### Mindset

- Risk-averse, focusing on secured lending, with a strong preference for contracted revenue and emphasis on debt service coverage ratios
- Balance sheet exposure limits per sector, with a need for clear collateral value

### Challenges in 2025

- **Green premium uncertainty.** Commercial models reliant on green premiums or tax benefits are exposed to policy changes.
- **Climate change is actually an issue.** Climate change can create new physical risks for new infrastructure, which, due to its novelty, can be hard to price, slowing or deterring loans.

### Opportunities in 2025

- **Innovative new financing models.** With a focus on deploying capital, many are looking at new types of financing mechanisms that can enable banks to meet their requirements while still deploying capital to impactful projects.
- **Falling interest rates incentivize loan issuance.** Though a complex interplay, lower interest rates may both stimulate demand and risk appetite.

### Climate Capital Stack


### What they offer

- **Types of finance**: equity (topco and project), debt (venture, commercial, construction, equipment, and project finance), tax equity
- **Other offerings & benefits**: working capital facilities, letters of credit, green bond issuance and marketing

### Key players

- Venture debt: HSBC Innovation Banking, Silicon Valley Bank (now part of First Citizens), East West Bank, NatWest
- Commercial debt: HSBC Innovation Banking, Barclays, BBVA, BNP Paribas, Citi, Goldman Sachs, Jefferies, JPMorgan, Morgan Stanley, Standard Chartered, Wells Fargo
- Tax equity: Bank of America, BNP Paribas, JPMorgan, Standard Chartered

### Case study: Thea Energy <> HSBC Innovation Banking

- **Investments:** HSBC Innovation Banking provided a $7m venture debt facility to Thea following their $20m Series A fundraise (2024) from Prelude Ventures and Lowercarbon Capital.
- **Why banks:** Taking venture debt from a bank, as opposed to raising more capital through VC equity, allows Thea to raise further funds without dilution.
- **Result:** Thea is taking a radically different approach to many other stellarator developers. Rather than building the complex stellarator shape physically, they're planning to create the shape within a magnetic field.
- **Take:** Thea is still a long way from a commercial power plant. They may be hoping that if they can show their tech works in a test reactor, they'll then be able to raise money more cheaply than they can now, making non-dilutive financing until then desirable.

# Infrastructure

## Investing in long-term infrastructure assets

**Overview**

These investors primarily deploy in long-term assets (i.e., solar farms, bridges, airports), rather than companies. The Infra investing umbrella includes Project Finance (PF), which refers to giving loans (plus interest) to credit-worthy projects – after conducting thorough due diligence, including a detailed review of long-term commercial agreements, credit quality of offtakers, market studies, and EPC contracts. They make returns on the cash flow of the project, its resale, or tax credits. Investors are primarily funds, but also banks and corporates. PF is non-dilutive to founders and VCs, but typically includes warrants, which give the investor the right to buy shares at a set price and time.

**Infrastructure investors can be categorized into three types:**

- Emerging Infra investors focus on earlier stage innovative technologies with investments of $10-75m
- Growth Infra firms typically deploy $75-250m, primarily through asset financing while occasionally acquiring companies
- Mature Infra investors, spending over $250m, prioritize low-risk, proven projects with strong counterparties

**Good for:**

- Hardware companies at their NOAK (th-of-a-kind) looking for scaled deployment
- Projects with contracted revenue streams
- Companies with strong balance sheets and credit ratings
- Asset-heavy businesses with predictable cash flows

**Mindset**

- Risk-averse, seeking stable long-term returns. An emphasis on downside protection over upside potential
- Focus on contractual cash flows and creditworthy counterparties
- Preference for proven technologies at scale
- Returns typically in 6-12% range for debt, 12-20% for equity

**What they offer**

- **Types of finance**: project-level debt, project-level equity, tax equity, equipment financing, and long-term operating debt
- **Terms:** can be long term
- **Other offerings & benefits:** Very scalable

**Key players**

- Emerging Infra: Generate Capital, True Green Capital, Axium
- Growth Infra: Spring Lane, Greenbacker Capital, Upper Bay
- Mature Infra: Brookfield, Macquarie, I Squared, BlackRock, KKR

**Case study: Infinum <> Brookfield Asset Management**

- **Investments:** Brookfield's PE expansion round of $1.1bn (2024), $200m for Infinium's Project Roadrunner and an additional $850m for future projects.
- **Why Infra:** Infinium wanted to scale up and develop multiple sustainable aviation fuel (SAF) production facilities simultaneously. That takes large-scale Project Finance, and few funds can lead rounds beginning with a $b.
- **Result:** Infinium is able to complete its marquee SAF project, Roadrunner, and move forward with development of several other planned projects. Some of these projects may also be SAFs, but others will focus on other eFuels like its earlier Project Pathfinder.
- **Take:** While most startups struggle to meet the rigorous diligence of Project Finance, Infinium had the benefit of both having already completed its FOAK with Pathfinder in 2023, and had already raised a Project Finance round with Breakthrough Catalyst, another example of how catalytic funding and support can unlock later rounds.

# Infrastructure

**Challenges in 2025**

- **Interesting interest rates.** Higher interest rates creating both challenges for project economics and opportunities for higher yields.
- **Tax credit where it's due.** IRA tax credits driving increased deal flow in clean energy infrastructure, but if they are repealed, this could affect investment.
- **The FOAK no man's land.** There's a need for innovative financing structures to support emerging technologies, but PF is not willing to take on the risk.

**Opportunity in 2025**

- **Permitting reform in the wings.** From the new UK government to the incoming US administration, permitting reform is on the agenda. Should it pass, it may accelerate opportunities for large climate tech projects.
- **AI = data centers = clean firm.** AI will continue to drive demand for data centers, and thereby clean firm power. This may mean more gas, but expect it to also drive nuclear investment and whatever else can do the job.
- **New capital continues to flow.** We continue to see firms positioning to lead in the climate transition, such as Generate Capital, who in November 2024 announced a new $1.2bn credit facility to support its efforts to lead in the space.

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**Climate Capital Stack**

# Insurance

## Covering risk to enable bankability

### Overview

Insurance providers are a critical risk transfer mechanism, moving risk from capital markets into insurance markets. With different offerings for different types of technologies and projects, they make money off of the premium, which is higher for riskier tech. But this de-risking is essential for making climate projects "bankable" (attracting non-dilutive pots of funding) and attracting investment.

### What they offer

- **Other offerings & benefits**: Performance insurance; Technology warranty insurance; Production/output guarantees; Weather risk coverage; Construction risk insurance; Operational risk coverage; Revenue/price hedging products; Carbon credit delivery insurance; Supply chain disruption coverage; Project completion insurance; Professional liability insurance

### Key players

- Traditional insurers: AXA XL, Allianz, Travelers, AIA Group, Zurich Insurance Group, Allstate, State Farm
- Reinsurance: Munich Re, Swiss Re
- Specialized climate insurers: New Energy Risk, Energetic, kWh Analytics

### Case study: ESS <> Munich RE

- **Deal:** Munich RE provided ESS with warranty insurance (2021)
- **Why insurance:** Warranty insurance allowed ESS, a flow battery, long-duration energy storage (LDES) solution, to provide clients with a 10-year guarantee on its products, improving its go to market offering.
- **Result:** ESS's deal with Munich Re came shortly before its $1.1bn IPO via SPAC, becoming the first LDES solution to go public. However, since then the company has underperformed and its share price has fallen significantly, down 97% by November 2024.
- **Take:** 2021 saw ESS launch its gen2 product, aiming to reduce production and maintenance costs, ahead of its IPO via SPAC later that year, an IPO from which the company hoped to raise $300m. Having an insured warranty enabled it to boost customer and investor confidence at a vital time.

### Good for:

- Novel climate technologies seeking Project Finance, including FOAKs and project developers seeking bankability
- Renewable energy projects needing performance guarantees
- Projects with weather-dependent revenues
- Supply chain risk management
- Carbon credit projects

### Mindset

- Risk quantification over risk avoidance; strong preference for data-driven underwriting, but hesitant about the unknowns
- Premium pricing based on technology maturity
- Portfolio approach to risk management

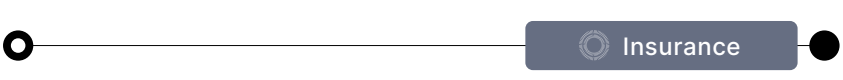
### Challenges in 2025

- **Insurance doesn't do novel.** Historically insurance worked on historical data; how often does an issue occur and how much does it cost. New technologies don't have precedents, making risk appraisal challenging.
- **Big downside, small market.** New large projects are more likely to run into issues. Pricing the risk may mean detailed and expensive analysis, where for only a handful of projects it may not be worthwhile.

### Opportunities in 2025

- **Opportunity in carbon markets.** The new Paris Agreement Crediting Mechanism (PACM) could bolster global carbon markets, making it more attractive for investors and insurers alike.
- **More players makes insurance easier.** Too few projects makes it hard to both price and spread risk. As deployments in areas like SAF and next-gen geothermal increase, insuring them will become easier.

### Climate Capital Stack



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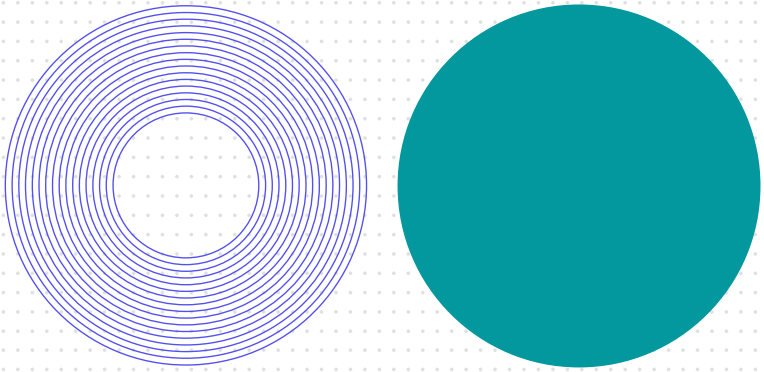
# 2025 Outlook



DECEMBER 2024

# *Outlook*

**Praying for exits**. Exits will make or break confidence in the entire climate tech theme. Without them, capital for climate will dry up starting from the top down as LPs become hesitant to back climate tech at-scale without first seeing returns. LPs have long memories and are appropriately sensitive to Cleantech 1.0 lessons learned – which will be strictly applied to climate tech today, even if slow exit markets are mostly symptomatic of the broader macroenvironment.

**Blended capital to bridge the gap.** Don't expect Infra funds to make any plays into FOAKs, despite the hype. Instead, FOAKs will rely on **blended approaches** – namely philanthropy, corporate balance sheets, or government grants and loans – to get off the ground. The real prize will lie in crossing the scale gap to Nth-of-a-kind (NOAK) projects, where the pile of Infra dry powder for sustainable assets awaits. While some Infra investors are tentatively eyeing emerging sectors (e.g. SAF, CCS, battery recycling), de-risked, investable companies and/or projects are still lacking. Meanwhile bridge financing is coming back in vogue as climate tech moves towards deployment. Similar to Cleantech 1.0's wind and solar projects, high-interest bridge loans are emerging to finance construction before refinancing at lower rates (e.g. **Fervo's debt deal with X-Caliber Rural Capital**).

**Rise of Europe and the Middle East.** The European Investment Fund (EIF) has emerged as the largest LP in Europe this decade, channeling over €1bn ($1.1bn) into climate VC and PE funds. European LPs will likely continue embracing climate and impact – with the Sustainable Finance Disclosures Regulation (SFDR) setting strict sustainability reporting requirements for "green" funds to qualify – while US counterparts remain cautious on ESG post-backlash. Meanwhile, sovereign wealth and state-owned enterprises in the Middle East, have been making significant commitments to climate, including for instance, the UAE'S **$30bn Alterra fund, announced at last year's COP28**, which has already allocated $6.5bn towards BlackRock, TPG, and Brookfield.

**The AI x climate convergence.** Watch for more climate VC and Infra funds capitalizing on AI's dual climate challenge and opportunity – whether by addressing new load growth by building better energy infrastructure or leveraging AI to discover new materials and optimize inefficient systems. Recent announcements like the **$30bn Global AI Infrastructure Investment Partnership (GAIIP)** between BlackRock, Global Infrastructure Partners, and Microsoft, and **the $50bn partnership** between KKR and Energy Capital Partners underscore infra's growing appetite for AI-related energy bets.

**Carrots, sticks, or less red tape – which works better?** 2025 will provide real data on the effectiveness of incentives across geographies and sectors. The US relies on tax credits like the PTC and ITC, while California mandates 4GW of clean firm capacity procurement. The EU-ETS allowance reductions are tightening market constraints, while the UK experiments with LDES price collars. Feed-in-tariffs continue driving deployment in markets like Germany and Japan. But now in a new Trump administration, expect incoming leadership at key federal agencies (including Elon and his new Department of Government Efficiency) to lower regulatory hurdles, leading to some faint silver linings in getting projects built faster.

**Seeing red.** China has been the growth engine of Cleantech 1.0, flooding the market with cheaper solar panels, wind turbines, batteries and EVs, but its role in next-gen climate tech like carbon removal and low-carbon fuels isn't so certain. Any escalation in the US-China trade relations could drive up the cost of the climate transition and expose Western supply chain reliance on Chinese components and technical know-how.

**Getting back to basics.** In 2025, investors will reward pragmatic execution over broad ambition. Success will depend on solutions that are cost-competitive, scalable, and backed by real demand. Sectors like hydrogen are facing hard demand resets, while capital will increasingly flow toward areas with clear demand signals, like clean firm power. At the same time, investors and corporate VCs alike will refocus on their core competencies and use climate tech to enhance existing capabilities or build new strategic business units. The era of chasing unicorns across all sectors is over; focus is the new name of the game.

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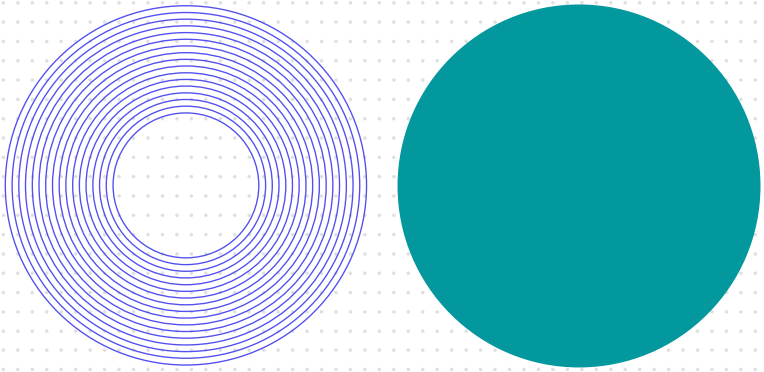
# Methodology



DECEMBER 2024

# *Methodology*

## Dry powder

| Key Assumptions | | Equivalent |
|---|---|---|
| **Deployment period (# quarters)** | | |
| VC | 12 | 3 years |
| CVC | 12 | 3 years |
| Growth Equity / PE | 16 | 4 years |
| Infra | 20 | 5 years |
| **Climate investment %** | | |
| VC | | |
| Climate | | 100% |
| Generalist | | **33%** |
| CVC | | |
| Climate | | 100% |
| Generalist | | **20%** |
| Growth Equity/ PE | | |
| Climate | | 100% |
| Generalist | | **20%** |
| Infra | | |
| Climate | | 100% |
| Generalist | | **20%** |
| Management fees | | 2% |
| Fund lifetime (years) | | 10 |
| Allocation for Mgmt fee | | 20% |
| Drawdown period (quarterly) | | 4 |
| Conversion | | *0.001* |

### Fund type

We're represented dry powder for climate-specific venture, corporate venture, Growth / PE, and Infra asset classes.

**Note:** Infra is included. Our dry powder analysis up until now has always excluded Infra funds. As more of these investors shift their attention to emerging and growth climate infrastructure plays outside the realm of just renewables, tracking their activity is more important than ever.

## Post-close

This analysis conservatively includes only funds that have announced the exact size of (at least their first) close – and excludes fickle announced targets. This report captures funds that have been publicly announced through regulatory filings or press releases as of 7 November, 2024.

## Deployment period

We've assumed a 3-year deployment period for VCs and CVCs, a 4-year deployment period for Growth / PE funds, and a 5-year deployment period for infra funds. Infra funds typically have longer holding periods and more gradual deployment time periods compared to VCs and CVCs. We've also assumed that these funds deploy 100% of their capital during the deployment period. Realistically, deployment follows a wider bell curve as funds "reserve" capital to follow on to original investments.

## Climate vs. Generalist

Not all funds we've tracked are purely climate-focused. A proportion of them are funds that deploy a certain % of their total capital in climate tech companies as part of a broader thesis. So that we get a more accurate reflection of dry powder numbers, we've set a 33% weighting for generalist VCs and a 20% weighting for generalist CVCs, Growth / PE funds, and Infra funds. Where we show AUM totals, the values are always climate-weighted.

- **Generalist:** Have climate or sustainability as a pillar, but isn't a core focus
- **Climate-specific:** 75%+ of fund mandate is climate-focused / overlaps with our climate tech methodology

## Management fees

We subtract a full 20% of the fund size upfront to cover management fees, and assume that just the remaining 80% of AUM is used for investments. (2% annual management fee over a ten year fund lifetime).

## No recycling

We don't include any assumptions for "recycling," or taking initial returns from the fund performance and deploying it back into the fund (often to make up for management fees cutting into the investable AUM).

# The Climate Capital Stack *Charts*

## VC, CVC, Growth / PE Charts

This report captures Venture Capital and Growth Equity / PE deals that have been publicly announced through regulatory filings or press releases as of 7 November 2024. We also verified deals directly with the most active investors.

The Climate Capital Stack charts included the investor leaderboard, climate investment breakdown by vertical and sector, and deal count by year. This data was collected as of 13 November 2024.

**Venture Capital: Investing in early-stage companies**
Using Sightline Climate data, we filtered for Pre-seed / Seed, Early-Stage (Series A, B), and Late-Stage investors (Series C+) and Venture Capital deals they participated in.

**Corporate VC: Venture arm or fund associated with a corporation**
Using Sightline Climate data, we filtered for Corporate VC investors and Corporate Strategic and Venture Capital deals they participated in.

**Growth / PE: Investing in growth-stage or mature private companies**
Using Sightline Climate data, we filtered for Growth and PE Buyout / Expansion investors and Growth and PE Buyout / Expansion deals they participated in.

## Defining climate tech

We've long held that climate tech is a theme not an industry. Our definition of climate tech comes with two filters:

# 1) climate *impact* and 2) climate *vertical*.

Companies must tick the box in at least one category for both filters in order to make the cut.

**Climate Impact**
To be counted as climate tech, companies must fulfill one or more of the following "climate impacts":

Mitigation - *Directly decarbonize across key emissions sectors.*
**Examples:** electricity & heat, ag & land use, industry, transportation, buildings

Adaptation - *Adapt to a changing climate with new products and economic models.*
**Examples:** New insurance products, producing food to use, geo-engineering

Monitoring - *Gather information / data about emissions or climate risks and impacts to generate insights.*
**Example:** Emissions and sustainability reporting, climate risk and intelligence

Removal - *Remove existing emissions from the atmosphere*
**Examples:** Carbon removal, nature-based solutions, reforestation

Regeneration - *Enhance general environmental "positive externalities" and "do more good, not just less bad"*
**Examples:** Regenerative ag enhances biodiversity & sequesters carbon

## Climate Vertical

In addition to having climate impact, companies must fall into at least one of the seven broad climate verticals below. These verticals encompass 60+ sectors and 250+ technologies helping us mitigate, adapt, monitor, remove, and regenerate in our warmer and weirder world.

### ⚡ Energy - *The electrons and fuel that power us*

**Sectors:** new generation technologies (e.g., nuclear, solar, geothermal), energy storage, hydrogen and other low-carbon fuels, enabling renewables software, marketplace, and grid management platforms, DER and demand response tools, utility transmission and distribution services

### 🚗 Transportation - *The movement of people and goods*

**Sectors:** battery technologies, EV autos, EV charging and fleet management, electric micromobility and ridesharing, zero-emission planes, boats, and trains, urban public transport

### 🌾 Food & Land Use - *The nutrients and resources that give us life*

**Sectors:** alternative proteins, regenerative farming, vertical farming, sustainable fertilizer and animal feed, nature restoration and ecosystem services, remote sensing for crop yield optimization, autonomous farming equipment, water tech, and food waste reduction

### 🏭 Industry - *The goods and raw materials we use every day*

**Sectors:** low-carbon cement, chemical and plastics, steel, manufacturing, metals and mining, circular economy commerce, sustainable textiles and packaging, waste and recycling

### ☔ Climate Management - *The data, intelligence, and risk associated with a changing climate*

**Sectors:** emissions and sustainability reporting, earth observation through remote sensing, climate risk and intelligence platforms

### 🏠 Built Environment - *The places we live and work*

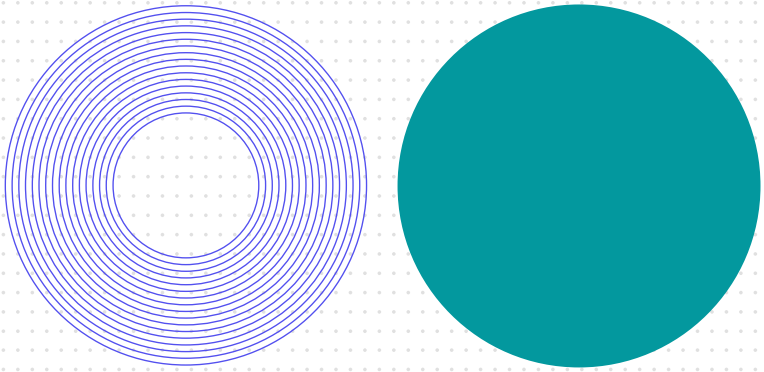
**Sectors:** sustainable building materials, low-carbon heating and cooling, prefab construction, energy efficiency, building electrification and energy optimization

### 💨 Carbon - *The avoidance and removal of emitted carbon*

**Sectors:** carbon offset marketplace and procurement platforms, carbon utilization, carbon removal and storage technologies, point-source CCS, verifiers and ratings enablers

**NOTE:** You may notice that some of our numbers are larger in this update than previous editions. We constantly update the dataset to have the most accurate data possible, including adding post-dated deals.

# Appendix: Capital Stages



DECEMBER 2024

# The funding journey from *innovation to deployment*

## Pre-seed / Seed | *You're working on an idea, but have limited clarity into product, commercial strategy, or market*

Pre-seed and seed generally have the fewest rules and least cookie-cutter approach to capitalization. Companies at this stage are scrappy by design: pre-revenue and laser-focused on proving team, market, and tech so funding here is about flexibility and speed. Grants and philanthropic capital can fill gaps but can be restricted in scope and come with strings attached. Meanwhile climate angels and VCs provide more open-ended equity betting on potential over profits – but at a much higher dilution cost if the idea proves viable.

### 💵 Funding options

**Government grants:** Non-dilutive capital to fund early-stage R&D and technology development. In the US, programs like SBIR (Small Business Innovation Research) and STTR (Small Business Technology Transfer) offer grants through agencies like Department of Energy (DOE), National Science Foundation (NSF), Environmental Protection Agency (EPA), and Department of Defense (DoD). In the UK and Europe, Innovate UK, Horizon Europe, and EIC provide R&D funding and commercialization support. But beware, while non-dilutive funding is great, it can often be tied to strict scopes, long application cycles, and post-award reporting. → Read more from our Founder's Guide to DOE and Investor's Guide to DOE

Who: Government

**Programs & Prizes:** Accelerator programs or competitions offer more than capital – think mentorship, lab space, and workshops. From general accelerators like Y Combinator to climate-specific ones like Elemental Excelerator and Third Derivative, these programs combine resources with funding. Prizes like XPRIZE and CleanTech Open target specific challenges, often with quick, no-strings cash. Many prioritize impact over returns, and strategic-run programs run by corporates can open doors to later-stage investment or acquisitions.

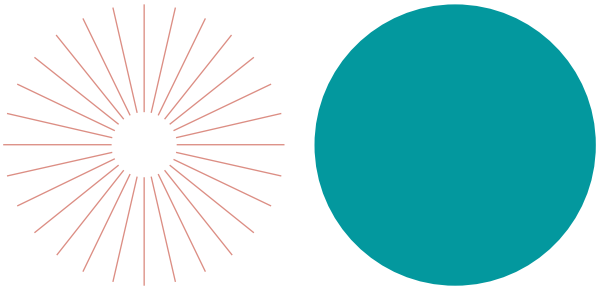
Who: Accelerators, Incubators, Competitions

**Angels & Syndicates:** Angels bring early capital where trust often outweighs traction. They are typically high-net-worth individuals, sometimes industry insiders, impact-driven, or perhaps friends and family wanting to get founders off the ground. Syndicates pool funds for network-driven deals. Beyond cash, angel backing can open doors to critical connections and mentorship.

**Who: Angel investors, Syndicate platforms**

**Pre-seed / Seed Venture:** Pre-seed and seed investors back early potential – teams, markets, and technologies – before revenue or polished products. They're often the first institutional backers, offering capital, networks, and strategic support to hit key milestones. Climate pre-seed and seed VCs range from technical specialists to generalists drawn by scale, with varying priorities on impact and speed to scale.

Who: Venture Capital, Catalytic capital



## Early | *You have a product or solution and are going to market*

Once a technology, company, or concept begins to show evidence of commercial viability or early traction, the financing landscape shifts dramatically. More capital becomes available – but it's not just free-flowing cash; it comes with clear expectations for returns. At this juncture, securing funding is about more than just a flashy valuation. It's the fuel for nailing product-market fit, pressure-testing go-to-market strategies, and building a team that can actually scale. Traction, whether measured in revenue, a prototype, or a robust in-field pilot, becomes the bargaining chip – especially when paired with hard evidence of customer demand or future revenue potential (think LOIs and MOUs). In climate businesses, the scaling story isn't always straightforward: operational complexities can rear their heads long after the initial buzz. Clarity in expected milestones and an understanding of how much capital is required to hit them is essential to keeping current and future dilution in check.

### Funding options

**Early-stage venture capital:** Early-stage venture capital provides Series A and beyond funding in exchange for equity ownership, typically targeting around 20% of the company. This funding supports startups as they scale proven products or strategies. Terms are shaped by round size and valuation, with investors seeking stakes aligned with the perceived risk and growth potential. Beyond capital, early-stage VCs often bring strategic guidance, access to networks, and operational support.

Who: Venture Capital, Corporate VCs

**Venture debt:** Venture debt offers fast-growing startups non-dilutive capital to complement equity, funding growth initiatives and extending operational runway. Typically structured as a term loan, it combines interest rates, warrants and origination fees as part of the economics. Unlike commercial debt tied to cash flows or assets, venture debt supports businesses to reach strategic milestones and increase valuation. Companies fronting costs for EV chargers or solar installations can use debt to support the working capital shortfall before generating revenue from those assets.

Who: Banks, Venture Capital

## Late | *You're feeling product-market fit, and it's time to hit the gas pedal*

As growth accelerates into the hockey-stick phase and a viable path to scaling revenue becomes clear, financing options expand exponentially – along with opportunities to deploy that capital. Whether focused on product development,

### 💵 Funding options

**Late-stage venture capital:** A later breed of venture capital in the Series B+ stages which exchanges capital for ownership of the company, dependent on fundraising terms of round size and valuation. Backers of growth stage climate tech companies run the gamut from traditional venture capital funds and corporate VCs to public-private crossover funds, and everything in between.

Who: Venture Capital, Corporate VCs, Crossover funds

**FOAK Funding:** Non-dilutive funding options to build first-of-a-kind (FOAK) projects. Typically companies must fund their first pilot or factory buildout off their own balance sheet with (expensive) venture capital. FOAK projects have a challenging credit profile, given the high upfront risk of being first of a kind and generating lower infrastructure returns. There's a huge gap for alternative loan financing to bridge this valley of death of putting the first steel in the ground. → Read more on FOAK financing from our FOAK series.

Who: Catalytic capital, Venture Capital, Corporate VCs, Government, Growth / Private equity, Infrastructure

**Commercial debt:** Non-dilutive capital appropriate for Series B+ companies with proven performance, typically EBITDA-positive, that can secure borrowing against cash flows or assets. Commercial debt can be sourced at earlier stages, but often comes at a hefty price tag, complex and burdensome operational / financial covenants, and lots of other strings. For companies with strong credit profiles, commercial debt is often the cheapest form of capital, with rates ranging from single-digit percentages to the low teens. Traditional commercial debt structures are relatively simple, involving an interest rate, origination fee, and covenants. While venture debt is typically high cost, low structure, commercial debt is low cost, high structure. Common lenders include commercial and investment banks. Later-stage debt comes in all types of colors and shapes - from lines of credit to smooth out working capital or secured debt backed by collateral.

Who: Banks, Growth / Private equity

factory production, acquisitions, marketing, or organizational expansion, every dollar raised should have a clear, compelling purpose that paves the way to less dilutive capital, now that much of the typical execution risk has been mitigated. With solid business metrics in place, the pool of interested investors continues to grow, as long as performance continues to exceed expectations.

## Growth | *You're deploying at scale and optimizing for long-term growth and profitability*

### 💵 Funding options

**Growth / Private Equity:** For the even more mature, growth and private equity is geared towards companies with proven revenue, strong unit economics, and a clear path to profitability. Private equity firms typically structure deals with larger equity stakes – often minority but sometimes controlling – alongside stringent performance metrics and governance oversight.
Who: Growth / Private Equity

**Project Finance:** Project Finance funds projects. Most mature hardware solutions get deployed commercially through infrastructure projects handled by a utility or project developer. Think of a project developer like a real estate developer – they identify a site, find a revenue stream, and organize all the project elements. Project Finance is the art of funding those assets. At this stage, a project itself becomes a company (with its own LLC!) and has an entire capital stack including equity and debt that's walled off from the corporate level.

Since infrastructure projects are seen as low-risk cash flow generators, Project Finance has a much lower cost of capital (3-9% for project and junior debt; 8-15% for Infra equity). Traditionally, Project Finance has played well in the mature tech and large asset sectors – think: large solar and wind projects. Now some investment firms are taking this same toolkit and applying it to emerging climate technologies. While Project Finance is starting to take on more risks, there's still a significant gap here in financing newer technologies like hydrogen fuel cells and anaerobic digesters to scale them faster than renewables did.

Who: Infrastructure

> **Government infrastructure:** More than $40bn in loans and loan guarantees are available to help deploy large-scale US energy infrastructure projects. While the LPO is infamous for its simultaneous bets in Tesla and Solyndra back in Cleantech 1.0, new directors Jigar Shah and Vanessa Chan are reviving the Loan Office and Office of Tech Transitions, respectively, to be more accessible for climate tech entrepreneurs. They're open for business - current available loans include ~$18bn for advanced technology vehicles manufacturing, ~$11bn for advanced nuclear energy, $8.5bn for CCUS and other advanced fossil, $4.5bn for renewable energy and efficient energy, and $2bn for tribal energy development. → Read more from our **Founder's Guide to DOE** and **Investor's Guide to DOE**
>
> Who: Government

## Other

*Along the way, you might also consider...*

**Alternative credit:** Other forms of credit that exist underwrite based off inventory, purchase orders, and revenue. Inventory and PO financing is useful for companies to pay for inventory and purchase orders before generating revenue. Equipment financing and hardware-as-a-service models are also gaining traction, providing capital-efficient ways to scale hardware-heavy solutions with less upfront costs. Revenue-based financing (RBF exchanges cash investment for a portion of revenue for a pre-agreed term or up until a cap is met. Although revenue-dependent instruments and royalty financing have existed in capital markets, RBF has become more mainstream for post-revenue high-growth startups with strong gross margins. New entrants like Enduring Planet now offer RBF more broadly to climate companies.

Who: Banks, Revenue-based Financing Platforms

**Partnerships / Offtake / Procurement:** The power of the purse from corporates or governments can powerfully accelerate climate tech co's growth through early purchases or offtake agreements, guaranteeing future revenue. By signing up early for orders pre-launch and paying some portion upfront, corporate or government purchases can fund climate startups' buildout. For financing capital-intensive hardware or factories, it can make sense to form a JV, leveraging the corporate's development and operational experience (and credit profile for bankability) and the startup's technology innovation.

Who: Corporate VCs, Corporates

## Exit | *You made it! Sort of*

There's a lot of ink out there already on multiple paths to exit, most of which are not unique to clima

There's a lot of ink out there already on multiple paths to exit, most of which are not unique to climate except for two key points: 1) later stage climate companies, particularly those with heavy government or project based financing, likely already have a high level of disclosure and obligatory reporting, and 2) public markets, due to various growing ESG mandates, are thirsty for companies that offset carbon or demonstrate a positive environmental benefit. These two factors make climate exits, when eventually they do come, a more attractive option to reduce the cost of capital to public market levels.

**IPO / SPAC:** These acronyms both boil down to becoming a publicly-traded and owned entity. The climate tech SPAC frenzy has lost its luster since its 2021-22 heyday, though SPACs still remain a viable vehicle for capital-intensive solutions looking to go public. Good SPAC candidates should have some traction (or iron-bound offtake agreements from corporates), proven pipeline, and strong ESG story with a big TAM. That said, many climate companies are staying private longer, focusing on scaling before public scrutiny.

**M&A:** A good old M&A purchase from a strategic acquiring technologies or assets to accelerate decarbonization goals, or financial sponsor betting on the transition theme for long-term returns.

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## ABOUT SIGHTLINE CLIMATE

Sightline Climate is the market intelligence platform bringing clarity to the new climate economy. Sightline Climate's subscription intelligence product provides data, tools, and frameworks to help investors, corporates, and governments build and finance the new climate economy.
Explore Sightline Climate: **www.sightlineclimate.com**

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