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GLOBAL ECONOMIC GOVERNANCE

Infrastructure for Sustainable Development: The Role of National Development Banks

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ROGERIO STUDART AND KEVIN P. GALLAGHER

Development banks are increasingly being relied upon to help finance sustainable infrastructure in the 21st century. Much of the emphasis has been on the role of the existing multi-lateral development banks (MDBs), but lesser attention has been paid to the role of national development banks (NDBs). To help fill this gap, Boston University's Global Economic Governance initiative (GEGI) and the Brookings Institution's Global Economy and Development program convened a Task Force on Development Banks and Sustainable Development to examine the extent to which development banks are becoming catalysts for achieving a climate friendly and more socially inclusive world economy.

Based on these assessments, the group's main findings are that:

- **National development banks are overlooked but essential players** in the developmental financing regime. With over 250 national development banks holding at least \$5 trillion in assets, NDBs dwarf the Western-backed multilateral development banks in scale, scope and roots in local political economies and project processes.
- **Infrastructure is largely not a priority for the vast majority of NDBs**, and for most sustainable infrastructure is an afterthought at best. While no one NDB stands out as a model sustainable infrastructure bank, we have identified a number of key programs and projects that can be shared and scaled up by other NDBs and MDBs.
- **NDBs are poised for a leadership role.** Given how close NDBs are to the project space, NDBs are poised to play a leadership role in promoting and expanding sustainable infrastructure at the national and global level. Indeed, through the International Development Finance Club, some NDBs have begun to do so already.

In order to realize their full potential as platforms to foster sustainable infrastructure finance, NDBs will need:

- **Prioritization from governments of sustainable infrastructure in their development strategies.** When specific national and subnational directives and policies prioritize sustainability, development banks, as policy instruments, can become more quickly mainstreamed and focused.
- **To create platforms for blending instruments and co-financing.** NDBs can act as the brokers and/or go-betweens for blending instruments at the project level with various other parties such as climate funds, guarantee funds, official development assistance providers, MDBs, and private sector actors at the local and global levels.
- **To help develop, strengthen, and scale up sustainable infrastructure projects,** by identifying viability gaps for infrastructure and incorporating sustainability criteria. In order to attract private capital, NDBs can also work with government to establish legal, regulatory and institutional frameworks, and to create new instruments and securities markets that are adapted to country circumstances, and that ensure that the benefits of such projects are broadly accepted and distributed.
- **To engage with the broader regional and international development finance community.** The urgency of rapidly moving from billions to trillions to climate friendly and socially inclusive projects takes cooperation among, national, regional and multilateral development banks. Through such groupings as the International Development Finance Club (IDFC) and the World Federation of Development Finance Institutions and its regional associations, NDBs can set joint goals, share best practices, collectively measure and monitor progress, and even move toward co-financing and blending instruments in platforms across other NDBs themselves.

In sum, how countries respond to their infrastructure needs may be the deciding factor in whether they can deliver on the agenda and commitments set out in the SDGs and Paris Agreement. National Development Banks are an overlooked source of leadership to this end, but will need to be reset, reinvigorated, and globally networked in order to fulfill their promise.



I. From conventional to sustainable infrastructure financing

Global infrastructure investment requirements over the next 15 years are estimated to be on the order of \$ 75 – 85 trillion, much more than the current existing stock. As challenging as it is to boost infrastructure investment worldwide, doing that in a ‘business as usual’ manner is not sustainable. As shown in Table 1, what is needed is to boost sustainable infrastructure – that is, infrastructure that provides those physical and organizational structures in a manner that is socially, economically, and environmentally sustainable. There is an urgent need for a stepwise increase in global infrastructure spending in order to lay a foundation for a low-carbon and more socially inclusive economy.

Table 1: Toward a Sustainable Infrastructure

From BAU	To better infrastructure
Inadequate Investments in sustainable infrastructure in most countries constraining growth and development	Scaled investment in sustainable infrastructure globally, leading to improved economic development and growth
Inadequate provision of affordable infrastructure for poor people, risking reversal in fight for development and poverty reduction	Increased infrastructure access, acceptability, and affordability for the poor, leading to improved development outcomes
High proportion of high-carbon infrastructure investments and efficient use of infrastructure, creating danger of lock-in and irreversible climate change	Increased preference for investments in low-carbon infrastructure , mitigating climate change to below 2 degrees
Low resilience infrastructure, creating vulnerability to risks of climate change (especially among poor people)	More resilient infrastructure that accounts for climate risks and protects populations most vulnerable to climate change

Source: authors adaptation from Bhattacharya et al (2015).

The challenge is enormous. However, if embraced by national governments and the international community, investments in sustainable infrastructure may offer an unique opportunity to address three of the core interrelated challenges facing the world economy today. First, if properly executed they can help accelerate growth beyond the weak recovery the world has experienced since the global financial crisis, and help lay the foundation for lasting prosperity.

Second, they can enable multiple SDGs to be achieved in a manner that is pro-growth, pro-climate, pro-poor, and pro-development. Indeed, massive investments are needed to fill the existing global infrastructure gap and utilizing this as an opportunity to focus on sustainability will have an enduring impact on climate resilience and socioeconomic development for at least a century to come.

Third, sustainable infrastructure is essential to moving the world economy onto a low-carbon growth path—as more than 60% of global carbon emissions currently emanate from the existing infrastructure of the world economy (Bhattacharya and Stern, 2016).

II: NDBs and Sustainable Infrastructure

The scale of investment needed to make infrastructure consistent with both climate and development goals is even larger than the numbers mentioned earlier. The entire nature and framework for infrastructure needs to shift away from the current structure, which is largely responsible for a high carbon and highly unequal global economy. Meltzer (2016) and Bhattacharya et al (2016) have estimated the ‘sustainable infrastructure premium’ or the additional investments needed to shift from the ‘business as usual scenario’ to a sustainable infrastructure path. Estimates of sustainable infrastructure needs consistent with a less than 2-degree climate goal are at least US\$4.7 trillion---or range from US \$313 billion to \$700 billion in additional investments per year (Bhattacharya et al, 2016; WEF, 2013).

National development banks can help address the impediments to sustainable infrastructure financing?

National development banks date back to the late 19th century, but became common in the post-World War II period. They are often to correct market failures and help foster transformative economic and social investments. For instance, in the 1950s when the newly created German national development bank (KfW) was helping to reconstruct its own infrastructure and productive sector, Brazil's national development bank

(BNDES) helped create the infrastructure needed for Brazil's government-sponsored industrialization process (Stuart and Ramos, 2016). In the 1960s, the Korean Development Bank was used to "finance and manage major industrial projects to expedite industrial development and enhance the national economy", a model that was copied in other Asian emerging economies.

NDBs were on the decline at the end of the 20th Century but the turn of the century has seen a renewal of interest and support for the creation of new NDBs - for at least three reasons. First, there was increasing evidence that part of the successful development experiences in the 70s and 80s, and the Chinese growth miracle in recent

decades has had a lot to do with the existence and expansion of NDBs. Second, the commodity boom from 2003 to 2013 increased the reserve assets of many developing countries. These countries sought to re-capitalize the MDBs but were only successful in doing so at the margins because of resistance from the industrialized countries. Finally, emerging market and developing countries have become increasingly frustrated with their level of voice, representation, and performance of MDBs and have sought to reinvigorate their own national and multilateral developmental institutions.

"The challenge is enormous. However, if embraced by national governments and the international community, investments in sustainable infrastructure may offer an unique opportunity to address three of the core interrelated challenges facing the world economy today."

Figure 1:



Source: Gallagher and Sklar, 2017

Today there are well over 250 national development banks currently operating in the world economy. As of 2015 these banks held approximately \$5 trillion in assets, considerably more than the just over \$1 trillion held by the MDBs (Gallagher and Sklar, 2016). The majority of these banks reside in Asia, such as the China Development Bank and the Korean Development Bank. The region with the second largest number of NDBs is Latin America, such as NAFIN in Mexico and BNDES in Brazil. However, NDBs are not relegated to the developing world, with the KfW (Germany) and AfD (France) among the largest in the world.

GEGI and Brookings convened a working group of experts and former policy-makers to study the extent to

which national development banks are financing sustainable infrastructure in their countries and regions. Regional assessments were conducted of national development bank activity in Africa, Asia, Europe, and Latin America. These assessments were accompanied by case studies of some of the largest development banks such as the Development Bank of Southern Africa, the China Development Bank, the Brazilian National Development Bank, India's major national development banks, and the KfW of Germany. All of the regional assessments and case studies are available at the GEGI web pages (www.bu.edu/gegi).

According to our assessment, very few of the banks have explicit infrastructure goals and even fewer focus on sustainable infrastructure. The banks that we focused on for case studies, however, tell a different story. National development banks in China, Germany, Brazil, India and South Africa all either have strong policies to prioritize infrastructure, significant sustainable infrastructure policies, or both. Significantly, these banks comprise a major portion of the total amount of assets held by NDBs. As indicated in Table 2, they have upwards of \$2.9 trillion in assets, or roughly three-fifths of all NDB assets in the world economy and double the amount of MDB assets.

Table 2: Major NDBs in the World Economy

Country	NDB	Total Assets (<i>USB</i>)	Total Loans (<i>USB</i>)	Infrastructure Finance Priority?	Infrastructure Finance Sustainable?
China	China Development Bank	1664	1281	Yes	Limited
Germany	KfW	650	585	Limited	Yes
Brazil	National Development Bank of Brazil	373	80	Yes	Limited
India	IFCI Limited	6	3	Yes	Yes
	Industrial Credit and Investment Corporation of India	106	31	No	
	Industrial Development Bank of India	58	20	No	No
	Infrastructure Development Finance Company	14	8	Yes	Yes
	India Infrastructure Finance Company Limited	6	4	Yes	Yes
	Total India NDBs	190	66		
South Africa	Industrial Development Corporation	10	2	Yes	Limited
	Development Bank of Southern Africa	6	5	Yes	Limited
	Total NDBs	2,893	2,019		

Our analysis is based on what those institutions are doing to support sustainable infrastructure project five fronts, as summarized in Table 3.

Table 3 - NDBs and Sustainable INfrastructure

	South African NDBs	India NDBs	China Development Bank	BNDES	KfW
Project development and scaling up	Most offer technical assistance for project elaboration.	Technical assistance for project elaboration through different windows (inside and outside banks).	Significant involvement in the planning and cooperation with local governments and infrastructure developers. It helps in the design social, regional, industrial, and market development plans for potential infrastructure projects, through providing technical support loans and consult service... It is very active in project selection following governments' project recommendations or "governments' entrance" called by CDB.	Almost no participation in project elaboration.	Strong participation in planning and project elaboration.
Leveraging finance	High dependence on government budget resources. DBSA and IDC raise the majority of their resources through bank loans or bond issues in the domestic market. Recently they received considerable government resources either via injections of new shareholder equity, removal of bad loans from their balance sheets, or other techniques not listed on the liability side of the balance sheet. DBSA also implements two funds, the Green Fund and major the Infrastructure Investment Programmed for South Africa (IIPSA).	The role of government funding is considerably large. Highly dependent on deposits; government budgets; soft loans from external sources; and hard-term financing (bank loans or capital market bond issues).	CDB has direct access to government budget resources, in the Wuhu and Tianjin Models CDB issues long-term bonds to public banks using land rights as guarantees for the loans.	Extremely dependent on fiscal and "para-fiscal resources", but also issues bonds directly to the domestic and international markets. BNDES offers risk sharing through maintaining a network of public and private banking agents to intermediate approximately half of its credit operations, and provides guarantee-sharing clauses in contracts.	KfW refinances its lending activities mainly in the international money and capital markets; the main currencies in which it borrows are US dollars and euros, though it also uses other currencies. The main investors who buy KfW bonds are institutional investors, though retail investors also purchase them.



Reducing the cost of capital	Through co-financing, guarantees and other credit enhancement mechanism. Blends guarantees from northern governments and co-finances with Global Environment Facility.	Cost of capital reduction is offered multiple modes viz. debt financing, subordinate debt and refinancing.	Interest rates provided by public banks are already low, but CDB does provide even lower rates given the implicit guarantee of the PBOC. Also it provides guarantees and credit enhancement mechanism that end up reducing the overall cost of capital to their clients.	BNDES has its own long-term interest rate, TJLP, which is also applied to co-financing of projects in PPP structures. TJP is often lower than treasury bond rates, and blended BNDES-market financing has a cost that is significantly lower than market rates.	A main financing instrument of KfW is the provision of loans at lower-than-market rates, facilitated by KfW's triple A credit rating.
Crowding-in private capital	Active through credit enhancement of bonds of infrastructure companies.	Very active through provision of credit enhancement for infrastructure bonds.	Very active: issues infrastructure bonds and green bonds.	Active: Recently started stimulating the issuances of infrastructure bonds by its borrowers.	Very active: long experience in promoting bond issues of its clients and of green bonds.
Governance and inclusiveness	The IDC has two dedicated infrastructure policy units reporting to both the Presidential Infrastructure Coordinating Committee (PICC) and to the IDC Board and Executive Committee, which fulfills its role as the coordinating agency for two strategic infrastructure projects. Guided by renewable energy plan and laws. Sets up community trusts to promote inclusiveness.	Completely integrated with government directives for sectorial policy, defined by the specialized government entities – such as Commission for Additional Sources of Energy (CASE) in the Department of Science & Technology, the Department of Non-Conventional Energy Sources (DNES) and the Indian Renewable Energy Development Agency (IREDA). It is developing new safeguard regime to promote inclusiveness.	CDB is an integral part of the GOC planning process, and all its strategies and policies followed GOC directives. Considerable engineering capacity. Given the scale of projects promotes inclusiveness through large-scale job creation, though numerous projects are criticized for lack of engaging local communities.	BNDES is part of the Ministry of Development and Industry and its strategies and policies are completely in tune with tools determined by the federal executive branch. By being linked with labor ministry inclusiveness, a core component is the job creation mandate, though numerous projects are criticized for lack of engaging local communities.	KfW fully complies to a Government Mandate: German institutional framework, namely the renewable energy law. In overseas projects the KfW has adopted a hybrid approach to safeguards to encourage inclusiveness and institutional capacity building.

Most of the national development banks leverage financing and reduce financing costs for the projects they sponsor. However, how they do so depends significantly on domestic market realities. For instance, subsidies are larger in Brazil, where short-term interest rates are one of the highest in the world, BNDES lending rates are much lower and overall financing conditions are much better than available in domestic market. KfW in turn raises most of its funding in domestic and international securities markets, where low (now negative) financing costs and long maturities prevail, and thus with significantly smaller implicit subsidy in their lending rates.

Project development includes various actions such as infrastructure system (sector) planning, capacity needs, alternative assessments, feasibility studies, and prioritization of projects based upon assessment of available financial resources. It requires detailed design and development of contractor subcontracts, specifications, and preconstruction documents. Sustainable infrastructure project planning also includes

environmental sustainability and also social impact analysis. Project development can become a serious bottleneck in moving towards a sustainable infrastructure investment path. In many economies, but particularly in developing economies, resources to do project planning and elaboration are scarce. Not surprisingly, those NDBs who have most success in promoting infrastructure projects seem also to be those that get most involved in identifying and supporting project elaboration. This is the case of the German development bank, KfW, and China Development Bank.

For a handful of NDBs sustainability around the world is a low, albeit a rising priority. But this is not the case in some of the case studies. But other NDBs, particularly those (such as Brazil and China) that have made significant commitments in international climate fora, are following that track. An interesting case in this regard is India. Sustainability has been for many years an important part of India's infrastructure investment plans; and now in its Intended Nationally Determined Contribution (INDCs) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) on October 1, 2015. India has agreed to reduce its greenhouse gas emissions intensity of its GDP by 33-35% by 2030 compared to 2005 levels, and increase its installed capacity of renewable power by 33% to 300-350 GW by 2030 thus further doubling the renewable capacity from 175GW in 2022. Achievement of INDCs target will require USD 2.5 trillion of investments as well as sourcing of an array of technologies from developed countries and collaborative R&D for their diffusion in the country. Not surprisingly its NDBs have been some of the most innovative in leveraging and crowding-in private resources. Some of such innovations are presented below.

Table 4:

Policies and Blending Instruments in Indian NDBs	
Infrastructure bonds and Green Bonds	Consortium approach to catalyze and diversify risks
Infrastructure Debt Funds/National Infrastructure Investment Fund	Take-out finance to address asset-liability mismatch
Intermediate credit lines from MDBs	Credit Enhancement of bonds of infrastructure companies
SPVs for mobilizing forex reserves for infrastructure financing	Refinance of infrastructure lending
ECBs backed by sovereign guarantees	Equity and mezzanine finance
Access to low cost funds through current accounts in retail banking	

KfW has long been a leader in fostering sustainable investments domestically and abroad. Indeed KfW's evolution in the past 57 years is perhaps one of the most paradigmatic cases of an NDB adapting in order to spearhead transformational changes – such as the one required now to foster sustainable infrastructure worldwide.

Founded in 1948, with the initial capital of the KfW provided by United States Marshall Plan resources, one of the key features of the KfW, both domestically and internationally, has been that much of its lending has been driven by clear government strategies. The KfW was given a major role in funding the reconstruction after II War, the expansion of SME sector in the 60s and 70s, and the development East Germany post-unification. Nowadays, KfW operates in a strategic institutional and policy framework, namely through the renewable energy law, as well as policy measures, such as feed in tariffs, and reverse competitive auctions which have made investment in renewables commercially attractive. A similar modus operandi existed for energy efficiency.

Additional expansions of capital have been basically funded from profits of KfW itself, which have been substantial over the years. Indeed, the KfW has become the second largest commercial bank in Germany. Its large scale, and its function as a German government instrument, for to implement a clear energy strategy, have allowed it to play a major role in Germany to finance the major energy transformation in the country, and one of the most important energy transformations in Europe (known as Energie wende).

KfW refinances its lending activities mainly in the international money and capital markets. It benefits from a statutory guarantee of the German Government and associated top long-term ratings of AAA (Fitch as well as Standard & Poor's) and Aaa (Moody's), which allow it to issue bonds at the most favorable terms, therefore it is able to lend in very favorable terms; the main investors who buy KfW bonds are institutional investors, though retail investors also purchase them (Griffith-Jones, 2016).

In this context, the KfW has covered at least one third of total funding of the green transformation in Germany. However, in some years the proportion has been even higher; in 2012, KfW funded EUR 10 billion of renewable investment, which represented over 50% of renewable investment in Germany, and as much as 90% of investment in on-shore wind in Germany, and over 50% of solar PV in Germany (Griffith-Jones, 2016).

With fewer exceptions, social inclusiveness does appear to be an afterthought in most NDB infrastructure programs. Fewer programs and projects seek to provide power and access for remote and poor communities, and even fewer have built-in mechanisms for engagement with the communities surrounding projects that do take place. Of course, well-planned infrastructure projects can create jobs and other multiplier effects, but the municipalities and communities where infrastructure transformations are taking place may not always be the recipients of such benefits. For instance, the Belo Monte hydroelectric dam, financed by the BNDES, did not incorporate key safeguard measures and has been met by massive local and global resistance--costing the participating firms and banks \$1.4 to \$5 million per day of delay due to protest (Nielson and Lima, 2013).

However, there are some successful cases. In South Africa some of the development banks have established community trusts that enable local communities to access and share the benefits of infrastructure projects, though as our Africa study reveals these programs have not been without controversy (Bradlow and Humphrey, 2016). Indian banks and the KfW have attempted to put in place safeguard policies that include local communities into decision-making and benefit sharing, though also to mixed results. Sometimes such measures can be seen as onerous and delay projects and prevent needed infrastructure to occur (Humphrey, 2015).

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III. National development banks: poised to lead?

National development banks may have a unique role to play with respect to fostering sustainable infrastructure investments – even though they must also face their own significant challenges.

First, they are policy instruments and thus often part of the preparation, implementation and monitoring of national development strategies. They can thus play leading roles in the governance, leadership and monitoring of sustainable infrastructure projects. As instruments for national policies goals, NDBs can take the lead in setting national development strategies in their broader global context and can be seen to have more legitimacy and buy-in from citizens and communities.

Second, NDBs are by definition embedded local markets and by having local knowledge NDBs are often poised to identify and mitigate various risks in the project cycle. In addition, NDBs are also poised to understand and assess the co-benefits of various sustainable infrastructure projects. For instance, NDBs are often equipped to identify and quantify instances where cleaner energy production or smart metro lines in cities have global benefits (emit less carbon dioxide emissions) and local benefits as well (emit less localized air pollutants that cause serious public health risks). By being tied to local credit markets, NDBs also help bal-

ance currency risks within particular projects financed.

Third, NDBs can also play significant roles in leveraging finance from abroad and in the local private sector. NDBs are more closely tied to domestic capital markets and other private sector players that can be 'crowded-in' to sustainable infrastructure projects—as in the case of NAFIN mentioned in the box below. Finally, NDBs have the potential to group and aggregate large numbers of smaller projects in order to securitize them and gain access to international capital markets.

Box 1 – NAFIN and the crowding-in of private capital to green investments

Mexico's Nacional Financiera (NAFIN) was created in 1934 with the overall objective of promoting the development and modernization of Mexico's industrial sector, and its current core mission is to promote the competitiveness of small and medium sized enterprises (SMEs). Nevertheless, NAFIN has become a key agent in the implementation of Mexico's low-carbon development strategy (NAFIN, 2016; Smallridge et al., 2013). Since 2009, it has leveraged national and international resources to finance strategic infrastructure investments in renewable energies. In order to engage the private sector in the development of green infrastructure, it has offered a wide range of financing products including long term loans for project development, contingent credit lines to cover transitory cash-flow shortages during the project life cycle, guarantees, and other risk sharing mechanisms (NAFIN, 2014).

NAFIN has a remarkable experience mobilizing, blending and leveraging financial resources coming from multilateral development banks, climate change funds, private investments, and its own budget. In 2011, NAFIN received a US\$70 million loan from the Clean Technology Fund (CTF) to finance renewable energy projects. These resources were blended with US\$370 million from the Inter-American Development Bank, US\$798 from NAFIN, and approximately US\$4 billion from various sources including private investments (NAFIN, 2015). This resulted in a total investment of about US\$6 billion representing 2.8 GW in installed capacity (solar, wind and hydro) and approximately 6.4 million tons of CO₂ emissions avoided once all the projects are operating (NAFIN, 2015).

Apart from financing renewable energy projects, NAFIN has also started to develop an innovative risk mitigation mechanism to unleash the potential of other clean energy sources such as geothermal. The Ministry of Energy, the Inter-American Development Bank, the Clean Technology Fund, NAFIN, and the insurance company Munich RE are collaborating in the design and implementation of a risk mitigation instrument for the early stages of geothermal exploration (NAFIN, 2015; IDB, 2014). These instruments will provide insurance during exploratory perforations. NAFIN will be in charge of canalizing and blending resources requiring a minimum of 30% investment from the project developers (NAFIN, 2015). The program is in its early stages but it has the potential of allowing the installation of 300MW of geothermal capacity and an estimated reduction of 1.1 million tons of CO₂ per year (IDB, 2014).

Furthermore, since NDBs are mission-oriented institutions, they can be mandated to expand their role in such projects, promote the scaling up of successful investments, and to leverage capital towards their financing. Learning processes can be accelerated by exposing their technical staff to best practices around the world, particularly from nations which share similar challenges – be it institutional or about capabilities.

That said, NDBs also face at least three challenges in terms of scale, politics and policy, and macro-economic environments. With a few exceptions the size of NDBs are miniscule relative to the size of the infrastructure gap that a country faces. With small size can also come limited capacity to engage in an efficient manner with project identification, design, and beyond.

Many governments have no clear development strategies and/or NDBs lack sustained political and policy support. Infrastructure finance requires long-run planning, policy orientation, and expertise. NDBs however can be susceptible to shorter-run political and electoral cycles that can lead to shifting priorities. Moreover, without the proper checks and balances in place, NDBs can be more susceptible to corruption and can have trouble avoiding rent-seeking behavior that can further distort policy priorities and bank efficacy (Amsden, 2001; Musacchio and Lazzarini, 2014).

Finally, especially in emerging market and developing countries, NDBs are hindered by the same external macro-financial challenges. Because of perceived risk, inflation targeting, and capital flow management many emerging market and developing countries face high interest rates and costs of financing—even in the presence of good macroeconomic ‘fundamentals.’

With over \$5 trillion in assets, NDBs are too significant to be overlooked. If the world community is to be serious about meeting the SDGs and Paris commitments, accelerating capital flows into sustainable infrastructure projects that are low carbon and socially inclusive should be high on the agenda. Development banks in general, and national development banks in particular, will need to maximize their comparative advantages and cooperate on local, national, regional and global levels in order for this potential to be realized.

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