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Greening National Development Banks: Institutional Design for Climate Finance Leadership

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NRDC
NATURAL RESOURCES DEFENSE COUNCIL

NOVEMBER 2026
R: 26-10-B

Acknowledgments

An earlier draft of this paper was presented at the High-Level Roundtable on Green and Greening Development Banks during London Climate Action Week on June 23, 2026. The authors are deeply grateful to Doug Sims for his extensive contributions to the development of the paper; to professor José Antonio Ocampo, professor Ulrich Volz, Joe Thwaites, and Sara Dougherty for their thoughtful review and comments; and to the participants in the Roundtable for their valuable feedback.

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Executive Summary

National development banks (NDBs) have played a pivotal economic role across countries, supporting socioeconomic development goals mainly through catalyzing long-term finance. This role has always been tied to the specific needs of each country's development strategy. As the climate crisis becomes more acute and moves to the center of economic policy debates and policymaking, an increasing number of NDBs have incorporated strategies to help finance investment and catalyze market creation in the transition to a resilient, net-zero economy.

This paper examines the institutional design of NDBs and how such design should be adapted to best support green development goals. Specifically, it looks at how four key design variables—mandate, governance, instruments, and funding structure—should be configured, and where necessary adapted, to support this transformation. These variables are not independent; their effectiveness depends on how well they interact with and reinforce one another and how well they work within the broader economic and institutional context in which each NDB operates.

There are many important commonalities and shared institutional design features across "green" NDBs. However, appropriate institutional design needs to take account of contextual dimensions that vary across countries in their pursuit of green transition strategies, such as the size and level of development of the economy, domestic financial and capital-market conditions, the productive and technological features of the transition, and the broader public institutional ecosystem.

Mandate—the first design variable examined—functions not only as an operational directive but also as an accountability mechanism, evolving over time in response to shifting developmental priorities. Drawing on the literature's discussion of what a good mandate looks like, this paper shows how NDBs have increasingly embedded climate (and broader sustainability) commitments into their formal remits—though unevenly: By 2025, less than half of more than 170 public development banks had committed to Paris Agreement alignment. Further, while "alignment" may reflect better incorporation of climate considerations in an NDB's operation, it may not always reflect the organizational transformation necessary to lead a domestic economy in the green transition.

Governance, the second design variable, determines how effectively a national development bank can pursue developmental goals. Four dimensions matter most: internal organizational structures that embed climate considerations across decision-making rather than confine them to a separate unit; accountability and reporting frameworks aligned with recognized disclosure standards; strategy and pipeline development, since the shortage of bankable projects, not capital, is often an important binding constraint; and climate risk management integrated into core portfolio assessment.

As the design of financial instruments and products cannot be considered in isolation from the risk environment in which they operate, this paper examines how loans, guarantees, equity, and more complex financial products should be analyzed in the context of climate-related financial risks. It shows that the choice among instruments reflects a fundamental trade-off between policy steer and leverage. These dynamics are illustrated through country examples including the role of German development bank KfW and China Development Bank in scaling solar energy and electric vehicles respectively, Corporación Financiera de Desarrollo's internal green governance in Peru; Korea Development Bankgreen bond program; and Development Bank of South Africa's blended first-loss facility for renewable energy in South Africa.

Finally, the funding structure, understood as the full framework of financial resources available to the institution that enables it to operate, determines both the scale and the type of risk an institution can bear. The paper distinguishes loss-absorbing capital from repayable funding sources and discusses domestic and international options, including fiscal capitalization, dedicated revenues, domestic savings mobilization, and international debt and equity. Sufficient paid-in capital supports sufficient scale of operation and green transition impact. Green investments are particularly up-front-capital intensive, making the high cost of capital facing most emerging markets and developing economies an especially binding constraint. Addressing it requires, among other measures, sustained efforts to strengthen domestic financial resource mobilization, without which this cost-of-capital problem is unlikely to be resolved.

Taken together, the analysis yields three conclusions. First, common features cut across all institutions, with even more commonalities among banks in similar economic and market conditions. Experience, know-how, and exchange are often relevant across institutions, regardless of country circumstances. Second, the traditional tools of development banking—patient capital, risk tolerance, long-horizon public finance—are well suited to this task. What is needed is not reinvention but adaptation: patience in instrument design, but urgency in the pace and ambition of deployment and a focus on lessons learned about how banks have been effective at catalyzing new markets and private investment. Finally, the four design variables are not independent, and their relationship is circular rather than sequential: Good governance reinforces mandate credibility and improves instrument effectiveness, while a clear mandate and well-designed instruments give governance structures the operational content they need to function. Sufficient loss-absorbing capital and repayable funding sources make mandates, governance, and instruments more effective. This circularity is perhaps the central lesson: All four variables must be designed together, not in isolation, and all four should remain dynamic as the green transformation itself evolves.

Introduction: The Role of National Development Banks—A Historical Overview

There are more than 500 publicly owned or controlled national development banks (NDBs) across more than 150 countries, collectively representing 10 percent of annual financing as a percentage of total global investment, though this aggregate is driven in significant part by China's national development banks.[1] NDBs are public financial institutions created to support national development objectives, especially by providing long-term finance, by addressing market gaps, and by helping channel investment toward public priorities. In some economies, subnational development banks also play similar roles at the regional or state level. NDBs have a pivotal economic role in both developed and developing countries, and since the 2008 financial crisis, recognition of their central role in financing investment in equitable development and the green transition has grown.[2] As the climate crisis becomes more acute, these functions can support the urgent need for long-term green structural transformation by helping shape the pace and direction of public and private climate investment, thereby also addressing the persistent gap between climate investment needs and current levels.

Recent years have seen the creation of many new NDBs as well as expansion of existing ones. The international recognition of NDBs as main pillars of the new development finance architecture was highlighted, for example, in the 2025 U.N. Fourth Financing for Development International Conference and Commitment in Seville, the 2026 FiCS G7 Special Event in Paris, and the 2025 G20 Sustainable Finance Working Group meeting in George, South Africa.

Historically, NDBs have pursued various developmental goals, mainly through catalyzing long-term finance. These goals include: 1) funding, directly or through catalyzing private finance, investment to support innovation and structural transformation inherent to dynamic and sustainable economic growth; 2) providing counter-cyclical finance; 3) enhancing financial inclusion; 4) supporting the financing of infrastructure; 5) supporting the provision of public goods, particularly combating climate change, and more broadly promoting environmental sustainability and green growth; and 6) helping develop missing financial markets (e.g., local currency bonds).[3]

Due to their quintessential link to the development strategies of countries and regions, the roles of NDBs have changed over time and across countries (e.g., in postwar reconstruction, import-substitution industrialization, and the response to the 2008 financial crisis).

As the climate crisis has become more acute, it has moved toward the center of economic policy debates and measures. It therefore is now clear that NDBs must play a central role in financing the "green transition" to a resilient, net-zero-emissions economy, given the extent of structural transformation necessary and the large gap between investment needs and committed finance to create such an economy. This is not incidental: NDBs' mandate to support long-term structural change makes them uniquely positioned to mobilize the scale

and type of finance that markets will not provide on their own, by delivering public finance and by catalyzing additional private finance and helping channel it toward investment in low-carbon activities.

Indeed, NDBs, by funding investment in the green transition, can help overcome several market failures. Some market failures are intrinsic to private financial markets, causing socially suboptimal private investment in key sectors. Examples include asymmetries of information and moral hazard, or various factors that prevent investment in low-income or otherwise marginalized communities.[4] Some are failures specific to the green transition, especially uncertainty for developing and introducing innovative technologies, or introducing new technologies and their commercialization in emerging and developing economies.

Thus NDBs can play a key role in "market creation" in the sense of kick-starting new investment in markets in which there is limited private sector investment, by providing initial financing from its own balance sheet. This can demonstrate the commercial viability of the underlying financed activity and catalyze subsequent private investment once private investors see these activities are profitable and low risk. This is illustrated by the role that KfW played in pioneering investment in solar energy, which was followed by private investment in Germany.[5] Later, the China Development Bank (CDB) provided initial public finance for solar panels, followed by Chinese private investment that led to a significant reduction in the cost of solar panel manufacturing. Here, public development banks often go beyond correcting market failures, creating new markets where none have existed.[6]

In addition to mobilizing private investment through their financing activities, NDBs can leverage public funds and catalyze significant amounts of private finance by raising capital. Raising funds on the debt capital market, or even attracting equity investment through financing vehicles or funds, can enable NDBs to increase their impact by channelling these private capital sources to high-priority activities for sustainable development.

This paper examines how the main institutional design variables of NDBs—mandate, governance, instruments, and funding structure—should be configured, and where necessary adapted, to best support a green structural transformation. These four variables are not independent; as the analysis will show, mandate, governance, instruments, and funding structure interact and reinforce one another, and their effectiveness depends on how well they are aligned with one another and with the broader economic and institutional context in which each NDB operates.

While there are commonalities among institutions, there is no one-size-fits-all solution for institutional design. The effectiveness of any NDB's institutional design is influenced by the size and level of development of the country, by the depth and features of its domestic financial system, and by the productive structure of the economy—and these vary significantly across countries. Understanding these structural features is therefore necessary before designing or transforming an NDB for the green transition in a particular country.

National Development Banks and Sustainable Structural Change: Understanding the Local Context for a Green Transition

Defining how NDBs should be modified or designed to support a green transition requires first mapping what that transition looks like in practice. This, in turn, depends on each country's economic structure, financial system, and institutional environment. There are many common features of all development and green banks, and therefore they can learn much from one another. However, the appropriate institutional design is also influenced by a set of contextual dimensions that vary across countries and that must be understood before mandate, governance, instruments, and funding structure can be configured.

1. **Size and level of development of the country:** The scale of the economy and structural features of its productive base shape what an NDB can do and how it should do it. A large middle-income economy with diversified productive sectors presents opportunities for green development banking that are different from those of a small, low-income country, and the institutional design of the NDB should reflect those differences.
2. **Financial and capital market conditions:** NDBs operate within their domestic financial systems; the scope and effectiveness of any intervention, including instruments used, will be shaped by the depth, structure, and gaps of the national capital market and commercial credit ecosystem. When capital markets are underdeveloped and small, NDBs can play an important role in developing them, as happened, for example, in the case of China. An important distinction is whether NDBs mainly fund themselves nationally, e.g., via bonds and/or domestic public resources, or rely heavily on foreign, usually public resources such as multilateral development banks (MDBs) or vertical climate funds. MDBs are often important for NDBs in poorer countries.
3. **Productive and technological dimensions of the green transition:** The green transition is, at its core, a profound transformation of productive structures that differs across countries and sectors. GHG-emitting capital assets and land uses must be replaced by zero-emission alternatives. The commercial maturity of specific technologies in a given economy is a key factor, as diffusion rates for low- or zero-emission technology will differ widely across markets, sectors, and demographics. A clean energy technology, for example, may be widely available, fully commercialized, and readily financeable in one economy and "unproven" or otherwise perceived as risky and novel in another.
4. **The broader public institutional ecosystem:** The role of other public agencies in shaping the conditions under which NDBs operate must be considered. Besides mobilizing capital for the green transition, NDBs also can play an important role as policy coordinators to amplify the effectiveness of a country's strategic sustainability plans, as well as help shape and design green development policy.[7] Present attention in climate policy circles to country platforms as a mechanism for national climate ambition through investment may obscure the need for a coordinating public financial institution to enable it.[8] However, Brazil's platform, often lauded as a model example, has relied significantly on the coordinating role of BNDES, Brazil's NDB.[9]

National Development Banks and the Green Transition: Institutional Design in Practice

This section offers a systematic characterization of each institutional design component—mandate, governance, instruments, and funding structure—in general and as each relates to green objectives. For each component, and especially for instruments, we will provide illustrative country examples.

Mandate

The mandate of a public development bank is defined as a formal delegation of developmental goals from the state to a financial institution, establishing those goals as the core of its business activity.[10] An explicit legal mandate—typically established in founding legislation—is normally related to pursuing developmental objectives at the national, regional, or sectorial level, regardless of whether the institution is fully state-owned.

The mandate functions not only as an operational directive but also as an accountability mechanism: It defines what the institution is for, against which its performance can be evaluated and its autonomy justified.

A 2017 World Bank survey of NDBs distinguished between two types of mandate: narrow and broad.[11] Narrow mandates usually define the sectors or activities that a development bank is expected to support, whereas

broad mandates are formulated in more general terms, without reference to specific sectors or beneficiaries.[12] In addressing a wide range of climate and clean energy–related challenges, Australia's Clean Energy Finance Corporation (CEFC) illustrates how it is possible to deal creatively with the potential dilemma of balancing focus and breadth by setting up ring-fenced funds with narrower mandates within a broad, institution-wide climate remit.[13]

Xu, Wang, and Ru identify seven types of mandates: development (effectively, the "broad mandate" of the World Bank's 2018 classification) and more narrow, sectorial mandates, including infrastructure, small business investment and employment, promotion of exports and foreign trade, rural and agricultural development, social housing, and decentralization and local governments.[14] Xu, Wang, and Ru, notably, do not include a climate-focused mandate in their taxonomy, which the authors of this paper would and do add (as discussed above and below).

Mandate, scope, and focus tend to vary systematically between developed and developing countries and evolve over time in response to shifting developmental priorities. The Korea Development Bank (KDB) is a clear example here: Its mandate shifted from postwar reconstruction and heavy industry promotion in the 1950s–'70s toward technology upgrading and, more recently, green transition support.[15]

The literature offers different views on what a good mandate looks like. Gutierrez and Kliatskova argue that mandates should be closely aligned with the economic rationale behind the creation of the institution (particularly market failures and coordination problems) so that development banks avoid crowding out private sector activity or deploying public resources inefficiently.[16] They further argue that financial sustainability (an expectation that the bank will at least break even or even have some profits that can be reinvested, thus facilitating higher future financing) should be embedded in the mandate to set the right institutional incentives. Xu, Wang, and Ru complement this by arguing that mandates must be oriented toward fulfilling public policy through active development financing—that is, going beyond a passive or reactive role to proactively shape market conditions in line with developmental goals—a view with which the authors of this paper agree.[17]

As climate mitigation and adaptation, as well as environmental objectives, have moved to the center of global development debates, public development banks have increasingly incorporated sustainability commitments into their formal mandates. Green industrial policy frameworks have explicitly recognized and emphasized the role of public development banks in supporting the green transition.[18] Furthermore, some important development banks, such as the European Investment Bank (EIB), have explicitly introduced specific green mandates and concrete targets for low-carbon lending; thus, for example, the EIB made a commitment, in the context of the EU Green New Deal, that by 2025 50 percent of its total lending would go to climate change–related activities, including both mitigation and adaptation. In fact, this target was actually surpassed. It further committed to aligning its remaining operations with the Paris Agreement, for example by forbidding financing investment in fossil fuel extraction.[19]

Yet the pace of this shift toward climate alignment has been uneven. According to the Climate Policy Initiative (CPI), only 28 percent of more than 170 public development banks had committed to aligning their operations with the Paris Agreement five years after its signing; by 2025—a decade on—that share had risen to 45[20] percent.[21] While the trend is clear, most institutions have yet to formalize this commitment. Further, while "alignment" may reflect better incorporation of climate considerations in an NDB's operations, it may not always reflect the organizational transformation necessary to lead a domestic economy in the green transition.

Nevertheless, recent evidence suggests that even these high-level commitments carry real economic consequences. Hu et al. find that when commercial banks adopt sustainability commitments, their borrowing firms significantly increase green innovation activity.[22] The effect is stronger among more financially constrained firms, lower-technology firms, firms with weaker corporate environmental management, and firms operating under less stringent government environmental regulation. The example mentioned above of the EIB shows how giving it a green transition mandate had a clear impact on its performance in this regard.

Beyond their direct financing role, public development banks may also serve as coordinators of public–private efforts toward sustainability goals. Zhang identifies several coordination mechanisms: providing expertise and information to support the design of sustainable strategies; deploying public finance tools to address policy and, most importantly, market gaps; and offering a coherent set of financial instruments aligned with green national priorities.[23]

Governance

Governance is the second institutional design variable that determines how effectively an NDB can pursue developmental goals. While the mandate defines the scope and ambition of a societal commitment, and instruments provide the operational tool kit, governance determines whether that commitment is consistently translated into institutional behavior, risk management, and accountable deployment of public resources. In the context of green goals, governance carries additional weight: The dynamic and technically complex character of the green transition—involving rapidly evolving technologies, shifting regulatory frameworks, and new categories of financial risk—places demands on NDB governance structures that go beyond what conventional development banking requires.

Four dimensions of governance are particularly important for NDBs pursuing green goals: internal organizational structures, climate and environmental risk management, accountability and reporting frameworks, and strategy and pipeline development. It is worth noting from the outset that, as with mandate and instruments, there is no one-size-fits-all governance model: What is appropriate for a large, well-capitalized NDB operating in a well-developed financial system will differ substantially from what is feasible for a smaller institution in a lower-income country. There are, however, key common dimensions that governance arrangements should address. The following section identifies these dimensions, rather than prescribing a single institutional template.

Internal organizational structures

Translating a green mandate into operational practice requires that environmental and climate considerations be embedded in the bank's decision-making processes at every level, rather than confined to a separate sustainability unit with limited influence over core lending decisions. This implies at minimum the existence of dedicated internal structures staffed by personnel with relevant financial and technical expertise in climate, clean energy, resilience, and related sectors, as well as in climate impact measurement and management, and with sufficient authority and seniority to shape investment decisions. Dalhuijsen et al. document that leading NDBs have moved in this direction by establishing board-level oversight of climate and environmental commitments, integrating climate considerations into strategic planning processes, and developing internal capacity to assess and manage climate-related financial risks.[24] The Inter-American Development Bank's (IDB) guidebook for NDBs on climate risk further recommends that NDBs integrate climate risk considerations into their governance, strategy, and risk management frameworks as a precondition for fulfilling their development mandate in a climate-constrained world.[25]

Good and relevant professional capacity of staff is key in all functions of green banks, particularly in two dimensions: 1) scientific, engineering, and technical abilities to help develop and evaluate projects and, where necessary, provide technical assistance in project implementation and monitoring, and 2) financial capacities for assessing commercial viability and designing projects' financial structures. As regards the latter, simpler financial instruments and project structures tend to be more desirable and make risks more transparent.

For NDBs, these structures and capacities matter not only for internal coherence but also for external credibility and trust in the outcomes. Well-governed NDBs with a clear and stable green mandate are more likely to be integrated into national policy frameworks. They are also better positioned to be seen as a trusted partner and to attract co-financing from multilateral development banks, development finance institutions, international climate funds, and private investors.[26]

A useful illustration of how this internal organizational logic can operate in practice is provided by the Corporación Financiera de Desarrollo (COFIDE), Peru's NDB. COFIDE created an Eco Committee with members drawn from its administration, marketing, finance, information technology, operations, and business divisions, with the mandate to promote efficient environmental management and reduce the bank's corporate carbon footprint. The committee's role extended beyond internal environmental management: It positioned itself as a gateway for integrating greenhouse gas accounting into COFIDE's financial projects and investments, and it developed awareness and capacity-building campaigns among the bank's financial intermediary partners. This illustrates a broader principle: Internal green governance structures can become channels for knowledge transfer to the wider financial system through which the NDB works, particularly where NDBs operate on a second-tier basis and their developmental reach depends on the capacity of commercial intermediaries.[27]

Accountability and reporting frameworks

Green governance requires not only that the right decisions be made internally, but that they be made transparently and verifiably. This encompasses the adoption of green taxonomies to define what counts as eligible green activity, the requirement that funds raised through green financing instruments be allocated exclusively to predefined green projects and reported on transparently, and alignment with internationally recognized disclosure standards. Accountability to stakeholders is also a governance function: NDBs that can demonstrate credible, trustworthy, independently verified green impact are better positioned to build trust with policymakers and private investors and to access international climate finance, issue green bonds at favorable terms, and maintain the reputational standing that their public mandate requires.[28] The KDB Sustainable Financing Framework illustrates this logic: It requires external second-party opinion verification and annual allocation and impact reporting as conditions of its green bond program, embedding accountability obligations directly into the instrument governance structure.[29] More broadly, the growing adoption of Paris Agreement alignment frameworks and green taxonomies across NDBs reflects an understanding that governance credibility and trust are inseparable from the ambition and effectiveness of the green mandate itself.

These capabilities are more demanding than those needed for conventional development lending. Many NDBs, particularly in lower-income countries, have yet to develop them. Staff training, knowledge-sharing with peer institutions, and engagement with technical assistance facilities should be treated as strategic governance investments rather than overhead costs. Building these capabilities is a precondition for converting a well-designed mandate and a well-capitalized balance sheet into actual green investment on the ground.[30] Knowledge-sharing and technical assistance with peer institutions, within the country or internationally, further increase the NDB's impact.

Strategy and pipeline development

Effective green development banking requires two further institutional functions that governance arrangements must actively support: strategic targeting and pipeline development. Strategic targeting can be understood as an NDB's capacity to identify where its intervention adds the most value, including by contributing to the creation of new markets—identifying which sectors, technologies, or borrower types with significant sustainable development impact face financing barriers that the institution is well placed to address—and to revise those priorities as market conditions and national strategies evolve.[31] This demands active market intelligence, scientific and technological knowledge, and deliberate choices about institutional focus.

Pipeline development is the operational complement, and one of the most consistently underestimated constraints on green finance at scale. One of the main barriers to scaling green investment is not the availability of capital but the shortage of bankable investment opportunities. Pipeline development therefore belongs at the center of an NDB's institutional strategy: Building the business case, project preparation, and borrower engagement need to be as much a part of what a green development bank does as lending itself. This requires staff with specialized knowledge of green technologies and related financial expertise.

Climate and environmental risk management

As discussed below in the instruments section, climate change and biodiversity loss generate systemic financial risks. Effective green governance, therefore, requires that these risks be integrated into the NDB's risk management processes rather than treated as a separate environmental compliance exercise. The way NDBs originate and structure financing and manage or fail to manage climate-related risks influences their ability to fulfill their development mandate; failure to do so bears the additional risk of locking in carbon emissions and vulnerabilities in the broader financial system of the jurisdictions in which they operate.[32] In practice, this could mean incorporating climate scenario analysis and stress testing into portfolio assessment, developing methodologies to identify and measure physical and transition risk exposures, and assigning climate risk representation to investment committees so that risk considerations inform financing decisions in real time. This will also make NDBs financially more stable.

The KDB provides a concrete example of this trajectory: Its 2022 risk management framework incorporated a capital buffer for transition risk, calculated from stressed climate probability-of-default scenarios using Network for Greening the Financial System (NGFS) pathways, and its 2025 Sustainable Financing Framework adopted the Equator Principles as the highest standard for environmental and social risk management in project-related transactions.[33]

Finally, it is important to reiterate that the relationship between governance and the other institutional design variables is circular rather than sequential: Good governance reinforces mandate credibility and improves instrument effectiveness, while a clear mandate and well-designed instruments give governance structures the operational content they need to function. This circularity is perhaps the central lesson for NDB institutional design in the context of the green transition: Mandate, governance, instruments, and funding structure must be designed together, not in isolation.

Financial instruments and products

NDBs use four main repayable financial instruments or products to support investment: loans (concessional and non-concessional), guarantees, equity investments (including venture capital and private equity), and structured financing instruments.[34] (NDBs can also issue non-repayable financing in the form of grants or allocate internal capacity to technical assistance and capacity building, operating more akin to other mechanisms of public programming and expenditure but with relevant financial expertise.)

Loans

Loans are the primary financial instrument of all NDBs, and practically all NDBs worldwide provide them. Loans can be first tier (i.e., directly granted by the NDB), or second tier (i.e., channelled through on lending by other financial institutions, usually commercial banks, but also subnational development banks and others).

The choice between these two modalities carries important implications for policy steer and operational efficiency. First-tier lending is generally preferable for larger, more strategic projects where agency costs between the NDB and potential financial intermediaries are high, and where complex technical and financial evaluation demands direct institutional engagement. In these cases, direct lending allows the NDB to maintain closer oversight of project design and implementation and to exercise greater influence over the developmental direction of the investment. Second-tier lending, by contrast, is better suited to smaller-scale operations where technical and financial assessment is less complex and agency costs (i.e., the costs of monitoring borrower compliance) are correspondingly lower. By adopting a portfolio approach through financial intermediaries, NDBs can maximize the potential of local financial markets, multiplying the developmental reach of their resources beyond what direct lending alone would allow.[35] On the other hand, NDB influence over real-economy outcomes through second-tier lending can be more diffuse, indirect, and dependent on influence over its financial intermediaries.

Most NDB loans are provided on a non-concessional basis.[36] Concessionality of loans may be done by subsidizing either the principal or the interest payments. Subsidized credit is a particularly useful mechanism when there is insufficient return on an investment to attract private investors but positive social or

environmental externalities (e.g., positive effects on reducing carbon emissions). Given their direct nature, subsidized loans and grants can have strong policy steer and can be used to direct lending toward sustainable development impacts, with appropriate reporting and monitoring. Thus, subsidies can be used to stimulate investment in new markets or to encourage higher financial inclusion. Loan subsidies can also influence who benefits from a specific project: Enabling concessional finance channels investment to low-income households or poor regions and can ensure that the benefits of clean, resilient technologies reach marginalized or underserved communities. In new markets or sectors, such subsidies are meant to be temporary and can be withdrawn when new activities become competitive. Solar and wind energy provide good examples, as costs have been reduced significantly due to technological improvements and economies of scale.[37]

NDBs can also bear noncommercial levels of risk or incur deal-arranging transaction costs that can enable financing in market gaps. These can be valuable tools, especially since nearness to commercial debt pricing may better convince commercial lenders of a financial opportunity and thus be more effective at crowding in.

Guarantees

Guarantees are another primary financial instrument of NDBs. The general theoretical case for public guarantees (including those of NDBs) is based on Arrow and Lind, the seminal conceptual framework for understanding the role of the state in bearing risk when there is risk aversion.[38] Arrow and Lind show that when risk is spread in small amounts over large numbers of investors, capital can be priced at risk-neutral rates. This implies that the state's inter-temporal tax and borrowing capacity gives it a unique ability to spread risk across large populations. Therefore, development bank guarantees can help encourage private investment or lending in the face of high risk or high-risk aversion by private investors or lenders.

Overall, guarantees are particularly effective in contexts of high-risk aversion by private investors or lenders in response to idiosyncratic project or sectorial risks—whether real or perceived—where the public guarantee corrects an excessive private risk premium without displacing the private sector role. Guarantees may also play a countercyclical role in periods of generalized uncertainty (such as the 2008–2009 financial crisis or the COVID-19 pandemic), when private risk aversion rises sharply across the board. A third context is that of underdeveloped financial systems, where guarantees can temporarily crowd in private lending by reducing the perceived risk of engaging with new borrowers, sectors, or technologies, though the evidence suggests that this function remains underutilized in lower-income countries.[39] Finally, guarantees are well suited to situations where agency costs between the NDB and financial intermediaries are relatively low and technical uncertainty is manageable, but borrowers lack adequate collateral. This configuration is common in energy efficiency lending, green agriculture, and small-scale renewable energy projects, where the underlying project economics are sound but conventional collateral requirements cannot be met.

Equity

A third important instrument is equity. Unlike grants or subsidized loans, equity financing allows the NDB to capture the upside potential of the investments it supports—and it is precisely this that makes it distinctive. By taking an ownership stake, the NDB assumes greater risk, which requires higher provisioning against its capital, but has the advantage that if the company or project becomes very profitable, the NDB will obtain part of the profits, which it can use to cross-subsidize socially or environmentally desirable operations and/or increase the development bank's own capital, leading to future increased ability to carry out larger or more transactions. Equity thus simultaneously serves a financial role—aligning the NDB's returns with project success—and a developmental one, allowing significant policy steer toward innovation and sustainable development goals.

Where the objective is to support innovation and innovative business models, equity is typically the most appropriate instrument. While some projects seeking investment may ultimately fail, the gains from a few winners should compensate for the failures of the losers and may generate significant net profits. Private sector venture capital or growth equity may be insufficient to achieve a socially optimal level of investment, particularly in "hard technology" sectors where the scale of returns, even if positive and substantial, may not

align with commercial expectations. Equity is the third-most widely used NDB instrument overall, and its use is more prevalent in higher-income countries where capital markets are more developed and the institutional capacity to manage equity portfolios is greater.[40]

Equity is not the only instrument through which development banks can capture the upside of the investments they support. Debt instruments with equity kickers, implying that debt can be granted equity-like returns under certain conditions, offer an intermediate option. One such instrument being currently applied by the EIB and other development banks is venture debt to support innovative enterprises.[41] If a business does well, the EIB gets part of that higher profit as compensation for taking a higher risk. This is usually done by a loan that is converted into an equity-linked instrument (warrants) or profit participation. Venture debt also has the virtue of financing the growth stages of companies, for example for scaling up from pilot to mass manufacturing, further development of R&D, or international expansion.

Capital markets are a key source of equity financing but remain underdeveloped in many countries and mostly inaccessible to smaller businesses. When these markets do not develop on their own, NDBs can support investments in sustainable development via equity and catalyze capital market creation. This requires transparency and monitoring systems in place to assess the results of public support mechanisms.

Complex financial products

The choice between simpler and more complex financial products reflects a fundamental trade-off in development banking between policy steer and leverage. Direct loans and direct equity maximize the development bank's ability to steer transactions toward developmental impact, but they use more of the bank's capital, particularly in the case of equity. Equity is especially well suited to ambitious or high-uncertainty projects or businesses, such as the development of a new technology or the adoption of an established technology in a new local context, where private finance is difficult to attract and the potential for transformative success justifies the NDB absorbing early-stage risk. Guarantees, as discussed above, have a complementary role in contexts of high, generalized uncertainty, where the priority is to create private sector confidence rather than to substitute for private capital entirely.

Alternatively, NDBs can deploy more complex "blended finance" structures engineered to attract additional private financing and increase leverage of public resources at the level of the transaction. The aim of these products is typically to maximize development impact by increasing the per-deal private financial participation (loosely described as "leverage"). This is particularly attractive in the financing of investment in low carbon, given the large scale and the urgency of investment needs. The use of such instruments, however, poses several challenges. First, it may lead to too much risk being taken by the NDB, including through contingent liabilities. Indeed, there may be too much risk transfer from the private financial intermediary to the NDB, and therefore potential losses to the NDB. Second, there may be a reduction of policy steer aimed at maximizing sustainable development impact. The potential of long-term losses to NDBs and governments is particularly problematic if the additional risk to the NDB is not accurately compensated (e.g., through sharing in the potential upside of a project) or priced. There may be, in short, a trade-off between needing fewer fiscal resources in the short term and potentially more in the long term. Finally, care must be taken to ensure that blended financing leads private participants to have increased confidence in the commercial viability of the relevant technology, sector, or market rather than assuming the continued need for public risk bearing.

Instead, NDBs may catalyze private investment in underfinanced sectors, technologies, and markets by being a first mover and demonstrating viability. This may entail less private sector participation at the transaction level, but subsequently greater private capital crowding into the target market. Post-transaction market effects could in principle be even more important than blended finance at the level of an individual deal or transaction but is much harder to measure.

Securitization

In more mature financial markets, NDBs can help private-sector climate investment scale by preparing assets for securitization (pooling individual debts and then sharing interests in the pool to investors as a tradeable security), in certain sectors. Securitization allows pools of loans or other cash-flowing assets to be packaged

into securities that can be sold to institutional investors and, in some cases, traded in secondary markets. This practice, common in developed financial markets, tends to lower the cost of financing, improve market liquidity, and enable scale. NDBs can support this process by standardizing early transactions, aggregating or "warehousing" portfolios until they reach sufficient scale, and generating performance data. This can help institutional investors participate in sectors where individual transactions are otherwise too illiquid, small, or fragmented, such as distributed energy or energy efficiency retrofits. The German development bank KfW pioneered this approach for mortgages for residential buildings with low carbon emissions. In less mature financial systems, securitization may have limited near-term relevance; however, where market conditions allow, an NDB, possibly with support from MDBs, may be able to build the standardized pipelines and track records that could support structured finance over time. In all markets, especially careful due diligence and strong regulatory oversight are required to ensure that these assets do not introduce prudential risk from poorly understood creditworthiness.

As with any developmental goal and any financial institution, the design of financial instruments or products is intrinsically linked to the risk environment in which they operate. In the case of green finance, climate change and biodiversity loss have emerged as major, interconnected sources of systemic financial risk, relevant to all financial institutions.[42] For NDBs, climate-related uncertainty and the relationship between patience and urgency are the two features of this risk environment most relevant to instrument choice.

Direct or first-tier lending—particularly in concessional form where positive externalities exist or first-mover problems prevent private entry—may be seen as the instrument most directly aligned with green objectives, precisely because it combines high policy steer with the ability to deploy at speed and scale without depending on private intermediary willingness. As for guarantees, while useful in the right context, they may work best when accompanied by more direct instruments such as technical assistance, so that the capacity-building role they are meant to catalyze can keep pace with the speed of transformation required. For equity, the venture capital logic of accepting early losses in exchange for longer-term returns remains valid, but green goals require pushing that logic further: Development banks can take stakes earlier, at larger scale, and at lower expected financial returns than purely commercial venture logic would support, on the grounds that the social return from accelerating green technology development compensates for the lower private financial return.

As regards funding instruments for NDBs, green bonds, despite significant growth in issuance volumes in recent years, remain a small fraction of what climate investment scenarios require. The urgency argument therefore supports a case for dramatically expanding these programs, which in turn implies either changes to capital or funding structure of development banks and/or the development of new mechanisms to attract institutional capital at the necessary volume and speed.

A final consideration cuts across all financial instrument types: Green developmental goals are inherently dynamic. This is not unique to green objectives; any developmental goal or structural change aim faces a comparable challenge of adapting to shifting conditions over time. What distinguishes the green transition is the pace of technological change and particularly the finite window imposed by climate and biodiversity tipping points. This distinction needs to be considered in the analysis of what kinds of financial support are needed and where public action is most effective. Initial focus on certain markets, technologies, or instruments may be appropriate at one stage of development but may need to be redesigned or phased out as conditions evolve. This calls for a degree of institutional flexibility and adaptability that is not always natural to development banks, which tend to operate through stable, long-horizon programs. NDBs pursuing green goals must therefore build in mechanisms for continual revision of their target sector and instrument design—regularly assessing whether the conditions and objectives they were originally designed to address still hold, and adjusting coverage ratios, concessionality levels, eligibility criteria, and target sectors accordingly.

Table 1 illustrates this diversity of instrument design across a selection of NDBs, capturing both the variety of instruments currently in use and the range of green objectives they are intended to serve.

TABLE 1: EXAMPLES OF GREEN FINANCIAL INSTRUMENTS USED BY NDBS

NDB (Country)	Instrument Type	Green Instrument
KfW Capital (Germany)	Equity/ venture capital	**Green Transition Facility:** A venture capital fund-of-funds program managed by KfW Capital, the wholly owned VC subsidiary of KfW, designed to improve access to risk capital for start-ups and innovative firms developing climate technology solutions. The Green Transition Facility allocates €100 million exclusively to VC funds whose investment strategy focuses on climate tech and related climate-relevant thematic fields, as defined by the EU Taxonomy Regulation and the Sustainable Finance Disclosure Regulation. Target sectors include sustainable mobility; bio-economy; circular economy; and climate, energy, and environmental technology. The facility operates by acting as anchor investor in climate tech funds—including first-time funds that face difficulty attracting private capital—providing the credibility signal and initial capital base that crowds in additional private investment, directly strengthening a segment of the German VC ecosystem where market gaps are most acute.
CORFO (Chile)	Second-tier concessional lending	**Crédito Verde:** A second-tier lending scheme providing a credit line to refinance loans granted by financial intermediaries. To participate in the program, intermediaries—primarily commercial banks—must register officially. The scheme supports investments undertaken by firms in sustainable projects, including renewable energy, energy efficiency, and green hydrogen across the value chain (pre-investment, production, and demand).
China Development Bank—CDB (China)	First-tier direct lending	**Direct Green Credit—BYD:** Early financing to enable strategic technologies to commercialize. As of 2024, cumulative credits granted by China Development Bank's Shenzhen branch to BYD—now the world's largest electric vehicle manufacturer—exceeded $11.2 billion; in 2016, CDB and BYD also signed an $8.4 billion strategic cooperation agreement to support rail transit development in Shenzhen. These loans were extended at a stage when China's electric vehicle sector was not yet commercially viable, making CDB's direct lending an integral part of a broader industrial policy package combining public credit, subsidies, and regulatory support. Sustained public financial commitment helped drive BYD's technological development and cost reduction to the point where the company became globally competitive, ultimately contributing to a worldwide decline in electric vehicle prices.
Small Industries Development Bank of India—SIDBI (India)	Partial credit guarantee	**Partial Risk-Sharing Facility for Energy Efficiency (PRSF):** A partial credit guarantee scheme to unlock commercial finance for energy efficiency projects implemented through energy service companies. The facility provides sub-guarantees to participating financial institutions to cover a share of the default risk they face when extending loans to eligible energy efficiency projects. The facility was designed to address the structural barriers that prevent commercial lenders from financing energy efficiency projects by combining risk coverage with end-to-end market development support.
Korea Development Bank (South Korea)	Green bonds and sustainable debt	**KDB Sustainable Financing Framework:** A sustainable financing framework through which Korea Development Bank issues green, social, and sustainability bonds and loans to finance and refinance eligible green and social projects. On the green side, eligible categories include renewable energy, clean transportation, energy efficiency, pollution prevention and control, sustainable water management, and climate change adaptation. The framework is aligned with International Capital Market Association (ICMA) Green Bond Principles and the EU Taxonomy and is subject to external second-party opinion verification and annual allocation and impact reporting. Since 2017, KDB has issued 15 green bonds and 11 social bonds in domestic and international markets, raising the equivalent of $6.7 billion by March 2022. Beyond bond issuance, KDB also arranges, underwrites, and invests in green and sustainable bonds issued by micro, small, and medium enterprises through collateralized bond obligations, extending the reach of green capital market instruments to smaller firms that would not otherwise have direct market access.

TABLE 1: EXAMPLES OF GREEN FINANCIAL INSTRUMENTS USED BY NDBS

NDB (Country)	Instrument Type	Green Instrument
Development Bank of Southern Africa—DBSA (South Africa)	Blended finance/first-loss facility	**Embedded Generation Investment Programme (EGIP):** A first-loss credit support facility developed jointly by DBSA and the Green Climate Fund (GCF) to finance embedded-generation solar photovoltaic and wind projects implemented by independent power producers operating outside South Africa's formal government procurement program. Because these projects are not underpinned by government guarantees or state-backed power purchase agreements, they carry higher perceived risk and would not otherwise attract private financing on commercially viable terms. The program provides a first-loss facility to improve the bankability of individual projects and bring them to financial close, with a total funding commitment of $200 million—$100 million from the GCF matched by DBSA—targeting 330 MW of renewable energy capacity. A dedicated component of approximately $84 million supports Broad-Based Black Economic Empowerment funding, enabling the participation and equity ownership of local community trusts and small and medium enterprises in the underlying projects.
Clean Energy Finance Corporation—CEFC (Australia)	Concessional consumer lending	**Green Car Loan Programme:** A concessional lending program offering discounted interest rates to businesses and households for the purchase of new, fully electric vehicles, backed by CEFC finance in partnership with commercial lenders including Hyundai, Kia, and Volkswagen Financial Services Australia. The program provides interest rate discounts of 0.5 percent to 1.0 percent below standard commercial rates, reducing the up-front cost of electric vehicle ownership and accelerating consumer-level adoption of zero-emission transport technology. The instrument targets the affordability barrier that prevents households and small businesses from transitioning to electric vehicles even where willingness exists, functioning as a demand-side complement to the supply-side industrial policy instruments deployed elsewhere in the green finance tool kit.

Source: Prepared by the authors based on information from KfW Capital,[43] CORFO,[44] SOAS Development Leadership Programme,[45] Small Industries Development Bank of India,[46] Korea Development Bank,[47] Development Bank of Southern Africa & Green Climate Fund,[48] and Clean Energy Finance Corporation.[49]

Funding structure

Funding structure is an essential design variable alongside mandate, governance, and instruments. In this paper, "funding structure" refers broadly to the full structure of financial resources available to the institution that enables it to operate. This includes its capital base, typically from equity, fiscal outlays, or grants, and other financing or credit enhancement that enables an institution to expand its balance sheet and lend and invest. Successful NDBs can also increase their capital over time through retained earnings.

The size and strength of an NDB's balance sheet matters, of course, for how much finance it can deploy. But the scale of its funding also affects the impact of that finance. An NDB that is too small in its capital base will struggle to shape or create markets, diversify risk, build specialized capacity, or credibly mobilize private investment, which can hamper its aims to finance transition to a resilient, net-zero economy. NDBs that are large and significant in scale (for example as a proportion of the country's GDP or the country's banking and capital market) clearly can have a large sustainable development impact; this has been illustrated by the large and crucial impact that Germany's KfW and later China's CDB had on supporting and developing the solar energy sector by large financing of research and investment in solar panels.[50]

However, funding decisions are not only about scale. They are also about the type of financial capacity an institution has. NDBs draw on a wide range of funding sources, including state-owned capital, in some cases deposits or savings products, domestic and international borrowing, and capital-market issuance.[51] The source and form of funding can shape an institution's capabilities as much as its mandate or governance arrangements. An institution with a weak capital base—with limited loss-absorbing capital—cannot use concessional lending or more risk-bearing investment instruments in the same way as one with a strong capital base. Conversely, an institution that does not raise debt from capital markets shrinks its potential scale relative to what its equity base could otherwise support.

Domestic funding: fiscal resources, dedicated revenues, and domestic savings

Since NDBs are instruments of public policy, capitalization from public resources remains the crucial starting point for most institutions. Fiscal capitalization may come through paid-in equity, budgetary transfers, dedicated public revenues (i.e., specific taxes or fees), or retained earnings generated over time. Fiscal constraints, whether economic or political, can limit a government's appetite or ability to provide sufficient scale, particularly where the NDB's balance sheet is consolidated with, guaranteed by, or closely linked to the sovereign. This matters especially in emerging markets and developing economies (EMDEs) facing limited fiscal space, higher borrowing costs, foreign-exchange constraints, or debt-sustainability concerns. Many EMDEs also face debt stress at levels that might appear relatively manageable for advanced economies, which helps explain why even productive public investments can be politically and fiscally constrained.[52]

However, an NDB can also be understood as a tool for fiscal efficiency rather than simply as an additional expenditure item. This fiscal-efficiency argument is clearest when NDBs are viewed through a "public sector balance sheet" lens rather than only as an expenditure.[53] A public capital contribution to a well-governed NDB exchanges cash for a public financial asset. If the institution has strong governance, financial discipline, and portfolio management, public capital paid into an NDB can create a reusable institutional balance sheet. Crucially, NDBs can mobilize private capital through co-financing, catalyze new markets to require less public finance in the future, and raise financing on the capital markets, each of which mechanism adds to an NDB's potential fiscal efficiency, or leverage of the public funds deployed into capital.

Domestic capitalization can also come through dedicated revenue streams, including climate policy–linked revenues such as carbon taxes or emissions trading proceeds, utility system charges, or other levies. Dedicated revenues can link the source of capital to the institution's public purpose and, where climate policy revenues are visibly recycled into climate investments, strengthen policy coherence and legitimacy. The use of carbon-pricing revenues is particularly important for public acceptability, since citizens' support for carbon pricing depends significantly on how revenues are used and perceived.[54] The Connecticut Green Bank, for example, has been capitalized through a combination of a charge on electricity customers and Connecticut's proceeds from the Regional Greenhouse Gas Initiative, a regional emissions trading scheme.[55] In New York, NY Green Bank was initially capitalized with electricity ratepayer funds, linking utility system revenues to an institution that finances clean energy in the state.[56]

NDBs need to mobilize domestic savings to fund themselves.[57] This is done mainly through the local bond market, from retail and institutional investors, or it can be done through specialized retail savings products. Domestic savings mobilization can connect national savings to national investment priorities and reduce currency mismatches because the institution's liabilities and assets are both denominated in local currency. More broadly, domestic capital-market access can help NDBs expand their funding base, but it does not substitute for loss-absorbing capital, especially where the institution is expected to take early-market, concessional, or first-loss risk.

The use of domestic sources for capitalization and funding is not a complete answer in every context. Its scale, tenor, and risk appetite may be constrained, especially in smaller, poorer economies with limited fiscal space and/or shallow capital markets. Nevertheless, domestic sources are especially important not only because they provide funding, but because they can create local-currency capacity, help develop domestic capital markets (as the China Development Bank did when it helped create the domestic bond market), and increase public legitimacy and durable national ownership. This potential remains largely untapped. Volz et al. show that emerging markets and developing economies continue to channel a substantial share of their savings abroad and argue that NDB-issued local-currency bonds could provide an attractive alternative to overseas investment, thereby strengthening the mobilization of domestic financial resources.[58]

International funding and the scale/risk trade-off

International funding can come from both public and private sources. Bilateral development finance institutions, multilateral development banks, and vertical climate and environmental funds (VCEFs) can provide funding, typically through concessional loans or through grants that support an NDB's balance sheet

or a portfolio or facility within it. While loans and grants—either non-concessional or concessional—are far more typical, MDBs have sometimes equity-capitalized regional development banks. For example, the African Development Bank (AfDB) has made equity investments in the Trade and Development Bank (TDB) and the East African Development Bank (EADB).[59]

Vertical climate and environmental funds deserve special attention for green NDBs because their funding is mission aligned. The Green Climate Fund (GCF) works through accredited entities, including public, private, national, subnational, regional, and international institutions that develop funding proposals and manage projects and programmes.[60] Its Readiness Program supports institutional capacities, governance mechanisms, planning, programming, and direct-access engagement.[61] The GCF, which has already accredited a few NDBs, has indicated interest in recent years in increasing flows through domestic accredited entities. The Global Environment Facility (GEF) has provided financing primarily as grants and mobilized co-financing for country-driven projects, while the Climate Investment Funds channel concessional finance through MDBs for upstream advisory and downstream investment activities.[62] These sources can be relevant to enabling an NDB transforming into a climate-focused institution or seeking to fund a facility or function delivering on climate objectives. These funds may not provide enough financial resources to transform a national economy on their own, but they can be catalytic if they help both establish green finance functions and provide flexible funding.

Some NDBs may also be able to raise debt from private markets, especially through domestic or international bond issuance. NDBs from developed countries do so regularly, but so do several in emerging economies, like DBSA in South Africa, NAFINSA in Mexico, CDB in China, and others. A smaller set of institutions may use other forms of market borrowing as well; BNDES, for example, describes international-market fundraising as including both bond issuance and syndicated loans.[63] International market access can provide scale, discipline, and market credibility, but access varies by institution, country, ownership structure, regulatory authority, and credit standing.[64] Recent efforts announced by IDFC, Finance in Common, the NDC Partnership, and MIGA to create a Public Development Bank Guarantee Hub are aimed at expanding NDB access to bond markets, or potentially other private-sector financing, for public development banks that would otherwise face prohibitive pricing, limited tenor, or insufficient investor confidence.[65] This is a valuable initiative that could greatly expand the resourcing and impact of NDBs globally.

Debt financing, however, has some limitations. International financing is often denominated in convertible currencies such as the dollar or euro. Since NDB outlays are often in the local currency, this can create currency risk that NDBs must manage. NDBs typically cannot raise debt internationally in the local currency, creating repayment risk and balance-sheet vulnerabilities from currency mismatch.[66] Institutions that rely heavily on repayable market funding may need more predictable cash flows, stronger portfolio discipline, and a more commercial risk profile. This can limit their ability to take early-market risk, provide first-loss capital, or support transactions whose developmental value exceeds near-term risk-adjusted financial return.

From an institutional design perspective, there is therefore no single best funding structure for NDBs seeking to catalyze climate investment. Fiscal resources, retained earnings, VCEF grants, and equity-like instruments can foster policy alignment and increase the institution's flexibility and risk budget, but they may be limited in scale. Local borrowing, retail savings products, and domestic bond issuance can expand the funding base, connect domestic savers to national investment priorities, and reduce currency mismatch because lending and borrowing are both in local currency. International debt capital can help create scale and market credibility but may also create operational constraints, currency exposure, and pressure toward more commercial portfolios.

The key distinction is therefore between the capital base, implying loss-absorbing resources, which determine how much risk an NDB can bear, and repayable funding sources, which determine how far it can expand its lending or investment book. The two are linked: A stronger capital base can support more borrowing and therefore more lending. But they perform different functions. Equity-like capital creates resilience and risk appetite; debt and other repayable funding create scale but must be serviced and repaid.

The design aim is to combine sources so that the institution has enough scale for market impact, enough loss-absorbing capital to bear risk and enter (or help create) new sectors and markets, enough discipline to remain financially sustainable, enough local-currency capacity to manage currency risk, and enough flexibility to

adapt as green investment needs evolve. Scale of capital is a key variable, as a sufficiently large capital base allows PDBs to have greater impact on scale of investment and helps steer this investment to increase its sustainable development impact. Ultimately, however, the right capitalization strategy must balance scale, risk appetite, policy steer, fiscal constraints, currency exposure, and financial sustainability.

Conclusions

This paper has examined how the main institutional design variables of NDBs—mandate, governance, instruments, and funding structure—should be configured, and where necessary adapted, to best support a green and sustainable transformation. Three crosscutting points frame the conclusions that follow.

First, there is no one-size-fits-all solution for NDB institutional design. The effectiveness of design is shaped by country specifics, the depth and features of its financial system, the productive structure of the economy, and the broader ecosystem of development agencies and public institutions. Designing or adapting NDBs for the green transition must therefore be context specific. That being said, there are a significant set of common features across all institutions—any successful green bank will need the right mandate, governance, instruments, and funding structure—and even more commonalities among banks in similar economic and market conditions. Experience, know-how, and exchange will also often be relevant from institutions across all country circumstances.

Second, the four design variables examined here are not independent. All interact with and reinforce one another, and their effectiveness depends as much on how well they are aligned with one another as on the broader economic context.

Third, the tools and logic of development banking—patient capital, risk tolerance, long-horizon public finance—are well suited to the demands of the green transition. What is needed is not a reinvention but a shaping of these traditional strengths by the specific features of the transition itself: Green objectives call for patient finance in instrument design, but impatience in the pace and ambition with which that finance is mobilized.

Starting with mandate, this design variable works not only as an operational directive but also as an accountability mechanism—defining what the institution is for, and against which its performance can be evaluated. As climate and environmental objectives have moved to the center of development debates, NDBs have increasingly incorporated sustainability commitments into their formal mandates, though the pace has been uneven. By 2025, only 45 percent of more than 170 public development banks had committed to aligning their operations with the Paris Agreement. The EIB illustrates what a strong green mandate can achieve: Its commitment to directing 50 percent of lending to climate-related activities was not only met but surpassed. Recent evidence confirms that such mandate changes to focus on climate carry real economic consequences—sustainability commitments by development-oriented financial institutions translate into measurably higher green innovation activity among their borrowers. Beyond direct financing, NDBs with clear green mandates can also serve as coordinators of public–private efforts, providing expertise, deploying public finance tools to address policy gaps, and offering coherent sets of instruments aligned with national green priorities.

Governance, the second design variable, determines whether mandate commitments are consistently translated into institutional behavior, risk management, accountable deployment of public resources, and trust. Four dimensions are particularly important: internal organizational structures that embed environmental and climate considerations at every level of decision-making rather than confine them to separate sustainability units; relevant technological and financial expertise to develop pipelines and actively shape markets; climate and environmental risk management processes that integrate physical and transition risks into core portfolio assessment rather than treat them as compliance exercises; and accountability and reporting frameworks—including green taxonomies, transparent allocation of proceeds, and alignment with recognized disclosure standards—that are preconditions for credibility with governments, international climate funds, and capital markets alike.

On instruments, direct lending provides the strongest policy steer and is most directly aligned with green objectives, requiring concessionality or greater risk appetite particularly where externalities are significant or first-mover problems prevent private entry; the experience of KfW in solar energy and CDB in electric vehicles illustrates the market-creation potential of sustained public lending at critical stages of technology development. Guarantees are most effective when private risk aversion is high or collateral is insufficient but work best when accompanied by technical assistance that builds commercial lender capacity at the speed the green transition requires. Equity—including through venture capital models—is the appropriate instrument for absorbing the deep uncertainty around early-stage green technologies, though green goals justify pushing the venture logic further than purely commercial expectations would support. Complex blended finance instruments can expand volumes but carry risks of excessive contingent liability and reduced policy steer that must be carefully managed. Securitization may also prove useful in certain contexts but needs to be accompanied by measures to ensure creditworthiness. Green bonds have grown significantly as a funding instrument for NDBs and offer lower-cost, longer-maturity capital for green portfolios, but issuance volumes remain far below what the transition requires, pointing to the need for NDB recapitalization and/or new mechanisms to attract institutional capital at scale.

The design of financial instruments must also account for the risk environment created by climate change and biodiversity loss. Physical risk—the impairment of asset values from climate events and ecosystem degradation—and transition risk—lost asset value and new liabilities from the shift to a low-carbon economy—are not merely developmental challenges but financial stability concerns that reshape the risk profile of every instrument in the NDB tool kit and the banks they work with. The instrument implication is principally the adaptation of existing tools: longer tenors, climate-contingent repayment structures, deeper integration of physical risk modeling into credit assessment, and the application of shadow carbon pricing in project evaluation. Green developmental goals are also inherently dynamic, requiring NDBs to build in mechanisms for continual revision of instrument design as technologies mature, regulatory frameworks evolve, and the conditions that originally justified a given instrument change.

Funding structure is an essential design variable alongside mandate, governance, and instruments. We define "funding structure" to refer broadly to the full structure of financial resources available to the institution that enables it to operate. This includes its capital base, typically from equity, fiscal outlays, or grants, and other financing or credit enhancement that enables an institution to expand its balance sheet and lend and invest. Financially successful NDBs can also increase their capital over time through retained earnings, which can allow them to increase future lending operations, make lending more concessional if and where needed, or provide technical assistance where necessary.

The size and strength of an NDB's balance sheet matters, of course, for how much finance it can deploy. But the scale of its funding also affects the impact of that finance. An NDB that is too small in its capital base will struggle to shape or create markets, diversify risk, build specialized capacity, or credibly mobilize private investment, which can hamper its aims to finance the transition to a resilient, net-zero economy. NDBs that are significant in scale clearly have a large sustainable development impact, as is the case with Germany's KfW or China's CDB.

However, funding decisions are not only about scale. They are also about the type of financial capacity an institution has. NDBs draw on a wide range of funding sources, including state-owned capital, domestic and international borrowing, and capital-market issuance. An institution with a weak capital base—with limited loss-absorbing capital—cannot use concessional lending or more risk-bearing investment instruments in the same way as an institution with a strong capital base. Conversely, an institution that does not raise debt from capital markets shrinks its potential scale relative to what its equity base could otherwise support.

Since NDBs are instruments of public policy, capitalization from public resources remains the crucial starting point for most institutions. Fiscal constraints, whether economic or political, can limit a government's appetite or ability to provide sufficient scale, particularly where the NDB's balance sheet is consolidated with, guaranteed by, or closely linked to the sovereign. This matters especially in EMDEs facing limited fiscal space, higher borrowing costs, foreign-exchange constraints, or debt-sustainability concerns.[67]

However, an NDB can also be understood as a tool for fiscal efficiency rather than simply as an additional expenditure item. If the institution has strong governance, financial discipline, and portfolio management, public capital paid into an NDB can create a reusable institutional balance sheet. Crucially, NDBs can mobilize private capital through co-financing, catalyze new markets to require less public finance in the future, and raise financing on the capital markets, each of which mechanism adds to an NDB's potential fiscal efficiency, or leverage of the public funds deployed into capital.

Domestic capitalization can also come through dedicated revenue streams, including climate policy–linked revenues such as carbon taxes or emissions trading revenues, utility-system charges, or other levies. The use of carbon-pricing revenues is particularly important for public acceptability, since citizens' support for carbon pricing depends significantly on how revenues are used and perceived.

NDBs mobilize domestic savings. This is done mainly through the local bond market or via retail and institution investors, or it can be done through specialized retail savings products. Domestic savings mobilization can connect national savings to national investment priorities and reduce currency mismatches. Use of capitalization and funding from domestic sources is not a complete answer in every context. Its scale, tenor, and risk appetite may be constrained, especially in smaller, poorer, or financially shallow economies with limited fiscal space and/or shallow capital markets. International funding can come from both public and private sources. Bilateral development finance institutions, multilateral development banks, and VCEFs can provide funding as well, typically through concession loans or grants that support an NDB's balance sheet or a portfolio or facility within it. Vertical climate and environmental funds deserve special attention for green NDBs because their funding is mission aligned. These sources can be relevant and catalytic to enabling an NDB transforming into a green bank or seeking to fund a facility or function delivering on climate objectives.

Some NDBs may also be able to raise debt from private markets, especially through domestic or international bond issuance. Recent efforts announced by IDFC, Finance in Common, the NDC Partnership, and MIGA to create a Public Development Bank Guarantee Hub are aimed at expanding NDB access to bond markets for public development banks that would otherwise face prohibitive pricing or limited tenor. This is a valuable initiative that could greatly expand the resourcing and impact of NDBs globally. Debt financing, however, has some limitations. International financing is often denominated in convertible currencies. Since NDB outlays are often in the local currency, this can create currency risk that must be managed. There is therefore a key challenge for NDBs to mobilize domestic savings.

The design aim is to combine sources so that the institution has enough scale for market impact, enough loss-absorbing capital to bear risk and enter (or help create) new sectors and markets, enough discipline to remain financially sustainable, enough local-currency capacity to manage currency risk, and enough flexibility to adapt as green investment needs evolve. Scale of capital is a key variable, as a sufficiently large capital base allows PDBs to have greater impact on scale of investment and helps steer this investment to increase its sustainable development impact.

The relationship among all four design variables is circular rather than sequential: Good governance reinforces mandate and credibility and improves instrument effectiveness, while a clear mandate and well-designed instruments give governance structures the operational content they need to function. A larger scale of capital and funding allows NDBs to perform their mandate better and increases the sustainable development impact of the instruments deployed. This circularity is perhaps the central lesson for NDB institutional design in the context of the green transition: Mandate, governance, instruments, and funding structure must be designed together, not in isolation—and all four must be adapted as the green transformation itself evolves.

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