

THE INDIA CLIMATE FINANCE REPORT



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Introduction

We started the Climate Capital Network 4 years ago as a platform to connect capital allocators across climate sectors and stages in India. Our focus then, as is now, has been on strengthening the continuum of capital, highlighting gaps and opportunity areas in the climate capital stack, and enabling more capital to flow efficiently to impactful climate innovations.

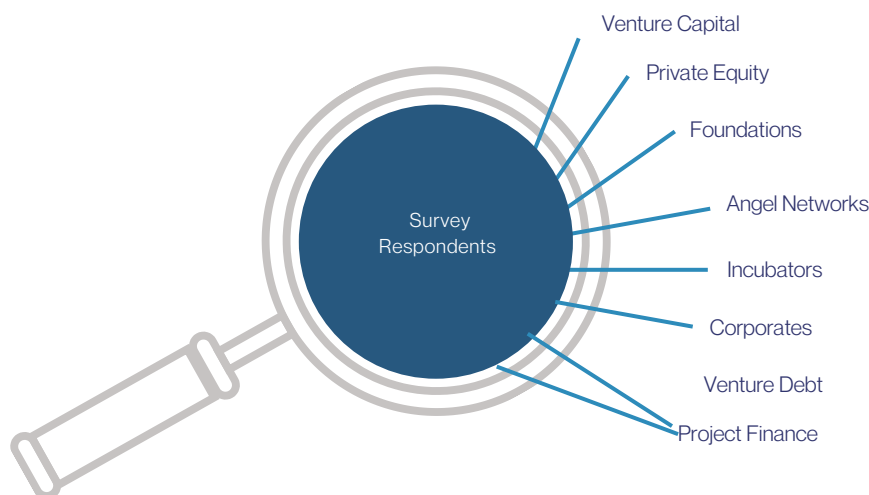
In the 4+ years of running the Network and working across the ecosystem, we have seen a radical shift in investor engagement with climate technology. Climate investing has grown from a niche investment vertical market to a widely recognised market that attracts billions of PE and VC capital globally and in India. In 2023, venture and growth investment into climate totalled [\\$32 billion](#) around the world and [\\$804 million](#) in India. The size of our network reflects the vast opportunity and high levels of enthusiasm.

Given this step change in the flow of capital, one would assume that the ecosystem in India has evolved and that the continuum of capital functions smoothly, with multiple instruments and funding approaches accessible and affordable for scaling climate innovations.

We decided to unpack this hypothesis in the third India Climate Finance Report and examine what really exists in terms of a continuum, how smooth the handovers are and what's still missing to enable climate innovation at scale.

Our report is a combination of survey insights and deep-dives/ guest articles from peers and partners in the ecosystem. With the focus on mapping, this time we've requested guest articles from stakeholders working at very specific points/ junctures of the continuum, and asked them to comment on what's working and what isn't. We've also tried to highlight the opportunity for family offices and emerging foundations with more broad-based/ flexible mandates. Also as always, we have highlighted the role of appropriate and accurate climate impact measurement, as a reflection of the value created.

Our survey respondents were:



We are grateful for the time and insights of our many contributors and fully recognize that there may be experts, funders, and perspectives we may have missed while compiling this report. We apologize for any oversights and welcome additional viewpoints—please feel free to reach out to us directly.

About Us

The Climate Finance Report by the Climate Capital Network (CCN) is the annual landscaping of the opportunities and white spaces in climate finance in India. Others in the ecosystem do a great job of summarising the flow of climate finance (primarily equity investments) to innovation in India and quantifying the insights. We refer to them through the report as foundational knowledge/ information. Our primary focus is on emerging trends, white spaces and climate finance instruments and showcase insights from organisations who are using innovative approaches. We see our report as complementary to understanding the lay of the land.

This report was produced by the CCN team with primary contributions from Maya Chandrasekaran and Maanya Rao.



[Green Artha](#) is a climate innovation and investment firm founded with the purpose of creating climate impact at scale. Green Artha operates by proving models that leverage a systemic approach to address market gaps and enable the larger ecosystem.

Green Artha works at the intersection of climate innovation and finance to accelerate the speed and scale of the adoption of impactful climate technologies. Apart from investing in transformational technologies, its work mobilizes new capital, creates a continuum of capital and develops the ecosystem.

Contact us at maya@green-arth.com/ starlene@green-arth.com



The Climate Capital Network was seeded in October 2021 with a view to creating a platform for capital allocators across the climate ecosystem in India to connect, exchange ideas, discover areas of mandate alignment, share pipelines, and build the continuum of capital. Given the nascency of the climate innovation (and climate finance) ecosystem in India, we were very intentional in our coverage across the capital spectrum – from philanthropic grant funding, through debt and equity – the returns spectrum – impact-first through to fully commercial – and across the breadth of climate sectors – far beyond energy and mobility.

To date, this is the only Network in India for and by climate capital allocators. Network activities are broad and include investment showcases, thesis deep dives, sector deep dives, panel discussions on topics of emerging interest and member offline connects.

Capital Flows

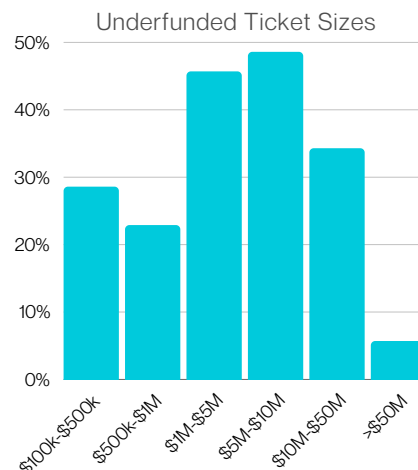
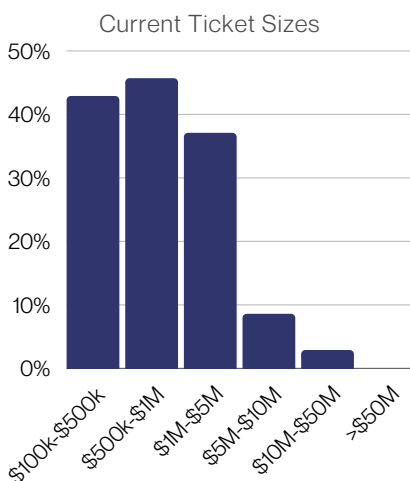
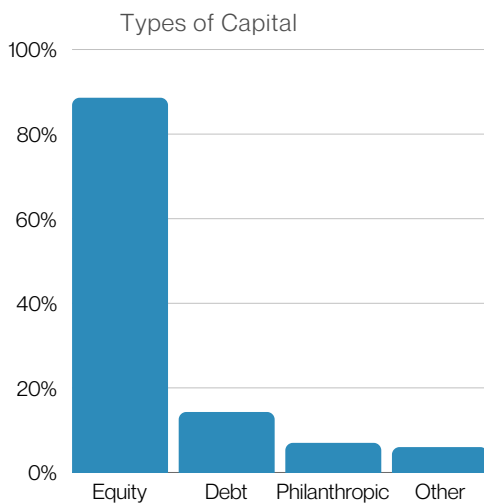
Each year, we survey members of the Network and other climate-focused capital allocators to gain insights into the evolving climate finance landscape. Our objective is to go beyond merely collecting funding data and draw out forward-looking trends, assess market risks, highlight key areas of innovation, and explore opportunities for collaboration among investors and funders. This year's survey revealed significant evolutions as well as persistent gaps in the Indian climate finance market.

Growing Funds but Limited Wingspan

On a promising note, there has been a clear increase in funds identifying climate as the focus of their mandate, driven by the emergence of multiple sector-focused funds dedicated exclusively to climate tech.

Where things get trickier is at the cheque size. Most of these new funds, alongside existing players, are concentrated in the \$100K to \$1M ticket size range. While there is significant activity at this level, the capital gap between \$1M and \$10M remains. 48% of funders highlighted a shortage of funding/ insufficient capital in the \$5-\$ 10M (Series A) stage while 45% recorded similar constraints in the \$1M to \$5M (Seed/ Pre-Series A) range.

This funding gap is reflective of the evolving market dynamics. In prior year surveys, while later-stage funding was highlighted as a missing piece of the climate finance toolkit, it didn't stand so clearly front and centre. As more startups and business models scale to capture a larger market share, their capital needs increase significantly – starting from Series A and beyond. These requirements remain underserved, a point that is now keenly felt by both funders and founders.



How they deploy and where its still lacking

New Instruments in the Capital Toolkit Needed

To bridge this Series A funding gap and beyond, we asked investors what type of additional capital instruments are needed. Blended Finance emerged as a vital tool in our report last year, and continues to be called out this year with even greater emphasis. Other critical tools, instruments, and approaches identified include Series B+ Equity, public finance-linked instruments such as Climate Resilience Bonds, Climate Linked Securities, Sustainable Development Bonds, and Green Revolving Funds.

We spotlight here some specific emergent approaches that our survey brought up. This is only a small sub-section of what is possible. Please see our [2023 report](#) for a longer, comprehensive list of innovative approaches and tools across the spectrum, and managed by philanthropy, private and public markets.

Democratising Climate Finance for Innovation: Engaging retail investors through models such as crowdfunding and pooled retail funds, expanding access to climate finance.

- **Carbon Equity, a Netherland-based Fund of Funds, enables retail investors to participate in climate tech private equity funds—an opportunity traditionally limited to institutional investors and high-net-worth individuals. By pooling capital from smaller investors, Carbon Equity enables access to larger, institutional-grade climate investment opportunities. The fund invests across various sectors such as renewable energy, electric mobility, and carbon capture technologies, offering retail investors a diversified portfolio of investments.**
- **Raise Green is a crowdfunding platform enabling community-driven project finance. The technology platform equips communities with toolkits enabling them to develop climate infrastructure, such as small-scale solar or energy efficiency upgrades. These projects are also paired with institutional or individual non-accredited investors. By enabling investments starting as low as \$100, Raise Green democratises both the ownership and the benefits of climate infrastructure, making it accessible to a wider range of investors.**

An alternate PE/VC approach by investing in climate companies and projects with minimal dilution.

- **Generation Investment Management’s Just Climate Fund focuses on the heavy asset, hard-to-abate sectors. By investing in both project companies that manage assets like renewable energy installations and corporate entities, the fund offers non-dilutive financing options such as debt and structured equity. This allows companies to retain more ownership while accessing the capital they need. For CapEx-intensive businesses, large-scale financing often proves more beneficial than equity rounds. Additionally, the fund joins the select group of investors who are tied to performance-linked compensations for their climate investments.**

“I find the various models of results-based financing very innovative and exciting. It not only incentivises correctly but also staggers funding in order to sufficiently de-risk investors. Blended models of multi-donor, results-based financing are the way to go for climate tech, in my opinion.”

- Smita Rakesh, Social Alpha

Securitized debt instruments provide an investment mechanism with reduced risk exposure. These instruments aggregate revenue-generating assets such as renewable energy infrastructure, and issue debt securities with returns generated from the income produced by the underlying assets.

- SolarCity, a U.S.-based solar energy services provider, launched the first-ever solar asset-backed securities (ABS) backed by cash flows from a pool of 6,596 mainly residential solar panel systems and power purchase agreements in California, Arizona, and Colorado. The company raised \$54.4 million at a 4.8% interest rate with a 13-year tenure, paving the way for similar green energy securitisation across the industry. This helped SolarCity, and later companies like Tesla (which acquired SolarCity) raise capital to expand their solar energy operations while offering stable, asset-backed returns to investors.

Debt at Every Stage

While debt has consistently been identified as a capital gap/ challenge, this year we took a deeper look into the instrument, both to understand the different needs for debt capital in the startup journey as well as the vantage point of some of our Network members on where they find deployment challenges.

All our debt respondents indicated that they begin providing debt when startups are either generating revenue or have a line of sight on profitability. However, the use cases for debt were broad and span multiple stages of growth.

At the early stage, debt is essential to address working capital needs, as startups lack access to traditional bank financing.

Although venture debt is available in the Indian market, it falls short of addressing the varied needs for climate tech innovations. See more insights from our climate debt network members on page 24.

Conversely, debt also plays a pivotal role for growth-stage startups to support infrastructure scaling of capital-intensive technologies.

First-of-a-kind (Foak) funding, which is essential for this purpose, is notably absent in India. Learn more about what it takes to create this instrument on page 19.

Apart from use cases, investors also highlighted the role of **blended finance debt instruments** in providing cushioning or first-loss guarantees.

Ecosystems for Impact

While this year's edition focuses on the continuum of capital, scaling climate startups requires a coordinated ecosystem effort. Investors stressed the role of three key levers essential for supporting capital investments in India:

- Non-dilutive R&D funding: Increased support from universities and the government to facilitate R&D at the university level, enabling scientists to transition into founders
- Corporate Support: Active engagement from corporates to provide commercial-scale demonstrations for startups
- Clear Policy and Implementation: Well-defined policies coupled with systematic execution at the local level.

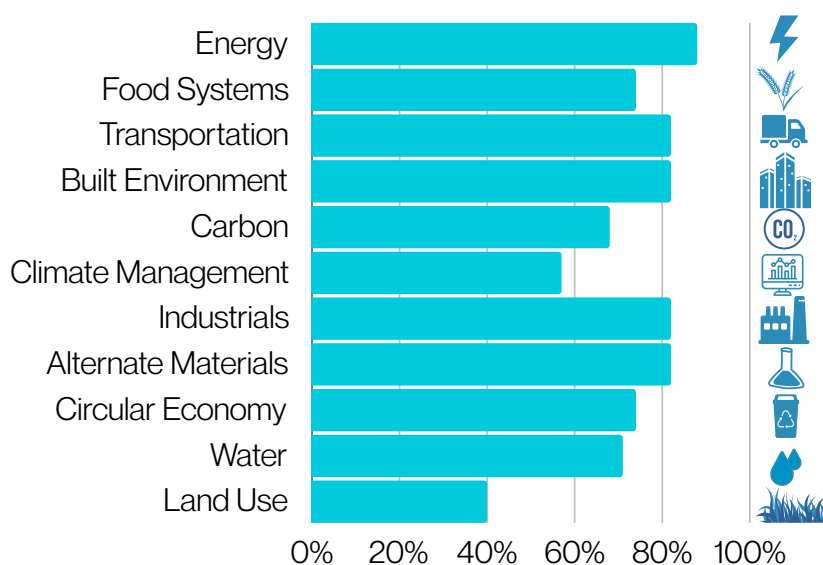
These gaps were highlighted in our report last year and are evidently still a work in progress.

Funding Sectors: Old Favourites & New Entrants

From a sectoral lens, Energy and Transportation continue to reign as the top investment areas for funders, with specific interests in energy efficiency, long-duration energy storage, waste heat recovery, and alternate fuels.

An interesting evolution of the sectoral landscape this year is the emergence of Built Environment, Industrial Decarbonisation, and Alternate Materials as high-priority sectors.

These areas now tie for Investor interest with the Energy and Transport sectors, with over 82% of respondents highlighting these 4 sectors as priority areas. The Waste and Water sectors followed closely, with 74% and 71% of respondents indicating strong interest.



Renewed interests in these top four sectors can be attributed to India's rapid economic growth, increasing energy demand, rising manufacturing output, and the entry of new funders into the ecosystem.

An emerging cohort of Family offices and Corporate VCs, bringing specialised business and technical expertise in industries such as construction, automotive, chemicals, and others, are driving a new interest in climate tech areas aligned with their core businesses.

While we are excited to see the extension of investor interest in hard-to-abate sectors like Industry, Alternate Materials, and Built Environment, to truly decarbonise, the multiple capital gaps must be bridged. We asked our expert network from across the capital stack to weigh in on what's working, what isn't, and how they think this bridge should be constructed.

Ecosystem partner Impact Investors Council comments on key emerging trends in the world of equity investing, and more specifically what's motivating these changes in the depth and breadth of climate tech investment.

Guest Article



The Evolving Landscape of Climate-Tech Investing: The Horizon Broadens

Divya Pinge and Neha Bhatnagar - Impact Investors Council

As we, at the Impact Investors Council (IIC), continue to track the investment trends across high-impact sectors, one space that stands out in recent times for the sheer spike in investment volumes is climate tech.

\$2.6 billion worth of equity investments! - a figure that the sector raised during the decade of 2010 to 2020, is now seen being invested in just 3 years (2021 to 2023). Evidently, innovations and investor interest in this segment have come a long way. As per IIC Research, climate tech commanded more than \$850 million of equity flows in 2023, a close second to the 'financial inclusion' sector.

Investments made in clean energy innovations shaped the climate-focused investment narrative in the initial years. However, domestic policy support, increasing customer interest and international trends have led to 'sustainable mobility' now becoming the forerunner in the investment landscape.

Even as Electric vehicle (EV) Original Equipment Manufacturers (OEMs) continue their bull run, we observe investors looking to participate in the development of the EV ecosystem. Investments across the life cycle of the lithium battery, stood at close to \$150 million in 2023 i.e. more than 20% of the investments in sustainable mobility. Battery management solutions including battery charging, swapping and recycling have seen the participation of impact investors such as British International Investment (BII), Avaana Capital, Green Frontier Capital and Theia Ventures to name a few.

While we expect this growth in EV-related investments to continue, other innovations emerge high on investor interest. Waste management solutions, recycling and upcycling technologies, products that use biodegradable materials; and essentially innovations that focus on the development of an environmentally conscious and circular economy have seen a noticeable increase in equity investments since 2020. Close to \$250 million worth of equity investments have been made in this segment from 2022 to 2024 (till June 2024) which is noteworthy given that this segment represented single-digit investment value in 2021. Our conversations with investors indicate that while waste management holds immense investment potential, there is a clear requirement to drive more private capital towards waste collection and segregation solutions - the infrastructure of a sustainable waste management value chain.

Another strong emergent theme is the strong correlation between climate-focused solutions and other high-impact themes such as agriculture, healthcare, financial inclusion and Water, Sanitation and Hygiene (WASH). 'Climate-smart agriculture' technologies have raised \$80 million in 2023, where we observe innovations in hydroponics, organic farming and precision farming, raising capital. With the climatic impact on health being a prime concern, we have observed water and air technologies raise funding in recent years. The execution capabilities for newer technologies, which are often untested, would have to be paid attention to, in order to avoid delays in scale-up. Addressing ecosystem challenges and demonstrating more success stories in the sector would be critical steps in building more investor participation.

We see the space of climate tech evolving not just in terms of tech innovations but also in the blend of investors participating. While angel investors and venture capitalists continue to bring in early and growth-stage capital, we also see Corporate players taking equity stakes in innovative enterprises. Examples like Hero MotoCorp which has partnered with EV OEM Ather Energy and Bajaj Auto which has invested in Yulu Bikes, are demonstrative of the synergies that are emerging within the larger ecosystem.

As an industry body that engages with different stakeholders, we see an increasing interest from domestic and international family offices, philanthropic foundations and even Corporate CSR, who are looking to invest in climate action. IIC has enabled solid interactions with global family offices from India, Singapore, the UK, the US, Switzerland, Germany and other EU countries. These conversations have demonstrated the keen interest that the younger generations of established business families have in developing an investment strategy that is not misaligned with urgent climate action. We observe their inclination towards 'doing good' and creating a positive impact; a possible outcome of increasing awareness globally, on the perils of climate change. Success stories that have demonstrated commercial viability as well, are an added incentive for them.

With Indian policy being conducive towards the growth of startups in India, we observe international investors viewing India as a promising investment destination. International family offices are looking to develop their understanding of India's impact investing landscape, acquaint themselves with upcoming innovations and develop an investment thesis backed by data-driven insights and ecosystem synergies - a place where we at IIC, continue to drive our efforts. On the other hand, Indian family offices, equipped with a better understanding of what 'impact' means in the Indian context, are inclined to participate in innovative financing structures, with climate being high on the agenda.

Our interactions have also led us to understand the enablers that such investors seek, for a more mainstream participation in the impact investing landscape. One key factor mobilising their participation would be the presence of a trusted intermediary connecting them to fund managers who are seeking to create impact. IIC, with our efforts like The India Room and other in-person convenings, are working in this direction.

As the narrative around climate-tech investing strengthens, we expect newer themes to emerge as investment opportunities, even as existing segments continue to grow. Our interactions show that building investor confidence in climate-tech investing in India would be fueled by robust impact measurement processes, the development of sustainable ecosystem relationships, demonstrating more success stories in the sector and knowledge exchange.

Building a programmatic approach to driving knowledge sharing and investor participation for the climate agenda continues to remain an area of focus for IIC - steps that we see will go a long way in fostering trust in India's evolving impact investing narrative.



All parts of the capital stack are critical. While Foundations and Philanthropies have traditionally funded conservation projects and some of the [more prominent areas of climate action](#), in this piece Rohini Nilekani Philanthropies Foundation describes some of the innovation funding opportunities for climate philanthropy in India.

Guest Article



Funding for Conservation, Community Resilience, and Climate Adaptation

Tanya Kak - Rohini Nilekani Philanthropies Foundation

Farmers for Forests, a Rohini Nilekani Philanthropies (RNP) partner, is working on a mission to increase and protect India's biodiverse forest cover, while also working on farmers' livelihoods using a payment for ecosystem services model. While their entry point was forest protection, their community members often asked them, "Aren't you here to help? Then why aren't you helping us with our houses and fields being destroyed by elephants and getting better prices for our agricultural and forest produce?" However, the community's demands quickly helped them understand that working for conservation and climate change is intrinsically linked to the daily livelihood challenges these communities face.

At RNP, our funding approach adopts a holistic lens to deal with the twin challenges of conservation and climate change, while supporting the livelihoods of those most affected. In the initial years, our curiosity led us to expand from the conservation of individual species to looking at wider ecosystems and habitats. At the same time, the reality of climate change meant a certain urgency was attached to addressing these challenges with speed and at scale.

While philanthropic capital can be catalytic and fund riskier innovations, it has allowed us to take a long-term perspective to invest in building resilient networks, local capacities of communities, and facilitating systemic transformation. For example, while India is one of the world's 17 megadiverse countries, many species are threatened, and land degradation continues to be a challenge. We have also seen multiple small and independent organisations carrying out valuable restoration work and amassing a wealth of experience. In order to make these rich insights accessible beyond the fragmented silos in which they exist, and to create a community of practice that is able to leverage and action this information readily, Rainmatter Foundation and RNP supported the emergence of a platform called Ecological Restoration Alliance (ERA), India. ERA partners are a group of organisations and individuals who have directly engaged in the practice of ecological restoration and generating knowledge about ecosystem restoration. Currently, they operate in 24 states, have over 350 individual members, and 8 institutional partners. From coastal ecosystems to high-altitude mountainous terrains, the alliance's biggest strength lies in the diversity of practice, the expertise, and the varied landscapes that its members operate in. ERA has moved from just being a network to a movement that addresses hyper-local restoration challenges while enabling replication and scale through local innovations and peer networks.

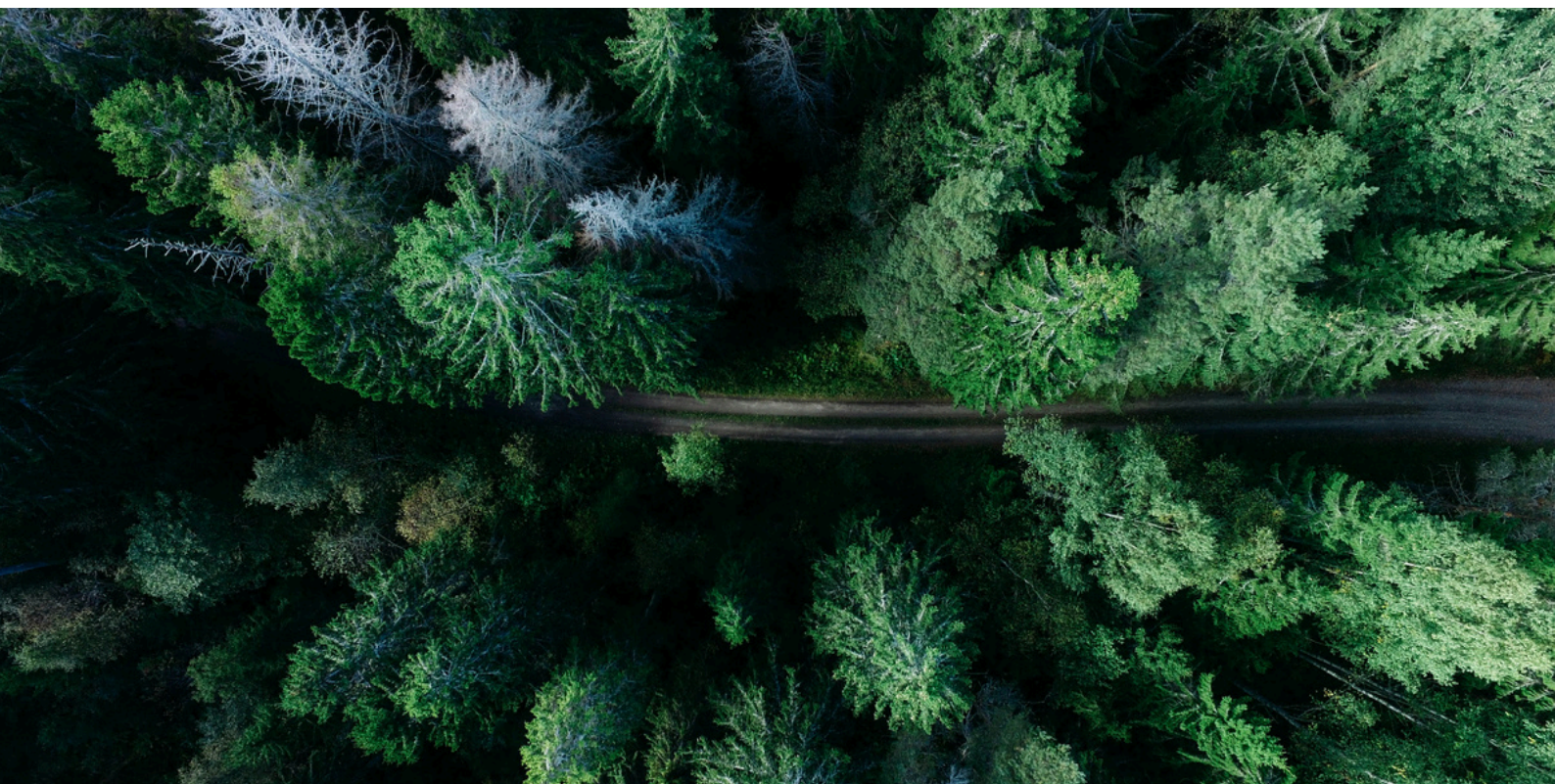
This example showcases how philanthropy can support ecosystem-building efforts. We have also found the following levers to be useful in our funding journey:

- **Multi-year, unrestricted grants:** Climate change is a series of compounding risks that will be felt globally as a social and economic reality. Philanthropic efforts need to mirror these concerns by balancing a sense of urgency with the patience and flexibility that is required to affect such long-term changes. With this in mind, the majority of the grants at RNP are multi-year, unrestricted grants that allow us to act as co-learning partners to our grantees. In a survey that we recently concluded with 90+ partners across our different focus areas, almost all of them highlighted how the unrestricted grants have given them the freedom to experiment and innovate

with new solutions, provided the cushion to respond to regular organisational challenges, and be agile enough to adapt to future needs, and make new pivots. One of our partners, WELL Labs, highlighted, “The unrestricted support gives us the freedom to experiment; it allowed us to raise 3X the amount of program funding than the previous year”.

- **Rethinking traditional methods of doing monitoring and evaluation:** As we have learned from giving unrestricted grants, the impact can be a spectrum of tangible outcomes such as collaboration, enhanced reach and scale and intangible behavioural change such as feeling empowered, living with dignity etc. Being tied to traditional notions of evaluating progress on key performance indicators or rigid project metrics can be limiting. Instead, funders can help by focusing on building the resilience of their partners and adopting a mix of qualitative and quantitative methods to look at progress.
- **Supporting networks and platforms that leverage collective wisdom:** The climate crisis affects everyone globally, and hence, cannot be solved by one individual or organisation in isolation. While targeted interventions are important, a network that brings different actors together to build and sustain vast, reciprocal connections that enforce mutual growth and leverage collective wisdom is crucial. For example, in 2020, Tata Trusts, McArthur Foundation, Edelgive Foundation, and Rohini Nilekani Philanthropies came together to build a first-of-its-kind climate philanthropy collaborative, India Climate Collaborative (ICC). Building bridges between a diverse set of actors - governments, philanthropies, businesses, civil society organisations, and research institutions, the ICC helped to mobilise domestic funds, scale impactful solutions, and facilitate collaboration across the ecosystem to enable climate action. Given all of these efforts, domestic donors are emerging in the Indian context to catalyse climate action; India has witnessed a 2.2X increase in total philanthropic capital towards climate-related action in the period between 2018-2023.

India faces the challenge of having to respond to climate change while balancing its developmental needs. Philanthropy has the opportunity to root India’s climate story in both - equity and efficacy. Its unique ability to hedge risks, support innovations, and pave the way for other funding makes it well-suited to take on this mandate.



Supporting early-stage climate technologies calls for much more than just capital. Third Derivative breaks down what it really takes to scale at the early TRLs.

Guest Article



'Entrepreneering' Market & Capital Readiness

Chetan Krishna and Alexander Hogeveen Rutter - Third Derivative

Noubar Afeyan, co-founder of Moderna, believes that the word 'entrepreneurship' should be replaced by 'entrepreneering' (à la 'engineering'), implying that good venture building is a structured discipline defining the problem and solution systematically. While there is always a need and room for inspired genius in venture building, innovation is fundamentally a process of successively and systematically retiring risk by building and testing hypotheses, which anyone can learn, not just a special few.

Given the enormity and complexity of the decarbonisation and sustainable development challenges India faces, we need a literal army of 'entrepreneers' to build solutions and scale them systematically.

We also need an ecosystem supporting these companies with resources and a long-term view to de-risk and scale climate solutions that commit to this systematic process. At Third Derivative, since 2020, we've had the privilege of working with nearly 20 Indian and about 235 global startups. Here are some of our key lessons:

1 - Begin solution development with the end in mind: Both technical and business innovation involve a large 'search space' of possible solutions, but only a few will be commercially viable. Venture building is about seeking commercial viability and scale from Day 0. Even when the technology is not proven, founders should build confidence in what customers will buy and that the market will sustain, and do so in a least-cost manner by gathering proof via letters of interest and intent, pre-orders, or recorded customer feedback. Investors find far more conviction when the value proposition and market interest are backed by evidence.

Alt Mobility, an EV financing solution for commercial fleets tested out the value proposition and built conviction with small experiments and frugal amounts of capital, going from less than 100 vehicles in 2022 to over 6000 today.

2 - For complex B2B climate technology, find sophisticated champions and partners in corporations as early as possible: These solutions include decarbonising industrial heat, LC3 cement, clean and efficient cooling, long-duration energy storage, etc. A recent study of over 3000 global climate tech startups found that when corporate players invest in startups at any stage, exit rates can improve by over 150%. Corporates provide technical diligence, validation, and proving ground and soft resources for risky technologies, particularly at the proof-of-concept and first-of-a-kind commercial stages. For financial investors, corporate diligence and engagement can also provide the confidence to commit to a hard-tech climate startup with unproven technology.

Mantel Capture (a point-source carbon capture solution bringing an entirely new class of capture materials to commercialisation) began engaging and developing a corporate customer pipeline while at the lab scale, leading to a meaningful demonstration project set to go online this year.

3 - Demonstrate team-problem-solution fit before product-market fit: Research shows that multi-founder teams with complementary skills addressing both technical and commercial de-risking can be twice as likely to succeed compared to single-founders. Both investors and partners find confidence in teams that can crack market problems, develop technology, and deliver at scale. The advice to early founders is to invest in building the right team and aligning incentives for long-term success.

4 - Utilise sources of non-dilutive capital smartly: While early-stage non-dilutive capital remains sparse, the

right grant strategy to retire binary technical risks can make a venture more compelling. When there is a clear line of sight to revenue and profitability, venture debt can also be a powerful lever. For grants, founders can look within India, at Rainmatter, and internationally at UN FLCTD. Some creative startups also develop alternative high-margin revenue streams through NRE or consulting first, which helps them weather long development timelines and fluctuations in risk capital markets.

This is only a small part of what is needed. An entire ecosystem of players must also commit and align with the systematic scaling process.

Corporates and other incumbents play an outsized role in generating successful outcomes in climate spaces. In India, far more corporations must take a creative and long-term view on developing solutions with early-stage founders, committing resources and time to unlock long-term financial and emissions reduction for themselves. Multiple studies of American firms showed that clever corporate venture capital activity strongly correlates with longer-term firm growth and improvements in internal innovation outcomes. This mode of corporate engagement requires an internal alignment of incentives plus a strategic commitment beyond shorter-term profit-seeking.

Indian academia can play a particularly important role and can benefit from entrepreneurial education to students, researchers, and faculty members engaged in spinning out technology from labs to the market. This includes basics such as cap table structuring, designing for an industry and market problem, hiring the right team, fundraising, and thinking with the 'venture capitalist's mindset'. Academia can also be crucial in developing ecosystem insights highlighting gaps and strengths to guide decision-making. It is telling how sparse academic research on innovation ecosystems in India is today.

Venture-building and early-stage support organisations that traditionally provide entrepreneurial education and development can also focus more deeply on climate and climate-relevant industries and sectors. One can learn internationally from models such as Rocket Internet and Idealab in the internet /SaaS space.

Finally, **grant capital** availability in India is still sparse and there is a need for both government and private actors to develop knowledge (perhaps in partnership with academia) about the role that grants can play and the critical problems and interventions that could be prioritised to maximise impact.

Fundamentally, there is no path to global climate alignment without India. DPIIT recognises nearly 150,000 technology-led startups in India, but it's telling that only ~3000 of them are climate-oriented. Given the multi-sectoral nature and scale of the climate problem, this number needs to grow by 10-20x at least to reflect the actual need of the hour. For that to happen, both Indian entrepreneurs and the Indian climate innovation ecosystem need to systematise, fund, accelerate, and scale early-stage climate 'entrepreneurship' as never before.



The evolution of the climate tech ecosystem is visible now in the number of companies that are ready to absorb early growth equity. Ankur Capital, Omnivore Capital and Neev Fund present diverse as well as overlapping viewpoints on where they see opportunity for early growth and mid market funding, as well as the parts of the ecosystem and continuum that remain unsolved.

Guest Article



Growing the Next Marquee Climate Startups

Satya Sagar - Omnivore

The long-drawn startup funding winter seems to be slowly lifting. We are experiencing an unprecedented IPO boom, and investments across early growth (Series A, B) and growth stage (Series C+) are surging.

However, VC investors now have a razor-sharp focus on strong unit economics, a clear path to profitability, and fair valuation multiples. Early-growth and growth-stage investors, sitting on more than USD 10 billion in dry powder, are actively looking for high-quality assets in niche areas.

As investment activity increases, Indian climate-tech startups are set to reap rewards. In the last two years, climate tech has been one of the most active sectors in the pre-seed and seed stages, with ~8-10% of all early-stage deals linked to climate change and sustainability. This has created a strong pipeline at the Series A/B stages and beyond.

The hard-coded, and often biased, perspectives of Indian early-growth and growth VC investors are also evolving:

- While investors typically shied away from capex-led and manufacturing-focused startups, this is no longer true; they are beginning to view manufacturing favourably, as opposed to vanilla trading & platform plays, in search of better bottom-line and increased revenue predictability
- Appetite to invest in strong IP-backed companies is increasing (and scepticism about deep tech and hardware bets reducing) as investors are seeking to invest in startups with long-term moats and spaces with high entry barriers
- As Indian public markets mature, investors are increasingly witnessing companies with strong fundamentals listed on the main board, delivering 5-7x returns for early-growth / growth investors, even at USD 400-700M valuation range. As a result, the traditional belief that VCs can realise tangible returns only if companies scale to multi-billion-dollar valuations is being broken.

This changing focus among Indian VC investors (especially among early growth and growth) bodes well for the Indian climate-tech space. Invariably, most climate-tech start-ups require investments in capex, manufacturing, and R&D, and involve science-based solutions or moonshot technologies with long gestation periods. As the Indian VC market evolves, we believe that India's climate-tech ecosystem can move towards more fundamental innovation-led startups, similar to Europe or the USA.

"Green" stocks in public markets have also displayed strong growth in revenues, delivering upper-quartile returns (>20% CAGR) to shareholders and signifying a maturing climate economy in India.

While we still expect most of the funding in the near term to be focused on electric mobility and its ecosystem enablers (like battery tech, charging infrastructure etc.), at Omnivore we are bullish on taking Series A/B bets across (a) Alternate materials, biomaterials, and green chemistry to decarbonise supply chains, (b) Green hydrogen as an energy source and as an input molecule, (c) Deep-tech for wastewater treatment and water conservation to enhance the groundwater table, (d) Securing ocean resources and improving ocean health, (e) Climate finance – innovative financing mechanisms to enable MSMEs and farmers to transition to sustainable practices, and

(f) Climate parametric insurance across energy, logistics, commodity pricing and agriculture.

Additionally, as the demand for electric vehicles increases in tier 2/3 cities and beyond, there will be rural-first models emerging to widen use-cases for electric mobility (across two-wheelers, tractors, and commercial vehicles), enable seamless EV ownership, and expand charging infrastructure.

However, one challenge VC investors continue to face is the ability to underwrite unique technologies and business models (such as precision fermentation, green hydrogen etc.) that emerge across climate and sustainability. Investors lack deep sector expertise to understand the early adoption of such technologies, how cost curves might evolve, profit pools, and the scope for long-term defensibility.

Another challenge investors face is evaluating the “right time”, or the inflexion point which would drive massive adoption and scale-up of such technologies. Often, investors are unable to comprehend the “traction” or “progress” made by climate-tech companies, and there is a need for a tailored framework (beyond traditional VC frameworks) to evaluate climate-tech startups.

Nonetheless, investors across the board are actively bridging these gaps and exploring opportunities in the climate-tech space. They are building specific expertise in their teams (via onboarding sector specialists in investment teams or as advisors) and investing time and resources to gain a better understanding of emerging technologies.

We believe that we are entering a decade where climate tech will dominate the Indian VC space, and the next set of marquee startups coming out of India will be climate tech companies.

At Omnivore, we view climate and sustainability as an underlying technological shift (like digital, AI, web3) that will unlock cross-cutting opportunities across every industry and business segment. With our new fund, we are more committed to investing across Series A/B stages in the climate tech space.





Early-Growth Equity in India's Climate Tech: Shoots of Opportunities & Challenges

Shiva Shanker - Ankur Capital

As India's climate tech landscape matures, early-growth equity is gradually emerging as a critical catalyst for scaling solutions that can address these pressing environmental challenges. While opportunities for Indian startups to build for the large growing domestic market and the global South in general are well known, the pathways for these businesses vary. Broadly, India's climate tech ventures can be categorised into four types – each presenting unique opportunities and challenges for investors.

1. Scaling proven Climate Technologies:

Scaling proven climate technologies, such as solar infrastructure projects, makes up for a significant slice of India's climate funding. These ventures focus on expanding already validated technologies to a larger scale, a process that is more about de-risking operations than technology. Given the relative stability of these models, they align more with private equity's risk-return profile than traditional venture capital and have absorbed \$2.6Bn annually in the last 2.5 years.

While funding for these models is available for early growth, the key for these businesses is operational excellence and the ability to drive efficiencies at scale. As these sectors mature, we anticipate emerging opportunities for new and existing companies to expand these technologies into less-proven applications (like residential rooftop projects), although those ventures may start to resemble the third category.

2. First-of-a-Kind (Foak) Innovations:

Foak innovations hold immense potential in the climate tech sector but are often hit by challenges in India. These ventures are pioneering new technologies, often with few global benchmarks. For example, battery technologies and biotech innovations focused on creating climate-friendly innovations are leading the way from this category, but grapple with hurdles including:

- **Capital Scarcity:** There is a dearth of India-based venture capital funds (Indian funds or Indian arms of global venture capital firms) that can lead Series A rounds for these models. These startups most likely raise funds from non-India-based strategic corporate institutions or global sector-specialist funds but since India is not an explicit focus segment for these investors yet, attracting their attention and closing the rounds in a timely manner are big concerns.
- **Strategic Partnerships:** Securing the right partnerships to pilot these technologies is challenging. While domestic partners exist, they usually demand broad-ranging exclusivity given the market's nascent stage, which can hinder wider adoption of the technology.
- **Talent Gaps:** While India boasts of software talent and talent to replicate scientific innovations, the expertise needed for hardware-based Foak projects is scarce. Building the first plant for such innovations demands specialised skills that are currently limited in number.

To solve this problem, we need targeted programs that showcase the best climate tech solutions to attract strategic global partnerships and the right talent. Government initiatives and industry-specific parks are vital to support the commercialisation of these technologies. Recent announcements of biotech manufacturing parks through the BioE3 Policy are encouraging, but similar efforts should be extended to other climate sectors to catalyse Foak developments.

3. First of a Global-South Kind Models:

Models that adapt successful global technologies to the unique conditions of the Global South have shown promise to accelerate the adoption of technologies in emerging markets. These include ventures like 2W electric vehicle (EV) manufacturers, charge point operators, and battery recyclers that are adapting these technologies for global south market realities. The technical de-risking for these models has largely been completed in other geographies, making the primary challenge one of adaptation rather than invention.

These models have been successful in attracting over \$600M in seed to Series B funding over the past 18 months, and are expected to continue to attract early growth capital as they offer a risk-return profile that sits between Foak innovations and operating models, appealing to a wide range of investors.

4. Digital Models for New Climate Markets:

Digital climate tech models, such as SaaS solutions for climate intelligence, rooftop solar financing platforms, and carbon trading marketplaces, are gaining traction in India. These ventures often have clear benchmarks through which they can be compared against non-climate tech peers, which attracts a wider pool of potential investors. Emission monitoring startups, for instance, are beginning to see some traction, drawing interest from traditional venture funds that otherwise would only focus on digital-only verticals.

While these startups raised below \$50M of funding in the 18-month period, capital for these digital ventures is expected to improve as the market matures. However, these models must navigate the challenging regulatory frameworks and ensure that their solutions are both scalable and adaptable to local market conditions.

The Path Forward

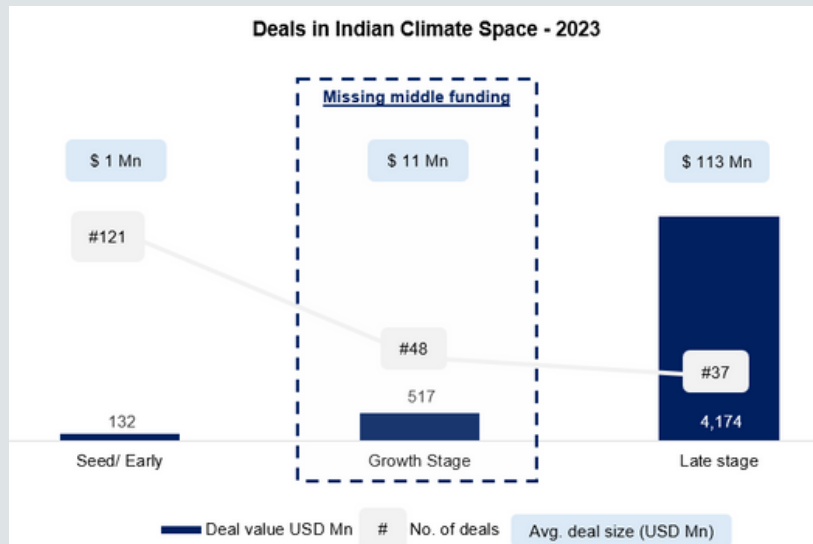
Early-stage equity in India's climate tech sector promises both, opportunity and challenges. For early-growth equity to thrive in India's climate tech sector, it will require not just capital but also strategic support in areas like talent development, regulatory alignment, and corporate partnerships. As the ecosystem matures, the role of early-growth stage equity will be pivotal in driving India's transition to a sustainable future.





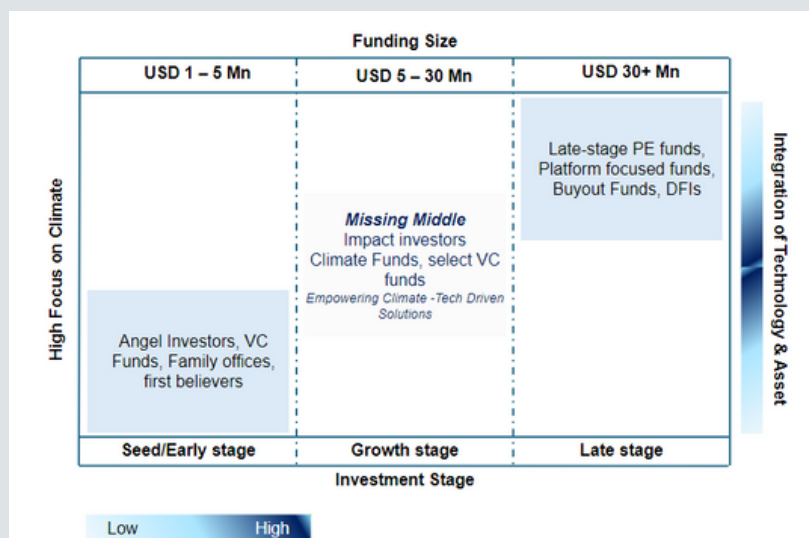
The Missing Middle in India's Climate Finance Continuum

Tejasvi Shetty and Suken Shah - Neev Fund



India's Climate Finance Landscape: A Three-Stage Journey with a Clear Missing Middle:

India's climate finance landscape is unfolding across three distinct stages, each presenting unique opportunities and challenges. This funding pattern depicts a clear missing middle, though, in India's climate finance continuum. This stage represents a pivotal juncture in the climate finance lifecycle, where startups with proven technologies and products transition into scalable enterprises capable of delivering substantial emission reductions. These ventures require capital infusion for technology-driven asset creation toward setting up manufacturing facilities, bolstering working capital for market expansion, and product commercialisation. Access to this stage of capital is critical for achieving scale and creating credibility with customers as a sustainable solution provider. However, this stage attracted only \$517 million in 2023 from climate funds and select VC/PE funds, a figure that pales in comparison to both the market demand and the capital flowing into later-stage ventures. Sectors in this segment that received funding include biofuels, waste management, sustainable agriculture, and circular economy.



Challenges and Solutions for Addressing the Missing Middle in Climate Finance:

Nascency and Market Adoption:

At the growth stage climate ventures struggle with a lack of proven scalability, established value chains and market size, and underdeveloped distribution networks. The lack of awareness about the benefits and applications of these technologies also delays adoption. Investors can employ a two-pronged strategy to enable ventures to achieve scale: (i) Market Linkages: Leveraging their expertise and networks to open new markets, fostering strategic alliances, access to technology and securing off-take agreements; and (ii) Capacity Augmentation: Implementing capacity-building initiatives including technical assistance and training programs for various stakeholders to enhance ventures' competitiveness and navigate market complexities.

Policy Development:

Policy/ regulatory development, certainty and enforcement are also key concerns. This has been evident with the success tasted in Renewable Energy (RE) tendering through SECI and EV (FAME policy, now PM E-Drive) has led to large amounts of capital being deployed in these sectors. While the government is progressively improving the policy landscape through EPR regulations, Green Hydrogen Mission, Biofuels policy, etc. - proactive stakeholder engagement and policy evolution are vital. Investors and industry players must actively collaborate with policymakers, providing technical expertise and advocating for clear regulations.

Continuum of Capital for Climate:

Nascent stage risks viz. market and policy development as outlined above have led to limited capital flow in the sector from PE/ VC funds in growth ventures. While Development Finance Institutions (DFIs) are funding climate-tech companies, they prefer large ticket sizes, and higher return expectations with preferred return structures, and therefore prioritise more established companies. While this has benefited the RE and the EV space, this creates a capital access challenge for asset development, working capital and scale capital for growth-stage companies. Recently, however, DFI's are keen to evaluate young ventures with smaller ticket sizes. The sector has also benefited from the interest of philanthropies who are providing risk capital to growth-stage companies.

This strategic shift necessitates the development of innovative financing mechanisms, such as blended finance to catalyse investments in companies that generate both financial returns and positive climate/ environmental impact. By de-risking investments for private investors and enhancing the financial viability of impactful projects, blended finance bridges the funding gap for ventures that would otherwise struggle to attract traditional financing and mobilise private sector capital.

Case study: One of Neev Fund's portfolio companies in the climate adaptation sector addressing India's food security problem - Leap India Food & Logistics Pvt Ltd (Leap) - played an instrumental role in revitalising India's archaic grain storage sector. Beyond capital infusion, Neev Fund, alongside Leap worked to strengthen the sector by creating an Association of Silo Developers and Operators (ASDO), a unified industry voice. ASDO's advocacy led to FCI quadrupling its silo storage capacity plans, ensuring food security for millions. Further, to tide over the impact of COVID-19, Neev Fund also supported Leap with low-cost concessional funding, which enabled timely completion of projects despite the impact of COVID. This success spurred further private sector participation, and Leap Today has turned into a leading agri-warehouse company in India which secured large commitments from a leading sovereign wealth fund.

The influx of growth capital in consumer, retail, and technology sectors despite the competitive nature of the business has led to the proliferation of newer brands, business models and technologies. In a similar vein, Climate-tech companies are looking for their "Flipkart Moment" to attract large capital into innovative businesses. It takes only one powerful success story for the sector to succeed, and we see the work at the Missing Middle as being important to the sector's success.

FoK-Tales for India

Green Artha

FoK, or First of a Kind, funding has been repeatedly highlighted in the Climate Finance Reports as an important and currently unaddressed need in India. [Prime Coalition](#) (Trellis Capital), [Siteline Ventures](#) (CTVC), and [Extantia](#) have done an excellent job defining the contours of FoK funding and how it's been done so far in the US and Europe. Building on this valuable foundation, FoK needs to be adapted to be effective in developing markets to account for different market norms, regulations and capital availability. *Here we contextualise FoK to the Indian market.*

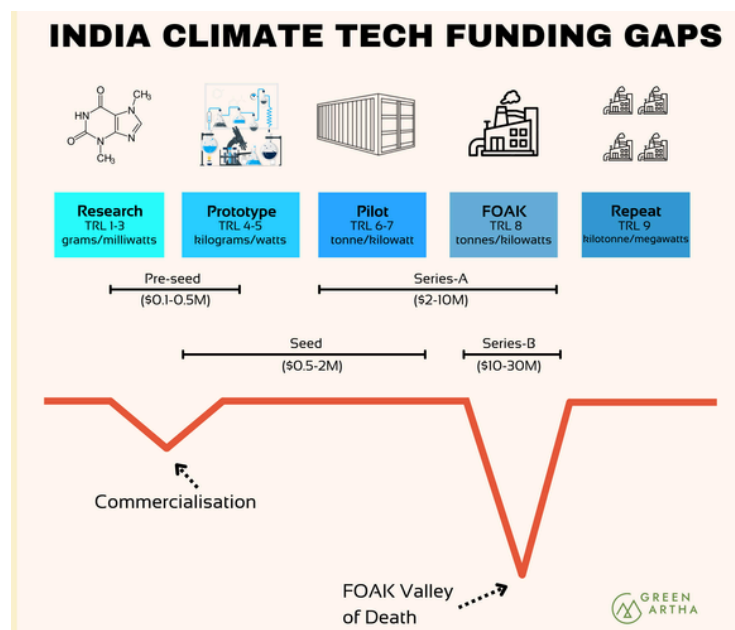


Image sourced from Extantia and adapted to Indian Market by Green Artha

As a brief background, FoK funding is a core part of the Green Artha approach. We invest in technologies and business models that will form the backbone of economic development and are necessary to enable the green transition. Often the nature of these businesses - providing products and infrastructure for Energy Transition, Industrial & SME decarbonisation, Built Environment, Circularity & Resource-Efficiency and Green Chemistry - require FoK (and second-of-a-kind) funding to prove commercial viability and secure capital to scale.

When thinking about FoK in India a few key differences include:

- **Market Conditions:** India is a market in which labour costs are lower than in developed economies; at the same time, material costs and availability are competitive due to strong domestic production and consumption.
- **Capital:** As with other developing markets, non-dilutive capital is less available, has a higher capital cost and often a lower risk-threshold.
- **Stage and Ticket Size:** As in the US and Europe, FoK funding is typically required around the TRL 8 stage, post-technology derisking and pre-commercialization. However, in developed markets, FoK funding falls within the range of \$25mn-\$50mn or higher. Due to capital constraints, Indian innovators frequently take a modular approach to building technology so FoK funding requirements typically range from \$2-10mn.

- **Timeframes: As a result of modular product development, testing and scaling feedback loops are relatively faster in India, with an ability to iterate and operationalise iterations with agility.**
- **Commercialisation support: Many of the innovators are first-time entrepreneurs and primarily technologists and require commercialisation support to navigate manufacturing, operations, supply chain management, business models, negotiation with large enterprise/ corporate customers and tying up appropriate financing.**

As with other markets, *securing the right capital is the greatest challenge for Foak-ready technologies in India*. The capital stack is neither mature nor deep enough at this point to support the nuanced requirements of this type of financing.

Grant funding for for-profit climate innovation is practically absent, with private philanthropic funders typically preferring to fund areas where there is a proximate and tangible human impact. A few organisations ([Spectrum Impact](#) and [Rainmatter Foundation](#)) will support for-profit innovations with non-dilutive funding, but they are very much the exception. A handful of government and public grants also exist ([BIRAC-BIG](#), [NIDHI Prayas](#), [Startup India Seed Fund Scheme](#) and [DST](#)) but both the number of grants and the quantum of grant funding available in the market are misaligned with the Foak funding requirements.

Debt is not designed to be a risk-taking capital instrument. In India, debt often comes at too high a cost, with collateral requirements and/or standards that are not viable for a startup; even when a startup has secured long-term contracts from blue chip customers, banks and NBFCs are often uncomfortable financing a Foak project. As a bright spot in the market, [TDB](#) offers a very impactful facility to support the build of first commercial plants; however, its diligence process makes accessing the facility and aligning capital at the right time challenging for many startups.

Equity, as a risk-taking capital instrument, is **clearly the most fit-for-purpose for Foak funding**. It aligns incentives and long-term risk and reward between the capital provider and the startup but requires a specialised approach to the market and to the scaling of climate technologies.

We've gone through this journey with several IP-led climate technologies and innovators, helping them unlock markets, negotiate robust offtake/ purchase/ development agreements to lock in demand and manage capital requirements, raise concessional debt, and build ongoing relationships with future commercial debt funders.

In our experience, all of this is eminently doable and viable for an equity fund/funder, and primarily calls for:

- **A more strategic approach to capital deployment to create a pathway from Foak to Noak**
- **Deep understanding of, and experience with developing the most appropriate capital structure**
- **Access to, and relationships with the right types of affordable debt-funding**
- **Understanding of commercialisation cycles within large customers/ off-takers and experience guiding entrepreneurs on commercialisation**

The Foak Valley of Death is very real. While there are a few emerging names around the world, significantly more specialised capital and Foak funds are required in India for our emerging climate innovations to make a meaningful economic and environmental impact.



Last year our colleagues at [Prime Coalition](#) launched the Early Climate Infrastructure (ECI) program to focus on infrastructure funding and supporting FoAK technology needs. More recently, the ECI program rebranded to [Trellis Climate](#), where they have continued their mission to demonstrate high-leverage, repeatable opportunities for philanthropy to crowd in traditional project finance, thereby accelerating the deployment and scale of critical GHG mitigation solutions. They have made initial investments in a highly related space, providing development capital for two companies. These early investments include [Ample Carbon](#), a company that converts retired coal plants to bioenergy with carbon capture and storage while developing local biomass supply chains, and [Ebb Carbon](#), a marine carbon dioxide removal company that is employing a novel electrochemical ocean alkalinity enhancement process to draw down atmospheric carbon. Funding will be used by Ebb Carbon to conduct engineering studies on a portfolio of sites and by Ample Carbon to support a feasibility study for its project.



An emerging cohort of sector and impact-aligned family offices is now actively engaged in climate investments. Spectrum Impact provides some guiding principles for family offices looking to fund climate innovation, as well as tangible examples of their work in these areas.

Guest Article



The Role and Opportunity for Family Offices in Funding Climate Tech Innovation in India

Mirik Gogri and Sreenivas Chigullapalli - Spectrum Impact

Family offices in India are uniquely positioned to play a transformative role in funding climate tech and innovation. As stewards of multi-generational wealth coupled with business acumen, family offices can adopt a long-term vision that aligns with the urgency of addressing climate change. The flexibility and intentionality with which family offices like Spectrum Impact approach climate finance can be a model for others, demonstrating how strategic investments can create significant environmental and economic value.

The Rationale for Family Office Involvement:

India is at a critical juncture in its climate journey. As one of the world's fastest-growing economies and a significant contributor to global emissions, India has the potential to lead in climate innovation. However, transitioning to a low-carbon economy requires substantial investment in emerging technologies and innovative solutions. While traditional sources of capital, such as venture capital and private equity, play a role, they often seek shorter-term returns and may shy away from higher-risk, early-stage innovations.

Family offices, however, can take a different approach. With greater freedom to deploy capital without the pressures of external stakeholders, family offices can afford to be patient and support disruptive technologies that may take longer to mature. This patient capital is crucial in the climate tech space, where developing new technologies, such as carbon capture, alternative proteins, and sustainable agriculture, often requires sustained investment over many years.

Quantitative Insights:

In 2023, climate tech investments in India reached a record \$2.5 billion, a significant increase from previous years. However, the demand for climate financing far exceeds this, with estimates suggesting that India will require [\\$10.1 trillion by 2070](#) to meet its net-zero targets. Family offices currently represent a small but growing portion of this capital, with their contributions expected to increase as awareness of the climate crisis deepens and the market for climate solutions expands.

Research also indicates that family offices globally are becoming more conditioned to impact investing, with [32%](#) of family offices in Asia-Pacific, including India, already allocating a portion of their portfolios to sustainable investments. In India, where family offices manage an estimated \$150 billion in assets, the potential to influence the climate tech landscape is substantial.

Family Offices Powering India's Climate Tech Revolution:

India's climate tech landscape is rapidly growing, driven by renewable energy, electric mobility, sustainable agriculture, and water management innovations. Family offices are increasingly investing in these areas, attracted by the long-term stability of renewable energy and the growth potential of electric vehicles. The shift toward impact investing, focusing on ESG integration, highlights their commitment to aligning wealth with sustainability. With the rise of green bonds, climate tech incubators, and corporate partnerships, family offices are poised to play a pivotal role in driving India's sustainable future.

Spectrum Impact has played a pivotal role in scaling climate solutions through strategic funding and active involvement in the ecosystem. By providing early-stage equity capital and soft debt to an energy-efficient home appliances company, Spectrum Impact enabled the firm to overcome initial hurdles in validating its concept and accelerate its growth, helping it raise over \$100 million in equity. Similarly, it extended debt financing to support businesses facilitating loans for commercial 3-wheeler electric vehicles (EVs), empowering small business owners and enhancing EV adoption.

Additionally, through grant capital provided to the Gogri Hub for Membrane Research at IIT Bombay, Spectrum Impact has advanced innovative membrane technologies from lab to pilot scale, fostering applications in clean water, healthcare, and sustainable energy. These efforts highlight the organisation's comprehensive approach to scaling technologies with significant environmental and societal impact.

Opportunities for Family Offices:

- **Supporting Early-Stage Innovations:** Family offices can bridge the funding gap for startups working on breakthrough technologies that may not yet attract traditional investors. By providing seed funding or participating in early rounds, they can help de-risk these ventures and accelerate their path to market.
- **Collaborative Investments:** Family offices can pool resources with other like-minded investors to create larger impact funds dedicated to climate innovation. Collaborative efforts can enhance due diligence, share risks, and amplify impact.
- **Long-Term Vision:** The ability to adopt a long-term perspective allows family offices to invest in projects that may have longer gestation periods but promise significant environmental and financial returns in the future.
- **Catalysing Systemic Change:** Beyond financial returns, family offices can use their influence to advocate for policy changes, build ecosystems around climate innovation, and drive the narrative on the importance of sustainability.

As the climate crisis intensifies, the need for innovative solutions has never been more urgent. Family offices in India have a unique opportunity to lead in funding climate tech, leveraging their flexibility, capital, and long-term vision. By doing so, they contribute to a sustainable future and position themselves at the forefront of one of our time's most critical and promising investment opportunities. The approach taken by Spectrum Impact, with its careful consideration and commitment to impactful investments, can inspire other family offices to engage deeply with climate innovation, ultimately driving systemic change across the country.



Debt as a Lever for Climate Technologies

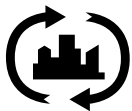


Role of Debt in accelerating the growth of climate technologies

Tata Capital: Climate technology projects are capital-intensive in nature with debt constituting roughly 60-80% of the means of finance in most of the projects. Climate tech solutions often face long lead times between development and commercialisation, debt helps bridge this gap by providing funds required for product development/under construction. Per an analysis by [Climake](#), debt financing accounted for \$17.7 Bn in 2023 out of the total climate tech investments in 2023 of \$22.5 Bn in India. This indicates the importance of debt financing for climate tech companies to scale up, commercialise their solutions and attract further investments.

cKers: Debt has a significant role. Most climate innovations require the installation of assets, like a solar plant, electric vehicle or heat pump, with higher upfront costs and lower running costs. Hence, the asset owner or the service provider needs debt to be able to leverage the deployed assets and achieve scale.

Caspian: Once the technology is proven and the business model established, climate innovations require setting up of infrastructure (putting up a manufacturing plant that produces batteries or energy efficient motors, establishing a large or mini solar plant, or providing end-user finance to enable the purchase of green equipment that often comes with a higher capital but lower operating cost, for example). The importance of infrastructure is also key in the adaptation area. For example, flood-proofing of warehouses or residential buildings. Infrastructure of this sort has always been financed by debt. Debt-to-equity ratios to finance infrastructure are often as high as 80:20. Climate innovations (where the technology and business model risks are well understood) should be no different. Apart from infrastructure finance, there is of course working capital finance as well (to purchase raw material, pay wages and contractors before customers pay).



Most interesting areas of climate innovation from a debt perspective

Tata Capital: The most interesting emerging areas in climate innovation are renewable with battery storage, electric mobility, green hydrogen, energy efficiency, waste and circularity.

cKers: There are many areas of interest where globally proven technologies are available to help reduce climate risk and also provide cost savings to the solution user. Rooftop solar and electric mobility have gone mainstream. In upcoming solutions, we see battery storage-based solutions, industrial and building energy efficiency solutions and solar-embedded solutions starting to be interesting.

Caspian: Climate debt providers typically have been very quick to provide loans as soon as technologies have stabilised. Often, they have taken on reasonable risks in providing debt even before business models have been established. A range of areas have proved "interesting" (in that they have attracted debt players) - from renewable energy plants, electric vehicle purchases, energy efficiency, smart grids and circular economy.



Challenges for debt providers when it comes to Climate Technologies

Tata Capital: Climate technologies, especially in their early stages are perceived as high-risk investments because of limited performance track record and limited history of bank borrowings. In some of the climate technologies like green warehousing, green hydrogen, waste to energy, circularity, etc, there is a lack of understanding of technology and technologies in these areas are also evolving, which leads to conservative lending practices.

cKers: Climate finance providers need lower-cost funds and risk mitigation mechanisms to scale faster in order to provide climate transition. The role of smaller/ specialist financing institutions is key here. These institutions often get crowded out by the larger financial intermediaries.

Caspian: There are two main challenges. One is risk tolerant debt providers (NBFCs) typically do not have access to medium- and long-term capital that is needed for infrastructure project finance. They end up mostly financing short-term working capital debt. Banks do have the means to provide term loans of 5 years or even more but may not have the ability to analyse specific climate projects. They would also ask for collateral. Taken together, this restricts the rollout of climate innovations. Also, our experience is that equity investors of climate companies inhibit the ability of the investee companies to take up debt. They encourage their companies to rapidly grow their revenue. This often means that companies have large cash burns which increases their riskiness for debt providers.



What's needed and from whom, to remove these barriers?

Tata Capital: A multi-stakeholder approach is required involving government, financial institutions, impact investors like DFIs, MDBs, Funds and Foundations, private investors and technology developers. Government and regulators need to provide long-term, predictable policy frameworks for climate tech industries. Despite the immense potential, climate technologies often face challenges in accessing sufficient financing to scale up operations and deploy innovative technologies. Due to high perceived risk within financiers, interest rate expectations rise which leads to detrimental effects on the entire business model. Access to finance at reasonable pricing, de-risking mechanisms and innovative financial products like Sustainability-Linked Bonds, Green Bonds, etc can help in increasing the flow of capital and accelerate the growth of climate tech.

cKers: Both international and domestic FIs need to support smaller/ unrated financial intermediaries with proven track records. The solutions are available in terms of guarantee structures, on-lending and refinancing lines.

Caspian: Climate technology is capital intensive and it is important for climate debt investors to develop the capability to invest reasonably large sums (above 10 Crores) at tenures of five to seven years in individual deals. This would provide climate entrepreneurs with to access capital at reasonable rates, retain control and build profitable businesses.



Interesting debt funding models that are emerging globally

Tata Capital: Innovative structures like Sustainability Linked Bonds, Green Bonds, Risk Sharing Facilities and Blended finance are emerging globally.

cKers: Not sure about globally, but in the Indian market, rental structures could expand the market if they are allowed to be reported to the credit bureaus and access debt recovery mechanisms available for loans.

Caspian: We have already written on the pay-as-you-go model of end-user finance in the 2023 India Climate Finance Report. We continue to believe that pay-as-you-go business models are very powerful in providing end-user finance and creating long-term impact. With digital apps being increasingly used, the model de-risks the provision of debt as well.

Moving to market expansion, Leapfrog Investments discusses the evolution of climate innovation in India, what excites later-stage funders and why they believe that the market is ready.

Guest Article



Beyond Early-Stage to Established: Funding the Green Leap

Nakul Zaveri - LeapFrog Investments

Providing consumers with access to green growth pathways is not only pivotal to achieving our climate targets but also offers an immense investment opportunity. As billions more people enter the consuming classes, their increasing spending, under the economic development trajectory of developed markets, will lead to higher emissions. By decoupling economic growth from carbon emissions, we can provide access to essential services for emerging consumers that are also sustainable, while tapping a new and fast-growing customer base. At LeapFrog, we describe this as a “Green Leap” – when consumers can leapfrog carbon-intensive development such as incumbent grid electricity or diesel generators and go straight to green alternatives.

We see four major areas for growth and impact in climate - energy, food, mobility, and the built environment. These sectors are all slated to boom across emerging markets in coming decades, as consumers reach income thresholds where they are able to connect to electricity grids, buy their first cars, upgrade their homes, and consume more protein. Currently, many inefficiencies exist across these four sectors making them highly carbon-intensive. For example, the use of diesel generators, over-use of fertilisers or pesticides, fossil fuel-based transport systems, and energy-intensive buildings and appliances. The investment opportunity is in identifying and backing those alternatives that provide cheaper, greener, and more accessible products.

Despite these promising opportunities, only about 5% of the required annual clean investment is flowing into the emerging markets of Africa and Asia, indicating a significant investment gap and a lost opportunity for investors and communities. The majority of current investments are dominated by venture capital funding however there is a real opportunity for growth investors who can provide expertise and guidance to take innovations to scale. A recent study has found that fewer than 3% of start-ups have managed to raise Series B funding or beyond, signalling a pressing need for growth-stage capital.

LeapFrog Investments makes private equity investments in high-growth businesses to deliver growth, profitability, and impact in some of the world’s fastest-growing markets. In the next 30 years, LeapFrog’s target markets of Asia and Africa could account for up to 80% of population growth and 50% of GDP growth globally. India, for example, is the world’s fastest-growing major economy, forecast to grow by 6.3% this year.

As an investor with a 17-year track record of investing for Profit with Purpose, LeapFrog has a deep understanding of emerging consumer preferences, especially in order to reach the customer segment of developing economies, affordability is of the highest importance. Climate solutions for the above-mentioned sectors will scale at mass only when they are more affordable than the incumbent technologies, a phenomenon we describe as a “Green Discount” for consumers. We are already witnessing the emergence of clean technologies that, after decades of R&D, innovation and testing and with government support have become cheaper than traditional carbon-intensive alternatives. These technologies are now reaching a tipping point for mass adoption, even without further regulatory support, for example, electric vehicles, decentralised solar systems, and clean cooking.

As green technologies rapidly become price competitive, they present a huge opportunity for the deployment of growth capital to enable adoption at scale, generate superior risk-adjusted returns, as well as create a real impact that will protect our climate, people, and enable prosperity for all.

No discussion of climate innovation is complete without articulating the value of climate impact. Our partners at Project Frame call out some of the important tools they have been developing to enable climate funders globally to better measure and communicate their climate impact in a cohesive and scientific manner.

Guest Article



Scaling Climate Finance in India

Claudia Leon and Sultan Zelei - Prime Coalition

Infuse Climate-Dedicated Capital to the Global South:

In Prime Coalition's latest research, [Regulatory Barriers and Levers for Deploying Foreign Catalytic Capital in Impact-Focused Enterprises, Funds, & Facilities in India](#), we explored the challenges and opportunities in scaling climate finance in India, among them, the fact that climate investments need to grow from \$18Bn to \$170Bn to meet ambitious net-zero targets.

To date, the majority of investment into India has been fully concessionary capital (grants), and increasingly, fully commercial, high-cost capital. Despite the recent increase in capital flows, deploying foreign capital—particularly catalytic capital*—into India is fraught with structural complexities. U.S. and Europe-based investors often face high legal costs, opaque regulatory conditions, and resource (knowledge and capacity) constraints in effectively aggregating capital in India. Our latest research explores potential pathways forward for more effectively aggregating and then deploying capital, via coordination between U.S.- and Europe-based capital owners and knowledgeable India-based capital managers.

Increase Access to Resources & Tools for High-Impact Investing:

While there are capital supply challenges, we note that the readiness of the Indian climate ecosystem to harness and deploy that capital is equally important. Prime's [Project Frame](#) initiative, which seeks to organize investors around forward-looking emissions impact methodology and reporting best practices, was built on the thesis that investors make smarter decisions when they have access to and knowledge of standardized methodologies and tools to assess and report forward-looking GHG impact.

As nascent climate markets scale, access to these tools and best practices will also be critical to ensure the sector's collective investments yield the greatest climate benefit. Since 2021, Project Frame's global collaboration has produced free resources that improve the field of forward-looking GHG Impact Measurement & Management (IMM), including:

- [Diving Deeper into Assessing Greenhouse Gas Impact](#), Project Frame's latest methodology guidance focuses solely on creating a high-level methodology for screening investments based on GHG impact.
- [GHG Impact Resource Dashboard](#) aims to simplify forward-looking emissions impact assessment by compiling tools, services, and consultants that assess emissions impact.
 - [CRANE tool](#) is a free and open-source tool built for anyone assessing the impact potential of their investments based on science-backed climate impact data and aligned with Project Frame's pre-investment methodology
- [Investor Profiles](#) allow investors in the Frame community to articulate their impact strategies in a consistent structure, bringing theory to practice.
- [Community Meetings](#) invite all who are interested to join us in conversation around important topics related to redirecting capital to mitigate climate change. Watch recordings of past Community Meetings and catch up on the latest news and insights on our [Blog](#).

Beginning October 2024, Prime Coalition and [Climate Collective](#) will co-lead a subset of the initiatives, to develop [case studies](#) and convening Global South-based climate investors to develop GHG impact assessments of at least

three different climate mitigation and adaptation solutions. Taking a “learning-by-doing” approach, our goal is to showcase how Frame’s methodology for forward-looking emissions impact assessment is used to understand future (potential and planned) impact, and challenges assessors face with choosing data sources and making baseline decisions. We will enthusiastically share these future emissions impact case studies in 2025!

*Capital that is designed to overcome specific, well-defined financial risks or other barriers that prevent investors from directing conventional capital – with terms that are representative of the asset class – toward impactful projects or companies.



Conclusion

Deploying at Scale

If we were to imagine the continuum of climate capital as a road, there are sections that are relatively well-laid and paved, dirt-track sections that are rough, still under construction but usable, and gaping chunks of missing infrastructure.

Early-stage infrastructure has extended in the last few years, new funders have emerged and existing funders have clearly indicated excitement at the breadth of climate innovation opportunities. In short, much has been developed, since our first report.

But the market has evolved and new, critical gaps have emerged. Fit-for-purpose climate capital remains inadequate in supply and quantum. In this and our previous reports, we've called out several innovative financial approaches that can address these gaps. The market needs to now move urgently from testing to deploying and scaling these financial solutions, if we are to enable the accelerated adoption of climate innovation at scale in India.



Guest Contributors



[Ankur Capital](#) is an early-stage venture capital firm in India, investing in digital and deep science technology companies. We invest in companies that build path-breaking global technologies unlocking large markets around climate, agriculture and emerging consumers. From seed to scale, Ankur Capital has invested in over 30 companies and has recently started deploying from its third fund, a \$150 million vehicle.



[Caspian Debt](#) is a catalytic debt provider to startups, social enterprises, and financial institutions working towards positive social and environmental impact and has disbursed over USD 480 Mn across more than 250 companies in India. It is the first Indian financial institution to be a signatory to the Partnership for Carbon Accounting Financials (PCAF) and has been recognised as a 2X Flagship Fund for its track record in gender lens investing. Caspian Debt is promoted by the Caspian Group which is a Certified B Corporation that has a 19-year track record of investing equity and debt into impact-creating businesses.



[cKers Finance](#) is a specialised Sustainability finance company that operates in the rapidly growing segments around clean energy and resource efficiency. Launched in 2017, it is developing new instruments for providing finance in the Sustainability space, and building data around risk metrics.



The [Impact Investors Council \(IIC\)](#) is India's preeminent member-based, not-for-profit industry body set up to strengthen impact investing in the country. IIC works in the areas of 4Ps - Impact Investment focused Programs, LP-GP Partnerships, Research backed Publications and Policy Research. IIC is supported by 65+ investors and ecosystem partners.



[LeapFrog](#) invests in healthcare, financial services and climate solutions businesses in high-growth global markets. Its companies deliver distinctive impact and robust returns, growing revenues on average 23% a year. LeapFrog companies now reach 537 million people in 37 countries. The firm has raised billions of dollars from global institutional investors, including a US\$500m commitment by Temasek to LeapFrog and its growth equity funds. LeapFrog has twice been ranked by Fortune as one of the top Companies to Change the World and was named inaugural Pioneer in Impact by the FT and IFC at the Transformational Business Awards.



[Neev Fund](#) launched in 2015, focuses on investments in climate and environment sectors. An initiative backed by the Government of India, UK Government, EIB, JICA, SIDBI, and managed by SBI Ventures. Neev I focuses on driving sustainable growth in underserved regions. Neev II, launched in 2021, targets SMEs offering solutions for climate change and environmental issues, bridging the funding gap for green innovation.



[Omnivore](#) is an impact venture capital firm that supports visionary entrepreneurs driving agrifood innovation, climate action, and rural transformation. Omnivore pioneered agritech investing in India and currently manages \$295 million through two active venture funds.

Guest Contributors



[Rohini Nilekani Philanthropies](#) is a grant-making organisation seeking to create and strengthen communities for their own betterment. RNPF does this by supporting ground-breaking work anchored in networks and movements and often sits at the intersection of Samaaj, Sarkaar, and Bazaar. RNPF focuses on emerging themes essential to an equitable and inclusive society, such as civic engagement, access to justice, gender equity, mental health and climate and environment. RNPF is founded by Rohini Nilekani, a committed philanthropist, and currently, the Chairperson of the Foundation. Rohini and her husband, Nandan Nilekani, are signatories to the Giving Pledge, pledging to give away half of their wealth to philanthropy.



[Prime Coalition](#) is a nonprofit organization that works with philanthropists and other mission-driven organizations and individuals to invest catalytic capital in sustainable, effective, and scalable solutions to climate change. Prime is also the co-creator of the [CRANE tool](#), a free and open-access tool that can be used to calculate the forward-looking GHG impacts of climate technologies. Prime's [Project Frame](#) is a global collaboration of investors and experts working to build frameworks and tools to assess the potential impact today's climate investments will have on GHG emissions in the future. Our mission is to mitigate climate change by demystifying climate investing and improving Impact Measurement & Management to drive capital towards the best possible climate solutions while galvanizing a network around transparency, accountability and collaboration.



[Spectrum Impact](#) is the family office of [Aarti Industries Ltd.](#), a publicly listed specialty chemical company. Spectrum Impact is dedicated to driving positive social and environmental outcomes by investing in technologies and businesses focused on addressing and reversing climate change. By strategically deploying capital to early-stage ventures, Spectrum Impact supports innovative businesses tackling global climate challenges. The organization leverages a combination of grants, equity, and debt to accelerate capital deployment, reduce investment risks, and secure long-term financial backing for climate-focused solutions. Through a blend of capital innovation, strategic guidance, and valuable networks, Spectrum Impact helps ventures scale their impact, overcome growth barriers, and foster long-term, sustainable success.



[Third Derivative](#), RMI's global climate tech accelerator and innovation engine, is accelerating the rate of climate innovation. Third Derivative's inclusive ecosystem rapidly finds, funds, and scales climate tech globally. By uniting and aligning investors, corporations, and experts with the world's most promising climate tech startups, Third Derivative bridges finance and resource gaps to increase the speed to market. The flexible and highly curated remote accelerator program enables startups to focus on their unique needs and opportunities. Together, we are moving markets to achieve an equitable climate future.



[Trellis Climate](#) is an impact-first catalytic capital program enabling novel climate infrastructure solutions to achieve commercial scale at speed. Committed to accelerating the deployment of first-of-a-kind (Foak) climate projects, Trellis Climate focuses on opportunities with significant climate impact potential, a clear path to scale, and an acute need for catalytic capital. Trellis Climate addresses both financial and systemic barriers by offering risk-tolerant investment capital and sector transformation nonprofit programming. By leveraging philanthropy to crowd in as much commercial capital as possible, Trellis Climate aims to expedite the scaling of climate technologies to achieve net-zero targets by 2050.