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Climate Allocation Compass, a Framework for Real-World Decarbonization (Compass-FRWD)

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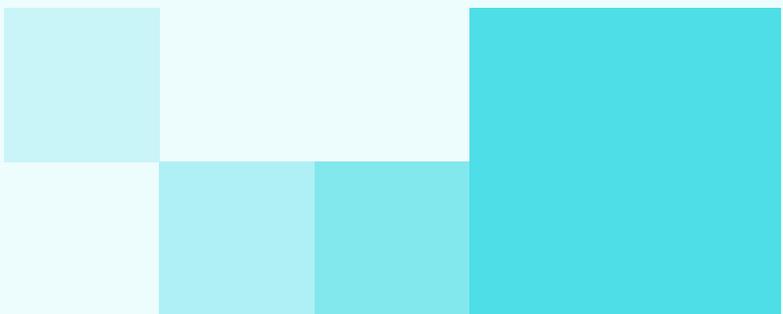


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Executive Summary¹

In the context of a significant shortfall in investment required to achieve global climate goals, the purpose of this paper is to discuss how Financial Institutions (FIs), and in particular investors, can help both bridge the investment gap and decarbonize the real economy through a framework of intentional capital allocation. This allocation should be based on capital needs identification, rigorous methods and metrics, and purposeful collaboration across the industry, as well as with key change-makers such as policymakers and multilateral banks.

In particular, the Columbia Center on Sustainable Investment (CCSI) and Man Group have developed the Climate Allocation Compass, a Framework for Real-World Decarbonization (referred to as Compass-FRWD hereafter). It seeks to depart from conventional practices, where there is (1) no incentive to financially support the transition of carbon-intensive sectors to net zero and (2) no framework to set ambitious targets for transition-enabling capital allocation beyond requirements to increase capital flows over time.

Our approach

By contrast, we advocate for a top-down, long-term, iterative approach to strategic investing in decarbonization that aligns with fiduciary duties, integrates decarbonization needs into portfolio construction alongside traditional financial requirements, sets the tone for stakeholders and portfolio companies, and fosters accountability through monitoring, reporting and adapting.

Thus, Compass-FRWD is an asset allocation framework designed to guide strategic capital distribution across multiple portfolios. The Compass-FRWD structure encompasses six steps:

- **Step 1:** To comprehensively understand the sectors and regions covered by the collective investment mandates of all portfolios utilizing this framework.
- **Step 2:** Calculate the emissions gaps of these regions and sectors, by comparing the emissions results from the current policy scenario and the net-zero scenario in Integrated Assessment Models (IAMs).
- **Step 3:** Define optimal percentage targets for capital distribution across the portfolios. The percentage targets for specific sectors or regions are equal to the relative emissions gaps while the percentage targets for climate solutions are their relative Emissions Reduction Potential (ERP) as indicated by a global sectoral pathway.
- **Step 4:** Translate these overarching targets into portfolio-specific targets, considering that different portfolios have their own contexts, including asset class, investment focus, and mandates.

¹ All data as of July 2024, unless noted otherwise.

- **Step 5:** Establish regular two-way communication between the overarching target and the different portfolios. With this two-way communication, capital flows can be tracked at the overarching level through a “Net Zero Deviation Index” (NZDI), which is the difference between how capital allocation is distributed and how it should be according to the initial targets set in the third step. The objective is to progressively reduce the NZDI with each deployment cycle. The ultimate aim is to achieve an optimal distribution of capital allocation across regions and sectors, assuming that if all investors follow this compass, the gap to net-zero emissions will close.
- **Step 6:** Given the various challenges in closing this gap, the final step is to implement an iterative portfolio construction strategy designed to mitigate investment constraints. Setting the strategy at the overarching level is advantageous, as one can leverage the strength of a multi-asset class response and define areas of engagement and collaboration across FIs and stakeholders.

Integral to Compass-FRWD is the development of an asset and entity screening process to ensure that any asset acquired aligns with a net-zero trajectory. It involves ensuring investments are aligned with both officially defined climate-aligned activities (e.g. as per taxonomies) and with robust net-zero transition plans at the entity level. When opportunities are comparable, asset selections should maximize the carbon impact ratio.²

Figure 1: Visualizing Compass-FRWD, step by step



Schematic illustration.

Enduring challenges

Significant challenges remain in targeting emissions gaps, ensuring additionality, and realizing the full intention of Compass-FRWD. While fixed income investments, particularly Green, Social and Sustainable (GSS) bonds, hold the highest potential for impact within the realm of climate finance (due to their signaling effect, their critical role in influencing firms’ cost of capital, providing ongoing financing opportunities and attracting a sustainably-oriented investor base), they are a nascent market. As the GSS market evolves, it is important to balance the need to create entry points for new issuers and to promote harmonized credible and robust standards.

². The ratio of avoided emissions to induced emissions.

Attracting international investors to Emerging Markets and Developing Economies (EMDEs) is hampered by factors such as a lack of investment-grade credit ratings, higher capital costs, currency risks, and a small investible project pipeline. Additionally, a lack of high-quality, reliable, and comparable data on corporate transition plans hampers the ability of financial institutions to allocate capital effectively and prevent greenwashing. Even with rigorous qualitative analyses and genuine efforts to support sustainable practices, the absence of robust data can lead to perceptions of insincerity or misrepresentation. This fear of unintended greenwashing may constrain the flow of capital when investors remain cautious about potential reputational risks and the integrity of their environmental claims. Engagement with portfolio companies is often insufficient despite commitments to net-zero alliances, and the focus on reducing portfolio emissions, rather than achieving real-world decarbonization, is still prevalent.

Addressing these issues is essential to reducing emissions on a global scale and ensuring effective capital shifts toward decarbonizing the real economy. Adopting a multi-asset class strategy helps accommodate the diverse Technology Readiness Levels (TRLs) required for decarbonization: Lower TRLs are riskier than higher TRLs and the spectrum of risks along the TRL scale can be matched with suitable asset classes according to their risk profile. A multi-asset class framework also ensures a coherent cross-asset strategy. Additionally, investors can leverage technology, such as generative artificial intelligence, to sift through vast amounts of data to identify companies and technologies crucial for decarbonization, enabling them to construct diversified portfolios aligned with the global transition to a low-carbon economy.

A collaborative effort

Collaboration with policymakers, across the industry, and with the Multilateral Development Banks (MDBs) is vital for effective capital deployment and addressing bottlenecks in portfolio allocation. Engaging with policymakers is critical to fostering an enabling environment for sustainable finance initiatives and non-state actors' effective climate action, while partnerships with underwriters and asset managers can improve the legal and sustainable quality of issuances. Collaborative approaches between asset owners and managers can align investment preferences with decarbonization commitments, developing innovative financial instruments to de-risk investments in climate solutions. Furthermore, engaging with portfolio companies to refine their transition strategies ensures alignment with decarbonization goals, while partnerships with MDBs can optimize the development of bankable projects, investible issuances and unlock private finance opportunities in EMDEs.

Through these collaborative efforts and a comprehensive decarbonization framework aimed at allocating capital where it is most needed, we can make significant strides in combating climate change and achieving a sustainable future.

Introduction

Climate finance flows have grown consistently over the past decade, but they still lag far behind what is needed to meet the goals of the Paris Agreement. It is estimated that USD 7.3 trillion per year of climate finance is required between now and 2050 – almost USD 200 trillion in total – to deliver on the Net Zero goals³. However, tracked global climate finance only passed USD 1 trillion for the first time in 2022.⁴ The world needs to decarbonize seven times as fast as the current rate to limit warming to 1.5°C above pre-industrial averages. Low-carbon spending will need to be 4 times higher than high-carbon spending by 2030, and 10 times by 2050.⁵

Transport and power systems face the largest investment gaps. Asia Pacific is estimated to require nearly 40% of the total global investment in mitigation while Africa will need to scale the investment flow by a factor of 10 as compared to 2020 levels.⁶

In the context of this wide investment gap to reach the global climate goals, the purpose of this paper is to discuss how FIs, and in particular the investors among them, can help both bridge the investment gap and decarbonize the real economy through a framework of intentional capital allocation. This allocation is based on capital needs identification, rigorous methods and metrics, and purposeful collaboration across the industry as well as with key change-makers such as policymakers and multilateral banks.

The time is ripe as investors have started grappling with transition finance: After a long period focusing on reducing the financed emissions, which has not been conducive to the decarbonization of the real economy, the investors' associations such as Glasgow Financial Alliance for Net Zero (GFANZ),⁷ The Institutional Investors Group on Climate Change (IIGCC)⁸ and UN-Convened Net-Zero Asset Owner Alliance (NZAOA)⁹ are now seeking to accompany investors in financing the reduction in emissions through embracing transition finance, and through shifting capital towards climate solutions in the sectors and geographies that need it the most.

Despite these efforts, the data indicates a lack of comprehensive allocation strategies tailored to climate solutions. This is evident in the distribution of investments across various sectors. While there has been notable growth in investments in climate solutions, reaching USD 380.6 billion in 2023, the allocation is heavily skewed towards specific sectors like buildings and energy, with directly-held real estate receiving a significant portion of these investments.¹⁰ The capital allocation is also skewed towards developed countries as private sector finance is particularly scarce in EMDEs.¹¹ Investors' current focus on real estate and developed countries underscores the need to implement comprehensive allocation strategies to unlock the full potential of climate finance and achieve meaningful impact.

3. Climate Policy Initiative, *How Big is the Net Zero Financing Gap?* (San Francisco: Climate Policy Initiative, September 2023), <https://www.climatepolicyinitiative.org/wp-content/uploads/2023/09/How-big-is-the-Net-Zero-financing-gap-2023.pdf>.

4. Barbara Buchner, Baysa Naran, Rajashree Padmanabhi, Sean Stout, Costanza Strinati, Dharshan Wignarajah, Gaoyi Miao, Jake Connolly and Nikita Marini, *Global Landscape of Climate Finance 2023* (San Francisco: Climate Policy Initiative, November 2023), <https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2023/>.

5. Emma Cox, Will Jackson-Moore, Leo Johnson, and Tarik Moussa, *State of Climate Tech 2023: How Can the World Reverse the Fall in Climate Tech Investment?* (London: PricewaterhouseCoopers, October 2023), <https://www.pwc.com/gx/en/issues/esg/state-of-climate-tech-2023-investment.html>.

6. Climate Policy Initiative, *How Big is the Net Zero Financing Gap?*

7. Glasgow Financial Alliance for Net Zero, *Scaling Transition Finance and Real-economy Decarbonization: Supplement to the 2022 Net-zero Transition Plans Report* (Glasgow: GFANZ, December 2023), <https://assets.bbhub.io/company/sites/63/2023/11/Transition-Finance-and-Real-Economy-Decarbonization-December-2023.pdf>.

8. Institutional Investors Group on Climate Change, *Climate Investment Roadmap: A Tool to Help Investors Accelerate the Energy Transition Through Investment and Engagement* (London: Institutional Investors Group on Climate Change, July 2022), <https://www.iigcc.org/resources/climate-investment-roadmap>.

9. United Nations Environment Programme Finance Initiative, "Net-Zero Asset Owner Alliance Progress Report Demonstrates Advance on Decarbonisation Targets," press release, September 20, 2022, <https://www.unepfi.org/industries/investment/net-zero-asset-owner-alliance-progress-report-demonstrates-advance-on-decarbonisation-targets/>.

10. United Nations Environment Programme Finance Initiative, *The Third Progress Report of the Net-Zero Asset Owner Alliance: Increasing Climate Ambition, Decreasing Emissions*, (Geneva: UNEPFI, November 2023), <https://www.unepfi.org/wordpress/wp-content/uploads/2023/10/NZAOA-Third-Progress-Report.pdf>.

11. Climate Policy Initiative, *How Big is the Net Zero Financing Gap?*

In particular, CCSI and Man Group have developed the Climate Allocation Compass, a Framework for Real-World Decarbonization (referred to as Compass-FRWD thereafter). It seeks to depart from conventional practices, which often (1) penalize holding assets in carbon-intensive sectors (since it increases portfolio emissions) and (2) lack frameworks to set ambitious targets for transition-enabling capital allocation beyond the basic requirement of increasing capital flows over time.¹² By contrast, we offer an approach for deliberate, dynamic, and net-zero aligned investment in climate solutions. In sections 1 and 2, this paper presents the Compass-FRWD framework, its metrics, and the strategy it tries to incentivize to ensure the financing of climate solutions at scale and in a dynamic environment. In section 3, we provide an overview of the sustainable and climate finance market and how to make it more impactful given its potential to increase the investors' base and lower the cost of capital for climate investments. Section 4 elaborates on the challenges to implementing and scaling Compass-FRWD such as the lack of good data on transition plans or the barriers to investment in EMDEs, and in section 5 we explore ways to overcome challenges via collaboration and engagement between the various stakeholders.

¹². According to the NZAOA, "[A]s per the third edition of the Alliance's Target-Setting Protocol (...), it is optional for members that set investment targets for climate solutions to define that target in quantitative terms. However, members are required to report the total amount of their climate solution investments annually. Over time, these should ideally demonstrate an increasing trend." United Nations Environment Programme Finance Initiative, *The Third Progress Report of the Net-Zero Asset Owner Alliance: Increasing Climate Ambition, Decreasing Emissions*.



1.

**Compass-FRWD: A multi-asset
class decarbonization framework**

This paper advocates for a top-down, long-term approach to strategic investing in decarbonization that aligns with fiduciary duties, integrates decarbonization needs into portfolio construction alongside traditional financial requirements, sets the tone for stakeholders and portfolio companies, and fosters accountability through monitoring, reporting, and adapting.

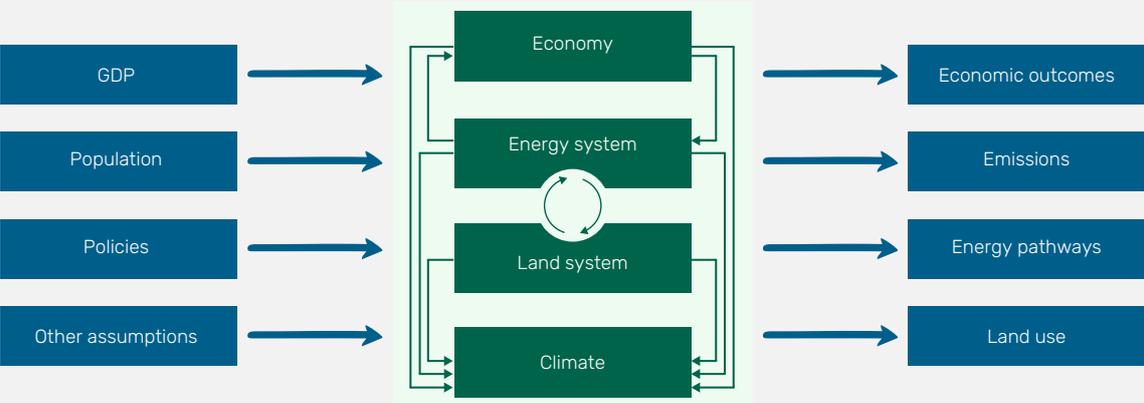
a. Investment thesis and features of Compass-FRWD

The investment thesis underlying Compass-FRWD aims to strategically allocate capital across regions and sectors in proportion to the effort required to achieve net-zero emissions in each area. This amount of effort is determined by the emission gaps identified through Integrated Assessment Models (IAMs): comparing the current policy scenario for a region or sector to the desired net-zero policy scenario helps quantify the emission gap by simply taking the difference in projected emissions results between the two scenarios.

Box 1: What are Integrated Assessment Models (IAMs)?

Integrated assessment models (IAMs) are simplified numerical representations of complex physical and social systems, focusing on the interaction between the economy, society, and the environment. IAMs aim to provide policy-relevant insights into global environmental change and sustainable development issues by providing a quantitative description of key processes in the human and earth systems and their interactions. IAMs simulate outcomes associated with various scenarios (the most widely known are listed in Table 1). Even when a standard scenario is used to specify input parameters, there is uncertainty associated with the model formulation. One can use a multi-model ensemble to mitigate this uncertainty, as each IAM makes different assumptions in the representation of key processes in the economy, energy system, land system, and climate (for more see Box 2). We focus on the emissions output from each IAM, as this should be more robust than the economic or financial output. Further, the investment prioritization is based on the relative size of the emission gaps, between two scenarios, which is relatively consistent between models regardless of fluctuations in absolute size of these emission gaps (see Appendix). The relative emission gap refers to the proportion of the total emission gap for which each sector/region combination is responsible.

Figure 2: Schematic illustration of an IAM, with input parameters on the left, modules in the center, and outputs on the right.



Schematic illustration.

Compass-FRWD has several key features:

It operates cyclically, acknowledging that achieving optimal capital distribution necessitates multiple deployment cycles and continuous learning. It is designed to encompass various asset classes and, as such, investors with a diverse range of asset classes in their portfolio can benefit most from its results. Additionally, engagement with key stakeholders throughout the investment value chain is crucial for both implementing the Compass-FRWD framework and generating meaningful outcomes. By fostering collaboration and leveraging insights from stakeholders, Compass-FRWD can be implemented most effectively to drive progress toward net-zero emissions. Each of these aspects will be discussed further below.

b. Compass-FRWD Structure

The Compass-FRWD structure encompasses six steps. Compass-FRWD is an asset allocation framework designed to guide strategic capital distribution across multiple portfolios.

- The **first** step is to comprehensively understand the sectors and regions covered by the collective investment mandates of all portfolios utilizing this framework. An investment mandate may include guidelines on priority countries or sectors, goals, benchmarks, risk, and types of asset classes to be used.
- The **second** step is to calculate the emissions gaps of these regions and sectors, by comparing the emissions results from the current policy scenario and the net-zero scenario in Integrated Assessment Models (IAMs).
- The **third** step is to define optimal percentage targets for capital distribution across the portfolios. The percentage targets for specific sectors or regions are equal to the individual emission gaps of sectors and regions, calculated relative to the total emission gap across all sectors or regions across all portfolios' mandates. Step three also includes setting percentage targets for climate solutions according to the share in Emissions Reduction Potential (ERP) of a mitigation measure relative to all measures indicated by a global sectoral pathway. In short, these targets are equal to the proportional emissions gap or the proportional ERP.
- The **fourth** step is to translate these overarching targets into portfolio-specific targets, considering that different portfolios have their own contexts, including asset class, investment focus, and mandates. This involves setting individual portfolios to allocate capital toward climate solutions in the sectors or regions identified in step two, within their own limitations, while collectively contributing to the overarching targets.
- The **fifth** step is to establish regular two-way communication between the overarching target and the different portfolios. The targets flow down to the portfolios, and capital allocation metrics broken down by region, sector or any other themes flow up from the portfolios to the overarching level. With this two-way communication, capital flows can be tracked at the overarching level through a "Net Zero Deviation Index" (NZDI), which is the difference between how capital allocation is distributed and how it should be according to the initial targets set in the third step. The objective is to progressively reduce the NZDI with each deployment cycle. The ultimate aim is to achieve an optimal distribution of capital allocation across regions and sectors, assuming that if all investors follow this compass, the gap to net-zero emissions will close.

- Given the various challenges in closing this gap, the **sixth** step is to implement an iterative portfolio construction strategy designed to mitigate investment constraints. Setting the strategy at the overarching level is advantageous, as one can leverage the strength of a multi-asset class response and define areas of engagement and collaboration across FIs and stakeholders.

Integral to Compass- FRWD is the development of an asset and entity screening process to ensure that any asset acquired aligns with a net-zero trajectory. It involves ensuring investments are aligned with both officially defined climate-aligned activities (eg: as per taxonomies) and with robust net-zero transition plans at the entity level. When opportunities are comparable, asset selections should maximize the carbon impact ratio.¹³

i) Setting initial targets based on emissions gaps at the geographic and sectoral level

The first steps of the Compass-FRWD framework entail delineating the optimal distribution of investments across various regions and sectors covered by the collective investment mandates of all portfolios utilizing this framework. The initial targets rely on the use of IAMs to identify emission gaps by region, sector, or sub-sector, guiding capital allocation proportionally to the effort needed to bridge the gap between current policies and the net-zero scenario. The current policy scenario is regularly updated to reflect recent economic and climate data as well as new policy commitments, so our targets will also update regularly. Box 2 provides an overview of the varying assumptions and uncertainties inherent in climate scenarios produced by the IAMs.

While climate scenarios have originally been designed for public policy and have later been adopted by FIs to complete climate-risk stress testing, this paper advocates the use of climate scenarios for capital allocation aiming to close the investment gaps in regions, sectors, and technologies. To our knowledge, only the IIGCC has attempted to use scenario analysis to quantify capital allocation needs across sectors and geographies. However, the IIGCC does not recommend a direct method for portfolio construction based on these needs. Instead, it proposes using this analysis retrospectively to evaluate a portfolio's performance and its alignment with the global climate goals.¹⁴

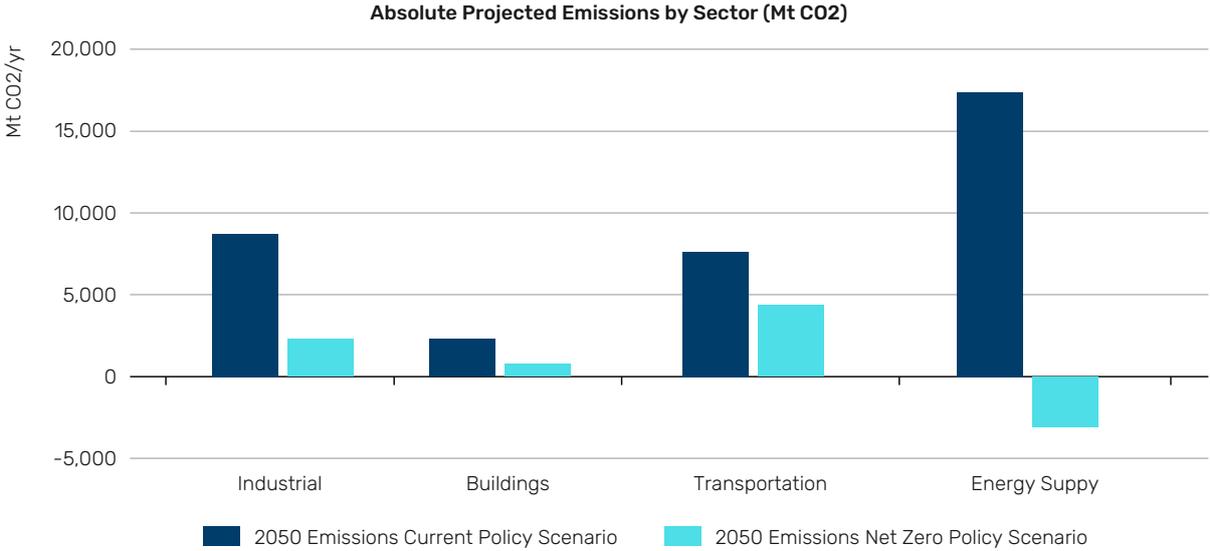
Compass-FRWD requires setting percentage-based targets for investment distribution, where the targets for each sector or region are derived by assessing their individual emission gaps in relation to the aggregate emission gaps found across all sectors or regions within the group. Thus, the target is the proportional emissions gap, calculated by taking the difference of emissions results from the current policy scenario and a net-zero scenario of an IAM.

Using the current policy scenarios and net-zero 2050 scenarios from the Global Change Assessment Model (GCAM), an IAM, the allocation targets according to the share in emissions gaps by geography, sector, and sub-sector are illustrated in Figure 3. Figure 3(a) shows the emissions of the energy sectors of the economy in the current policy and net-zero policy scenarios. Figure 3(b) displays the emission gaps of these sectors together. Finally, Figure 3(c) presents pie charts showing allocation targets, which are the proportional emission gaps.

¹³. The ratio of avoided emissions to induced emissions.

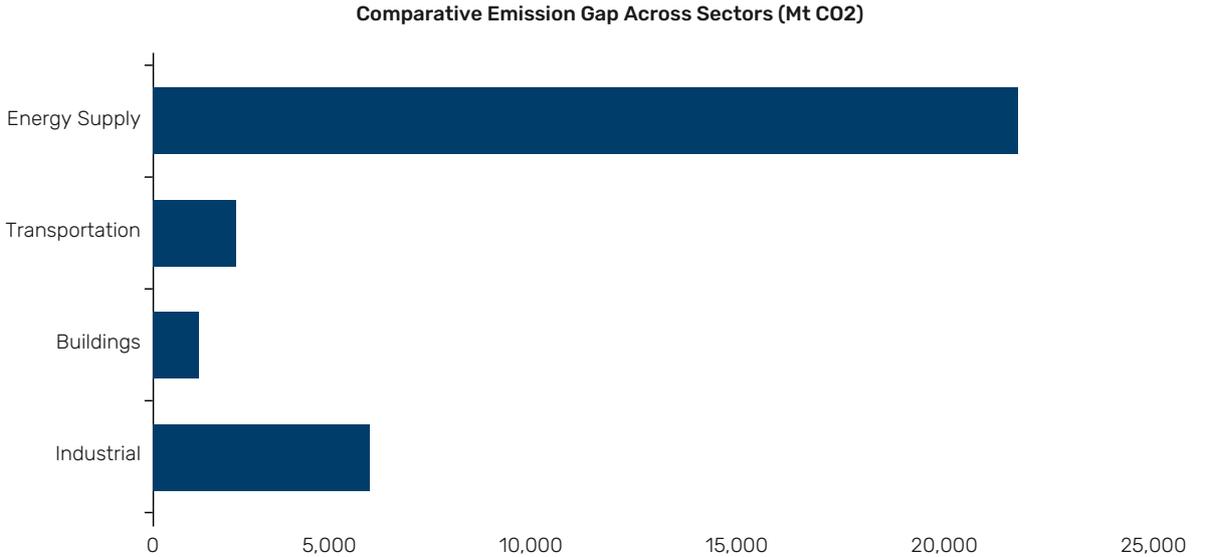
¹⁴. Institutional Investors Group on Climate Change. *Climate Investment Roadmap*.

Figure 3(a): Difference between emissions in current policy and net-zero policy scenario of sectors in absolute terms



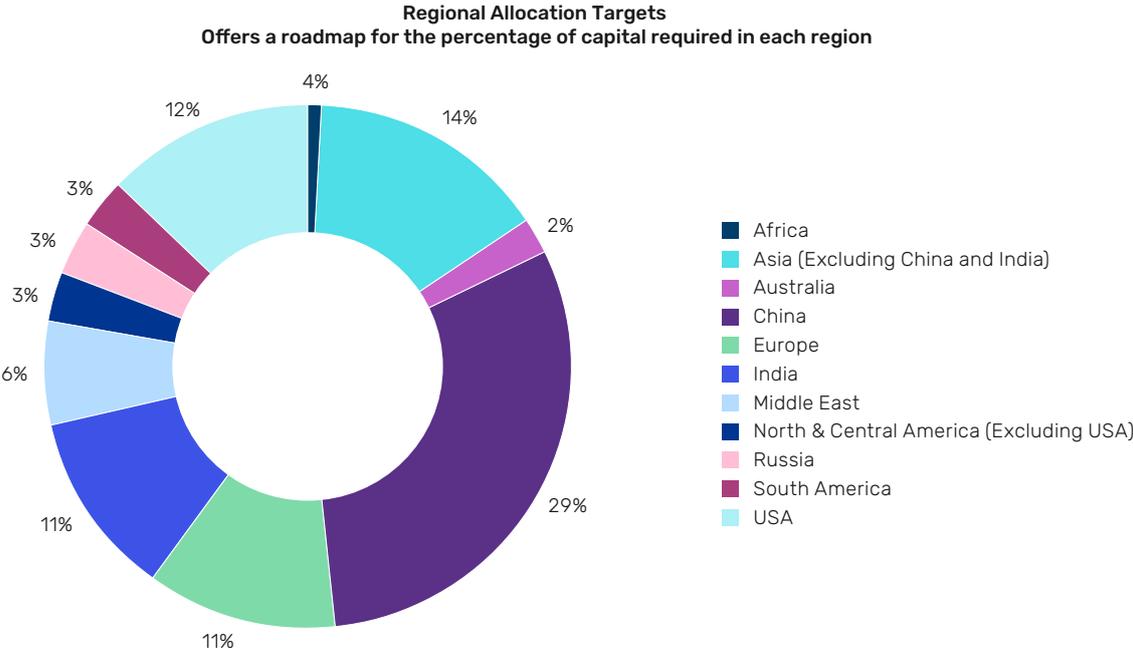
Source: Internal data, prepared by authors. As of July 2024.

Figure 3(b): Emission Gaps of different sectors together

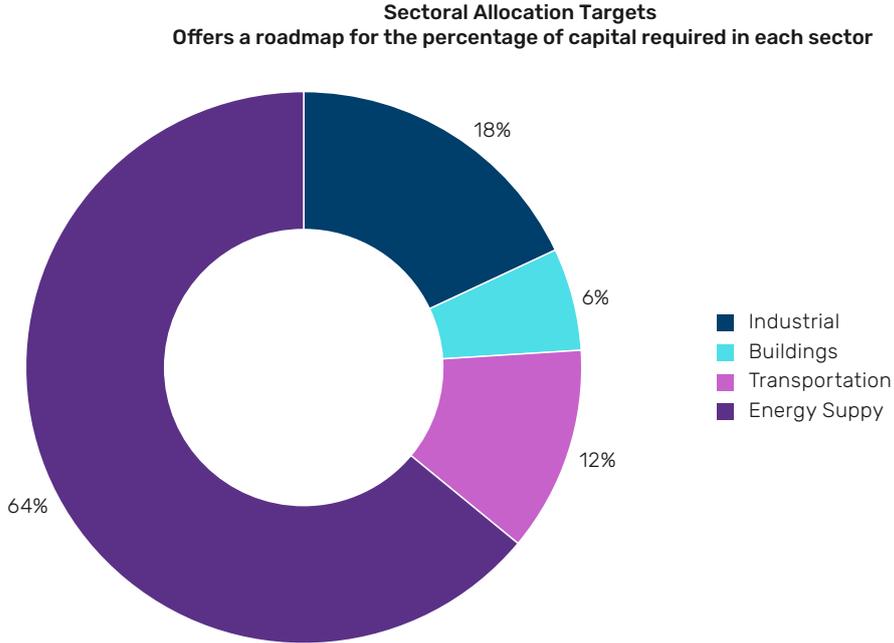


Source: Internal data, prepared by authors. As of July 2024.

Figure 3(c): Allocation targets by geography, sector and sub-sector

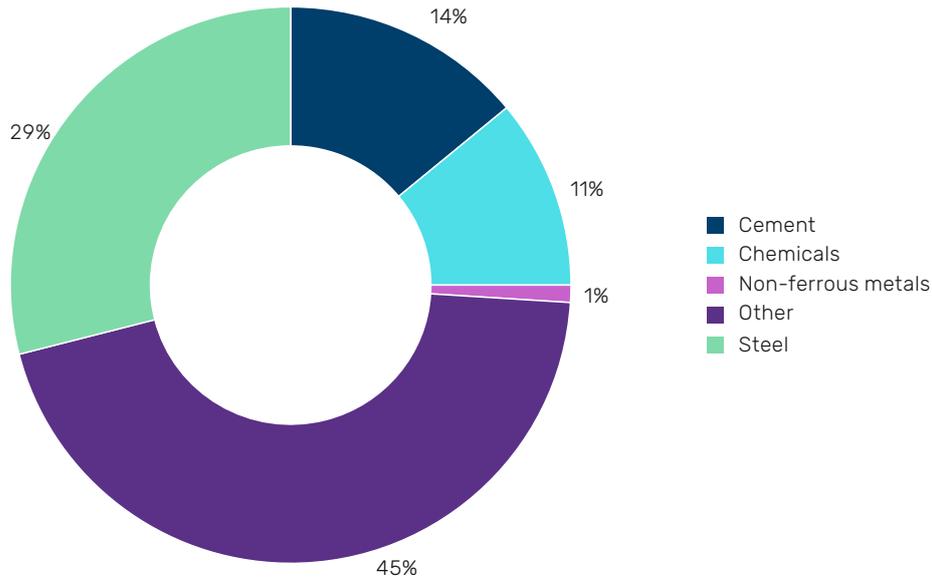


Source: Internal data, prepared by authors. As of July 2024.



Source: Internal data, prepared by authors. As of July 2024.

Thematic Allocation Targets
Offers a roadmap for the percentage of capital required in each of the industrial sectors



Source: Internal data, prepared by authors. As of July 2024.

Interestingly, without providing practical guidance, GFANZ refers to a similar concept as that proposed here: in capital allocation, they suggest considering “Expected Cumulative Emissions (ECE)” which characterizes the gaps between an entity’s absolute emissions and where it should be by 2050 as per a net-zero alignment.¹⁵ At the level of sectors, ECE could support the allocation of capital according to the larger gaps.

¹⁵ Glasgow Financial Alliance for Net Zero, *Scaling Transition Finance and Real-economy Decarbonization: Supplement to the 2022 Net-zero Transition Plans Report*.

Box 2: Climate scenarios, different assumptions and uncertainties

A climate scenario provides one coherent vision of the future situation of the world. It is based on a model setting socio-economic assumptions, activity levels, cost of technology over time, technology uptake, temperature outcome, and an associated carbon budget with a certain probability. The International Institute for Applied Systems Analysis (IIASA) hosts an open-access database of 1,184 peer-reviewed scenarios across 31 different models, which were all reviewed in the Intergovernmental Panel on Climate Change (IPCC)'s Fifth Assessment Report.¹⁶ These scenarios particularly differ in the level of ambition, sectoral coverage, and whether they rely heavily on negative emissions. Table 1 illustrates the variations across different models and their respective assumptions.

Compass-FRWD is based on the NGFS' Orderly Net-Zero 2050 scenario (see Table 1), a widely used scenario.¹⁷ It also presents the advantage of offering a breakdown of economic activity and CO₂e emissions by region and sector, clearly showing the most likely technology path to net zero, while only relying, to a limited extent, on negative technologies and natural offsets.

Table 1: Comparison of key climate scenarios

Source	Scenario	Sector Coverage	Temperature Outcome (°C)	Description
1.5°C Scenario				
IEA	Net Zero Emissions by 2050 (NZE)	Energy sector (excludes AFOLU)	1.4	Assumes higher shares of carbon sequestration to achieve net zero, with approximately 7.6Gt CO ₂ /year by 2050, including CO ₂ removal from bioenergy with carbon capture and storage (BECCS) and DACCS. 49% of final energy demand comes from electricity generation in 2050, and hydrogen use is 20EJ/year.
NGFS	Orderly: Net Zero 2050	All sectors	1.5	Assumes stringent climate policies are introduced early and a high innovation environment is cultivated, limiting warming to 1.5°C. Electricity provides 53% of final energy demand in 2050 while hydrogen use is 18EJ/year. CCS delivers around 8.5Gt CO ₂ /year by 2050.
NGFS	Disorderly: Divergent Net Zero	All sectors	1.5	Assumes policies are delayed and divergent across countries, but sufficiently stringent to reach 1.5°C. 58% of final energy comes from electricity in 2050 while hydrogen use is 16EJ/year. CCS delivers around 6Gt CO ₂ /year by 2050. There are particularly high transition costs associated with this scenario, which assumes a carbon price of ~\$630/tCO ₂ per year (2020 real prices).
IRENA	1.5°C Scenario (1.5-S)	Energy sector (excludes AFOLU)	1.5	Assumes relatively higher renewable penetration and hydrogen deployment to reduce emissions.
PRI	Inevitable Policy Response: Required Policy Scenario	All sectors	1.5	IPR's assessment of future policy developments needed to accelerate emissions reduction and hold the global temperature increase to a 1.5 degree outcome.

Source: IIGCC, 2024.¹⁸

¹⁶. Keywan Riahi, Edward Byers, and Volker Krey, *AR6 Scenario Explorer and Database* (Laxenburg: International Institute for Applied Systems Analysis, January 2023), <https://iiasa.ac.at/models-tools-data/ar6-scenario-explorer-and-database>.

¹⁷. While the Disorderly Net Zero scenario also achieves net zero by 2050, the transition costs are higher, so we opt to use the Orderly scenario to define targets. One can use the framework to assess any number of scenarios and targets.

¹⁸. Institutional Investors Group on Climate Change, *Climate Investment Roadmap*.

ii) Setting initial targets for climate solutions based on global sectoral pathways

The Compass-FRWD includes a strategy to set initial climate solution targets within sub-sectors based on global sectoral net-zero pathways (see Box 3 for a definition of climate solutions). These targets serve as an instrumental tracking mechanism, enabling the identification of investment shortfalls and facilitating the advancement of critical technologies necessary for each sector's transition toward net zero while also ensuring additionality. This approach focuses on developing critical yet underfunded technologies without overlooking region-specific solutions with strong success potential.

Box 3: Defining climate solutions¹⁹

A “climate solution” is an economic activity that contributes to emissions reductions required by a 1.5°C pathway. A climate solution is of three types:

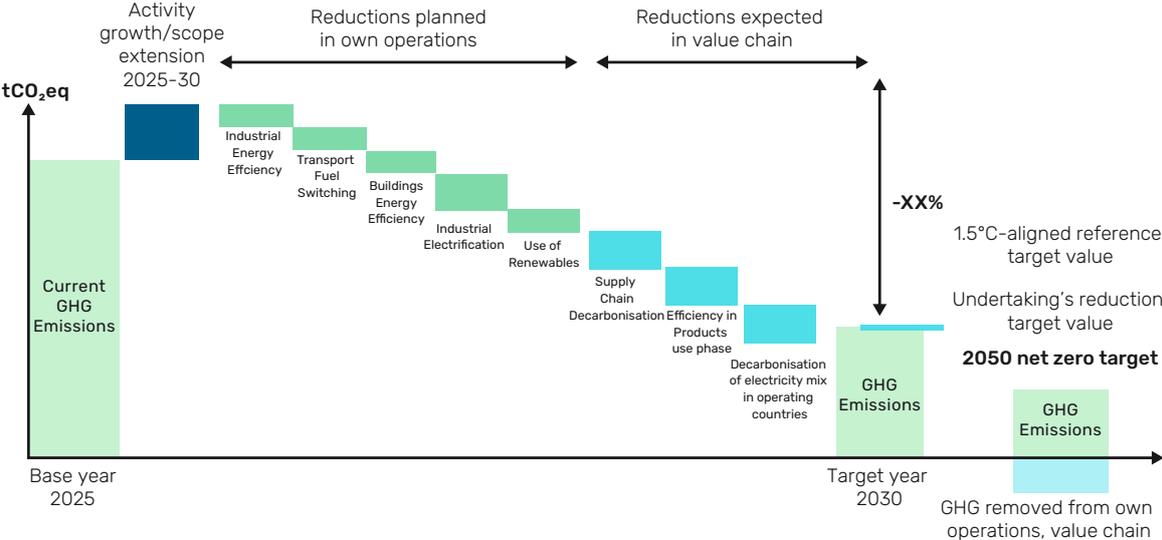
- “Low-carbon” or “zero-carbon” climate solutions are economic activities with close to zero emissions.
- “Transitional” climate solutions are economic activities that reduce their own emissions along a 1.5 trajectory but remain emissions-intensive today.
- “Enabling” climate solutions refer to economic activities that enable emissions reductions in the wider economy such as equipment or infrastructure.

Climate solutions may vary by region and over time as decarbonization pathways are geographically sensitive. The interaction of policies, technologies, and the increased observation of physical damage from climate change will probably lead to the emergence of new climate solutions, sometimes making others redundant but above all making the future uncertain. This highlights the need for a dynamic and iterative framework.

The hypothesis is that the ERP of each “mitigation measure” or “decarbonization lever” serves as a crucial indicator (see Figure 4 for a simplified view of a suite of mitigation measures to achieve a generic decarbonization pathway). Several climate solutions can fall under one mitigation measure (e.g., implementing green hydrogen is the mitigation measure which can require different types of technologies which are the climate solutions). Essentially, the ERP value of a measure indicates the extent to which a mitigation measure needs to be deployed to contribute effectively to a sector's transition to net zero. Consequently, this ERP metric, and its contribution to achieving net zero in the sector, acts as a proxy for capital allocation, providing a clearer estimate of the capital required to implement these solutions comprehensively. Through this approach, we can prioritize investments in technologies and strategies with the highest potential for reducing emissions, thereby making more informed decisions and impactful allocation decisions.

¹⁹ Adapted from: Institutional Investors Group on Climate Change, *Climate Investment Roadmap*.

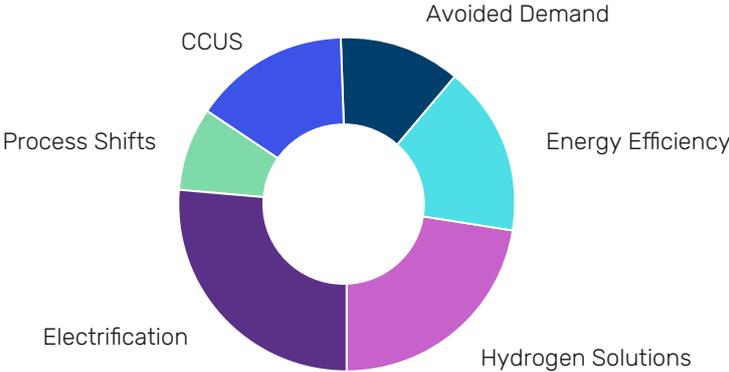
Figure 4: Example of a mitigation strategy and mitigation measure to achieve decarbonization



Source: Official Journal of the European Union, 2023 (AR31).²⁰

As shown in Figure 5, an illustrative example of this strategy is evident in the global steel sector, which has different mitigation options including hydrogen-based solutions, electrification, Carbon Capture, Utilization and Storage (CCUS), energy efficiency, process shifts, and demand reduction. The projected emission reductions from these diverse categories provide insights into the potential collective impact of climate technologies specific to this sub-sector. Consequently, these targets function as a strategic framework, guiding firms in prioritizing the development of crucial technologies.

Figure 5: 2050 Emission reduction contribution (%) by mitigation measure in the steel sector



Source: Prepared by authors, based on the International Energy Agency (IEA).²¹

²⁰ European Commission, Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 Supplementing Directive 2013/34/EU of the European Parliament and of the Council as Regards to Sustainability Reporting Standards (December 2023), https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202302772.

²¹ International Energy Agency, Net Zero Emissions by 2050: A Roadmap for the Global Energy Sector (Paris: International Energy Agency, May 2021), <https://www.iea.org/reports/net-zero-by-2050>.

This strategy acknowledges the importance of regional specificities, recognizing that while the global pathway involves setting ERPs by mitigation technologies for each sector, their suitability and effectiveness might vary regionally. For instance, a technology developed and successfully implemented in one region may not seamlessly translate to another due to differences in climate, geography, infrastructure, government policies or socio-economic factors (e.g. solar panels critical to the power sector decarbonization pathway can be highly successful in sunny regions like Africa but are not as efficient in northern Europe; conversely, differences in government policies, such as subsidies or energy market regulations, and existing infrastructure can make the cost-effectiveness or feasibility of solar power less attractive in Africa). Therefore, these targets function as a guide at a strategic level across all portfolio mandates, leaving flexibility at the portfolio level to tailor capital allocation to specific geographies.

iii) Portfolio allocation strategy

Translating these overarching targets into portfolio-specific targets constitutes the next step. The central tenet of Compass-FRWD is that diverse portfolios can set their own targets within the context of their investment focus and mandates, enabling portfolio managers to establish realistic and achievable goals. For instance, venture capital (VC) is particularly effective in funding innovative, emerging technologies, whereas a portfolio in the fixed income space may be better equipped to target larger-scale and long-term commercial deployments. Similarly, different mandates and client bases may influence the geographical regions in which a portfolio can operate. This framework is equally applicable if there is only one portfolio utilizing it and specializing in a specific asset class or geography. In such cases, the targets would be tailored to the regions or sectors that the portfolio can realistically cover and influence. However, by incorporating the diverse strategies of VC, fixed income, and geographical specificity, a multi-asset fund with access to various asset classes stands uniquely positioned. Such a fund manager can effectively extend their reach across new markets urgently requiring climate finance without the constraints of a segregated mandate. Nevertheless, all portfolios utilizing this framework need to work in concert to advance overarching targets for broader decarbonization of the economy; this approach would be akin to the investment strategy adopted when deciding how to invest a pool of assets across a range of portfolios.

The flow diagram below shows the transition of overarching targets into portfolio-specific targets, emphasizing the importance of working within existing constraints to ensure the feasibility of any investment framework. By allocating the overarching targets to each portfolio based on their respective mandates, such as specific regional exposures, progress can be methodically achieved at portfolio level to collectively progress towards the ideal targets. While immediate, widespread shifts in capital allocation toward an ideal distribution across regions and sectors might not be achieved, concerted efforts are dedicated to gradually steering portfolios toward the most efficient and effective allocation strategies.

Figure 6: Transition from overarching targets to portfolio-specific objectives



Schematic illustration.

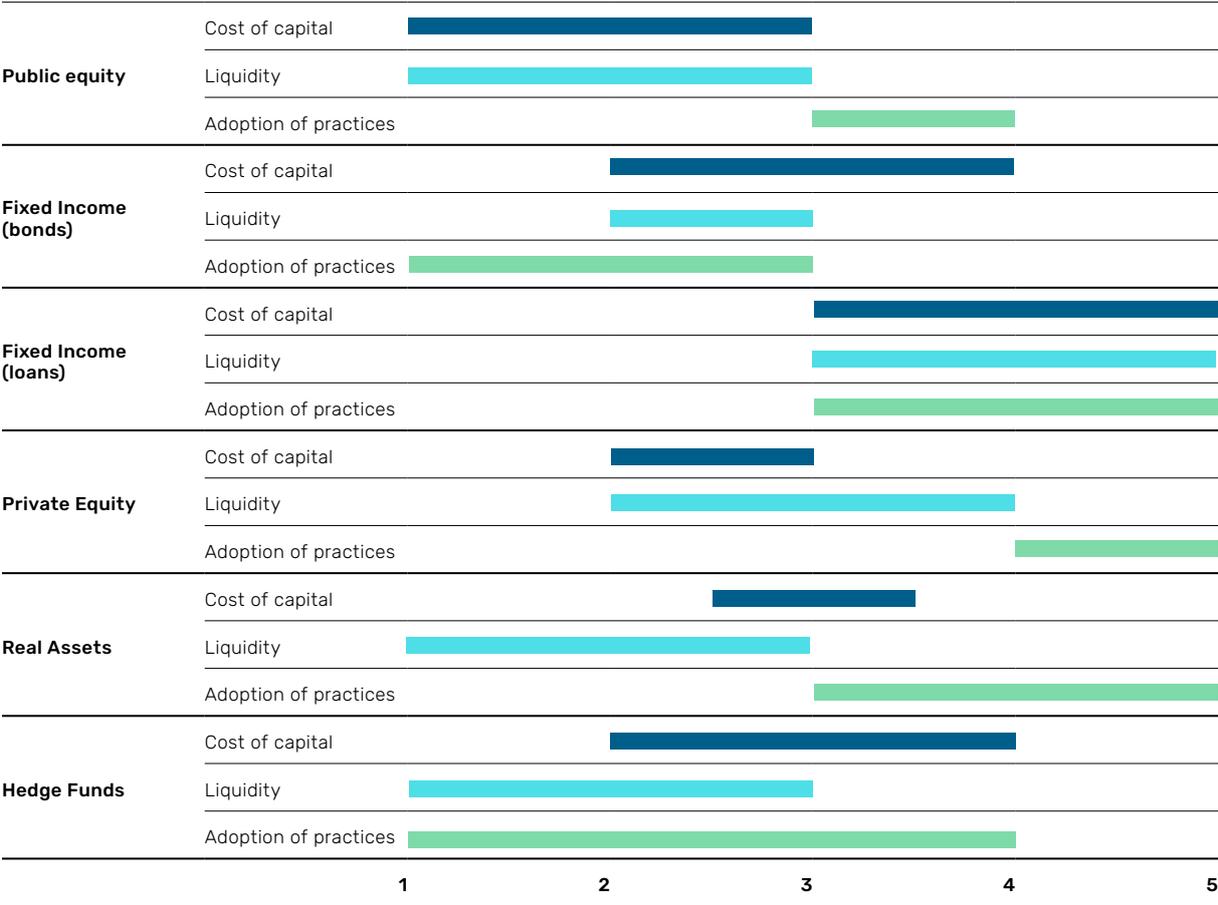
iv) Asset class and transmission mechanisms for impact

Under Compass-FRWD, it is recommended to restrict asset classes to only those that have demonstrated efficacy in supporting the deployment of climate solutions.

According to available literature, the impact of the five key asset classes—public equity, fixed income, private equity, real assets, and hedge funds—depends on transmission mechanisms, namely the avenues through which investors can affect real economy outcomes. The table below provides a ranking of the impact potential for each asset class based on three transmission mechanisms: cost of capital, access to liquidity, and changing corporate practices. The rankings range from negligible (1) to strong impact (5), considering the likelihood, magnitude, and persistence of the potential impact.²²

²² Ben Caldecott, Alex Clark, Elizabeth Harnett, and Felicia Liu, "How Sustainable Finance Creates Impact: Transmission Mechanisms to the Real Economy," *Review of World Economics* (2024), <https://doi.org/10.1007/s10290-024-00541-9>.

Table 2: Impact of transmission mechanisms across asset classes



Source: Cadecott et al., 2024.²³

The analysis reveals that fixed income, especially sustainability-linked products, and private equity have the highest potential for generating significant impact. In contrast, public equity, particularly passive strategies, has the least potential, in particular in increasing access to liquidity and reducing the cost of capital. It is worth noting that the effectiveness of these mechanisms depends on various factors, including investor type, strategic objectives, the size of the investment, and the regulatory context. For instance, when direct and active engagement is led by listed equity holders that are large and colluded, it could lead to change in corporate practices, but otherwise the expected change on corporate practice from this asset class is low.

The table below gives additional details on the modalities of each transmission mechanism based on the asset class.

²³ Ben Caldecott, Alex Clark, Elizabeth Harnett, and Felicia Liu, "How Sustainable Finance Creates Impact: Transmission Mechanisms to the Real Economy."

Table 3: Overview of each transmission mechanism based on the asset class

Asset Class	Cost of Capital	Access to Liquidity	Changing Corporate Practices
Public Equity	Passive investors' impact largely limited to index choice and weighting. For active investors, identifiable impact conditional on being large shareholder, and/or a highly illiquid market, and/or strong market signal conveyed to investors restricting access to capital.	Large-scale trading volumes and number of investors on stock exchanges means impact on liquidity is generally negligible. Stronger effect possible where trading volumes or investor pool are small, and firms' funding requirements are large.	Direct engagement and use of voting rights can exert pressure to change, but conditional on involvement of larger shareholders, and/or those more able to build stable coalitions of investors sharing a desired outcome. Scale effects and supply chain spillovers are possible.
Fixed Income - Loans	Impact of single lenders' rate-setting is greater where pool of lenders is small or highly consolidated. Less impact for firms with access to broad lender pool and access to capital markets.	Impact potentially significant in absence of liquid secondary market for loans, and given most firms' reliance on regular access to loan markets for working capital requirements.	Loan conditionality more likely to result in changes for smaller, unlisted firms without access to other financing sources. SLLs can drive behaviour directly if non-compliance penalties sufficiently high.
Fixed Income - Bonds	Greater impact for firms that tap bond markets regularly. Yields in secondary market trading can send signals on firm risk profile and affect cost of future issuance. SLBs directly affect cost of capital as part of contract.	Nature of secondary market trading activity can affect ability to access bond markets in future issuance, or grow/shrink investor base. Sustainable bond issuance can help access broader liquidity pool.	Leverage over firms limited to disinvestment or refusal to participate in new issuance, which has more gravitas for large lenders with a long history of holding the firms' debt and/or equity. SLBs can drive behaviour directly if non-compliance penalties sufficiently high.
Private Equity (PE) & Venture Capital (VC)	Cost of debt in leveraged PE buyout depends more on investor than target firm, but PE firms can help to lower borrowing costs by helping target firm develop relationships with lenders. VCs typically have significant scope to determine cost of equity upon acquisition.	Greater impact on smaller firms with limited alternative sources of capital. Less impact for larger firms with established borrowing channels, such as former public firms taken private through a leveraged buyout.	PE/VC investors generally acquire substantial or controlling stakes. Can have decisive and direct say over corporate practices and governance, for immature and established firms alike.
Real Asset and Infrastructure	Brownfield assets generally trade on secondary markets, with limited scope to affect developer cost of capital. General lack of liquid secondary markets. Where market perceives sale of existing real assets as evidence of assets' liquidity, developers' cost of capital for new projects may fall.	Assets are less liquid and standardised than other asset classes. Where market perceives sale of existing real assets as evidence of assets' liquidity, developers' access to liquidity for new projects may improve. Supply of working and long-term capital limited by small pool of investors and projects' capital intensity, so individual investors can have significant impact.	Real asset funds generally hold substantial or majority shares in projects, individually or through consortia. Impact on operating practices can be significant through imposition of direct conditions. Have ability to instruct, sanction or replace management companies. For greenfield projects, funds with role in arranging finance can also influence corporate practices in construction phase.
Hedge Funds	Hedge funds participating only in secondary and derivatives markets, trading large firms, have no direct route to affecting firms' ability to raise capital or its cost. Hedge funds trading in distressed debt can set cost of capital for new borrowing.	Hedge funds trading in distressed debt are effectively liquidity providers of last resort.	Activist coalition-building hedge funds with minority shares can use cumulative leverage to influence corporate practices and governance. Hedge funds with shares in distressed firms may seek to convert unpaid debt to equity and gain influence over corporate practices by becoming shareholders.

Source: Caldecott et al., 2024.²⁴

²⁴ Ben Caldecott, Alex Clark, Elizabeth Harnett, and Felicia Liu, "How Sustainable Finance Creates Impact: Transmission Mechanisms to the Real Economy."

Similarly, GFANZ confirmed the differentiating factors that will impact the degree of association between the financing activities and the decarbonization of the real economy, as shown in Table 4.

Table 4. Key factors influencing the decarbonization impact of financing activities

	Higher degree of association	Lower degree of association
Financing structure	Use of proceeds	General purpose
Market exposure	Primary market	Secondary market
Ownership stake	Control interest	Passive interest

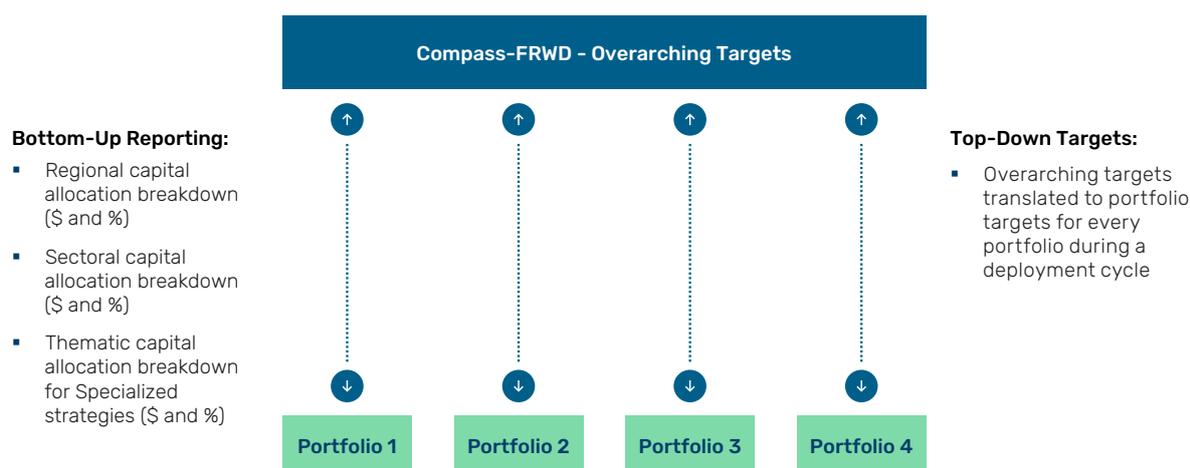
Source: GFANZ, 2023.²⁵

Thus, under Compass-FRWD, it is essential to categorize asset classes into two distinct groups: those that can claim to have mobilized climate finance for specific solutions (fixed income, private equities, etc.) and those that influence indirectly (public equities, etc.). This clear distinction is crucial for tracking and monitoring the impact of the portfolio allocation. The role of asset classes that have a lower impact on climate finance mobilization claims will be discussed in section 1.b)vii).

v) Aggregation of portfolio results & the Net Zero Deviation Index (NZDI)

The next step within the Compass-FRWD framework establishes a dynamic two-way system, directing targets from the overarching strategy to individual portfolios (top-down) and aggregating metrics from these portfolios to evaluate progress at the strategic level (bottom-up), ensuring accountability and effective communication throughout the process. As seen in Figure 7, the targets flow down to the portfolios, and capital allocation metrics broken down by region, sector, or any other themes flow up from the portfolios.

Figure 7: Top-down and bottom-up integration of targets and metrics



Schematic illustration.

²⁵ Glasgow Financial Alliance for Net Zero, *Scaling Transition Finance and Real-economy Decarbonization*.

It is recommended that portfolios report capital allocation comprehensively, providing granularity at both geographical and sub-sectoral levels to ensure flexibility for refining future strategies. This bottom-up reporting entails breaking down regional capital allocation, sectoral capital allocation, and thematic capital allocation for specialized strategies (such as one focusing on hard-to-abate sectors), all expressed in both dollar amount and percentage. These reporting metrics contribute to tracking the key result at the overarching level, which is focused on the disparity (relative difference) between current capital allocation distribution and the ideal capital allocation distribution as needed for a net-zero future, the NZDI. Figure 8 illustrates this NZDI, highlighting the variances between the actual and ideal allocations across different regions and sectors. A positive NZDI indicates an over-allocation while a negative NZDI indicates an under-allocation. The actual allocations are based on a hypothetical portfolio while the ideal allocations are based on the relative emissions gaps estimated with the GCAM IAM mentioned above.

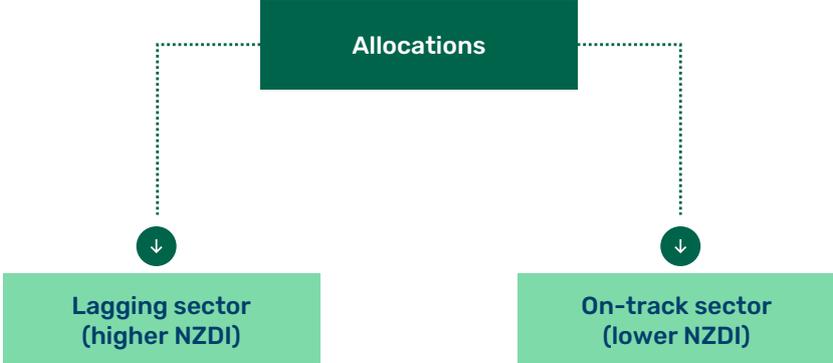
Figure 8: Regional and sectoral allocation targets and the Net Zero Deviation Index



Source: Internal data, prepared by authors. As of July 2024.

As illustrated in Figure 9, the objective is to progressively reduce the NZDI with each deployment cycle until capital allocation achieves an optimal distribution across regions and sectors, resulting in a NZDI of zero globally in an ideal future scenario. The underlying principle suggests that when every investor invests with this objective in mind, capital allocation will seamlessly align with the imperatives for achieving net-zero emissions.

Figure 9: Reducing the NZDI involves targeting the higher NZDI in each deployment cycle



Schematic illustration.

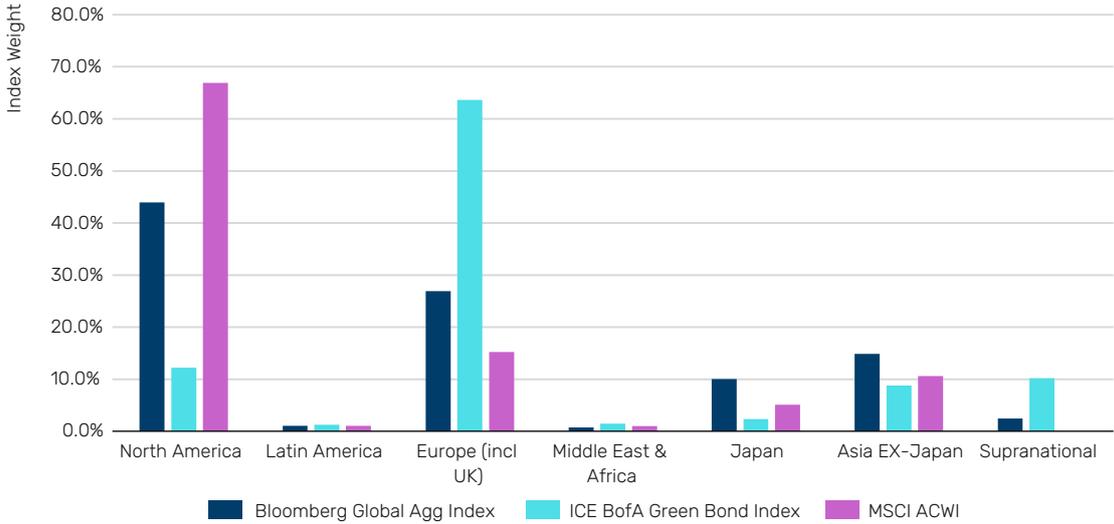
vi) Reset allocations and iterate

Recognizing the complexities in achieving optimal allocation distribution, Compass-FRWD is intentionally designed to operate iteratively. After each deployment phase, typically defined as one year, or after a specific capital allocation, the NZDIs are measured to pinpoint under-allocated areas. Subsequently, investment managers convene to strategize future portfolio approaches aimed at progressively minimizing the NZDI in the subsequent deployment phase. The primary application of this NZDI is to spotlight those regions and sectors requiring the most innovation and collaboration for transition, both from an investor’s perspective and in terms of general barriers to entry.

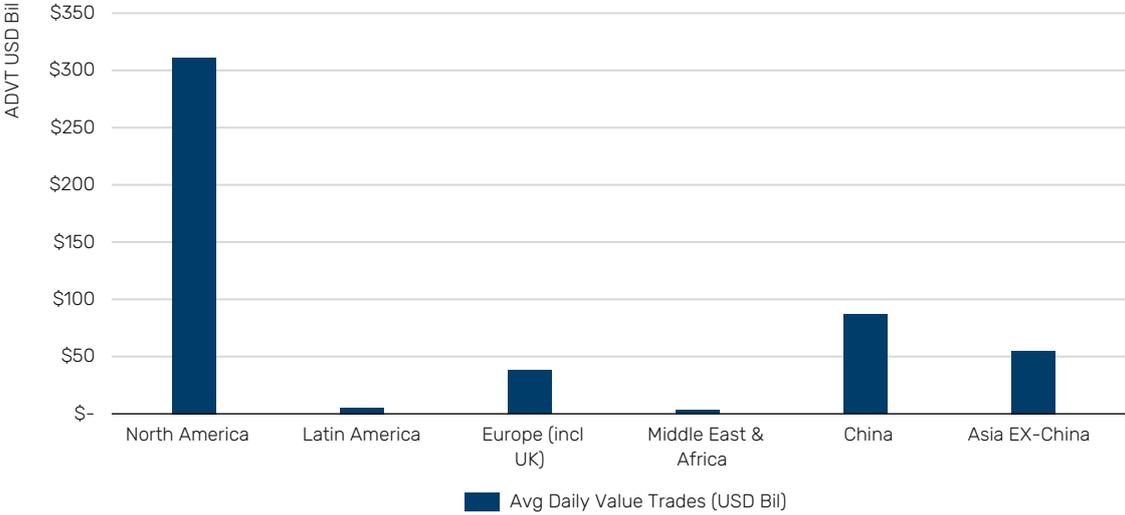
This approach facilitates root cause analysis and the formulation of strategies to rectify these discrepancies in the NZDI. For instance, consider a scenario with a 8% and a 16% under-allocation in Africa and the Middle East, respectively, for a specific portfolio. This discrepancy may arise from the region’s limited production of investment-grade assets or assets deemed to have a higher risk profile than stipulated by the investment mandate. It might also arise from low weights in traditional benchmarks resulting in portfolio managers unwilling to embrace large tracking error (hence risk) versus their benchmarks.

As shown in Figure 10, the Middle East and Africa, have the smallest regional weights and lowest liquidity of the major equity and credit indices.

Figure 10: Regional weights and liquidity of major equity and credit indices



Source: Prepared by authors based on Bloomberg, Ice BofA, MSCI as of May 2024.



Source: Prepared by authors based on BNP Paribas, average daily volume March 2022 – April 2024.

Thus, in the subsequent deployment cycle, faced with the challenges of missing investable issuances, the investor can reallocate to other priority areas (according to the emissions gaps) where investable opportunities are more numerous. However, addressing missing issuance is critical to ultimately closing the NZDI. It is discussed in the next subsection.

Closing the NZDI will also entail understanding when to redeploy capital credibly. For example, in scenarios where fixed income investments in green bonds achieve their climate impact and financial objectives, the conditions may become suited for redeploying capital to under-allocated areas, without having to subtract the capital deployment tracking for the initial region or sector at the overarching level. We note that this recycling of capital with an associated measure of climate impact should follow strict criteria to ensure credibility and accountability in liquid markets. This is particularly necessary in the context of active trading of certain asset classes and underlying assets. The situation whereby a bond is traded for arbitrage with no regard to whether the capital inflow has enabled the development of a climate solution should not contribute to reducing the NZDI.

vii) New strategy development to address gaps

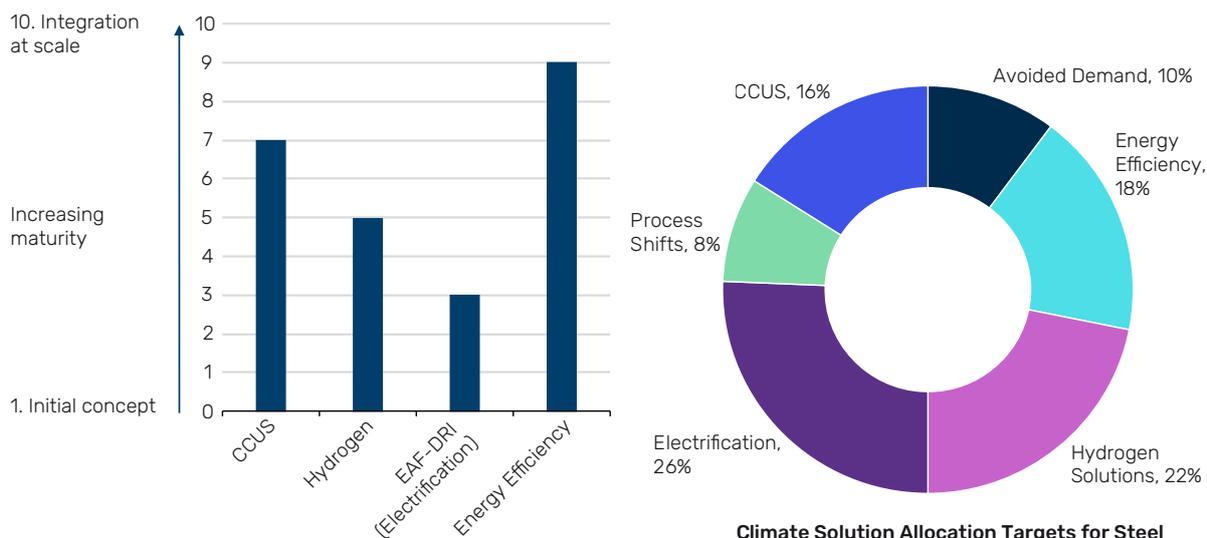
In the development of new strategies to address the gap analysis and support the iterative process, there should be a focus on two primary actions: adopting a multi-asset class strategy and implementing an engagement strategy.

Multi-asset class strategies for addressing gaps

The adoption of a multi-asset class strategy plays a critical role in addressing investment gaps. For instance, where a fixed income instrument might be lagging, a different asset class could make up the investment shortfall. In situations where all asset classes lag, the use of blended finance vehicles becomes a solution to bridge the gap effectively. As such, future multi-asset portfolio construction under Compass-FRWD should be tailored to integrate climate considerations from the outset. A holistic approach to portfolio construction is essential, treating the NZDI as a critical metric alongside traditional metrics like volatility in multi-asset portfolio construction. Technology Readiness Levels (TRLs)²⁶ can serve as a first important metric in selecting the most suitable asset class, whether it be VC or debt, to effectively tackle sector-specific challenges. Figure 11 illustrates the TRL of the various mitigation measures of the steel decarbonization pathway. The lower the TRL, the riskier. Hence low TRLs are best addressed with asset classes with higher risk appetite such as grants, VCs, and private equity whereas the high TRLs can be matched with less risky asset classes such as fixed income (see Table 5).

²⁶ TRLs are a well-established framework used by organizations such as NASA, the European Space Agency (ESA), and the Department of Defense (DoD) to assess the maturity of technologies. The descriptions of each TRL level are widely available in technical literature and government publications and are also used by the IEA in the Energy Transition Perspective database.

Figure 11: TRLs of the various mitigation measures for the steel decarbonization pathway



Source: Prepared by authors based on IEA's Energy Technology Perspectives, 2023.²⁷

Table 5: Generic relationship between Technology Readiness Levels and asset classes

TRL	Description	Characteristics	Financial Instruments	Rationale
1-3	Basic Research and Proof of Concept	Early-stage research, theoretical concepts, lab-based validation	Grants, seed funding, venture capital	High-risk, high-reward investments. Investors look for groundbreaking innovations.
4-6	Technology Development and Validation	Validation in laboratory and relevant environments, prototype development	Venture capital, angel investors, private equity	Technologies have reduced risk compared to the earliest stages but require significant funding for development and real-world validation.
7-8	Demonstration and System Integration	Prototype demonstration in operational environments, system integration	Private equity, corporate venture funds, strategic partnerships	These stages involve scaling up and demonstrating technology in operational settings. Investors back companies with clear commercialization paths.
9	Full Commercialization	Fully operational technology, commercial deployment	Public equity, debt financing, infrastructure funds	Technology is market-ready and can generate revenue. Investments focus on scaling and maximizing returns from established technologies.

Source: Prepared by the authors, based on NASA, JRC, IEA, NBI-KPMG, 2023.²⁸

²⁷ International Energy Agency, Energy Technology Perspectives 2023 (Paris: International Energy Agency, January 2023), <https://www.iea.org/reports/energy-technology-perspectives-2023>; International Energy Agency, ETP Clean Energy Technology Guide.

²⁸ Catherine G. Manning, "Technology Readiness Levels," *The National Aeronautics and Space Administration*, September 27, 2023, <https://www.nasa.gov/directorates/somd/space-communications-navigation-program/technology-readiness-levels/>; Mathieu Doussineau, Eskarne Arregui Pabollet, Nicholas Harrap, and Fernando Merida, *Drawing Funding and Financing for Effective Implementation of Smart Specialisation Strategies: S2E Technical Report* (Luxembourg: European Union, 2018), https://publications.jrc.ec.europa.eu/repository/bitstream/JRC112708/jrc112708_online.pdf; International Energy Agency, Clean Energy Innovation (Paris: IEA, 2020), <https://www.iea.org/reports/clean-energy-innovation>; Steve Nicholls, Marijke Vermaak and Zarina Moolla, *NBI Green Economy Finance Project Research Report – Project Overview: The Power of Collective Action in Green Economy Planning* (Sandton: National Business Initiative, November 2015), <https://www.nbi.org.za/wp-content/uploads/2023/02/NBI-Report-Green-Economy-Finance-Research-Report-January-2016.pdf>.

Besides the use of TRLs, analyzing historical and current market trends is key to designing future portfolios that are responsive to climate finance needs in specific geographies. For example, the Climate Bonds Initiative (CBI)'s H1 2023 report highlights that the green bond fixed income space was led by Germany and China, accounting for 27% of issuance primarily for renewables.²⁹ In real assets, equity financing volumes for the European transport infrastructure sector reached €118 billion, according to MSCI 2023.³⁰ VC and private equity flows predominantly targeted climate solutions in the energy, mobility, and food/agricultural/land use categories in 2022, as reported by PwC 2023.³¹

This data suggests that specific asset classes are better positioned to support particular climate solutions more than others given certain market conditions. Most importantly, this data can also help detect new trends in the application of specific asset classes, which provides the necessary understanding for an investor to be ahead of the curve. AI-enabled tools, such as language processing models, are particularly well equipped for quickly analyzing the entirety of climate finance flows through reports. An application of AI in this context will be discussed in section 5b) of this paper.

Finally, although some asset classes like public equity may not directly qualify under Compass-FRWD for claiming climate finance mobilization toward specific sectors and regions, they can still play an enabling role. Public equities that satisfy specific asset screening criteria (detailed in section 2) can be integrated into portfolios to enhance diversification, provide low correlation, and extend the reach of asset classes, such as fixed income, that are eligible for claiming climate finance mobilization. This strategy enables portfolios to leverage the full potential of asset classes that can directly claim climate impact. Similarly, derivatives which do not directly qualify for climate finance claims can still play a role in facilitating broader financial engagement with key sectors by mitigating risks such as currency or liquidity risks. It is important to note that to achieve real-world decarbonization, portfolios should maximize the deployment of asset classes with direct impact that will help lower the NZDI and only utilize asset classes like public equities to the extent needed to enable others.

Orienting engagement strategies for addressing gaps

Moreover, implementing engagement strategies is crucial for addressing areas with limited capital allocation opportunities. Achieving significant growth in these markets requires collaborative and coordinated efforts with key stakeholders including underwriters, corporations, regulators, and technologists. Furthermore, collaboration among FIs is essential to amplify the impact of these engagements and enhance investable opportunities in specific regions or sectors. The needs and the target for engagement effort will differ by climate solution, sector and geography, and depend on what is blocking the investability.

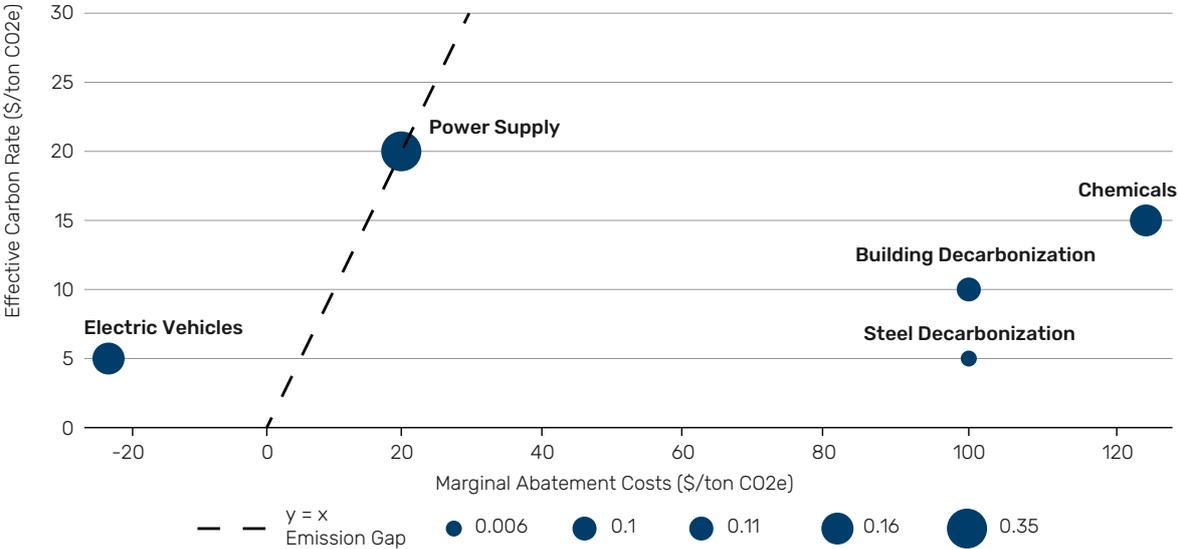
²⁹. Climate Bonds Initiative, Sustainable Debt Market: Summary H1 2023, (London: Climate Bonds Initiative, August 2023), https://www.climatebonds.net/files/reports/cbi_susdebtsun_h12023_01b.pdf.

³⁰. MSCI European Infrastructure Index (New York: MSCI, 2024), <https://www.msci.com/documents/10199/bcdb0528-dc83-4be2-a166-27d859766914>.

³¹. Cox, Jackson-Moore, Johnson, and Moussa, *State of Climate Tech 2023*.

Understanding what blocks investability can be assessed through the lens of implicit/explicit carbon pricing and marginal abatement costs. Areas needing technology scaling across different readiness levels can be identified by comparing the marginal abatement cost (the cost of reducing one more unit of carbon emissions) with the region’s and sector’s implicit or explicit carbon cost (referred to as the “effective carbon rate” by the OECD³²). Where the effective carbon rate is much lower than the marginal abatement cost, a combination of policy and technology is required to reduce costs and better incentivize decarbonization. Conversely, areas where the marginal abatement cost is low, effective carbon rates are high, and NZDI remains high, present the most investable opportunities, offering lower risk and higher potential returns (see Figure 12). Running the root cause analysis from this perspective will enable tailoring the collaboration, engagement, and innovation efforts to address the high levels of NZDI. In other words, the root cause analysis allows investors to identify where they can play a productive role in decarbonization, compared to governments or other actors (see further discussion in section 5).

Figure 12: Marginal abatement cost vs effective carbon rate



Source: Internal data, prepared by authors. As of July 2024.

NZDI and time targets

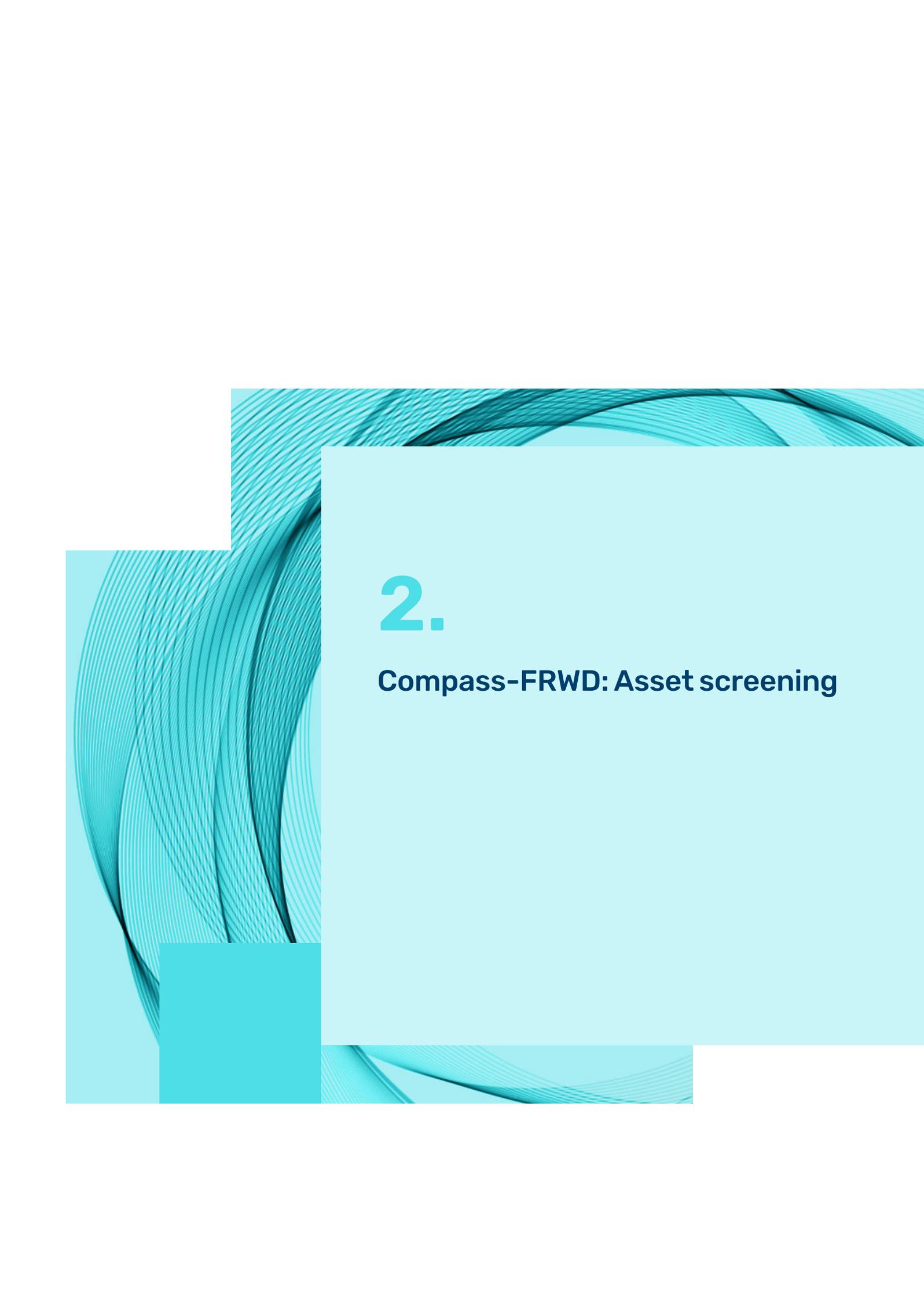
This root cause analysis is not only pivotal for developing strategies to reduce the NZDI, but also critical to develop time targets for the NZDI reduction. Regions or sectors where commercially-mature technologies exist and investable opportunities are emerging (where the carbon pricing exceeds abatement costs) can be categorized in the near-term bucket for reducing NZDI.

Conversely, regions or sectors facing more complex barriers such as policy, infrastructure or economics issues can considerably limit the investable opportunities and as such can be categorized the longer-term bucket as it is currently challenging to address the NZDI.

32. ECD Data Explorer, Carbon Pricing Score, <https://data-explorer.oecd.org/>.

This categorization essentially maps regions and sectors into “easy wins” and “difficult wins.” The “easy wins” might only require a shift in strategy or building internal expertise to address their NZDIs, whereas the “difficult wins” necessitate more significant engagement and resources, often involving development banks, governments and other stakeholders in the value chain to move the market. As such, this categorization should dictate the timeline to be established for addressing each specific NZDI.

Finally, while Compass-FRWD allows for deepening into or expanding to more regions, sectors and sub-sectors and encourages ambition, its effectiveness might depend on investors’ internal expertise. Thus, closing the NZDI within a reasonable timeline may hinge on a parallel expertise expansion and sharpening on regions, sectors and subsectors at the asset manager’s level.



2.

Compass-FRWD: Asset screening

a. Initial screen

Within the parameters of the Compass-FRWD framework, assets targeted for investment must undergo a rigorous screening process to ensure alignment not only with an official national or regional taxonomy but also with the net-zero transition plan at the entity level. It is crucial to note that taxonomy-based approaches and pathway-based approaches are not mutually exclusive; rather, they complement each other. Both methodologies should be considered when selecting assets for investment. This approach enhances the robustness of the asset screening process, ensuring investments are aligned with both net-zero activities and the entity's climate transition pathway.

i) Taxonomy approach at the level of the activity

Taxonomies, as defined by the European Commission, are classification systems that establish criteria for economic activities aligned with a net-zero trajectory by 2050 and broader environmental goals beyond climate.³³ They play a pivotal role in advancing the transition to an environmentally sustainable economy by establishing science-based and rigorous technical criteria for economic activities and projects aligned with environmental goals. Serving as a practical guide for market participants—including asset owners, investment managers, FIs, issuers, policymakers, regulators, and other stakeholders—taxonomies promote transparency and informed decision-making in sustainable finance practices.

The more recent taxonomies have undergone significant evolution, with concerns being addressed through the refinement of early taxonomies and the introduction of innovative approaches in subsequent iterations.³⁴ Some of these innovations include recognizing interim performance improvements, which acknowledge advancements towards sustainability goals even before full compliance is achieved. This is facilitated by the inclusion of sunset dates for interim (called “amber”) performance levels, providing clear pathways for activities to transition towards green status over time. Furthermore, the rejection of “amber” categories where viable green alternatives exist ensures that only genuinely sustainable options are incorporated. Additionally, there is a heightened focus on CapEx-related measures in taxonomy implementation, emphasizing the critical role of investment decisions in advancing sustainability outcomes, among other improvements.³⁵

³³. European Commission, EU taxonomy for sustainable activities, <https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities>.

³⁴. Some approaches to taxonomy encompass various methods for determining eligibility and classification of activities, each with its unique characteristics and focus areas. Some examples are: 1) “whitelist” method, which entails listing specific projects or activities meeting predefined criteria to determine eligibility for financial instruments (e.g. China’s Green Bond Endorsed Project Catalogue); 2) the “traffic lights” method, which categorizes activities into different levels (e.g. ASEAN Taxonomy); 3) the “integrated” approach that incorporates multiple criteria and considerations to classify activities into different categories, encompassing factors such as science-based pathways, emissions reduction objectives, and local specificities, in order to ascertain activity eligibility (e.g. Singapore-Asia Taxonomy). Source: Nicholas Pfaff, Özgür Altun, and Stanislav Egorov, *Transition Finance in the Debt Capital Market* (Zurich: International Capital Market Association, 2024), <https://www.icmagroup.org/assets/Transition-Finance-in-the-Debt-Capital-Market-paper-ICMA-14022024.pdf>.

³⁵. Pfaff, Altun, and Egorov, *Transition Finance in the Debt Capital Market*.

In the event that a formal taxonomy is unavailable, alternative methodologies can still uphold a taxonomy-based approach, as outlined by the IIGCC's Taxonomy-plus approach. These include:³⁶ 1) Taxonomy-equivalent approach where investors operating in a jurisdiction without a taxonomy may leverage local regulations, standards, or other relevant criteria for an activity that is commonly covered by taxonomies; 2) Extra-taxonomy approach which is applied when a particular sector or activity is not presently recognized as eligible by local taxonomy standards but it is deemed crucial to the climate transition according to credible net-zero scenarios (e.g. the IEA's Clean Energy Technology Guide³⁷).

ii) Pathway approach at the level of the entity

Pathway-based approaches, which focus on the entity level, rely more on forward-looking information and judgment, making them more flexible and evolutionary compared to taxonomy-based approaches.³⁸

Investors are increasingly seeking information on organizations' plans and progress to transition to a low-carbon economy. This shift is also evident in guidance related to the specific use-of-proceeds instruments, where organizations are increasingly encouraged to align their use of proceeds with broader transition plans.

For instance, the GFANZ released a report expanding on the Task Force on Climate-related Financial Disclosures (TCFD) guidelines for net-zero transition plans, emphasizing the importance of integrating transition plans with asset climate performance and specific sustainable finance products.³⁹ The International Capital Market Association (ICMA), whose Green Bond Principles (GBP) have served as the industry standard for years, released an updated climate transition finance handbook for issuers which emphasizes the connection between green social and sustainability (GSS) bonds and transition plans, writing that "an issuer's climate transition strategy should be referenced in connection with any applicable GSS bond issuance."⁴⁰ Similarly, Second Party Opinions (SPOs) which have traditionally assessed alignment with the GBPs, are now expanding their use-of-proceeds analysis: for instance, S&P Global Ratings is using a "shade of green" analysis providing a point-in-time evaluation to assess whether the climate solution is in line with the low carbon strategy.⁴¹ CBI has also responded to this trend by expanding its certification framework to offer "entity" certification, signaling a heightened emphasis on transition plans at the organizational level.⁴²

³⁶. Adapted from Emily Homer, Chandra Gopinathan, Stephen Porter, and Tim Smith, Investing in Climate Solutions: Listed Equity and Corporate Fixed Income (London: Institutional Investors Group on Climate Change, November 2023), https://139838633.fs1.hubspotusercontent-eu1.net/hubfs/139838633/2023%20resource%20uploads/IIGCC_-_Investing%20in%20Climate%20Solutions_-_Listed%20Equity%20Fixed%20Income_-_Nov2023.pdf.

³⁷. International Energy Agency, *ETP Clean Energy Technology Guide* (Paris: International Energy Agency, September 2023), <https://www.iea.org/data-and-statistics/data-tools/etp-clean-energy-technology-guide>.

³⁸. Satoshi Ikeda, Government of Japan Financial Services Agency, Chief Sustainable Finance Officer, Financial services, CCSI and Man Group Event: Defining Climate Impact in Investment Portfolios, March 8, 2024.

³⁹. Glasgow Financial Alliance for Net Zero, *Financial Institution Net-Zero Transition Plans: Executive Summary* (Glasgow: GFANZ, November 2022), <https://www.https://assets.bbhub.io/company/sites/63/2022/10/Financial-Institutions-Net-zero-Transition-Plan-Executive-Summary.pdf>.

⁴⁰. International Capital Market Association, *Climate Transition Finance Handbook: Guidance for Issuers* (Zurich: International Capital Market Association, June 2023), <https://www.icmagroup.org/sustainable-finance/the-principles-guidelines-and-handbooks/climate-transition-finance-handbook/>.

⁴¹. Charlie Cowcher, "Analytical Approach: Shades Of Green Assessments," S&P Global, July 27, 2023, <https://www.spglobal.com/ratings/en/research/articles/230727-analytical-approach-shades-of-green-assessments-12770725>.

⁴². *Climate Bonds Standard: Globally Recognized, Paris-Aligned Certification of Debt Instruments, Entities, and Assets Using Robust, Science-Based Methodologies* (London: Climate Bonds Initiative, April 2023), Version 4.0, https://www.climatebonds.net/files/files/CBI_Standard_V4.pdf.

More importantly, the regulations are evolving in that direction too: governments are implementing guidelines mandating the presence of transition plans, reinforcing the importance of robust transition plans in sustainable finance practices. For instance, Singapore has introduced a new taxonomy for sustainable finance, where entities must have a 1.5°C transition plan in place for their assets and activities to qualify as amber under the taxonomy.⁴³ Additionally, the European Union’s guidelines for the use of “European Green Bond” or “EuGB” specifies that if the issuer has a transition plan, they must describe how the bond proceeds contribute towards that plan.⁴⁴

iii) Existing Transition Plan Frameworks and Gaps

The significance of a robust climate transition plan has grown substantially, driven not only by evolving regulations but also by heightened expectations from investors and financial institutions seeking greater transparency and disclosure mechanisms. Table 6 shows how these frameworks converge and diverge.

Table 6: Scope and objectives across different transition plan frameworks

Theme	Component	Sub-Component	Financial institution led initiatives				Standard setters/ assessors/ data providers					Regulation			
			GFANZ	ICMA	IIGCC	SMI*	ACT	CDP	CA100	CBI	SBTI	TPI	ESRS E1	G20	TPT
Targets	Environmental	Emissions													
		Business & operational													
	Other	Financial													
Delivery strategy	Foundation	Objectives, priorities & implications													
		Business planning and operations													
		Financial planning													
	Implementation	Engagement with the value chain													
		Engagement beyond the value chain													
		Sensitivity analysis													
		Internal policies													
		Accountability mechanisms	Internal governance	Oversight & remuneration											
External transparency	Mechanisms	Disclosure													
		Independent verification													
		Internal governance	Mechanisms												

Source: Climate Bonds Initiative, 2023.⁴⁵

43. “Amber” activities are activities that are not yet on a 1.5°C pathway but are moving towards that pathway within a specified time frame (or are enabling meaningful emissions reductions). *Singapore-Asia Taxonomy for Sustainable Finance: 2023 Edition* (Singapore: Monetary Authority of Singapore, December 2023), <https://www.mas.gov.sg/-/media/mas-media-library/development/sustainable-finance/singaporeasia-taxonomy-dec-2023.pdf>.

44. The EUGB requirements include a bond factsheet, annual allocation report, and impact report, all of which require the issuer to describe how the bond contributes to “the broader environmental strategy of the issuer. Council of the European Union and European Parliament, Regulation (EU) 2023/2631 on European Green Bonds and Optional Disclosures for Bonds Marketed as Environmentally Sustainable and for Sustainability-Linked Bonds, November 30, 2023, (EU Regulation European Green Bonds and Optional Disclosures for Bonds Marketed as Environmentally Sustainable and for Sustainability-Linked Bonds), [https://www.europeansources.info/record/proposal-for-a-regulation-on-european-green-bonds/#:-:text=Regulation%20\(EU\)%202023%2F2631%20%2D%20adopted%20by%20the%20co.environmentally%20sustainable%20and%20for%20sustainability%2D](https://www.europeansources.info/record/proposal-for-a-regulation-on-european-green-bonds/#:-:text=Regulation%20(EU)%202023%2F2631%20%2D%20adopted%20by%20the%20co.environmentally%20sustainable%20and%20for%20sustainability%2D).

45. Climate Bonds Initiative, *Transition Finance Mapping: Frameworks to Assess Corporate Transition* (London: Climate Bonds Initiative, September 2023), <https://www.climatebonds.net/files/files/Transition%20Mapping%20-%20Climate%20Bonds%20-%2006%20Nov%202023.pdf>.

The Transition Plan Taskforce (TPT) has been working on developing a gold standard for private sector climate transition plans, aiming to fill existing gaps and outline best practices for credible and robust plan disclosures.⁴⁶ The International Sustainability Standards Board (ISSB) will from now on assume responsibility for the TPT’s disclosure-related materials in search for harmonization across the field of transition plan guidance.⁴⁷

Within the TPT Framework, three fundamental principles—Ambition, Action, and Accountability—guide its structure and implementation. As seen below, the framework is structured around five core Elements, aligning with the transition planning components outlined by GFANZ in its guidance.

Table 7: Transition Plan Taskforce (TPT) framework

Principles	Ambition	Action			Accountability	
	↓	↓	↓	↓	↓	
Disclosure Elements	1. Foundations	2. Implementation strategy	3. Engagement Strategy	4. Metrics & Targets	5. Governance	
Disclosure Sub-Elements	1.1 Strategic Ambition	2.1 Business operations	3.1 Engagement with value chain	4.1 Governance, engagement, business and operational metrics and targets		5.1 Board oversight and reporting
	1.2 Business model and value chain	2.2 Products and services	3.2 Engagement with industry	4.2 Financial metrics and targets	5.2 Management roles, responsibility and accountability	
	1.3 Key assumptions and external factors	2.3 Policies and conditions	3.3 Engagement with government, public sector, communities, and civil society	4.3 GHG metrics and targets	5.3 Culture	
		2.4. Financial planning		4.4 Carbon credits	5.4 Incentives and remuneration	
					5.5 Skills, competencies and training	

Source: Transition Plan Taskforce, 2023.⁴⁸

Transition planning, as recommended by the TPT Disclosure Framework, should take a “strategic and rounded approach”, encompassing the entity’s decarbonization efforts, responses to climate-related risks and opportunities, and contributions to an economy-wide transition.⁴⁹ Moreover, provided the synergies and trade-offs between nature and climate, GFANZ, the Taskforce on Nature-related Financial Disclosures (TNFD), and Finance for Biodiversity (FfB) now advocate for a clear incorporation of nature-related aspects into transition plans.⁵⁰

⁴⁶ Transition Plan Taskforce, *Disclosure Framework* (London: Transition Plan Taskforce, October 2023), https://transitiontaskforce.net/wp-content/uploads/2023/10/TPT_Disclosure-framework-2023.pdf.
⁴⁷ IFRS Foundation, “ISSB delivers further harmonisation of the sustainability disclosure landscape as it embarks on new work plan,” June 24, 2024, https://www.ifrs.org/news-and-events/news/2024/06/issb-delivers-further-harmonisation-of-the-sustainability-disclosure-landscape-new-work-plan/?utm_medium=email&utm_source=website-follows-alert&utm_campaign=immediate.
⁴⁸ Transition Plan Taskforce, *Disclosure Framework*.
⁴⁹ Transition Plan Taskforce, *Disclosure Framework*.
⁵⁰ Finance for Biodiversity Foundation, *Aligning Financial Flows with the Global Biodiversity Framework: Translating Ambition into Implementation Finance*, April 2024, https://www.financeforbiodiversity.org/wp-content/uploads/FfB_Aligning-financial-Flows-with-the-Global-Biodiversity-Framework_April2024.pdf.

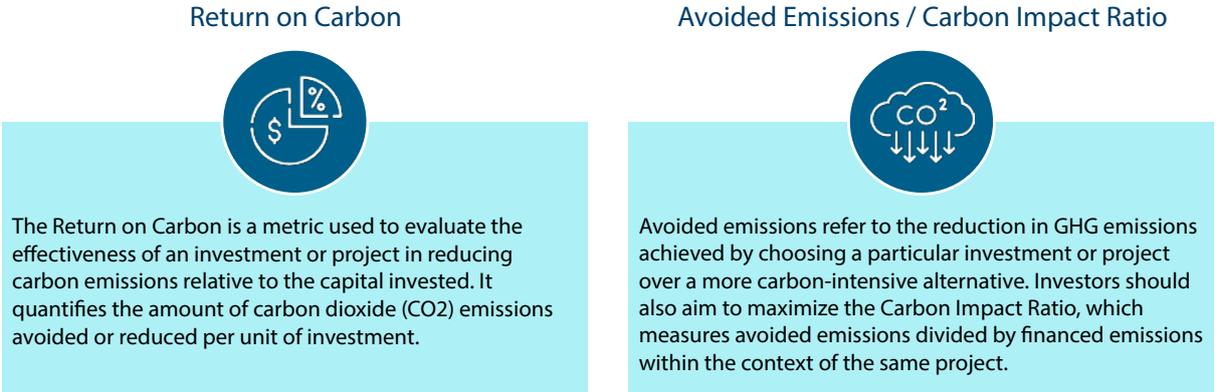
In transition plans, a well-formulated implementation strategy reinforces the credibility of its targets. The World Benchmarking Alliance, in the name of a large collective of experts, has developed a guide for assessors in charge of attesting the credibility of the plan,⁵¹ encompassing all guidance for credibility assessment developed so far. Moreover, Annex 2 presents the typical red flags of transition plans, providing a threshold for credibility assessment.

While guidance for assessing the robustness of corporate transition plans is still evolving and improving, it has reached a certain level of maturity and harmonization that enables capital allocation frameworks such as Compass-FRWD to make it central to both a robust screening process and a basis for engagement (see section 5 for further discussion).

b. Metrics to maximize

In selecting assets, the focus is on maximizing the Return on Carbon and Avoided Emissions, relative to the specific mitigating measures (climate solutions) and sub-sectors, such as energy efficiency in steel. Moreover, Box 5 outlines the essential safeguards investors should consider when screening climate solutions for investment. This approach ensures capital is directed where it is most needed, following the Compass-FRWD, rather than chasing overall Return on Carbon and Avoided Emissions maximization with no consideration for additionality and with the risk of over-allocating to regions and sectors that don't suffer from an investment gap.

Figure 13: Return on carbon vs Avoided emissions/Carbon impact ratio



Schematic illustration.

These metrics rely on setting a baseline, an exercise fraught with challenges that involves the development of a hypothetical counterfactual scenario, which could overestimate impact. There is not a standardized approach to calculating these metrics. These pitfalls are clearly identified by GFANZ. Given the importance of the avoided emissions metric for the VC community, Project Frame, a coalition of VCs and experts, has developed methodological rules to implement avoided emissions calculations.⁵² In parallel, a partnership between Mirova and Robeco addresses this gap through the development of a database of emission avoidance factors that are granular and geographically specific.⁵³

⁵¹ World Benchmarking Alliance, Assessing the credibility of a company's transition plan: framework and guidance, June 2024, https://assets.worldbenchmarkingalliance.org/app/uploads/2024/06/Guidance-on-assessing-Companies-Transition-plans_Public-consultation-2.pdf.
⁵² "About Project Frame," Project Frame, <https://projectframe.how/about>. "Project Frame (Frame) is a nonprofit program, convened by Prime Coalition, built to organize investors around forward-looking emissions impact methodology and reporting best practices."
⁵³ Mirova, "Mirova and Robeco Announce I Care and Quantis to Develop a Global Standard for Calculating Emissions Avoided By Low-Carbon Solutions," press release, January 1, 2024, <https://www.mirova.com/en/news/mirova-robeco-icare-quantis-global-standard-avoided-emissions-low-carbon-solutions-US>.

Box 4: Key considerations for Investors in Screening Climate Solutions for Investment

It is important to highlight that climate solutions must not result in prolonging the emission lifespan of assets slated for phaseout, as outlined in science-based, net-zero pathways. There are three scenarios where investors should exercise caution regarding climate solutions:⁵⁴

1. The adoption of a climate solution should not impede the early retirement or execution of the phase-out plan for high-emitting operations associated with it.
2. Implementing a climate solution should not create disincentives for developing or executing a phase-out strategy for high-emitting operations.
3. If the development, scaling, or utilization of a climate solution necessitates the creation of new high-emitting assets or operations.

⁵⁴ Glasgow Financial Alliance for Net Zero, *Scaling Transition Finance and Real-economy Decarbonization*.



3.

Focus on impactful fixed income instruments: Green, Social, Sustainability, and Sustainability-Linked (GSSS) labeled bonds

While Compass-FRWD requires a multi-asset class approach, fixed income instruments, particularly Green, Social, Sustainability, and Sustainability-Linked (GSSS) bonds (see Box 5 for definitions) hold the highest potential for impact within the realm of climate finance due to their signaling effect and critical role in influencing firms' cost of capital, providing ongoing financing opportunities and attracting a wide investor base that supports sustainable practices while benefiting from the development of international rigorous standards. In addition, GSSS bonds are uniquely positioned to enable the application of the pathway approach and taxonomy approach, enabling the required screening at entity and asset level which is integral to Compass-FRWD.

The GSSS bond market has experienced significant growth in recent years, driven by increasing investor and issuer interest in environmental, social, and governance criteria. The cumulative volume of GSSS issued globally reached over USD 5.5 trillion by the end of 2023.⁵⁵ The section focuses on green bonds and SDG-linked bonds, given their significant sustainable market dominance and growing role in advancing the financing of climate solutions. The GSSS labeling also applies to loans and there has been an increase in sustainability-linked and green loans. However, our focus in this section is on the more transparent and highly regulated liquid part of the GSSS fixed income, i.e. bonds.

Box 5: Green, Social, Sustainability, and Sustainability-Linked (GSSS) bonds

GSSS bonds are fixed income debt instruments designed to fund projects with specific environmental, social, or sustainability objectives. Green bonds are any type of bond instrument where the use of proceeds will be exclusively applied to finance or refinance new and/or existing eligible Green Projects; Social Bonds and Sustainability Bonds are similarly structured but respectively apply to Social Projects and Green and Social Projects. Unlike use-of-proceeds bonds, Sustainability-Linked Bonds (SLBs) are performance-based. They are not tied to specific projects but are linked to the issuer's overall sustainability performance. This performance can be measured through predefined Key Performance Indicators (KPIs) or against predefined Sustainability Performance Targets (SPTs). The financial terms of these bonds, such as the coupon rates, can change depending on whether the issuer meets predefined sustainability targets.⁵⁶

⁵⁵. "Green, Social, Sustainability, and Sustainability-Linked (GSSS) Bonds." The World Bank, October 2023. <https://thedocs.worldbank.org/en/doc/3d313e4819de8d6bcb4238f253874b0f-0340012023/original/GSSS-Quarterly-Newsletter-Issue-No-5.pdf>.

⁵⁶. "Green, Social, Sustainability, and Sustainability-Linked (GSSS) Bonds." *The World Bank*, October 2023.

a. Challenges and potential of green bonds

Green bonds are estimated to reach USD 600 billion by the end of 2024.⁵⁷ Cumulative corporate green bond issuances have surpassed the USD 1 trillion mark,⁵⁸ while sovereign and quasi-sovereign/supranational issuances have exceeded USD 2 trillion.⁵⁹ New green bonds from hard-to-abate sectors are entering the market,⁶⁰ along with new sub-label bonds like blue bonds.⁶¹

Transition bonds, where the definition of the allowable use of proceeds is less clear than with green bonds, aim to support a range of projects that help companies move from being “brown” to “less brown.” Transition bonds make up less than USD 15 billion, or about 1% of the global GSSS market.⁶² These bonds have been considered a “sub-breed” of green bonds due to the lack of an internationally agreed definition of what transition projects should look like, including the minimum degree of transition required for certain sectors.⁶³ Transition bonds could see significant growth, particularly from issuers in hard-to-abate sectors in jurisdictions that use this label; for example, Japan’s government issued climate transition bonds in 2024 aimed at financing the energy transition.⁶⁴ Transition finance standards are also evolving following the release of a multisector transition taxonomy by the Monetary Authority of Singapore⁶⁵ and ICMA’s updated Climate Transition Finance Handbook in June 2023.⁶⁶ These documents provide guidance for climate transition-themed bonds.

The issuance of green bonds can initiate a positive feedback loop within a company’s management by integrating sustainable practices more deeply into their corporate strategies or within a government by igniting sound planning efforts. In fact, corporate and sovereign issuers have recently used green bonds to test the credibility of their strategy.⁶⁷

The green bond market faces challenges, particularly in terms of standardization, accountability and transparency. The primary issue lies in the voluntary nature of international guidelines and principles governing its operations (i.e. ICMA’s Green Bond Principles (GBP)⁶⁸, or CBI green bond certification). In the absence of mandatory regulations, adherence to green bond standards relies largely on issuers’ willingness to comply as well as investors’ requests for compliance.

57. Ahren Lester, *Sustainable Bonds Insight 2024* (London: Environmental Finance, 2024), <https://www.environmental-finance.com/content/downloads/sustainable-bonds-insight-2024.html>.

58. Lester, *Sustainable Bonds Insight 2024*.

59. “Sustainable Debt,” Environmental Finance, <https://www.environmental-finance.com/channels/sustainable-debt.html>.

60. Lester, *Sustainable Bonds Insight 2024*.

61. Francois Kotze, “Blue Bonds Today Are Where Green Bonds Were 10 Years Ago. Can They Mirror the Success of Their Green Counterparts?” *Man Institute*, November 2023, <https://www.man.com/maninstitute/blue-bonds-sustainable-debt>.

62. Patrice Cochelin, Bryan Popoola, and Emmanuel Volland, “Sustainable Bond Issuance To Approach \$1 Trillion In 2024,” S&P Global, February 13, 2024, https://www.spglobal.com/_assets/documents/ratings/research/101593071.pdf.

63. “Transition Bonds: Could 2023 Be the Year We See Them Take Off?” *Environmental Finance*, February 20, 2023, <https://www.environmental-finance.com/content/the-green-bond-hub/transition-bonds-could-2023-be-the-year-we-see-them-take-off.html>.

64. “Japan Climate Transition Bonds,” Japan Ministry of Finance, May 2024, <https://www.mof.go.jp/english/policy/igbs/topics/JapanClimateTransitionBonds/index.html>.

65. *Singapore-Asia Taxonomy for Sustainable Finance*.

66. International Capital Market Association, *Climate Transition Finance Handbook*.

67. See for instance, Cemnet.com, “Saint-Gobain issues first double green bond,” March 2024, <https://www.cemnet.com/News/story/176682/saint-gobain-issues-first-double-green-bond.html> and Interview with Saint Gobain, June 2024. Also see, Japan’s Green Transformation (GX) Plans - Updates - January 2024 (Tokyo: Government of Japan, 2024), https://griapan.com/sites/default/files/content/articles/files/january_2024_gr_japan_update_on_gx_plans.pdf.

68. International Capital Market Association, *Green Bond Principles Voluntary Process Guidelines for Issuing Green Bonds*, June 2021, <https://www.icmagroup.org/assets/documents/Sustainable-finance/2022-updates/Green-Bond-Principles-June-2022-060623.pdf>.

The challenges faced by the green bond market vary significantly between emerging and developed markets. In emerging markets, the primary obstacles often stem from limited capacity, lack of technical expertise, and insufficient regulatory frameworks. While GSSS can be advantageous for both sovereigns and corporates, structuring them rigorously for issuance is difficult and time intensive, which emerging market or small issuers have trouble affording.⁶⁹ On the other hand, as markets mature, particularly in developed regions, the focus should be on upholding standards and tightening regulations to ensure compliance and minimize the risk of greenwashing. A dual approach, tailored to the needs and maturity levels of different markets, is essential for fostering a sustainable and trustworthy global, green-bond ecosystem.

Much attention is paid to the perceived poor performance of green bond funds or indices, despite no conclusive evidence that green bonds underperform non-green bonds.⁷⁰ It is the interest rate risk, credit risk, liquidity risk and other macro geopolitical factors which drive the value of any bond.⁷¹ This misplaced focus on the “greenium” (difference between the yield of a plain vanilla bond and that of a green bond for the same tenor and same issuer)⁷² distracts from efforts to enhance the efficacy and sustainability of green (or other GSSS) bonds.

There are signs that the market is improving with an 18% increase in green bonds volume certified by SPOs between 2022 and 2023, with Chinese and German entities exhibiting the largest growth with 46% and 7% respectively.⁷³ Moreover, many investors now refuse to invest in green bonds that are tagged as “self-labeled” (ie: not being verified by SPOs) on Bloomberg terminals.⁷⁴

Section 3c explores further actions to advance the transparency, standardization, and overall effectiveness of green bonds. Progress in this market will expand and improve the options available to investors as they pursue their Compass-FRWD targets.

b. Challenges and potential of sustainability-linked bonds (SLBs)

Since SLBs are not tied to specific projects, they are accessible to a wider array of issuers and sectors-- for instance, companies that want to transition but do not have enough qualifying green projects. This includes industries that face challenges in identifying suitable projects for financing through green or other use-of-proceeds bonds, particularly those classified as hard-to-abate sectors. Compass-FRWD prioritizes these sectors, given their high NZDI, so the SLB market is of particular interest.

⁶⁹. Global Investors for Sustainable Development (GISD), *Guidance On Sovereign SDG Bonds For Countries And Investors*, April 2024.

<https://www.gisdalliance.org/sites/default/files/2024-04/GISD%20Alliance%20Guidance%20on%20Sovereign%20SDG%20Bonds-FINAL.pdf>.

⁷⁰. See for instance: Caroline Harrison, Candace Partridge, and Aneil Tripathy, “What’s in a Greenium: An Analysis of Pricing Methodologies and Discourse in the Green Bond Market,” *The Journal of Environmental Investing* 10, (2020), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3684927; Johann Plé, “Sustainable Bonds Series: Module 4 - What is Greenium and How Does it Work?” AXA Investment Managers, March 1, 2023, <https://www.axa-im.co.uk/research-and-insights/investment-strategy-updates/fund-manager-views/fixd-income/what-greenium-and-how-does-it-work>, <https://www.climatebonds.net/2023/09/32-green-bonds-achieved-greenium-first-half-2023>.

⁷¹. The reality is the green bond universe has a higher concentration of certain sectors; utilities, banks and REITs vs other indices, which is really what influences the valuation. Green bonds or plain vanilla bonds are simply: bonds; and bonds’ returns are driven by interest rate risk, credit risk, liquidity risk and other macro geopolitical factors.

⁷². The “greenium” was first coined by Caroline Harrison in 2017 and combines the word “new issue premium” with “green”. Climate Bonds Initiative, “Green Bond Pricing in the Primary Market: Q4 2016 Snapshot” (London: Climate Bonds Initiative, 2016), https://www.climatebonds.net/files/files/March17_CBI_Briefing_Primary_Market.pdf.

⁷³. Climate Bonds Initiative, *Sustainable Debt, Global State of the Market, 2023*, (London: Climate Bonds Initiative, 2023), https://www.climatebonds.net/files/reports/cbi_sotm23_02h.pdf.

⁷⁴. Interviews with asset managers run in June 2024.

It is important to note that the SLB market is still nascent, with the first SLB issued in December 2018. As such, there have been concerns that low-quality deals with poor disclosure and insufficient ambition have been driving the market. SLB issuance dropped in 2023 due to greenwashing concerns, and CBI assessed that 86% of total SLB issuances that same year were not aligned with climate best practices.⁷⁵ Nevertheless, as the market continues to evolve with more clarity around adequate pricing structures, SLBs have the capacity to emerge as instrumental tools in advancing sustainability goals. This will enable investors to expand their use of SLB investments to reach Compass-FRWD targets in high-emitting sectors. The case study of ENEL in Box 6 is a case in point; it reveals how to create trust in the SLB market.

Box 6: The Case of ENEL's Sustainability-Linked Bond

Italian utility company ENEL, a pioneer in green bonds, issued the first SLB in September 2019.⁷⁶ However, in April 2024, ENEL missed a key sustainability-linked target related to GHG emissions, impacting close to USD 10 billion of issued bonds and triggering a 25 basis points coupon step-up. The target, embedded in the bond documentation, required ENEL's power generation to reach an intensity of 148 gCO₂eq/kWh for Scope 1 GHG emissions.⁷⁷

ENEL attributed the shortfall to the Italian government's force majeure gas energy decree in response to the Russia-Ukraine energy crisis, a factor beyond the company's control. Since the onset of the energy crisis, ENEL consistently communicated the potential impact on emissions, with 2022 performance and Q1 2023 data indicating significant challenges in meeting the target. Despite the missed target, ENEL opted to honor the step-up clause rather than seek legal exemptions.⁷⁸

This event was a milestone in climate finance for three reasons: 1) It marked the first instance where a climate KPI triggered a contractual coupon adjustment on such a large scale, affecting USD 10 billion in bonds; 2) Investors remained supportive despite the missed target, as ENEL had transparently communicated the likelihood of the miss well in advance; 3) ENEL's decision not to seek legal exceptions, despite the miss being beyond their control, underscored their dedication to maintaining transparency and integrity in their climate commitments. As a result, ENEL's standing in the market remained robust.

⁷⁵. "86% of SLB Market Not Aligned with International Climate Goals, But Improvement Noticeable in 2023," Climate Bonds Initiative (blog), March 27, 2024. <https://www.climatebonds.net/2024/03/86-slb-market-not-aligned-international-climate-goals-improvement-noticeable-2023>.

⁷⁶. Enel Group, "A New Framework for Even More Sustainable Finance," press release, February 22, 2023. <https://www.enel.com/company/stories/articles/2023/02/new-framework-sustainable-finance-group>.

⁷⁷. Green Bond Report 2023: Supporting Notes (Rome: Enel Group, 2023), https://beyonddreporting.enel.com/content/dam/enel-beyonddreporting/pdf_bds/appendice/Sustainability-linked%20financing%20report_EN.pdf.

⁷⁸. Jihye Hwang, "Enel Raises €1.5bn From SLB Despite Pressure on Targets," International Financing Review, February 17, 2023. <https://www.ifre.com/story/3755160/enel-talks-up-esg-strategy-despite-pressure-on-targets-2fczx7zvqz>.

c. Towards more impactful fixed income instruments

Considering that Compass- FRWD can only achieve its objectives through a combination of practicality, integrity and forward-looking design, this subsection offers avenues to make sustainable debt more standardized and climate-impactful as markets mature. The challenge is to increase rigor while not stifling growth with burdensome reporting. First, is a transition toward impactful hybrid instruments that mix features of green bonds and SLBs. For instance, Empresas CMPC, a Chilean company in the integrated forest industry engaged in pulp and paper, forestry, and bio-packaging issued a Green Sustainability-Linked Bond which combines the features of a use-of-proceeds green bond and SLB targeting short and medium-term climate KPIs that are specific for its industry (e.g., reduction of water use, waste, and forest conservation and reduction in GHG emissions reduction).⁷⁹

Second, investors can proactively engage with issuers, advocating for greater transparency, improved reporting practices, and adherence to higher standards. By doing so, investors can drive accountability and foster improvements within the market, resulting in a demand-driven transformation. For example, investors in developed markets can use the covenant signed between the issuer and the bondholder as the basis of engagement. Standardized and science-aligned climate KPIs such as those proposed by CBI should be commonly agreed upon, taking into account sector-specific and geographic-specific challenges. In fact, in Europe, the promulgation of the EU green taxonomy has already considerably facilitated standardization of green bonds and improved trust in the stated use of proceeds.

A third way to increase impact is to encourage more binding terms in GSSS bonds, using the covenant to establish standard clauses and develop standardized documentation, a concept already familiar in the financial sector, exemplified by Master Agreements for derivatives.⁸⁰ While implementing actionable covenants will place additional contractual burdens on issuers, issuers that fulfill these obligations stand to gain favor with the investor community, which is increasingly prioritizing green and sustainable investments.⁸¹ This, in turn, could result in greater demand, potentially leading to lower pricing for issuers. Until the market matures further, actionable covenants should be required with established green bond issuers rather than first issuers as further discussed below.

Last, as the market moves towards stricter regulations, investors can address non-compliance through informal warnings or more assertive measures like demanding financial compensation, suspending further advances or accelerating repayment.

⁷⁹. DNV Independent Assessment on Empresas CMPC S.A Sustainable Financing Framework (Oslo: DNV, February 2022, https://s23.q4cdn.com/927837516/files/doc_downloads/sustainability_frameworks/CMPC_Green-and-SL-Finance-SP0_Final.pdf).

⁸⁰. International Swaps and Derivatives Association, Inc., 2002 Master Agreement, (March 2011) <https://www.sec.gov/Archives/edgar/data/1065696/00011931251118050/dex101.htm>.

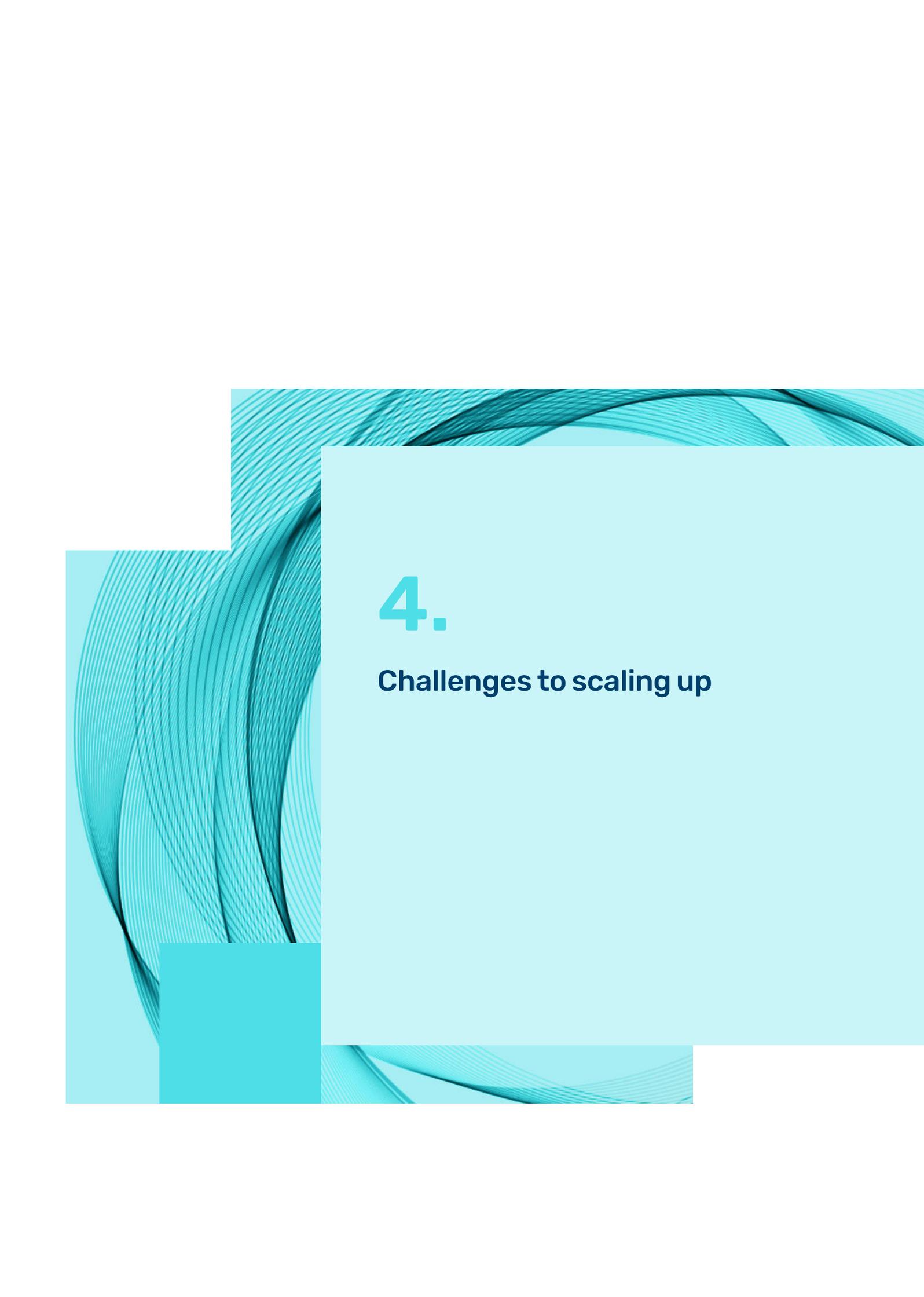
⁸¹. Michael Doran and James Tanner, Critical Challenges Facing the Green Bond Market (Chicago: Baker McKenzie, November 2019), <https://www.bakermckenzie.com/-/media/files/insight/publications/2019/09/ifrc--green-bonds-%28002%29.pdf>.

Seeking a more binding environment for GSSS not only mitigates the potential for deceptive environmental claims but also provides bondholders with a comprehensive set of solutions to address such breaches.⁸² However, stricter market regulation can face resistance,⁸³ and the EU GBS, coming into force in December 2024, remains voluntary despite the recommendations of the European Central Bank. This highlights the need to gradually encourage and sensitize the market to the benefits of higher standards to avoid a backlash from both issuers and investors.⁸⁴ Some market participants also believe that a stringent environment will discourage first-time issuers, who should instead be encouraged to participate and be supported by investors to improve over time. Balancing the objective of promoting rigorous standards while creating entry points for new issuers is essential for achieving a truly sustainable and inclusive global financial system.

82. Agostini, "From 'Green Bond Principles' to 'Green Bond Clauses': Mitigating Greenwashing Through Contract Law."

83. European Banking Federation argue that EU Green Bond Standard (EU GBS) mandatory standardization seeking to align the EU GBS standard with the EU taxonomy could, in particular: a) create an uneven bond market, hindering European issuers while providing flexibility to extra-EU counterparts and b) limit the green bond issuance to Taxonomy-aligned activities, possibly shrinking the market and diverting funds away from EU GBS adoption. European Banking Federation (EBF), "The European Banking Federation on the Latest Developments Concerning the Commission Proposal for a European Green Bond Standard," press release, July 1, 2022, https://www.ebf.eu/wp-content/uploads/2022/07/EBF-on-the-EU-GBS_1-July-2022.pdf. Moreover, the Federation of European Securities Exchanges (FESE) warns that the evolving definition of "green" poses risks to bond financing, as changes in environmental credentials could trigger defaults or cross-defaults, jeopardizing corporate financing. Issuers may downplay green bond impact to mitigate risk, leading to less ambitious sustainability goals. Refinancing bonds and green-covered bonds, susceptible to losing their green label before maturity, would require constant reassessment, increasing operational complexity. This may diminish the appeal of the EU GBS as a capital-raising tool, potentially favoring conventional bonds among investors. Position Paper on Green Bond Prospectus (Brussels: Federation of European Securities Exchange, April 2019), <https://www.fese.eu/app/uploads/2019/05/190429-FESE-Position-Paper-on-Green-Bond-Prospectus.pdf>.

84. EU Regulation European Green Bonds and Optional Disclosures for Bonds Marketed as Environmentally Sustainable and for Sustainability-Linked Bonds; Peter Young, Farmida Bi, Caroline May, Peter Noble, David Shearer, Kirstin Russell, Nigel Dickinson, Yusuf Battiwala, Update: Provisional Agreement Reached on the European Green Bond Standard (London: Norton Rose Fulbright, March 2023), <https://www.nortonrosefulbright.com/en/knowledge/publications/3a31a991/update-provisional-agreement-reached-on-the-european-green-bond-standard>.

The background features a complex, abstract design in shades of teal and light blue. It consists of numerous thin, overlapping lines that create a sense of depth and movement, resembling a stylized wave or a series of concentric, flowing paths. The design is layered, with some elements appearing to be in front of others, creating a three-dimensional effect. The overall aesthetic is clean, modern, and professional.

4.

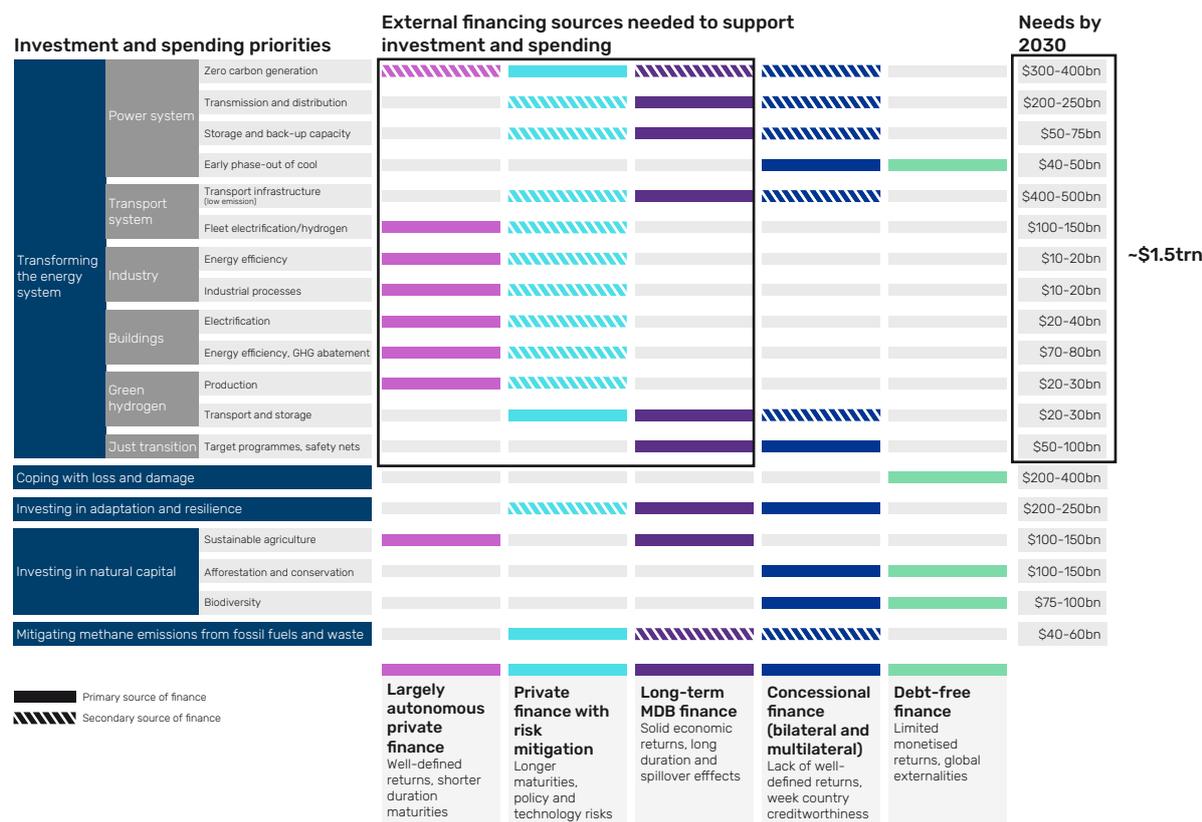
Challenges to scaling up

Climate finance must increase by at least five-fold annually, as quickly as possible, to avoid the worst impacts of climate change.⁸⁵ While Compass-FRWD has been designed to contribute to this aim and provide a systematic approach for investors to shift capital towards the transition economy, challenges remain in effectively targeting emissions gaps to achieve real-economy decarbonization.

a. Closing the gap in emerging markets and developing economies

As shown in Figure 14, private finance is positioned to meet the opportunity and fill the needs gap both globally and in EMDEs, but the scale and speed need to increase. International private finance to EMDEs must increase fifteen-fold if we are to achieve net zero by 2050.⁸⁶ As estimated by the IEA, the funding gap for the energy transition in EMDEs amounts to up to USD 850 billion annually.⁸⁷ Given the resource constraints in EMDEs, mobilizing private finance is seen as a way of funding critical investments without burdening public budgets. The International Monetary Fund (IMF)'s analysis underscores the urgency for the private sector to play a more substantial role, with its share of climate finance in EMDEs to rise from 40% to 90% of the total in 2030.⁸⁸

Figure 14: Sources of external financing for climate action and Development Goals



Source: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science.⁸⁹

⁸⁵ Buchner, Naran, Padmanabhi, Stout, Strinati, Wignarajah, Miao, Connolly and Marini, Global Landscape of Climate Finance 2023.

⁸⁶ A Climate Finance Framework: Decisive Action to Deliver on the Paris Agreement, Summary (London: London School of Economics, November 2023), <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2023/11/A-Climate-Finance-Framework-IHLEG-Report-2-SUMMARY.pdf>.

⁸⁷ International Energy Agency, World Energy Investment 2023 (Paris: International Energy Agency, May 2023), <https://www.iea.org/reports/world-energy-investment-2023>.

⁸⁸ Prasad Ananthkrishnan, Torsten Ehlers, Charlotte Gardes-Landolfini, Fabio Natalucci, "Emerging Economies Need Much More Private Financing for Climate Transition," International Money Fund (blog), October 2, 2023, <https://www.imf.org/en/Blogs/Articles/2023/10/02/emerging-economies-need-much-more-private-financing-for-climate-transition>.

⁸⁹ Vera Songwe, Nicholas Stern, and Amar Bhattacharya, Finance for Climate Action: Scaling Up Investment for Climate and Development (London: London School of Economics, November 2022), <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2022/11/IHLEG-Finance-for-Climate-Action-1.pdf>.

The level of private capital flowing towards achieving the Sustainable Development Goals (SDGs) is a function of four variables:⁹⁰ i) the supply of bankable projects, ii) risk mitigation strategy, iii) the relationship between the providers of concessional finance and private sector investors, and iv) the genuine orientation of private investors towards investing with impact beyond the usual risk-return way to integrate ESG dimensions.

However, attracting international investors to EMDEs can be challenging due to factors such as the lack of investment-grade credit ratings and liquidity levels that institutional investors often require. Approximately 60% of emerging markets and a mere 8% of developing economies possess an investment-grade rating.⁹¹

This challenge is particularly evident in corporate bond markets, where institutional investors hold a substantial portion of outstanding corporate bonds, representing as much as 86% of the total in countries like the US and Japan.⁹² Investment decisions in corporate bonds are frequently guided by credit rating categories and the preference for higher-rated bonds further disadvantages EMDE issuers who often carry the same credit ratings of the countries or lower. Investors may face restrictions or regulations that prohibit investment in lower-rated bonds, further limiting the amount invested in EMDEs' bond market.

Moreover, the cost of capital remains significantly higher in EMDEs compared to advanced economies, evident in various indicators. In 2022, the average difference between EMDEs and US sovereign bond yields in USD was 2.4%, showing a narrowing trend from 3.4% in 2020. Furthermore, by the end of 2022, the US corporate bond spread with US Treasuries stood at 395 basis points for EMDEs corporates, significantly higher than the 138 basis points for US corporates, indicating a spread of 2.6%.⁹³

Additionally, the reliance on foreign currency denomination is particularly crucial in EMDEs with limited domestic investor bases, where attracting capital often hinges on securing funds from cross-border investors. However, this strategy introduces concerns about currency risk, especially when financing is in foreign currency while project revenue is in the local currency. Managing foreign exchange risk poses a significant challenge for climate finance in these markets. Investors tend to prefer climate investments with minimal or no foreign exchange risk exposure.⁹⁴ This risk can hinder both cross-border investment flows and the development of local debt markets. While larger EMDEs may have access to commercial hedging options, they are often costly, illiquid, and incomplete, particularly for long-term projects. Smaller emerging markets and low-income countries typically lack market-based hedging alternatives altogether, exacerbating the challenge of managing foreign exchange risks in climate finance initiatives.⁹⁵

Furthermore, EMDEs encounter challenges in establishing well-structured, investable project pipelines within local markets that align with the risk-return preferences of private investors. In lower-income countries, bankable projects predominantly rely on MDB and their own financial resources, with limited involvement from the private sector. Project execution in EMDEs often encounters delays in fund disbursement, regulatory fluctuations, and extended timelines, exceeding

⁹⁰. Robert W. van Zwieten and Harald Walkate, "Route17 (I/IV): The Mobilizing Private Capital Equation," Illuminem, November 25, 2023, <https://illuminem.com/illuminemvoices/introduction-and-supply-of-bankable-projects-bankability>.

⁹¹. Torsten Ehlers, Charlotte Gardes-Landolfini, Ekaterina Gratcheva, Shivani Singh, Hamid Tabarraei, and Yanzhe Xiao, Chapter 3: Financial Sector Policies to Unlock Private Climate Finance in Emerging Market and Developing Economies in: Global Financial Stability Report (Paris: OECD, October 2023), <https://www.imf.org/-/media/Files/Publications/GFSR/2023/October/English/ch3.ashx>.

⁹². Towards Orderly Green Transition: Investment Requirements and Managing Risks to Capital Flows (Paris: OECD, 2023), <https://www.oecd.org/investment/investment-policy/towards-orderly-green-transition.pdf>.

⁹³. Towards Orderly Green Transition: : Investment Requirements and Managing Risks to Capital Flows.

⁹⁴. Zhiyu Fu, Capital Flows and the Making of Risky Currencies (Chicago: University of Chicago, November 2023), https://socialsciences.uchicago.edu/sites/default/files/2023-11/JMP_Fu_2.pdf.

⁹⁵. Ehlers, Gardes-Landolfini, Gratcheva, Singh, Haid Tabarraei, and Xiao, Chapter 3: Financial Sector Policies to Unlock Private Climate Finance in Emerging Market and Developing Economies.

those typically seen in the private sector. Moreover, projects in EMDEs tend to be small-scale, aside from a few large infrastructure initiatives.⁹⁶ The absence of large-scale pooled investments results in high due diligence expenses and a lack of portfolio diversification, discouraging participation from global institutional investors.

Within the landscape of green investments in EMDEs, challenges arise regarding measurement, transparency, and disclosure, potentially resulting in capital withdrawal from countries where these ESG-labeled products and frameworks are not fully developed. This problem now extends to the difficulty for EMDE corporates to issue credible corporate transition plans while the regional sectoral pathways are often nonexistent (further discussed below); it is expected to marginalize these corporates to the growing ratings assessing corporate transition plans.

Given these challenges, the task of balancing investor risk tolerance with available opportunities to address the financing and emissions gap presents significant hurdles, often leading to a bias in capital allocation towards developed countries.

b. The problems of current blended finance structures

While blended finance structures aim to address the financing gaps in EMDEs, they are not without their challenges.⁹⁷

One of the primary challenges is that their perceived risks do not align with actual financial data. Such perceptions can be influenced by historical prejudices, a lack of transparency in financial reporting, or simply inadequate exposure and understanding among international investors. Despite their objective of mitigating the risks associated with investment in EMDEs, blended finance structures are still associated with the perceived and real risks of direct investment in EMDEs.⁹⁸

Credit rating agencies are pivotal in shaping the perceptions and thus the appeal of blended finance vehicles. Unfortunately, many agencies lack a nuanced understanding of how to effectively evaluate these instruments and suffer from outdated methodologies. Typically, ratings are either missing or assigned based on a simplistic aggregation of the underlying assets' characteristics, with no regard for what the structures try to achieve as a whole and no consideration for the need to accurately assess the guarantee and guarantor, which are key to de-risking.

Despite the outdated approach adopted by these agencies, there is a growing body of evidence indicating that blended finance vehicles are not as risky as initially thought. Historical data from these vehicles suggests a discrepancy between assigned credit ratings and actual performance.⁹⁹ Notably, there have been remarkably few defaults in the senior tranches of blended finance funds.¹⁰⁰ Similarly, public-private partnership projects have evidenced the lowest default risk when compared to other project finance in the 1983-2020 period.¹⁰¹ This record indicates a resilience that current credit ratings fail to capture.

⁹⁶. Ehlers, Gardes-Landolfini, Gratcheva, Singh, Haid Tabarraei, and Xiao, Chapter 3: Financial Sector Policies to Unlock Private Climate Finance in Emerging Market and Developing Economies.

⁹⁷. "Blended Finance Working Group," Global Impact Investing Network, <https://thegiin.org/blended-finance-working-group/>.

⁹⁸. International Development Finance Club, Blended Finance: A Brief Overview. (Paris: IDFC, 20219), https://www.idfc.org/wp-content/uploads/2019/10/blended-finance-a-brief-overview-october-2019_final.pdf.

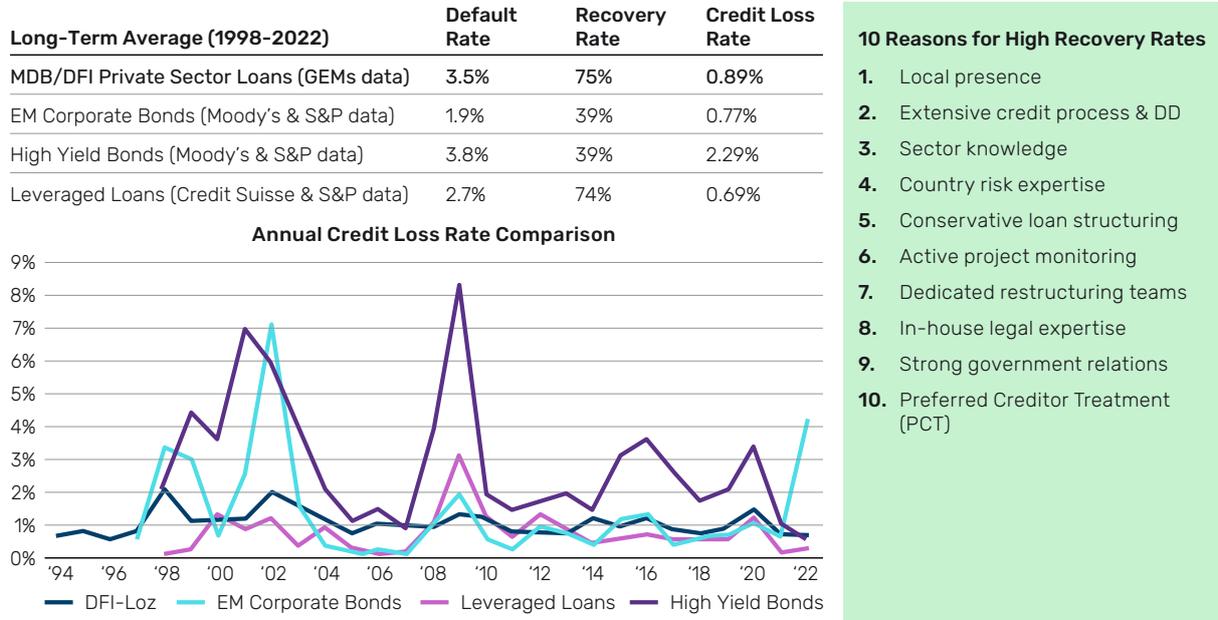
⁹⁹. "Risk Database Consortium: Leveraging Data from Multilateral Development Banks and Development Finance Institutions to Support Investment and Development," Global Emerging Markets, <https://www.gemsriskdatabase.org/>.

¹⁰⁰. OECD DAC Blended Finance Principle 4 Guidance: Revised Note Following Public Consultation (Paris: OECD, 2020), https://www.oecd.org/dac/financing-sustainable-development/blended-finance-principles/principle-4/Principle_4_Guidance_Note_and_Background.pdf.

¹⁰¹. "Emerging Markets Insights," Moody's Ratings, <https://events.moodys.com/emerging-markets-insights/reports>.

While the average recovery rate for defaulted sovereign debt in developed markets is around 75%, EMDEs have shown recovery rates that sometimes exceed this percentage, indicating the resilience of infrastructure sovereign debt.¹⁰² Similarly, when investors invest alongside development finance institutions (DFIs) or MDBs, for instance in private sector loans in blended finance structures, the performance can also be higher. With the Global Emerging Markets Risk Database (GEMs)¹⁰³, it is now possible to quantify the real credit risk for the emerging markets loan operations extended by its member institutions, MDBs and DFIs (see Figure 15).

Figure 15: EMDEs’ recovery rates



Source: Presentation shared in the framework of the 2024 Chief Investment Officer/Chief Risk Officer Forum on Private Capital Mobilization in Washington D.C. - Presented by Manfred Schepers of the ILX Fund.

However, the lack of a comprehensive database to track and document the performance and outcomes of blended finance vehicles continues to be a challenge. Without robust, accessible data, credit rating agencies continue to rely on conservative estimates that do not reflect the vehicles’ true risk profiles or their performance history. The OECD in their Blended Finance Guidance and Principles¹⁰⁴ highlights the acute need to increase the availability of external information and accurate risk assessment to increase investment flows.

Blended finance structures often also face liquidity constraints, especially in EMDEs where financial markets may be less developed and more volatile. Limited liquidity can impede the efficient functioning of these structures, making it challenging to attract investors and raise capital for development projects. Blended finance deals are usually small (under USD 50 million). Even when blended finance deals are large in size, ranging from USD 100-200 million, they are often not listed on an exchange and do not have enough daily quotes (requiring at least two brokers pricing daily) to be considered liquid. The lack of secondary markets for blended finance instruments also means that investors may be reluctant to commit capital to illiquid assets with limited exit options. Additionally, overall returns are usually low and may not compensate for the liquidity premium.¹⁰⁵ Box 7 relates the challenges associated with investing in DFI finance, which closely mirror those encountered in blended finance.

¹⁰². Kathrin Heitmann, A. J. Sabatelle, and Walter J. Winrow, Default and Recovery Rates for Project Finance Bank Loans, 1983-2020 (New York: Moody’s Investor Services, March 2022). <https://events.moodys.com/emerging-markets-insights/default-and-recovery-rates-for-project-finance-bank-loans-1983-2020>.
¹⁰³. “Risk Database Consortium,” Global Emerging Markets.
¹⁰⁴. OECD Development Cooperation Directorate, The OECD DAC Blended Finance Guidance, (Paris: OECD, 2021) https://www.oecd.org/en/publications/the-oecd-dac-blended-finance-guidance_ded656b4-en.html.
¹⁰⁵. Interviews with asset managers, June 2024.

In parallel, the complexity of the regulatory environment significantly impacts capital mobilization within the financial ecosystem, particularly in relation to the prudential measures of the international regulatory framework. For instance, commercial banks are influenced by the Basel III regulation's prudential requirements, and EU insurance companies by the Solvency II regulation, both of which impose high capital charges on investments deemed high-risk, such as those in emerging markets. This creates a disincentive for these institutions to invest in development and blended finance.¹⁰⁶

Despite efforts to mitigate risks through blended finance structures, there are often insufficient mechanisms in place to address potential challenges.¹⁰⁷ While some projects may benefit from guarantees or insurance provided by MDBs or other guarantors, many remain exposed to various risks, including political instability, currency fluctuations, and regulatory changes. Inadequate risk mitigation measures can deter investors and lenders from participating in blended finance initiatives, particularly in high-risk environments where the potential for financial losses is greater. Moreover, the lack of standardized risk assessment frameworks and contractual arrangements further complicates risk management efforts, making it difficult to align the interests of stakeholders and ensure project viability.¹⁰⁸

On top of these, blended finance structures often involve multiple stakeholders, complex contractual arrangements, and significant transaction costs which can hinder their scalability and effectiveness. Coordinating the interests and contributions of various actors, including governments, development finance institutions, private investors, and project implementers, requires extensive time and resources. Moreover, navigating legal and regulatory frameworks across different jurisdictions adds further complexity to blended finance transactions, increasing administrative burdens and compliance costs. As a result, the efficiency and transparency of these structures may be compromised, limiting their ability to mobilize capital and achieve sustainable development outcomes.¹⁰⁹

106. Thomas Tayler et al., *The Tipping Point for Climate Finance*, (White Paper, London: Aviva Investors, 2023), <https://www.avivainvestors.com/en-gb/views/aiq-investment-thinking/2023/11/tipping-points/>.

107. Joan M. Larrea, "Five Critiques of Blended Finance - and Five Responses From Convergence," *Convergence* (blog), August 17, 2021, <https://www.convergence.finance/news/7DQV0eR4TfDlLqbsyszb8/view>.

108. Dirk Schoenmaker and Ulrich Volz, *Scaling Up Sustainable Finance and Investment in the Global South*, Center for Economic and Policy Research, (London: Center for Economic and Policy Research, November 2022), <https://cepr.org/publications/books-and-reports/scaling-sustainable-finance-and-investment-global-south>.

109. Adva Saldinger, "Why Blended Finance Hasn't Taken Off," *Devex*, February 24, 2020, <https://www.devex.com/news/why-blended-finance-hasn-t-taken-off-96612>.

Box 7: Man Group's experience with investing in fixed income in Africa

As fixed income investors, we faced significant challenges finding suitable investments that aligned with the investment mandate in the Africa category; notably, no corporate entities qualified. When the African Development Bank (AfDB) introduced its debut Hybrid Tier 1 sustainable bond instrument—a sustainable bond linking its proceeds to green or social projects—we deemed it a suitable option from a credit perspective. The AfDB is a well-established multilateral development bank with an issuer rating of AAA, and the bond was a large liquid issue at USD 750 million, offering attractive pricing for its debut subordinated structure.

From a climate impact standpoint, a 2023 report by the G20 advocated for boosting development banks' stretched capital bases through hybrid instruments, making support for this new issue in primary markets aligned with this initiative. Hybrid capital strengthens a bank's capital base, enabling it to on-lend more funds, thereby creating a multiplier effect. While these were compelling reasons to invest in our Africa category, the investment proved more volatile than anticipated. The key issues included poor primary placement, where the new issue was placed with short-term hedge funds rather than long-term investors. Traditional bank investors, such as central banks, typically purchase AAA-rated multilateral senior issues but avoid subordinated issues. Additionally, many long-only sustainable investors are restricted from investing in hybrid bank capital instruments, and most ESG indices exclude hybrid instruments. There was also lower-than-expected liquidity due to limited broker quotes and trading activity, compounded by insufficient knowledge about AfDB as an issuer.

To address these challenges, we recommend that policymakers and think tanks designing new instruments consult market practitioners. They should organize more effective new issue roadshows and commit to better liquidity provision to broaden the investable universe.

c. Data availability issues

FIs encounter a significant hurdle in their pursuit of effectively allocating capital and preventing greenwashing practices due to a lack of high-quality, reliable, and comparable data. The credibility of a FI's ability to develop and execute its transition strategy hinges on the credibility of its current and would-be portfolio companies' capacity to develop and execute their own strategies. Consequently, even well-intentioned companies with genuine sustainable initiatives might struggle to attract the necessary investment. Indeed, investors may prefer to avoid the potential pitfalls associated with unverifiable environmental claims, thereby limiting the resources available for companies striving to make a positive environmental impact. This situation creates a paradox where the lack of data, meant to enhance transparency and accountability, inadvertently stifles progress by fostering an environment of doubt and hesitancy.

The table below illustrates the various challenges encountered by FIs when utilizing non-financial firms' transition plans.

Table 8: Issues faced by FI when using non-financial transaction plans

Lack of data	<ul style="list-style-type: none"> – Data collection process is too complex and costly for financial institutions – Not all non-financial firms, particularly small and midsize enterprise (SMEs), can provide adequate/relevant data <ul style="list-style-type: none"> – Lack of data from all upstream/downstream companies, especially more granular Scope 3 data – Lack of capacity to produce/assess data (technical skills, knowledge or understanding of expectations) – Lack of clarity on government policy and roadmaps (which may not be in place) and technological trends for industries (which may be uncertain) – Lack of data on exposure to physical or nature-related risks
Available data is not comparable	<ul style="list-style-type: none"> – No common definitions for non-financial firms' transition plans, albeit some jurisdictions are more advanced than others. For example, in the UK The Transition Plan Taskforce has published a sector neutral framework for the disclosure of transition plans and supporting guidance on preparing a disclosure, legal considerations and sectoral guidance on disclosure but this is currently voluntary. In the EU, binding rules such as the Directive (EU) 2022/2464 Corporate Sustainability Reporting Directive (CSRD) and the Corporate Sustainability Due Diligence Directive (CSDDD) may require financial and non-financial firms to develop and/or disclose plans to ensure transition with compatible business models and strategies but the detail of how comparable disclosure should be disclosed is yet to be set – No standardised physical risk or nature-related risk data sets
Uncertain reliability of data	<ul style="list-style-type: none"> – Where non-financial firms' transition plans do provide adequate information, this forward-looking information could become inaccurate due to non-financial firms' failure or inability to operationalise their plans or as a result of inaccurate underlying assumptions or uncertainties generally inherent in such data
Differing purpose of available data	<ul style="list-style-type: none"> – Information in non-financial firms' transition plans could be limited to a single climate scenario based on its strategy and may not provide information on sensitivities to varying states Of the world which would be necessary for a more complete risk assessment by a financial institution

Source: Network for Greening the Financial System (NGFS), 2024.¹¹⁰

¹¹⁰ Network for Greening the Financial System, Connecting Transition Plans: Financial and Non-Financial Firms (Paris: Network for Greening the Financial System, April 2024), https://www.ngfs.net/sites/default/files/media/2024/04/17/ngfs_connecting_transition_plans.pdf

Investors, particularly those without expertise in climate data, need clear guidelines on what data to gather, how to weigh it, and how to determine its quality. Unlike credit investing, where the criteria for a good credit profile and its corresponding rating are well understood, climate and biodiversity assessments are inconsistent, and credibility assessments of corporate transition plans are too weak and not standardized to be forward-looking and have an impact on valuations. This lack of clarity and data also impedes support for SLBs or transition bonds. Without any data, it is hard to support these instruments that are less brown but not green due to the all-prevailing fear of greenwashing. This gap can lead to perceptions of insincerity or misrepresentation. As mentioned above, the data problem is even more acute with EMDEs, where climate and corporate transition data is missing altogether and ESG ratings are automatically downgraded as a result.

An additional difficulty is outdated ratings which can significantly obstruct capital flows and present significant challenges for investors. An illustration comes from a power company in Latin America that is actively decommissioning coal-fired plants and instead opting for renewable energy sources. A large rating provider showed this company to have more than 50% of its revenues from coal. This data was outdated for more than 2 years. In the meantime, the company continues to shut down coal plants and has set an ambitious target to exit coal entirely before 2030. Investors are hesitant to override old backward-looking data, as investors' investment guidelines are hardcoded to third-party data and there is often no established override process that is transparent and linked to agreed-upon verifiable metrics from more than one data provider.

Finally, while benchmarking corporate transition plans against sectoral pathways has now been established as a key methodology to determine the quality of plans, there is an acute lack of regional sectoral pathways that outline the roadmap for specific economic sectors and that take into account regional specificity. This presents a challenge for all actors involved: companies, investors, and credit rating agencies.

d. Lack of engagement

The engagement of investors with portfolio companies is inconsistent even when institutions have adhered to net-zero alliances to show their climate commitments. For instance, the European Central Bank has analyzed that “[f]irm borrowers are no more likely to set climate targets after their lender sets a climate target, which casts doubt on active engagement by lenders. These results call into question the efficacy of voluntary commitments. (...) Our evidence suggests that Net-Zero Banking Alliance (NZBA) banks are neither divesting nor engaging differently from banks without a climate commitment.”¹¹¹

¹¹¹ Parinitha Sastry, Emil Verner, and David Marques-Ibanez, *Business As Usual: Bank Climate Commitments, Lending, and Engagement* (ECB Working Paper no. 2921, Frankfurt: European Central Bank, 2024), <https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2921-603e225101.en.pdf>.

Similarly, for asset managers holding public equities with voting rights, support for climate-related proposals remains modest, even among firms that promote environmental and social initiatives.¹¹² This is due to several factors including increased awareness of the cost-benefit analysis of shareholder proposals, an increase in anti-ESG proposals, and lower-quality/less-specific proposals.¹¹³ The politicization of ESG factors in the US has also had an impact on shareholder activism, especially where asset owners delegate engagement and voting to asset managers who want to keep a low profile if they have a diverse client base.¹¹⁴ This makes advocating for and assessing the level of engagement as well as measuring its effectiveness more complicated than it used to be.

This lack of engagement is also perceptible at the level of asset owners who insufficiently engage with asset managers despite their influence over them.¹¹⁵ The Global Impact Investing Network (GIIN) mainly explained this situation in terms of shortcomings in asset owners' clear articulation of impact objectives and in the ability of asset owners to understand asset managers' impact-oriented strategies. GIIN also highlighted continued actual and perceived tensions between financial returns and climate impact objectives, and the limited ability to influence asset managers given established fund structures.¹¹⁶

e. A misplaced focus on portfolio emissions as a leading indicator

The technical issues of portfolio emissions are now documented, and solutions are being formulated.¹¹⁷ However, it remains that portfolio emissions (or weighted average carbon intensity (WACI)) are "not considered sufficient on their own to evaluate the contribution of an FI's actions to a 1.5°C transition."¹¹⁸ The reduction in portfolio emissions is often called "paper decarbonization." Yet, it is standard practice among FIs to look at portfolio emissions as a leading indicator, which can misrepresent their decarbonization impact, internally and externally.¹¹⁹ Portfolio emissions should instead measure the emissions reductions of portfolio companies due to specific strategies deployed by FIs to finance and influence the implementation of these reductions. It should be a lagging indicator, sanctioning strategies. More and more international standards and guidelines now advocate that the leading indicators should be those that incentivize the range of transition-enabling activities that FIs can conduct to align their activities to the net-zero world goal.¹²⁰ This is why we offer NZDI as a leading indicator.

¹¹². Betsy Vereckey, "ESG Funds Often Fail to Vote Their Values, Research Shows," MIT Sloan School of Management, June 21, 2021, <https://mitsloan.mit.edu/ideas-made-to-matter/esg-funds-often-fail-to-vote-their-values-research-shows>; ShareAction, "New Data Shows Scant Improvement in Fund Managers' Voting on ESG Resolutions," press release, December 15, 2021, <https://shareaction.org/news/new-data-shows-scant-improvement-in-fund-managers-voting-on-esg-resolutions>; Roni Michaely, Guillem Ordóñez-Calafí, and Silvina Rubio, "Mutual Funds' Strategic Voting on Environmental and Social Issues," (Finance Working Paper no. 774/2021, Brussels: ECGI, February 2022), <https://www.ecgi.global/sites/default/files/Paper:%20Roni%20Michaely%20Guillem%20Ordóñez-Calafí,%20Silvina%20Rubio.pdf>; Tao Li, S. Lakshmi Naaraayanan, and Kunal Sachdeva, "Conflicting Objectives of ESG Funds: Evidence from Proxy Voting (Rochester: SSRN, February 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3760753.

¹¹³. Harvard Law School Forum on Corporate Governance, "Navigating ESG Fatigue in Shareholder Voting," January 22, 2024, <https://corpgov.law.harvard.edu/2024/01/22/navigating-esg-fatigue-in-shareholder-voting/>.

¹¹⁴. Jeff Green and Saijel Kishan, "America's Political Right Has a New Enemy No. 1: ESG Investors," Bloomberg, May 20, 2022, 8, <https://www.bloomberg.com/news/articles/2022-05-20/why-esg-investing-is-under-republican-attack?leadSource=verify%20wall>; Lance Dial, Elizabeth Goldberg, and Rachel Mann, "The Challenge of Investing in the Face of Anti-ESG Legislation," Reuters, August 24, 2022, <https://www.reuters.com/legal/legalindustry/challenge-investing-face-state-anti-esg-legislation-2022-08-24/>; Texas Comptroller of Public Accounts, "Texas Comptroller Glenn Hegar Announces List of Financial Companies that Boycott Energy Companies," August 24, 2022, <https://comptroller.texas.gov/about/media-center/news/20220824-texas-comptroller-glenn-hegar-announces-list-of-financial-companies-that-boycott-energy-companies-1661267815099>.

Simon Jessop, "Pension managers back climate group after high-profile US exits," Reuters, May 29, 2024, <https://www.reuters.com/sustainability/pension-managers-back-climate-group-after-high-profile-us-exits-2024-05-29/>.

¹¹⁵. Joseph Power, Jordan McDonald, So Lefebvre, and Tom Coleman, The Time to Green Finance: CDP Financial Services Disclosure Report 2020 (London: CDP, 2020), <https://cdn.cdp.net/cdp-production/cms/reports/documents/000/005/741/original/CDP-Financial-Services-Disclosure-Report-2020.pdf?1619537981>.

¹¹⁶. Sophia Sunderji and Ben Ringel, Institutional Asset Owners: Strategies for Engaging With Asset Managers for Impact (New York: Global Impact Investing Network, January 2022), 6, <https://thegiin.org/publication/research/institutional-asset-owners-strategies-for-engaging-with-asset-managers-for-impact/>.

¹¹⁷. For instance, Lisa Sachs, Nora Mardirossian, and Perrine Toledano, Finance For Zero: Redefining Financial-Sector Action to Achieve Global Climate Goals and Ilmi Granoff and Tonya Lee, Shocking financed emissions: the effect of economic volatility on the portfolio footprinting of financial institutions, Working Paper 2024 (New York: Sabin Center for Climate Law and Columbia Center on Sustainable Investment, May 2024), <https://climate.law.columbia.edu/content/shocking-financed-emissions-effect-economic-volatility-portfolio-footprinting-financial>.

¹¹⁸. The Science Based Target Initiative, The SBTi Financial Institutions Net Zero Standard Conceptual Framework and Initial Criteria, Consultation Draft, June 2023, <https://sciencebasedtargets.org/resources/files/The-SBTi-Financial-Institutions-Net-Zero-Standard-Consultation-Draft.pdf>.

¹¹⁹. Lisa Sachs, Nora Mardirossian, and Perrine Toledano, Finance For Zero: Redefining Financial-Sector Action to Achieve Global Climate Goals (New York: Columbia Center on Sustainable Investment, June 2023), <https://ccsi.columbia.edu/finance-for-zero>.

¹²⁰. Institut Louis Bachelier et al., The Alignment Cookbook 2 - A technical panorama of the alignment methodologies and metrics used by and applied to the financial sector, with a view to inform consolidated alignment assessments (Paris: ILB, 2024), <https://www.institutlouisbachelier.org/wp-content/uploads/2024/05/cookbook-0905.pdf>.



5.

**How to make it work within
constraints of risk/return profiles**

a. Adopting a multi-asset class strategy

As mentioned above, shifting capital towards the decarbonization of the real economy requires a top-down but flexible approach taking into account the risk profile of each portfolio and asset class. Adopting a multi-asset class approach is not only necessary to accommodate the various TRLs that the decarbonization entails (see section 1.b)vii) above) and assess which approach is best aligned with the risk/return profile of a specific portfolio but also ensure a coherent cross-asset strategy. Currently, the investment strategies behind equity and debt holdings in a company can be incoherent (e.g. “investors taking a long position on an oil major’s debt while simultaneously shorting its stock, reflecting the divergent priorities of fixed income investors seeking protection against downside risk, and equity investors taking risks to increase upside”)¹²¹ and sending conflicted signals to the company’s management.

b. Use of technologies to map out the universe of opportunities

The expanding access to machine learning (ML) technologies eases the burden of finding investable opportunities. Often, investors do not have an adequate depth of knowledge within each decarbonization technology. As a result, investors rely on data providers who tend to be focused on emissions and SDGs. These providers lack coverage across the EMDE markets, and the data moves at a slow pace, unable to keep up with the changing technology landscape. Deploying new generative AI technology can help us develop more inclusive investment road maps that link geographies to technologies to investment opportunities.

Building research strategies that use ML is possible with the current state of natural language processing (NLP) technology, particularly with General Purpose Technologies (GPT). GPT has revolutionized the process of constructing an investable universe of assets, particularly in specialized domains like decarbonization. By leveraging the language understanding capabilities of GPT models, investors can sift through vast amounts of data to identify companies and technologies that are pivotal to the decarbonization effort. One of the key advantages of GPT is its ability to comprehend and summarize complex information from various sources, including the International Energy Agency’s Energy Technology Perspectives (IEA ETP) and the IEA Clean Energy Guide.¹²²

¹²¹. Oxford Sustainable Finance Group, Smith School of Enterprise and the Environment, and University of Oxford, “Sustainable Finance and Transmission Mechanisms to the Real Economy,” (Working Paper No. 22-04, Oxford: University of Oxford, April 2022), <https://www.smithschool.ox.ac.uk/sites/default/files/2022-04/Sustainable-Finance-and-Transmission-Mechanisms-to-the-Real-Economy.pdf>.

¹²². International Energy Agency, Energy Technology Perspectives 2023.

The IEA ETP offers insights into energy technologies and their market viability, making it a valuable resource for understanding the landscape of decarbonization. The IEA ETP is a comprehensive report and database that assesses the role of different technologies and their potential to contribute to a more sustainable energy future. It provides an in-depth analysis of over 550 different technology options that could aid in the global transition toward decarbonization. The report examines key parameters such as technology readiness, investment requirements, and their potential impact on emissions reduction, energy security, and economic growth. It also explores various scenarios and strategies that could enable the world to achieve a sustainable and low-carbon energy system. The IEA ETP is an invaluable resource for policymakers, industry stakeholders, and investors as it offers a detailed roadmap of the technological advances required to meet international energy and climate goals such as those outlined in the Paris Agreement. By identifying the trends and milestones necessary for a clean energy transition, the IEA ETP helps to guide investment and development in energy technologies that are essential for reducing greenhouse gas emissions and combating climate change.

Through natural language processing, GPT can analyze the IEA ETP to extract relevant information about emerging technologies. This analysis can then be cross-referenced with data from company earnings calls and reports, which often contain strategic information about a company's involvement in decarbonization technologies. GPT models can efficiently process this information to highlight companies that are actively investing in or developing these technologies, even if the researcher does not have deep prior knowledge. By identifying mentions of clean energy initiatives, carbon capture and storage, renewable energy investments, and other related topics, GPT can help investors build a list of potential assets. This capability allows for a more informed and targeted approach to investing in the decarbonization space, enabling the construction of a diversified portfolio that aligns with the global transition to a low-carbon economy.

GPT, in conjunction with other forms of NLP, can be instrumental in discerning the materiality and strategic relevance of technologies identified in the IEA ETP to a company's business operations. GPT can process and understand complex narratives from various sources, such as company reports and sector analyses, to pinpoint references and contextual associations with decarbonization technologies. ML strategies, such as graph models, can help us build a more relational understanding of the summaries that GPT provides. Graph models, often used in the context of data analysis and machine learning, are mathematical structures that represent relationships between various entities. These entities are known as nodes (or vertices), and the relationships between them are called edges (or links). In a graph model, nodes could represent individual data points, such as companies, technologies, or concepts, while edges would signify the connections or correlations between these points, such as partnerships, influence, or flow of information. Graph models are particularly powerful in understanding complex networks and are used for tasks such as social network analysis, biological network analysis, and knowledge representation. In the context of analyzing the relevance of IEA ETP technologies to companies, a graph model would help in identifying how different technologies are associated with different companies, revealing patterns and strengths of relationships that might not be apparent from a simple data review.

This form of modeling can clarify how central a particular technology is to a company's strategy, showing direct investments or indirect influences, such as through supply chain linkages. By highlighting these connections, graph models enable a more nuanced approach to identifying investment opportunities that are material and strategically relevant to a company's business. Graph models can then visualize these relationships, mapping out connections between companies and relevant technologies based on factors like research and development or market deployment. This synergy allows for a distilled comprehension of a company's engagement with specific IEA ETP technologies, filtering out noise and highlighting substantive links. The result is a systematic and efficient approach to investment analysis that surfaces the most pertinent opportunities, aligning with strategic decarbonization goals and promising financial prospects. This targeted strategy enables investors to allocate capital more effectively to companies that are not only contributing to a sustainable future but are also poised for growth within the transition to a low-carbon economy.

Within the investment landscape, asset classes such as equities, fixed income, commodities, and real estate each interact differently with decarbonization technologies. Graph models can extend to asset class maps, elucidating how these technologies impact or are impacted by the characteristics and performance of different asset classes. For example, equities in renewable energy companies might be directly affected by advancements in decarbonization technologies, while the fixed income space may see the rise of green bonds financing these technologies. Commodities, particularly those used in energy storage like lithium, could become more valuable as the demand for batteries increases in a decarbonizing economy. Real estate investments might be influenced by the need for energy-efficient buildings and infrastructure. By creating asset class maps that reflect these dynamics, graph models help investors understand the broader financial ecosystem's response to decarbonization technologies, enabling a more strategic allocation of capital across the spectrum of asset classes to harness the full potential of the shift towards a low-carbon future.

c. Opportunities for collaboration

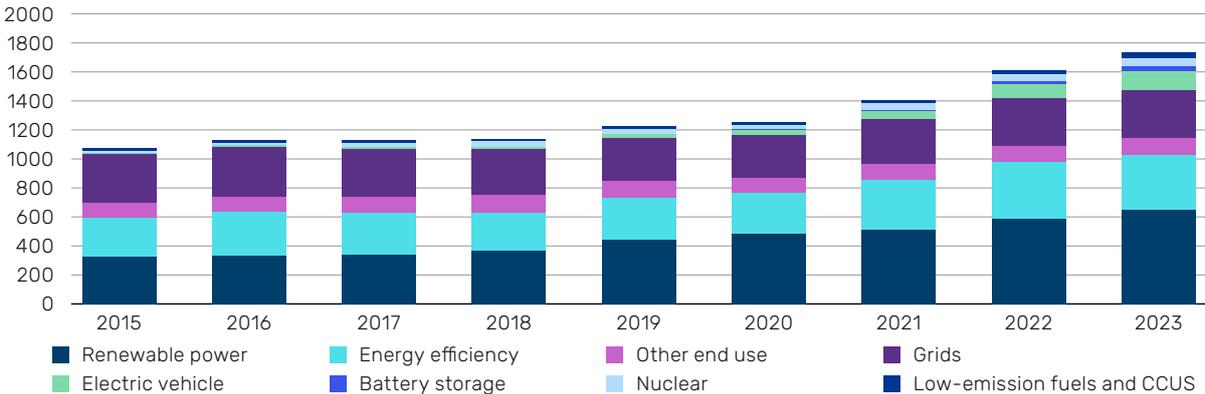
To effectively address the investment gaps and reduce global emissions, a collaborative effort across the industry and with other stakeholders is key for capital deployment and to address bottlenecks in data, methodologies, perceived and actual constraints of limited opportunities fitting the risk/return profiles of funds. Collaborative efforts can be established at various levels to address different purposes.

i) Collaboration with policymakers

Policy advocacy plays a pivotal role in promoting policies and regulatory frameworks conducive to climate investments; a stronger policy and planning framework for the transition is needed to unlock private finance, send clear market signals, and increase certainty for investors. The current focus on corporate disclosure across geographies should not obviate the need to deploy transition-enabling policies.

Governments worldwide have intensified their support for the development and manufacturing of clean energy technologies, including emerging ones. This surge aims to expedite decarbonization, secure energy supply chains, and bolster economic growth, competitiveness, and employment. Figure 16 highlights the significant increase in investments over recent years, underscoring the global commitment to advancing clean energy initiatives. The emergence of green industrial plans, coupled with escalating regulatory pressure on companies to decarbonize, is beginning to reshape investment strategies and carbon transition risks, particularly in sectors highly exposed to change, such as oil and gas, automotive, and power. However, investing in unproven technologies entails significant execution risks, while persistent geopolitical risks and trade barriers further complicate investment strategies and supply-chain management.¹²³

Figure 16: Annual global clean energy investment 2019-23 (USD billions)



Source: Moody's Ratings based on the International Energy Agency and Moody's Ratings, 2024.

In this context, the Conference of the Parties highlighted “the need to strengthen policy guidance, incentives, regulations and enabling conditions to reach the scale of investments required.”¹²⁴ This is indeed key for an orderly transition and FIs should engage with governments and industry associations to foster an enabling environment for sustainable finance initiatives and stop any funding of lobbying efforts that would be detrimental to the deployment of transition enabling policies.¹²⁵ Investors could advocate for meaningful corporate disclosures regarding transition strategies, including detailed plans for capital expenditures across all companies. This transparency would enable investors to develop tailored investment and engagement strategies for the transition. Additionally, investors could advocate for the development of region-specific transition roadmaps and sustainable investment taxonomies which would provide a structured framework for identifying critical climate investments tailored to specific regions. As such, it would elucidate the required pace of escalation for green revenues and capital expenditures aligned with a Paris Agreement trajectory. Last, investors and FIs more generally could be particularly well positioned to warn policymakers of the impact of geopolitics on industrial policies, alerting to the fact that excessive desire to build domestic industry could create an oversupply making projects uneconomic or raise the cost of climate solutions through high import tariffs.

¹²³. “Industrial Policies Drive Innovation, With Scope to Disrupt Hard-to-Abate Sectors.” Moody’s Investor Services, April 11, 2024. https://www.moodys.com/research/Carbon-Transition-Global-Industrial-policies-drive-innovation-with-scope-to--PBC_1383832.

¹²⁴. United Nations Framework Convention on Climate Change, Conference of the Parties Serving as the Meeting of the Parties to the Paris Agreement: First Global Stocktake, (December 2023). https://unfccc.int/sites/default/files/resource/cma2023_L17_adv.pdf.

¹²⁵. Lisa Sachs, Nora Mardirossian, and Perrine Toledano, Finance For Zero: Redefining Financial-Sector Action to Achieve Global Climate Goals.

ii) Collaboration with underwriters to improve the legal and sustainable quality of issuances

Asset managers and other bondholders in collaboration with underwriters can play a pivotal role in both corporate lending and securities underwriting activities. In the context of underwriting securities, underwriters can require thorough due diligence, such as conducting environmental impact assessments, and actively encourage clients to incorporate Responsible Business Conduct (RBC)¹²⁶ risk reporting into the prospectus. As part of their advisory role, banks can guide clients to include RBC considerations in critical disclosure documents, such as the prospectus, during securities underwriting transactions. Additionally, banks can request clients to articulate their plans for addressing key RBC issues likely to impact their future performance. Banks can further contribute by challenging clients' perceptions of material risk issues, particularly where RBC risks might be underestimated or deemed irrelevant to investors from a financial standpoint.¹²⁷ These collaborative efforts of underwriters and asset managers serve as a powerful mechanism to ensure that issuers of green bonds adhere to environmental standards and legal compliance.

iii) Collaboration with asset owners and asset managers to reconcile investment belief, risk appetite, and decarbonization goals

A collaborative approach between asset owners and asset managers is key to aligning investment beliefs with a decarbonization commitment, agreeing on why a decarbonization strategy is necessary for fulfilling a fund's purpose as well as agreeing on the implications for risk-return profiles. Asset owners and managers can adopt a pro-active attitude to balance the risk and return over time while supporting decarbonization. A pro-active attitude can involve partnering within the industry and with green finance institutions to implement robust risk mitigation strategies and financial products that can direct investor finance towards climate-related investments and riskier technologies. This includes the development of innovative financial instruments to de-risk investments such as insurance products, hedging mechanisms but also securitization instruments that are used to pool and monetize revenue streams from renewable energy projects and other sustainable infrastructure investments. By securitizing these assets, financial institutions can create investment opportunities that appeal to a broader range of investors, including institutional investors and pension funds. This diversification of funding sources can help mitigate risks associated with smaller-scale, ticket-size projects.

¹²⁶. Under the MNE Guidelines (OECD Guidelines for Multinational Enterprises) "responsible business conduct" (RBC) means that business should: i) make a positive contribution to economic, environmental, and social progress with a view to achieving sustainable development; and ii) should avoid and address adverse impacts through their own activities and seek to prevent or mitigate adverse impacts directly linked to their operations, products, or services by a business relationship" Due Diligence for Responsible Corporate Lending and Securities Underwriting: Key Considerations For Banks Implementing OECD Guidelines for Multinational Enterprises (Paris: OECD, 2019), <https://mneguidelines.oecd.org/due-diligence-for-responsible-corporate-lending-and-securities-underwriting.pdf>.

¹²⁷. Due Diligence for Responsible Corporate Lending and Securities Underwriting.

iv) Collaboration and engagement with portfolio companies and corporations

Another proactive attitude is to use the leverage of equity shareholder engagement or the covenant for fixed income to target a change in corporate behavior toward the development of a credible and feasible plan to align with the 1.5 trajectory.

The Canada Pension Fund (CPP), for instance, has developed assistance with its investee companies by developing a framework to help prompt strategic conversations “around a feasible and ambitious pathway and prioritize economic (proven) abatement actions that will have the highest impact, per dollar spent, (...) long-term (probable) measures that require higher net capital expenditures, based on its climate ambition, (...) [and] emissions associated with emissions that are either technically not possible to abate or currently very uneconomic.”¹²⁸ This framework is called the Abatement Capacity Assessment Framework and provides a step-by-step guide to explore the technical and economic feasibility and emissions-reduction potential of individual decarbonization options in the context of a company’s marginal abatement cost curve (MACC),¹²⁹ enabling engagement efforts around what is feasible but not done today (eg: using renewables to lower Scope 2) and how the company should prepare to seize the feasible opportunities of the near future.

When considering portfolio companies’ transition strategies, it is important to recognize their significance as vital sources of information for business insights and risk assessments for FIs. Thus, active collaboration between FIs and these corporations becomes paramount to enhancing transition strategies. Illustrated in the table below are various avenues through which FIs can engage with portfolio companies (described as “non-financial firms” in Table 9). This engagement then leads to a close collaboration, which aims to refine the latter’s transition plans, ensuring they align more effectively with the goals and requirements of FIs.¹³⁰

¹²⁸. Peter Busse, Michael Hall, Som Ghosh, and John Guo, Decarbonizing Investment Approach: Progress Report (Toronto: CPP Investments, October 2023), <https://www.cppinvestments.com/insight-institute/decarbonization-investment-approach/>.

¹²⁹. Busse, Hall, Ghosh, and Guo, Decarbonizing Investment Approach.

¹³⁰. Network for Greening the Financial System, Connecting Transition Plans: Financial and non-financial firms.

Table 9: Recommendations for FIs to engage with non-financial firms to improve transition plans

Financial institutions' informational needs	Recommendations on areas to engage with non-financial firms on their transition plans
For risk management	<ul style="list-style-type: none"> – Engage and incentivise clients to take climate risk mitigation actions e.g. flood adaptation measures – Raise awareness - when possible - on how to develop and implement a transition plan e.g. sharing best practices – Streamline engagement with clients to reduce data collection burden (e.g. through automated collection processes to supplement tailored engagement) – Increase likelihood of non-financial firms' successful implementation (see below)
Financing/investment/ insurance opportunities	<ul style="list-style-type: none"> – Engage non-financial firms on their transition plans and their financing/insurance needs in order to implement said plans, including potential opportunities to extend funding or insurance to their upstream and downstream (e.g. suppliers) in relation to both decarbonisation as well as adaptation opportunities
Progress on FI own decarbonization targets	<ul style="list-style-type: none"> – Introduce ongoing continuous engagement – Stimulate the measurement and reporting of GHG emissions – Engage with clients to refine public disclosure of their transition plans – Recognize there is no 'one size fits all' solution. Support real economy transition planning efforts e.g. establishing dialogue with industry associations and other relevant stakeholders such as regulators and governments – Incentivise emissions reduction actions by clients e.g. sustainability linked loans – Increase likelihood of non-financial firms' successful implementation (see below)
Likelihood of non-financial firm's follow through with transition plan (this can be used for risk identification or financial institutions' own decarbonisation targets)	<ul style="list-style-type: none"> – Collect information on robustness of governance and encourage process enhancements where necessary – Collect information on presence of actionable milestones and consider incorporation into financial institutions' own processes e.g. when setting KPIs for sustainability linked financing instruments – Raise risk awareness by encouraging non-financial firms to identify their transition plan dependencies (e.g. technological and/or policy developments)

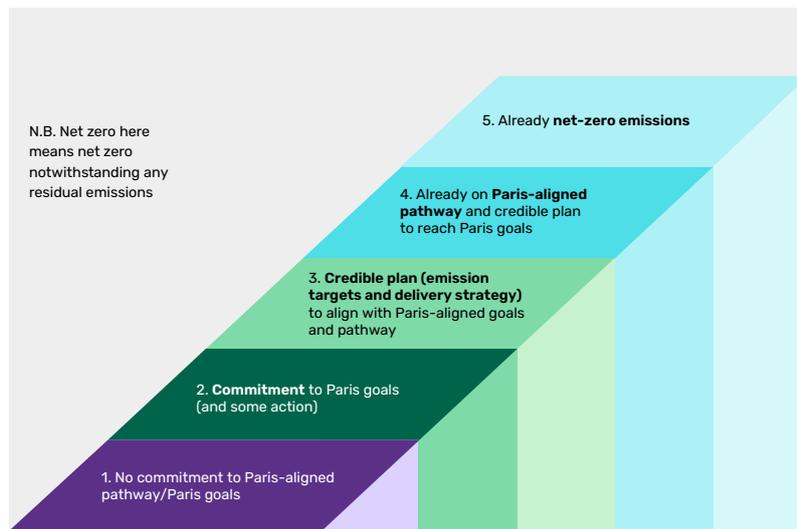
Source: Network for Greening the Financial System (NGFS), 2024.¹³¹

Maturity ladders can help FIs evaluate the ambition and feasibility of transition plans as well as track the FIs' portfolio companies' progress towards net zero, which in turn impacts FIs' own transition delivery progress. To this end, CBI has put forward a classification system for corporate transitions that identifies five categories of corporate decarbonization transition maturity and key indicators for a corporation's inclusion in each of those categories (see Figure 17). By aligning selected indicators of an ambitious and credible transition plan with the steps on this ladder, multi-criteria indicators can be organized into summary evaluations of a corporation's current and future transition efforts. This allows FIs to aggregate and differentiate between corporates, develop effective engagement strategies and roadmaps across their portfolios, and use corporate transition maturity as a target metric for their own transition targets.¹³²

¹³¹. Network for Greening the Financial System, Connecting Transition Plans: Financial and non-financial firms.

¹³². Climate Bonds Initiative, Navigating Corporate Transitions.

Figure 17: CBI's maturity scale for ambitious and credible corporate transitions



Source: Climate Bonds Initiative, 2024.¹³³

v) Collaboration with Multilateral Development Banks

Collaborative efforts between FIs and MDBs hold significant potential for optimizing the development of bankable projects and unlocking the vast opportunities of private finance. MDBs serve as crucial facilitators in providing accessible financing to bolster economic recovery and advance sustainable development, particularly in regions where investment flows and government budgets are insufficient. These institutions work alongside governments and the private sector to cultivate investment-friendly environments and facilitate transformational initiatives. Historically, they stand out as the most effective entities for furnishing low-cost, long-term financing, mitigating risks encountered by private investors, and efficiently distributing risk.¹³⁴

While the reform of their approach remains paramount to improving the effectiveness of how they approach private sector mobilization, investors are encouraged to engage more directly with MDBs to demonstrate their commitment to providing finance to EMDEs, particularly through blended finance initiatives, contingent upon the fulfillment of suitable conditions. Such mobilization of private finance can take various forms, including direct investment, intermediation through funds or credit lines, or indirect mobilization enabling outputs.¹³⁵ By leveraging catalytic capital to enhance the risk-return profile of investments, blended finance has the potential to make climate-focused projects commercially viable. For instance, loan guarantees can offer protection against political risks, while concessional loans may incentivize investors to support new technologies lacking proven track records.

Moreover, financial institutions should collaborate with MDBs to intensify outreach to rating agencies, advocating for the incorporation of innovative financing structures, risk mitigation efforts, and sound transition planning into their rating criteria. This recognition can ultimately enhance the investment ratings of EMDEs and blended finance structures fostering increased private sector participation.¹³⁶

¹³³. Climate Bonds Initiative, Navigating Corporate Transitions: A Tool for Financial Institutions to Assess and Categorise Corporates by Their Transition Credibility and Maturity (London: Climate Bonds Initiative, May 2024), https://www.climatebonds.net/files/reports/cbi_navcorptran_03b.pdf.

¹³⁴. The Triple Agenda: Report of the Independent Experts Group (New Delhi: Government of India Independent Expert Group, 2023), https://www.cgdev.org/sites/default/files/The_Triple_Agenda_G20-IEG_Report_Volume1_2023.pdf.

¹³⁵. Bella Tonkonogy, Jessica Brown, Valerio Micale, Xueying Wang, and Alex Clark, Blended Finance in Clean Energy: Experiences and Opportunities (San Francisco: Climate Policy Initiative, January 2018), <https://www.climatepolicyinitiative.org/wp-content/uploads/2018/01/Blended-Finance-in-Clean-Energy-Experiences-and-Opportunities.pdf>.

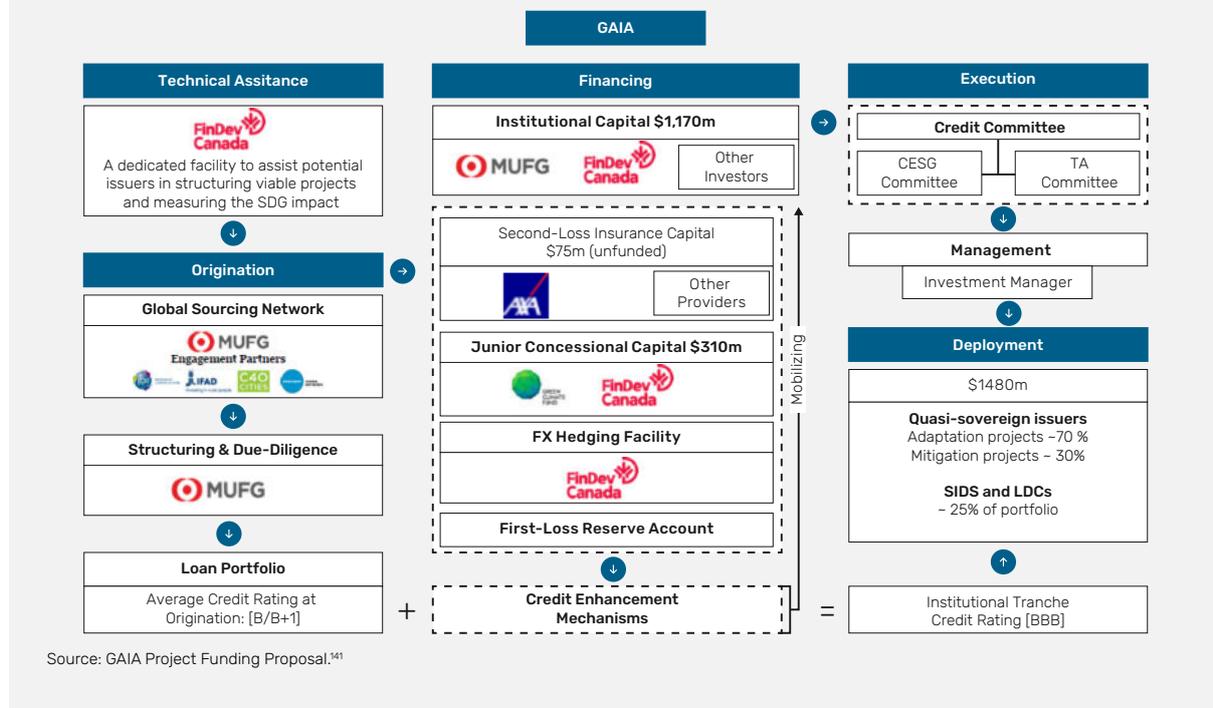
¹³⁶. United Nations Environment Programme Finance Initiative, Scaling Private Capital Mobilization: Call to Action to Heads of State, Policymakers and Multilateral Development Bank Officials (Geneva: UNEPFI, November 2023), <https://www.unepfi.org/industries/investment/scaling-private-capital-mobilization/>.

Some private sectors can be more active than just investing, shaping definitions and methodologies needed to create standardized, scalable capital structures.¹³⁷ Initiatives such as the Sustainable Markets Initiative (SMI) Blended Finance Task Force and projects like the GAIA Platform, led by prominent global institutions, exemplify the potential for impactful collaboration (explained in further detail in Box 8). In 2023, the SMI unveiled the inauguration of its Blended Finance Task Force. Task Force members play a pivotal role in unlocking essential capital necessary to fulfill global commitments concerning climate change and sustainable development, particularly in emerging economies where climate change imposes a disproportionately adverse impact. The Task Force is led by Caisse de dépôt et placement du Québec (CDPQ).¹³⁸

Box 8: GAIA initiative: bridging the adaptation financing gap

GAIA represents a USD 1.48 billion initiative to complement global commitments and bridge the adaptation financing shortfall. The Green Climate Fund (GCF)'s USD 150 million investment validates the financing framework central to the GAIA platform. GCF's involvement is expected to attract other concessional capital partners. Essentially, concessional capital within GAIA generates approximately USD 3.8 for every USD 1 contributed, exceeding the efficiency of equivalent private sector mobilization efforts by traditional multilateral development partners.¹³⁹ Through the layers of equity protection (such as partial credit guarantees and foreign exchange hedging) and commercial insurance around its portfolio, the GAIA platform is able to transform individual country risks that may be rated as B into a solid BBB. The net return for commercial investors is around SOFR¹⁴⁰ + 385 bps, which is illustrative and subject to change based on market conditions and the actual loan portfolio.

Figure 18: Mapped potential partners for GAIA's investment process



137. Naomi Desai and Vinay Shandal, "Climate Finance Needs a Push. Asset Owners Can Supply One," *Boston Consulting Group*, August 21, 2023, <https://www.bcg.com/publications/2023/asset-owners-can-supply-push-in-climate-finance>.

138. Sustainable Markets Initiative, "Sustainable Markets Initiative Launches Blended Finance Task Force to Build New Pathways For an Investable Pipeline of Projects," press release, April 14, 2023, <https://www.sustainable-markets.org/news/sustainable-markets-initiative-launches-blended-finance-task-force-to-build-new-pathways-for-an-investable-pipeline-of-projects/>.

139. Green Climate Fund, *Project GAIA ("GAIA") Funding Proposal* (Incheon: Green Climate Fund, November 2023), <https://www.greenclimate.fund/document/project-gaia-gaia>.

140. SOFR: Secured Overnight Financing Rate

141. Green Climate Fund, *Project GAIA ("GAIA") Funding Proposal*.

In conclusion, collaborative efforts between FIs and MDBs offer a promising avenue for optimizing the development of bankable projects and harnessing the potential of private finance, particularly in EMDEs. The involvement of the private sector in shaping standardized capital structure, innovative financing and supporting initiatives like the aforementioned underscores the potential for impactful collaboration in mobilizing essential capital to advancing climate finance and promoting sustainable development worldwide.

Conclusion

Reorienting global financial flows, and directing finance into the necessary geographies, sectors, and technologies will necessarily require robust public sector leadership. Most fundamentally, “[g]overnments are responsible for producing official pathways (...) in order to guide technologically sound, cost-effective, integrated, and long-term transformation strategies.”¹⁴² The role of non-state actors is also critical in achieving the climate goals as emphasized by the United Nations High-Level Expert Group on Net-Zero Emissions Commitments of Non-State Entities (UN HLEG)¹⁴³ Most notably, as capital providers, underwriters, and fiduciaries of trillions of dollars of capital flows annually, FIs play a critical role in decarbonizing the economy and scaling access to climate solutions.

Playing this role requires intentionality and integrity, which in turn calls for the development of a strategic framework serving as a multi-year compass to ensure that capital is effectively allocated where it is needed from a geographical and sectoral perspective.

Thus, this paper has highlighted the importance of establishing such a compass, with clear targets based on cumulative emissions gaps to net zero at geographical and sectoral levels from IAMs, as well as on climate solutions grounded in global sectoral pathways. The top-down, long-term approach to strategic investing in decarbonization outlined in Compass-FRWD facilitates more efficient portfolio construction, allowing for adaptation to different portfolios with their own targets and mandates. The ultimate objective is to progressively reduce the NZDI with each deployment cycle until capital allocation achieves an optimal distribution across regions and sectors, resulting in an NZDI of zero globally in an ideal future scenario.

For Compass-FRWD to effectively achieve climate goals and support the deployment of climate solutions, selecting the appropriate asset class for each investment is crucial. We have seen that among the traditional asset classes, fixed income, particularly GSSS-labeled bonds, has the highest potential impact. However, their nascent nature presents some challenges and underscores the need to balance creating entry points for new issuers and promoting harmonized robust standards and transparent reporting mechanisms to maintain their integrity, comparability, and credibility. Addressing these shortcomings through first aligning investors’ requirements with international standards and then regulatory oversight is essential for upholding the effectiveness of these instruments. This will enable issuers to enhance investor confidence and attract more capital towards climate-related projects.

¹⁴² Sachs, Mardrossian, and Toledano, *Finance For Zero*.

¹⁴³ United Nations’ High-Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities, *Integrity Matters: Net Zero Commitments by Businesses, Financial Institutions, Cities and Regions* (New York: United Nations’ High-Level Expert Group on the Net Zero Emissions Commitments of Non-State Entities), https://www.un.org/sites/un2.un.org/files/high-level_expert_group_n7b.pdf.

While Compass-FRWD has the potential to drive tremendous impact, significant challenges remain in targeting emissions gaps and ensuring additionality. Private finance must play a substantial role, particularly in EMDEs, where investment needs to increase five-fold to achieve net zero by 2050. However, attracting international investors to EMDEs is hampered by factors such as a lack of investment-grade credit ratings, higher capital costs, and currency risks. Blended finance structures, which aim to address financing gaps in EMDEs, face their own set of challenges, including absent or outdated credit rating methodologies, liquidity constraints, and complex regulatory environments.

Additionally, a lack of high-quality, reliable, and comparable data on corporate transition plans hinders the ability of financial institutions to allocate capital effectively and prevent perceived or real greenwashing. Engagement with portfolio companies is often insufficient despite commitments to net-zero alliances, and the focus on misleading portfolio emissions is still prevalent.

Addressing these issues is necessary to reduce emissions on a global scale and ensure effective capital shifts toward decarbonizing the real economy. To achieve this, a top-down yet flexible approach tailored to various risk profiles and financial instruments is necessary. Adopting a multi-asset class strategy helps accommodate the diverse TRLs required for decarbonization and various risk profiles, and ensures a coherent cross-asset approach. Additionally, leveraging technology, particularly ML and NLP, can help identify investment opportunities.

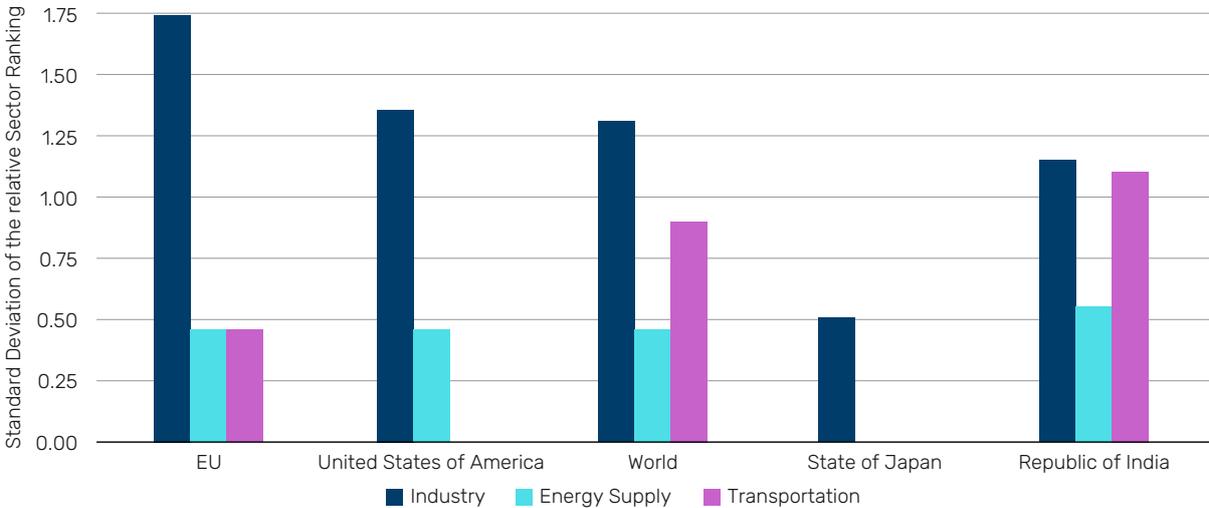
Collaboration with policymakers, across the industry and with the MDBs is vital for effective capital deployment and addressing bottlenecks in portfolio allocation. Engaging with policymakers while stopping counter-productive lobbying is critical to fostering an enabling environment for sustainable finance initiatives and non-state actors' effective climate action. Partnerships within the finance industry can improve the legal and sustainable quality of issuances. Collaborative approaches between asset owners and managers can align investment preferences with decarbonization commitments, inducing the development of innovative financial instruments to de-risk investments in climate solutions. Furthermore, engaging with portfolio companies to refine and support their transition strategies translate into robust plans for FIs, while partnerships with MDBs can optimize the development of bankable projects, investible issuance and unlock private finance opportunities in EMDEs.

Through these collaborative efforts and a comprehensive decarbonization framework aimed at allocating capital where it is most needed, we can make significant strides in combating climate change and achieving a sustainable future.

Annex 1 - Investment prioritization and IAMs.

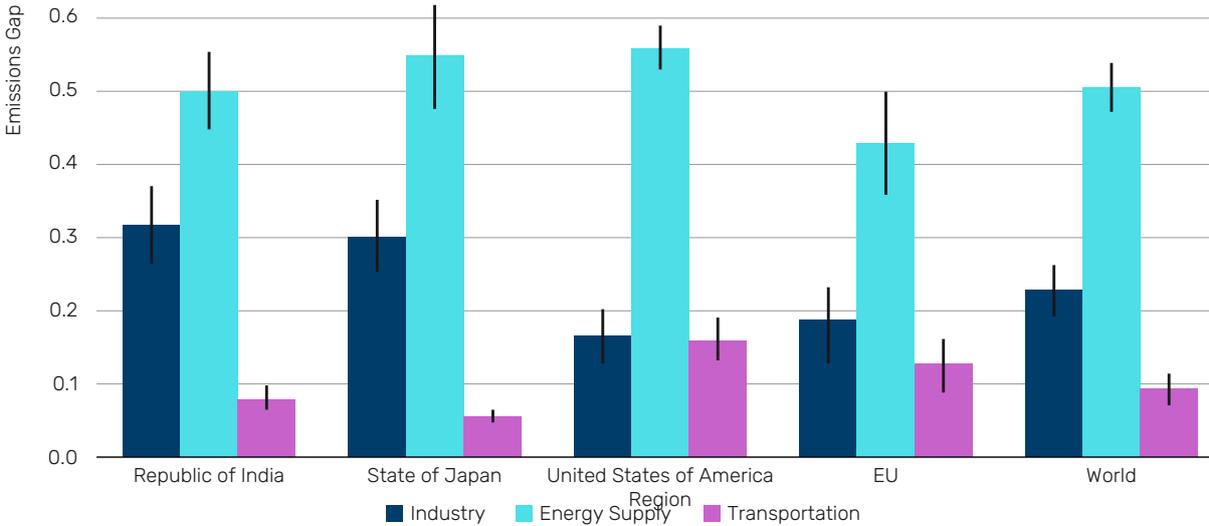
Figures 19 and 20 evidence that the investment prioritization based on the relative size of the emission gaps is relatively consistent between models. For this comparison, three iterations of three leading models for IAMs are used. Figure 19 shows the standard deviation of the relative sector ranking (leading to investment prioritization), calculated based on the average sector ranking (based on the relative emissions gaps) within each region. Thus, we see that industry is where models can deliver the most variation in terms of ranking; however, even for industry, variance in the ranking is low. Here, the ranking includes over 20 sectors within each geography. Figure 20 shows the average emissions gap and the standard error deviation of the relative regional and sectoral emissions gaps calculated based on the average regional and sectoral emissions gaps. Similarly, we largely see agreement among the various sectors within each region.

Figure 19: Standard deviation of the relative sector ranking within region



Source: Internal data, prepared by authors. As of July 2024.

Figure 20: Mean Emission Gaps Across Regions with Standard Error



Source: Internal data, prepared by authors. As of July 2024.

Annex 2 - Identifying red flags in Transition Plans evaluation

When assessing climate transition plans, it is crucial to keep an eye out for various warning signs that could indicate weaknesses or gaps in the approach, as detailed in Table 10.

Table 10: Red flags in transition plans

Transition Plan Red flags	Possible indication of:
Incomplete or inaccurate emission coverage	The company's assessment of its GHG emissions may lack accuracy or comprehensiveness
Over-reliance on carbon offsets	The absence of genuine efforts to reduce emissions at the source
Vague or unrealistic timelines for achieving targets	Insufficient urgency or a lack of clear direction in the transition plan
Outdated or non-representative baselines	The plan is incomplete, lacking critical component or details necessary for effective implementation
Absence of Scope 1, 2, and 3 emissions within short-, medium-, and long-term targets	
Lack of a comprehensive decarbonization strategy	Questionable credibility of targets
Missing a clear roadmap outlining actions and steps	The plan falls short in terms of effectiveness.
Unaligned financial targets	Insufficient progress towards emission reduction objectives
Insufficient engagement strategies	A need for a clearer understanding or strategy for addressing climate change
Failure to define climate solutions	
Failure to conduct qualitative and quantitative assessments of potential locked-in GHG emissions	Lack of a thorough evaluation of the extent of its GHG emissions or the potential impact of its activities on climate change
Absence of robust plans to phase out fossil fuels	Passive stance towards transitioning away from fossil fuels
Nonexistent governance mechanisms to monitor progress	Notable absence of accountability
Lack of robust reporting	The transition plan is inherently flawed

Source: Adapted from Reclaim Finance, 2024.¹⁴⁴

¹⁴⁴ Paul Schreiber, Corporate Climate Transition Plans: What to Look For (Paris: Reclaim Finance, January 2024), <https://reclaimfinance.org/site/wp-content/uploads/2024/01/Report-Climate-Transition-Plan-Reclaim-Finance-January-2024.pdf>.

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