New Development Bank

CASE STUDY

Renewable Energy Development Project, South Africa

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Executive Summary

A key structural constraint in the economic growth of South Africa has been its energy sector, which relies heavily on coal, accounting for about 90% of the energy mix in 2016. This has led to high GHG emissions and inefficiencies. Persistent gaps in infrastructure, financing, and grid capacity negatively affected economic growth and requires substantial investment, making private sector participation critical. To address this, the government introduced the Integrated Resource Plan (IRP), prioritising renewable energy expansion.

The New Development Bank supported this transition by lending ZAR 1.15 billion to the Industrial Development Corporation (IDC), which financed renewable energy sub-projects. The initiative has contributed to an increase of 250 MW electricity capacity, generating about 774 GWh annually and reducing up to 0.8 million tonnes of CO_2 emissions each year. The projects also incorporated hybrid solar and storage systems that enhanced grid stability. The project created around 4,000 employment opportunities during construction peak and a more inclusive society through Black Economic Empowerment (BEE) shareholding.

Key takeaways from the project included the importance of alignment with national priorities, adoption of innovative technologies for grid reliability, and strong public-private partnerships to mobilise large-scale investment.

1. DEVELOPMENT CONTEXT

A key structural constraint in the economic growth of South Africa is its energy sector. The country relied heavily on coal, which accounted for about 90% of its energy mix as at end-2016. At the same time, aging coal-fired power plants and inadequate maintenance have caused frequent breakdowns, resulting in persistent load shedding and energy shortages that negatively affected economic growth. This dependence has led to high greenhouse gas emissions and low energy efficiency, making South Africa one of the world's top emitters.

Power generation accounted for around half of all energy-related carbon emissions. South Africa's emission levels could grow rapidly, potentially increasing by as much as four times by 2050.[1] Multi-dimensional gaps persisted in terms of electricity infrastructure, financing, and grid capacity, requiring significant investment. Given the limited financial capacity of the Government, private sector participation became crucial to support energy diversification, improve reliability, and achieve climate goals. Accordingly, the Government of South Africa formulated an Integrated Resource Plan (IRP), with a strong focus on accelerating renewable energy sources such as wind and solar by 2030.[2] To achieve the goal, the Government launched special programs that are designed to facilitate private sector investment into renewables and alternate energy sources. Further,

[1] https://www.gov.za/sites/default/files/gcis_document/201409/nationalclimatechangeresponsewhitepaper0.pdf
[2] https://www.gov.za/sites/default/files/gcis_document/202510/53596gon6767.pdf

the Government has shown strong commitment to reduce emissions and transition to a low-carbon, climate-resilient economy by 2050.

2. PROJECT DESCRIPTION

NDB financed the Renewable Energy Sector Development Project of South Africa, through a loan of ZAR 1.15 billion to the Industrial Development Corporation of South Africa (IDC). The IDC, a wholly government owned national financial intermediary, on-lent these funds to selected renewable energy sub-projects.

Project Description	
Country operation	South Africa
Approval date	March 31, 2019
Total project cost	ZAR 27.77 billion
NDB Financing	ZAR 1.15 billion
Borrower	IDC
Type of loan	Non-sovereign
Alignment with SDGs	SDG 7 – Affordable and Clean Energy SDG 13 – Climate Action

The total project cost was ZAR 27.77 billion, NDB contributed around 4% of overall financing and participated in South Africa's energy transition.

The project financed four sub-projects in the Northern Cape Province:

- **Redstone project**: A 100 MW concentrated solar power[3] (CSP) plant with thermal storage.
- **Scatec projects**: Three solar photovoltaic plants[4] (50 MW each) combined with battery storage systems.

Together, these projects provide a total installed capacity of about 250 MW and incorporated advanced technologies, including hybrid solar and storage systems that enhanced grid stability and dispatchable power supply. While the three Scatec projects became operational in late 2023, the Redstone project became operational in May 2025 following implementation challenges associated with a first-of-its-kind utility-scale CSP facility, including contractual, financing, construction and market complexities involving multiple stakeholders. Notwithstanding these challenges, the project represents an important technology demonstration for dispatchable renewable energy in South Africa.

3. DEVELOPMENT IMPACT

The project is generating significant positive environmental, economic, and social impacts. It is expected to produce approximately 774 GWh of renewable energy annually and avoid up to 0.8 million tonnes of CO_2

[3] Concentrated solar power technology uses mirrors or lenses to focus sunlight, producing heat to generate steam and drive turbines for electricity generation.

[4] Photovoltaic plants are solar power systems that convert sunlight directly into electricity using semiconductor materials, typically silicon cells, producing clean energy without emissions or moving parts.

emissions each year.[5] This contributes directly to South Africa's climate commitments and its transition away from coal-dependent energy. The introduction of renewable technologies with storage capacity also enhances grid reliability and helps address peak demand, reducing the effects of load shedding.

The project has also played a catalytic role in mobilising private sector capital, with total investment reaching around 24 times the NDB contribution. It builds on the broader success of the Independent Power Producer Procurement Programme, which has attracted substantial private investment into the energy sector.

Socially, the project promoted inclusive development through Black Economic Empowerment (BEE) shareholding (e.g., 24% in Redstone and 49% in Scatec) and shareholding of community trusts. The project entities also invested funds in a range of community initiatives and outreach programmes. Further, the project has created employment opportunities, with peak construction jobs reaching 4,000. Overall, the project contributed to energy security, climate mitigation, and socio-economic development by expanding transformative equity.

Transformative Equity	
Redstone	**Scatec**
• Shareholding by BEE: 24% • Shareholding by Community Trusts: 15% • Investments in community initiatives during construction: ZAR 5 Mn • Expected investment in community initiatives during LoP: ZAR 575 Mn	• Shareholding by HI holding (BEE): 49% • Investment in community initiatives during construction • Expected investment in community initiatives during LoP

Source: Project Performance Evaluation, Independent Evaluation Office, NDB.

4. SUCCESS FACTORS

Several key factors contributed to the project's overall success.

Strong alignment with national priorities and policies: The project was closely aligned with South Africa's development agenda, including the Integrated Resource Plan (IRP) and the country's commitments under international climate agreements such as the Paris Agreement. By supporting renewable energy generation and emissions reduction, it directly addressed critical national challenges such as energy shortages and climate vulnerability. By financing renewable energy infrastructure, the project directly supported the government's strategic shift toward a more diversified and sustainable energy mix. At the same time, the project advanced South Africa's climate goals by promoting greenhouse gas emission reductions and strengthening resilience to climate-related risks.

Use of innovative and advanced technologies: The strategic selection of advanced technologies proved to be a major success factor. The Redstone project utilises concentrated solar power through a tower-mounted molten salt central receiver with 12 hours of thermal storage capacity, marking the first installation of its kind in Sub-Saharan Africa. As a result, it has the potential to serve as a catalyst for the wider adoption of similar advanced solar technologies across the region. Scatec projects are hybrid energy projects that combined solar power generation with battery storage systems. These technologies enabled dispatchable power supply,

[5] Achieved/forecasted values.

allowing electricity generation during both peak and off-peak periods. These innovative and technological choices enhanced grid stability and addressed intermittency issues associated with renewables.

Strong institutional arrangements and capable partners: The involvement of experienced sponsors such as ACWA Power and Scatec ensured high technical and operational standards. These companies have significant global experience and financial capacity, which strengthened implementation and long-term sustainability. Equally critical was the choice of IDC as a national financial intermediary. As a development finance institution with a mandate to promote industrial growth and economic development, IDC contributed deep knowledge of the local regulatory, financial, and socio-economic landscape.

Effective public–private partnership framework: The project leveraged the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) of South Africa, which provides a transparent and competitive bidding process. This framework incentivised private investment, ensured cost efficiency, and facilitated large-scale participation from private sector developers and financiers.

Robust financial structures and risk mitigation mechanisms: The use of long-term, local currency (ZAR) financing reduced foreign exchange risks for borrowers. Additionally, 20-year power purchase agreements with Eskom, backed by government guarantees, provided stable revenue streams, and reduced investment risk.

Promotion of transformative equity and local development: The project integrated socio-economic development objectives through BEE participation, community shareholding, and local procurement. It supported job creation, enterprise development, and community initiatives, contributing to inclusive growth in underserved regions.

5. KEY TAKEAWAYS

The Renewable Energy Sector Development Project demonstrated how targeted investment in renewable energy can address multiple development challenges simultaneously. It successfully contributed to increasing clean energy capacity, reducing greenhouse gas emissions, and improving energy reliability in a country heavily dependent on coal.

Several lessons emerge from this project. First, alignment with national policies and priorities is critical for ensuring relevance and impact. Second, innovative technologies, particularly those that enhance storage and dispatchability, are essential for addressing energy system constraints and enhancing grid reliability. Third, strong institutional partnerships and effective public-private collaboration can mobilise large-scale private investment.

Overall, the project represents a successful model of renewable energy development, with important implications for scaling up similar investments in emerging markets. It underscores the role of development finance institutions in catalysing private capital and supporting sustainable and inclusive growth.

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The BRICS-NDB Knowledge Portal is a joint initiative of BRICS and NDB. The Portal aims to institutionalise the existing knowledge available across BRICS Working Groups by systematically compiling them in alignment with NDB priority areas and sharing good practices from NDB's operations.

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