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African Development Bank

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## Towards a Sustainable Energy Future: Evaluation of the AfDB's Support for Renewable Energy (2012–2021)

Executive Summary



AFRICAN DEVELOPMENT BANK GROUP

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IDEV conducts different types of evaluations to achieve its strategic objectives



# Executive Summary

## Background

As part of its 2021 work program, the African Development Bank Group (AfDB or “the Bank”)’s Independent Development Evaluation (IDEV) undertook an evaluation of the Bank’s support for renewable energy (RE) over 2012–2021. The evaluation focused on accountability and learning, drawing lessons and recommendations to better inform the design and implementation of future RE interventions at the Bank. This report summarizes the findings, conclusions, and lessons that emerged from the evaluation.

An adequate, reliable, and affordable energy supply is vital to economic growth and better living standards. RE is an important contributor to this goal. However, some key challenges remain for African countries.

## The international context for renewable energy

Various global strategies and initiatives have emerged in recent decades to address climate change and promote RE. These include the African Union’s Agenda 2063, the sustainable development goals (SDGs) set in 2015 to be achieved in 2030, the Paris Agreement, and the Glasgow Climate Pact adopted at COP26 in 2021. Other significant policies and initiatives are the Kyoto Protocol, which was adopted in 1997, and the United Nations millennium development goals (MDGs), set in 2000 to be achieved by 2015. Development partners have integrated RE into their actions and strategies and continue to refine their approach. While no established, stable approach to RE guarantees unequivocal success, these actors are actively working towards the common goal of universal access to energy and the transition to a sustainable, low-carbon growth path and greener economy.

## The AfDB’s support for renewable energy in Africa

**Strategic orientation.** The AfDB has several strategic documents that guide its work to reconcile Africa’s natural strengths, economic opportunities, and development needs with global climate change goals. These include the Ten-Year Strategy 2013–2022, the High 5s for Transforming Africa, the New Deal on Energy for Africa (NDEA) 2016–2025, the Climate Change Action Plan II 2016–2020, the Energy Sector Policy of 2012, and the 2022 Amendment to the Energy Sector Policy that stipulated that the Bank would no longer finance coal projects. These strategic documents prioritize investments in areas such as energy access, RE generation, the policy environment, utilities, funding pools, and regional integration. They aim to achieve the SDGs, align with the Paris Agreement, and promote inclusive, green, and sustainable economic growth in Africa.

**The AfDB’s RE portfolio.** Almost half (49%) of the UA<sup>1</sup> 8 billion invested by the AfDB in the energy sector from 2012 to 2021 was allocated to RE through 156 interventions to deploy RE in Regional Member Countries. The value of annual net approvals for RE fluctuated over 2012–2021, with large volumes recorded in 2012, 2014, and 2018, and volumes averaging approximately UA 250 million in the other years. Two-thirds of the volume of the Bank’s support for RE over the period was allocated to grid-connected power generation; technical assistance and advisory services accounted for 22%. Over 2012–2021, 63% of the total net amount approved in investments in power generation was allocated to RE generation capacity. The percentage was higher (85%) between 2016 and 2021.

<sup>1</sup> 1 Unit of Account (UA) = 1.40 United States Dollars (USD) as of December 2021

At the regional level, Southern Africa was the largest recipient of the Bank's support for RE. Southern Africa received approximately 28% of all support, amounting to around UA 1 billion. Next came North Africa (23%) and East Africa (17%). Central Africa and West Africa received the least amount of RE support from the AfDB (approximately 11% each). A notable proportion of the AfDB's RE support (approximately 11%) was allocated to multinational interventions designed to promote regional cooperation in RE. Countries such as Angola, Kenya, Morocco, Nigeria, Rwanda, and South Africa were the leading recipients of AfDB's support for RE interventions; transition states also benefitted significantly. Most of the interventions in the Bank's RE portfolio approved over 2012–2021 remain active (64% of all 156 interventions approved for 2012–2021). The portfolio includes 32 newly approved projects and 68 ongoing projects. Completed/closed projects make up about 32% and projects that were approved but were abandoned or terminated constitute 4%. Note that the construction timeline for hydropower, wind, and solar (except photovoltaic) plants is longer than for conventional technologies, primarily due to land acquisition challenges, the need for environmental approvals, and delays in reaching financial closure.

The Bank Group's African Development Bank (ADB) window accounts for nearly two-thirds of the Bank's total RE commitments; guarantees are gaining importance. Africa's private power sector received a significant share of the Bank's RE support in 2012–2021 (32%), mainly in countries with supportive governance, such as Kenya, Morocco, and South Africa. The private sector is more engaged in such countries.

### Purpose and scope of the evaluation

The objective of this evaluation is to inform the Bank's strategies and operational approach to the RE sector. The evaluation identifies emerging trends in the sector, assesses how the Bank has responded to these trends, takes stock of the results of the Bank's support, and draws lessons for future work.

The evaluation's purpose is twofold: accountability (the retrospective dimension) and learning (the prospective dimension).

The scope of the evaluation is the AfDB's support for RE generation in the power sector. In this independent evaluation, RE covers geothermal, hydropower, solar power, and wind power. The evaluation assesses AfDB interventions that were approved and implemented over 2012–2021. The interventions include investment projects and enabling environment-related interventions (institutional strengthening, technical assistance, and project preparation). The evaluation focused on both utility-grid-scale RE and smaller-scale, decentralized energy access solutions. The evaluation period coincides with the AfDB's Energy Sector Policy (from 2012 onwards) and overlaps with the NDEA (2016–2025).

The evaluation addressed the following questions:

Q1. To what extent did the Bank's interventions align with clients' priority RE needs as they navigated changing RE markets and expanding global initiatives?

Q2. To what extent did the Bank's interventions align with the Bank's wider policy frameworks and with other interventions implemented by the Bank, and to what extent were they coordinated with and complementary to the interventions of governments and other development organizations?

Q3. To what extent was the Bank's support for RE effective at addressing barriers, mobilizing finance, leveraging experience and partnerships, and achieving the results expected for developing RE in order to meet RMCs' energy and environmental needs?

Q4. To what extent did the Bank's support for RE deliver, or is likely to deliver, results in an economic and timely way?

Q5. How sustainable are the results of the Bank's assistance for RE?

## Methodology

The evaluation was designed to meet accountability and learning objectives while generating lessons to improve the design and implementation of RE interventions, new and ongoing. The evaluation employed a theory-based approach and a mix of quantitative and qualitative methods. It evaluated performance at four levels (interventions, clusters, countries, and strategies), taking into account contextual, policy, governance, and organizational influences on the Bank's performance at each level. The findings were generated by triangulating information from multiple lines of evidence gleaned from a literature and policy review, a portfolio review, country case studies, cluster evaluations, and intervention analytical grids. Data collection methods include desk-based research, key informant interviews, and visits to intervention sites. As for the case studies, the evaluation team carefully selected countries according to a set of criteria that ensured adequate representation of diverse regions and country contexts. These criteria encompassed factors such as the population's access to electricity, the significance of renewables in the energy mix, the potential of renewables, the challenges posed by fragile situations, and the deployment of RE technologies.

The evaluation used a four-point rating scale for each evaluation criteria, namely, relevance, coherence, effectiveness, efficiency, and sustainability. The evaluation's overall performance rating is derived from an assessment of these five criteria along a six-point scale.

The evaluation encountered some limitations, including the limited quality of the Bank's project database (SAP), the small number of completed interventions, the inclusion of policy-based operations whose components went beyond RE, and the difficulty in classifying operations that focused on multiple RE technologies. Various strategies were used to address the limitations. The use of multiple lines of evidence, systematic triangulation, and the validation of emerging conclusions ensured the robustness of the evaluation's findings.

## Findings

### Relevance

**EQ1.** To what extent did the Bank's interventions align with clients' priority RE needs as they navigated changing RE markets and expanding global initiatives?

**Strategic and operational alignment:** The evaluation found that the Bank's system has successfully adapted to evolving international concerns and pressures, initially prioritizing universal access to reliable energy and later shifting focus to RE. Positive findings emerged regarding the Bank's adaptation over time and in different country contexts, and on the evolution of its instruments, for example, by providing financial guarantees, differentiating its approach for fragile states, and adjusting interventions' design. However, the evaluation found room for improvement in the articulation of the Bank's RE approach at the strategic, regional, and country levels and in the Bank's role in shaping countries' RE strategies through policy dialogue. The evaluation found that the AfDB's pivotal role in the development of several energy sector strategic documents (policies, strategies, and initiatives) demonstrated the Bank's strong commitment to RE. However, stakeholders pointed to a lack of action plans to complement the AfDB's strategic documents on RE: this hindered the deployment of RE. Additionally, at the regional level, the evaluation found that the evolution of the AfDB's regional strategic documents over time did not show a clear path to increasing support for RE. A review of the wording and budgets of regional integration strategy papers (RISPs) developed for the Bank's five regions over the evaluation period shows explicit support for RE to have been limited. Furthermore, the direction taken by a given RISP was found to depend strongly on the team responsible for preparing and negotiating that RISP. At the country level, the evaluation found that because country strategy papers were very much aligned with country priorities, a limited focus on RE within national priorities could constrain the Bank's support for RE. While some RMCs, such as Egypt, Ghana, Kenya, Morocco, and South Africa,

had a national RE development plan, others did not. The Bank strategically aims to align its support for RE with the priorities of national governments, but its role in influencing these priorities through policy dialogue was found to be limited. This may lead to a mismatch between the Bank's overall RE ambitions and implementation at country level.

**Quality of design:** Overall, the evaluation found that the objectives and design of the Bank's RE interventions were aligned with the priorities of RMCs and beneficiaries' needs. Interventions' design was found to be globally relevant, despite some shortcomings in the technical design of wind projects and the integration of climate change in hydropower projects. Several projects' design was based on comprehensive feasibility studies and data collection, but some designs needed to be revised during implementation due to geological challenges, a lack of data, or the relocation of dam sites. Additionally, feasibility studies displayed shortcomings in technical and financial aspects. These included (i) paying insufficient attention to the challenges of integrating intermittent production (such as solar and wind projects) into the energy grid and (ii) overlooking financial risks such as the impact of government subsidies on the national budget and the vulnerability of off-takers' solvency. Moreover, the feasibility studies sometimes failed to sufficiently address the risks associated with venturing into new markets. Finally, although the Bank's strategic documents underlined the importance of strengthening all components of the energy system—e.g., governance, human capacity development, and private sector participation—to increase the use of RE, the evaluation found that in the countries reviewed, only 14% of technical assistance activities and advisory services supplied through the Bank's support focused on developing RE.

**Adaptation:** The evaluation found that the Bank actively drove key initiatives aimed at providing substantial non-lending support to scale up energy sector investments and build resilience: SEFA is a notable example. The evaluation highlighted the Bank's ability to adapt to the increasing role

of the private sector in RE and the evolution of its instruments. Notably, guarantees emerged as a risk mitigation instrument crucial to expanding private sector investments in on-grid generation. To some extent, the AfDB has deployed a differentiated approach in transition states, with more project preparation support. Furthermore, the evaluation identified instances where an intervention's design was adjusted appropriately in response to a changing environment (e.g., the XINA One Project in South Africa; the Uganda Achwa II Project). Finally, the evaluation noted the presence of innovative RE interventions within the Bank's portfolio (e.g., the Côte d'Ivoire securitization mechanism for solar home systems, a pioneering attempt at wellhead steam-based securitization in Kenya and Morocco, and the first AfDB-funded solar independent power producer in Cameroon).

On balance, the relevance of the Bank's support for RE is rated as satisfactory despite important shortcomings.

## Coherence

**EQ2.** To what extent did the Bank's interventions align with the Bank's wider policy frameworks and with other interventions implemented by the Bank, and to what extent were they coordinated with and complementary to the interventions of governments and other development organizations?

**Internal coherence:** The evaluation found that the Bank's support for RE objectives was in line with the ascribed corporate sector policies (i.e., the Energy Sector Policy (2012) and the NDEA) and concurrent key priorities, like the High 5s, the Ten-Year Strategy, and the Development and Business Delivery Model. In particular, the portfolio review found that the Bank's RE portfolio included significant hydropower projects, which introduces an intricate interplay between energy and water considerations albeit with potential negative externalities.

**External coherence:** Aligning the Bank's support for RE with national RE programs involved

discussions with RMCs and other development partners, but government officials and development partners raised concerns about the technical and financial skills of AfDB country teams compared to International Finance Corporation (IFC) staff. This was partly attributed to limited levels of specialized human resources in the Bank's country offices. Weak coordination was identified in specific countries, including Côte d'Ivoire, the Democratic Republic of Congo, and Morocco, where stakeholders mentioned the small number of meetings or low involvement on the part of the AfDB. At the intervention level, the evaluation found effective coordination and interaction between the Bank and other donors. Furthermore, the evaluation found that the Bank exhibited exemplary leadership and coordination with other partners at the Headquarters level. However, the evaluation also found a lack of awareness of Headquarters initiatives by staff and stakeholders at the country and regional level.

Overall, the Bank's support for RE demonstrated a satisfactory level of coherence.

## Effectiveness

**EQ3.** To what extent was the Bank's support for RE effective at addressing barriers, mobilizing finance, leveraging experience and partnerships, and achieving the results expected for developing RE in order to meet RMCs' energy and environmental needs?

**Lending operations:** The Bank's support for RE was found to contribute (or be likely to contribute) to the objectives and targets of SDG7 and Agenda 2063 at the country level, primarily by increasing RE-based generation capacity. However, the evaluation found that the expected outcomes at the continental level were not being delivered at the desired pace and fell short of the Bank's ambitious targets. For example, data from the AfDB's Energy Complex revealed that between 2016 and 2020, the Bank's support achieved only 14% of the 22 GW of installed power generation capacity targeted by NDEA for 2025 (16% of the 14 GW installed RE-based generation

capacity targeted for 2025). The case study countries ranged widely in terms of the share of RE in their electricity generation and the population's access to electricity. Despite this, project-level evaluations demonstrated that completed projects had met or, for a few exceptions, had exceeded the main expected output (new installed capacity in GW) with 102% of achievement. However, the evaluation found that challenges related to a lack of supporting infrastructure, such as storage and transmission lines, limited the achievement of the expected outcomes in some cases (e.g., the Achwa II Hydropower Project in Uganda, Lake Turkana Wind Power Project in Kenya).

**Enabling and hindering factors:** The evaluation pointed out the importance of national policies and instruments as enabling factors for the deployment of RE in RMCs. It also identified hindering factors to RE development, including inadequate financing, intermittency, transmission construction delays, political and economic uncertainty, and land acquisition challenges. The evaluation found that the Bank had taken steps to address these barriers through financing arrangements, project restructuring, and knowledge sharing.

**Non-lending operations:** The Bank's non-lending support for RE was found to be uneven. Perceptions of the Bank's role as a knowledge broker, advisor, and convener varied across countries. While the evaluation highlighted the Bank's potential to trigger a catalytic effect in its support for RE development in different countries, the evaluation also found mixed views on the Bank's effectiveness and impact. The Bank has a proven track record in mobilizing concessional resources. For example, in the Democratic Republic of Congo, the Bank's support for the rehabilitation of the Inga I and II hydropower plants, amounting to UA 33 million, has had a significant leverage effect (1:20), mobilizing UA 666 million from other financial partners. Additionally, the Sustainable Energy Fund for Africa (SEFA) was transformed into a special fund and raised well over USD 300 million in grant resources since 2019, making it by far the Bank's largest trust fund/special

fund. The evaluation found that the Bank is actively driving initiatives at the corporate level to support policy dialogue, knowledge management, and investment platforms in the energy sector through various programs and platforms (e.g., the Africa Energy Market Place, the Electricity Regulatory Index for Africa, the Africa Energy Portal, the Africa NDC Hub, and the Africa Investment Forum). Furthermore, the evaluation acknowledged the Bank's successful partnerships on RE interventions, including active collaboration with development partners and national authorities. Nevertheless, the evaluation found that the Bank's contribution to shaping the RE policy and institutional framework in member countries was limited.

Overall, the effectiveness of the Bank's support for RE was found to be satisfactory.

## Efficiency

**EQ4.** To what extent did the Bank's support for RE deliver, or is likely to deliver, results in an economic and timely way?

The efficiency of the AfDB's support for RE was assessed along three dimensions: delivery (timeliness and cost/budget), economic and financial performance, and supervision.

**Timeliness and budget performance:** Many AfDB-funded RE interventions experienced delays, among other things because of projects' complexity and the time required to reach financial closure and address design shortcomings (e.g., 75 months for the Inga Project in the Democratic Republic of Congo; 27 months for the Uganda Buseruka Hydropower Project). The evaluation identified several factors that contributed to these delays, including geophysical constraints, inadequate preliminary analyses, lengthy project negotiations and land acquisition processes, slowness within partner countries, Bank-level delays, and external factors. The evaluation found that

projects' budget performance varied, depending on the accuracy of assessments, competitive bidding processes, cost-saving measures, unforeseen circumstances, and other factors. The evaluation highlighted the importance of proper assessments, responsive project management, and the leveraging of competitive bidding processes to optimize budget performance.

**Economic and financial performance:** The evaluation highlights the importance of sound economic evaluation during projects' pre-feasibility and feasibility analyses, particularly when the Bank's assistance and financial commitment were required. The evaluation found that overall, the estimated economic internal rate of return (EIRR) was above the opportunity cost of capital (around 10%) and the financial internal rate of return (FIRR) was above the weighted average cost of capital (WACC) (around 2.3%) everywhere except Morocco. By involving the private sector in the form of independent power producers, the evaluation found AfDB-funded RE projects to be at the forefront of management practices in terms of economic and financial analyses, with positive ex-ante economic and financial performance. However, the evaluation was unable to assess this performance at the completion and ex-post stages due to the unavailability of information.

**Supervision:** The evaluation found that the Bank carried out supervision missions regularly to review project progress and address issues. The missions were well appreciated.

The evidence was mixed as to the efficiency of the AfDB's support for RE with respect to timeliness, budget performance, and supervision. The evaluation was unable to assess ex-post economic and financial aspects of RE interventions because of a lack of data. Because of this, the overall efficiency of the Bank's support for RE was not rated.



## Sustainability

**EQ5.** How sustainable are the results of the Bank's assistance for RE?

The evaluation found that AfDB-funded RE interventions used state-of-the-art technologies that were in general adapted to the country context. Notwithstanding some shortcomings in their maintenance mechanisms, these technologies were appropriately deployed in the field. The AfDB's support for RE also involved stakeholders. Still, the financial sustainability of AfDB-funded RE interventions was threatened by the financial distress of power utilities. This affects the entire energy sector, including RE. De-risking mechanisms are seen as critical to catalyzing capital flows to deploy RE, but sub-optimal risk-sharing can impose long-term financial burdens on governments, adding to sovereign debt stress and hampering the further development of critical infrastructure, including infrastructure for RE. Additionally, the evaluation found the Bank's contribution to strengthening institutional capacity in countries' RE sector to be limited. Finally, the Bank was found to systematically assess environmental and social risks and incorporate mitigation measures at the strategic country level and within RE interventions. Nevertheless, the evaluation also found unintended, underestimated, or unresolved environmental and social issues, including concerns related to indigenous people's rights in Kenya, the environmental safety of batteries used in Côte d'Ivoire, an inadequate monitoring and evaluation system for tracking environmental and social issues in Uganda, poorly managed landfills in South Africa, and residual environmental risks in Cameroon.

Given these shortcomings, the evaluation rated the sustainability of the Bank's support for RE as partly unsatisfactory.

## Conclusions

Overall, the Bank's support for RE was assessed as mostly successful, but some key concerns remain. The evaluation identified several

factors that enabled or hindered success in RE development: national policies, project finance (in)adequacy, the availability and intermittency of wind and solar sources, climate change, the speed of delivery of transmission lines, land acquisition processes, the speed of AfDB decision-making processes (issuances of non-objection), and the political and economic situation in each country. Tailoring the Bank's support to specific needs and challenges was found to be crucial to individual countries' achieving more results. At the same time, a lack of supporting infrastructure (storage technology, transmission lines, and adaptation to a broader energy grid) was often found to make large-scale deployment of renewable energies unfeasible.

## Lessons

The following are the key lessons from this evaluation.

**Lesson 1:** Complementing strategies with action plans strengthens stakeholders' participation in RE.

Complementing strategies with action plans bridges the gap between a high-level vision and implementation on the ground. It empowers stakeholders by giving them specific tasks, responsibilities, and a tangible roadmap to follow, thereby encouraging greater engagement and participation in RE initiatives. A case in point is the South African Renewable Energy Independent Power Producer (IPP) Procurement Program, which is a competitive tender process designed to facilitate private investments in grid connected RE generation in South Africa.

**Lesson 2:** Supporting infrastructure, such as transmission and distribution lines, storage infrastructure, and adaptation to the broader power grid, makes it possible to achieve the outcomes desired for on-grid RE projects.

The evaluation observed difficulties in using the electricity produced by certain Bank-funded RE projects because of the absence of distribution and

transmission lines, insufficient storage equipment, and power system instability. Resolving these issues would optimize the benefits of such projects.

**Lesson 3:** Prioritizing origination and sharing risks with private finance makes it possible to scale up financing for the development of RE infrastructure.

The evaluation emphasized that without good risk sharing, de-risking mechanisms (e.g., financial guarantees provided by the Bank and RMCs), which were seen as critical to catalyzing capital flows for RE deployment, can impose long-term financial burdens for the government, adding to sovereign debt stress and hampering the development of further critical infrastructure, including infrastructure for RE.

**Lesson 4:** Making sure that RE investments with intermittent production integrate smoothly into a country's energy grid makes RE interventions more effective.

The evaluation found that several solar and wind projects had been designed without taking into account the challenges of integrating their production into the country's energy grid. This limited the possibility of new additional production capacity, either because of the difficulty of connecting to the grid or because of the difficulty of managing intermittent production.

## Recommendations

IDEV makes the following recommendations:

**Recommendation 1:** Better articulate the Bank's renewable energy approach at the corporate, regional and country level to better align goals and objectives.

Key priority actions include:

- Ensuring more systematic integration of RE development in the Bank's Ten-Year Strategy, RISPs and CSPs.
- Strengthening policy dialogue with a view to shaping RE strategic documents at regional and country level.

**Recommendation 2:** Enhance the quality at entry of RE interventions.

Key priority actions include:

- Increasing support for early-stage project development.
- Enhancing due diligence of technical and financial feasibility studies.
- Strengthening the assessment of potential environmental and social impacts of RE interventions.

**Recommendation 3:** Expand the use of blended finance instruments to scale up investments in renewable energy in RMCs.

Key priority actions include:

- Expanding the deployment of innovative risk mitigation instruments to attract more private sector investment.
- More proactively supporting RMCs in creating the enabling environment for increased private sector investment.
- Doubling down on the Bank's track record in mobilizing concessional resources for RE initiatives such as SEFA. ■





## About this evaluation

Independent Development Evaluation conducted an evaluation of the assistance for renewable energy (RE) by the African Development Bank (AfDB or “the Bank”) over the period 2012- 2021. During this period, the Bank allocated USD 5.74 billion to RE, through 156 interventions in Regional Member Countries.

The evaluation assessed the AfDB’s support for RE generation in the power sector, specifically for geothermal, hydropower, solar power, and wind power. It focused on both utility-grid-scale RE and smaller-scale, decentralized energy access solutions. It assessed the Bank’s support in terms of relevance, coherence, effectiveness, efficiency and sustainability, and drew lessons and recommendations to inform the design and implementation of future AfDB renewable energy interventions.

Overall, most of the Bank’s support for RE was rated successful, but important concerns remain. At the corporate level, the Bank had adapted well to international trends in RE, and in the RMCs, complementarities between the Banks and other development partners RE interventions were deemed effective. The Bank’s lending support had increased RE-based power generation capacity, although the Bank’s contribution to shaping the RE policy and institutional framework in member countries was limited. There were mixed views on the of the Bank’s role as a knowledge broker, advisor, and convener. The financial distress of power utilities was found to have a negative impact on the sustainability of RE interventions.

Key lessons were drawn around action plans to complement strategies, supportive infrastructure, prioritization and risk-sharing, and RE integration to the grid. The evaluation recommends that the Bank approaches RE at the corporate, regional and country level to better align objectives; enhance the quality at entry of RE interventions; and expand the use of blended finance instruments to scale up renewable energy investments in Regional Member Countries.



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