CATALYTIC CAPITAL:

A KEY TO ALIGNING INFRASTRUCTURE INVESTMENTS WITH CLIMATE MITIGATION IN EMERGING MARKETS

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GIIN
GLOBAL IMPACT INVESTING NETWORK

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EXECUTIVE SUMMARY

As climate urgency grows in emerging markets, the need to align infrastructure investments with climate imperatives is rising. At the same time, the gap between the infrastructure investment required and actual funds is widening as the need to build infrastructure to meet climate needs and to retrofit existing infrastructure to adapt to climate change expands. Historically, development finance institutions (DFIs) and large financial institutions were the main investors providing catalytic capital to help bridge emerging market infrastructure financing gaps. But now, diverse non-DFI providers are exploring ways to support the need for climate infrastructure financing. These new providers include philanthropies, impact investors and others who offer flexible and patient capital. Their explorations have been valuable but fragmented, resulting in promising pilots and one-off transactions that have not yet been consistently duplicated or expanded into larger scale. As a result, there are still significant unmet needs in the market.

The climate infrastructure finance gap is so large, and the imperative to scale up institutional investment is so pressing, that catalytic capital providers should prioritize ongoing coordination and sharing hands-on learning. This way, they can quickly spot and address key market needs and maximize the effect of their capital, voice and leadership. Current strategies by DFIs and multilateral development banks (MDBs) to attract private capital for climate projects in emerging markets are changing. Given the limited resources and even more limited catalytic capital, there is a pressing need for catalytic capital providers to transition from isolated pilot projects to a systematic roadmap for addressing the vast challenges ahead.

THE OUTLINE OF SUCH A ROADMAP INCLUDES THE FOLLOWING FOUR PRIORITY AREAS FOR ACTION AND ATTENTION:

1. **TARGET: Focus on interventions that can dramatically increase the scale of catalytic capital across the risk spectrum**
2. **SPEED: Accelerate mobilization where catalytic capital can have a meaningful and immediate effect**
3. **SUPPORT: Incubate and accelerate capital deployers, especially to develop domestic and regional institutional ecosystems**
4. **ANALYZE: Work to improve transparency and support much-needed data analysis initiatives**

OVERVIEW

This issue brief seeks to identify the impediments discouraging private investment, and in particular institutional capital, into climate infrastructure in emerging markets. "Climate infrastructure" refers to infrastructure needed to address mitigation or adaptation needs as well as investments to make infrastructure resilient to increasingly unpredictable events caused by climate change.

This paper seeks to provide a framework for private institutional investors that aim to address climate challenges through their capital. By making use of targeted catalytic capital and other strategies, these investors can help make significant progress towards global decarbonization targets by accelerating the build-out of climate infrastructure in emerging markets.

This brief expands on an initial market scan conducted by the GIIN that examined the broad use of catalytic capital structures to stimulate institutional capital toward climate investment. Disappointingly, that market scan found few models that institutional asset owners or their managers were willing to replicate or scale. Thus, this brief focuses more narrowly on emerging market climate infrastructure finance and proposes a roadmap to attract institutional capital providers.

The conclusions presented in this brief are derived from an updated market scan, two roundtable discussions, one-on-one interviews with more than 30 investors and practitioners, and a review of existing vehicles, strategies and platforms designed to support climate infrastructure investment. Based on these activities, the brief identifies where catalytic capital providers are well-positioned to drive institutional asset owners' investment flows and how they can act to drive more climate infrastructure finance over the near to medium term. Other important topics, such as the availability of infrastructure-related data and the so-called 'just transition,' merit further attention by catalytic capital providers but remain nascent at present and, as such, are outside the scope of this brief on employable solutions.

The Climate Infrastructure Imperative and Background

The world faces an urgent imperative to scale and finance infrastructure that responds to climate change in emerging markets, which will account for the majority of the growth in emissions in coming decades under current circumstances.[1] Massive deployment of new low- and zero-carbon infrastructure will be necessary to meet the decarbonization goals laid out in nationally determined contributions under the Paris Agreement. Unfortunately, the current pace of infrastructure investment in such markets falls far short of what is required to meet the stated adaptation and mitigation goals. This gap is exacerbated by the severity of climate change impacts magnifying over time, making infrastructure that is more resilient to climate change, whether through retrofits or greenfield development, both increasingly critical and costly. In most cases, the infrastructure revolution in emerging markets will require careful consideration of both mitigation and adaptation measures.

The challenge is daunting. Emerging markets require a minimum of USD 1 trillion per year of investment in energy infrastructure to achieve net zero[2] and USD 3-6 trillion per year across all sectors by 2050 to mitigate climate change.[3] These investments depend mainly on public money from donor governments, borrower governments, DFIs and MDBs. Yet investment flows to emerging markets, including in infrastructure, had stagnated even before the pandemic both in nominal terms and as a proportion of global investment and continue to languish given current macroeconomic conditions.[4]

1 International Energy Agency (IEA), Financing clean energy transitions in emerging and developing economies (IEA, 2021).

2 Ibid.

3 Torsten Ehlers et al., How to Scale Up Private Climate Finance in Emerging Economies (International Monetary Fund, 2022).

4 Global Infrastructure Hub (2023), Private investment in infrastructure back to pre-pandemic level but stagnant for eighth year running (GI Hub Infrastructure Monitor, 2023).

Aligning these infrastructure investments with climate goals, whether specifically via country-level nationally determined contributions (NDCs) or otherwise, unfortunately, adds considerable complexity. In addition to their strong claims regarding historical responsibility for greenhouse gas (GHG) emissions and climate change, emerging market governments often see the additional costs of sustainable infrastructure as being at odds with growth and development. Political factors, policy gaps, including planning and regulations, and constraints in expertise and experience have slowed official endorsement of climate infrastructure investment.

Ultimately, though, emerging markets need to decarbonize their economies to secure sustainable growth into the 2030s and beyond while addressing mounting adaptation and resilience needs, especially given their relative vulnerability to climate change. The long-term investments necessary to achieve these objectives should maximize efficiency, avoid costly rebuilding and sustain inclusive economic growth. They should be able to resist climate extremes and resume operation in the case of climate events. In the case of continued fossil fuel investment, the risks of locking in long-term emissions with greenfield investments and emerging market countries falling behind on new technologies will indeed have broader economic implications. Open questions remain regarding, among other things, the appropriate medium- and longer-term energy transition pathways for emerging markets and the mobilization of loss and damage funds.

Some of these key topics are largely beyond the scope of this brief. Although organizations such as the GIIN can advocate for reforms that support a constructive role for both catalytic and institutional capital in emerging market climate infrastructure, policy reform and institutional development in emerging market governments and the evolving role of MDBs remains primarily a dialogue between donors, governments, MDBs and other DFIs.

INFRASTRUCTURE INVESTMENT CHALLENGES IN EMERGING MARKETS

Infrastructure investments include traditional and renewable energy, critical transport (e.g., railways, roads, ports), basic services and utilities (e.g., water and waste), information and communications technology installations, and social infrastructure (e.g., schools, hospitals).

However, development involves long timelines, large up-front capital investments, and exposure to a range of risks, including, often, political risks. Because these assets also have limited post-construction flexibility, policy, planning and project preparation are critical, as is developing with sustainability and resilience as goals from the earliest stages.

In developed markets, these investments may be attractive because of their low volatility and stabilized, inflation-linked cash flows from long-lived operating assets, often in highly regulated industries.

In emerging markets, the economic, institutional, policy and regulatory conditions to support these investments are often not in place. The organizational ecosystem that supports commercial infrastructure investments, including financial institutions, is often incomplete or missing, and market participants have, or are perceived as having, lower creditworthiness than in developed markets. Finally, most projects' cash flows are denominated in local currency; because of currency volatility, many institutional investors will not take local currency risk.

WHAT IS CLIMATE INFRASTRUCTURE?

A workable definition of climate alignment for infrastructure investment is becoming increasingly clear due to both voluntary labeling initiatives as well as mandatory taxonomies and reporting frameworks, as in the EU and China. Investments are mostly directed to climate mitigation but may also be aimed at adaptation and resilience (or some combination of these).

The first category, infrastructure for climate mitigation, includes:

- Generating, transmitting, storing, distributing or using renewable energy
- Improving energy and resource efficiency
- Increasing clean or climate-neutral mobility
- Switching to sustainably sourced and renewable materials
- Establishing energy infrastructure to enable decarbonization
- Making clean, efficient fuel of renewable or carbon-neutral inputs
- Strengthening land carbon sinks
- Increasing use of carbon capture, utilization and storage with net GHG reduction

Investments for mitigation have been more scalable at commercial terms in investment-ready markets with visible project pipelines and programs. More mainstream capital vehicles exist, some of which have used blended finance. Institutional investors tend to allocate capital to these when they are located in markets with a developed ecosystem of policymakers, regulators, financial institutions, developers, operators and service providers, as in larger middle-income countries (MICs) such as Brazil and India.

A second category, focused on adaptation and resilience in infrastructure investment, remains at an early stage. This category is primarily dependent on policies and regulations, including construction codes. In general, it is difficult to identify cash flows specifically associated with adaptation, although there are exceptions, such as in the water sector.

A third category, transition investments, recognizes many emerging markets' dependence on fossil fuels and their longer transition to decarbonization. Several organizations have put forward transition finance guidelines to aid in assessing these investments over their entire life cycle and their role in a decarbonization strategy. However, investors have not yet embraced this category of climate alignment in infrastructure investments.

Sources: EU Taxonomy for Sustainable Activities, Climate Bonds Initiative, Glasgow Financial Alliance for Net Zero.

The GIIN believes that this under-recognized investment gap must be addressed with actionable information suited to the specific challenges faced by a spectrum of stakeholders and actors. To that end, the GIIN is plans to support ongoing dialogue between catalytic capital providers, asset owners, institutional investors, and other key market participants to help apply these insights to current and potential future collaborations.

The conclusions from earlier interviews by the GIIN highlighted the potential for catalytic capital and gaps to be filled for investors to put more institutional capital to work. These observations are equally relevant for emerging market infrastructure finance:

- Catalytic capital is essential to developing the blended finance vehicles and investable pipelines that would be most appropriate for institutional investors.
- Investors primarily identified investment risks in climate investments, e.g., local currency exposure, demand/price volatility and technological obsolescence.
- Institutional investors identified a second related risk: inadequate returns due to high transaction costs, performance risks and the low profitability of business models.

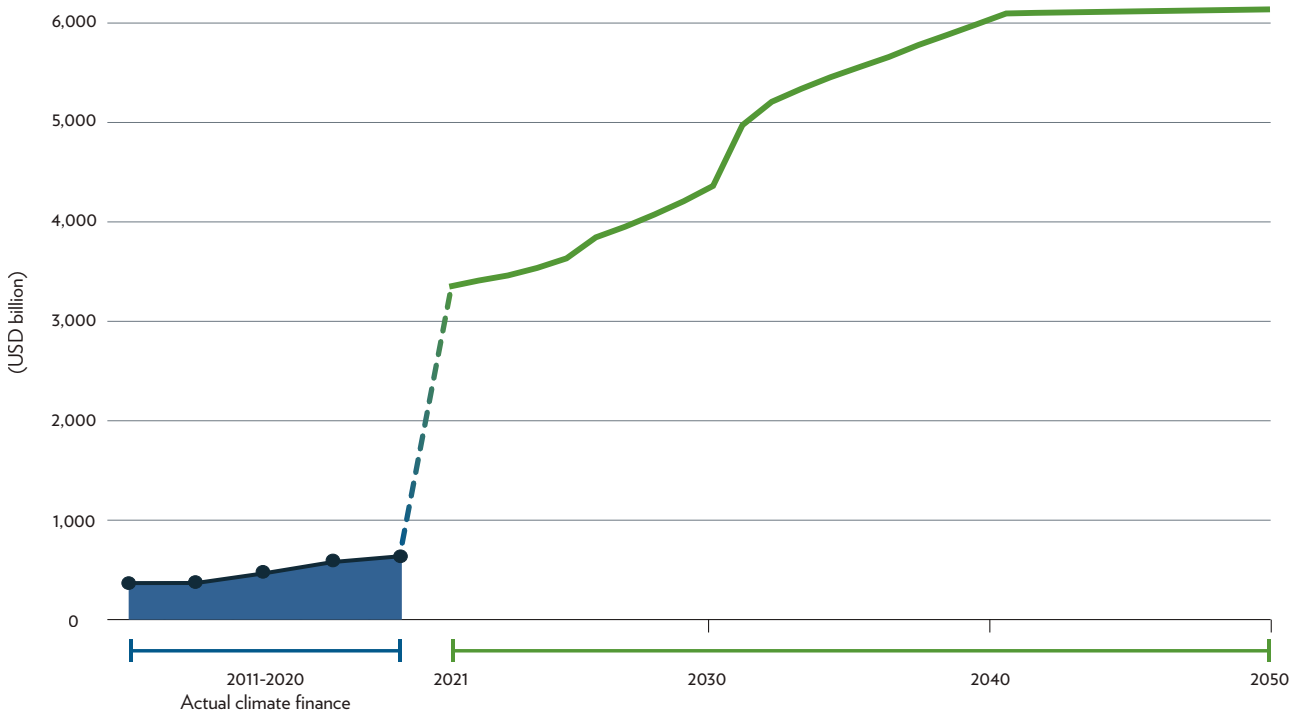
- Investment constraints beyond financial parameters include limited knowledge and understanding of emerging markets and how to properly evaluate impact and environmental or social opportunities of blended finance vehicles, and a lack of track records among climate-focused asset managers.
- Catalytic capital instruments have been developed and deployed to address these risks in the form of grants, early-stage and junior equity, subordinated debt, credit insurance and guarantees, currency hedging, early-stage pipeline building and pooled facilities such as funds-of-funds. Technical assistance and capacity-building are also powerful catalytic capital tools.

Overview of the Status Quo in Emerging Market Climate Infrastructure Finance

Investment needs are massive and unprecedented

According to estimates from both the International Energy Agency (IEA) and the International Monetary Fund (IMF), climate energy infrastructure investments in emerging markets alone must reach at least USD1 trillion per year by 2030, while between USD 3-6 trillion in additional investments across all sectors will be required per year by 2050 to achieve global decarbonization goals.[5] A further USD 160-340 billion in adaptation finance investments will be needed by 2030, according to conservative estimates, with these numbers rising sharply over time depending on how effective climate mitigation measures prove to be.[6]

FIGURE 1: **Tracked climate finance flows and average estimated annual climate investment through 2050**



Source: Climate Policy Initiative, Global Landscape of Climate Finance, 2022.

5 International Energy Agency (IEA), Financing clean energy transitions in emerging and developing economies (IEA, 2021); Torsten Ehlers et al., How to Scale Up Private Climate Finance in Emerging Economies (International Monetary Fund, 2022).

6 United Nations Environment Programme, Adaptation Gap Report 2022: Too Little, Too Slow – Climate adaptation failure puts world at risk, (UNEP, 2022).

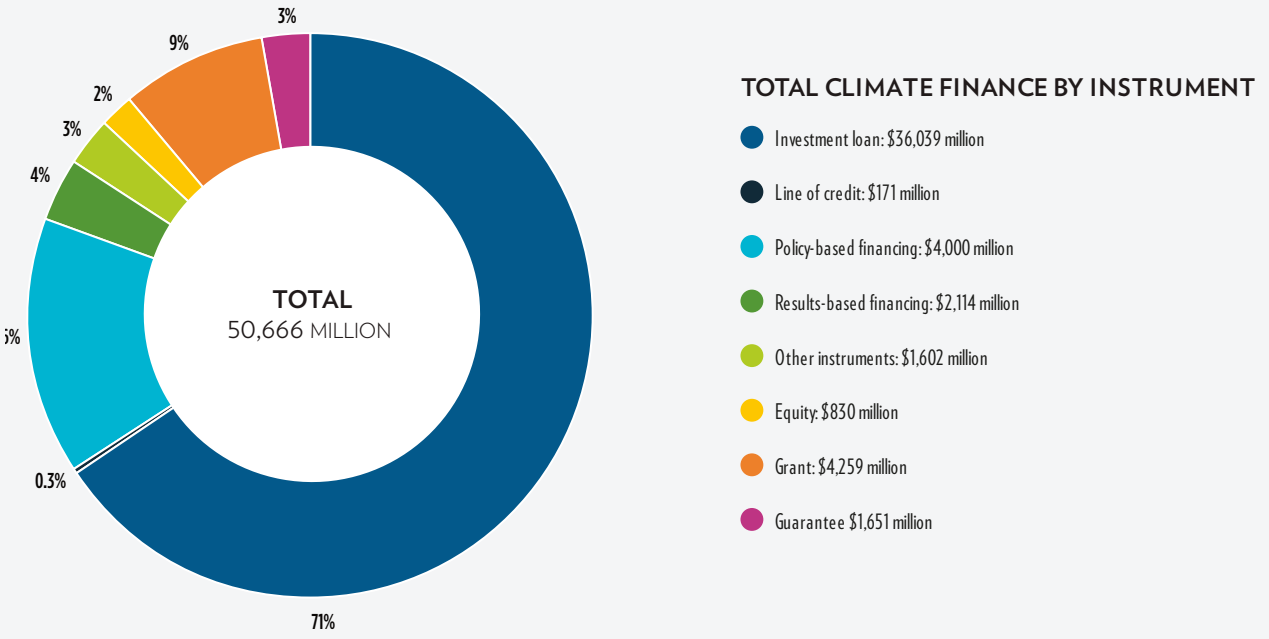
These huge numbers stand in stark contrast to the official estimates for climate finance flows to date. First in 2009, then again in the 2015 Paris Agreement, national government parties to the United Nations Framework Convention on Climate Change (UNFCCC) pledged to mobilize USD 100 billion per year by 2020 in climate finance for developing countries, a pledge which has yet to be met. Notably, public finance, both domestic and international, is currently the primary source of capital and is generally necessary to secure private funding.

WHAT IS CATALYTIC CAPITAL FOR CLIMATE INFRASTRUCTURE IN EMERGING MARKETS?

Tideline's foundational definition of catalytic capital includes "debt, equity, guarantees, and other investments that accept disproportionate risk and/or concessionary returns relative to a conventional investment in order to generate positive impact and enable third-party investment that otherwise would not be possible."[7] Although that initial definition did not recognize grants, the Catalytic Capital Consortium (C3) has refined the definition to recognize the role of grants and non-financial capital (C3).

MDBs, DFIs and governments have provided most of the finance for emerging market infrastructure to date, but this includes fossil fuels and conventional infrastructure such as roads and ports. MDBs' climate finance, which is jointly tracked, illustrates that investment loans make up the vast majority. Grants, policy- and results-based financing make up less than a quarter of financing.

FIGURE 2: **MDB climate finance by type of instrument in low- and middle-income economies, 2021 (in $ million)**



Source: EIB's Joint Report on Multilateral Development Banks, 2022

Other, much-needed instruments for infrastructure, such as equity and guarantees, amounted to only 2% and 3% of total climate finance, respectively, underlining the need for the current dialogue to enable the MDBs to underwrite more risk for climate investments.

7 Tideline. Catalytic Capital: Unlocking more investment and impact. (Tideline, 2019).

Existing initiatives and vehicles

Early flagship initiatives and vehicles, often launched with the sponsorship and assistance of MDBs and DFIs, have led to additional albeit incipient innovation by catalytic capital providers in recent years, even in smaller and less developed markets. Replication of these early ventures remains rare, however, even as existing investors and catalytic capital providers interviewed insist that ample liquidity is available to develop and finance emerging market climate infrastructure when projects and portfolios are bankable and well-prepared.[8]

Overview of opportunities and challenges for catalytic capital in emerging markets

While the efforts noted above are positive indicators, and the opportunities are clear, impediments remain for investing in emerging markets climate infrastructure. A series of consultations with GIIN members and market participants highlighted the following key opportunities and obstacles to deploying more catalytic capital to emerging market climate infrastructure:

TABLE 2: **Opportunities and challenges to deploying more catalytic capital**

OPPORTUNITIES	CHALLENGES
Cross-sector, multi-stakeholder funds and platforms that offer blended finance, visibility, comfort, non-finance resources and potential long-term pipelines of activity	• Slow and bureaucratic processes and diligence • Time-consuming for private sector participants • Many initiatives still early-stage • Unclear/uncertain outputs
Programs and portfolios rather than single projects, to achieve more aggregation and risk diversification, larger volumes of projects via replication, and standardization	• Incomplete or early-stage complementary upstream work on policy, institutions and planning • Project pipeline and diligence capacity lacking, slow supply of bankable projects • Inadequate quantum of catalytic capital to achieve target returns
Emphasis on local market participants and building robust domestic and regional public-private ecosystems for climate infrastructure development and finance	• Need for capacity-building across the institutional spectrum • Missing financial policies and instruments to incentivize local institutional capital providers

Investor perceptions, assessments, and public mitigants of risk in emerging markets.

While a robust debate about sovereign credit ratings is ongoing and lies outside the scope of this brief, it is important to note the role played by risk ratings in limiting private investment in emerging markets generally and in climate infrastructure in emerging markets more specifically. Most developed market investors rely on sovereign risk ratings published by the three big rating agencies (S&P, Moody's, and Fitch) as their primary benchmark for country-related risk and, therefore, as a proxy for project risk. The median sovereign risk rating of the 142 Low and Middle-Income Countries (LMICs) is B-, with 76% of these countries rated B or lower. Given the agencies' 'sovereign ceiling' convention, the preponderance of investment opportunities in these geographies have ratings significantly below investment grade and fall outside many investors' fiduciary and regulatory risk limits. When compounded by the currency risk of investing in debt or equity, very few opportunities remain that meet investors' criteria.

8 See catalytic capital examples listed in the Appendix for a subsample of existing funds, vehicles and organizations that have financed emerging market climate infrastructure with catalytic capital.

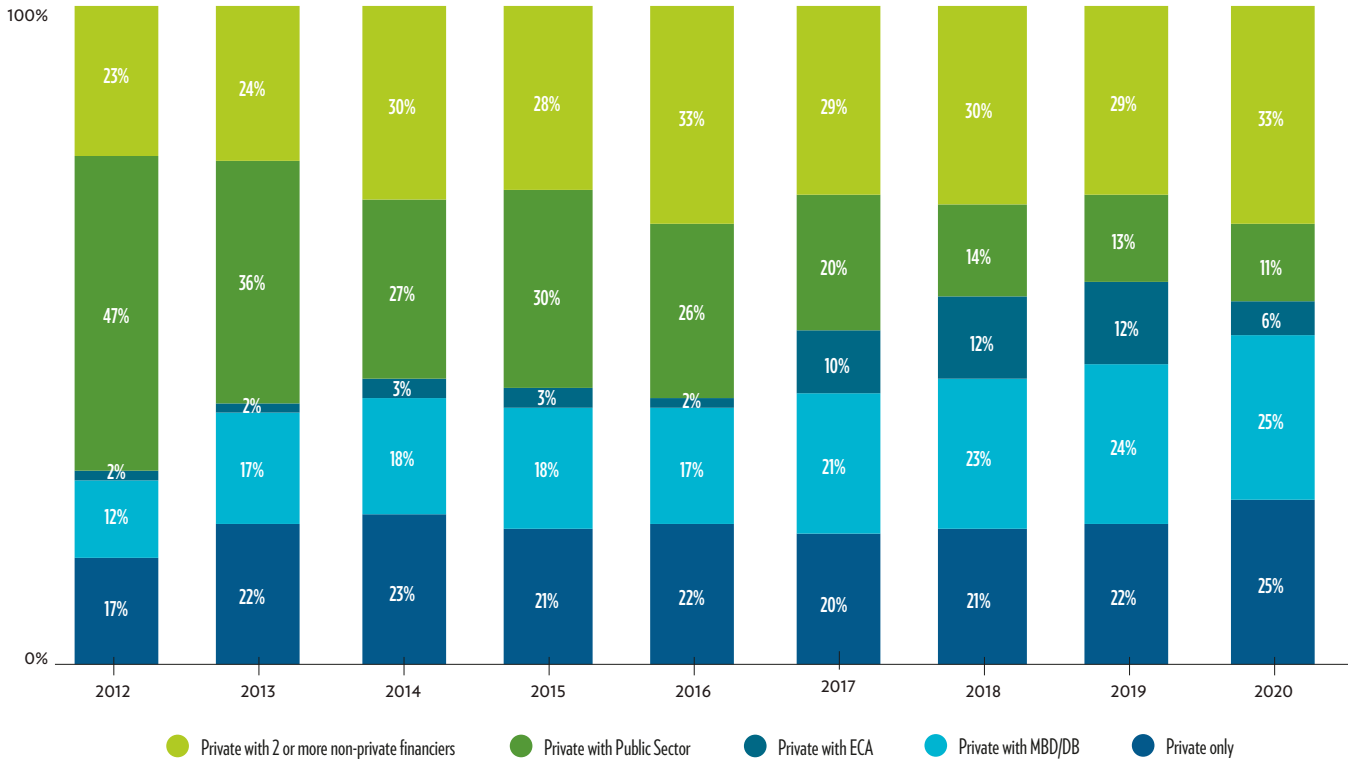
Of approximately USD 140 billion in annual financing commitments from MDBs and DFIs, some 2% is utilized to de-risk emerging investment risk to within fiduciary and regulatory risk appetites. The Organization for Economic Co-operation and Development's (OECD) 2022 Climate Mobilization Report concluded that all public sector development finance mobilizes USD 13-14 billion of private investment annually for climate projects in low- and middle-income countries (LICs and MICs). These are similar levels to those before the SDGs were established, and the Paris Agreement was agreed eight years ago, and account for approximately 2% of LICs' and MICs' investment needs.[9] In the absence of a formal emerging market de-risking process – something being discussed in the context of the Bridgetown Initiative and in other related forums – private investment mobilization into emerging markets is likely to remain limited.

Public and MDB support and capital are needed to unlock private capital

Aggregate MDB, DFI and donor funding for climate investment averages approximately USD 240 billion per year, comprising just 5% of total SDG and climate investment needs across LICs and MICs.[10] This, however, belies the pivotal role the public sector, MDBs and DFIs play in underwriting risks that other institutions cannot, or will not, underwrite. Public capital, especially from MDBs and DFIs, provides comfort to investors by financing alongside private capital in 80% of low- and middle-income country (LMIC) infrastructure investments. Alongside the grants, guarantees, loans and equity, which position MDBs and DFIs as the primary source of catalytic capital in emerging market infrastructure by an order of magnitude, these bodies provide a wide range of investment resources besides capital, including knowledge, advice, stewardship and endorsement.

An undercurrent to this discussion is the debate involving the balance between an MDB's financial strength and performance and its ability to deliver more development and climate impact. Although the conversation falls outside the remit of this brief, catalytic capital providers in this sector may wish to consider instances where collaboration, as opposed to identifying and filling a gap in the landscape, is the path of greatest impact.

FIGURE 3: **Private infrastructure investment in LMICs by finance source (% of total, 3 yr moving avg.)**

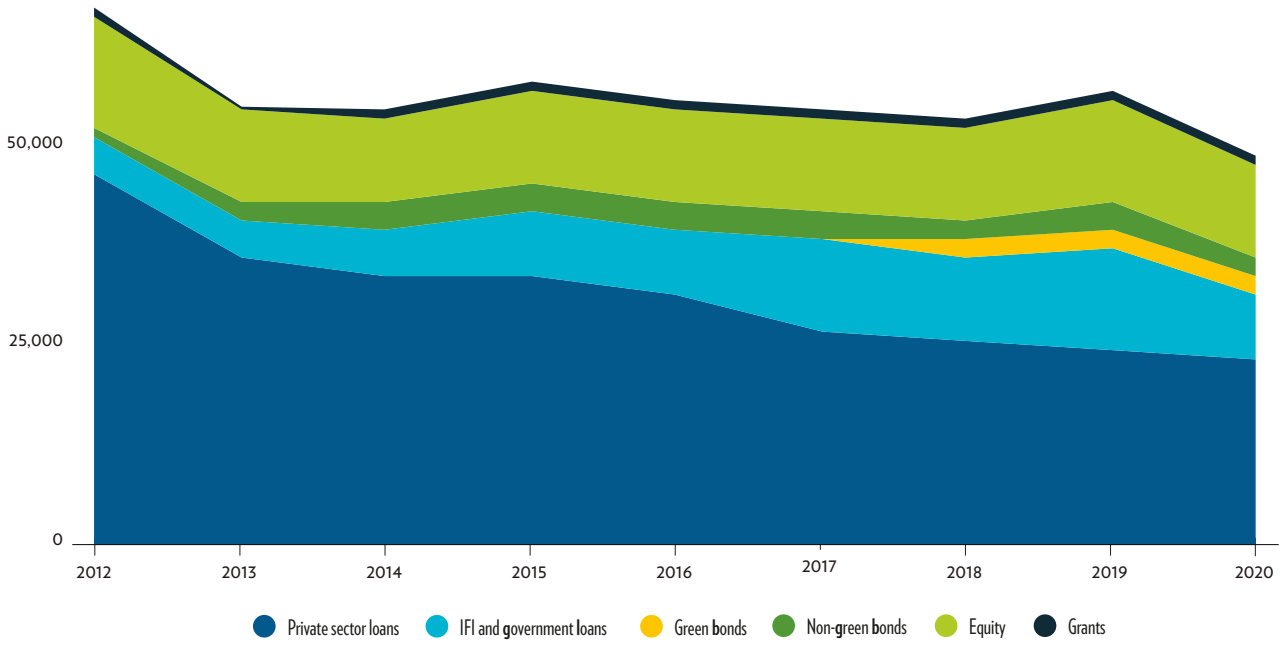


Source: Global Infrastructure Hub Monitor, 2023

9 OECD, Climate Finance Provided and Mobilised by Developed Countries in 2016-2020: Insights from Disaggregated Analysis, (OECD, 2022).

10 Convergence, The Action Plan for Climate and SDG Investment Mobilization, (Convergence, 2022).

FIGURE 4: **Private investment in infrastructure projects by instrument type (3 yr moving avg. USD bn)**



Source: Global Infrastructure Hub Monitor, 2023

PRIVATE INVESTMENT MOBILIZATION MODEL: HIGH-LEVEL SUMMARY

In 2022, experts from leading development, private investment and blended finance organizations collaborated to research, debate and agree on the Action Plan for Climate and SDG Investment Mobilization for LMICs. The consensus was that public sector concessional funds should be deployed at three points or stages, as indicated below, to increase the number of SDG and climate investment projects. Notably, however, most catalytic capital providers can only participate in the third stage.

1. **Structure viable projects at early,* development phase.** This phase involves funding output-driven project development in partnership with private investors, to transform projects from theoretical feasibility to practical viability. Most concessional funding has been deployed to date at input-driven preparation that too frequently has not led to implementation.

2. **Transform viable projects into commercially investable projects by de-risking at the project level.** Even if a project is developed to viability, it will likely not attract debt or equity investment due to (i) limited domestic resources, (ii) unacceptable project investment risk and (iii) high country/currency risk. De-risking at the project level is often required to attract a bank to make a loan or an investor to allocate an equity investment.

3. **Increase the supply of investment flowing to commercially investable projects by de-risking at the portfolio level.** Most investors deploy capital in emerging market only through a portfolio or fund where an intermediary manager invests directly in projects, loans, or equity investments. Portfolio diversification can help mitigate the perceived high risk of individual projects and can typically yield a two-notch uplift under rating agencies' risk methodologies. Aggregation can also help bridge the gap between the relatively small investment needs for individual projects, and investors' typical requirements for larger ticket sizes. Additionally, financial structuring at the portfolio level can further de-risk private investment through tranched offerings.

Institutional capital must be mobilized but remains predominantly on the sidelines

Despite its strategic role, the level of public and DFI capital allocated to increase total investment in climate infrastructure is inadequate for the challenge of the net zero transition in emerging markets. Over the past three years, numerous private investor groups, such as the Net-Zero Asset Owner Alliance, have elucidated the most effective and efficient approaches to mobilize allocations into climate infrastructure. The demand from investors appears to be high – certainly higher than in previous years – yet public sector de-risking funds and financing mechanisms remain largely absent from the marketplace.

Pension, insurance and sovereign wealth fund assets at the end of 2021 amounted to USD 60.6 trillion, 40 trillion and 11.4 trillion, respectively.[11] Yet, as a percentage of total assets, the OECD's annual pension fund surveys show an average allocation of 1.6% to unlisted global infrastructure equity among large pension funds, near the bottom of the 1% to 20% range, and virtually no exposure to infrastructure debt.[12]

Unsurprisingly, most pension fund allocations in developed markets are either domestic or allocated to other developed markets. Emerging markets receive very little, and addressing the structural, organizational, and financial factors that suppress allocations to emerging market infrastructure is part of the work of climate investor coalitions. Catalytic capital providers should look to such coalitions and other related efforts, such as the work of the Glasgow Financial Alliance for Net Zero (GFANZ) on this topic, to better understand where further involvement may be warranted.

Domestic sources of institutional capital are key emerging market investors

Amid a few notable but small allocations to emerging markets in Asia and Latin America, a key takeaway is that sources of domestic institutional capital within emerging markets are local infrastructure investors. These domestic institutional investors – public pension funds, local banks and national development banks – have the capacity and several advantages, including the ability to take local currency risk, knowledge of the policy landscape and on-the-ground experience and networks. Transformative policy and institutional work will be needed to build deeper, broader financial markets to lower the prohibitive cost of capital to emerging markets for climate infrastructure. Catalytic capital providers can play a useful role here, too, via targeted fund investments in domestic platforms and vehicles that scale up domestic capacity to enable, among other things, further local currency lending to climate projects.

Renewable energy infrastructure investment still lags

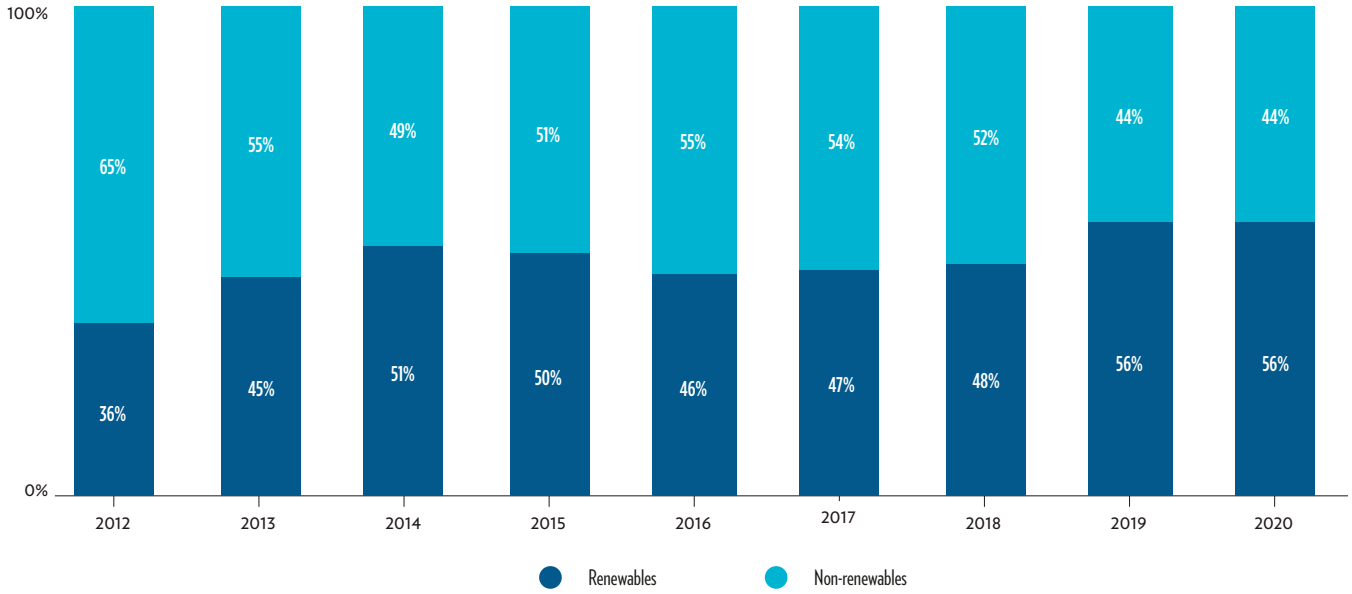
Investors in emerging market infrastructure remain more likely to invest in non-renewables than in renewables, as evidenced by the fact that the proportion of investment in renewables is only slightly higher in 2020 than in 2014. Global Infrastructure Hub notes that 55% of total private investment in energy generation went to non-renewables in 2020, compared to 50% in 2014.[13]

11 Organisation for Economic Co-operation and Development (OECD), Pension Markets in Focus 2022, (OECD 2023); International Associate of Insurance Supervisors (IAIS), 2022 Global Insurance Market Report (GIMAR), (IAIS 2022); Diego Lopez and Daniel Brett, Global Global SWF 2023 Annual Report, (Global SWF, 2023).

12 OECD, Annual Survey of Large Pension Funds and Public Pension Reserve Funds 2020, (OECD, 2021).

13 Global Infrastructure Hub (2022), Investors are twice as likely to invest in renewable energy in developed markets as in developing markets, (GI Hub Infrastructure Monitor, 2022).

FIGURE 5: **Private investment in renewables and non-renewables (% total private investment in energy generation, 3 yr avg.)**

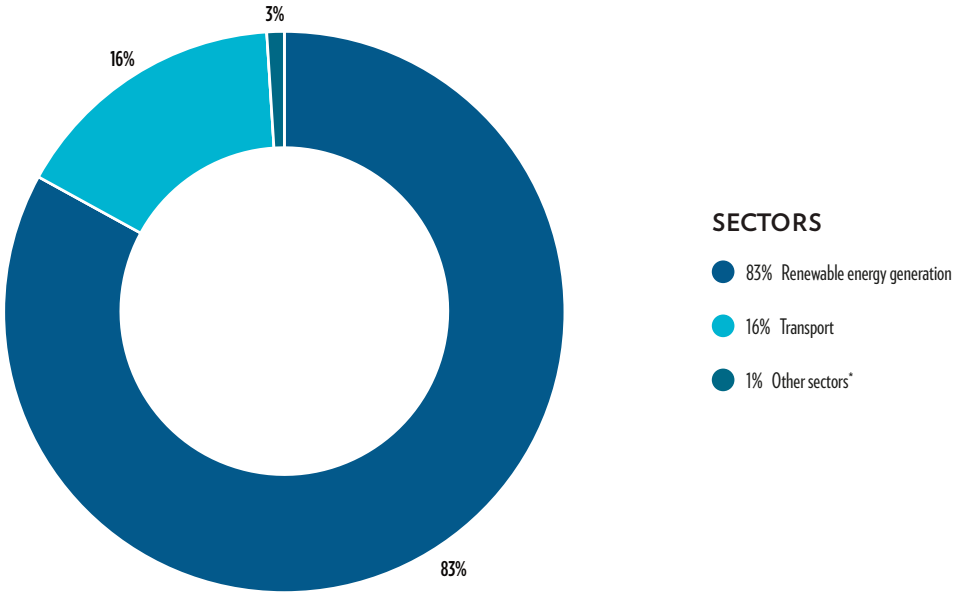


Source: Global Infrastructure Hub Monitor, 2023

Energy accounts for most investments, but other sectors have seen large recent increases

Energy and power are the most urgent transition investments, with solar and wind receiving the bulk of climate infrastructure investment allocations in emerging markets. Although the cost of proven technologies has fallen and business models are established, investments are often impeded by undeveloped and varied policies, weak regulatory frameworks, and financial conditions. Currently, approximately 25% of these investments are dedicated to transport, with a very small proportion, below 5%, allocated to other investments such as water and waste.

FIGURE 6: **Green private investment in infrastructure projects in middle and low-income countries (2010-2020 average)**



Note: *Other sectors includes social, other energy, water and waste.

Source: Global Infrastructure Hub Monitor, 2023

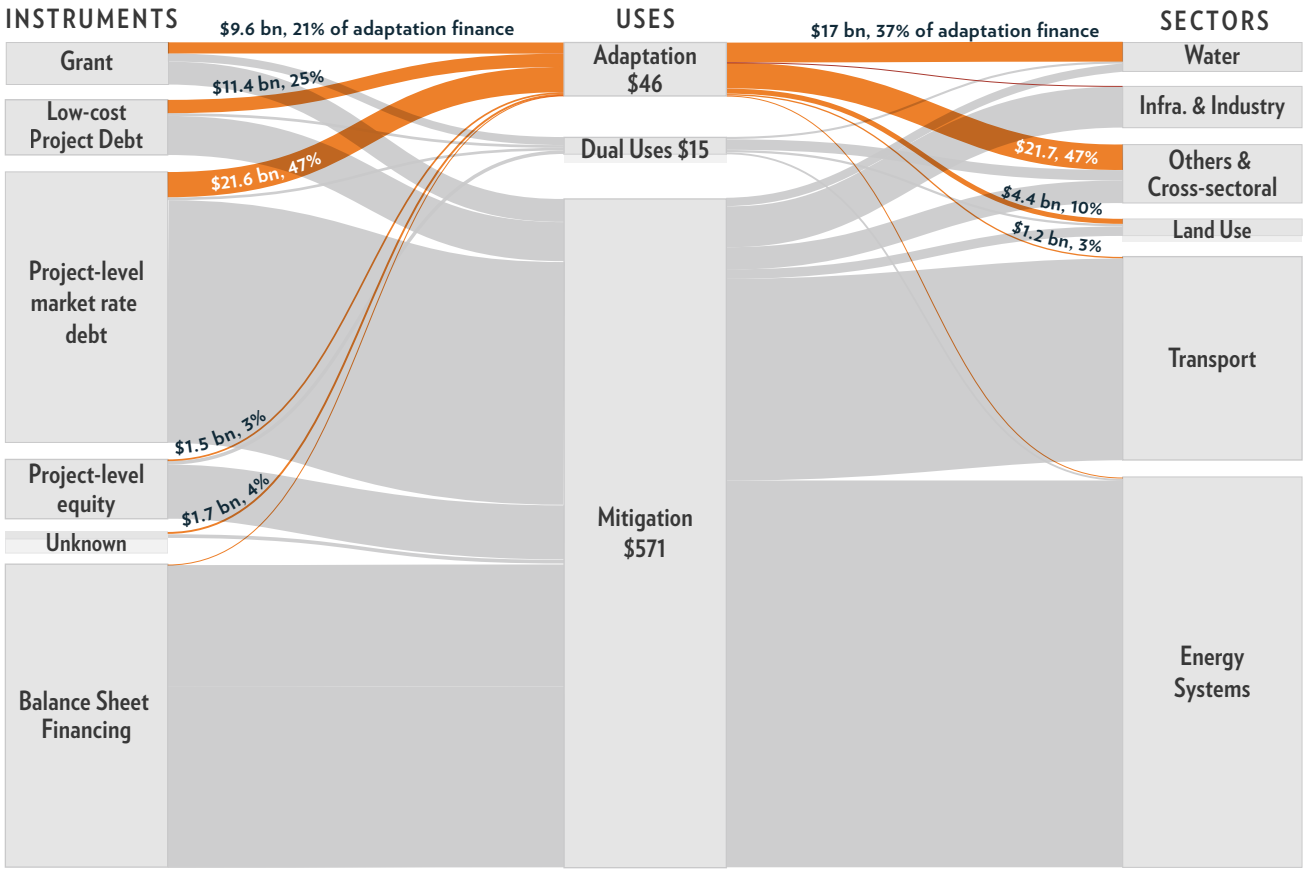
High geographic concentration in capital deployment

Ideally, catalytic capital would broaden climate infrastructure investment across geographies. The top ten recipient countries between 2016 and 2022 received 55% of all private climate finance. Private adaptation finance is even more highly concentrated among the top ten recipient markets, capturing 81% of all investment flows.[14] Investors and practitioners see the opportunities in investment-ready or near-ready markets, but the necessity is to convince them of wider opportunities in other underserved markets.

Adaptation finance needs to dramatically ramp up

Overall, approximately 10% of total Global North-South climate finance flows are currently directed to adaptation or combined adaptation and mitigation.[15] Most climate finance to MICs is dedicated to mitigation investments, while LICs receive climate finance for adaptation.[16] Yet, according to the United Nations Environment Programme, "international adaptation finance flows to developing countries are 5-10 times below estimated needs, and the gap is widening."[17] Financing is urgently needed to turn adaptation strategies into action.

FIGURE 7: **Adaptation finance by source and instrument**



Source: Climate Policy Initiative

14 OECD, Climate Finance Provided and Mobilised by Developed Countries in 2016-2020: Insights from Disaggregated Analysis, Climate Finance and the USD 100 Billion Goal, (OECD 2022).

15 Baysa Naran et al., Global Landscape of Climate Finance A Decade of Data 2011-2022, (Climate Policy Initiative, 2022).

16 OECD, Climate Finance Provided and Mobilised by Developed Countries in 2016-2020: Insights from Disaggregated Analysis, Climate Finance and the USD 100 Billion Goal, (OECD 2022).

17 United Nations Environment Programme, Adaptation Gap Report 2022: Too Little, Too Slow – Climate adaptation failure puts world at risk, (UNEP, 2022).

The Catalytic Capital Landscape and Critical Themes for Deployment

Experience in developed and developing markets suggests that catalytic capital and blended structures can reduce risks to institutional capital providers, thereby increasing the attractiveness of returns compared to alternative exposures outside emerging market infrastructure. However, that experience also indicates the need for a granular assessment of requirements across the emerging market infrastructure landscape. A comprehensive exploration of specific opportunities within this spectrum would be useful in the future if capital could be mobilized at a sufficient scale. Notably, while this brief focuses primarily on downstream investing and financing opportunities where private, non-DFI catalytic capital can be most effective, other upstream support efforts and public finance, for instance, in the form of grants to improve policy-enabling environments or technical assistance for project preparation, remain critical enablers.

Knowing where catalytic capital investments can be directed across project lifecycles is useful, but even more important is understanding how catalytic capital can be most effectually employed. To this end, stakeholder feedback was solicited across a range of viewpoints, including institutional investors, infrastructure finance experts, DFIs, and catalytic capital providers and practitioners themselves (see Acknowledgements section). These conversations identified four themes critical to the effective use of catalytic financing for climate infrastructure in emerging markets: targeting, speed, support and analysis.

TABLE 3: **Summary themes for the effective use of catalytic financing for climate infrastructure in emerging markets**

THEMES	PRIORITIES
TARGETING Focus on those interventions that can dramatically increase the quantum of catalytic capital across the risk spectrum	First loss capital and de-risking for programs and portfolios via funds, companies and other aggregation platforms rather than solely targeting individual projects Emphasis on local market participants such as developers and infrastructure operators (including SMEs) and institutional investors (e.g., pensions, insurance, banks) More diversified asset class allocation including, especially debt, and more risk mitigation through grants, program-related investments (PRIs) and guarantees
ACCELERATE Accelerate mobilization where catalytic capital can have meaningful impact	Create windows for catalytic capital/resources that can be accessed across the entire project lifecycle, for all needs, to minimize transaction costs in building out infrastructure Standardization of investment vehicles, such as funds, loan participations and securitization Pledges to aggregate and commit capital to fill much-needed market gaps (e.g., risk cover and guarantee facilities)
SUPPORT Incubate and accelerate capital deployers, especially to develop domestic and regional institutional ecosystems	Technical assistance and long-term capacity-building across key domestic and regional participants Cross-stakeholder platforms and partnerships with public and private governance Competitive and transparent processes to find and develop best enterprises, portfolios, projects and teams
ANALYZE Pledge to improve transparency and support much-needed data analysis initiatives	Data initiatives, GEMS included, to generate and share information on historical performance, counterparties, blending structures and impact and outcomes Taxonomy and reporting for private infrastructure and for transition activities in emerging markets Data and transparency on blended finance already deployed

By identifying areas of competence and ascertaining where investors' capital can be most effectively deployed across the four themes, the impact of the allocations can be magnified. This impact can be further compounded through closer collaboration amongst participants across the risk-return spectrum. There are numerous ways this can be accomplished, including creating shared resources and best practices and deeper, expanded public-private partnerships. Regardless of methodology, closer alignment will improve innovation around financing structures and solutions, create broader mandates, mitigate potential mistakes, and maximize the effectiveness of the limited, flexible, and potentially high-impact capital.

Catalytic capital's roles in emerging market climate infrastructure

While the four identified themes and related priorities outlined above can serve as a preliminary decision framework for catalytic capital providers, many potential pathways exist to deploy catalytic capital for scale and impact in emerging market infrastructure. Catalytic capital providers should consider their distinct roles in the context of their respective missions and mandates, risk appetites, and organizational capacities, among other criteria.

The 'Seeding, Scaling, and Sustaining' rubric developed by the C3 can help filter potential opportunities. The table below shows two possible dimensions of opportunity in which to assess the deployment of catalytic capital: **enterprises and fund managers** and **geographies and populations**.

TABLE 4: **Two possible dimensions of opportunity to assess the deployment of catalytic capital**

	ROLES FOR CATALYTIC CAPITAL		
	SEEDING "But-for" capital	**SCALING** Growth capital	**SUSTAINING** Long term capital need
ENTERPRISES AND MANAGERS	First-time managers, early-stage innovative enterprises, innovative projects and funds, especially domestic/regional managers Technical assistance to address specific challenges (e.g., regulatory change) and capacity-building (e.g., long-term skills building) Finance for adaptation and integration of adaptation in mitigation projects	Enterprises, operators and fund managers with early track record to replicate in new markets and/or aggregate mitigation investments Competitive processes to identify and allocate capital to 'best ideas' investments or to build demand for bankable projects and a marketplace of opportunities	Up-front project development costs, transaction costs, long-term technical assistance and capacity-building for planning, energy transition and SDGs Pipeline developers, innovation and deal-sourcing platforms to accelerate supply of bankable projects, blended finance vehicles, technology and business model innovation
GEOGRAPHIES AND POPULATIONS	Investment-ready middle-income countries to develop new models for replication City and sub-national scale programs and portfolios to develop capacity and project aggregation Underserved and LIC markets, for climate-vulnerable populations, FCAS and Small Island Developing States, to foster adaptation and energy access*	Smaller and improving markets, replications at city and sub-national scale	Underserved markets, LICs*

* Cases unlikely to attract institutional capital over the near to medium term

Recommendations and Emerging Uses for Catalytic Capital

While the roles that catalytic capital can play are evolving rapidly, several uses or applications are immediately actionable. These are detailed and discussed below; while some are not easily classified, they are grouped according to their dominant focus area, and recommendations are provided for which type of catalytic capital best fits.

The following uses for catalytic capital are aligned with investments:

Loan participations. *Recommendation: Target*

The development banks providing most of the catalytic capital in emerging market infrastructure have sold participations in their loan portfolios to investors for many years. However, interest in structuring MDB and DFI loans into portfolios has surged in line with alternative, sustainable investment assets. For instance, the recently launched ILX Fund aggregates DFI loan participations into an SDG and climate fund. Catalytic capital might help de-risk these portfolios in appropriate sizes to anchor innovative first-time funds.

Guarantees. *Recommendation: Target*

Risk mitigation instruments, principally guarantees, have proven critical in bringing institutional investors and intermediaries to infrastructure in emerging markets. Yet, few opportunities exist for catalytic capital to participate in growing the availability of guarantees. A recent example, the Green Guarantee Company, was launched in 2022 with the endorsement of the CPI Climate Finance Lab to provide investment-grade guarantees for green bonds and loans with the Climate Bonds Initiative's standards and certification.

Securitization. *Recommendation: Speed*

Securitization that supports climate mitigation, adaptation and resilience could be a productive use of catalytic capital; publicly issued bonds and equities could, for instance, help pilot innovative financing models.[18]

The main examples of securitization in emerging markets comprise MDB, government and agency issuance of green and sustainability bonds. Catalytic capital could support the development of green or climate versions of mainstream, tax-advantaged instruments such as India's Infrastructure Investment Trusts (InvIT) and Brazil's infrastructure debentures, both of which have seen strong local institutional investor interest. Among other proposals under consideration, catalytic capital could help back the creation of a global pipeline development platform to issue securities with donor collateral.

The following uses for catalytic capital would be driven by grants:

Adaptation finance. *Recommendation***:** *Hybrid (Target / Support / Analyze)*

Efforts to make physical infrastructure more adaptive and resilient are in the early stages of development. Public funding and catalytic capital would assist in making the case for financing the required planning, improvements and long-term risk management of the project. Given the business challenges and information gaps, the role of catalytic capital would most likely focus on public sector capacity, improved regulation, data and analytics, investor decision tools, and innovative finance, especially in the most climate-vulnerable geographies and communities.

Multi-stakeholder platforms. *Recommendation: Analyze*

Catalytic capital may help grow collaborative initiatives and their follow-on mobilization efforts, as well as provide a forum for shared learning and information exchange. Programs aimed at convening public and private stakeholders to drive climate investments in emerging markets, such as the emerging market-focused regional and thematic initiatives of GFANZ, have emerged in recent years. These platforms aim to develop coalitions of governments, donors, DFIs and private and financial sector partners to ramp up beneficiary country capacity to identify, prioritize, develop and finance climate infrastructure. Related country-led initiatives coming out of GFANZ aim to support just transitions in the energy sector and could be expanded to cover other sectors such as food and agriculture.

18 The Forest Resilience Bond in the US offers a good example of securitization with philanthropic support and a blended structure that introduces a new funding model.

These multi-stakeholder platforms are also critical vehicles through which catalytic capital providers and those who leverage such capital, including governments and institutional investors, can share best practices to help replicate successful innovations.

Further, given the relative paucity of catalytic capital and the urgency of the climate infrastructure finance imperative, it is vital that stakeholders share learnings to avoid the unnecessary delays and wasted resources that come from failures to learn what has and has not worked in the past. For instance, both the Global Revenue Guarantee, an initiative tied to the Finance to Accelerate Sustainable Transition-Infrastructure (FAST-Infra) initiative, and the Net Zero Asset Owners Initiative call for asset managers to scale up climate infrastructure finance in emerging markets, have resulted in limited activity. Forums should be made available for proponents of such projects to openly discuss lessons learned and insights about future efforts.

Some strategies are not directly addressable by catalytic capital providers but are nonetheless important forms of catalytic support:

Technical assistance, advisory support, and capacity-building. *Recommendation: Support*

The skills and expertise gap to develop climate infrastructure in emerging markets is a source of friction and costs – often a reason new deals are passed over. Governments (especially at city and sub-national level), finance providers and essential SMEs such as developers and operators need such skills and expertise support sustained over the long term. Although this is often financed by grants, some investors suggest that organizational transformation will be more effective when tied to catalytic capital and investments.

For example, Rocky Mountain Institute's Climate Finance Action Network supports advisors in emerging markets and provides climate finance training for domestic civil servants. Participants emphasized the following key needs:

- Long-term, high-quality advisory, in particular to develop strategies and programs beyond individual project support.
- Capacity-building for domestic expertise and on-the-ground leadership to build technical and management skills and to integrate the practice of climate and SDG alignment.
- Support from specialist intermediaries experienced in climate investments to advise on investment alignment, capital-raising and investment promotion.

Frameworks, taxonomies, and labels. *Recommendation: Support*

A fundamental transformation in financing markets, such as the one envisioned in this brief, will necessitate improved climate finance taxonomies and standards. With the adoption of powerful tools like the GIIN's IRIS+ and taxonomies and investment labels being codified into law in many jurisdictions and exchanges, the work to define a standardized set of clear and concise classification methodologies is well underway. Opportunities currently in development include the FAST-Infra Platform and Blue Dot Network for infrastructure project certification.

Themes for Catalytic Capital

Beyond the current landscape and emerging opportunities highlighted in this brief, the range of future applications and uses for catalytic capital could broaden further, from upstream support to governments (in collaboration with DFIs and donors), to supporting infrastructure supply chain (in partnership with corporates), to downstream financing of new construction, existing developments, and the reuse of decommissioned projects. Beyond investing in physical infrastructure, catalytic capital should also safeguard climate alignment and broader sustainability missions, by promoting governance, transparency and accountability.

Notable frontiers for future work and collective action may include the utilization of catalytic finance, support and information analysis for:

- **Mainstreaming science-based reporting and impact measurement** to clarify climate impacts alongside environmental and social co-benefits for all capital providers.
- **Advancing the just transition** to help maintain the livelihoods of workers in industries dependent on fossil fuels while increasing access to, and social impacts of, clean energy.

- **Enabling cities and sub-national jurisdictions** to develop and finance climate infrastructure, especially for bankable urban portfolios and city/sub-national green bonds.
- **Improving integration of climate and SDGs** for governments and infrastructure-implementing agencies, building next-generation policies, regulations and practices on the back of toolkits and guidance from MDBs and governments.
- **Educating institutional investors,** especially in local markets, in collaboration with catalytic capital providers, on the use of blended finance structures.
- **Integrating nature-based solutions and natural capital** to improve planning, stewardship, and risk reduction outcomes, recover biodiversity, and develop carbon sinks.
- **Developing new technologies and digitalization** to develop and operate well-planned, efficient, and long-lasting infrastructure.

CONCLUSION

Rapidly scaling up climate infrastructure in emerging markets is a critical lynchpin for meeting global decarbonization goals, but the world is nowhere near on track. With the flexibility and creativity necessary to move quickly, non-DFI catalytic capital providers can and indeed must play a pivotal role in the next several years of climate finance action. While the road ahead is steep, targeted, concentrated, and measured investments by these actors can surmount the challenge.

In our race against time with finite resources, the financial system stands at a pivotal juncture. We cannot afford to repeat past mistakes. Instead, we must channel resources and efforts where they will be most effective. Directing more institutional investments to climate infrastructure finance in emerging markets is not just a choice, it's imperative for the collective mission.

APPENDIX

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FinDev Canada

FMO

ILX

IKEA Foundation

Lazard Asset Management

MacArthur Foundation

Macquarie

Ninety One

Nithio

Nuveen

New Zealand Super Fund

Ontario Teachers' Pension Plan

PGGM

Prime Coalition

Rockefeller Foundation

SDI Asset Owner Platform

Shell Foundation

Soros Economic Development Fund

Temasek

Tempest Advisors

Three Cairns Group

Catalytic Capital examples:

Subsample of existing funds, vehicles and organizations utilizing catalytic capital tools for emerging market climate infrastructure

EXAMPLE	KEY FEATURES AND CATALYTIC CAPITAL TOOLS
EIB-sponsored Global Energy Efficiency and Renewable Energy (GEEREF)	• DFI-advised fund-of-funds structure investing in specialist private equity funds • Small and medium-sized projects with proven technologies in emerging markets • Tools: capital pledge, market signal
Amundi Planet – Emerging Green One (in conjunction with the IFC)	• Green emerging market bond fund • Encourages emerging market financial institutions to develop green underwriting capacity • DFI-provided technical assistance • Tools: technical assistance, credit enhancements
Bayfront Infrastructure Capital securitizations	• Infrastructure debt take-out from major banks • Securitization of diversified infrastructure loans to institutional investors • Green, social and sustainability tranches • Joint MDB-private ownership • Tools: credit guarantees and enhancements
Thailand National Housing Authority sustainability bonds	• Funds investments for energy efficiency and housing access • Local currency bonds absorbed by local institutional investors • DFI support for frameworks, project selection, local currency bond markets • Tools: technical assistance, capacity building
IFC Managed Co-lending Portfolio Program (MCPP)	• Customized, large-scale, pooled participations • Driven by large MDB lending, supported by donor countries • Alignment with United Nations Sustainable Development Goals (SDGs) and climate goals • Tools: first loss capital
Climate Investment Coalition leveraging investments from Nordic and United Kingdom pension funds in emerging markets' renewables and green energy solution projects	• Public-private project-level collaborations • Emphasis on proven technologies • Annual progress reporting • Tools: guarantees and off-take agreements

EXAMPLE	KEY FEATURES AND CATALYTIC CAPITAL TOOLS
Climate Investor One co-funded by the European Union	• Phased finance facilities matched to project development stage • Investments in renewable energy infrastructure projects in emerging markets, focusing on wind, solar photovoltaic and hydro technologies • Tools: guarantees, technical assistance, early-stage equity
GuarantCo – Multiple DFI supported initiative to leverage local capital in lower income countries in Africa and Asia	• Local currency-denominated credit guarantees • Enabling local currency bond issues that mobilize banks and institutional investors • Tools: guarantees
Southeast Asia Clean Energy Facility (SEACEF) – catalytic development capital to fund a low carbon transition in South East Asia	• Early-stage development capital from philanthropic investors • Emphasis on proven technologies in solar, wind, and energy storage, and business models that accelerate a low carbon transition • Focus on high-emitting MICs • Tools: equity, technical assistance
The Climate Finance Partnership managed by BlackRock	• Emerging market-oriented blended finance vehicle managed by a large institutional asset manager • Focus on climate infrastructure • Blended finance provided by DFIs and philanthropies • Tools: blended finance risk mitigation
Convergence Design Funding window	• Design and feasibility funding to enable practitioners to formulate catalytic blended finance vehicles or products that can attract capital at scale • Focus on blended finance solutions • Donor, DFI and philanthropic sponsorship • Tools: grants, technical assistance
The Global Innovation Lab for Climate Finance	• Public-private accelerator for innovative climate finance • Government and philanthropic funding to mobilize technical support, expertise and capital • Tools: technical assistance and competitive selection process to identify the best solutions for capital raise

Note: The above table points to features of existing funds, vehicles and organizations that have financed emerging market climate infrastructure with catalytic capital. These examples range from initiatives that are lower risk and closer to market-rate investments to investments for longer-term project and pipeline development. The investment vehicles noted above have all raised or mobilized and allocated institutional capital.

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