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Climate Change and International Finance:

Toward the Creation of an African Green Bank

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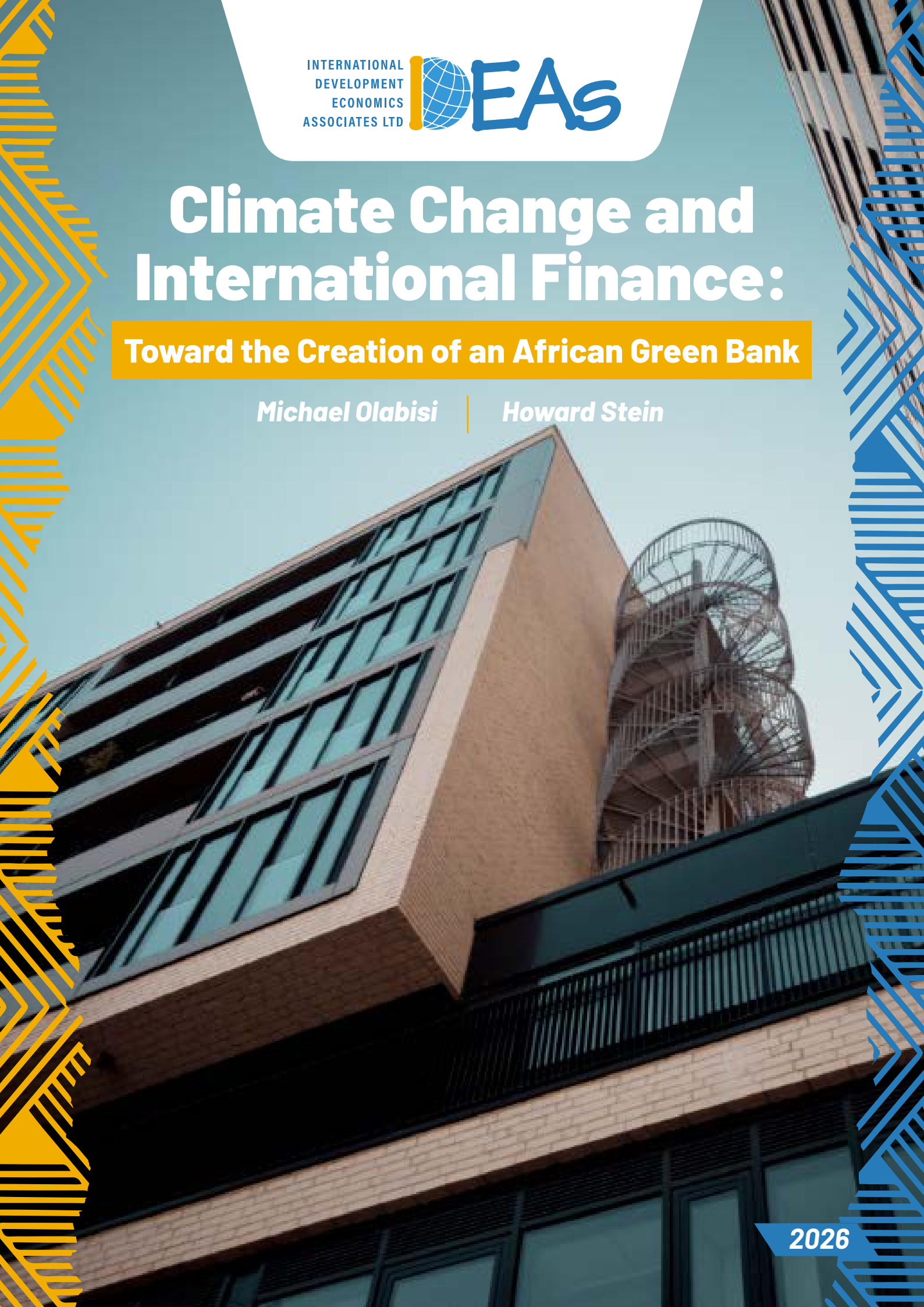

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Michael Olabisi and Howard Stein

Abstract

Africa can be the key player that shifts the trajectory of the global transition to a sustainable economy. This shift calls for a serious rethinking of the global financial architecture. In this article, we propose the creation of a regionally focused global repository of climate finance, an Africa-based Green Bank, as a crucial step toward remaking the global financial order to address the global climate challenge. The proposal is a robust follow up to the Nairobi Declaration which recognizes that the power to address the global climate challenge, in many ways, is tied to Africa's renewable energy potential.

In many scenarios for the next century, the climate is so changed that millions die, global crises ensue, and several economies are wiped out. Meanwhile, in the current financial order, African economies are stuck in a vicious cycle of commodity dependence, economic instability, and periodic debt crises that limit the capacity of African states to deal with structural weaknesses. Green banking for Africa's renewable potential can create a capital base that supports the creation of green-focused manufacturing capacity and green energy projects. The architecture of the Green Bank supports global prosperity through significant greenhouse gas reductions while helping African countries achieve more stable and sustainable economies.

JEL Classification

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Key words

Climate Change, Development Banks, Industrial Policy, Africa, Green Energy, Green Manufacturing

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Introduction

The entire planet faces the challenge of climate change, evidenced by a pattern of increasing climate disaster events including 28 confirmed weather-climate disaster events with losses over a billion dollars in the US alone, and a global count of 175 for flood, drought, and extreme-weather disasters in 2022 (Newman and Noy, 2023; NCEI, 2023). It is impossible to address this crisis without a primary role for African economies. While perspectives may vary on how Africa can be involved in a global solution to the climate challenge, the need for Africa-based resources for most solution pathways is undeniable. Some of the best locations for renewable solar resources on the planet are in Africa (Olabisi, 2024; Solar Atlas, 2023) and while it may not be obvious, some of the top locations with potential for wind are in the transition zones to the tropics (Wind Atlas, 2023). A solar panel in Africa provides more energy, which translates directly into US dollars per day of output than the same solar panel, placed in the northern parts of the Asian, European, or North American continents. Despite Africa's centrality to addressing climate change, finance has been an obstacle to the renewable energy transition in Africa (Olabisi, 2024; Olabisi et al., 2023).

Purpose: To enable a global green transition that includes Africa, we propose an African Green Bank whose role would be to support and stimulate the full range of activities needed for a transition to a renewable energy-based sustainable economy. Just as mortgage banks helped to create a robust housing market in many high-income countries, and the industrial banks helped to drive industrial growth in east Asia (e.g., Lockwood, 2015), we see a role for a financial institution tasked solely with turning Africa's renewable economy potential into real investments, jobs and positive climate action at the global scale. The proposed institution bridges a critical gap between the potential sources of finance, and the public or private-sector organizations that require investments to transform Africa's energy and economic landscape. The proposed bank will address the unduly high capital costs faced by African clean energy projects. It will also offer a contrast to existing American or European Green New Deals which are often conceived in isolation from their global impact.

Activity focus: The activities supported by the bank will range from mining and the industrial production of equipment for the generation and storage of energy to low-carbon (or green) manufacturing in Africa and the deployment of renewable energy-based production. One key advantage that derives from structuring the bank to support the full value chain of activities in the transition to a green economy is that such an approach can help to address the perennial structural weaknesses that have slowed African economic progress since political independence, The structure we propose for organizing the bank also includes innovations designed to address many of the challenges linked to financing development on the continent over the past decades.

Structure: The structure of the institution must be such that its survival, and the totality of its economic incentives are tied to the sustainability of our shared planet, and the economic well-being of the residents of the African continent. In particular, the stated mission, control and leadership of the organization must be exclusively African in order to address issues of equity, avoid conflicts of interest, and ensure unwavering commitment. This point marks a significant departure from the existing multilateral institutions like the World Bank and International Monetary Fund or others with substantial non-African ownership and control like the African Development Bank (AfDB). The board of the AfDB currently has 20 members, with 13 representing the 54 African countries and seven from the 27 non-regional member countries that control about 40% of its voting rights (AfDB, 2023).

Financing: A new institution like the African Green Bank can address needs that are not met by the status quo. The African Green Bank's primary advantage can be a more efficient and appropriate transmission of funding to existing institutions, as none of the major institutions currently offering loans and aid to African countries are engaged in the business of industrialization. The expertise needed for unlocking the potential of an entire renewable energy value chain does not lie within the core competencies of any of the existing institutions. Furthermore, a new institution, especially one using a broader set of theories as the foundation for its operating principles, represents a step away from the contentious histories that African countries have had with multilateral lending institutions. This last point can be crucial for creating buy-in and a sense of ownership among African leaders.

The proposed bank responds to the needs of African citizens and fits the goals of the international community's commitments to implement transfers to developing countries in the Paris Accord. It offers an opportunity to tailor an institution to the needs of this unique period in history, and sidesteps the challenges facing existing multilateral financial institutions, without necessarily discarding their expertise when tailored to African requests and needs. It is positioned to shift the paradigm of financial control toward frameworks that serve Africa and the Global South. The AGB will also aim to firmly place the full value chain of the production of vital goods for climate change mitigation and adaptation on the continent instead of extracting and shipping out the key minerals needed for those goods. It sets up an effective tool for achieving the UN Sustainable Development Goals, simultaneously reducing poverty, and creating employment, while fostering effective climate action.

African Policy Proposals for Climate Change

Green industrialization was the focus of a second round of meetings of African heads of state that took place at COP28 (December 2, 2023). Presidents and representatives of Kenya, Angola, Burundi, Djibouti, Ghana, Côte d'Ivoire, Mauritania, Nigeria, Senegal, and Zambia launched the African Green Industrialization Initiative (AGII) at the meeting. COP28 President Sultan Ahmed Al Jaber and the UAE also participated. The UAE dedicated $4.5 billion to green industrial investment. One proposal to come out of these meetings was Mauritania's plan to develop green hydrogen and ammonia for export, drawing on gas, solar and wind energy. Other national leaders discussed the abundant wind potential and the need for pathways to green industrialization. Africa has raw materials needed to power green industrialization, including bauxite (the aluminum-rich ore used for primary aluminum production), steel and iron ore, among others (Malasi, 2023a; Malasi, 2023b Agrawal, 2023).

The pathways to green industrialization call for the finance and know-how that adds value to the raw materials. The value-added steps will go farther than the status quo of basic raw material or fuel exports and serve the continent better than ideas to export green ammonia or hydrogen fuel. These arguments for green industrialization corresponded with the consensus of the recently issued Nairobi Declaration. The 66-point Nairobi Declaration summarizes the main points of the first African climate change summit in September 2023. Heads of African states met in Kenya and pointed to potential transformative interventions to address climate change, including Africa-focused investment to catalyze new industries to transform the planet (20), leapfrogging the traditional progression of industrial development to foster green production (24), strengthen continental collaboration to enable and advance green growth including greater grid connections (28), and expand energy intense industries to create a virtuous circle of green energy and green growth that adds value to Africa's natural resources (29).

The proposals of the Nairobi Declaration are to be accomplished by channeling $100 billion of SDRs through the African Development Bank, issuing new SDRs, expanding concessional multilateral development bank finance, improving debt management by drawing on the expert review embedded in the Common Framework and the Debt Sustainability Analysis, debt moratorium and relief, mechanisms to de-risk private capital to encourage investment and greater tax cooperation to limit African tax losses (52)(Africa Union, 2023). One weakness of the proposed approach is that the African Development Bank is not a specialized climate finance institution and like other multilateral financial institutions, has a limited track record with the kinds of industrialization on the continent needed to meet the challenges of climate change (Stein, 2008, Forum on the African Development Bank ,2009; Bazbauers and Engles, 2021, Boas and McNeil, 2003 a, b; Ikpe, 2020; Mingst,1990).

In the first place, green industrialization should be truly green, it should result in lower net global emissions and be based on proven technologies. It should also address the structural issues that have plagued many African economies for decades and relegated the continent's producers to the role of vulnerable suppliers of raw materials on the periphery of the global economy. Remedying the terms of trade status quo while addressing climate change represents a win-win for global and African interests. What is clearly missing is an organization that can focus on coordinating finance and industrial policy in a manner that can stimulate the economic capacities of the continent to deal with the adaptation to climate change while mitigating its impact. The economic capacities needed include green-production and services, infrastructure, and knowledge systems. The Nairobi Declaration noted that:

> "...despite Africa having an estimated 40 percent of the world's renewable energy resources, only $60 billion or two percent of US$3 trillion renewable energy investments in the last decade have come to Africa (clause 14)"

The Nairobi Declaration provided a path to bridge the gap in investments, but we will argue that the path proposed in the Nairobi declaration does not address the governance and institutional issues that have held back investors from African renewable energy.

The meeting of heads of state at COP28 focused on financing. William Ruto, the President of Kenya, suggested the solution to the challenges of green industrialization might be to "restructure the international financial architecture: "We have to empower the World Bank and the IMF for more concessional funding to young and developing countries in Africa" (Malasi, 2023b). In line with the comment above, a fair critique of this statement is that a proposal for more concessional funding through the World Bank and IMF is not likely to lead to the desired outcomes (Stein, 2008). The Nairobi Declaration, and President Ruto's advocacy for changing the international financial architecture all suggest some discontent among leaders of the Global South. There are legitimate arguments to be made, that given past failures of institutions like the World Bank and IMF in Africa, other institutions should take a larger role in hosting the Loss and Damage Fund. To make multilateral spaces better serve the interest of the Global South in climate change financing, institutions like the proposed African Green Bank should substitute for some roles currently played by multilateral financial institutions.

The thought framework for the meetings of African leaders centered on the 2016 UNECA Economic Report on "Greening Africa's Industrialization". The report's principal author is Camilla Toulmin, former director of IIED and leading expert on climate change in Africa. It is easy to understand how policymakers can support industrialization, which can address some of the perennial poverty challenges of the region, while embracing the call to address global climate change. The report recognizes the importance of industrial policy, while focused on interventions to address market imperfections and failures.[1] For example, in designing interventions to support green industrialization, the focus is on six

[1] The UNECA has taken a deliberate approach to present reports in neoclassical economic terms. This was the case with UNECA, 2014. The principal author of the report and coauthor of this paper was unable to draw on other economic approaches such as original institutional economics to theoretically compose; the analytical framework

specific environmental market failures:

1) Greenhouse gases impose a negative externality;

2) Research, development, and innovation are largely "public goods";

3) Capital markets are imperfect, short-term and risk averse, and thus do not generate and allocate capital into the uncertain, long-term investments needed to address climate change;

4) Imperfect information about what other actors are likely to do induces coordination failure and slows collective action;

5) Actors operate with imperfect information about the economic and technical opportunities open to them, especially in a time of rapid change;

6) Moving to a low-carbon economy generates multiple co-benefits, or positive externalities, but individuals are unlikely to harvest those benefits directly (UNECA, 2016, p.65).

The theoretical foundations for the 2016 report can be extended, and we propose options for extending those foundations in this paper. Given that economies are shaped by wealth, power and ideas, the kind of industrial policy needed for greening industry in Africa should draw on more than one set of economic tools. There is a case to be made for drawing on structural economics and original institutional economic theory. Such a broader base for theory can tap into the strengths of frameworks that reflect the crucial role of institutions while avoiding the weaknesses embedded in the constructs used in the 2016 report. Here, market imperfections are seen as any deviation from ideal situations with perfect markets and fully informed utility maximizing atomistic agents, when such deviations are the norm in most low-income economies. Hence, policy in this vision is predicated on individualized models of rational choice.

Taking a broader set of theories to shape the foundation of the response to a broad challenge like green industrialization in Africa reduces the risk of creating solutions that falter because the actions of governments, corporations and households deviate from stylized models of individualized rational choice applied to collective action. In many situations within developing economies, what economists call a market imperfection is a tool for sustaining advantage by one party in an economic system (Stein et al, 2026).

In looking for theoretical frameworks that address some of the complexity of climate change, one could draw for example on Swaney (1987), who points out:

> Even if all resources were privately owned, all markets were perfectly competitive, and the distribution of income and wealth was fair, the free market would fail us because individual pursuit of individual objectives would produce socially undesirable outcomes. This is true even if transactions costs are zero, because future generations have no "votes" in today's marketplace. Those who would extend the assumptions of a fair income and wealth distribution, perfectly competitive markets, and zero transactions costs into the indefinite future are engaged in a tautological fairy tale. (p.1747)

Swaney argues for the concept of co-evolutionary sustainability where environmental systems evolve interdependently with human development.

In this framework, natural goods, natural resources, and life-support systems flow into the social system and the economy. The natural environment also acts as a sink that receives undesirables disposed from the economy, which can overload the sink, threatening co-evolutionary sustainability and environmental flows. The framework calls for a duality of conceptions of socio-economic systems, the natural environment, and their interdependence.

The 2016 report proposes a five-point plan of action at individual state levels, focusing on building a green industrialization vision and strategy, shifting government regulations, expenditures, and fiscal measures, and building up the capabilities to deliver the policy agenda. It is challenging to imagine green industrialization rising from individual state-actions on the continent based on the recommendations of this report, given the stark variation in the capabilities, politics, natural endowments, and financial resources across African countries including the paucity of country development banks dealing with industrialization. An African Green Bank considers both the global nature of the climate challenge, and the heterogeneity in national capacities while coordinating the implementation of solutions at the regional level.

The industrialization proposed by UNECA and broadly supported by many African leaders appears nearly impossible without financial institutions willing to assume a long-term vision, while managing the risks associated with investing in industry. The risks tied to investing in this sector are real, so a robust vision, significant levels of investment, and a coordinating organization that aligns multiple interests and multiple levels of governance are needed to achieve this form of industrialization. How can a continental plan be conceptualized and implemented in Africa? A starting point for thinking about the possibilities for this financing and coordination function, targeted at green industrialization, are the national development banks that were part of many African economies.

Development Banking + Industrial Banking

The failure of industrialization at scale in Africa is marked by a pattern of importing manufactured goods while exporting raw materials and running up foreign-currency public debt to mask structural macro-economic weaknesses. The worrisome debt situation faced by many African nations reflects this issue, as well as systemic currency disadvantages. We can therefore argue that strong institutional support for a green industrial transition can help to address some of the other macro-economic challenges seen in many countries on the continent.

Ndikumana et al, 2021 point out that national development banks (NDBs) were a central part of the policy apparatus of state-led growth and structural transformation in the 1960s and 1970s. The institutions failed, were closed, or privatized by structural adjustment policies. In some cases, they were transformed into commercial banks.[2] After 1990, privatizing state banks became an increasingly frequent condition in the World Bank Financial Sector Adjustment Loans and in the financial conditionality in general adjustment loans (Stein, 2008). Governments rapidly privatized or liquidated state banks in many African countries. In Cote d'Ivoire, four of six state development banks were liquidated by 1988 (Mkandawire, 1999).

Development Banks were designed to serve as "government-sponsored financial institutions concerned primarily with the provision of long-term capital" (Ndikumana et al. 2021, p.3). The climate challenge is one that calls for an institution with a long-run view. Such institutions even in mainstream economic theory with a long-term capital focus are justified by the prevalence of financial market failures from asymmetric information, a lack of collateral, high transaction costs, moral hazard, and the temporal mismatch between funds in the system and lending needs. Commercial banks can be reluctant to lend to new investments needed for structural transformation, given their risk aversion, and a lack of specialized skills to assess and monitor the creditworthiness of new projects. More than one economic tradition offers justifications for national development banks. Building on the traditions of Keynes (1936)

[2] One notable example is the closure of the small-enterprise support division named Small Enterprise Finance Company Limited (SEFCO) of the Development Bank of Kenya in 2002. The parent bank was formerly the Development Finance Company of Kenya, founded in 1963 and converted to a commercial bank in 1997 (Kamunde, 2010)

and Minsky (1977), Ndikumana et al. (2021) argue that banking and finance, particularly in more liberalized markets, tend toward procyclical and crisis-prone lending patterns. On the contrary, development banks can play an important stabilizing role both with short-term and long-term countercyclical finance (Griffith-Jones and Cozzi, 2016, Brei and Schclarek, 2018). Recent works show that public banks played a similar stabilizing role during the Covid-19 shock (e.g., Barrowclough, 2020; Barrowclough et al., 2020).

NDBs fulfill the role expected of them, even if they have a higher share of non-performing loans, which should not be surprising, given their riskier portfolios (Ndikumana, 2021). They are not necessarily less profitable than commercial banks, in a manner that is statistically significant. Larger banks were more profitable in both the public and private sectors. Longer-term lending led to higher profitability compared to short-term lending. The authors tapped the Bankfocus data set and several African case studies to evaluate the lending practices and profitability of 49 national development banks, compared to 543 private and public commercial banks. Notably, 22 of the 52 countries in the data set do not include a national development bank. As predicted, the share of medium and long-term loans is 22% higher for national development banks in the Bankfocus data, compared to the private commercial banks. The evidence suggests that NDBs fulfilled the role expected of them, that of meeting long-term capital needs.

The work of Ndikumana et al. (2021) on national development banks and their long-term lending ability can be extended in one important way, which we address in this paper. That is, asking how they structurally transform their economies through their lending activities. This includes an analysis of the sectors that receive support from the NDBs. Once one perceives national development banks as industrial policy organizations (IPOs) one can bring insights from a wide variety of theoretical tools to conceptualize their nature and role in the economy. IPOs are entities of containment with their own internal dynamics fully able to shape and enhance procedural and conceptual capabilities but also should be seen as institutionally connected to other entities through organizational fields where correlative behavior arises from common meaning and purpose.

An industrial policy framework can be described as a broad network of government ministries, industrial policy organizations, and private sector firms joined in a coordinated effort to expand industrial production. In this sense, an industrial policy organization like an NDB is not simply a medium- and long-term lender, but part of a wider effort to transform the structures of economies and livelihoods of populations (Stein et al, 2026). Our proposal applies this logic to climate action finance on a continent-wide scale.

The Institute of New Structural Economics (2024), in cooperation with the Agence Francaise de Developpement, has so far documented 74 development financial institutions in 33 African countries (See appendix). The Bankfocus database used by Ndikumana et al, 2021 lists other countries with development banks that are not included in the INSE site: Burundi, Congo, Libya, Mauritius, Mozambique, Seychelles, and Togo. The gap in the data suggests limitations on how we can interpret the Ndikumana et al. (2021) study. The biggest category of bank classifications by sector is the flexible group (22 banks). The second largest group is that of enterprises specializing in micro-, small and medium-sized enterprises (17). Nine countries have banks focused on agriculture, four have financial institutions emphasizing infrastructure, three emphasize lending for housing, and another three on export-import financing. Namibia is the only country listing an environmentally focused investment bank.

Only six countries have banks that are explicitly focused on industrialization (Egypt, Eswatini, Kenya, South Africa, Zambia, and Zimbabwe), but three of these are specializing in micro-, small and medium-sized enterprises, illustrating the paucity of existing national institutions that can deal with the challenges of climate change and the related exigencies of green industrialization. One advantage of our proposal is that it avoids the critique of public banks in developing economies as captured by national politics, thereby reducing efficiency, undermining financial development, and retarding economic growth (e.g., LaPorta et al., 2022). While there has been some pushback against this view, including by Ndikumana et al., (2021), our proposal offers a continent-wide solution that is free from the control of individual nation-state politicians, while pursuing goals that can offer benefits at the local, national, and global levels. We explore this further in the following discussion of options for the bank's ownership, control, and operational structure.

The Case for a New Institution

Few of the key institutions currently offering loans and development assistance to African countries, are primarily in the business of industrialization. The expertise or institutional knowledge needed for unlocking the potential of an entire value chain tied to renewable energy is not the strong point of the regional development bank and international financial institutions serving African governments. Full participation in a global response to climate change by African countries call for high levels of industrialization (Zhang, 2011; Opoku and Boachie, 2020). The proposed industrialization provides both the finished and intermediate goods of a cleaner economy produced using materials available on the continent in ways that reduce global environmental pollution, while supporting jobs that reduce poverty and raise the earning ability of the continent's growing population.

There is a new-wine-into-new-wineskins argument to be made for organizing the expertise needed for driving a new initiative, based on a different paradigm, through a new institution. In principle, existing banks can acquire this expertise and pivot their operations to address the task. In practice, the combination of the climate change agenda and the needed green industrialization response, is new to the existing institutions, and deserves its own organizational resources. The contentious histories that African countries have had with multilateral lending institutions, can hold back the full participation of African countries in the proposed Bank. Many of the current leaders have experience with economic hardships tied to structural adjustment programs of past decades, or the adverse economic effects linked to the conditionalities of balance-of-payment loans. Some of the policy leaders and thinkers of the region may prefer, if they had a say in the process, to have another custodian for a major new initiative designed to reflect the wishes of Africans for green industrialization and a renewable energy-based economy. As such, a new organization, organized differently and reflecting a broader set of theories in its operating principle may be more compelling for getting buy-in with a sense of ownership from African leaders.

The Structure of the Green Bank

The paucity of national and subregional development banking institutions specializing in industrialization makes the need for organizing a structure to generate green industrialization even more pressing. An African Green Bank has the potential to design transformative strategies at the national, regional, and continental levels, secure financial resources, concentrate scarce capacities in engineering, organizational design, business management, and environmental sciences, and supply financial, economic and legal experts that are open to a wide variety of theoretical and policy tools.

Governance: The African Green Bank needs to be region-based rather than beholden to any national government, with a mission to address regional needs in careful balance with the national interests of participating countries. We suggest a partnership with the African Union (AU) secretariat for coordinating functions with African nation-states. It should, more importantly, be independent of all countries outside the region. It is crucial that the management, capital and voting structure be controlled by African countries to avoid the problems experienced with other pan-African organizations.

Keeping control of the Bank on the continent avoids possible conflicts of interest with extra-regional owners that may have short-term interests that run against the proposed Green Bank's mission. The Green Bank should have a board with directors drawn from across many African countries with no directors having ties outside the continent. Africans should be able to trust the AGB as free from outside interests, and outsiders should be able to trust the AGB as competent and independent of any national government.

Financing: The African Green Bank's capital base should come from African countries' capital contributions, contributions from partner organizations within and outside the region (with no conditionalities except to ensure the funding is used for its stated purpose), and from transfers linked to global climate initiatives like the Green Climate Fund. Capital contributions should be based on the comparative size of African countries. In 2022, the GDP of Africa was estimated at $2.98T. Nigeria with the largest GDP ($0.48T) would therefore pay in 16% of the capital but would also get 16% of the votes. Egypt, the second largest would receive 15.9% of the vote and South Africa with the third largest economy would receive 13.6% of the vote. The capital deposit can be a mix of domestic currency and dollars, to support the stability of the currencies where the Bank does business. To motivate contributions from African economies, eligibility for loans to state-supported projects could be limited to a multiple of each country's capital contributions.

A possible source of finance for the Green Bank is the promised $100bn/year Paris Accord payments, and other climate change compensation including portions of the $300bn/year promised at COP29 (UNFCC, 2024) which has been reaffirmed at COP 30 (Stuckert, 2025). The bank can resolve the two-way trust issues that have held back climate finance for more than a decade. On the one hand, developing economies have no reason to trust high-income countries particularly with the reversals in US policy that followed the 2024 election. Africans have reason to be cautious, when high income countries commit to a responsibility of $100bn/year of climate action in developing economies and do not deliver (Timperley, 2020). Developing countries are justified in their reservations regarding the promises of the Copenhagen and Paris Accords, especially if OECD countries are reporting climate finance payments that never reach any developing country (Carty et al., 2020). On the other hand, high-income countries may be skeptical about handing climate finance funds to or through governments that they perceive as corrupt, or as less technically capable.

The proposed Green Bank provides a transparent channel for finance that can be accountable to the people affected by climate change and can report on climate actions undertaken to the global community of supporters and contributors. The bank can also provide monitoring services for delivering loss and damage compensation payments agreed upon at COP 27. Trust can also be fostered by the professional nature of employees and management of the AGB. By design, the Green Bank should have the largest concentration of experts in relevant areas of engineering and science and industrial policy on the continent. Similar to the Taiwanese manufacturing extension service, the AGB can make this workforce available as a green extension force to advise manufacturers and projects dealing with climate change mitigation and adaptation, even if investments in this area are not directly financed by the AGB.

The bank can also tap private international financial markets for funds that help reduce the cost of capital for clean energy projects in Africa. Recent estimates suggest that the cost of capital in Africa is two to three times higher than in high-income countries (IEA, 2023). Most of the difference in capital costs can be explained by the country, not the type of project. For example, the cost of capital for a wind farm in Kenya will be higher than the global average, not necessarily because the cost of capital for wind farms is high, but simply because the costs of capital for Kenyan projects are high. The pattern fits earlier work that showcases this added burden African countries bear in seeking funds (c.f., Olabisi and Stein, 2015; Olabisi and Stein, 2024) The Green Bank can float bonds on international markets on the strength of its capital base. The borrowed funds can be lent to private-sector projects and countries at a lower rate that comes closer to reflecting the value of climate action in Africa.

The proposed bank can add inflows from ownership stakes in private and public-sector projects it supports on the continent. This follows the model of main banks in Japan that took an ownership stake in their clients, earning interest and equity revenue from their stake in the businesses (c.f., Aoki and Patrick, 1994; Sheard, 1989; Stein, 2002). German 'Hausbanks' performed similar functions and earned revenue in the same way (Gorton and Schmid, 2000). Proponents of these two examples of governance emphasize the monitoring functions that banks can perform, which applies to our scenario, where scores of new projects that need expert monitoring are expected to be funded by the Bank. A key difference in our proposal is that the AGB is to work as a regional model, while the foregoing examples are national banking models.

Organizational Structure: As part of its work on boosting economic resilience, to support climate resilience, the Bank could act as a clearinghouse for intra-African trade, reducing problems of trading in scarce foreign currency faced by many African countries. This currency clearinghouse role can dovetail with other tasks undertaken by the bank to build industrial capacity for green industrialization and green energy. For example, support for building solar panel production by companies in African countries for deployment in energy generation could work well while limiting the costs and challenges of seeking foreign currency to facilitate exchanges in that value chain. In this sense, the AGB's role fits within the larger framework of coordination and facilitation for value chains tied to green industrialization.

A coordinated effort at green industrialization can help build value chains in Africa that break free of the pattern of the past decades. This warning featured in recent work by Gabor and Sylla (2023), who argue that the current approach of Namibia aimed at de-risking foreign investment to increase raw material inputs into the global hydrogen value chain, is likely to reproduce the enclave economy where the rules are set, and the benefits go overseas, while Namibia misses opportunities for broad-based development. Similar opportunities for hydrogen exist in other African countries, (e.g., South Africa and Mali). In May 2022, Egypt, Kenya, Mauritania, Morocco, Namibia, and South Africa formed the Africa Green Hydrogen Alliance to work together on this opportunity (AGHA, 2024). An African Green Bank could help generate new forms of public ownership and control that ensures that the value chain is largely embedded on the continent.

To achieve the multiple functions outlined in the previous paragraphs, the Green Bank could be organized on thematic lines. Our suggestion is for seven interdependent units that share governance and leadership structures. The first three units would provide finance and investment services to the green sector. The first unit focuses on green energy production. The unit's activities could include banking for wind, geothermal, solar, or tidal energy projects as well as green energy related infrastructure. The second unit could focus on agricultural and related value chain activities that employ green technology. This unit could support the integration of agri-food processes across multiple African

countries, (yielding the outcome expected from industrial policy initiatives). The third unit is to support the downstream processing and manufacturing activities that flow from the mining of materials needed for a renewable energy transition. Notable examples include aluminum, cobalt, and lithium, as well as rare earth metals like dysprosium and terbium.

Producing goods on the continent from these metals is a win-win policy that should be one of the explicit goals of the Bank. This is related to the need to develop goods and services for climate change adaptation. For example, supporting companies that manufacture and install solar based drip irrigation systems could help deal with climate related droughts in many parts of the continent. For this purpose, we propose a fourth unit which is aimed at expanding climate change adaptation goods production, encouraging value chain integration, and developing and supporting the commercialization of end products. The success of this segment of the bank is contingent on coordination with national governments through incentives, subsidies and penalties on a domestic and regional level.

The last three units would play more direct service roles than the others. The fifth unit serves as the investment intermediary that attracts and brokers foreign investment to key green industries in African countries. The sixth unit would coordinate an extension service to assist green energy projects. These services could be available for non-Green Bank projects. The seventh division is the holding company that specializes in the monitoring and reporting functions described previously, where funds allocated to green projects combine loans and equity. This unit would ensure adequate monitoring and transparency while drawing on the expertise of the Bank. Members of the Green Bank, coordinated through this unit, can be on the management board of each organization receiving project funds.

Most African countries do not have much familiarity with industrial policy or the technical expertise to assist with new manufacturing industries. Therefore, the Green Bank can serve as a repository of expertise to assist with developing new projects. Eventually, we could see the organization of sub-regional and national branches of the Green Bank.

Possible Indirect Benefits of the Green Bank

Having an African Green Bank as a driver of green industrialization in Africa can provide the added benefit of stabilizing the currencies of countries in the region. The stabilizing effect is needed, given the systemic currency disadvantages described earlier in the paper as a key barrier to green industrialization for many African countries. The effect comes from two features. First, the exportable revenue and exports from the Bank-supported projects relieve the pressure for foreign currency in the projects' host countries. In principle, given the dvantages tied to the endowments of wind and solar resources on the continent, there should be more exports of energy intensive manufacturing on the continent for both African and international consumption. Second, offering African countries (even if limited) options to meet their obligations in local currencies to the Bank, can help to relieve some of the downward pressure most countries face on their currencies. The Bank can offer this option, in part because it will have spending commitments in local currencies in those countries, and the investments themselves are geared to support the stability of the economies in question. As its operations ramp up in scale, the Green Bank loans in international currencies could accommodate greater shares of repayment in African domestic currencies.

As a custodian of value for many countries, the bank can facilitate international transfers and exchanges within the continent, especially when such transfers are tied to the value chains of projects in the Bank's portfolio. For example, payments from a solar farm or utility in Tanzania to a solar cell manufacturing plant in Kenya or Ethiopia could be simply coded to the respective balances of each project at the Bank, when both corporations are partly owned by the Bank and are the Bank's clients.

Conclusions

In this paper, we propose a new institution, an African Green Bank, to address the multiple challenges of coordinating effective climate action and to serve private and public sector projects at all stages of the value chain needed for a renewable energy transition in the region. The Bank will help unlock the untapped value in Africa's renewable energy resource potential, as it lends to and monitors investments in renewable energy generation, renewable energy infrastructure, green manufacturing, and adaptive activities in the agricultural sector.

In the context of the challenge of climate change, which is poised to hit the African region harder than others (Schlenker and Lobell, 2010), we describe the policy positions of African political leaders on climate change, the need for revisiting development banking, and a set of proposals for the structure of the Green Bank. We also mention possible indirect benefits of having a well-funded stable banking entity that supports renewable energy –based economic trade and growth in the region.

In summarizing the position of African policymakers, we highlight the broad consensus put forward at the 2023 African Climate Summit: African economies are open to green industrialization and moving towards a renewable energy-based economy provided that the investment conditions required to enable such a transition are available. Our reflection on development banks extends the evidence and theory, notably Ndikumana et al. (2021), on how they have served developing economies, and how their experience can be useful in conceiving the operations of a Green Bank. The proposals for the structure of the African Green Bank – its operations, ownership and control address key opportunities and lessons that we can draw from the experience of development banks, as well as the regional and international financial institutions that serve the region today.

We are hopeful that timely action by policymakers and investors in the interest of the long-run sustainability of the global economy will include take-up of this proposal. We urge action to translate what we have laid out as a framework into the reality of an institution that creates positive synergy for Africa and the world at large.

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Appendix

List of African National Development Finance Institutions

Source: Institute of New Structural Economics, Peking University
http://www.dfidatabase.pku.edu.cn/DataVisualization/index.htm

Name of PDB&DFI	Establishment Year	Levels of Ownership	Country	Total Assets (million USD)	Size Category	Official Mandate	Income Group
Industrial Development Corporation	1940	NATIONAL	South Africa	10,917	Small	FLEX	UMIC
Development Bank of Southern Africa	1983	NATIONAL	South Africa	6,842	Small	FLEX	UMIC
Land and Agricultural Development Bank of South Africa	1912	NATIONAL	South Africa	2,377	Small	AGRI	UMIC
National Housing Finance Corporation	1996	NATIONAL	South Africa	494	Micro	HOUS	UMIC
Small enterprise Finance Agency	2012	NATIONAL	South Africa	399	Micro	MSME	UMIC
Lesotho National Development Corporation	1967	NATIONAL	Lesotho	145	Micro	FLEX	LMIC
Lesotho National Development Corporation	1967	NATIONAL	Lesotho	145	Micro	FLEX	LMIC
Eswatini Development Finance Corporation	1995	NATIONAL	Eswatini	87	Micro	MSME	LMIC
Eswatini National Industrial Development Company	1971	NATIONAL	Eswatini	NI	NI	MSME	LMIC
The Industrial Development Company of Eswatini	1987	NATIONAL	Eswatini	NI	NI	MSME	LMIC
Botswana Development Corporation	1970	NATIONAL	Botswana	463	Micro	MSME	UMIC
Citizen Entrepreneurial Development Agency	2001	NATIONAL	Botswana	159	Micro	MSME	UMIC
National Development Bank	1963	NATIONAL	Botswana	126	Micro	FLEX	UMIC

Name of PDB&DFI	Establishment Year	Levels of Ownership	Country	Total Assets (million USD)	Size Category	Official Mandate	Income Group
Industrial Development Corporation of Zimbabwe Limited.	1940	NATIONAL	Zimbabwe	139	Micro	INFRA	LMIC
Agricultural Bank of Zimbabwe	1999	NATIONAL	Zimbabwe	91	Micro	AGRI	LMIC
Infrastructure Development Bank of Zimbabwe	2005	NATIONAL	Zimbabwe	57	Micro	INFRA	LMIC
Small & Medium Enterprises Development Corporation	1983	NATIONAL	Zimbabwe	10	Micro	MSME	LMIC
Zimbabwe Women's Microfinance Bank	2017	NATIONAL	Zimbabwe	10	Micro	MSME	LMIC
Development Bank of Namibia	2004	NATIONAL	Namibia	538	Small	FLEX	UMIC
Agricultural Bank of Namibia	1907	NATIONAL	Namibia	234	Micro	AGRI	UMIC
Environmental Investment Fund of Namibia	2001	NATIONAL	Namibia	13	Micro	FLEX	UMIC
Development Bank of Angola	2006	NATIONAL	Angola	775	Small	FLEX	LMIC
Industrial development Corporation Zambia	2014	NATIONAL	Zambia	1,588	Small	FLEX	LIC
Zambian Investment Holding	1937	NATIONAL	Zambia	3,651	Small	INFRA	LIC
Development Bank of Zambia	1972	NATIONAL	Zambia	123	Micro	FLEX	LIC
Citizen Empowerment Commission	2006	NATIONAL	Zambia	3	Micro	FLEX	LIC
Export Development Fund	2012	NATIONAL	Malawi	NI	NI	EXIM	LIC
Industry Promotion Fund	1989	NATIONAL	D.R. Congo	364	Micro	MSME	LIC
Development Finance Company	1970	NATIONAL	D.R. Congo	NI	NI	MSME	LIC
TIB Development Bank	1970	NATIONAL	Tanzania	278	Micro	FLEX	LMIC

Name of PDB&DFI	Establishment Year	Levels of Ownership	Country	Total Assets (million USD)	Size Category	Official Mandate	Income Group
Tanzania Agricultural Development Bank	2002	NATIONAL	Tanzania	156	Micro	AGRI	LMIC
Development Bank of Rwanda	1967	NATIONAL	Rwanda	307	Micro	FLEX	LIC
Agricultural Finance Corporation	1963	NATIONAL	Kenya	104	Micro	AGRI	LMIC
Kenya Industrial Estates Fungua Viwanda	1967	NATIONAL	Kenya	32	Micro	MSME	LMIC
Kenya Development Corporation Ltd	1954	NATIONAL	Kenya	NI	NI	FLEX	LMIC
Uganda Development Bank	1972	NATIONAL	Uganda	344	Micro	FLEX	LIC
Somali Development and Reconstruction Bank	2012	NATIONAL	Somalia	NI	NI	FLEX	LIC
Caisse des Dépôts et Consignations Gabon	2010	NATIONAL	Gabon	831	Small	FLEX	UMIC
Development Bank of Ethiopia	1909	NATIONAL	Ethiopia	3,132	Small	FLEX	LIC
Agricultural Bank of Sudan	1959	NATIONAL	Sudan	NI	NI	AGRI	LIC
National Investment Company	1964	NATIONAL	Cameroon	1,695	Small	MSME	LMIC
Caisse des Dépôts et Consignations Cameroon	2010	NATIONAL	Cameroon	309	Micro	FLEX	LMIC
Bank of Industry	1959	NATIONAL	Nigeria	4,155	Small	FLEX	LMIC
Development Bank of Nigeria	2017	NATIONAL	Nigeria	1,217	Small	MSME	LMIC
Nigerian Export-Import Bank	1991	NATIONAL	Nigeria	423	Micro	EXIM	LMIC
The Infrastructure Bank PLC	1992	NATIONAL	Nigeria	15	Micro	INFRA	LMIC
Federal Mortgage Bank of Nigeria	1956	NATIONAL	Nigeria	NI	NI	HOUS	LMIC
National Economic Reconstruction Fund	1989	NATIONAL	Nigeria	NI	NI	MSME	LMIC

Name of PDB&DFI	Establishment Year	Levels of Ownership	Country	Total Assets (million USD)	Size Category	Official Mandate	Income Group
Ghana Infrastructure Investment Fund	2014	NATIONAL	Ghana	325	Micro	INFRA	LMIC
Ghana Export-Import Bank	2016	NATIONAL	Ghana	226	Micro	EXIM	LMIC
Development Bank of Ghana	2021	NATIONAL	Ghana	NI	NI	FLEX	LMIC
National Investment Bank	1959	NATIONAL	Côte d'Ivoire	1,848	Small	FLEX	LMIC
Caisse des Dépôts et Consignations Côte d'Ivoire	2018	NATIONAL	Côte d'Ivoire	NI	NI	FLEX	LMIC
Caisse des Dépôts et Consignations Benin	2018	NATIONAL	Benin	1,379	Small	FLEX	LMIC
National Bank for Agricultural Development	1981	NATIONAL	Mali	1,138	Small	AGRI	LIC
Guarantee Fund for Private Sector	2013	NATIONAL	Mali	92	Micro	MSME	LIC
Mali Mortgage Guarantee Fund	2000	NATIONAL	Mali	11	Micro	HOUS	LIC
National Investment Bank of Guinea	2018	NATIONAL	Guinea	NI	NI	FLEX	LIC
Caisse des Dépôts et Consignations du Niger	1973	NATIONAL	Niger	NI	NI	FLEX	LIC
Agricultural Bank of Faso	2019	NATIONAL	Burkina Faso	NI	NI	AGRI	LIC
Caisse des Dépôts et Consignations Burkina Faso	2018	NATIONAL	Burkina Faso	NI	NI	FLEX	LIC
The Agricultural Bank	1984	NATIONAL	Senegal	563	Small	AGRI	LMIC
National Bank for Economic Development	2013	NATIONAL	Senegal	520	Small	MSME	LMIC
Caisse des Dépôts et Consignations Sénégal	2006	NATIONAL	Senegal	NI	NI	FLEX	LMIC
Deposit and Development Fund	2010	NATIONAL	Mauritania	233	Micro	FLEX	LMIC

Name of PDB&DFI	Establishment Year	Levels of Ownership	Country	Total Assets (million USD)	Size Category	Official Mandate	Income Group
Caisse de Dépôts et de Gestion du Maroc	1959	NATIONAL	Morocco	35,061	Medium	FLEX	LMIC
Agricultural Credit of Morocco	2008	NATIONAL	Morocco	14,102	Small	AGRI	LMIC
Municipal Equipment Fund	1959	NATIONAL	Morocco	2,867	Small	LOCAL	LMIC
CDG Capital	2006	NATIONAL	Morocco	1,676	Small	MSME	LMIC
TAMWILCOM	1949	NATIONAL	Morocco	94	Micro	FLEX	LMIC
National Investment Fund	1963	NATIONAL	Algeria	15,896	Small	MSME	LMIC
Caisse des Dépôts et Consignations Tunisia	2011	NATIONAL	Tunisia	3,374	Small	FLEX	LMIC
Caisse des Prêts et de Soutien des Collectivités Locales	1902	NATIONAL	Tunisia	380	Micro	LOCAL	LMIC
National Investment Bank of Egypt	1981	NATIONAL	Egypt	14,839	Small	FLEX	LMIC
Export Development Bank of Egypt	1983	NATIONAL	Egypt	5,407	Small	EXIM	LMIC
The Egyptian Industrial Development and Workers Bank	1947	NATIONAL	Egypt	1,900	Small	MSME	LMIC

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