New Development Bank

INDEPENDENT EVALUATION OFFICE

Republic of South Africa

RENEWABLE ENERGY SECTOR DEVELOPMENT PROJECT

PROJECT PERFORMANCE EVALUATION

FULL DOCUMENT | AUGUST 2024

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PREFACE

This report presents the findings and recommendations of the Independent Evaluation Office's project evaluation of the Renewable Energy Sector Development Project in South Africa.

Through the funding of renewable energy plants, the project's main objective was to contribute to the power generation mix and reduction in CO_2 emissions in South Africa. The total project cost was ZAR 27.769 billion, with NDB financing ZAR 1.15 billion. The loan was provided to the Industrial Development Corporation of South Africa (IDC) – a national development finance institution owned by the government – to then be on-lent to renewable energy projects. The NDB loan financed four sub-projects in the Northern Cape Province: the Redstone sub-project, a 100 MW concentrated solar power project; and three sub-projects by Scatec, each building a 50 MW solar photovoltaic and battery storage plant.

Overall, the project has been successful, contributing to the generation of renewable energy, reducing greenhouse gas emissions, and fostering sustainable development; in fact, the energy generation targets were exceeded by the Scatec sub-projects alone. Furthermore, the project gave impetus to the institutional arrangements put in place by the government to support energy sector development, and introduced state-of-the-art technology too – e.g. by providing dispatchable power with the capacity to store excess electricity, which enhanced stability in the energy sector.

However, there are areas for improvement: the social innovations incorporated by Government in local procurement were not fully highlighted in the investment, and NDB did not establish strong relationships or leverage the potential partnerships the investment provided. Additionally, there are several investment opportunities for NDB to unlock further renewable investments which the Bank did not capitalise on, for instance in transmission capacity investments.

The evaluation offers several key recommendations. For example, that NDB should use its investments to build stronger relationships and increase visibility in South Africa and the region; incorporating transformative equity into project design, monitoring, and supervision frameworks is crucial for achieving deeper impacts; there should be clear accountability for tracking parameters stipulated in the loan agreement to ensure proper monitoring and reporting; and additionally, NDB should collaborate better with technical institutions in South Africa to develop and share lessons from its investments.

This report has been reviewed by key stakeholders in the government, NDB and project teams, and incorporates the written NDB Management Response. I trust this report will be helpful to readers seeking to understand better the support NDB is providing to South Africa, including what has worked and what has not, and prompt wider discussion on the importance of renewable energy investments.

Ashwani K. Muthoo
Director General
Independent Evaluation Office

ACKNOWLEDGEMENTS

The Independent Evaluation Office (IEO) of the New Development Bank (NDB) would like to express its gratitude for the support and facilitation of this evaluation of the Renewable Energy Sector Development Project in South Africa.

IEO would like to thank the NDB Board of Directors for their overall support and guidance. The evaluation team is deeply grateful to some of the key institutions in the country involved in the energy sector for sharing their insights, namely the Industrial Development Corporation of South Africa Limited (IDC), the Department of Mineral Resources and Energy (DMRE), the Independent Power Producer Procurement Programme (IPPPP), Eskom, the South African National Energy Development Institute, ACWA Power and Scatec. A special thanks is due to the Department of National Treasury for their insights and cooperation. Appreciation is also due to the NDB Management and Operations staff and other colleagues for sharing their perspectives and for facilitating the evaluation mission in the country.

The evaluation was conducted under the overall leadership and oversight of Mr. Ashwani K. Muthoo, the Director General (DG), IEO. The evaluation was managed by Ms. Nidhi Chaudhary, Evaluation Specialist, IEO. A team of experts, including Ms. Maliha Hamid Hussein (Senior Evaluation and Development Expert) and Ms. Lungile Mashele (Energy Sector Expert) provided critical inputs during the evaluation process. Ms. Jaqueline Rabelo Souza, (IEO Evaluation Communication and Outreach Expert) provided key inputs in the organisation of the mission and the preparation of communication and outreach products based on the main findings of the evaluation and Mr. John Laird, IEO evaluation editor provided support in preparing and ensuring the good quality of the document.

IEO also invited the Department of Planning, Monitoring and Evaluation (DPME) in South Africa as the peer reviewer of the evaluation, which was a key part of the process. Their comments and suggestions were incorporated in the final version of the report.

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ABBREVIATIONS AND ACRONYMS

BEE	Black Economic Empowerment
BW	Bid Window
CSP	Concentrated Solar Power
CO_2	Carbon dioxide
DMF	Design and Monitoring Framework
DMRE	Department of Mineral Resources and Energy
DPME	Department of Planning Monitoring and Evaluation
E&S	Environmental and Social
EIRR	Economic Internal Rate of Return
FIRR	Financial Internal Rate of Return
GHG	Greenhouse Gas
IDC	Industrial Development Corporation of South Africa
IRP	Integrated Resource Plan
IPP	Independent Power Producer
IPPPP	Independent Power Producer Procurement Programme
MW	Megawatt
NDP	National Development Plan
NFI	National Financial Intermediary
M&E	Monitoring and Evaluation
PDB	Project Document to the Board
PPA	Power Purchase Agreement
PPR	Project Progress Report
PV	Photovoltaic
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RMIPPP	Risk Mitigation Independent Power Producer Procurement Programme
USD	United States Dollar
ZAR	South African Rand

CURRENCY UNITS AND EQUIVALENTS

Currency Equivalents
Currency Unit = South African Rand (ZAR)
USD 1.00 = ZAR 14.00 (Appraisal End Date: February 26, 2019)
USD 1.00 = ZAR 19.01 (March 2024)

Measures

GW	Gigawatt (1,000 Megawatts)
GWh	Gigawatt-hour (1,000 Megawatt-hours)
kV	Kilovolt (1,000 volts)
KWh	Kilowatt-hour (1,000 watt-hours)
MVA	Megavolt-ampere (1,000,000 volt-amperes)
MW	Megawatt
MWh	Megawatt-hours
MWp	Megawatt Peak (DC capacity of the solar array/total rated capacity of all solar modules in the system)

EXECUTIVE SUMMARY

Background: This report presents the findings and recommendations of the project performance evaluation (PPE) of the Renewable Energy Sector Development Project in the Republic of South Africa by the Independent Evaluation Office (IEO). For this project, NDB provided a loan to the Industrial Development Corporation of South Africa Limited (IDC), a national financial intermediary (NFI), wholly owned by the Government of South Africa for lending to private sector entities. The loan proceeds were on-lent by IDC to renewable energy projects (sub-projects) in South Africa that contribute to the reduction in carbon dioxide emissions, improvement of South Africa's energy sector mix, and to the increase of energy efficiency.

Country context: South Africa boasts a complex and relatively developed economy but faces significant challenges. The Government has pursued ambitious development objectives despite some endemic structural and complex social issues inherited from its past legacies. In recent years, the South African economy has faced several challenges characterised by fluctuating GDP growth, high unemployment and an energy crisis. To accelerate economic growth, spur job creation, and improve livelihoods, structural reforms are needed to reduce constraints. Such reforms remain central to the government's medium-term plans, with a focus on creating a competitive electricity market and efficient ports and rail logistics systems. The public and private sectors are working to improve infrastructure and education, which could unlock productivity gains.

Sectoral context: South Africa is one of the world's largest coal producers and uses coal as the primary energy source for the economy. The Government of South Africa has tough choices to make while it has a plentiful supply of cheap coal which assures a low-cost fuel source for electricity generation, it has experienced growing load shedding due to the frequent breakdown of its energy plants and their contribution to greenhouse gas (GHG) emissions. As one of the world's top 15 GHG emitters, South Africa is also one of the world's least energy-efficient nations. If unmanaged, South Africa's emission levels could grow rapidly by as much as four times by 2050. On the other hand, load shedding had a 1.8 percentage point impact on the country's overall economic growth in 2023.

The project: The Renewable Energy Sector Development Project was approved by the NDB Board of Directors on March 31, 2019; the loan agreement was signed on February 6, 2020, with the loan scheduled to close on December 6, 2023; and physical completion was expected on February 6, 2024. The loan proceeds were expected to be on-lent by IDC to renewable energy projects (sub-projects) in South Africa that contribute to the reduction in carbon dioxide emissions, improvement of South Africa's energy sector mix, as well as to the increase of energy efficiency of the economy. IDC had committed to support projects selected as preferred bidders under the Independent Power Producer Procurement Programme (IPPPP). At the time of the presentation of the proposal to the Board, only the Redstone Solar Thermal Power project had been identified for financing by NDB. IDC subsequently selected three additional sub-projects by Scatec and included them as part of the project.

Project performance

IEO gives a performance rating for each project performance evaluation criterion on a six-point scale – with 1 being "highly unsuccessful" and 6 being "highly successful".

Relevance: The project objectives were very relevant to the country's need for clean energy and its target of reducing its GHG emissions. The project was designed under the General Strategy for 2017-2021 (NDB's first strategy) but is also well aligned with NDB's General Strategy for 2022-2026 on a host of aspects such as non-sovereign lending, using country systems, its focus on clean energy and climate change mitigation, and the use of transformative technologies. The sub-projects were very relevant in terms of addressing the need to manage peak energy demand with the technologies that were selected. However, some of the technologies selected such as the concentrated solar power (CSP) technology were untested and posed a risk. Thus, while the project was **evaluated to be successful overall in terms of its relevance it was rated a (5).**

Effectiveness: The overall energy generation and CO_2 targets in the design and monitoring framework (DMF) have already been exceeded with the operation of Scatec sub-projects alone. The financing that was leveraged was considerable, and the technologies that were used were complex but innovative and appropriate to the needs of meeting peak energy demand. It is too early to assess the technical parameters of the projects, and these need to be more actively monitored and verified once the sub-projects start operation and are measured over time. On balance, IEO rates project **effectiveness as successful (5).**

Efficiency: The projects were completed within budget and while the Scatec sub-projects were completed on time, the Redstone sub-project is still under construction. The Redstone sub-project has been delayed by the complexity of its technology and the delay in receiving all the equipment. CSP does not feature in any future iterations of Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) or the Integrated Resource Plan (IRP) (both run by the Department of Mineral Resources and Energy), and this technology is much more expensive than others because of the system requirements and the complex design. Hybrid technologies which offer the benefit of affordable solar energy and provide the flexibility of battery storage for dispatchability are more popular and more affordable and less complex than CSP. The evaluation assesses project **efficiency as moderately successful (4).**

Impact: The evaluation assessed that the project would have a positive impact on climate mitigation and will not generate any adverse impacts on local land, water, or any local species. The project is expected to have a positive impact in leveraging private capital for energy investments, improving energy reliability, and reducing the cost while also strengthening country systems. The sub-projects are expected to have a positive social impact due to shareholding under Black Economic Empowerment (BEE) schemes, job creation, increasing local content in procurement, and community initiatives. However, given that most of the impact is yet to be achieved as one of the projects has not yet started functioning and the other has only recently started, the project **impact** is rated as **successful (5).**

Sustainability: The institutional sustainability of the investments is underpinned by the strong corporate capability of the sponsors of the sub-projects. The economic and financial analysis show returns and net present value, which indicate good returns, especially given that all sub-projects selected have the capacity to supply during peak load. The technical sustainability of the Redstone CSP sub-project is uncertain given the complex nature of the technology. The Scatec sub-project, on the other hand, appears to be technically sound. The projects are environmentally sustainable and are designed to mitigate climate change and are in turn resilient to climate risks. Thus, the **sustainability** prospects of the sub-projects are considered **successful (5).**

Overall project achievement is considered **successful (5)** with some areas for improvement, which are outlined in the main report. However, **NDB's performance has been rated moderately unsuccessful (3)** because of its limited engagement in the country with the partners and sponsors of the project, and its limited role in monitoring, implementation support and knowledge-sharing.

The overall performance of IDC in this project is rated as moderately successful (4). IDC selected the sub-projects primarily based on the agreed selection criteria. However, since the project was not yet completed at the time of the evaluation, IDC was unable to report on certain criteria, such as the economic internal rate of return (EIRR) or the CO_2 emissions avoided per ZAR million spent. IDC largely relied on sponsor updates regarding project timelines, without addressing any anticipated delays. While IDC funded the socio-economic development aspects of the project, including Black Economic Empowerment (BEE) schemes, community initiatives, employment creation, and enterprise development for local communities, it did not monitor specific outcomes, such as the number of jobs created or the proportion of women employed.

Conclusions

The project gave further impetus to the institutional arrangements that the country has put in place to support the sector. The choice of the Government owned IDC was an appropriate one, given its strong mandate for support to the private sector entities to achieve the ambitious energy mix targets for the country and assist it in its bid to transition to a more sustainable path and move away from excessive reliance on fossil fuels.

The overall outputs and outcomes expected from the project are delayed but are expected to be achieved. The project had envisaged that five sub-projects were to be completed including one biomass project, with a total installed capacity of at least 120 MW of new renewable energy generation through IDC lending. However, the number of sub-projects the project would finance was indicated in the proposal to the Board and the DMF but not a binding covenant in the loan agreement. In any case, NDB co-financing is expected to install twice the installed capacity. Redstone is expected to generate 491 GWh annually with 462,000 tonnes of CO_2 avoided. Scatec is expected to generate 849,471 GWh with 798,504 tonnes of CO_2 emissions avoided of per year.

Technical innovations promoted by NDB projects were not properly highlighted or disseminated as a mechanism for learning from their experience and the potential for replication: the four sub-projects financed by NDB all introduced state-of-the-art technology, which can serve to build stability in the energy sector by providing dispatchable power that can provide electricity during both peak and off-peak times, as they have the capacity for storage of excess electricity. The lessons from the project need to be properly examined and shared to capitalise on the role of NDB as a development partner in collaboration with technical specialists in the country.

The social innovations that the South African Government has incorporated in its local procurement in the renewable energy sector were not fully highlighted in the investment. NDB can better serve its role as a development bank by developing strong tools for promoting transformative equity in infrastructure projects it finances and seize upon valuable opportunities for equitable and sustainable development.

NDB does not appear to have built strong relations in the country or leveraged the potential for partnerships that the investment provided. NDB could have leveraged the project for building a stronger partnership with a host of local and commercial investors and development finance institutions involved in the project and the leading private sector sponsors of the project. NDB's Africa Regional Centre (ARC), based in Johannesburg, appears to have limited technical capacity to foster the relationships which could have helped to highlight the role and opportunities for the Bank.

There are several investment opportunities for the NDB in order to unlock further renewable investments. Renewables are often most concentrated in areas where the grid has not undergone significant investment. Notwithstanding NDB's previous transmission investment, there is a need for more transmission capacity investments.

Recommendations

Recommendation 1: NDB's investment should be guided more strategically by its position as a development bank for emerging markets and developing countries. NDB should carefully review how it can best add value as a development bank in South Africa, where there is significant commercial interest in the renewable energy sector.

Recommendation 2: Highlight the lessons learnt from its experience and develop knowledge products. NDB should partner with technical institutions in South Africa to help develop and communicate the lessons from its investments regarding the appropriate choice of technology, the experience with the CSP and how to address the challenges that this promising technology presents.

Recommendation 3: NDB should use the opportunity provided by its investments to build relations and highlight its visibility in the country and the region. The project provided a strong platform for building relationships with a wide range of country stakeholders, in the renewable energy space, such as commercial banks, equity partners, insurance companies and BEE partners, etc. NDB should in the future seize the opportunity to leverage its position and highlight its role. This is vital if the path outlined by NDB's General Strategy for 2022-2026 of catalysing its role in mobilizing financing from diversified sources is to be achieved.

Recommendation 4: Incorporate transformative equity as a key aspect of NDB investments and integrate it into project design and monitoring and supervision frameworks in the South African context. The evaluation recommends that these aspects should be incorporated as key elements in all relevant documents to highlight the contribution that NDB can make to transformative equity through its projects.

Recommendation 5: Track key parameters. Assign clear responsibility for tracking some of the parameters stipulated in the loan agreement or these are likely not to be properly tracked and reported.

Recommendation 6: Build structured flexibility into loan agreements. in terms of specifying the time frame and other conditions to avoid frequent amendments in loan agreements. Energy sector projects are typically much more complex than projects in other sectors which do not require such a range of extensive partnerships and coordination among them. It would therefore be prudent to allow adequate time for their implementation and provide flexibility in the contracts to avoid renegotiating the loan agreements and making frequent amendments to them.

NDB MANAGEMENT RESPONSE

General comments

The Management appreciates Independent Evaluation Office (IEO) evaluation of the South African Industrial Development Corporation (IDC) Renewable Energy Sector Development Project.

The 100 MW Concentrated Solar Power (CSP) project demonstrates NDB's commitment to supporting renewable energy initiatives in South Africa, aligning with the country's energy action plan, development priorities, and contributing to global climate goals.

The Project was implemented under the modality of Lending to National Financial Intermediaries (NFI)[1], which enabled NDB to leverage local financial systems and expertise, streamline reporting requirements to effectively channel funds to the CSP project. This approach facilitates the efficient allocation of resources and mitigated risks associated with direct lending. Bank's collaboration with local financial intermediaries ensures that projects are well-integrated into the national development framework and that the financial and operational oversight is maintained at the highest standards.

The Management is of the view that the project evaluation should have more accurately captured the specifics of applicable lending modality, as the level of expected NDB's involvement and due diligence process for NFI loans differs compared to direct project loans. For NFI transactions a set of sub-project eligibility criteria are agreed upon with the NFI and the achievement of these criteria allows the NFI to draw down the NDB loan against the newly added sub-projects. The NFI takes on the primary responsibility for hands-on supervision and monitoring project progress.

Furthermore, while we recognize that evaluating incomplete projects presents obvious challenges, the evaluation findings do provide valuable insights. However, as the project is not completed, applying a rating for NDB performance and overall project performance at this stage does not provide a fair and complete assessment.

The Management's responses on the recommendations of IEO are presented below.

Recommendation 1: NDB's Investment should be guided more strategically by its position as a development bank for EMDCs

The NDB should review how it can add value in South Africa's renewable energy sector, where there is already significant commercial interest. As NDB is likely to be a minor investor in these projects, it needs to bring additional value by playing a strategic role. The bank should focus on long-term investments with limited commercial interest, innovative approaches, and partnerships to de-risk investments. Key areas for future investment include inadequate grid infrastructure, weak transmission capacity, energy storage and dispatchable power for grid flexibility, inefficient permitting and planning processes, and supply chain weaknesses for renewable energy development. This strategy would enhance NDB's effectiveness as a development solutions provider.

Management Response

The objective of the project was to enhance South Africa's energy infrastructure by increasing the share of renewable energy in the national grid, thereby improving energy reliability and reducing carbon emissions. This was achieved through the deployment of advanced renewable energy technology of concentrated solar power generation (first of its kind in South Africa) and the development of new power generation capacities. The mission aligned with the broader goals of the NDB, which aims to support sustainable development and promote economic growth in its member countries.

1 The relevant Policy is the Policy on Loans without Sovereign Guarantee to National Financial Intermediaries (NFIs). It describes the loan modality whereby the selected NFI on-lends NDB loans as sub-loans to finance one or more projects (back-to-back loan or two-step loan), all termed as subprojects.

Lending through NFIs ensures that projects are aligned with national development goals and strategies, facilitating smoother implementation and greater impact. Further, a portion of the NDB loan (38%) was also used to finance solar energy projects incorporating battery storage systems, which is relatively new technology for the country, and innovative approach to optimizing energy form renewable energy sources.

Recommendation 2: Highlight the lessons learnt from its experience and develop knowledge products.

NDB should collaborate with technical institutions in South Africa to develop and share lessons from its investments, focusing on technology choices, experiences with Concentrated Solar Power (CSP), plant size optimization based on weather conditions, grid connection challenges, and addressing weak transmission capacity using advanced automation and ICT. Partnering with specialists, NDB should create and disseminate knowledge products and learning notes on these topics.

Management Response
The Management acknowledges the importance of capturing lessons learned and disseminating this information. As per existing practice lessons learned and innovative practices from NDB operations are captured in the Project Completion Report (PCR), which is shared with relevant stakeholder.

Recommendation 3: NDB should use the opportunity provided by its investments to build relations and highlight its visibility in the country and the region.

NDB has not fully leveraged the potential for partnerships in its investments and needs to better highlight its role in key projects, especially in energy transition. This includes being actively involved and acknowledged in promotional materials, presentations, and sponsor websites. The project offered a platform to build relationships with a wide range of stakeholders, including international private sponsors, commercial banks, equity partners, insurance companies, and BEE partners. The NDB's operational team in the African Regional Centre should raise their profile and enhance their capacity to play a stronger role in the sector. Future efforts should focus on leveraging NDB's position and highlighting its role to align with its General Strategy 2022-2026 of mobilizing financing from diverse sources.

Management Response
NDB developed strategic partnerships with key role players in the implementation of energy projects in South Africa, including regular engagements with entities in the public sector such as the Ministry of Energy and Electricity, Eskom, and the National Energy Crisis Committee (NECOM), as well as the private sector including the International Partners Group (IPG).

In 2021 NDB pledged USD 3.0 billion to support the just energy transition plan for the country over the next 3 years. This commitment demonstrated the role of the regional office in placing the NDB's profile in the local and international stage. On 19 August 2023, the ARC presented the Redstone sub-project at the BBC Energy Masterclass, held at Gallagher Estate on the sidelines of the XV BRICS Summit.

Building on these partnerships, in August 2024 NDB will host a high-level energy seminar on the sidelines of Bank's Annual Meeting to further strengthen these relationships.

Recommendation 4: Incorporate transformative equity as a key aspect of NDB investments and integrate it in project design and monitoring and supervision frameworks.

Investments in South Africa highlight the economic development potential of renewable energy projects. The Government promotes transformative equity, with Independent Power Producers (IPPs) considering bidders' economic development potential in areas like black South African empowerment, community shareholding, gender participation, job creation, skill development, and community initiatives. Sub-projects report on these elements to build transformative equity. However, NDB does not detail these aspects in its project documents to the Board or its Design and Monitoring Framework.

Project monitoring reports mainly cover environmental and social assessments, addressing labor and community issues. The evaluation recommends incorporating these economic development aspects into all key documents.

Management Response
The Bank aims to evaluate and enhance positive social impact from all projects, including considerations of equitable economic development and social empowerment in addition to identification and mitigation of social risks. Given that the Bank relies on country systems, all projects funded by the NDB adhere to the transformation imperative of the member country and the information available at project level. Specifically, in the case of Redstone, the sub-Project has initiated a socioeconomic development program and an enterprise development program to provide skill training to local labors, promote preferential local employment and procurement, and provide socioeconomic benefits to local communities. In addition, the Project committed to a community trust equivalent to 2.5% annual revenue for uplifting the local area and for the community to benefit from the project during project operation. These commitments have been assessed during the Bank's due diligence and project monitoring. The Management will consider incorporating these elements going forward in the PDBs appropriately.

Recommendation 5: Track key parameters

Assign clear responsibility for tracking the parameters stipulated in the loan agreement to ensure proper monitoring and reporting. The loan agreement required sub-projects to have an economic internal rate of return (EIRR) of at least 8% and a financial internal rate of return (FIRR) above the sub-project's weighted average cost of capital. Additionally, each sub-project was expected to reduce CO_2 emissions in South Africa by at least 70 tonnes per year for every ZAR 1 million of the total cost. Although initial EIRR and FIRR assessments were presented to the NDB Board, there was no subsequent assessment to track these metrics against changing financial or economic conditions. NDB should enhance its capacity to regularly track and report key metrics from loan agreements.

Management Response
The importance of tracking the parameters is acknowledged. It is recorded in the draft Project Completion Report (PCR) which is yet to be finalized. Where the NFI (National Financial Intermediary) loan modality is used, the local NFI is required to provide continuous monitoring and management of funds, ensuring high standards of financial oversight and accountability.

Recommendation 6: Build structured flexibility into loan agreements

To improve the effectiveness of NDB's loan agreements in accommodating complex projects, it is recommended that the agreements incorporate a degree of structured flexibility. Projects of this type require a range of different contractors and very detailed procedures for initiation of work and commercial operations. It would therefore be prudent to allow adequate time for their implementation and provide flexibility in the contracts to avoid renegotiating the loan agreements and making frequent amendments to them.

Management Response
The Management agrees that the loan agreements should provide adequate flexibility of the project design and acknowledges the importance of putting in necessary tools both at the appraisal and implementation stages. To this end, the practice is already followed by the Bank.


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I. BACKGROUND

A. Introduction

1. This report presents the findings and recommendations of the project performance evaluation (PPE) on the performance and progress of the Renewable Energy Sector Development Project in the Republic of South Africa. For this project, a non-sovereign operation, NDB provided a loan to the Industrial Development Corporation of South Africa (IDC), a development finance institute (DFI) wholly owned by the Government of South Africa for lending to private sector entities. The loan proceeds were on-lent by IDC to renewable energy projects (sub-projects) in South Africa that contribute to the reduction in carbon dioxide emissions, improvement of South Africa's energy sector mix, as well as to an increase in energy efficiency.

2. The undertaking of this PPE was approved by the NDB Board in November 2023. While some project activities were still ongoing, all the NDB funds were disbursed prior to the IEO evaluation which took place over March/April 2024, and the loan closing date was December 6, 2023. In consultation with the NDB Management, it was considered an opportune time to undertake the evaluation to build further on the lessons gleaned from the IEO evaluation of the Greenhouse Gas Emissions Reduction and Energy Sector Development project[1] in South Africa in 2023. The undertaking of an independent evaluation is also consistent with the Evaluation Strategy 2024-2026[2] approved by the Board, which notes that IEO should selectively conduct evaluations of ongoing operations.

B. Country context

3. South Africa is an emerging market and developing economy boasting attributes of both an advanced economy and a less developing economy.[3] The country has been on a stable development progression since its first democratic elections in 1994. The Government has pursued ambitious development objectives since that time, despite some endemic structural and complex social issues it has inherited.[4] In recent years, the South African economy has faced several challenges characterised by fluctuating GDP growth, high unemployment, and an energy crisis. In the period from 2012 to 2023, the average real GDP growth was approximately 1%, lower than the sub-Saharan Africa average of 3% and that of emerging market and developing economies (EMDEs).[5] South Africa also contends with one of the world's highest unemployment rates in 2023 at approximately 32.4%, with youth unemployment exceeding 50%. High unemployment perpetuates deep inequality within the country given its severity among the black South African population, women and the less educated.[6]

4. South Africa has faced a structural fiscal deficit for over a decade due to declining economic growth. In 2023, the economy grew by 0.6 percent in real terms.[7] The negative impact of power cuts, the poor state of ports and rail freight, and inflation have taken a toll as binding constraints to growth. However, the outlook for the country, however, shows moderate improvement. Structural economic reforms are being implemented to address these binding constraints. GDP and total employment have recovered from the 2020 COVID-19 induced slump.[8] Global inflationary pressures are receding, and interest rates are expected to decline. Power cuts are

1 See SA-Report.pdf (ndb.int). https://www.ndb.int/wp-content/uploads/2024/02/SA-Report.pdf
2 See IEO-Evaluation-Strategy-2024-2026.pdf (ndb.int). https://www.ndb.int/wp-content/uploads/2023/12/IEO-Evaluation-Strategy-2024-2026.pdf
3 See International Monetary Fund. 2024. https://www.imf.org/en/Publications/WEO/Issues/2024/04/16/world-economic-outlook-april-2024
4 See DPME.2024. https://www.dpme.gov.za/news/SiteAssets/Pages/25-Year-Review-Launch/Towards A 25 Year Review.pdf
5 Source from the World Bank: https://www.worldbank.org/en/country/southafrica/overview
6 See South Africa Overview: Development news, research, data | World Bank. https://www.worldbank.org/en/country/southafrica/overview
7 See South Africa Statistics. March 2024. https://www.statssa.gov.za/publications/P0441/P04414thQuarter2023.pdf
8 From the Report on Rapid Evaluation of the Economic Reconstruction and Recovery (ERRP) Programme.

expected to recede as additional generating capacity becomes operational. Economic growth is projected to average 1.6% per year from 2024-2026. Economic reforms remain central to the medium-term plans of the Government, with a focus on creating a competitive electricity market and efficient ports and rail logistics systems. Fiscal policy continues to prioritise stabilizing debt and meeting debt service costs. The government remains on course to achieve a primary budget surplus in 2023/2024 to stabilise debt at 75.2% of GDP in 2025/26.[9] The public and private sectors are working to improve infrastructure and education, which could unlock productivity gains. Additionally, with an established financial sector and abundant resources, South Africa is well-positioned for continued strength in traditional sectors such as mining and finance, while also harbouring potential for growth in fields like information technology and renewable energy.

C. Sector context and strategic imperatives on climate change

5. South Africa is one of the world's largest coal producers and uses coal as the primary energy source for its economy. In 2022, coal dominated the South African energy mix, providing 80% of the total system load.[10] The country has tough choices to make given that while it has a plentiful supply of cheap coal, which assures a low-cost fuel source for electricity generation, it is also mindful of the climate change impact from the emissions it generates. As one of the world's top 15 greenhouse gas (GHG) emitters,[11] South Africa is one of the world's least energy-efficient nations.[12] The energy sector contributes nearly 80% of the country's GHG emissions, of which 50% are from electricity generation and liquid fuel production alone.[13] If unmanaged, South Africa's emission levels could grow rapidly by as much as four times by 2050.

6. In December 2009, under the United Nations Framework Convention on Climate Change (UNFCCC), South Africa committed to reducing GHG emissions by 34% come 2020, and by 42% come 2025. Following this commitment, the National Climate Change Response White Paper (2011) outlined the target of reducing the country's annual GHG emissions to a range between 398 and 614 million metric tonnes of CO_2 equivalent by 2030. This commitment was translated into the nationally determined contributions (NDCs) from South Africa to the Paris Agreement on Climate Change 2015. It advocates for South Africa's transition to an environmentally sustainable, climate change resilient and low-carbon economy, through the use of renewable energy.

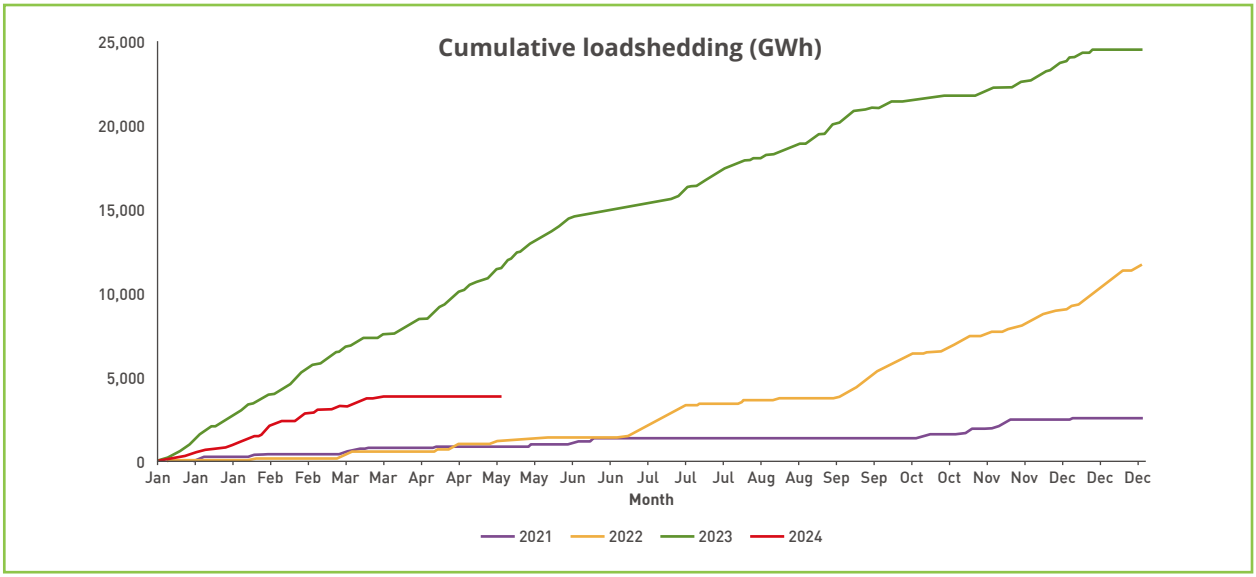
7. The country faces significant challenges in its energy sector, primarily due to its heavy reliance on coal-fired power plants. These plants frequently experience breakdowns due to inadequate maintenance, leading to unplanned outages known as load shedding (i.e. controlled or scheduled power cuts) which diminish the electricity available to the grid. Load shedding, albeit a necessary measure employed by the system operator to safeguard the grid from complete blackouts, has become a recurrent issue in South Africa since 2021, stemming from a demand for electricity that surpasses the country's supply capacity.

8. During these energy load-shedding periods, the power is rationed between different electrical grid areas across the country and within municipal areas. Despite having a technical reserve margin of more than 30%, the years 2022 and 2023 marked the pinnacle of load shedding severity and frequency in the history of Eskom – the vertically integrated, state-owned power company, which generates approximately 80% of the electricity used in South Africa. The loadshedding pattern over the last few years is shown in figure 1. According to the South African Reserve Bank's Financial Stability Review, loadshedding is expected to detract two percentage points from the country's overall economic growth in 2023.

9 Budget Review. 2024. Treasury. Government of South Africa. https://www.treasury.gov.za/documents/National Budget/2024/review/Chapter 1.pdf
10 Source: Council for Scientific and Industrial Research (CSIR), Statistics on Power Generation in South Africa for the first half of 2022 (1 January 2022 to 30 June 2022). https://www.csir.co.za/csir-releases-statistics-on-power-generation-south-africa-first-half-2022-and-loadshedding-data
11 Source: United States Agency for International Development, and the Global GHG Emissions published by the World Resources Institute https://www.wri.org/
12 From the website of South Africa National Electricity Efficiency Programme: https://www.gov.za/about-government/national-electricity-efficiency-programme
13 The Integrated Resource Plan (IRP2019). https://www.gov.za/sites/default/files/gcis_document/201910/42778gon1359.pdf

FIGURE 1

Cumulative load shedding pattern (2021-2024) gigawatt hours (GWh)[14]



Source: Eskom, Independent Power Producer Office (IPPO), the Reserve Bank and the loadshedding app.

9. Policymakers in South Africa have been mindful of the competing challenges and have sought to diversify the sources of power generation and reduce emission levels. The Government's National Development Plan (NDP) is the blueprint for infrastructure development. The NDP lays out a framework for future power generation in South Africa, while energy policies are driven primarily by the Department of Mineral Resources and Energy's (DMRE's) Integrated Resource Plan (IRP). The IRP is an electricity infrastructure development plan based on the least-cost electricity supply and demand balance, considering the security of supply and the environment. The plan envisages a total addition of 29,500 MW to electricity capacity by 2030, predominantly by renewables (notably 14,400 MW from wind and 6,000 MW from solar photovoltaic).[15] At the time of this evaluation, the IRP 2019 was undergoing review. The draft 2023 IRP introduces a "Two Horizons" approach, which enables a focused view on short-, medium- and long-term perspectives. Horizon, one focuses on fixing existing infrastructure, accelerating already committed new build and independent power producer (IPP) projects, and maintaining dispatchable capacity for reliability. Horizon Two focusses on adding more dispatchable capacity (i.e. gas and nuclear), continuing with decarbonisation initiatives by adding more renewable energy, maintaining grid stability and reliability by introducing cleaner coal technologies and extending the life of power plants.

10. Eskom not only generates approximately 80% of the electricity used in South Africa,[16] it also generates a substantial share of the electricity generated across the African continent. About 45% of all end users in South Africa receive their power straight from the firm, while the remaining 55% receive their energy from redistributors (including municipalities). Meeting the rising demand for power and ensuring economic growth is Eskom's main mandate. The Government has also initiated Eskom's Just Energy Transition (JET) to progress the evolution for the transition towards a cleaner and greener energy future. The JET vision focuses on achieving

14 Calculated ((MW*total hours of loadshedding in a year*total days of load shedding in a year)/1000).
15 South Africa - Country Commercial Guide. International Trade Administration. January 2024. https://www.trade.gov/country-commercial-guides/south-africa-energy
16 ESKOM. 2024. https://www.eskom.co.za/heritage/

"Net Zero" carbon emissions by 2050, with an increase in sustainable jobs. The World Bank and other development partners are assisting in the effort to make this transition possible.[17]

11. The Government has decided to unbundle the different services currently offered by Eskom and separate the generation, transmission, and distribution functions. This is expected to enable the separate companies to identify and focus on their specific needs independently, improve efficiency, and reduce costs to the consumer, while also enhancing transparency and accountability. The transmission and distribution functions will be assigned to separate entities by creating separate generation, transmission and distribution line divisions, which will continue to be wholly owned subsidiaries of the Eskom Group. The National Transmission Company of South Africa (NTCSA), with independent operation is expected to commence in July 2024, and the establishment of a separate National Electricity Distribution Company of South Africa (NEDCSA) is under process. NTCSA will become the buyer of power from the IPPs. These changes are not expected to have any impact on the financial sustainability of IPP sub-projects financed via the NDB loan.

D. The Renewable Energy Independent Power Producer Procurement Programme

12. The Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) was established by the DMRE with the primary goal of attracting private sector investments in the development of renewable electricity generation capabilities and to support the achievement of the energy mix goals set by the IRP. REIPPPP also aims to contribute to broader national development objectives such as the empowerment of black South Africans through shareholding in the sub-projects, job creation, social uplift, and economic and small enterprise development. NDB's current loan was provided to IDC to support selected investments through the REIPPPP. The programme currently assigns a score of 90% to the price proposal and 10% to the potential of the proposal to contribute to economic and social development in the area.

13. Under the programme, IPPs are invited to submit bids for onshore wind, solar photovoltaic (PV), concentrated solar power (CSP), small hydro, biomass, biogas, or landfill gas projects. Once IPPs are appointed as preferred bidders, they are required to sign standard, non-negotiable, Rand (ZAR) denominated 20-year power purchase agreements (PPAs) with Eskom. Prices are indexed to inflation. The PPA is supported by an implementation agreement between the IPP and the DMRE, which, along with a government framework support agreement, guarantees Eskom's payments to the IPPs. There is also a standard direct agreement between the IPPs, Eskom, DMRE, and lenders, which provides lenders with step-in rights in the event of default.

14. Each Independent Power Producer Procurement Programme (IPPPP) bid round is initiated with a DMRE procurement instruction detailing a capacity allocation (or cap) and the targeted technology mix for the bid. The IPP has initiated special windows to attract particular types of investments to increase dispatchable energy such as through Bid window 3.5 for the CSP. DMRE has added additional windows to attract firms to provide risk mitigation renewable energy with storage to address the volatility brought about by intermittent renewables. More recently a special window has been launched to elicit proposals for energy storage through the launch of Bid Window (BW) 3 of the battery storage programme. In total 138 renewable energy IPPs have been declared preferred bidders from BW 1 to 6, the Risk Mitigation-IPPPP (RMIPPPP) and the Battery Energy Storage-IPPPP (BESIPPPP) BW 1. The IPP is well monitored and reports on the bids received, the installed capacity, the energy mix, the economic and social development potential, local content, etc. The programme also monitors the trends in terms of the key metrics of each bid window to track investment patterns and changes over time.

17 South Africa - Country Commercial Guide. International Trade Administration. January 2024. https://www.trade.gov/country-commercial-guides/south-africa-energy

II. THE PROJECT

A. Project objectives and design

15. The Renewable Energy Sector Development Project was designed to provide a loan to IDC, a national financial intermediary (NFI), wholly owned by the Government of South Africa. IDC is a significant financing provider in the renewable energy sector in South Africa. The loan proceeds were expected to be on-lent by IDC to renewable energy projects (sub-projects) selected through the REIPPPP in South Africa. IDC's financing programme in renewables is focused on the support of private investors in this sector, both large companies and small- and medium-sized enterprises (SMEs), having a significant transformational impact on South Africa's energy sector that is currently mostly state owned. The NDB financing provided IDC with attractive long-term financing that was denominated in local currency (ZAR) to avoid foreign exchange risk for the borrower and sub-borrowers.

16. As approved by the Board of Directors, the project's predominant objective is to facilitate investments in renewable energy that can contribute to the power generation mix and reduction in CO_2 emissions in South Africa. The project was expected to achieve a yearly electricity generation of 512.2 GWh from clean energy sources and avoidance of not less than 481,436 tonnes of CO_2 emissions annually, starting from 2024, when the sub-projects were expected to become fully operational. In a broader context, the project was expected to contribute to the Sustainable Development Goal (SDG) 7 (Ensure access to affordable, reliable, sustainable, and modern energy for all), and to SDG 13 (Take urgent action to combat climate change and its impacts).

B. Project design and components

17. The loan to IDC was without sovereign guarantee and provided to an NFI (senior unsecured). In accordance with this policy, on-lending terms and conditions of sub-projects were to be determined by IDC in accordance with its existing framework. The project design envisaged that the NDB loan of ZAR 1.15 billion would be given to IDC which would in turn on-lend it to the sponsors of the selected sub-projects. IDC committed to select preferred bidders from the IPPPP. To ensure the additionality of NDB financing, conditions of the disbursement stipulated that financing from NDB's loan should not exceed more than 50% of each of the sub-project's costs. The funds were to be on-lent to sub-projects identified by IDC in accordance with predetermined selection criteria.

18. Sub-project selection was to be based on the selection criteria devised to allow NDB to determine that each of the sub-projects:

    (i) contribute to impact, outcomes and outputs as set in the project's Design and Monitoring Framework (DMF);

    (ii) have sufficient level of preparedness; and

    (iii) are in line with NDB's policies on economic and financial analysis, project procurement, and environmental and social impact management.

TABLE 1

Selection criteria for sub-projects

Item		Project design approved by NDB Board
Sub-project selection criteria	(i)	Sub-project must be the construction of a renewable energy power project.
	(ii)	Sub-project must utilise one of the following technologies: solar PV, CSP, onshore wind, biomass, small hydro (<20 MW) and landfill gas.
	(iii)	Sub-project shall be located in South Africa and shall comply with all applicable national laws and regulations relating to environment, resettlement and indigenous people.
	(iv)	Sub-project must have an economic internal rate of return (EIRR) of not less than 8% and a financial internal rate of return (FIRR) above the sub-project's weighted average cost of capital (WACC).
	(v)	Sub-project shall contribute towards the reduction in CO_2 emissions in South Africa by not less than 70 tonnes per year per ZAR 1 million of the sub-project cost.
	(vi)	Sub-project shall have all South African governmental authorisations and permits to start the construction.
	(vii)	Counterparty funding for the sub-projects must have to be identified by the Borrower.
Criteria for financing instrument	1.	Minimum maturity of a loan (loans) provided under the relevant financing instrument must be 10 years.
	2.	Each financing instrument, funded by any proceeds of the loan, shall be senior debt, or mezzanine debt.

Source: Summarised from the Loan Agreement between NDB and IDC, February 6, 2020.

19. At the time of the presentation of the project proposal to the Board, only the Redstone project had been identified for financing by the borrower through this on-lending facility. IDC subsequently selected three sub-projects by Scatec and included them as part of the project. Thus, NDB financing was used for the Redstone project and the three Scatec projects as follows:

- **Redstone solar thermal power project** (Redstone sub-project), a 100 MW CSP plant, as an anchor sub-project to be supported by the NDB loan. About ZAR 750 million (c.a. 65% of the total loan amount) was allocated to this entity. The Redstone sub-project was awarded as the preferred bidder under BW 3.5 of the REIPPPP, and a power purchase agreement with Eskom was signed in April 2018 with financial close targeted for April 30, 2019. Redstone was expected to invest at a minimum an equal amount of funds.

- **Scatec Kenhardt Solar PV.** From the remaining NDB funds, ZAR 400 million would be used for investment under the Small Projects Independent Power Producer Procurement Programme (SP-IPPPP). Under this window, a proposal for the development of three greenfield solar photovoltaic power plants each with a 50 MW net contracted capacity consisting of a 100 MW solar PV facility (installed capacity) combined with a 75 MW/400 MWh battery energy storage system (BESS) in Kenhardt, Northern Cape Province in South Africa.

C. Amendments to the loan agreement

20. There were two amendments made to the loan agreement:

(i) to avoid loan cancellation due to lack of disbursement in the first year; and

(ii) due to a change in the credit rating of IDC. The first change was made due to the delay in finalizing the financing arrangements of the Redstone project and the selection of the remaining sub-projects. The loan agreement was signed on February 6, 2020. Rating agency Moody's downgraded IDC on the June 25, 2020, from Ba1 (negative outlook) to Ba2 (negative outlook), whereas the sovereign rating for the country at that time was Ba1. This was a breach with respect to the credit rating clause which required IDC to maintain an international credit rating at or above South Africa's sovereign rating from at least one major rating agency (Fitch, Standard & Poor's, or Moody's). In response, NDB waived its rights to declare an event of default that would be triggered by the downgraded rating from Moody's. At the IDC's request, NDB's Board approved an amendment under which IDC would only be considered in breach (triggering mandatory prepayment) if its credit rating fell to B2 or lower by Moody's or to B by either Standard & Poor's or Fitch.

TABLE 2

Amendments to the loan agreement

Amendments	Item	Highlights
Amendment 1	**February 5, 2021**	1. Automatic cancelation is deleted in its entirety. 2. Removed commitment charges on undisbursed loan for the first twelve months.
Amendment 2	**October 27, 2021**	1. Reduction in the repayment period from 228 months to 171 months. 2. The definition of "Credit Rating Agencies" is inserted as meaning collectively Fitch, S&P and Moody's. 3. Margin increased from 2.10% to 2.53% per annum. 4. Omission of the requirement for the IDC to maintain an international credit rating at or above South Africa's sovereign rating from at least one major rating agency (Fitch, S&P, or Moody's). 5. Terms and conditions for prepayment have been added in response to the omission of the requirement above.

Source: Summarised from the Loan Agreement between NDB and IDC, February 6, 2020.

D. Implementation arrangements and support

21. The IDC was responsible for identifying, selecting, appraising, financing, and monitoring sub-projects eligible for NDB funding. The programme was expected to follow a competitive tender process of selecting independent power producers for large scale renewable energy generation through the IPPPP. Before seeking a disbursement for every new sub-project, IDC was expected to submit to NDB a set of documents confirming the sub-project's conformity to the selection criteria. Apart from this, sub-projects for which IDC's sub-loan was above a certain threshold (the "free limit"), needed approval of NDB. For establishing the free limit, it was proposed to take into account the average loan size in IDC's renewable energy portfolio, which is approximately ZAR 750 million, and to set the threshold at this level (for reference, this is at approximately 2.6% of IDC's loan portfolio of ZAR 28.6 billion and approximately 0.5% of IDC's assets of ZAR 142 billion). NDB's approval was also needed for all sub-projects assessed as Category "A" with respect to an environmental and social impact (according to the NDB Environment and Social [E&S] Framework).

22. The NDB policy on Loans without Sovereign Guarantee to NFIs provides the Bank with the option to set an additional limit above which a sub-project needs to be appraised by NDB. Taking into consideration the extensive experience of IDC in the energy sector, IDC's proven capacity as a development financial institution, and the proposed loan's requirement that not less than five sub-projects shall be financed by IDC (thus, diversifying the financed portfolio), it was proposed not to set this appraisal floor.[18]

23. In addition to the oversight role of IDC, each of the sub-projects were designed with a large range of co-financing and implementing partners for the very technical and specialised tasks required for the design, procurement, construction and operation and management of the sub-projects. These institutional arrangements are outlined below.

    (i) The Redstone project was developed by a consortium of partners led by ACWA Power registered and head-quartered in Saudi Arabia. The construction of the sub-project (including the 132 kV substation and the transmission line) was managed through a turn-key engineering procurement and construction (EPC) contract executed between the project company and a consortium of Shandong Electric Power Construction III (SEPCO III) and Power China (parent company of SEPCO III). The First National Operation and Maintenance Company (NOMAC), a subsidiary of ACWA Power, along with a local partner, was to provide operations and maintenance (O&M) services to the sub-project under an O&M agreement. In addition, MPAMOT Africa was appointed as the IDC's technical advisor and provided regular monitoring reports on the progress of the various aspects of construction of the sub-project.

    (ii) Scatec was the main borrower from IDC and has also received loans from the Standard Bank Group as lead arranger and British International Investment (BII). The sub-project was to be developed by Scatec ASA (51%) and H1 Holdings (49%). Scatec assumed the functions of the EPC and O&M contractor for the project while outsourcing specialist roles including construction and battery energy and storage systems (BESS) O&M to subcontractors. Scatec also appointed IBIS Environmental Social Governance Consulting South Africa (Pty) Ltd (IBIS) for the E&S compliance assessments.

18 The average cost for Bid Window 4 of REIPPPP projects was ZAR 20.6 million/MW. The cost for smalls is higher as there is no benefit from economies of scale.

E. Cost and financing

24. The original Redstone project cost was estimated to be ZAR 11.061 billion. The current project cost is ZAR 11.296 billion. This represents an increase of 2% in the Redstone sub-project cost. The Scatec sub-projects original cost was expected to be ZAR 16.429 billion. At completion, the Scatec sub-project cost was calculated to be ZAR 16.473 billion. This represents an increase of just 0.03%. Redstone is experiencing time overruns but is expected to be completed within the given budget even though there has been utilisation of the contingency budget to service debt. There is a standby facility the project can make use of in case of cost overruns. NDB provided the agreed loan of ZAR 1.150 billion. The original value of the loan in United States dollars was USD 82 million at the time of the project approval but the exchange rate eroded, subsequently the rate at which the ZAR was disbursed amounted to a total value of USD 59 million.

TABLE 3

Total project budget

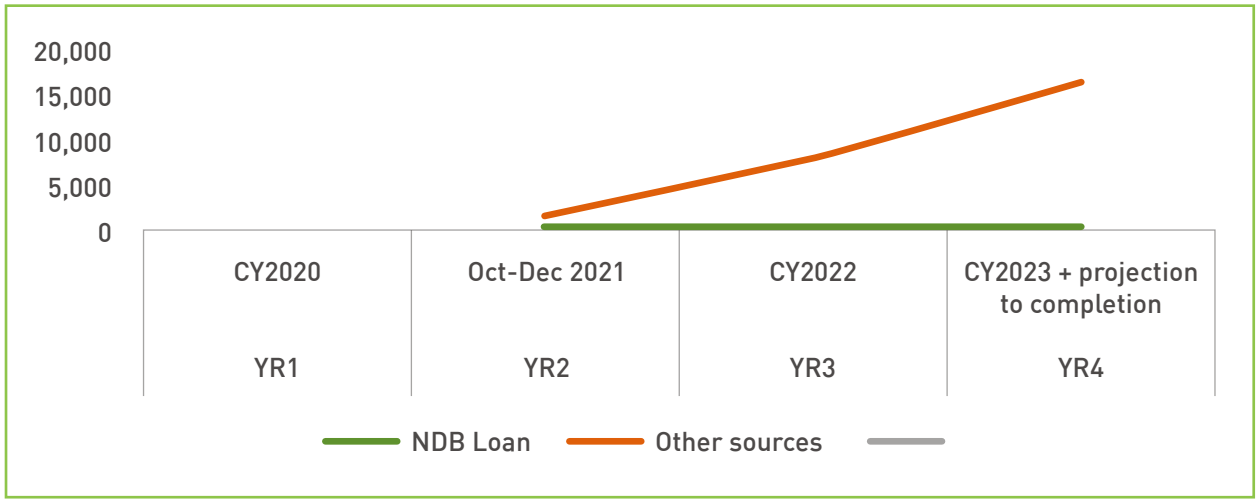
Sub-projects	Initial amount (Millions of ZAR)	Actual/estimated costs to completion (Millions of ZAR)
Redstone	11,061	11,296
Scatec	16,429	16,473
Total	**27,490**	**27,769**

Source: Project progress report (PPR), IDC.

25. There were a large number of lenders of the sub-projects who provided 96% of the total financing. NDB's share was less than 4% of the total project costs of around USD 1.4 billion. From NDB funds of ZAR 1.15 billion, 62% was provided to Redstone and 38% was provided to Scatec. The timeline of fund utilisation of the NDB loan and the funds from other sources are shown in the figure below. The figure shows that NDB funds were disbursed to IDC at a relatively steady pace whereas the funds from other lenders and the sponsors show an exponential rate of expenditure as the construction phase progressed.

FIGURE 2

Source of funds by year
(In ZAR million)



Source: PPR, IDC.

F. Project timelines

26. The project was approved on March 31, 2019, and the loan agreement was signed on February 6, 2020, with the loan closing on December 6, 2023, and physical completion in February 2024. There were several delays experienced by the sub-projects and by April 2024 when this evaluation was conducted, progress could be summarised as follows:

    (i) Redstone was still under construction and had not initiated commercial production. There were delays in the Redstone CSP sub-project reaching financial close due to the complexity of the transaction, COVID-19 and the withdrawal of one of the lenders due to a change in the country's credit rating. The Redstone CSP sub-project is expected to start operations in late July/early August 2024; and

    (ii) The three Scatec sub-projects had begun commercial operations. Scatec 1 and 2 started commercial production in November 2023, and Scatec 3 in December 2023. Scatec was approved under the RMIPPP which was scheduled to reach financial closure in July 2021. However, due to delays in a court case which relate to the accusation of flaws in the bid award process, the programme was delayed. The court case reached its conclusion by the end of November 2021 and financial close was reached in July 2022. The project's construction phase is complete, and the projects have commenced operations.

TABLE 4

Basic project data and timelines

Country	South Africa
Loan no.	19ZA03
Project name	Renewable Energy Sector Development Project
Borrower	Industrial Development Corporation of South Africa Limited (IDC)
Executing agency	IDC
Loan approval date	March 31, 2019
Loan signing date	February 6, 2020
Loan effectiveness date	February 6, 2020
Loan closing date	December 6, 2023
Physical completion date (original)*	February 6, 2024
Physical completion date (expected)	July/August 2024

* The loan agreement does not specify a project completion date, it mentions that the borrower must notify NDB in writing of the completion of the project, but the project completion report should be submitted no later than 12 months from the loan closing date.
Source: PPR IDC, loan agreement, project design document.

G. Implementation results

27. The loan was fully disbursed by NDB to IDC between December 9, 2021 and May 19, 2023, with five disbursements made within 18 months. The proceeds of the NDB disbursements were used for reimbursement of funds disbursed by the IDC for financing the sub-projects. These were in keeping with the loan covenants and were not made earlier than the retroactive financing date and no later than the loan closing date.

28. In order to make the disbursements for the loan in local currency,[19] therefore, for this project NDB converted USD into ZAR for supporting the loan disbursements. To manage the foreign exchange risk, NDB entered the cross-currency swap or forward contracts with treasury counterparties. Some of the forward contracts with counterparties are short term due to the underlying costs, market regulations as well as inherent risks, which were rolled forward monthly with the counterparties. Some of the potential implications of the above practices could include: inefficient and escalated operational risks due to frequent rolling forward transactions for managing the foreign exchange exposures; complications related to calculating and attributing the entire funding costs for supporting the ZAR disbursement; and opportunity costs of using the USD assets for managing a ZAR funding swap, compared with raising the ZAR from the debt financial markets.

TABLE 5

NDB's disbursement dashboard for the loan to IDC

Description	Value date	Currency	Disbursed amount	Disbursed amount (USD)
Disbursement: 1	December 9, 2021	ZAR	302,304,653	15,728,397
Disbursement: 2	May 19, 2022	ZAR	71,854,310	3,738,458
Disbursement: 3	September 30, 2022	ZAR	411,800,375	21,425,273
Disbursement: 4	February 3, 2023	ZAR	160,178,614	8,333,821
Disbursement: 5	May 19, 2023	ZAR	203,862,048	10,606,596
Total			**1,150,000,000**	**59,832,545**

Source: NDB Loan Dashboard.
Note: Exchange Rate (ZAR 19.220 = USD 1) as of February 29, 2024.

19 NDB only issued its first ZAR bond in August 2023.

H. Monitoring, evaluation and supervision arrangements

29. In screening its borrowers, IDC was required to comply with South Africa's Financial Intelligence Centre Act (FICA), and the Know-Your-Client (KYC), Integrity Due Diligence (IDD) and Sanctions Compliance of sub-project entities. In addition to this, IDC was obliged by the loan agreement with NDB to provide information on sub-project entities that would allow NDB to also conduct a screening of the names, thereby mitigating the IDD and sanctions risk in addition to monitoring the IDD conducted by IDC.

30. IDC was also expected to monitor the implementation of the sub-projects and evaluate their benefits. The results of the monitoring were to be aggregated in project progress reports to be submitted to NDB annually. Apart from physical progress on the construction site, the reporting items were to include:

    (i) compliance with E&S standards;

    (ii) identified issues with the project procurement;

    (iii) use of funds, including NDB Loan proceeds;

    (iv) performance of sub-projects after completion including their contribution to the development indicators listed in the DMF; and

    (v) quality of IDC's sub-loans financed with NDB resources. Within 12 months after the loan closing date, by December 6, 2024, IDC is to prepare a project completion report (PCR).

31. Both the sub-projects made arrangements to closely monitor safety, labour, social and environmental issues. Community liaison offices were hired to monitor community issues and find remedial measures in close discussion with local contractors and local government and labour representatives.

32. IDC was expected to submit project progress reports to NDB, and NDB's Africa Regional Centre (ARC) in Johannesburg was expected to prepare a project performance assessment. Standard templates were provided to IDC for the purpose, and these were submitted in a timely manner. Based on these reports NDB prepared its reports for sharing with NDB management. NDB was also expected to undertake regular supervision missions and prepare regular credit analyses and an assessment of the overall business outlook and projections. NDB was expected to monitor compliance to ensure that disbursements met the loan agreement requirements.

III. EVALUATION OBJECTIVES, METHODOLOGY, AND PROCESS

A. Evaluation objectives

33. The main objective of this evaluation is to assess the performance of the project in achieving its objectives of facilitating investments in renewable energy that can contribute to South Africa's power generation mix, energy stability and avoidance of CO_2 emissions. At the same time, the evaluation is envisaged to derive lessons and recommendations that can assist in the design and implementation of ongoing and future NDB operations, particularly similar investments with the private sector in the renewable energy sector in South Africa and beyond.

B. Methodology, evaluation questions, and rating scale

34. The evaluation was conducted within the overall framework of the NDB Evaluation Policy,[20] approved by the Board in August 2022, and the NDB Evaluation Strategy 2024-2026, approved by the Board in November 2023. The core methodology of the evaluation entailed the use of internationally recognised evaluation criteria, as followed by the Evaluation Cooperation Group (ECG) of the Multilateral Development Banks. The criteria were however customised to the South African context, the project, and NDB.

35. IEO assessed the performance based on a set of evaluation criteria (see annex 4) that included relevance, effectiveness, efficiency, impact, and sustainability. Furthermore, the Government of South Africa places increased emphasis on specific aspects during evaluations, as detailed in South Africa's National Evaluation Policy Framework 2019-2024.[21] This framework underscores the critical importance of incorporating transformative equity and climate and ecosystem health (CEH) into evaluation processes. According to the Department of Planning Monitoring and Evaluation (DPME) guidelines,[22] transformative equity examines how an intervention's goals, planning, execution, and outcomes either address or fail to address systemic inequities, aiming to foster a more inclusive society. The CEH evaluation focuses on the consequences arising from how intervention activities interact with climate and ecosystems. It also provides insights on enhancing intervention strategies to positively impact CEH, thereby increasing the resilience of the intervention and its beneficiaries to climate change. These considerations have been integrated within the traditional evaluation criteria applied to ensure a comprehensive assessment.

36. Based on the assessment and ratings assigned to each of the above-mentioned criterion, IEO assessed and provided a composite rating to the evaluation criterion titled, "Overall Project Achievement". The evaluation also assessed NDB and borrower (i.e. IDC) performance, respectively, and examined NDB's additionality.

37. Furthermore, as the project comprised four sub-projects implemented through private sector IPPs, at the sub-project level, this evaluation assessed several aspects as normally applied in the evaluation of private sector operations: financial performance, economic sustainability, and E&S performance.

20 New Development Bank Evaluation Policy, 2024. https://www.ndb.int/wp-content/uploads/2024/04/NDB_IEO_Evaluation-Policy-.pdf
21 South Africa's National Evaluation Policy Framework 2019-2024 (DPME, 2019). https://www.dpme.gov.za/keyfocusareas/evaluationsSite/Evaluations/National Policy framework Nov 2019.pdf
22 The CEH guideline can be accessed https://www.dpme.gov.za/keyfocusareas/evaluationsSite/Guidelines/CEH%20Guideline_2.2.25_v3.pdf and the TE guideline can be accessed https://www.dpme.gov.za/keyfocusareas/evaluationsSite/Guidelines/Evaluation%20Guideline_Transformative%20Equity_v3_Latest%20version.pdf

38. In conducting its analysis, IEO utilised mixed methods that included a quantitative and qualitative analysis. The use of triangulation techniques validated the analysis, leading to the assignment of a performance rating for each criterion on a six-point scale.

TABLE 6

Rating scale

	Rating scale	Description
6	Highly Successful	The project achieved or surpassed all main targets, objectives, expectations, and results and can be considered as a model within its project typology (overwhelming positive results and no shortcomings).
5	Successful	The project achieved almost all (indicatively, over 80-95%) of the main targets, objectives, expectations, and results (strong results, with minor shortcomings).
4	Moderately Successful	The project achieved the majority (indicatively, 60 to 80%) of the targets, objectives, expectations, and results. However, a significant part of these was not achieved (positive results with some shortcomings in several areas).
3	Moderately Unsuccessful	The project did not achieve its main targets (indicatively, less than 60%), objectives, expectations, and results (several shortcomings that outweigh some positive results).
2	Unsuccessful	The project achieved only a minority of its targets, objectives, expectations, and results (largely negative results, with very few positive results).
1	Highly Unsuccessful	The project achieved almost none of its targets, objectives, expectations, and results (significant negative results, with hardly any positive results).

C. Key questions examined

39. The evaluation examined some key questions which are given below. Annex 5 provides a more complete set of questions covered.

- To what extent did the project align with and contribute to the objectives outlined in South Africa's National Integrated Resource Plan 2019 regarding the diversification of power generation sources, especially the integration of renewable energy? Additionally, how effectively did it support the National Development Plan's vision for an environmentally sustainable, climate-resilient, low-carbon economy, while simultaneously advancing broader NDP objectives such as poverty reduction, reducing inequality, and creating job opportunities?

- What were the key policy and regulatory challenges that may have impacted the project being operationalised?

- How effectively has the project realised its declared outputs and outcomes? Are there quantifiable metrics that demonstrate successful implementation? Furthermore, has the project made a significant contribution to the stability of the local power grid and enhanced energy access and security within the country?

- To what extent has the project contributed to stimulating private sector financing and increasing availability of long-term funds for the energy sector projects in South Africa?

- Did the project demonstrate efficiency in its implementation, including timely loan effectiveness and disbursement processes? How did its costs and financial management practices compare to benchmarks and expectations set at the project's outset? Additionally, were the allocated financial and physical resources sufficient to ensure the project's successful completion and alignment with its intended objectives?

- Are the operations and maintenance aspects of the project (and sub-projects) structured to ensure long-term sustainability?

- Is the design of the intervention inclusive, addressing societal inequities and the need for transformative equity?

- In what ways does the intervention interact with the natural environment? What natural resources does the intervention depend upon and what impacts do the intervention's activities have on CEH?

D. Key evaluation phases and process

40. **Desk review.** IEO conducted an initial literature review. The documents reviewed included, inter-alia, the project design document, loan agreement and its amendments, the project progress reports, project performance assessment reports, financial and economic analysis reports, and the technical reports and E&S reports produced by technical experts of the sub-projects. The team also reviewed policy documents and plans of the Government of South Africa, focusing on renewable energy and access to finance within the sector from private sources. Additionally, the team examined NDB's Policy on Loans without Sovereign Guarantee to NFIs. Relevant experience of how other countries have approached this sector were also reviewed where relevant. This phase of the review was undertaken in preparation for the field work and culminated in preparing an approach paper outlining the sector and project context as well as the overall evaluation methodology, process, and timelines.

41. **Field work.** In March-April 2024, the IEO team embarked on a two-week evaluation mission to gather additional information, visit the project sites, conduct interviews with key stakeholders, and undertake preliminary analyses. The team engaged in discussions with key government bodies, the NDB Africa Regional Centre, and the IDC. The evaluation team also met with key institutions such as the Department of National Treasury, the Department of Mineral Resources and Energy, the IPPPP procurement team, the South African National Energy Development Institute, Eskom, African Development Bank (AfDB), the International Finance Corporation (IFC), and the Department of Planning, Monitoring and Evaluation (DPME). The team also interacted with representatives from two of IDC's clients, ACWA Power and Scatec. Site visits allowed the team to meet with the project managers of both the Redstone and the Scatec sub-projects, technical staff, and engage with members of the local communities.

42. **Wrap-up debriefing.** After concluding the fieldwork, the IEO organised a presentation on April 10, 2024 to share its preliminary findings with a range of stakeholders, as a way also to capture their early feedback for the report writing stage.

43. **Drafting of the evaluation report.** Building on the desk review and field work, IEO drafted the main evaluation report. The draft was shared with IDC, NDB Management, and the South Africa National Treasury for comments. The National Treasury was invited to share the draft report with other relevant government departments, as appropriate. IEO has carefully considered all comments received in preparing the final report. An audit trail was produced illustrating how the comments received were incorporated by IEO in the final report. Once the final report has been prepared, the NDB Management would prepare a written Management Response to the independent evaluation, which will be included in the evaluation report once published. Additionally, DPME in South Africa served as peer reviewer of the evaluation. Their comments on the evaluation's design and draft final report were carefully considered by IEO and incorporated as appropriate.

44. **NDB Management Response and Board discussion.** The evaluation report along with the Management Response will be considered by the NDB Board in August 2024.

45. **Knowledge sharing and outreach.** In line with the NDB Evaluation Policy and Evaluation Strategy 2024-2026, the final evaluation report – inclusive of NDB Management Response – will be published on the IEO webpages. Evaluation findings will also be shared through relevant social media and communication instruments. An Evaluation Lens – a two-page pamphlet, outlining the key findings from the evaluation – will be prepared and disseminated to a wider audience.

E. Limitations

46. The evaluation team faced several challenges during the evaluation. The main issue was that the Redstone project is still under construction and has not initiated commercial production; and Scatec had initiated commercial production for only five months as at the date of this report. As such it was not possible to assess some of the technical performance metrics on the actual functioning of the plants to assess their actual production capacity and the issues with down time, levels of solar irradiance and other aspects of operation and maintenance. The reports produced by IDC and NDB are repetitive and very basic. They do not delve deeper into some of the technical, economic and social aspects. Their main focus has been on disbursements and not on some of the key lessons that emerge from the experience so far. There is limited information on the financial internal rate of return and economic internal rate of return and the assumptions made in undertaking the analysis were incomplete. There were no project completion reports prepared by IDC or NDB as these were not yet due. Some of these issues should be covered in the PCR to be prepared by NDB.

IV. PROJECT PERFORMANCE

A. Relevance

47. In line with the internationally recognised definitions, the relevance criterion assessed the extent to which:

(i) project objectives were aligned with Government policies and the needs of the borrowing country as well as with NDB's first and second General Strategies and other relevant Bank policies and priorities;

(ii) the design of the intervention was appropriate to meet project objectives; and

(iii) the intervention was adapted, as needed, to address any changes in the context during implementation.

Relevance of project objectives

48. **Alignment with Government policies and strategies.** Presently, about 80% of South Africa's primary energy needs are provided by coal.[23] South Africa's highly coal-dependent power generation is aging, unreliable, polluting, and unable to keep up with demand.[24] The current power supply gap is estimated at 4-6 GW causing load shedding of up to 10 hours daily, affecting people's day-to-day lives and the country's economic prospects. Although electricity access is high compared to regional averages, about 10% of South Africans still lack access to electricity, and 47% are considered energy poor. Despite the shortage, the Just Energy Transition Partnership plans to decommission and repurpose outdated coal-fired power plants in order to lower the high level of emissions. According to the Integrated Resource Plan 2019, by 2030, South Africa plans to retire 12 GW of coal plants and add 18 GW of new wind and solar PV to meet energy needs.[25] This growth will be fuelled by the Renewable Independent Power Producer Procurement Programme and the removal of the licensing cap, which will enable more private sector participation in the power sector. Given this situation, investment in the project was highly relevant to the country's needs. Additionally, renewables are expected to help ensure that South Africa can continue to have competitive exports in the face of growing carbon tariffs (e.g. the European Union's Carbon Border Adjustment Mechanism [CBAM]) and provide a significant reduction in emissions (NOx, SOx, PPM, CO_2) and water usage.[26] The current project objectives are closely aligned with the Government's plans.

49. **Alignment with climate agenda.** The investment in the renewable energy sector is also highly relevant to the commitments the country has made to reducing its GHG emissions. The power sector generates 41% of South Africa's CO_2 emissions, due mainly to Eskom's fleet composition. Its 15 coal-fired power plants, with an average age of 41 years, provide 38.7 GW of the country's 52.5 GW installed capacity.[27] Reducing greenhouse gas emissions is in line with the Government's goal to transition South Africa toward a low-carbon, resilient economy and society by 2050, as

23 International Trade Administration. January 2024. https://www.trade.gov/country-commercial-guides/south-africa-energy#:~:text=Presently%2C%20about%2080%20percent%20of,%2C%20primarily%20coal%2Dfired%20generation
24 Factsheet: Eskom Just Energy Transition Project in South Africa. World Bank. June 2023. https://www.worldbank.org/en/news/factsheet/2023/06/05/factsheet-eskom-just-energy-transition-project-in-afe-south-africa
25 ibid.
26 ibid.
27 ibid.

outlined in the Just Energy Transition framework for South Africa, championed by the Presidential Climate Change Commission and endorsed by the cabinet in August 2022. The project is also consistent with commitments under the country's updated Nationally Determined Contributions to a mitigation range of between 398-510 $MtCO_{2e}$ by 2025, and between 350-420 $MtCO_{2e}$ by 2030.[28] Additionally, the investment is also in line with South Africa's commitment under the 2009 United Nations Framework Convention on Climate Change (UNFCCC, 2009) to reduce GHGs from its emissions growth trajectory by 34% by 2020, and 42% by 2025.[29]

50. **Alignment with NDB's first and second General Strategies and policies.** The project was approved and signed during the implementation of NDB's first General Strategy for 2017-2021 which prioritised clean energy and the adoption of innovative new technologies, such as energy storage systems, adaptable smart electricity grids and solid-waste-based energy generation. The project was implemented during the period of NDB's second General Strategy for 2022-2026 regarding mobilisation of private capital, expanding non-sovereign operations and its focus on clean energy and energy efficiency. The project contributes to NDB's commitment to dedicate 40% of its total volume of approvals to projects contributing to climate change mitigation and adaptation, supporting member countries' transition to a more sustainable development path. The project also enabled the use of country systems in environmental, social, and governance, as well as procurement practices, as a defining feature of NDB's approach. Similarly, the project has also contributed to NDB's target of loans denominated in local currencies to account for 30% of financing provided by the Bank. The project is in keeping with NDB's commitment to support its member countries' transition towards a low-emission development pathway, as guided by their NDCs.

Relevance of project design

51. The loan was provided to IDC which was a significant financing provider in the renewable energy sector in South Africa under the IPPPP. At the time of the project appraisal, it had an exposure of ZAR 14 billion (equivalent to USD 1 billion) in 24 IPP projects made up of 57% debt, and the balance in equity and quasi-equity financing. The NDB loan to IDC was without sovereign guarantee and provided to a national financial intermediary (senior unsecured). The project design envisaged that the NDB loan would be in the form of a loan to IDC which would lend it to the sponsors of the selected sub-projects. These funds were to be on-lent to sub-projects identified by IDC in accordance with a predetermined selection criterion. In accordance with NDB policy, on-lending terms and conditions of sub-projects were to be determined by IDC in accordance with its existing framework. To ensure the additionality of NDB financing, conditions of the disbursement allowed for the financing from NDB's loan of not more than 50% of each of the sub-project's costs.

52. At the time of the approval of the project, IDC presented to NDB the Redstone solar thermal power project (Redstone sub-project), a 100 MW CSP plant, as an anchor sub-project to be supported by the NDB loan. About ZAR 750 million (c.a. 65% of the total loan amount) was expected to be allocated to this sub-project. The Redstone sub-project was awarded as the preferred bidder under Bid Window 3.5 of the REIPPPP. The project document to the board and the DMF stated that IDC had committed to finance at least five out of the 20 projects which were selected as preferred bidders under the Small Projects Independent Power Producer Procurement Programme totalling 25 MW (solar and biomass) with total project costs amounting to ZAR 1 billion. However, there is no such stipulation in the loan agreement.

28 ibid.

29 Following on this commitment, the National Climate Change Response White Paper (2011) outlined the target of reducing the country's annual GHG emissions to a range between 398 and 614 million metric tonnes of CO_2 equivalent by 2030. This commitment was eventually translated into Nationally Determined Contributions from South Africa to the Paris Agreement on Climate Change 2015.

53. The projects eventually included in the project were the Redstone CSP sub-project and three solar photovoltaic and battery storage plants by Scatec that are in close proximity to each other in one location. All the Scatec projects were considered as independent projects with three separate power purchase agreements. The biomass project and projects under the SP-IPPPP were not selected. In discussions with technical specialists from the sector, the evaluation mission concluded that biomass projects suffer from issues regarding the adequate supply of fuel and its detrimental impact on the environment and issues in attracting investments for the small-projects due to economies of scale. Thus, IDC made an appropriate decision to exclude these from the sub-project list.

54. Instead of the five sub-projects with a combined capacity of at least 120 MW of new renewable energy generation capacity through IDC lending, the project financed four sub-projects with a total installed capacity of 640 MW. Furthermore, the revised expected energy generated by the project is 1340 GWh/annum (Redstone 491 GWh/annum and Scatec 849 GWh/annum) which is more than twice the targeted 512.2 GWh/annum of energy expected at design. Redstone was selected under the REIPPPP and Scatec projects were selected under the technology agnostic RMIPPP.

55. The selection of the sub-projects was in keeping with the selection criteria devised to ensure that each of the sub-projects:

    (i) contributed to impact, outcomes and outputs as set in the project's DMF;

    (ii) have sufficient level of preparedness; and

    (iii) are in line with NDB's policies on economic and financial analysis, project procurement, and environmental and social impact management; and

    (iv) have contributions from the private sector of a certain minimum level of investment from sources other than NDB for each sub-project. The project also unlocked private sector investment, and increased the availability of long-term funding in local currency for the energy sector projects in South Africa.

56. **Technological choice of sub-projects.** The sub-projects selected are expected to contribute to enhanced stability of the local power grid and enhance energy security as both have the capacity for storage. The technologies chosen were highly relevant to the needs of the shortages in energy supply during peak time and the capacity of the sub-projects to address this demand. However, this particular aspect of storage capacity and dispatchability was not included in the DMF or as a criterion in the loan agreement.

    (i) The Redstone project uses concentrated solar power through a tower-mounted salt central receiver (MSCR) with 12-hours of thermal storage capacity. This enables the plants to respond effectively to the electricity needs especially to meet demand when it peaks near sunset just as PV capacity ramps down to deal with the phenomenon referred to as the "duck curve".[30] CSP can more easily store energy during the night, making it more competitive with dispatchable generators that can be programmed on demand at the request of power grid operators.

30 The duck curve is a graph of power production over the course of a day that shows the timing imbalance between peak demand and solar power generation.

(ii) The Scatec project totalling 540 MW solar and 225 MW/1,140 MWh battery storage, is one of the world's largest hybrid solar and battery storage facilities, overcoming intermittency challenges and bolstering grid stability. With the ability to deliver reliable power in low or no sunlight, the integrated storage enhances overall reliability and the need to provide power to meet peak loads. The power plant sizing is driven by the power purchase agreement with Eskom which takes into consideration energy requirements and resource seasonality.

57. **Relevance to private sector participation.** The sub-projects were deemed highly relevant for private sector partners and attracted a large range of financiers and technical specialists required for the design, procurement, construction and operation and management of the sub-projects. This approach was very relevant and supportive of the public-private partnership (PPP) mechanism promoted by both NDB and the IDC to leverage resources of the private sector and increase its participation in major infrastructure projects. The sub-projects were designed to at least double the loan from NDB and bring together a large range of investors from the commercial, development finance, Black Economic Empowerment (BEE) and community trusts.

Adaptation during implementation

58. There were several adaptations made during implementation that included the reduction in the number of sub-projects from the original five to four. While the number of projects to be financed was included in the document presented to the Board and the DMF it was not a condition in the loan agreement. The biomass and smaller projects were not included in the final selection as the raw material for these plants are hard to source and small projects cannot help in achieving economies of scale. Changes were also made to the loan agreement to factor the unanticipated delays in reaching financial close and the changes in perceptions of credit risk. The first change was made to avoid automatic cancellation of the loan, resulting from no disbursement within first year of signing the loan agreement (February 5, 2021) and the second change was made to remedy the breach of covenant when the IDC credit rating was downgraded (by Moody's in 2020) below the sovereign credit rating (October 10, 2021).

59. **Summary.** The project objectives were very relevant to the country's need for clean energy and its target of reducing its GHG emissions. The project was also well aligned with both of NDB's General Strategies on a host of aspects such as non-sovereign lending, using country systems, its focus on clean energy and climate change mitigation and using of transformative and innovative technologies. The sub-projects were very relevant in terms of addressing the need to manage peak energy demand in terms of the technologies that were selected. While not explicitly discussed or noted in the project document to the Board, the project is also very relevant in addressing the social development objectives of greater economic participation of black South Africans in the country's economy. However, one area of concern is the choice of the CSP technology which presents difficult technical issues even though the storage capacity it offers is critical. The project was therefore evaluated to be **Successful** in terms of **Relevance**.

Criterion	Rating
Relevance	**Successful (5)**

B. Effectiveness

60. Effectiveness is the extent to which the intervention achieved or is expected to achieve its objectives and results. The DMF had identified the outputs and the outcomes expected from the project (see full list in annex 1). In assessing effectiveness, the evaluation first summarises the main outputs achieved and then assesses the achievement of project objectives.

61. **Achievement of project outputs has not yet been fully achieved.** The project was expected to install five sub-projects with a combined capacity of at least 120 MW of new renewable energy generation capacity through IDC lending. A biomass project was eventually not included by IDC in the list due to lack of raw materials and neither were projects under the SP-IPPP due to issues of economies of scale, and this small window was eventually discontinued. The sub-projects selected included the Redstone CSP project and three solar PV projects by Scatec. Redstone also included a high voltage overhead line (OHL) and its related connection and termination points. The work comprised of a 132 kV single circuit OHL (between NOKO to Olien 132 kV Line), a 3-bay 132 kV switching station deviation of the Olien to Ouplaas 132 kV line near Olien MTS (Main Transmission System). The Noko substation and OHL were energised on November 24, 2022. The electrical grid interconnection works have been completed. At the time of the visit of the evaluation team, the Redstone project indicated that they had completed most of the construction, but the 41,265 heliostats had not yet been installed due to replacement of the firm that was initially hired for the installation. The new date given for the commissioning was reported to be July 2024 which appears optimistic.

62. The three other sub-projects include Scatec 1, Scatec 2 and Scatec 3 with a total 150 MW (3 x 50 MW) of contracted capacity to produce approximately 283,157 MWh per plant per year (283 GWh). Scatec has built each of the plants with an installed capacity of 180 MW each to ensure they are able to provide the contracted capacity which is much lower than installed capacity. The projects have been completed and Scatec 1 and 2 started commercial production at the end of November 2023 and Scatec 3 started production in December 2023. The storage capacity of each of the plants is 380 MWh or a total of 1,140 MWh. On the day of the visit of the evaluation team, one of the transformers from Eskom's side was not functioning but was expected to be repaired by the end of the day or by the end of the next day.

63. **Expected outcomes from the total sub-projects have been met even though Redstone has not yet begun commercial operations.** Based on the installed capacity, the four sub-projects were expected to produce a total of 1340 GWh/annum (Redstone 491 GWh/annum and Scatec 849 GWh/annum) which is more than twice the targeted 512.2 GWh/annum of energy expected at design. All the sub-projects offer storage capacity and Redstone is the first Renewable Energy Independent Power Producer Procurement project to provide ancillary services such as grid stabilisation to Eskom, at no additional cost. The outcomes expected from the Redstone project have not yet been realised as the sub-project has not started commercial production and not generated any benefits so far.

64. **Sub-projects' effectiveness of reducing CO_2 emissions per ZAR 1 million invested.** To ensure NDB funds would be utilised effectively for achieving the project objectives, the project document to the Board indicated that for sub-projects to be eligible for funding, the sub-project shall contribute towards the reduction in CO_2 emissions in South Africa by not less than 70 tonnes per year per ZAR 1 million of sub-project cost. This figure was calculated and included based on the assessment that the competitive procurement process would yield sub-projects that would be able to meet this criterion. However, given that the CSP project is an innovative and much more expensive technology and would not be able to meet this criterion, an exemption was sought for it under its financing from the Development Bank of South Africa from NDB's Credit and Investment Committee.[31] However, the current evaluation recalculated the ratio and found that none of the sub-projects had met this requirement and were producing only 44 tonnes per year per ZAR 1 million in the case of Redstone and only 48 tonnes per year per ZAR 1 million invested in the case of Scatec. It appears that the project appraisal did not properly calculate the CO_2 that would be avoided in the case of the sub-projects or apply for a waiver in the current case.

65. **Technical indicators.** Given that one of the main projects has not begun production and three others have only recently started production, it is too early to evaluate the technical indicators that reflect the quality and efficiency of the systems. However, the evaluation mission discussed some of the technical factors with the sponsors such as the expected ratio of actual output to potential output. Redstone expects to produce 76% of the installed capacity and Scatec expects to produce around 55% of the installed capacity. It is too early to provide details on:

    (i) the percentage of time that the systems are expected to be operational;

    (ii) the energy yield, which measures the amount of energy produced per unit of installed capacity; and

    (iii) the performance ratio, which measures the ratio of actual output to expected output based on standard conditions. It would be advisable for both IDC and NDB to monitor and track these technical metrics as part of their project completion reports.

TABLE 7

Project generation capacity timeline

Year	Number of sub-projects completed	Newly added generation capacities (GWH per year)	Accumulated number of completed sub-projects	Accumulated generation capacities
By the end of 2023	3	849	3	849
By the end of 2024	1	491	4	1,340

Source: PPR. IDC.

31 See South-Africa-Project-Evaluation-18ZA02. IEO NDB 2023. https://www.ndb.int/wp-content/uploads/2024/02/SA-Report.pdf

66. The project progress reports and the project performance assessments have not compared the actual outputs and capacity ratio of the sub-projects with the initial design (per their allocation letter). The current estimates of the sub-projects' average emission factor and their corresponding annual CO_2 emission reduction per unit of funds invested do not align with what was stipulated in the project document presented to the Board. Additionally, since the project was not yet completed at the time of evaluation, there is no reaffirmation of the EIRR and NPV that considered any changes in the initial emissions and the delay in the commercial operation date of Redstone. These limitations raise questions regarding the sub-projects' eligibility for selection, likelihood in achieving their performance targets and eligibility for NDB's funding. A more robust assessment should be conducted at project completion to evaluate the projects' eligibility for NDB financing and propose any necessary remedial measures.

67. **Increasing the availability of long-term funds for the energy sector projects.** A key project objective was "to facilitate investments in renewable energy that can contribute to a diverse energy generation mix in South Africa" and "bring additionality in terms of crowding in private sector financing and increasing availability of long-term funds for the energy sector projects in South Africa."[32] These four projects were able to attract funds totalling to ZAR 27,769 million (USD 1.4 bn) compared to the ZAR 1.15 billion from NDB. In addition, the IPP Procurement Programme has been a major catalyst for private sector investment in energy, attracting ZAR 332 billion in energy infrastructure across all bid windows. By the end of 2023, 109 projects had been contracted under the various bid windows, of which 93 projects are in operation, and have generated 104,596 GWh from renewable energy sources while others are at various stages of development and procurement. Thus, the IPPPP under which the projects were selected has been successful in attracting the private sector.

TABLE 8

Bids received and preferred bidders under the IPPPP

Programme and bid window (BW)	Bids received		Preferred bidders	
	No. of projects	Capacity	No. of projects	Capacity
REIPPPP 1	53	2,127.7	28	1,425.3
REIPPPP 2	79	3,232.9	19	1,040.4
REIPPPP 3	93	6,023.0	17	1,451.6
REIPPPP 3.5	3	300.0	2	200.0
REIPPPP 4	77	5,804.5	26	2,205.4
REIPPPP 5	99	9,644.0	25	2,583.0
REIPPPP 6	56	9,663.7	6	1,000.0
RMIPPPP	28	5,079.5	11	1,998.0
BESIPPPP BW1	17	1,643.0	4	360.0
Total	**505**	**43,518.2**	**138**	**12,263.7**

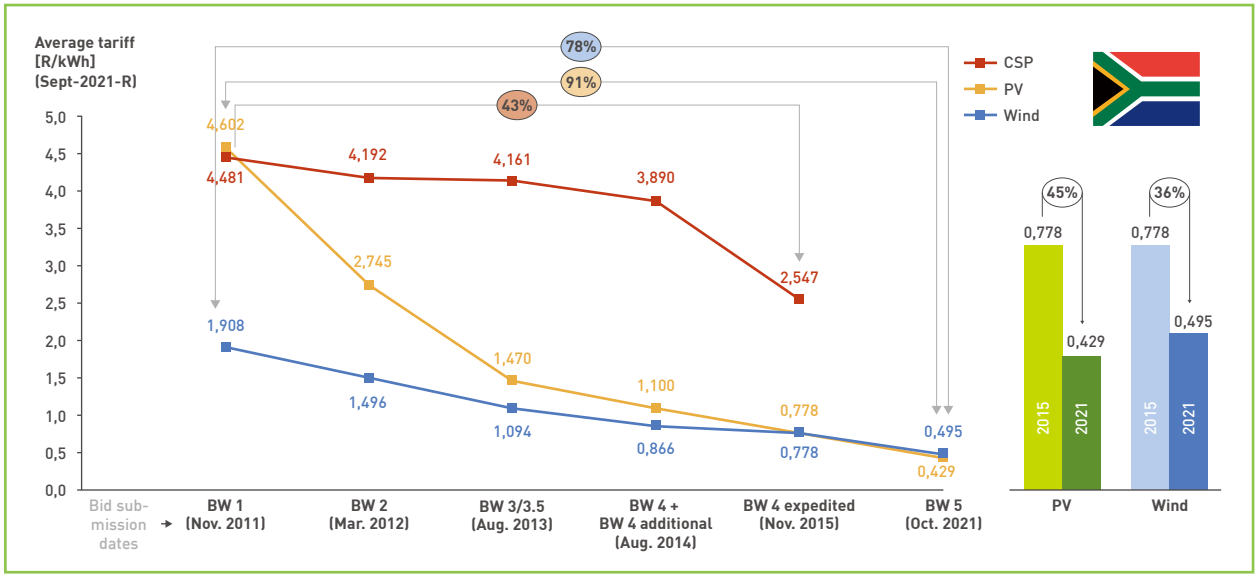
Source: IPPPP. April 2024.

32 Project Document to the Board (PDB), NDB. March 14, 2019.

68. The IPPPP has been very effective at driving down energy prices since 2011 owing to numerous factors such as greater deployment leading to economies of scale and enhanced competition among the major players. However, this trend indicated only the cost of renewable energy tariffs and not the overall electricity prices. The figure below shows that the actual tariffs achieved under the REIPPPP have fallen dramatically by 78% for new wind and 91% for solar PV. However, this reduction does not apply to the Redstone project which used the expensive CSP technology with the highest tariff rates ever accepted under the REIPPP. Similarly, Scatec charged higher rates due to its hybrid nature and its storage capacity to enable it to meet peak demand. There is need to continue to review the value for money spent particularly on CSP technology and its impact on tariffs, especially when the power-purchase agreements are for a long period of time as is the current case.

FIGURE 3

REIPPPP tariff movements since 2011



Source: Department of Mineral Resources and Energy.

69. In rating the project effectiveness, the evaluation team considered the fact that the overall energy generation targets in the DMF have already been exceeded with the operation of Scatec alone. The Redstone sub-project has not yet been completed but is close to completion while the three Scatec PV plants have been completed on time and have started commercial operations with a well-functioning battery storage system. This is because the sub-projects identified by IDC had significantly larger capacity than earlier envisaged. The financing that was leveraged was considerable, and the technologies that were used were complex but innovative and appropriate to the needs to meet peak energy demand. Some of the factors identified in the selection criteria may have been breached such as the CO_{2e} avoided per each million ZAR of total sub-project cost. However, it is too early to assess the technical parameters of the projects and these need to be more actively monitored and verified once the sub-projects start operation and measured over time. On balance, IEO rates project **Effectiveness** as **Successful.**

Criterion	Rating
Effectiveness	**Successful (5)**

C. Efficiency

70. Efficiency involves assessing the outcomes, both in qualitative and quantitative terms in comparison to the resources used. It signifies optimizing resource utilisation to attain desired outcomes while minimizing costs. This evaluation criteria reviews project costs, project timelines, cost per unit of electricity produced and CO_2 avoided, etc.

71. **Adherence to loan agreement.** The loan agreement was largely adhered to by IDC in its selection of sub-projects. However, a few concerns were noted by the evaluation team including:

    (i) the absence of a requirement for due diligence reports for all sub-projects such as Scatec for which only a summary sheet was required at the time of approval;

    (ii) the project's environmental impact criteria required sub-projects to reduce CO_2 emissions by at least 70 tonnes per year for every ZAR 1 million of total sub-project cost – which was not tracked; and

    (iii) the agreement stipulates an upfront fee requirement before the first disbursement, yet this has not been reported, raising questions about the enforcement and adherence to such critical financial obligations.

72. **Adherence to project timelines.** The project was approved on March 31, 2019, and signed 11 months later on February 6, 2020. This is more or less in accordance with the previous nine projects approved in South Africa when benchmarked against them as more than half saw their loan agreements signed within 10 months of approval. There were several delays experienced by the sub-projects due to:

    (i) the delay in the Redstone CSP sub-project reaching financial close due to the withdrawal of one of the lenders;

    (ii) the breach of the credit rating covenant of IDC under the loan, which was remedied, following amendment to the loan agreement on October 10, 2021; and

    (iii) delays in financial close for Scatec projects due to a court case filed based on concerns regarding the procurement process.

73. Scatec 1 and 2 started commercial production at the end of November 2023 and Scatec 3 started production in December 2023. Redstone is currently projecting its completion in July/August 2024 which appears unlikely. The contractor responsible for the installation of the heliostats is being replaced due to increased demand for additional funds due to a delay in the delivery of the mirrors. The new contractor was not on-site at the time of the visit by the evaluation team. The overall physical completion of the project will be delayed by at least 5 to 6 months if not more.

TABLE 9

Project timelines

	Overall	Redstone	Scatec
Project approval by Board	March 31, 2019		
Loan signing	February 6, 2020		
Loan effectiveness	February 6, 2020		
Preferred bidder status		REIPPPP bid window 3.5 2014	RMIPPPP June 2021
Expected financial close		Early 2015	July 2021
Actual financial close		April 30, 2019	July 2022
PPA signed		April 2018	June 2022
Last disbursement	May 19, 2023	April 2024	August 2023
Loan closing	December 6, 2023		
Expected physical completion		February 6, 2024	November 2023
Actual physical completion		July/August 2024	November/December 2023
Expected commercial operation date (COD)		February 2024	November 2023
Actual COD		After July/August 2024	November/December 2023

Source: Summarised from the project design document, PPRs and PPAs.

74. **Adherence to project budget.** The original Redstone project cost was estimated to be ZAR 11,061 million. The current expected project cost of Redstone is ZAR 11,296 million. This represents an increase of 2% in the Redstone sub-project so far. Redstone does not expect any cost overruns for the moment and has used its contingency budget to meet its debt service obligations. The delay will cause additional interest expenses, operating costs during construction, and additional expenses to arrange debt repayments. The Scatec sub-projects' original project cost was ZAR 16,429 million. The current project cost is ZAR 16,473 million. This represents an increase of less than 0.03% in its overall expected budget. Thus, the sub-projects appear to be within budget so far.

TABLE 10

Cost overruns as of April 2024

Sub-projects	Initial amount (ZAR million)	Actual/estimated costs to Completion (ZAR million)	Cost overrun (Percentage)
Redstone	11,061	11,296	2.00
Scatec	16,429	16,473	0.03
Total	**27,490**	**27,769**	**0.90**

Source: PPR of IDC.

75. **Adherence to disbursement schedule.** The first disbursement for this project occurred on December 9, 2021, 672 days (or 22 months) after the signing of the loan agreement on February 6, 2020. This timeframe is considerably protracted when benchmarked against the average duration of 49 days from loan effectiveness to initial disbursement observed in other NDB-financed projects in South Africa. This was due to the delays in the projects reaching financial close due to the withdrawal of one of the lenders. Subsequent disbursements were executed within a six-month interval from the preceding one, a timeline that is considered lengthy both in isolation and when compared to the disbursement schedules of other NDB-financed projects within South Africa. The full loan amount for this project was disbursed over a span of 17 months, from December 9, 2021 to May 19, 2023.

76. By the time of the second disbursement in May 2022, only 32% of the loan had been disbursed. This pace accelerated by the third disbursement in September 2022, with 68% of the loan amount disbursed. This was primarily attributed to the approval and subsequent disbursements for the three Scatec sub-projects. All disbursements were conducted on a reimbursement basis, supported by detailed statements of expenditures for each sub-project and sub-borrower. Disbursement conditions were diligently met, with all requisite documentation and certifications provided by IDC, ensuring compliance with the agreement's terms. It was also ensured that the financial instruments used were in compliance with the loan agreement, being either senior or mezzanine debt with a loan maturity of a maximum of 171 months from the date of the loan agreement in February 2020. Furthermore, disbursements made by NDB in respect of the respective sub-project did not exceed 50% of the total cost of that sub-project.

TABLE 11

IDC disbursements to the sub-projects from the NDB loan
(ZAR million)

	December 2021	May 2022	September 2022	February 2023	May 2023	Total
Redstone	302	72	76	157	110	717
Scatec 1	-	-	116	-	85	201
Scatec 2	-	-	108	2	5	115
Scatec 3	-	-	112	1	4	117
Total	302	72	412	160	204	
Cumulative	302	374	786	946	1,150	
% of NDB loan	26.3	32.5	68.3	82.3	100	

Source: Statement of expenditure reports, IDC.

77. **Unit costs per CO_2 emissions reduced.** one of the selection criteria stated that the sub-projects shall contribute towards the reduction in CO_2 emissions in South Africa by not less than 70 tonnes per year per ZAR 1 million of sub-project cost. While this criterion was well intentioned and designed to ensure that the NDB funds were only on-lent to very efficient and effective sub-projects to maximise their impacts of generating clean energy and reducing the CO_2 emissions, in reality it was not well thought out or appropriate for the innovative technologies that were selected which come with storage capacity to meet peak demand and therefore entail much higher cost.

TABLE 12

Tonnes of CO_2 reduced per million ZAR invested

	Total cost (ZAR million)	Expected CO_2 per million	Expected CO_2 avoided (Tonnes)	Expected CO_2 tonnes (Per million ZDR)
Redstone	11,296	790,720	500,000	44
Scatec	16,473	1,153.110	798,000	48

Source: PPR of IDC.

78. **Efficiency of spend.** Private sector IPPs developed all sub-projects, so no mandatory procurement procedures specific to project procurement in sovereign operations had to be applied under NDB's Procurement Policy. Additionally, the REIPPPP requires at least 40% of the sub-project investment value should be spent on local content, and all sub-projects have periodically reported their actual procurement performance against their commitment to the IPP Office. NDB did not systematically track the proportion of local content.

79. **Efficiency in meeting energy demand.** Through its sub-project financing NDB has funded cutting edge technology that serves the dual need of energy security and decarbonisation. Redstone is likely to take some time after the completion of construction for testing, commissioning and commercial production, and the plant will require time before it can ramp up production. The sponsors project that Redstone expects to produce 76% of the installed capacity. Redstone which is not yet complete and will most likely be the last CSP project built in South Africa. Scatec intentionally overdesigned the three PV and installed 180 MW plants to ensure that it could provide the contracted capacity of 150 MW. This is because Scatec estimates that the plant will produce around 55% of the installed capacity. These potential electricity generation figures are reported to be the norm. Scatec hopes to learn from the actual operation of the plant about optimal sizing of the plant based on actual performance. Compared to coal plants which take a long time to come on board, the selected sub-projects have much shorter construction and commissioning time frames despite the delays. Scatec took just 15 months to complete and Redstone, while delayed is also much faster to bring into production than coal. The sub-projects can alleviate loadshedding by 550 MW during the day and 250 MW during the evening peak.

80. Delays and overruns were mainly caused due to delays in financial close and by uncontrollable external factors such as the COVID-19 pandemic and flooding in the port of Durban that caused disruption in the supply chains. However, construction was fairly rapidly undertaken once financial close was achieved. Redstone has been delayed by the complexity of the project and due to the delay in receiving all the equipment. CSP does not feature in any future iterations of REIPPPP or the IRP and this technology is much more expensive than others because of the system requirements and the technology design that uses the tower. Hybrid technologies which offer the benefit of affordable solar and provide the flexibility of battery storage for dispatchability are more popular and more affordable and less complex than CSP. The Redstone sub-project has not yet been completed and it is not clear when it will begin commercial operations. There is insufficient data on the technical efficiency of Scatec so far. Based on these findings, the evaluation assesses project **Efficiency** as **Moderately Successful**.

Criterion	Rating
Efficiency	**Moderately Successful (4)**

D. Impact

81. Impact is defined as the positive and negative changes a development intervention produces, directly or indirectly regardless of whether it is intended or unintended. The evaluation assessed the main impacts and effects of the activity on the local social, economic, environmental, and other development indicators.

82. **Overview.** The project was expected to add to the capacity to generate 512.2 GWh of electricity annually from renewable sources leading to savings in CO_2 emissions of around 481,436 tonnes annually. The development impact of the sub-projects to be supported through the loan was expected to be reduction in carbon dioxide emissions and a better mix of energy technologies in South Africa which are heavily reliant on coal. In addition, the project was also expected to unlock private sector investment, as well as increase availability of long-term funding in local currency for the energy sector projects in the country. The project appraisal document of the NDB submitted to the Board did not include specific components and initiatives for social development in the project area or to improve local communities' well-being, and therefore, the Design and Monitoring Framework did not include any indicators or targets in this regard.

83. **CO_2 emissions reduction.** The DMF set a target of 481,436 tonnes of GHG that would be avoided annually. It was estimated that for every MWh of energy generated using renewable energy sources, the country would avoid CO_2 emissions of 0.94 tonnes.[33] The sub-projects' own estimation is that the Redstone would avoid GHGs equivalent of 500,000 tonnes per year, and Scatec would help avoid GHGs of around 798,000 tonnes per year. Given the expected reduction in the emissions due to the project, it was expected to contribute 3% to the emissions reduction target of the country which had committed to keep emissions to a range of 350-420 million tonnes of carbon dioxide equivalent ($MtCO_{2e}$) by 2030 from 442 million tonnes in 2020.[34]

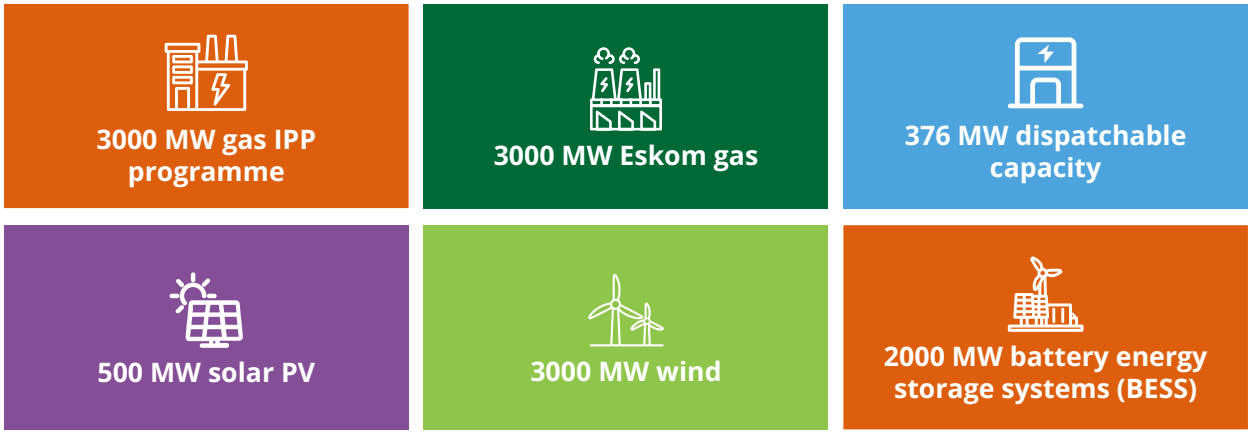
84. **Energy mix.** South Africa has strived to diversify its energy mix, which until 2016 was comprised of over 90% coal fired plants which has been now reduced to reduced 80%. The envisaged energy mix in the draft IRP for the 2023-2030 period is given in figure 4 below. The IDC sub-projects helped to further diversify this mix by adding CSP with molten salt battery storage technology and the more popular hybrid solutions with solar photovoltaic and battery storage. The technologies selected in the IDC sub-projects are not only necessary for a country experiencing persistent loadshedding but solve many technical challenges faced by the system operator such as dispatchability, flexibility and the need for voltage and frequency stability. These technologies are also aligned to the Sustainable Development Goals, in particular SDGs 7 and 13 which speak to affordable and clean energy, and climate action respectively. NDB, through its sub-project financing, has funded cutting edge technology that serves the dual need of energy security and decarbonisation. They do however fall short on the affordability aspect purely because of the system requirements and the technology design employed.

33 South Africa's carbon emission factor, derived from its current energy source mix.
Source: Emissions Intensity benchmarks for the South African carbon tax, Technical Support Study by The Green House and Ecofys, Oct. 2014.
https://www.treasury.gov.za/publications/other/GHG_Emissions_Intensity_Benchmarks_for_SA_Carbon_Tax.pdf

34 Exclusive: South Africa to miss 2030 emissions goal as it keeps coal plants burning. Promit Mukherjee. November 2023.
https://www.reuters.com/sustainability/south-africa-miss-2030-emissions-goal-it-keeps-coal-plants-burning-2023-11-09/#:~:text=%22Our%20models%20suggest%20we%20will,the%20target%20would%20be%20missed

FIGURE 4

Energy mix for 2023-2030 in South Africa



Source: Eskom.

85. **Climate and ecosystems health.** The sub-projects have all got a positive impact on climate mitigation because of their capacity to reduce CO_2 emissions by using clean energy sources. In addition, the sub-projects are all carefully assessed prior to approval for any adverse impacts on land and water use and loss of biodiversity. Both land sites selected were such that they did not displace anyone and did not cause any adverse impacts on the local flora and fauna in the area. Furthermore, the Scatec sub-projects have dedicated areas cordoned off where no construction was undertaken due to species that are facing extinction, and the staff was also trained on how to handle snakes and other animals found on site. All permissions were sought from national authorities and local municipalities as required. Water for the project was abstracted from licensed boreholes for which due permissions were sought from the Department of Water and Sanitation. Renewable projects also use much less water than traditional coal fired plants and entail substantial water savings. Projects had put in place proper arrangements for monitoring and reporting on the Environmental & Social Management Plans (ESMPs) they were expected to develop and track (see annex 6). Any heritage sites in the small area in which the sub-projects were located were properly identified and cordoned off.

86. Where there was any probability of endemic species on the site, relevant authorities were contacted, and their advice was sought. Scatec conducted an assessment prior to construction, specifically relating to the search and rescue of protected flora on site. Each specimen that was relocated has been recorded in an interactive geographical information system including the date, quantity, GPS coordinates and photographic evidence. Contractors were required to submit rehabilitation and habitat restoration method statements for specific activities. An avifaunal specialist was actively engaged during the design stages of the 33 kV and high voltage lines, including the development of an avifaunal monitoring plan. Bird flappers were installed on the 33 kV line to mitigate the effect on the Kori Bustard and the electric fence designed to limit impact to small fauna traversing the site. Proper arrangements were made for waste disposal.

87. **Leveraging private sector capital.** The private capital invested in the project was 24 times the investment of NDB. However, this is due to the considerable interest that the renewable energy sector has been able to attract in South Africa. The IPPPP has shown that there is a growing interest from the private sector in the various bids offered under the REIPPP and RMIPPP. The IPPP has been a major catalyst for private sector investment in the renewable energy sector. By the end of January 2023, the IPP had attracted ZAR 332 billion (USD 17.4 billion) in energy infrastructure across all bid windows. While this cannot be credited to the project per se, it is a function of the buyback guarantees, the non-recourse finance availability and the expectation of positive returns. Due to the success of the IPP in attracting commercial and private capital, multilateral development banks in the country have begun to focus on other strategic areas in the sector such as storage and dispatchable facilities, grid connections and strengthening transmission capacity.

88. **Improving energy reliability.** Based on the installed capacity, the four sub-projects were expected to produce a total of 1,340 GWh (Redstone 491 GWh and Scatec 849 GWH) which is more than twice the targeted 512.2 GWh/annum of energy expected at design. Households in South Africa are heterogeneous, and electricity use by households is not well characterised by averages. Appliance ownership, age, utilisation patterns and monthly spend on electricity all vary with household income which is very diverse. The power generated by these sub-projects could supply the electricity usage equivalent to the needs of around 300,000 low-income households or 200,000 middle-income households every year across the country. These figures assume an average annual electricity consumption of 4,703 KWh for a low-income household in South Africa and around 6,983 KWh per year middle-income households.[35] The sub-projects report much higher outreach numbers in terms of household numbers which are likely to have been calculated based on much lower level of energy consumption per household.

89. **Increasing efficiency in the energy sector.** Electrified households consume roughly 17% of the country's total grid electrical energy to provide energy services,[36] the most significant of which is resistive water heating. During peak periods, the residential sector can account for up to 35% of national electricity demand and energy efficiency in the residential sector can therefore contribute to reducing peak demand.[37] Studies have shown that up to half of South Africa's households may be in energy poverty.[38] The cost of purchasing electricity can contribute significantly to energy poverty and therefore energy efficiency interventions can also realise important social benefits in South Africa's lower income households. Energy expenditure has been growing due to an increase in energy prices over the years and does not leave much disposable income for other critical needs. Reported spending on electricity varies widely, with a mean and median spending of ZAR 907 and ZAR 600 per household per month.[39] The IPPPP has shown that over time the tariff prices offered by bidders has been coming down. This can have the long-term impact of reducing the electricity prices and household expenditure on electricity over time. However, under the current project, the sub-projects selected – especially Redstone – come at a high price because of its storage capacity. Similarly, while Scatec tariffs are competitive, they are not among the lowest tariff due to its hybrid capacity to provide peak demand through storage.

TABLE 13

Pricing trends offered under the IPPPP – March 2024

	Bid window 4	Bid window 3	Bid window 2	Bid window 1
Price: Fully indexed (Ave. Rand per MWh) (Base Apr '11)	R 659	R 881	R 1,645	R 2,758
Price: Fully indexed (Ave. Rand per MWh) (Base Apr '13)	R 740	R 990	R 1,848	R 3,098
Price: Fully indexed (Ave. Rand per MWh) (Base Apr '14)	R 786	R 1,050	R 1,961	R 3,268
MW allocation	415 MW	435 MW	417 MW	632 MW
Total project cost (ZAR millions)	**R 8,504**	**R 8,145**	**R 12,048**	**R 23,115**

Source: IPPPP. March 2024.

35 The annual average household electricity consumption data is from a research paper published by the University of Cape Town on May 31, 2021, titled as "Residential electricity consumption in South Africa research project report." https://ebe.uct.ac.za/sites/default/files/content_migration/ebe_uct_ac_za/1135/files/2021%2520Residential%2520Electricity%2520Consumption%2520in%2520South%2520Africa%2520research%2520report.pdf
36 See footnote above.
37 See McNeil, M.A., Covary, T. & Vermeulen, J. 2015. Water Heater Technical Study to Improve MEPS - South Africa. https://www.osti.gov/biblio/1237332
38 Department of Energy. 2013. A survey of energy related behaviour and perceptions in South Africa: The Residential Sector 2013. Pretoria. https://www.cityenergy.org.za/survey-of-energy-related-behaviour-and-perception-in-sa-residential-sector-2013/
39 See footnote 35.

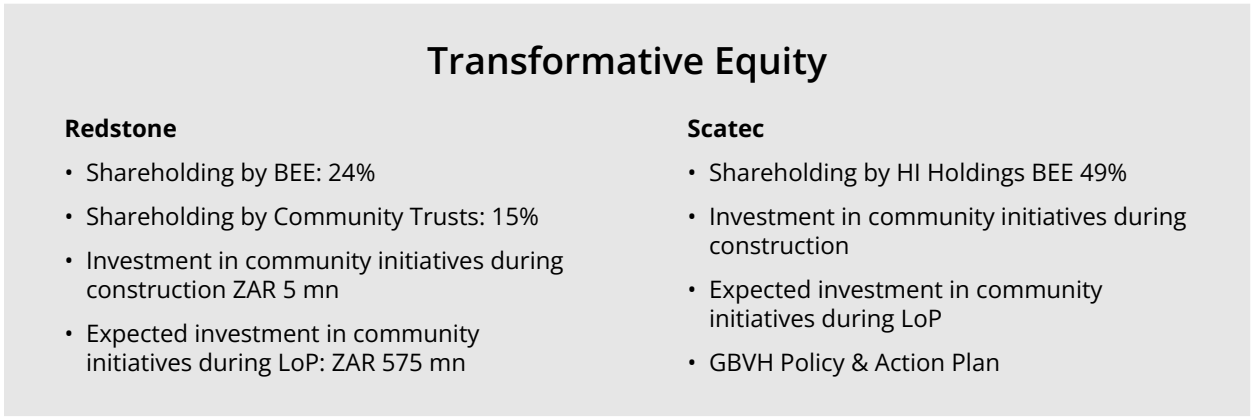
90. **Transformative equity.** The sub-projects which were selected are designed to contribute to the promotion of a more inclusive society through Black Economic Empowerment (BEE) shareholding, the promotion and their focus on community initiatives, and providing employment creation and enterprise development for local communities. The renewable energy sector has incorporated in their selection criteria the ranking of sub-projects based on their economic development potential. The Redstone project gave 24% shareholding to their BEE partner "Pele Green" and a 15% Community Trust/SPV (Bowwood), while Scatec has given 49% of the shares to H1 holding representing BEEs.

91. The REIPPPP and the RMIPPP both require IPPs to allocate a portion of their anticipated earnings throughout the 20-year duration of their operational project towards initiatives that promote socio-economic development and enterprise development, and the minimum requirement for socio-economic development contributions is 1% of revenue. Both sponsors, ACWA Power and Scatec, had invested funds in a range of community initiatives and outreach programmes and expect to continue to support these initiatives during the life of the project. Redstone has invested ZAR 5 million in community initiatives during the construction phase and has reported that it will provide another ZAR 575 million over the next 20 years. This would represent 5% of their total investment.

92. The sub-project sponsors have invested in building local youth capacity by training local youth for construction work and working on the project during its operations and maintenance phase. A group of youth had also been sent to the United Arab Emirates for training by Redstone. Scatec has also trained and employed young people from nearby local communities. Scatec has also increased sensitivity regarding gender-based violence and harassment and worked with a local NGO to build increased awareness about these issues to ensure the increased protection and safety of women. Based on a needs assessment, Scatec has made annual plans for local development, enterprise development, investment in youth, education and health programmes and small infrastructure. It is too early to assess how the sponsors will actually perform on these aspects over time – so monitoring will be required. Greater focus needs to be given to specifying gender specific targets in each of these development initiatives.

FIGURE 5

Transformative equity aspects in the sub-projects



Source: Presentations made by Redstone and Scatec to the mission.

93. **Economic and social development.** A significant feature of the IPPPP is a focus on economic and socio-economic development impacts that IPPs commit to over the lifetime of the project. The IPP tracks the overall performance of bidders on their potential for local procurement, job creation, and the extent of local content involvement. Job creation has a significant impact on socio-economic development due to the high unemployment rates in the isolated area where the sub-projects are located. The number of jobs created during the construction and operations and maintenance phase by the sub-projects are given below. While the jobs significantly reduced during the O&M phase they provide a boost to the local economy. The energy sector is an area

where women are still largely underrepresented, one reason being the isolated project sites. Redstone did not track the number of women regularly and could not provide exact figures. Scatec reports that around 20% of the workforce were women during the construction phase. The number of both men and women employed during the O&M phase has reduced significantly with only two women employed currently by Scatec from the 52 people on site. There is limited gender disaggregated data on the level of jobs and training provided to women. The overall impact of the sub-projects on the stimulation of local industry and employment generation needs to be better tracked and reported upon with systematic reporting over time.

FIGURE 6

Employment creation

Employment Creation

Redstone	Scatec
Jobs created during construction peak: 1,500	Jobs created during construction peak: 2,500
Local community jobs created at peak: 400	Local community jobs created at peak: 2,000
Jobs created during O& M: 100	Jobs created during O& M: 52
Jobs created for women: 10%	Jobs created for women: 19.7%
Local Content: 40%	Local Content: 40%
Promote use of local taxi services.	Promote use of local enterprises (Transport, mobile toilts, local assembly, etc).
Training in UAE	

Source: Reports produced by Redstone and Scatec.

94. Redstone and Scatec had committed that the proportion of local content in their projects would be 40%. In addition, both sponsors used local entrepreneurs as much as possible to grow local businesses that were needed by the sub-projects, such as the use of local taxi services to and from the sites to transport workers. The staff of the engineering procurement and construction companies also facilitate local development through housing and catering services for their staff from local entrepreneurs who provide these facilities. The IPP office regularly reports the commitments made on the socio-economic commitments undertaken during the bidding process. However, the IDC's project progress reports and NDB's project performance assessments do not track these aspects in any systematic manner, and neither were they included in the DMF.

95. The evaluation assessed that the project would have a positive impact on climate mitigation through its potential of reduction of CO_2 and will not generate any adverse impacts on local land, water or any endemic species. The project is expected to have a positive impact in leveraging private capital for energy investments and improving energy reliability because the sub-projects are designed to provide storage capacity for supplying energy during peak periods; and there has been an increase in the efficiency of the sector as a whole, as the growing competition under the IPPP has over time brought down the tariff price offered by bidders which can over the long-term reduce electricity prices and household expenditure on electricity. The sub-projects have also had a positive social impact due to BEE shareholding, job creation, increasing local content in procurement, community initiatives. The investments made in the Redstone sub-project have not yet delivered any results as the construction has been delayed. There are questions about when the CSP will begin its commercial operations and begin to deliver on its promise. The project therefore needs to be closely monitored. All in all, however, the evaluation assesses project **Impact** as **Successful.**

Criterion	Rating
Impact	**Successful (5)**

E. Sustainability

96. The evaluation examined several aspects of sustainability from the technical, financial, institutional and environmental perspectives. The salient aspects of the assessment of the project are outlined in this section.

97. **Institutional sustainability.** The current model of encouraging investments in the renewable energy sector has helped to encourage investments from a wide range of large multinational companies which have the financial strength to participate in the IPPPP. The sub-projects require significant investments and entail financing of the preparatory environmental impact assessments' review and documentation which can be expensive and time consuming. Some of the largest private sector firms with considerable experience have bid for the sub-projects. The sponsor for the Redstone project is ACWA Power, a developer, investor, and operator of power generation and desalination water plants. In 2022, ACWA Power had a portfolio of over 68 assets across 12 countries with a gross capacity of 44.4 GW of which 39% was renewable. ACWA Power's previous experience in South Africa was the construction and commissioning of the 50 MW Bokpoort CSP thermal energy power plant in 2016. The other three sub-projects were awarded to Scatec which first entered the South African market in 2010. Scatec is a Norwegian based company which aims to increase access to reliable and affordable clean energy in high growth markets with a 4.6 GW in operation and under construction across four continents. These firms have strong institutional and technical capacity to ensure the operational sustainability of their investments.

98. **Economic and financial sustainability.** All four sub-projects selected by IDC had been identified as preferred bidders in the IPPP. Redstone had been identified much earlier in the March 2014 CSP Bid Window of the REIPPPP, and the three Scatec projects had been selected under the RMIPPP in 2021. While the growing competition in the renewable energy sector has led to a decline in average energy prices over time, the selected sub-projects were all able to secure higher prices because of their offer of dispatchable power. A much higher tariff was fixed by Redstone in its bid which was accepted due to its 12-hour storage capacity. Thus, at peak load it can charge 2.7 times the base tariff. Scatec also has battery storage capacity of around seven hours and can offer dispatchable power which offers higher than the base tariff. The offered bid tariff prices indicated in the bids were expected to be escalated annually based on the consumer price index rate. Redstone's Scheduled Commercial Operational Date is already delayed by more than four months. Any time delays are subtracted from the power purchase agreement period which invariably affects the cashflows and profitability of the investment at the tail end.

99. All the projects have ZAR denominated 20-year power purchase agreements with Eskom. However, these guarantees have been reduced under the seventh bid window of REIPPPP and the industry will need to be sustained without such support in the future. The PPAs are supported by an implementation agreement between the sub-projects and the Department of Mineral Resources and Energy, which, along with a Government Framework Support Agreement, effectively guarantees Eskom's payments to the sub-projects over the entire lifespan of their PPAs through a sovereign guarantee. Eskom has never defaulted on any of these agreements. The provision of government guarantees and non-recourse finance places all the project risks on the Government. The IPPs will pay penalties in case they are unable to supply the required about of electricity or there is a delay in the supply. Scatec started its commercial operations in November 2023, and it reports that it has received timely payments from Eskom, including the curtailment charges, with positive operating cashflows since they began commercial operations. Redstone expects to start commercial production sometime at the end of this year.

100. Given that the bid prices were offered by corporate sponsors, it is likely that the offers were based on a careful analysis of the financial viability of the investments. The analysis for the Redstone sub-project was conducted with 2019 as the base year, for a period of 23 years from the date of commencement of construction of the project. A financial model was developed for both projects by their sponsors. The Redstone sub-project assumed a construction period of 31 months and an operations period of 20 years. Electricity generation profile – according to P90 solar resource study.[40] The tariff rates used were based on the PPA which used ZAR 1,462.7/MWh during standard hours and ZAR 3,949.4/MWh during peak hours. Operating costs included the payments to the O&M contractor, insurance costs, land lease payments, facility agent costs, personnel and general administrative costs based on actual contracts. The senior debt repayment period for on-lending by IDC to sub-borrowers was calculated for 16 years after construction completion. The long-term consumer price inflation assumed was 5.7% in line with the historical inflation data. The benefits of both the projects included incremental sale of electricity and environmental benefits including avoided carbon dioxide emissions and savings on water usage. The key economic parameters assessed are given below which show that the sub-projects were both feasible.

101. The project progress reports prepared by IDC and the project performance assessment undertaken annually by NDB did not collect data to track sub-projects EIRR and FIRR at different stages to verify if the initial assumptions made were still valid. The Redstone project has been delayed by more than five months and while the sponsor is optimistic of completing the project in July 2024, it is not clear how this delay will impact its financial metrics and the projected returns.

FIGURE 7

Economic and financial analysis

Economic & Financial Analysis

Redstone

- Nominal FIRR 14.8%
- Real FIRR 8.6%
- EIRR 11.6%
- Sub-Project Weighted Average Cost of Capital 11.4%
- Average Debt Service Coverage Ratio: 1.65
- Minimum Debt Service Coverage Ratio: 1.27

Scatec

- FIRR 14.11%
- EIRR 33.98%
- Weighted Average Cost of Capital 12.63%
- PPA period NPV @ 15%: ZAR 50 mn
- Post PPA NPV @13%: ZAR 124 mn

Source: Reports produced by Redstone and Scatec.

40 Level of electricity generation by the sub-project that can be achieved with not less than 90% probability based on statistical data.

102. **Technical sustainability.** The renewable technologies that were selected by the sub-projects included concentrated solar power and three hybrid photovoltaic plants with battery storage. Previous experience with CSP technologies has demonstrated the technical challenges with the technology. Ten years ago, SolarReserve's Crescent Dunes 110 MW project in the US suffered a leak in the molten salt thermal energy storage tank.[41] Since this, SolarReserve could not continue its global pipeline of permitted projects. ACWA Power is therefore now completing Solar Reserve's Redstone project in South Africa. There were no new tower CSPs with thermal energy storage commercially bid on in the US after this incident. The problem was not so much the higher temperature of Tower CSP but rather a greater temperature differential which caused the leak. CSP technology is considered a relatively risky technology due the long ramp up time, ensuring the rotating heliostats function accurately and complex automation, all of which can directly affect plant reliability, performance, and cost. Redstone has not yet started functioning and is already late. Thus, it is not clear if any of the problems that beset the Crescent Dunes project will pose issues for Redstone. These issues were not discussed in any of the project progress reports or project performance assessments by IDC or NDB. However, the technology is very promising and if it functions well, it will be a very important achievement for the sector. Scatec sub-projects have started commercial production and have built excess capacity to ensure that they are able to provide the required energy to Eskom. However, due to problems in the transmission capacity and weaknesses in the grid infrastructure, technical problems can arise. For example, one of the transformers at Scatec was not functioning on the day of the evaluation team's visit to the plant. However, overall, the technology is well tested and is expected to function smoothly.

103. **Operational sustainability.** The arrangements for operations were identified at the outset under the sub-projects. Redstone has engaged NOMAC, an ACWA affiliate, for the O&M, together with Pele Green its BEE partner. Scatec assumed the functions of engineering procurement and construction and as the O&M contractor for the project while outsourcing specialist roles including construction and BESS O&M to subcontractors. Thus, the O&M teams were integrated in the process early in the engineering procurement and construction process and both companies have either a close relationship with their O&M companies (Redstone) or are the same (Scatec). This will ensure that the engineering and procurement decisions will be fully owned by those undertaking operations and maintenance. This close relationship between the EPC and O&M is considered a best practice and specialists suggest that the O&M company operates the plant under the supervision of the EPC during commissioning.

104. **Environmental sustainability.** There is a comprehensive system for environmental and social review and management which is in place for all sub-projects under the IPPPP. The procedures include a pre-deal E&S appraisal of each new sub-project comprising E&S categorisation by using the NDB Environmental and Social Framework, review of the sub-project technical and permitting documentation to ensure that relevant E&S studies and management plans have been prepared, and applicable E&S approvals and permits have been secured. During implementation, the E&S supervision was executed mainly by professional lenders' technical advisors appointed for each

41 Vast Solar's fix for tank leaks that stymied the first CSP Tower. April 2023. https://www.solarpaces.org/vast-solar-has-a-fix-for-crescent-dunes-thermal-storage-tank-leak/#:~:text=Vast Solar's solution for buckling,sodium nitrate and potassium nitrite

sub-project. The evaluation observed that the scope of work under these advisors encompasses monitoring of sub-project adherence to the country E&S systems. Close monitoring of action plans addressing identified concerns has been maintained. The sub-projects are not expected to have any significant adverse negative affect on the environment during construction or operations or to generate any affluents or significant waste or air pollution. Dust levels are closely monitored on both sites and permission for water extractions have been secured from local authorities. These projects also entail considerable water savings. Conventional fuels (e.g. nuclear and fossil fuels) withdraw significant quantities of water over the life cycle of energy production, especially for thermoelectric power plants operated with a wet-cooling system. The quality of water is also adversely affected in some stages of energy production from these fuels. On the other hand, solar photovoltaic technology exhibits the lowest demand for water, and can be considered the most viable renewable options in terms of water withdrawal and consumption.[42]

105. **Resilience to climate change.** Sub-projects can be impacted by climate factors during both construction and operation. There were considerable delays during construction of the Redstone sub-project due to excessive rainfall in early 2022, and flooding in Durban which delayed the delivery of materials to site. However, climate resilience is incorporated in the design to make sub-projects resilient to extreme weather events. The 41,265 rotating heliostats which will be used by Redstone are resistant to hail and can withstand strong winds common in the area. Solar plants are impacted in their operations by the uncertainty of the solar resource and need for accurate solar resource assessment of the site. Redstone has commissioned estimates of the typical meteorological year to model renewable energy systems and is confident that the project will be financially and economically sustainable. Scatec also closely monitors irradiance levels to maintain the balance between power generation, storage and supply to the grid during the day.

106. In conclusion, the institutional sustainability of the investments is underpinned by the strong corporate capability of the sponsors of the sub-projects, namely ACWA Power and Scatec. The economic and financial analysis shows returns and net present value which indicate good returns especially given that all sub-projects selected have capacity to supply during peak load. The long-term power purchase agreements with sovereign guarantees and non-recourse finance make the sub-projects very attractive. The technical sustainability of the CSP is uncertain given the complex nature of the technology used and the fact that the Redstone project is already several months late. Scatec on the other hand appears to be a technically sound project. There are strong O&M arrangements in place for all sub-projects with an ACWA Power affiliate undertaking O&M for Redstone, and Scatec responsible for its own O&M. The projects are environmentally sustainable and are designed to mitigate climate change and are in turn resilient to climate risks. Thus, the **Sustainability** prospects of the project is considered **Successful**.

Criterion	Rating
Sustainability	**Successful (5)**

42 Renewable energy choices and their water requirements in South Africa. Journal of Energy in Southern Africa On-line version ISSN 2413-3051 Print version ISSN 1021-447X. https://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S1021-447X2014000400008

F. Overall project achievement

107. The table below provides a summary assessment of project performance ratings, including a rating of the composite indicator on overall project achievement. The composite indicator is not rated based on a mathematical average of the various ratings but is based on IEO's wholistic judgement of the project's success and challenges faced. **Overall Project Achievement** is considered **Successful** with some areas for improvement which have been outlined in the various sections.

Criterion	IEO rating
Relevance	Successful (5)
Effectiveness	Successful (5)
Efficiency	Moderately Successful (4)
Impact	Successful (5)
Sustainability	Successful (5)
Overall project achievement	**Successful (5)**

V. OTHER EVALUATION CRITERIA

A. NDB performance

108. The assessment of NDB's performance covers project design and appraisal, monitoring, supervision, implementation support, knowledge management and visibility of NDB's contribution to the sector.

109. **Project design and appraisal.** The project consisted of several sub-projects which were selected by IDC from the successful bidders of the various Independent Power Producer bid windows under the Renewable Energy Independent Power Producer Programme and the Risk Mitigation Independent Power Producer Procurement Programme. The Redstone project was developed by ACWA Power and the three other sub-projects were developed by Scatec. NDB was not expected to have a role in the design of the sub-projects which had strong sponsors. However, NDB appraised the Redstone project in the project document to the Board which had been identified at the time of loan approval. The Redstone project appraisal discussed some of the key risks associated with the CSP technology such as its much higher cost due to the novel technology and its limited track record. The Scatec sub-projects were identified later under the RMIPPP and were not appraised in any detail by NDB. The sub-projects were only confirmed to meet the selection criteria in the loan agreement.

110. **Strategic role.** NDB did not sufficiently leverage its role to highlight its value added in areas where risk was high, such as in the CSP or the use of the hybrid photovoltaic plants with the battery storage system used by Scatec. While the NDB funds were invested in innovative technologies which were better suited to the critical need to meet dispatchable energy during peak times in South Africa, this aspect of the investment was not fully highlighted by NDB in any detail in any of its reports. NDB did not build on its relations with some of the other development partners and the sponsors of the sub-projects for a more strategic analysis and understanding of the lessons learnt from these projects and the emerging trends in the sector and where it could play a more strategic role for the future.

111. **Operational support.** NDB monitored compliance with the loan covenants but did not actively point out specific breaches. The loan disbursement was delayed initially because there was a delay in the financial close of the Redstone sub-project due to the withdrawal of one of the lenders due to a change in the country credit rating. The Scatec financial close was also delayed due to concerns about the bid process which was referred to a court of law. Two amendments which were required in the financing agreement were made by NDB to avoid automatic cancellation after no disbursements were made in the first year and to avoid breach of a credit rating covenant. The procedures for financial close in the renewable energy space in South Africa have been made much more complex due to the growing competition and the rapidly evolving nature of the sector. NDB demonstrated flexibility during implementation, especially when COVID-19 heavily impacted South Africa, and international rating agencies downgraded the country and there were delays in financial close and disbursements. NDB amended the loan agreement twice and facilitated the disbursements to move the sub-projects to the next phase. Financing agreements need to provide some leeway to accommodate delays and avoid unnecessary amendments.

112. **Supervision and monitoring.** The monitoring and supervision activities at the sub-project level were mainly conducted by co-lenders through the lenders' technical advisors. NDB played a minimal role in the process and prepared annual project performance assessments largely based on the project performance reports submitted by IDC after incorporating inputs from NDB's Environmental, Social, and Governance Department, the Procurement Division, and the Finance, Budget and Accounting Department (Loan Back Office) teams. NDB kept a light touch in terms of supervision and has had a minimal role by reporting on the very structured templates currently used by NDB for the purpose. The NDB's project performance assessment reports tend to be repetitive and do not have much analysis of project progress. The first report by NDB was submitted in November 2021, which was about 21 months after the project effectiveness date. There was no supervision mission conducted to the site before this period due to travel restrictions resulting from the COVID-19 pandemic. Over the last four years, NDB teams visited the project for only three days and an E&S specialist has visited the project once for one day in 2022. The project completion report has not yet been prepared due to the delay in overall project completion which is currently expected at the end of December 2024. The PCR will be due at the end of December 2025.

113. **Highlighting NDB's role in promoting a social and transformative agenda.** NDB has remained at arm's length from the project in terms of promoting any specific agenda regarding the empowerment of black South Africans, community development or transformative impact on women. These aspects are key in the South African context and are highlighted in the selection criteria in the renewable energy sector too. Both the sub-projects included partners with substantial shares for local Black Economic Empowerment and for community initiatives. These aspects of the sub-projects have never been highlighted in any of the reports or the publications by NDB. The DPME has recently established new guidelines for a focus on transformative equity and climate and eco-system health. As a key development bank with a strong social and transformative agenda, it would have been useful for NDB to integrate these guidelines into its supervision and monitoring of the sub-projects. While some of these aspects are reported on as part of the E&S monitoring, the aspects of transformative equity are not part of the supervision report template and were not fully reported upon. NDB's Africa Regional Centre's position is that it will pursue this agenda once clear instructions are received from headquarters.

114. **Knowledge management, outreach, and visibility.** The Bank has not developed specific documents, brochures, videos, or other promotional activities, nor organised events to showcase the project or the Bank's role in financing. While a summary of the project appears on the NDB website, there was limited awareness about NDB's role among some of the key stakeholders. NDB's direct engagement with the sponsors has been limited and its role as a financier of these projects through IDC is not well known. NDB had sponsored Redstone via its on-lending arrangement through the Development Bank of South Africa as well. However, the two main sponsors, ACWA Power and Scatec, were not even aware that NDB was providing funds for the projects. The sponsors of the sub-projects have produced their own websites and documents, to enhance their visibility. None of these promotional materials mention the role of NDB in financing the sub-projects.

115. In summary, NDB could have played a more strategic role in building its relationship with key and emerging partners in the sector in the country. On the operational side, NDB was not expected to do much because very strong implementing partners were implementing the projects and providing the technical and construction support. However, there was substantial potential for NDB to enhance the quality of its project performance assessments. For instance, by incorporating evaluations of the social development potential and analysing the internal rate of return along with other selection criteria, NDB could provide a more robust analysis. These critical elements were not sufficiently monitored or reported on. NDB's main focus has been on expediting disbursements and tracking compliance with some aspects of the loan covenants. NDB had limited opportunities to visit the project regularly or to gain an in-depth understanding of the challenges faced by the sub-projects during implementation. Additionally, interactions with the main sponsors of the sub-projects were infrequent, which may have affected the clarity regarding NDB's role as a financier. NDB could seize the opportunity to highlight its role as a development bank established by BRICS nations and its capacity to drive development in Africa. Furthermore, by dedicating more effort to capturing and sharing lessons from successful operations, NDB could significantly enhance its outreach and visibility, thereby reinforcing its impact and presence in the development sector. Taking the above into account, the evaluation rates **NDB's performance** is rated as **Moderately Unsuccessful.**

Criterion	Rating
NDB Performance	**Moderately Unsuccessful (3)**

B. Borrower performance

116. IDC played its assigned role in identifying, selecting, appraising, financing, and monitoring sub-projects eligible for NDB funding. The projects were selected by IDC from the preferred bidders who were procured through the various bid windows established by the Department of Mineral Resources and Energy under the Independent Power Producer Procurement Programme. The IPPPP has been a major catalyst for private sector investment in energy, attracting ZAR 332 billion in energy infrastructure across all bid windows by the end of January 2023.[43] A significant feature of the IPPPP is a focus on economic and socio-economic development which it monitors in terms of jobs created, CO_2 emissions offset, shareholding by black South Africans and local communities, proportion of local content involvement, funds for local development, etc. IDC has itself invested ZAR 16 billion in renewable energy since the inception of the REIPPP. From among this financing ZAR 4.6 billion of funding supported community trusts and black South African-empowered entities and it facilitated the creation of 2,991 direct jobs.[44]

117. The IPPP process is a very well structured one and was assessed to be generally transparent with clear criteria. However, the projects under the Risk Mitigation IPPPP (the bid window through which the Scatec projects were appointed) faced a number of delays up to closure. Shortly after the announcement of the preferred bidders in 2021, one of the unsuccessful bidders launched a legal challenge against its non-appointment. It sought an interdict against the appointment of any preferred bidders under the bid window. While the challenge was successfully contested, the courts required a review process which delayed the finalisation of closure preparations until early 2022. There were also subsequent delays in the various regulatory approvals, including Eskom board approval, and regulatory approval under section 54 (2) of the Public Finance Management Act (PFMA), which are pre-requisites for financial close of any IPP procurement bid window. In addition to the outstanding regulatory approvals, the DRME had also received requests from the preferred bidders to postpone the signing of the commercial agreements, citing various pending approvals from the National Energy Regulator of South Africa, the Department of Environment Forestry and Fisheries, Department of Transport and the Department of Trade, Industry and Competition, amongst others.

43 IPP Presentation. March 2024.
44 IDC Annual Report 2023.

118. IDC chose sub-projects for NDB financing from the list of those which qualified under the IPP process and met the additional selection criteria specified in the financing agreement. IDC submitted documentation to NDB verifying the sub-project's adherence to the criteria. The sub-projects were also in keeping with the selection criteria that the NDB financing should not exceed 50% of the sub-project's costs. The on-lending terms and conditions of the sub-projects were determined by IDC in accordance with its existing framework. IDC had ensured that the agreed outcomes identified in the design matrix could be accomplished by the selected projects. While IDC funded the socio-economic development aspects of the project, including Black Economic Empowerment schemes, community initiatives, employment creation, and enterprise development for local communities, it did not monitor specific outcomes, such as the number of jobs created or the proportion of women hired. Furthermore, the rationale for selecting the sub-projects for NDB financing was not clearly outlined. IDC's main contention was that it picked projects for NDB which were ready for financing at the time.

119. The loan was disbursed in a timely manner after the initial delay following the loan agreement between the borrower and the NDB. The borrower ensured compliance with the NDB's procurement policy given that these were non-sovereign loans and followed a competitive process in which price was given 90% of the weight and 10%[45] was assigned to economic development aspects. The progress reports were prepared by the borrower during implementation and submitted to the NDB in a timely manner. However, these reports tend to be repetitive and do not report on all aspects of the sub-projects. The delay in the completion of the Redstone project was not accurately anticipated by IDC and the project is still under construction. The sponsor ACWA Power expects that the project will be completed by July 2024, however, this maybe an optimistic assessment. The Scatec projects were the first projects in this bid window to reach financial close in July 2022, and initiated commercial operation in November and at the beginning of December 2023. A PCR is expected to be provided by IDC at the end of December 2024 when all sub-projects are expected to be completed.

120. IDC selected the sub-projects primarily based on the agreed selection criteria. However, since the project was not yet completed at the time of the evaluation, IDC was unable to report on certain criteria, such as the EIRR or the CO_2 emissions avoided per ZAR million spent. IDC largely reported what the sponsors conveyed about project timelines and did not report any anticipated delays in timelines or other aspects of delays. Like NDB, IDC did not monitor the socio-economic development aspects of the sub-projects and did not delve at any depth into the economic and financial aspects of the selection. In consideration of these factors, the overall **performance of IDC** under the project is rated as **Moderately Successful.**

Criterion	Rating
Borrower (IDC) Performance	**Moderately Successful (4)**

45 Some projects were selected based on 70% of the weight for tariff and 30% for its social and economic development potential at the start of the IPPP. However, the Treasury Division has now indicated that the 90% and 10% formula will be used for all projects.

C. NDB additionality

121. NDB funds were not assigned for dedicated use or any specific component within the renewable energy sector sub-projects. A question to be asked therefore is whether NDB could have added greater value added by specifying the use of its funds for specific activities such as focus on ensuring transformative equity or climate and ecosystem health or policy reform or innovation. However, the NDB loan provides IDC with attractive long-term financing in the local currency to avoid currency risk for IDC, which lends to sub-projects in ZAR.

122. NDB only issued its first ZAR bond in August 2023. Therefore, for this project NDB converted USD into ZAR for supporting the loan disbursements. To manage the foreign exchange risk, NDB entered into the cross-currency swap or forward contracts with treasury counterparties. As of March 2021, the average cost for ZAR funding swap was reported by NDB Treasury Division as 3M JIBAR+32bps (around 3.96%). The loan pricing is based on mid-market rate for deposits in Rand administered by the Johannesburg stock exchange.

123. IDC is a significant financier in the renewable energy sector in South Africa with current exposure of ZAR 14 billion (USD 1 billion) in 24 projects and has plans to continue to support this sector. Given the strong commercial sector interest in the renewable energy sector, all sub-projects would have been implemented without NDB's financing. NDB's investment, comprising 4% of the total cost of the four sub-projects, did not significantly impact the mobilisation of financing from other sources, including the private sector. This suggests a limited crowd-in effect by NDB, indicating that its contribution in terms of additional financing was small.

124. IDC has a strong pipeline of projects which it selected from several of the IPPPP bid windows. The first sub-project which was identified for NDB financing was the Redstone project using the CSP technology for which commercial banks tend to take a more cautious stance. However, the lenders and funders for this project included both development banks and commercial banks and a range of financial services providers such as Amalgamated Banks of South Africa, African Development Bank, BII, Development Bank of Southern Africa, Investec, Kreditanstalt für Wiederaufbau, Deutsche Investitions- und Entwicklungsgesellschaft, NedBank, Prescient and Sanlam. Thus, there was no shortage of commercial interest in the project. The three Scatec projects which were selected subsequently for NDB financing were the largest hybrid solar and battery storage facilities. Scatec has also been able to attract a large list of commercial investors. Thus, while the technologies were new and somewhat riskier, they had been able to attract significant commercial interest. The growing private interest in the sector has had a significant transformational impact on South Africa's energy sector that is currently mostly state owned.

125. NDB was not expected to provide any technical assistance, capacity-building or implementation support as the partners dealing with the projects had very strong capacity and both the sponsors ACWA Power and Scatec were leaders in the renewable energy field. The sub-projects were selected through the IPPPP windows which is in keeping with NDB's policy of using and strengthening country systems. However, the evaluation believes that NDB simply took many of the aspects of the sub-projects presented to them at face value and did not conduct its own due diligence on some of the analysis presented. In employing diverse financing modalities, including loans through national financial intermediaries, NDB encounters unique complexities compared to direct project financing. NFIs, serving as intermediaries, introduce distinct challenges related to their financial stability, management capabilities, and operational history. Given these considerations, it is imperative that NDB adapts its due diligence process to address the intricacies of intermediary financing effectively. This adaptation involves conducting

a comprehensive financial assessment of the NFI, reviewing its operational track record, and developing a risk management strategy tailored to the nuances of intermediary involvement. Moreover, implementing a robust monitoring and reporting framework is essential to ensure ongoing evaluation of the NFI's performance and project progression. Engaging with stakeholders, including project beneficiaries and local communities, is crucial to gain insights into the NFI's operational impact and the broader project outcomes. By adopting such a modality-specific due diligence approach, NDB can better manage the risks associated with NFI financing, thus ensuring the integrity of its operations and alignment with its strategic objectives.

126. The NDB technical capacity for conducting a more in-depth analysis of some key indicators in the renewable energy sector is also limited. NDB needs to consider in the long-term in which areas it would like to add value to its investments. Energy generation and transmission both represent opportunities. NDB can add value in terms of supporting projects from a transformative equity perspective especially in a country like South Africa where energy sector projects are required to make BEE and community investments. NDB can also add value by highlighting the lessons that will emerge from the use of both the CSP and the photovoltaic hybrid technology, and provide lessons in terms of the optimal sizing of plants, energy mix to be used, the framework of support required to promote greater competition, etc.

127. Given the low proportion of its financing, the undirected use of its funds, the lack of the ability to highlight its role as a development bank in the investment and the failure to build strategic relationships or develop knowledge products or draw lessons from the investment, the evaluation rates **NDB Additionality** as **Moderately Unsuccessful** in this project.

Criterion	Rating
NDB Additionality	**Moderately Unsuccessful (3)**

VI. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions

128. **The Renewable Energy Sector Development Project was well placed to benefit from the increasingly competitive environment which has attracted a range of both national and international financiers and strong implementing partners to support the transition to renewable energy in South Africa.** The project gave further impetus to the institutional arrangements that the country has put in place to support the sector. Also, the project's objectives are consistent with the country's current policy priorities for increasing energy generation capacity and just transition. The choice of the Government owned Industrial Development Corporation was an appropriate one given its strong mandate for support to the private sector entities to achieve the ambitious energy mix targets for the country and assist it in its bid to transition to a more sustainable path and move away from excessive reliance on fossil fuels. The institutional arrangements that have been put in place to select qualified bidders under the Independent Power Producer Procurement Programme of the Department of Mineral Resources and Energy appears to be working well and has generated considerable interest and financing to the sector. The process relies on using country systems and is leading to strengthening these systems and making them more transparent and accountable over time. The number of bids received every year have grown exponentially and the number of bids and the capacity of power generation offered is significantly higher than the available MW for allocation under each bid cycle. The tariff prices offered have gradually become more competitive over time. The process offers adequate guarantees through the long-term power purchase agreements with Eskom and the provision of non-recourse finance has attracted interest of strong sponsors from international bidders. The programme has the potential to encourage oligopoly or a market structure where a few large firms dominate the market due to the significant upfront investment costs required and the initial costs of securing all authorisations and approvals. However, the overall policy posture of the Government is to introduce reforms to deconcentrate the energy supply industry from solely relying on Eskom by bringing in independent power producers, by unbundling Eskom and also introducing reforms to electricity pricing policy. These measures can be seen as a step away from monopolistic market structure in line with the intended reforms.

129. **The overall outputs and outcomes expected from the project are delayed but are expected to be achieved.** The project document to the Board had envisaged that five sub-projects were to be completed including one biomass project with a total installed capacity of at least 120 MW of new renewable energy generation through IDC lending. NDB co-financing is expected to install twice the installed capacity with the Redstone 100 MW Concentrated Solar Power project with molten salt central receiver and Scatec with an installed capacity of 180 MW or (540 MW) Solar PV and Battery Energy Storage Systems (BESS) for each of the three Plants. These figures are well above the 120 MW of energy generation capacity that IDC committed to at design. Redstone is expected to generate 491 GWhs annually with CO_2 avoided of 462,000 tonnes. Scatec is expected to generate 849,471 GWhs with carbon dioxide emissions avoided of 798,504 tonnes per year. These figures are well above the 512.2 GWh/annum of energy generated from renewable sources and 481,436 tonnes of carbon dioxide gas emissions annually given in the DMF. Given the expected reduction in the emissions due to the project, it would contribute 3% to the emissions reduction target of the country which had committed to keep emissions to a range of 350-420 million tonnes of carbon dioxide equivalent by 2030 from 442 million tonnes in 2020.[46]

46 See, "Exclusive: South Africa to miss 2030 emissions goal as it keeps coal plants burning", Promit Mukherjee. November 2023. https://www.reuters.com/sustainability/south-africa-miss-2030-emissions-goal-it-keeps-coal-plants-burning-2023-11-09/

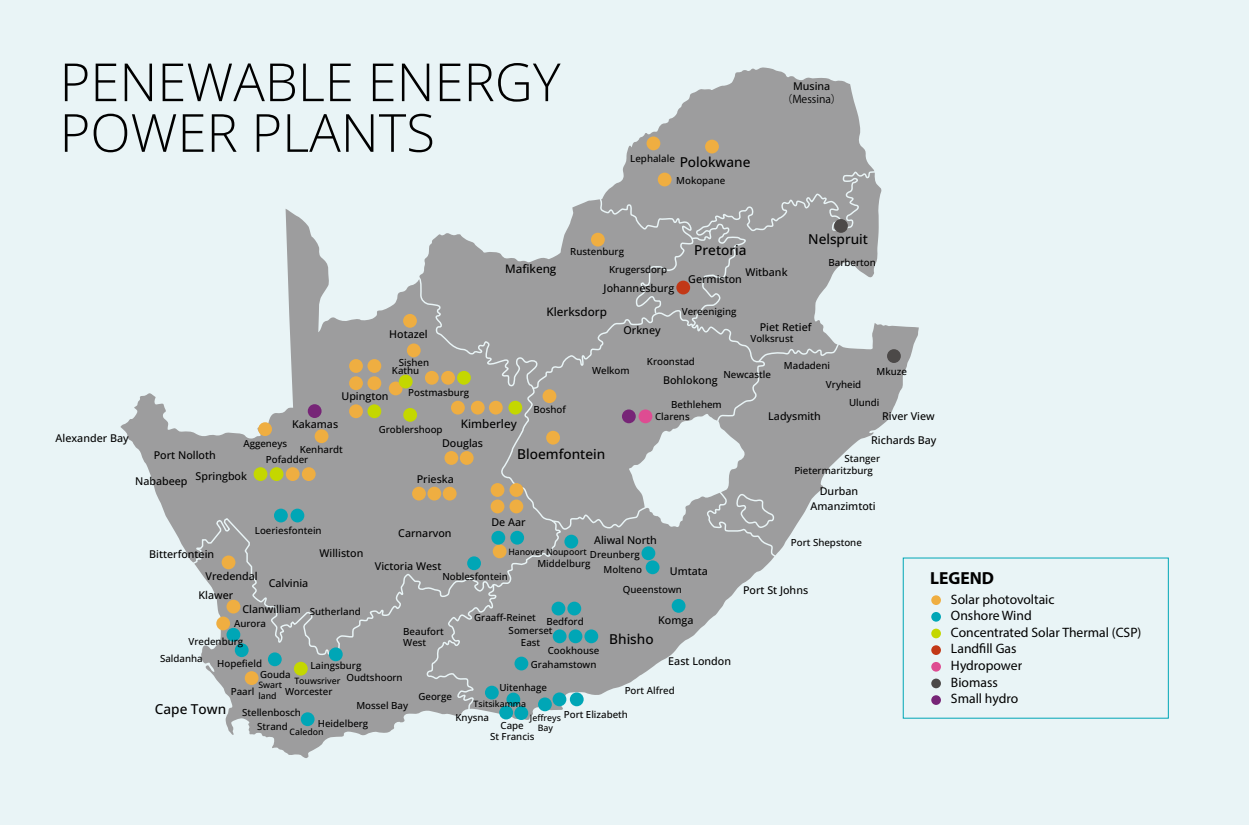
130. **Technical innovations promoted by NDB projects were not properly highlighted or disseminated as a mechanism for learning from their experience and the potential for replication.** The four sub-projects financed by NDB all introduced state of the art technology which can serve to build stability in the energy sector by providing dispatchable power that can provide electricity during both peak and off-peak times as they have the capacity for storage of excess electricity. The 100 MW Redstone sub-project uses CSP with a molten salt central receiver with 12 hours of full-load energy storage to reliably deliver a stable electricity supply. The Scatec project is one of the largest hybrid solar and battery storage facilities, with an installed solar capacity of 540 MW and a battery storage capacity of 225 MW/1,140 MWh. There are a lot of questions being asked in the sector about the most appropriate choice of technology, the experience with CSP and its attendant challenges, the optimal sizing of photovoltaic plants, the appropriate technology mix and the lessons that emerge from connecting to an overloaded grid where issues of poor communication and breakdowns can pose challenges to systems that count on automation. These lessons on innovations need to be properly examined and shared to capitalise on the role of NDB as a development partner in collaboration with technical specialists in the country such as Eskom, South African National Energy Development Institute and DMRE.

131. **The social innovations that the Government of South Africa has incorporated in its local procurement in the renewable energy sector were not fully highlighted in the investment.** The sub-projects under evaluation in the IDC facility are located in the Northern Cape province of South Africa. The province is vast and boasts immense potential in its energy sector as abundant sunshine and strong winds make it a prime location for renewable energy projects. This has attracted significant investment. However, the local economy remains heavily reliant on mining and agriculture. High unemployment and poverty rates persist, creating a significant challenge. Bridging this gap will require leveraging the opportunities presented by renewable energy to create sustainable jobs and empower local communities. The IPPPP proactively directs project procurement expenditure towards local content and priority groups of black South Africans, women, and small and emerging enterprises, and seeks to direct funding towards projects that have a positive socio-economic impact through job creation, community initiatives and shareholding for BEEs and local communities. The government is also becoming increasingly interested in tracking its impact on the transformative equity agenda. While the Independent Power Producer tracks all projects based on its score on these aspects, these were not fully incorporated into the monitoring and design framework of NDB or IDC. There were no specific targets or indicators assigned to monitor these aspects. NDB can serve its role as a development bank better by developing strong tools for promoting transformative equity in infrastructure projects financed by it and seize upon a valuable opportunity for equitable and sustainable development.

132. **There are several investment opportunities for the NDB in order to unlock further renewable investments.** Renewables are often found in areas where the grid has not undergone significant investment. Notwithstanding NDB's previous transmission investment, there is a need for additional energy transmission infrastructure. Greater investments are required to fund the Transmission Development Plan in the country and foresees the need to expand 14,000 km of new transmission lines in South Africa, in particular in the Eastern and Western Capes. Although the REIPPPP projects have a large geographical spread in seven out of nine provinces, there is a concentration in the Western, Eastern and Northern Capes owing largely to the vast coastline and mountainous regions for wind plants and a solar resource rated as some of the best in the world.

FIGURE 8

Location of renewable energy plants



Source: Mahachi and Rix, 2016.

B. Recommendations

Recommendation 1: *NDB's Investment should be guided more strategically by its position as a development bank for emerging markets and developing countries.*

133. NDB should carefully review how it can best add value as a development bank in South Africa where there is significant commercial interest in the renewable energy sector. Given the financial resources that are required for investments in the renewable energy sector, NDB is likely to be a minor investor in the projects it finances and therefore needs to bring additionality by playing a more strategic role. In the energy sector, NDB should focus on those investments which require a longer-term perspective in which commercial interest maybe limited or in areas which require experimentation with more innovative approaches or technologies and building partnerships that assist in de-risking the investments. For the future, these areas could include investments in the inadequate grid infrastructure, strengthening the weak transmission capacity through piloting public-private private partnerships, building further on the insufficient energy storage capacity and dispatchable power to build grid flexibility, strengthening the inefficient permitting and planning processes and the weaknesses of the supply chains that provide the inputs for the development of renewables. This approach would enhance NDB's effectiveness as a provider of development solutions.

Recommendation 2: *Highlight the lessons learnt from its experience and develop knowledge products.*

134. NDB should partner with technical institutions in South Africa to help develop and communicate the lessons from its investments regarding the appropriate choice of technology, the experience with the CSP and how to address the challenges that this promising technology presents, the optimal size of plants required given the weather conditions in the country to meet contracted supply, how to address the problems that arise in connecting to the grid and how to best address problems of weak transmission capacity and use of the state of the art automation and information communications technology required for the sophisticated systems needed to moderate the supply and demand for the grid. NDB should partner with technical specialists in the country such as Eskom, the South African National Energy Development Institute and DMRE and produce knowledge products and learning notes on each of these areas and disseminate them widely.

Recommendation 3: NDB should *use the opportunity provided by its investments to build relations and highlight its visibility in the country and the region.*

135. **NDB does not fully appear to have leveraged the potential for partnerships which the investment provided and needs to better highlight its role in the key investments it is making in the country such as its energy transition.** This involves actively participating in and being acknowledged in all related promotional materials, presentations, and sponsor websites, especially those involving leaders in the renewable energy sector. The project provided a strong platform for building relationships with a wide range of country stakeholders international private sponsors who are leaders in the renewable energy space such as commercial banks, equity partners, insurance companies and BEE partners, etc. The NDB operational team in the Bank's African Regional Centre needs to raise its profile and build its capacity to play a stronger role in the sector. NDB should in future seize the opportunity to leverage its position and highlight its role. This is vital if the path outlined by NDB's General Strategy for 2022-2026 of catalysing its role in mobilising financing from diversified sources is to be achieved.

Recommendation 4: *Incorporate transformative equity as a key aspect of NDB investments and integrate it in project design, and monitoring and supervision frameworks.*

136. **Investments in South Africa provide an excellent framework for highlighting the economic development potential of renewable energy projects.** The Government encourages investments in transformative equity and the IPP has provision for considering the economic development potential of bidders in renewable energy through their potential for shareholding for the empowerment of black South Africans, community shareholding, gender participation, job creation, skill development community initiatives for social sector and enterprise development. The sub-projects are all expected to report on these elements which are important for building transformative equity. NDB does not report on these aspects in any detail in its project document to the Board and has no provision to include them in its Design and Monitoring Framework; and its project monitoring reports merely focus on some of the environmental and social assessment sections to report on problems with labour and community expectations. The evaluation recommends that these aspects should be incorporated as a key element in all key documents to highlight the contribution that NDB can make to transformative equity through its projects.

Recommendation 5: *Track key parameters.*

137. **NDB should assign clear responsibility for tracking some of the parameters stipulated in the loan agreement or these are likely not to be properly tracked and reported. It is important for NDB to strengthen its capacity to track the key metrics given in the loan agreements and report on them on a regular basis.** There was a clear stipulation in the loan agreement regarding the parameters of the economic and financial viability of the sub-projects with an economic internal rate of return of not less than 8% and a financial internal rate of return above the sub-project's weighted average cost of capital. It was also stipulated that each of the sub-projects should contribute towards the reduction in CO_2 emissions in South Africa by not less than 70 tonnes per year per ZAR 1 million of the total cost. While an EIRR and FIRR assessment was undertaken at the start and presented to the NDB Board, there was no assessment presented to track these metrics based on the changing financial or economic aspects and assumptions made at the start. These should be covered in the project completion report. For the current project, IEO may also consider conducting another evaluation (ex-post) of the project, to gain deeper insights into its impact and sustainability and track some of the key metrics.

Recommendation 6: *Build structured flexibility into loan agreements.*

138. **To improve the effectiveness of NDB's loan agreements in accommodating complex projects, it is recommended that the agreements incorporate a degree of structured flexibility.** Projects of this type require a range of different contractors and very detailed procedures for initiation of work and commercial operations. Experienced firms are procured for the engineering procurement and construction, and a range of small- and medium-sized enterprises to prepare the sites. Detailed social and environmental safeguard assessments are required together with initiation of discussions with local communities and local governments. These are typically much more complex than projects in other sectors which do not require such a range of extensive partnerships and coordination among them. It would therefore be prudent to allow adequate time for their implementation and provide flexibility in the contracts to avoid renegotiating the loan agreements and making frequent amendments to them. However, to prevent ambiguities and ensure clarity in loan terms, this flexibility should be defined within clear parameters. For example, the agreements could include provisions for predefined adjustable timelines or milestone-based adjustments, which are activated by mutual consent under specified conditions.

VII. ANNEXES

The annexes to the report (listed below) are available on the Independent Evaluation Office website at: https://www.ndb.int/wp-content/uploads/2024/08/Annexes_Evaluation-on-Renewable-Energy-Sector-Development-Project-in-South-Africa.pdf

Annex 1: Design and monitoring framework
Annex 2: Sub-project data sheet
Annex 3: Sub-project implementation arrangements
Annex 4: Definition of the evaluation criteria used by IEO
Annex 5: Evaluation framework
Annex 6: Environmental & social impact review
Annex 7: List of key persons met
Annex 8: List of documents reviewed
Annex 9: Photos from the evaluation main mission Redstone and Scatec sub-projects

New Development Bank

INDEPENDENT EVALUATION OFFICE
New Development Bank
1600, Guozhan Road, Pudong New District,
Shanghai – 200126 China

Tel: +86-21-8021-9512
E-mail: ieo@ndb.int
Website: https://www.ndb.int/governance/independent-evaluation/

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