

Investment in technologies of today: increasing flows of finance into developing countries

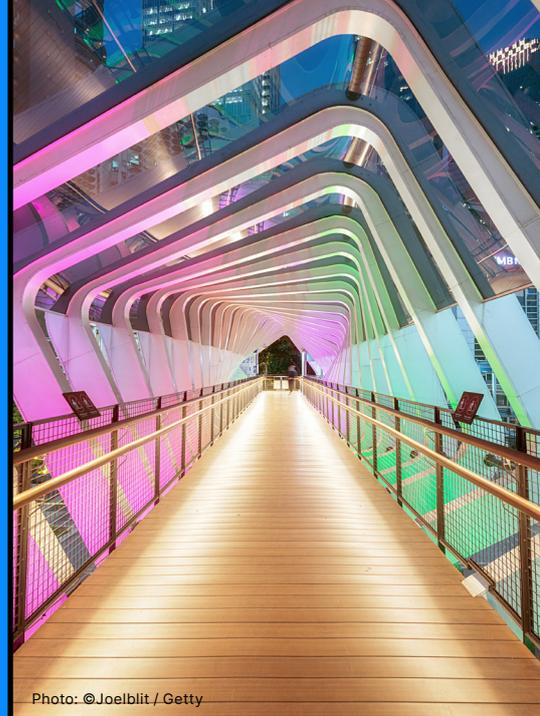


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Abstract

Developing countries face two broad categories of challenges in financing the deployment of the sustainable technologies of today. Commercially viable technologies, characterized by considerable existing deployment and relatively low risk perceptions, require the scaling up of investment flows for sustainable development. Financially underserved segments, characterized by higher risk perceptions as a result of limited track records of business models and technology performance, require de-risking to attract the initial flow of investments.

Using real world examples, this paper analyses the capacity of developing country financial systems to finance the deployment of sustainable technologies consistent with sustainable development trajectories. Highlighting existing constraints, the paper outlines the role of financial instruments and financial regulation in addressing existing bottlenecks to the flow of capital. Building upon the solutions identified, the paper examines the role of both domestic policy and multilateralism in implementing these solutions.

BACKGROUND PAPER

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1. Introduction

The year 2022 marks the 50th anniversary of the United Nations Conference on Human Environment held in Stockholm. With 122 countries attending, it directed a sharp focus on the environment as a vital challenge of our times, perhaps for the first time ever at a gathering of such a size. The establishment of the United Nations Environment Programme (UNEP) was a direct outcome of the conference, which also saw the adoption of the Stockholm Declaration and Action Plan for the Human Environment. The ensuing 50 years have been marked by significant advancements in technology. However, the past five decades have also seen the environment face ever-increasing and graver challenges that would have been unimaginable at Stockholm, as a consequence of unsustainable economic growth. Developing countries are particularly vulnerable to these challenges, arguably more so than developed economies. At the same time, developing countries also need to continue making material progress to improve the standard of living of their citizens. While the technologies that permit environmentally conscious development are available, these are either expensive or needed at a scale that is outside the ability of developing



economies to reasonably fund by themselves. So how big a financing challenge do developing countries face, and what can be done to mobilize finance for the technologies of today?

Environmentally conscious finance flows come with many different prefixes, such as green, sustainable or climate, to name just a few. However, whatever the prefix, each results in a positive and beneficial impact on the environment. Nowhere are these flows more apparent than in the low-carbon transition, which is potentially one of the most significant drivers of capital flows in the 21st century. While an estimated USD 100 trillion in investments are necessary to achieve global net-zero greenhouse gas emissions by mid-century (Glasgow Financial Alliance for Net Zero, 2021), the investment requirements for even less ambitious trajectories still number in the trillions. Much of these investment flows will have to be directed towards developing countries, which will drive the incremental consumption of energy and materials going forward. For example, as per the International Energy Agency (IEA), developing countries are expected to account for 88% of the growth in electricity demand between 2019 and 2040 (Bond et al., 2021). However, these countries are not evidently well equipped to mobilize the necessary investments on their own.

Examining the financing challenge through an emissions lens at a country level reinforces the enormity of its scale. In a recent report, the Council on Energy, Environment and Water (CEEW) estimated that achieving India's stated 2070 net-zero target would entail an investment of USD 10.1 trillion in 2020 prices (Singh & Sidhu, 2021). While a large part of the investment requirement could be mobilized through conventional sources, a significant investment gap of USD 3.5 trillion would remain.

In fact, international climate negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) explicitly recognize the need of developing countries for financial support to accelerate low-carbon development (United Nations Framework Convention on Climate Change, 2021a). The issue of climate finance features prominently in international climate negotiations, though there remains considerable debate on the scale and type of finance required. Further, international negotiations also note that low-carbon investments should be aligned with sustainable development and support a just transition (United Nations Framework Convention on Climate Change, 2021b). This paper aims to explain why the financial systems of developing countries cannot support the desired level of investments in low-carbon and other environmentally aligned technologies of today and how additional finance may be mobilized to bridge the gap.

2. What do we mean by technologies of today?

The low-carbon transition requires an economy-wide transformation encompassing the decarbonization of electricity and heat generation, transport, industry and buildings sectors (International Energy Agency, 2021). Such a transition that contributes to sustainable development involves investments across a range of technologies. This paper focuses on 'technologies of today', in other words those that have demonstrated technological viability (and achieved commercially viable deployment in some developed countries) but remain at varying levels of commercial viability in developing countries. Besides technological maturity, policy and market conditions play a key role in the competitiveness and thus the commercial viability of technologies. Therefore, what is commercially viable in one country may not necessarily be so in another. Nonetheless, from a financing perspective, such technologies have differing financing requirements.



2.1 Financing of commercially viable technologies

These technologies are those that have attained deployment at scale, and therefore have already succeeded in attracting capital flows at scale. Utility-scale renewables in China and India are examples of such technologies. Based on the UNEP and Bloomberg New Energy Finance Global Trends in Renewable Energy Investments report series, these have attracted annual average investment flows of around USD 90 billion in China and around USD 9 billion in India over the five-year period spanning 2016–2020. While attracting investments by themselves is not challenging, mobilizing them at the scale dictated by long-term decarbonization trajectories could still be challenging from existing sources of finance. Long-term deployment ambitions could necessitate tapping new sources of finance to augment flows from existing sources. For example, CEEW estimates that achieving 450 GW out of India's target of 500 GW non-fossil fuel based electricity capacity by 2030 through non-large hydro based renewable energy sources (primarily solar and wind) would require USD 200 billion for generation alone, not including storage and transmission (Singh et al., 2020). In contrast, the existing exposure of India's domestic banks and non-banking financial companies to the entire power sector is estimated to be around USD 160 billion. There is evidently not nearly enough headroom at these traditional sources of finance to fund India's 2030 targets by themselves. In other emerging markets, the financial sectors are likely to be even smaller and even less able to service the ambitions and infrastructure that low-carbon sustainable development pathways might entail.

2.2 Financing of financially underserved technologies

In contrast to commercially viable technologies, financially underserved segments are not characterized by large-scale deployments. These technologies have not succeeded in attracting the initial large-scale flow of finance, which is generally a reflection of the lack of attractive returns or elevated risk perceptions. This could be the result of the absence of supportive policy and regulation. For example, Indonesia's utility-scale solar capacity stood at 154 MW at the end of 2020, which is considerably lower than the country's targeted deployment of 4.7 GW over the following decade (Kurniawan and Tumiwa, 2021; Perusahaan Listrik Negara, 2021). This largely stems from the limited tendering of capacity and an unattractive tariff regime that made investments in most parts of the country unviable in the past (Dutt et al., 2019). With supportive policies put in place, the inherent competitiveness of the technology could result in the rapid scaling up of deployment.

Limited deployment could also stem from limited track records of technology performance for specific applications or the absence of well-established business models. Examples of such applications include the productive-use applications of distributed renewable energy (DRE) (e.g. solar-powered textile mills, flour mills, cold storage) and rooftop solar. In rural India, the estimated market size for using DRE in income-generating applications is USD 53 billion, whereas in sub-Saharan Africa, USD 11.3 billion could support solar-based irrigation, cooling and crop processing in 12 million farms (Jain et al., 2021). The small scale of assets and the absence of an extensive track record make debt financiers wary of DRE-powered productive livelihood applications. In the case of rooftop solar, perceptions of poor creditworthiness of small residential or industrial consumers have limited penetration to large industries. The de-risking of such investment opportunities is essential in order to kick-start the flow of finance at scale and, in many cases, bring the energy transition closer to poor and vulnerable communities.



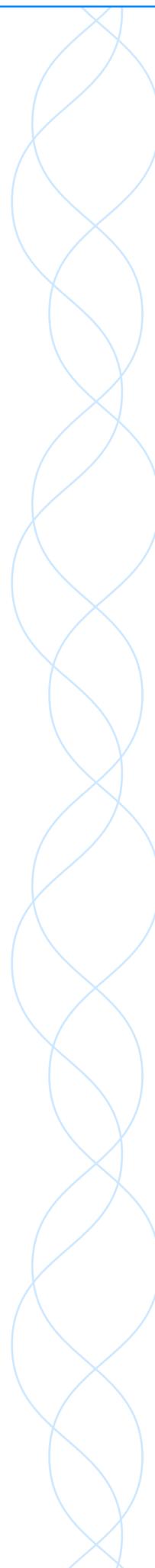


Looking beyond environmentally aligned investments towards wider sustainability-linked investment opportunities yields a familiar story. The investment gap between business-as-usual scenarios and the capital investment needed for the attainment of sustainable development goals (SDGs) in developing countries was estimated to total USD 2.5 trillion per year in 2014 (United Nations Conference on Trade and Development, 2021). In a subsequent evaluation, the gap was still found to be considerable. For example, the investment gap for infrastructure related to water, sanitation, transportation, energy, irrigation and flood protection is expected to range between 2% and 8% of GDP by 2030, depending on policy choices made by individual countries (United Nations, 2019). These investment gaps also need to be bridged for sustainable development.

3. Why do developing countries need support for increasing sustainable investment flows?

It is pertinent to point out here that the end use of investment in what qualifies as clean, green or sustainable technologies manifests most often in the form of finance for physical infrastructure. And physical infrastructure is typically majority debt financed via the extension of credit. For example, solar and wind projects in India are financed by debt to the tune of 75%. Equity only makes up the balance of 25% (Dutt et al., 2020). Extension of credit is, in turn, one of the primary roles of the financial sector. Indeed, the World Bank defines the financial sector as the 'set of institutions, instruments, markets, as well as the legal and regulatory framework that permit transactions to be made by extending credit' (World Bank, 2021a). At the same time, it also highlights important benefits that accrue with financial sector development. These include (a) economic development; (b) reduction in poverty and inequality; and (c) growth of small and medium enterprises.

As such, evolved financial sectors are not just important for general economic development. They are also essential for investments in the technologies of today, which can ensure that development proceeds in an environmentally conscious and sustainable manner. It is here that developing economies face a fundamental challenge. Their financial sectors are either not large enough or not evolved enough, and in many instances, both. The World Bank, which tracks domestic credit to the private sector, also compares it to the GDP of respective countries. Figure 1 below depicts this comparison, with countries grouped by the World Bank according to income levels (World Bank, 2021b). The implications are clear. The lower the income level, the greater the disadvantage when it comes to mobilizing much needed credit for investment.



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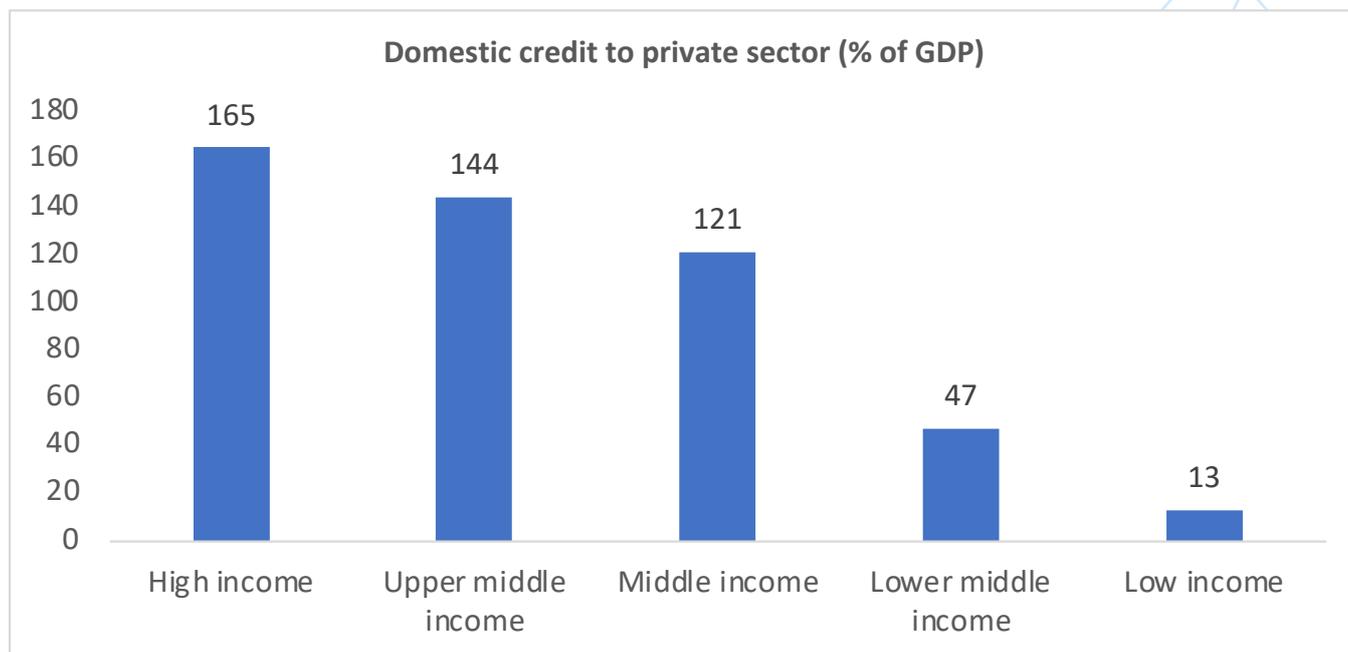


Figure 1: Developing countries are disadvantaged in mobilizing investments for sustainability

Source: CEEW compilation based on data sourced from World Bank (2021b)

Moreover, not only are the domestic financial systems of developing countries inadequate relative to the scale of the investment requirement, they are usually not well equipped to catalyze investment flows in financially underserved segments. Such segments require patient capital, typically drawn from public sources, to underwrite a portion of the investment risks and thereby crowd in private capital. Such interventions can help generate an initial track record of investments, which can provide risk–return guidance for future capital flows and facilitate the creation of self-sustaining markets.

Given the weaker state of public finances in developing countries relative to their developed counterparts, as well as competing developmental uses of public capital, developing countries have limited capacity to deploy public capital in a catalytic manner. The disruption caused by Covid-19 has further stretched public finances in developing countries. Furthermore, the institutional arrangements for the delivery of catalytic capital are often missing in domestic financial systems. Catalytic finance facilities, such as green banks or other dedicated institutions/mechanisms for advancing capital to financially underserved low-carbon technologies, are present in only a few large emerging economies (Table 1).


Table 1: Catalytic low-carbon finance facilities in emerging economies

Country	Host institution	Name	Size	Funding
India	Indian Renewable Energy Development Agency (IREDA)	Green Window	USD 100 million	USD 20 million from IREDA, USD 80 million to be sourced from other agencies
South Africa	Development Bank of Southern Africa (DBSA)	Climate Finance Facility	USD 110 million	USD 55 million from DBSA, USD 55 million from the Green Climate Fund
Malaysia	GreenTech Malaysia and Credit Guarantee Corporation Malaysia (CGC)	Green Technology Financing Scheme 2.0	USD 475 million ^a	Government of Malaysia, Bank Negara Malaysia, CGC

^a This factors in a USD to Malaysian Ringgit exchange rate of 4.21.

Source: Press Information Bureau, Government of India (2019); Green Bank Network (2019); Green Tech Malaysia (2021).

Besides dedicated institutions, while most domestic infrastructure finance institutions in developing countries do have allocations to environmentally sustainable projects, these are generally marginal in their overall portfolios. Further, concessional capital necessary for catalyzing private sector financing is largely missing.

4. Addressing financing constraints of developing countries

A combination of market instruments and regulation could alleviate the financing constraints that hamper the flow of capital to developing countries.

4.1 Catalytic finance

As many developing countries by themselves do not possess the wherewithal to de-risk financially underserved investment opportunities, the pooling together of risks across countries and their de-risking through a common fund represents one possible solution. Such a process benefits from scale and the diversification of risks. However, there appears to be a fundamental lack of appreciation of the importance of de-risking investments in developing countries. For example, out of 26 international initiatives on clean energy finance initiated between 2011 and 2021, only nine initiatives seek to address investment risks – of which only five include initiatives that provide funding (Ghosh & Harihar, 2021). Thus, there remains a critical need for finance initiatives that tackle investment risks in developing countries. Proposals such as those for a Global Clean Investment Risk Mitigation Mechanism (GCI-RMM) could address this gap. The GCI-RMM is envisioned to operate on the principle of risk pooling across projects and across countries. Its design could achieve further reductions in the cost of de-risking (Ghosh & Harihar, 2021) as described below.

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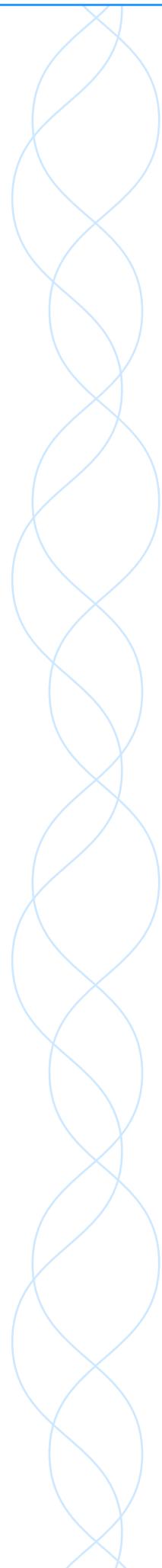
1. The GCI-RMM would reduce transaction costs by facilitating access to non-project risk-management tools.
2. It would coordinate with financial institutions to optimize the available de-risking products.
3. Its implementation could boost overall volumes in risk markets, translating into increased liquidity and offering insurance providers more diversified portfolios that lower de-risking costs.
4. The higher volumes achieved could stimulate learning effects that set the stage for greater financial innovation in the future.

Another example of a catalytic intervention addresses the very specific challenge highlighted earlier in this paper. That challenge is the lack of evident headroom within the Indian banking and non-banking financial sectors to fund India's 2030 renewable energy targets by themselves. To be sure, international debt capital markets have stepped up and mobilized significant amounts of capital. For example, a recent study by CEEW found that more funds had been raised by Indian renewable energy developers via the international green bond markets in the first six months of 2021 (USD 3.5 billion) than in any previous full calendar year (Garg et al., 2021). However, even such robust capital flows are insufficient. So how can catalytic finance help plug the gap? An intervention that allows Indian renewable energy developers to access the domestic bond market at greater scale could open up a much needed, and hitherto relatively untapped, source of capital. A report by CEEW has proposed exactly such a catalytic intervention, sized to double India's utility-scale solar capacity, with a capital mobilization multiplier effect of 16x (Singh et al., 2020).

4.2 Financial and fiscal regulation

The Glasgow Financial Alliance for Net Zero, a group of 450 banks and institutional investors commanding USD 130 trillion in assets under management, declared its intention to align financing with net-zero by 2050 at COP26 (Glasgow Financial Alliance for Net Zero, 2021). However, the nominal availability of this capital does not necessarily translate into flows to developing countries without a pipeline of bankable assets into which this capital may flow.

Private sector investments in low-carbon technologies in developing countries have thus far largely been shaped by sectoral policies and regulations, which are geared towards reducing investment risks. Financial and fiscal regulation offer other routes to complement sectoral regulation in directing capital flows towards sustainability. Taxonomies and corporate sustainability disclosures can facilitate the identification of credible investment opportunities. By doing so, such regulations enable the linking of international capital flows with investment opportunities in developing countries. In addition, the pricing of negative externalities and sustainability-linked credit ratings can help enhance the attractiveness of sustainable assets from the perspective of investors. While these measures facilitate the creation of a supply of credible sustainable investment opportunities, sustainability-linked lending and investment mandates for lenders and institutional investors could play a complementary role.





Taxonomy of sustainable activities

A taxonomy of sustainable activities is a classification system with specific performance thresholds, which establishes a list of sustainable activities. It provides a common set of definitions of what constitutes a sustainable activity, in other words, the criteria an economic activity must meet to qualify as contributing to a country's sustainability priorities. By clearly specifying what qualifies as sustainable, a taxonomy can address concerns associated with greenwashing and thereby support the linking of international capital with a credible pipeline of projects. Such regulation boosts investor confidence in investment opportunities in developing countries.

While the European Union's taxonomy was the first major taxonomic framework to be implemented, taxonomies are at various stages of development in developing countries such as China, Malaysia, South Africa and India. Given the socio-economic contexts of developing countries, these could consider weaving relevant socio-economic criteria besides environmental standards into taxonomy development in order to facilitate a just transition to a low-carbon economy.

Corporate sustainability disclosures

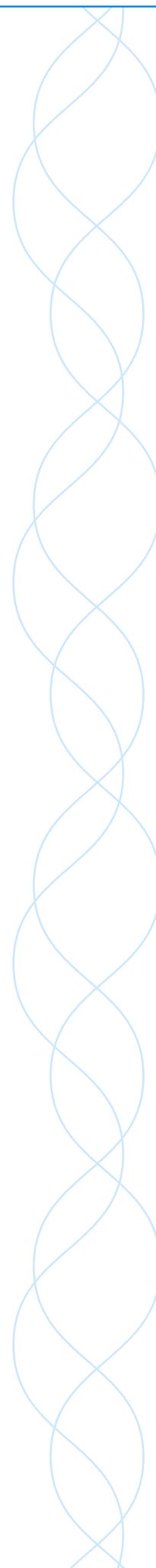
While taxonomies facilitate due diligence for sustainability investors at the activity or asset level, corporate climate-related disclosures can do so for investments at the corporate level. Such disclosures may incorporate two basic dimensions – the impact of businesses on the climate and the impact of climate change on businesses (European Commission, 2021a). Disclosure requirements could also extend to broader environmental, social and governance (ESG) related factors instead of merely focusing on climate disclosures.

Sustainability reporting requirements around the world vary between jurisdictions in terms of their coverage as well as their enforceability. For example, the European Union's guidelines for corporate climate-related reporting are not legally binding, whereas India's Business Responsibility and Sustainability Reporting guidelines will be mandatory from 2023 onwards for the top 1000 listed companies in terms of market capitalization (European Commission, 2021b; Securities and Exchange Board of India, 2021). In Indonesia, ESG reporting is mandatory for banks (since 2019) and listed companies since 2020 (International Finance Corporation, 2021).

Besides climate-related disclosure requirements for the corporate sector, some jurisdictions also have separate sustainability reporting requirements for the financial services sector (European Commission, 2021c). While financial institutions have a limited impact on sustainability through their direct operations, their lending and investment practices have a considerable impact on the sustainability of economy-wide activities. Central banks and financial supervisors in developing country jurisdictions will have a key role to play in framing the contours of such regulation.

Pricing externalities

Besides facilitating the identification of credible investment opportunities, regulation can also help direct capital flows towards sustainability by explicitly penalizing the negative externalities associated with unsustainable economic activities. Carbon pricing initiatives are existing examples of regulation that could be made more prominent, though regulations should tackle other key environmental and social



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priorities as well. Further, mandates to explicitly penalize these externalities in credit ratings could also help accelerate the pace of sustainable capital flows.

Carbon pricing initiatives: Carbon pricing initiatives are policy instruments that disincentivize high-carbon-emission activities by ascribing a cost to the negative externalities of greenhouse gas emissions and linking them to their sources. These commonly take the form of cap-and-trade schemes, in which emitters pay to emit above certain thresholds, or in the form of explicit carbon taxes.

COP26 was notable for large developing countries such as India, Vietnam and Nigeria announcing their intention to pursue net-zero targets. These announcements add to net-zero commitments already made by several other large developing countries such as China, Brazil and Indonesia in the year leading up to COP26. Net-zero commitments entail greatly accelerated decarbonization. These would inevitably entail the introduction of some form of carbon pricing. Ahead of COP26, Indonesia finalized regulation that paves the way for a cap-and-trade carbon emissions trading mechanism (Reuters, 2021a). This follows a recently announced measure on carbon tax on coal-fired power plants (Reuters, 2021b). Such announcements by a heavily fossil fuel-dependent economy such as Indonesia are a sign that carbon pricing could become increasingly common globally. Some developing countries such as China, South Africa and Colombia already have carbon pricing initiatives in place (Dutt, 2021).

While carbon pricing initiatives penalize greenhouse gas emissions, in order to holistically promote sustainability, financial and fiscal regulations should be broadened to safeguard other environmental priorities such as biodiversity conservation, land degradation, blue economy etc. At the same time, these must also be consistent with a just transition. These remain areas that fiscal and financial regulation must also subsume.

Sustainability-linked credit ratings: A credit rating represents a rating agency's opinion on the likelihood of the rated debt obligation being repaid in full and on time (Crisil, 2019). However, such definitions of credit ratings do not necessarily reflect the fact that environmental and social factors are increasingly having a material impact on the business prospects and thereby the creditworthiness of companies. In cases where these are not explicitly factored into credit ratings ascribed to companies' capital-raising activities, they will not influence their cost of borrowing. Regulations that mandate pricing environmental and social factors into credit ratings, complemented by a standardized framework for this purpose, could hasten the shift of capital flows towards sustainability. Such regulation would elevate the cost of borrowing for unsustainable activities (on either environmental or social grounds), thereby increasing the relative attractiveness of sustainable activities.

Sustainability-linked lending and investment mandates

As indicated earlier in this section, private sector financial institutions are looking to systematically invest in low-carbon investment opportunities. While such an organic shift in capital allocation priorities is welcome, regulators can accelerate the shift towards sustainability. Mandates for a minimum allocation of lending portfolios of banks and non-bank financial institutions to SDG-compliant activities, as well as for institutional investors such as pension, insurance and mutual funds to invest a minimum portion of their portfolios in sustainable assets, could be considered by financial regulators.





5. Role of multilateralism in accelerating capital flows to developing countries

Multilateralism will also have a critical role to play in scaling up investment flows towards the technologies of today in developing countries. Emerging multilateral platforms and processes should not only bolster the capacity of catalytic finance interventions, but also create enabling environments that maximize the effectiveness of financial and fiscal interventions that aim to direct capital towards sustainability.

5.1 Bolstering catalytic finance capabilities

Climate finance support provided to developing countries under the UNFCCC could become a means to considerably enhance catalytic finance capabilities. By de-risking investment opportunities for private capital, catalytic finance would, in turn, maximize the impact of climate finance support by mobilizing many multiples in private sector investments as compared to finance mobilization through direct lending. In order to do so, concessional finance support must be considerably ramped up from current levels. Grant finance totalled USD 16.7 billion, accounting for only 27% of public climate finance support in the latest reported figures (UK COP26, 2021). While deliberations on a new collective quantified goal for climate finance beyond the USD 100 billion annual target were initiated at COP26 (United Nations Framework Convention on Climate Change, 2021c), it is essential that future climate finance commitments encompass substantially enhanced grant finance support directed towards capitalizing catalytic instruments. Besides climate-aligned investments, international public capital to bridge the investment gap towards the attainment of SDGs also needs to be mobilized.

5.2 International harmonization of financial regulation

While the financial and fiscal regulations discussed in section 4.2 could be key enablers of cross-border sustainable finance flows, it is essential that the regimes in various developing countries are mappable to international standards. In the absence of international harmonization of such standards, these could hinder rather than accelerate capital flows. Therefore, central banks and financial supervisors in developing country jurisdictions must engage with their counterparts on multilateral forums during the development of regulation to ensure international harmonization.

Various platforms exist to facilitate coherence in the adoption of sustainability in financial regulation.

- The International Platform on Sustainable Finance offers a multilateral platform for dialogue between policymakers and regulators for the development of sustainable finance regulation, with membership comprising countries representing 55% of both GDP and greenhouse gas emissions (as of November 2021) (European Commission, 2021d).
- The Network of Central Banks and Supervisors for Greening the Financial System connects 102 central banks and regulators on matters of climate risk management (as of November 2021) (Network of Central Banks and Supervisors for Greening the Financial System, 2021).



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- The Taskforce on Climate-related Financial Disclosures, constituted by the G20's Financial Stability Board, offers recommendations on climate-related disclosures (Taskforce on Climate-related Financial Disclosures, 2021).

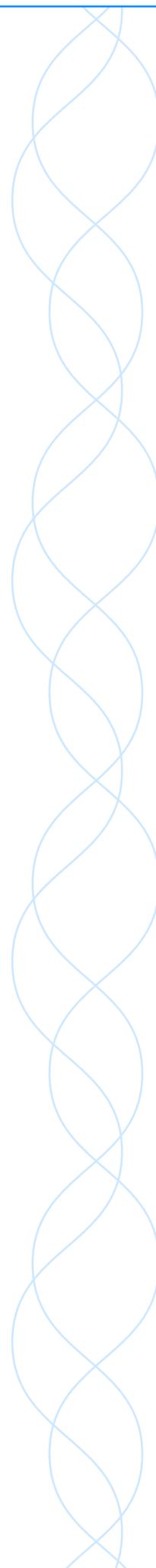
In order to be effective, emerging sustainable finance forums must learn from the experience of mainstream multilateral finance processes that have been criticized for under-representation of developing country interests. Given that developing countries will be the major destinations of sustainable investments, in order to be truly effective sustainable finance platforms must include developing countries as equal partners in shaping the global sustainable finance architecture.

5.3 Enabling carbon pricing mechanisms

Besides financial regulation, multilateralism could also be an enabler of carbon pricing mechanisms in developing countries. International carbon offsets have played a key role in several carbon pricing initiatives. Among developing countries, obligated entities are permitted to use certified emission reductions for meeting a part of their obligations under the South African and Colombian carbon tax regimes (Dutt, 2021). The finalization of the implementation guidelines of Article 6 of the Paris Agreement at COP26 could enable the trading of credits both bilaterally under Article 6.2 and through a centralized market mechanism under Article 6.4. These could facilitate the setting up of more carbon pricing initiatives going forward in developing countries.

6. Conclusion

Environmentally sustainable economic development is not the impossibility that many believe it to be. Technologies that can ensure it happens are not futuristic. They already exist to a large extent today. However, countries most in need of economic development also happen to be those that face the biggest challenges in mobilizing capital for investment in such technologies. A holistic and calibrated approach which addresses this challenge from multiple perspectives can significantly bridge the gap between the present and the desired future. Doing so essentially requires policy and multilateralism to work in tandem to ensure that capital flows to where it is needed the most. The environment is not the problem of any one country, and signs are that the international community has, by and large, come to acknowledge it as such. It just needs to match that acknowledgement with action now.





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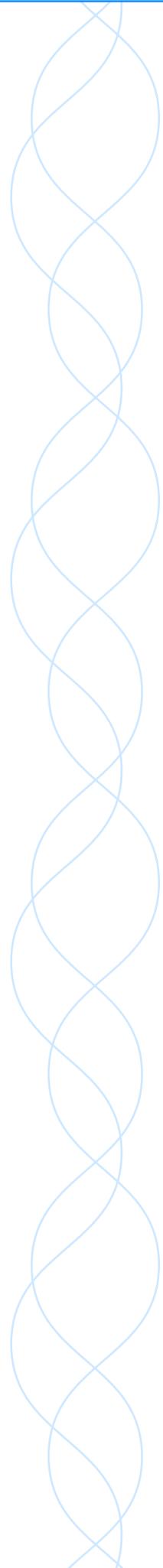
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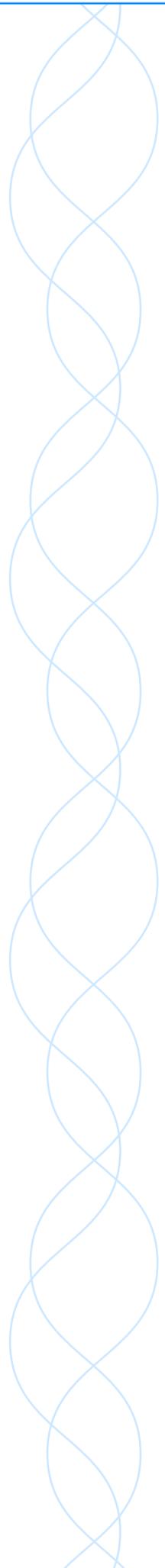
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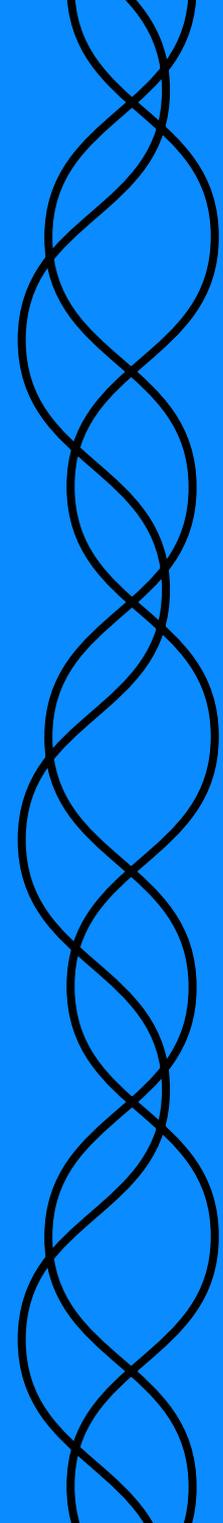
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