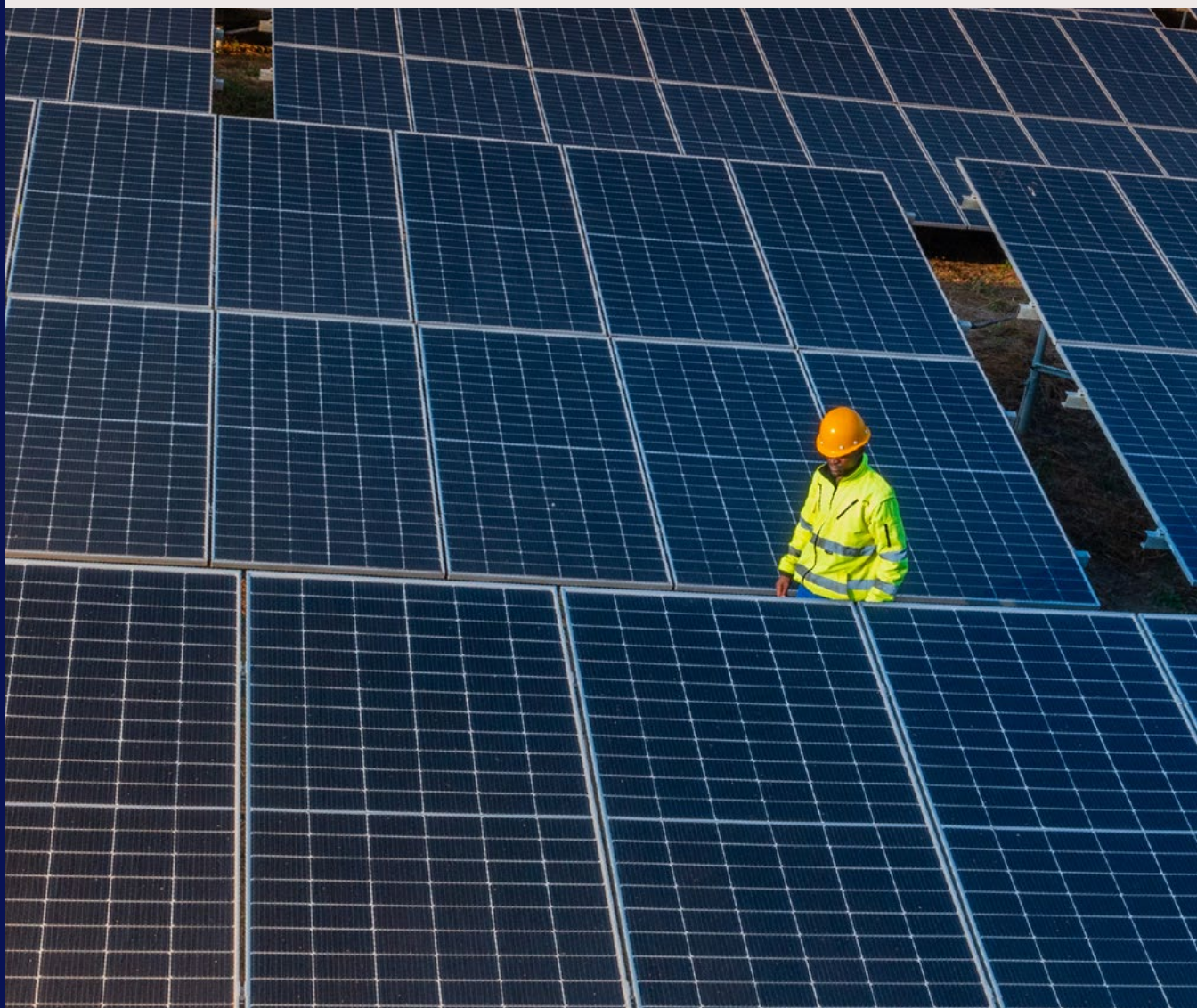
Department for Evaluation

ANNEXES 2-4

Evaluation of Norfund's investments in renewable energy



5. Annex 2: Methodology

5.1 Data Collection

This section outlines the various data sources and instruments used to collect the data and evidence used for the evaluation.

5.1.1 Document review

A review of related documentation. We categorized documents based on the three levels of the evaluation – 1) strategic level, 2) portfolio level, and 3) case study level (i.e. country and investment level). Documents were also grouped by source, including Norfund, other Norwegian government sources, completely external sources, among others. While the preliminary list below includes examples of relevant documents, the list grew during the data collection phase, as new evidence emerged.

Examples of relevant documents include, but are not limited to:

Level	Document
Strategic level	• Norfund governing documents
	○ From Government/MFA (Norfund Act; MFA Instructions for DIM, CIM; National Budgets and allocations *(Meld. St. 1*; *Prop. 1 S)*; mandates for PDRM, grant facility)
	○ From Norfund (General Assembly minutes; Norfund Statutes)
	• Strategy documents (Norfund strategies (2012-2015; 2016-2020; 2019-2022; 2023-2026); CIM Strategy 2022-2026)
	• Norfund policies and guides (Additionality framework; ESG Policy; Investment Manual; Risk Appetite Statement, Enterprise Risk Management frameworks; Compliance standards; etc.)
	• Previous evaluations of Norfund[116] and other related evaluations and reviews[117]
	• Other high-level documents (*Meld. St. 6 2022-2023 Greener and more active state ownership*;
Portfolio level	• Portfolio data (financial)
	• Portfolio data (development effects)
	• Norfund reports (Annual Reports; Reports on Operations; CIM report 2022)
	• Special Norfund documents (Exit analyses; Portfolio Risk Assessments)

[116] Department for Evaluation (2003). Evaluation of the Norwegian Investment Fund for Developing Countries (Norfund). 1/2003; https://www.norad.no/om-bistand/publikasjon/2010/evaluation-of-the-norwegian-investment-fund-for-developing-countries-norfund/
Department for Evaluation (2015). Evaluation of the Norwegian Investment Fund for Developing Countries (Norfund). 1/2015. https://www.norad.no/om-bistand/publikasjon/2015/evaluation-of-the-norwegian-investment-fund-for-developing-countries-norfund/

[117] Department for Evaluation (2020) Norwegian Development Assistance to Private Sector Development and Job Creation. 2/2020. https://www.norad.no/om-bistand/publikasjon/2020/norwegian-development-assistance-to-private-sector-development-and-job-creation/
PwC (2021) Analyse av Norfunds investeringer gjennom tredjeland
https://www.norfund.no/content/uploads/2021/07/Analyse-av-Norfunds-investeringer-gjennom-tredjeland-2.pdf
SIGLA (2018) Norfund's role in some of the most difficult market segments
PWC (2023) A comparative assessment of DFI cost efficiency
Dalberg (2022) Comparative review of DFI strategies
SIGLA (2018) A comparative assessment of DFI cost efficiency

	• EDFI Comparative analyses (2015; 2016; 2017; 2018; 2019; 2020; 2021; 2022)
	• Documentation for individual projects
	○ Clearance in Principle documents
	○ Final approval documents (and attached documents)
	○ Exit approval documents
Case study level	• Documentation for individual projects
	○ Clearance in Principle documents
	○ Final Approval documents (and attached documents)
	○ Exit approval documents
	○ Results reporting from investees
	○ Other internal Norfund documentation (depending on project)
	• Country level documentation
	○ Energy sector plans/strategies
	○ Other donors' programs' documentation
	○ Country Risk reports
	• Other documentation on investee firms and/or specific investments/projects

5.1.2 Third-party literature

Third-party literature was also consulted in order to generate comparisons and lessons learned from other actors. This was not a comprehensive literature review, but an opportunity to draw on information from third-party sources where relevant. Examples include, but are not limited to[118]:

- Academic literature, working papers, e.g.
  - Gregory (2023) Taking Stock of MDB and DFI Innovations for Mobilizing Private Capital for Development CGD Policy Paper 290
  - Carter et al. (2019) The Elusive Quest for Additionality
  - Attridge, S. & Engen, L. (2019) Blended finance in the poorest countries: the need for a better approach
  - Winckler et al (2021) Evaluating Financial and Development Additionality in Blended Finance Operations
  - Xu, J. & Gallagher, K. P. (2022) Transformation Towards Renewable Energy Systems: Evaluating the Role of Development Financing Institutions
  - Attridge, S. & Novak, C. (2022) An exploration of bilateral development finance institutions' business models
- Reports and evaluations from other development partners, e.g.:
  - World Bank IEG (2023). International Finance Corporation Additionality in Middle-Income Countries.
  - World Bank IEG (2008) Independent Evaluation of IFC's Development Results 2008 IFC's Additionality in Supporting Private Sector Development
  - OECD (2021) Towards harmonised management and measurement of impact: The experience of development finance institutions
  - Annual Reports and other documentation from relevant comparator DFIs (e.g. BII, FMO, SwedFund)
- Country and sector level documentation, such as:
  - Multiconsult (2018) Scandinavian Investments in Renewable Energy in Developing Countries
  - South African Renewable Energy Masterplan (SAREM)(2023)
  - India National Electricity Plan (2023)
  - Market analysis of renewable energy, for example IRENA reports[119]

5.1.3 Interviews

Key informant interviews were conducted with a broad set of stakeholders. Interviews were semi-structured and followed an interview guide which also allowed for flexibility to probe deeper into topics as they emerged. The specific interview questions were guided by the evaluation questions as outlined in the evaluation matrix, but were tailored to each individual interview based on the information we wanted to extract from the particular interviewee. Interviews on the

[118] Additional resources will be added as the evaluation implementation progresses

[119] One concrete example is IRENA (2022) Renewable Energy Market Analysis: Africa and its Regions

strategic level were conducted virtually, with some interviews carried out in Oslo, Norway taking place in-person. The following section gives a complete list of all key informant interviews conducted.

5.1.3.1 Interview list

Level	Category	Organization
Case study (India)	Norwegian government stakeholders	Norwegian Embassy in Delhi
Case study (India)	Norfund Project Team	Norfund
Case study (India)	Norfund Project Team	Norfund
Case study (India)	Investee	Enel Green Power India
Case study (India)	Co-financier	HSBC
Case study (India)	Norfund Project Team	Norfund
Case study (India)	Norfund Project Team	Norfund
Case study (India)	Norfund Central	Norfund
Case study (India)	Investee	ResponsAbility
Case study (India)	Investee	ResponsAbility
Case study (India)	Investee	ResponsAbility
Case study (India)	Investee	ResponsAbility
Case study (India)	Investee	ResponsAbility
Case study (India)	Investee	ResponsAbility
Case study (India)	Investee	ResponsAbility
Case study (India)	Norfund Project Team	Norfund
Case study (India)	Norfund Project Team	Norfund
Case study (India)	Investee	Fourth Partner Energy
Case study (India)	Investee	Fourth Partner Energy
Case study (India)	Investee	Fourth Partner Energy
Case study (India)	Co-financier	TGP
Case study (India)	Co-financier	TGP
Case study (India)	Off-taker / Client	Filatex
Case study (India)	Off-taker / Client	Nexus Malls
Case study (India)	Off-taker / Client	Nexus Malls
Case study (India)	Local affected stakeholders	Multiple Villages
Case study (India)	O&M Subcontractor	Viraj Power
Case study (India)	O&M Subcontractor	Subcontracted workers
Case study (India)	Local affected stakeholders	Multiple Villages
Case study (India)	Off-taker / Client	GETCO
Case study (India)	Investee	Enel Green Power India
Case study (India)	Investee	Enel Green Power India
Case study (India)	O&M Subcontractor	Suzlon
Case study (India)	O&M Subcontractor	Suzlon Foundation
Case study (India)	Local government	District Animal Department
Case study (India)	Local government	District Social Security Office
Case study (Madagascar)	Investee	WeLight
Case study (Madagascar)	Investee	WeLight
Case study (Madagascar)	Investee	WeLight
Case study (Madagascar)	Investee	WeLight
Case study (Madagascar)	Investee	WeLight
Case study (Madagascar)	Investee	Baobab+
Case study (Madagascar)	Investee	Baobab+
Case study (Madagascar)	Investee	Baobab+
Case study (Madagascar)	Government of Madagascar	Agency for the Development of Rural Electrification
Case study (Madagascar)	Government of Madagascar	Ministry of Energy and Hydrocarbons
Case study (Madagascar)	Government of Madagascar	Ministry of Energy and Hydrocarbons
Case study (Madagascar)	Government of Madagascar	Ministry of Energy and Hydrocarbons
Case study (Madagascar)	Government of Madagascar	Agency for the Development of Rural Electrification
Case study (South Africa)	Investee	GSAMS
Case study (South Africa)	Investee	GSAMS
Case study (South Africa)	Investee	GQ Corporate
Case study (South Africa)	Investee	GQ Corporate

Case study (South Africa)	Investee	Overberg Wind Power (Klipheuwel shareholder)
Case study (South Africa)	Investee	Doricap (Klipheuwel BEE Partner)
Case study (South Africa)	Investee	GSAMS
Case study (South Africa)	Investee	GSAMS
Case study (South Africa)	Investee	GSAMS
Case study (South Africa)	Investee	GSAMS
Case study (South Africa)	Investee	GSAMS
Case study (South Africa)	Investee	Theewaterskloof Local Municipality (Klipheuwel ED beneficiary)
Case study (South Africa)	Investee	Alona Fresh Produce (Klipheuwel ED beneficiary)
Case study (South Africa)	Investee	Elgin Community College (Klipheuwel SED beneficiary)
Case study (South Africa)	Investee	Elgin Community College (Klipheuwel SED beneficiary)
Case study (South Africa)	Investee	IDC (Klipheuwel financier)
Case study (South Africa)	Investee	IDC (Klipheuwel financier)
Case study (South Africa)	Investee	IDC (Klipheuwel financier)
Case study (South Africa)	Investee	IDC (Klipheuwel financier)
Case study (South Africa)	Investee	Standard Bank (Klipheuwel financier)
Case study (South Africa)	Investee	Standard Bank (Klipheuwel financier)
Case study (South Africa)	Investee	GQ Corporate
Case study (South Africa)	Investee	GQ Corporate
Case study (South Africa)	Investee	IPP Office (facilitator of the REIPPPP)
Case study (South Africa)	Investee	BII
Case study (South Africa)	Investee	Climate Fund Managers (BBP investor)
Case study (South Africa)	Investee	B2W Energy Holdings
Case study (South Africa)	Investee	B2W Energy Holdings
Case study (South Africa)	Investee	BBP
Case study (South Africa)	Investee	B2W Energy Holdings
Case study (South Africa)	Investee	B2W Energy Holdings
Case study (South Africa)	Investee	BMW (BBP off-taker)
Case study (South Africa)	Investee	H1 Holdings (Upington Solar BEE partner)
Case study (South Africa)	Investee	H1 Holdings (Upington Solar BEE partner)
Case study (South Africa)	Investee	H1 Holdings (Upington Solar BEE partner)
Case study (South Africa)	Investee	H1 Holdings (Upington Solar BEE partner)
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Veer Group (Stakeholder engagement contractor)
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Scatec
Case study (South Africa)	Investee	Ubunele Primary Coop (Upington Solar ED beneficiary)
Case study (South Africa)	Investee	Serengeti Energy (REH owner)
Case study (South Africa)	Investee	Serengeti Energy (REH owner)
Case study (South Africa)	Investee	Serengeti Energy (REH owner)
Case study (South Africa)	Investee	Serengeti Energy (REH owner)
Case study (South Africa)	Investee	Combined Churches in Action
Case study (South Africa)	Investee	Combined Churches in Action
Case study (South Africa)	Investee	Combined Churches in Action

Case study (South Africa)	Investee	Combined Churches in Action
Case study (South Africa)	Investee	Combined Churches in Action
Strategy level	Norwegian government stakeholders	MFA
Strategy level	Norwegian government stakeholders	MFA
Strategy level	Norwegian government stakeholders	MFA
Strategy level	Norwegian government stakeholders	Norad
Strategy level	Norwegian government stakeholders	Norad
Strategy level	Norwegian government stakeholders	Norad
Strategy level	Norwegian government stakeholders	Norad
Strategy level	Norfund Central	Norfund
Strategy level	Norfund Central	Norfund
Strategy level	Norfund Central	Norfund
Strategy level	Norfund Central	Norfund
Strategy level	Norfund Central	Norfund
Strategy level	Norfund Central	Norfund
Strategy level	Norfund Central	Norfund
Strategy level	Comparator Organizations	Swedfund
Strategy level	Comparator Organizations	BII
Strategy level	Comparator Organizations	IFU
Strategy level	Comparator Organizations	IFU
Strategy level	Comparator Organizations	University of Copenhagen
Strategy level	Comparator Organizations	OECD
Strategy level	Norfund Central	Norfund Board
Strategy level	Norfund Central	Investment Committee
Strategy level	Norwegian government stakeholders	Norwegian embassy in South Africa
Strategy level	Co-financier	KLP
Strategy level	Norfund	Norfund South Africa
Strategy level	Norfund	Norfund South Africa
Strategy level	Norfund	Norfund South Africa

Personal information has been removed for privacy reasons

5.1.4 Surveys

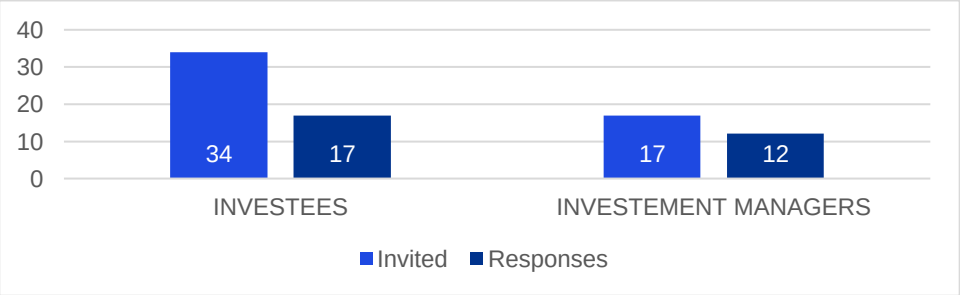
Two online surveys were administered to target a broad set of stakeholders and capture information, opinions, and views for further investigation using qualitative interviews/focus group discussions. These surveys included:

A) **A survey of Norfund project managers**: Online survey of project managers for all renewable energy investments. (n = 12)

B) **A survey of investees**: Online survey of representatives of investee companies. (n = 17)

Figure 57 summarizes the invitations and participation. Investment managers and investee list of contacts were both provided by Norfund. The relatively low level of survey responses (50% of investees, 71% of investment managers) might imply a bias whereby the respondents are more likely than average to have strong opinions on the Norfund, either positively or negatively. No specific incidences were reported during the evaluation.

Figure 57: Survey respondents



The surveys were administered using Questback which is an online survey platform. This allowed for tracking responses, providing the questionnaire in multiple languages (if necessary), and sending automatic reminders.

Data generated by the online survey was complied, cleaned, and analyzed using both quantitative and qualitative data analysis techniques depending on the question type. The survey questionnaires was designed by the evaluation team and validated by the Department for Evaluation at Norad. The questionnaires contained a mix of attitudinal, behavioral, knowledge-based and characteristics questions for both project managers and investees, related to the evaluation questions as per the evaluation matrix (Section 5.1.6). The exact questions were based on the document review and initial key informant interviews, in order to ensure the survey was suited to the portfolio and context.

Survey participants were invited to participate in virtual focus group discussions to share ideas, thoughts, and reflections concerning the preliminary findings from the survey. Due to lack of volunteers, only one focus group discussion session for investment managers was organized, on August 5th 2024, with two participating investment managers.

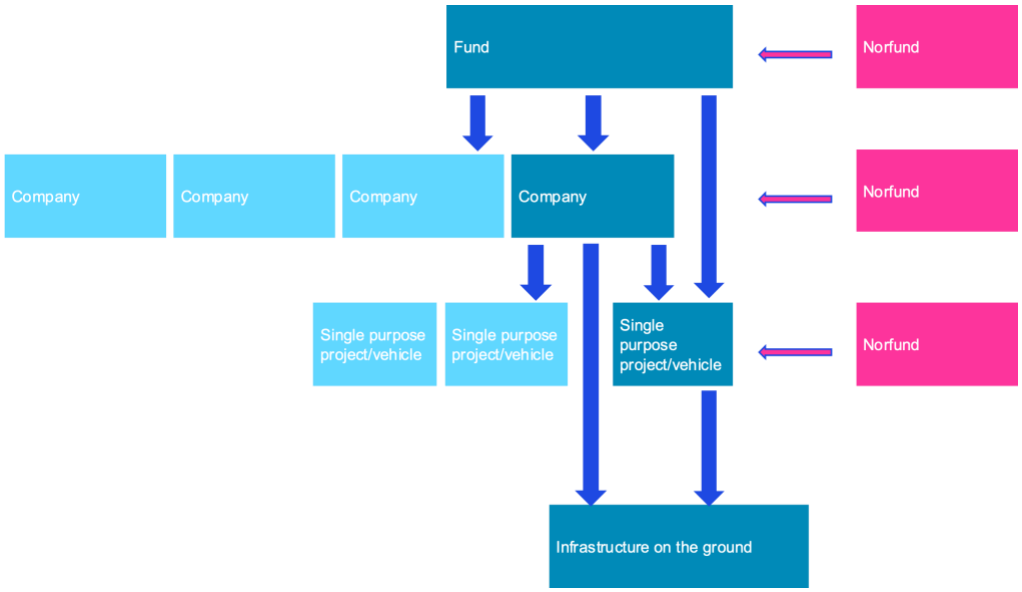
5.1.5 Case studies

In order to provide a more detailed view of investments, nine investments were selected for case studies in three countries (India, Madagascar, and South Africa). The case studies involved a more thorough review of individual investments and involve engaging a wider set of stakeholders, a more thorough document review, an in-depth analysis of the country and sector contexts, and field visits/site visits. The interviews list in Section 5.1.3.1 provides more information on stakeholders engaged on the case study level. It should be noted that the evaluation team relied on Norfund to provide contact details to many of the stakeholders.

Case studies were used to assess projects at the investment level and at the infrastructure level. Case study investments involve a broad variation of investment types and instruments. These vary from

direct investments in projects[120] (e.g. H1 Upington), and direct investments in companies or platform companies (e.g. WeLight or Globeleq), to indirect investments through funds (e.g. responsibility ACPF; Figure 58).

Figure 58 – Case study investment levels simplified overview

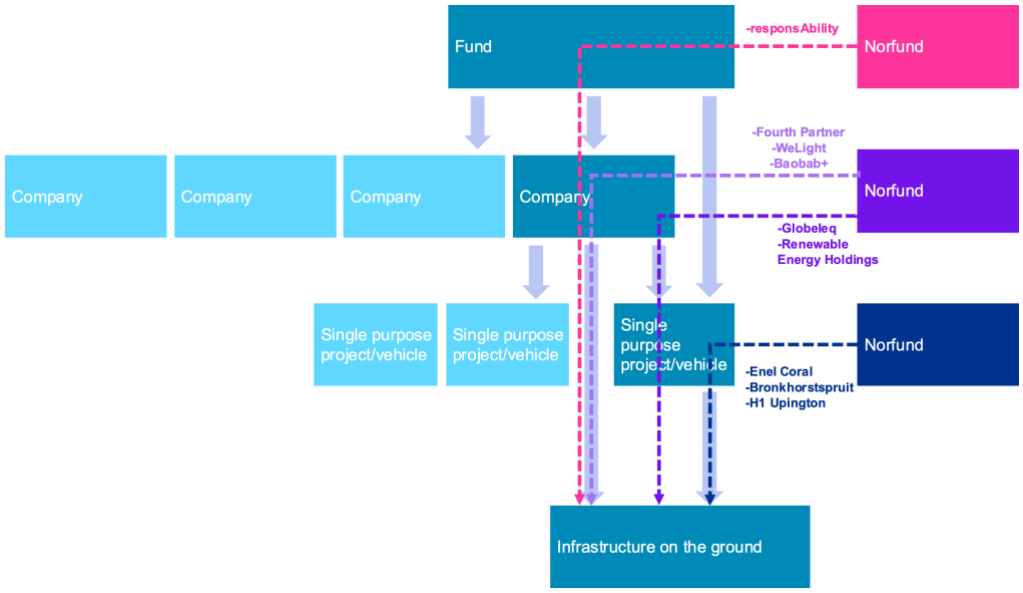


For each of the case studies, we selected a specific asset "on the ground" as a part of the investments (Figure 59). For example, in the case of ResponsAbility ACPF, we identified a specific asset, belonging to a company invested in by the fund. This was used to answer evaluation questions related to the on-the-ground infrastructure (for example unintended effects), while the investment relationships itself (on a higher level) were used to answer evaluation questions related to the investment/transaction itself (for example additionality). In cases with investees with regional or global scope, the case study was limited (to the extent possible) to the funds flowing through the relevant case study country. Projects were selected to provide a representative sample of projects (e.g., across instruments, technologies) reflecting the broader portfolio, given the constraints (countries pre-selected, limited number of projects, etc.)[121].

[120] Note that the actual investment is always technically in a legal entity, such as a company or special purpose vehicle (SPV). We separate here investments into specific projects from investments in more general companies which multiple underlying projects.

[121] The Evaluation team is still waiting for detailed investment data from Norfund in order to select projects.

Figure 59 – Case study selection investment levels overview



The case studies were categorized according to country, leveraging specific context-specific insights to enrich the review process. The case study selection is described below. Each country represents a particular focus for Norfund and this emphasis is underscored in the corresponding case studies. With the intention that the selected investments in these countries will illustrate Norfund's specific areas of focus:

- South Africa: Energy generation
- Madagascar: Off-grid solar
- India: Climate

Case studies are not intended to be representative of the entire Norfund renewable energy portfolio, but serve as illustrative, case-by-case examples of factors that are at play in a given investment. In addition to providing evidence for the main report, each case study will be summarized in case study reports attached to the report.

5.1.5.1 Case study specific methodology

The full interview list covering the case studies is found in Annex 5.1.3.1.

5.1.5.1.1 Madagascar

Data collection

Secondary Data Collection and Analysis: The evaluation began with an in-depth review of documents provided by Norfund and the investee companies. This included investment reports (IC), financial data, impact assessments, fundraising documents, and bank loan approvals. The secondary data analysis provided a foundation for understanding the context, operations, and financial health of the investments, as well as their intended impact.

Primary Data Collection: To complement the secondary data, the evaluation team conducted face-to-face and remote key informant interviews (KIIs) with Norfund staff, including investment managers, as well as members of the management teams of WeLight and Baobab+, including the CEOs of both companies. In addition the team conducted fieldwork to collect primary data as described below.

Field Data Collection Methods

The fieldwork also included direct interviews with beneficiaries to assess the on-the-ground impact of the services provided by WeLight and Baobab+. The study focused on three types of beneficiaries:

- Households using the services for personal use.

- Income-generating activities (a mix of very small, small, and medium enterprises) to create economic value.
- Public service entities such as schools, health centers, and local administrative offices.

To maximize the depth of data collection, the following specific methods were employed:

WeLight: Four electrified villages selected for data collection. One near Antananarivo and three near Sambava in northeast. A total of 55 interviews were conducted, including 22 households, 22 income-generating activities (IGAs), and 11 public service institutions. Additionally, three focus group discussions were held with women, very small businesses and medium-sized businesses, and school parents, focusing on the effects of WeLight on education and health. Each focus group consisted of 7 to 10 participants, combining those previously interviewed with new participants to ensure a mix of familiar and fresh perspectives.

Baobab+: In contrast, 17 interviews were conducted of which 7 in urban and 10 rural areas in the region of Moramanga, at three hours driving distance from Antananarivo, targeting households, income-generating activities and when relevant public institutions. Due to the dispersed nature of Baobab+ clients, compared to WeLight sites, it was not feasible to conduct focus group discussions.

Limitations

It is important to note the limitations of this study:

- Geographic Limitation: The survey was geographically limited, which may have introduced biases related to specific local contexts.
- Sample Size: The relatively small sample size limits the ability to generalize the findings to all beneficiaries across Madagascar.

5.1.5.1.2 India

The case study is based on interviews with relevant stakeholders, a review of documentation, and a field visit. See annex 5.1.3.1 for a list of stakeholders interviewed. The team visited the sites of the FPEL Gondal site near Rajkot, Gujarat on July 29-30, 2024, and the Enel Coral site near Bhuj, Gujarat on August 1-2, 2024.

5.1.5.2 Case study selection[122]

The three case study countries were explicitly specified in the terms of reference (see Annex 1) Using the background dataset provided by Norfund during the Inception Phase, we identified 32 investees[123] who received investments at some point between 2015 and 2023 in these three countries:

Table 12: Active investments by case study countries 2015-2023 (CIM and DIM)

	2015	2016	2017	2018	2019	2020	2021	2022	2023
India	3	4	3	3	6	6	7	11	11
South Africa	8	8	9	6	9	9	11	12	11
Madagascar	0	0	0	0	1	1	3	4	4

Note: The investee Evolution Fund II (Through KNI) is present in both South Africa and India

Investments selected for case studies should aim to represent the wider renewable energy portfolio. Nevertheless, due to the predetermined selection of countries, achieving a comprehensive representation of

[122] Note the case study selection is based on Q3 2023 data

[123] Fourth Partner Energy was invested in through both the DIM and the CIM

the entire portfolio would not be possible. As a compromise, we strove to ensure that at least one case study investment was selected from each of the most significant categories within the portfolio, as listed below:

- ✓ Financial Instruments: Equity, Loan, or both
- ✓ Mandates: Development vs. Climate
- ✓ Project maturity (young (post 2021) vs old (pre 2022)), and should include at least one exited investment
- ✓ Size: Large (>500 million NOK), Medium (100 million – 499 million NOK), Small (<100 million NOK)
- ✓ Sector: At least one from biomass, solar, wind, hydro
- ✓ Greenfield and non-greenfield

In order to focus on the cases on the selected countries, we excluded very large global funds/platforms with small shares (<20%) of activities in the selected countries

Based on these criteria, we made a short-list of potential candidate investments. From this short-list, we considered each investment in further detail to make sure the final list represented feasible and interesting cases, illustrating the breadth of the renewable energy portfolio. Table 13 lists the final list of the suggest nine case study investments:

Table 13: Case study selection final list of investments

Investee	Mandate	Country	Highest commitment point (2015-2023)	Sector	Business segment	Instrument	Commitment year
Fourth Partner Energy	CIM[124]	India	431,514,820	Solar power	C&I	Equity (Ordinary share)	2023
Renewable Energy Holdings	DIM	South Africa	39,242,017	Hydropower	Not available	Loan, Guarantee	2014
responsAbility ACPF	DIM	Global	112,429,263	Renewable energy fund	Not available	Funds	2019
Bronkhorstspruit Biogas Plant	DIM	South Africa	25,817,420	Biomass	IPP	Loan, Equity (Ordinary share)	2011-2022
Enel Coral	CIM	India	430,236,047	Wind power	IPP	Equity (Ordinary share), Guarantee	2022
Baobab+	DIM	Regional (Madagascar)	108,477,943	Solar power	Off-grid	Loan, Equity (Ordinary share)	2021
WeLight	DIM	Regional (Madagascar)	132,694,983	Energy	Off-grid	Loan, Equity (Ordinary share)	2019
H1 Upington	DIM	South Africa	192,904,208	Solar power	IPP	Loan, Equity (Ordinary share), Guarantee	2015 – 2023

[124] There is also a DIM investment in Fourth Partner Energy from 2021, but the case study examines the 2023 CIM investment.

Investee	Mandate	Country	Highest commitment point (2015-2023)	Sector	Business segment	Instrument	Commitment year
Globeleq	DIM	Regional	2,323,493,691	Energy	Not available	Equity (Ordinary share), Guarantee	2014

Table 14 compares the statistics of the selected case study investments against the total investment portfolio for the three selected countries.

Table 14: Case study investments against selection criteria (CIM and DIM)

Criteria	Category	Investments (in 3 countries)	Case study investments
Instrument	Equity	9	1
	Loan	6	2
	Both	12	5
	Fund	5	1
Mandate	Development	25	7
	Climate	8	2
Maturity	Young (post 2021)	8	2
	Old (pre 2022)	17	6
	Exited	7	1
Size	Large (>500 million NOK)	6	1
	Medium (100 million – 499 million NOK)	17	6
	Small (<100 million NOK)	10	2
Sector[1]	Biomass	3	1
	Solar	10	3
	Wind	3	1
	Hydropower	4	1
Greenfield	Yes	21	4
	No	11	5
Country	India	13	3
	South Africa	16	4
	Madagascar	4	2

[1]Other investments are classified with less granular sector classifications (e.g. renewable energy)

Within each case study, we look at a specific asset for the on-the-ground evaluation questions. For the selected case studies this involves:

Table 15: Case study selection, project level

	Fund level	Company / platform level	Project level
Case study 1	**responsAbility ACPF**	Fourth Partner Energy	Gondal
Case study 2		**Fourth Partner Energy**	Gondal
Case study 3			**Enel Coral**
Case study 4		**WeLight**	Madagascar site
Case study 5		**Baobab+**	Madagascar site
Case study 6			**Bronkhorstspruit Biogas Plant**
Case study 7		**Globeleq**	Klipheuwel
Case study 8		**Renewable Energy Holdings**	Stortemelk Hydro
Case study 9			**H1 Upington**

5.2 Limitations and challenges

While we believe that the evaluation was carried out on the basis of a sound methodological approach, we acknowledge some limitations and challenges exist, which are outlined below. General methodological limitations involve a purposive/convenience sampling strategy for interview/survey respondents, self-reported responses, scarcity of data, potential data quality/availability issues, and challenges related to virtual data collection. The evaluation was reliant on document reviews and self-reported answers from evaluation participants, and it is possible that information in documents may have been incomplete or inaccurate and stakeholders' self-reported responses may be subjected to biases and thus unreliable.

Systems for collecting and storing data at Norfund have changed considerable over the period under review. This is especially the case for data on development effects and additionality. This means the data is not easily comparable from year to year, and investment level data might not add up to officially disclosed aggregated Norfund data. The evaluation team has to the extent possible used granular data and done separate aggregations, but in some cases this data is incomplete. It has not been possible for the evaluation team to reproduce aggregated development effects data from investment level data, which has limited the scope of analysis possible.

The limited quantitative approach is thus constrained by not having access to data on investees where Norfund did not invest (as a control group). The quantitative analysis relied on already implemented projects within Norfund's existing or previous portfolio. Therefore, without randomized control groups (as with an experimental approach), systematically measured baseline values, or other means for gathering different types of temporal evidence at specific time intervals, it was not possible to attribute outputs to participation among investees.. Another issue is the limited number of projects under renewable energy (small sample size), and the fact that Norfund is not the sole investor in many of these projects.

Actual (ex-post) additionality is notably difficult to determine. The methodological issues related to determining additionality have been noted in Section 2.3.

The methodology was designed based on a *preliminary* document review, and not a complete review of all available information. Some information, such as detailed investment level information was only made available late in the process, and was not thoroughly reviewed until after the inception phase. This has led to selection of methodologies that are less relevant than expected, for example including the quantitative analyses on success factors, and the analysis of development effects data. Due to lack of data, some methodological choices have been made based on an extrapolation of data availability, i.e. documents for a sample of projects which were reviewed (case studies).

The evaluation was to a high degree based on data made available from the subject of the evaluation – Norfund. This could in theory pose challenges to independence of the evaluation, if Norfund was not forthcoming in making data available, or steered the evaluation towards certain areas or projects through data availability. In the Inception Phase, this was not experienced as an issue, and the evaluation team has been given access to comprehensive dataset, from which relevant data can be selected. Collecting development effect data from investees without Norfund's help was considered not feasible. In order to overcome the challenge, the evaluation team triangulated evidence collected from Norfund with primary sources of evidence such as interviews and surveys.

6. Annex 3: Case Studies

The case studies conducted for India, Madagascar, and South Africa provide a detailed view of Norfund's renewable energy investments across these diverse regions. These case studies were selected to assess the on-the-ground impact of Norfund's interventions and examine the investment and infrastructure levels. Each country represents a different focus—energy generation in South Africa, off-grid solar in Madagascar, and climate investments in India—allowing for a thorough evaluation of varied project types.

The methodological approach includes a comprehensive document review, stakeholder interviews, and site visits. The evaluation team engaged local communities, government bodies, investees, investors and project operators to gather qualitative and quantitative data. These findings are assessed through an impact framework that measures the effectiveness, additionality, sustainability and efficiency of the investments. By using a standardized framework, the evaluation ensures consistency across countries while adapting to the unique socio-economic contexts of each region.

Incorporating the findings from these case studies into the main evaluation report allows for a structured presentation of results that support the broader evaluation objectives. Each case study is structured to include a project overview, financial and operational analysis, stakeholder feedback, and a summary of lessons learned. This approach facilitates direct comparison between regions, enhancing the clarity and coherence of the evaluation findings. Furthermore, these case studies contribute to identifying strategic lessons for future renewable energy investments, helping to strengthen Norfund's portfolio by reflecting on past successes and challenges.

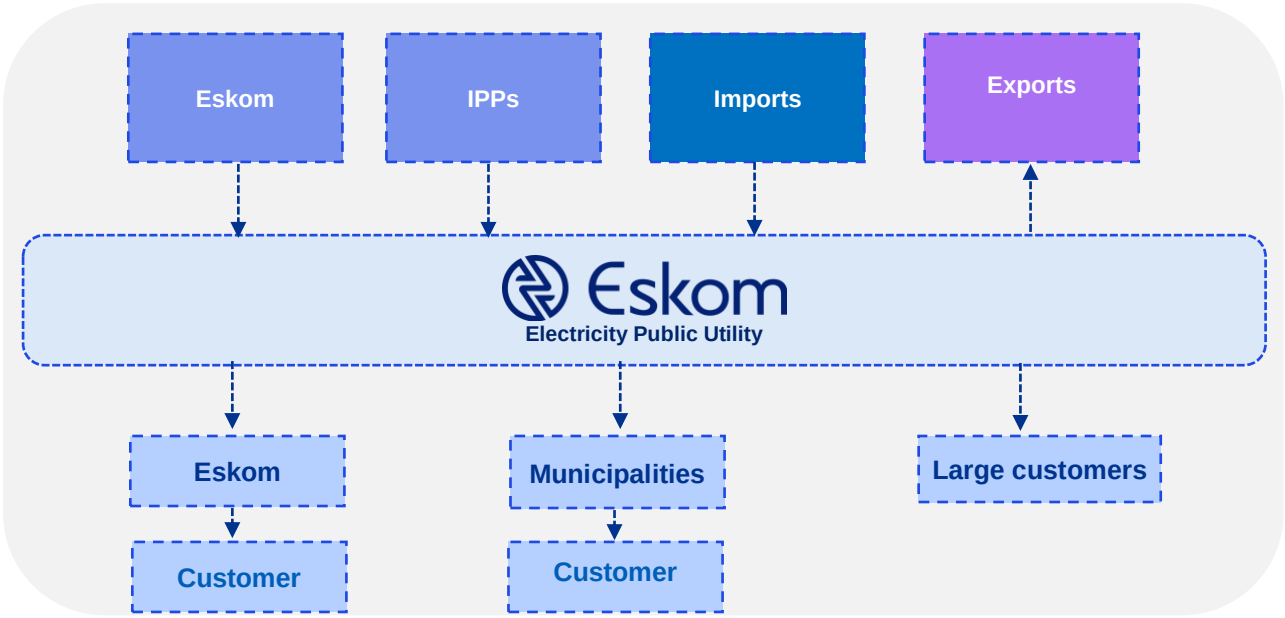
6.1 Case studies: South Africa

6.1.1 Background

6.1.1.1 South African Electricity Landscape

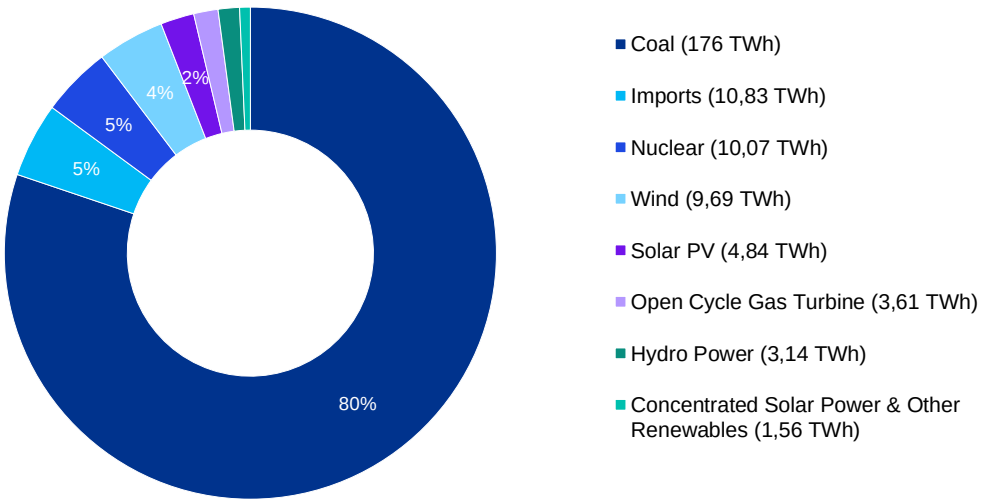
South Africa's energy mix is heavily reliant on coal, with coal-fired generation stations having an installed capacity of 39.8 GW, representing about 80% of the country's total electricity generation capacity as of 2022.[125] The coal stations are primarily owned and operated by Eskom, the national power utility, which operates as a vertically integrated entity under a single buyer energy model. In 2022, Eskom supplied approximately 88% of South Africa's total electricity demand. The remaining 12% is met by municipalities, imports, and independent power producers (IPPs).[126]

Figure 60: Eskom Structure



Source: Large-scale-RE-MIR-2024-digital.pdf (greencape.co.za) & Statistics of utility-scale power generation in South Africa, CSIR, Feb, 2023

Figure 61: South African Energy Mix



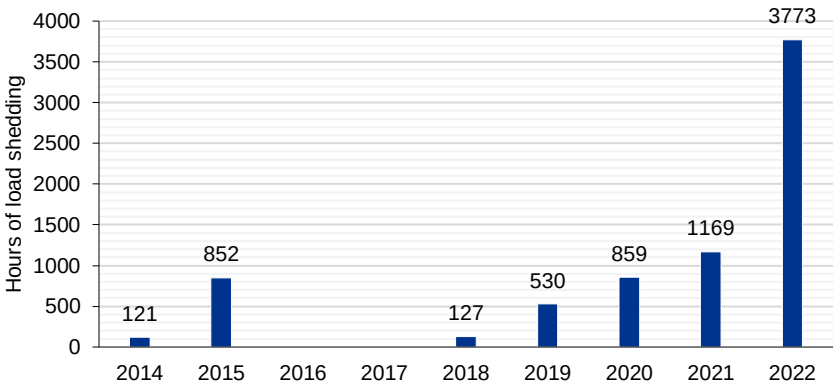
Source: Statistics of utility-scale power generation in South Africa, CSIR, February, 2023

125 Microsoft PowerPoint - Statistics of utility-scale power generation in South Africa in 2022 (FINAL) (csir.co.za)

126 2023 Large-Scale Renewable Energy Market Intelligence Report, P.15

Since 2007, South Africa's energy sector has faced load shedding, a controlled process of reducing load on the power grid to prevent a total blackout. This involves planned outages to manage periods when demand exceeds available capacity. Load shedding is implemented in stages, with each stage representing the removal of 1,000 MW increments of demand by controlled shut down on sections of the supply grid based on a predetermined schedule.

Figure 62: Duration of outages (hours)



Source: Council for Scientific and Industrial Research

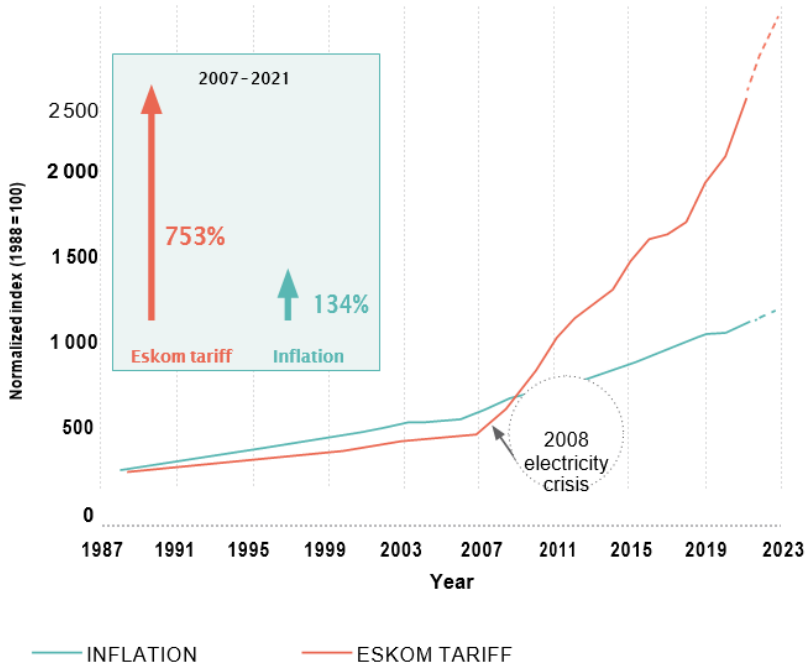
Load shedding in South Africa significantly impacts daily life and the economy, with 3,775 hours of power cuts recorded in 2022, a 227% increase from 2021.[127] Extended outages disrupt households, education, and essential services. Economically, businesses face reduced productivity and higher operation costs due to the need for alternative power sources, leading to increased consumer prices and inflation. For example, between 1988 and 2007, electricity tariffs increased by 223%, whereas inflation during the same period increased wih 335%. However, beginning with the 2008 electricity crisis, there is a noticeable and steep rise in electricity tariffs in South Africa. From 2007 to 2023, electricity tariffs surged by 753%, while inflation over this timeframe was 134%. Consequently, electricity tariffs increased more than fourfold (or quadrupled) in real money terms in 15 years.[128] Furthermore, the South Africa Reserve Bank cut the 2023 GDP growth forecast by two percentage points to 0,3%, citing load shedding as a major factor.[129] This persistent energy crisis deters investment and stunts economic growth, necessitating urgent improvements in the country's energy infrastructure.

[127] Statistics of utility-scale power generation in South Africa, CSIR, February, 2023

[128] 2023 Energy Services Market Intelligence Report, GreenCape

[129] Statement of the Monetary Policy Committee, 26 January, 2023

Figure 63: Average Eskom tariff versus inflation (CPI) projected to 2023



Source: 2023 Energy Services Market Intelligence Report, GreenCape

The causes of load shedding in South Africa are due to aging infrastructure, underinvestment, operational issues, rapid demand growth, and project delays. For example, significant delays in bringing new power stations online, such as the Medupi and Kusile plants, meant that expected additional capacity was not available when needed.

Various measures have been taken to address these challenges, including energy diversification and increased private sector participation through the Renewable Energy Independent Power Producer Procurement Program (REIPPP).

6.1.1.2 Current State of South Africa's Renewable Energy Market

The South African renewable energy sector presents significant investment opportunities, particularly in private procurement and local manufacturing. However, these opportunities are accompanied by challenges related to grid capacity, policy uncertainty, and skills shortages. Addressing these barriers is crucial for unlocking the full potential of the sector. The estimated market size across private, public, and manufacturing opportunities totals R468 billion by 2030, making it a critical area for future growth and investment.[130]

[130] 2023 Large-Scale Renewable Energy Market Intelligence Report

Table 16: Summary of opportunities within the large-scale renewable energy market

Macro context	
▪ Energy crisis ▪ High unemployment rates ▪ Economic recovery ▪ Just Energy Transition ▪ Infrastructure development plans	- Heavy industries and mining sector net-zero targets - The global effort to drive a hydrogen economy and elimination of CO2 emissions by targeting renewable energy sources for hydrogen production - COP4 26 (2021) & COP 27 (2022)

Opportunities in Public procument: Short term (present)		
Stakeholders	**Key drivers**	**Barriers**
▪ DMRE ▪ IPPO ▪ Eskom ▪ Municipalities ▪ Developers, IPP, EPC, OEM and O&M companies ▪ Financiers and legal ▪ Energy-intensive users ▪ Industrialists	✓ 20 GW by 2030 (Integrated Resource Plan 2019) ✓ Expected 35 GW decommissioned coal by 2050	- Need for grid infrastructure investment to upgrade the grid - Local governments lack capacity (financial, technical, procurement planning) to leverage opportunity to procure electricity from IPPs - Only municipalities in good financial standing can procure from IPPs - Policy and clarity of procurement rules

Opportunities in Private procument: Short to medium term (1 – 3 years)		
Stakeholders	**Key drivers**	**Barriers**
▪ DMRE ▪ IPPO ▪ Eskom ▪ Municipalities ▪ Developers, IPP, EPC, OEM and O&M companies ▪ Financiers and legal ▪ Energy-intensive users ▪ Industrialists ▪ Local manufacturers	✓ Changes in electricity regulations on new generation capacity ✓ Declining renewable energy prices	- Capital requirements - Wheeling frameworks only developed for a limited number of municipalities

Opportunities in Local manufacturing of renewable energy components and systems: Medium to long term (3 – 10 years)		
Stakeholders	**Key drivers**	**Barriers**
▪ Local manufacturers, OEMs, EPCs ▪ DMRE, IPPO	✓ Local content in bid requirements ✓ International logistical challenges	- Policy uncertainty - Procurement rule changes - Challenging local content requirements - Commercial viability - Market uncertainty

Source: 2023 Large-Scale Renewable Energy Market Intelligence Report

6.1.1.3 The Renewable Energy Independent Power Producer Procurement Program

The introduction of renewable energy in South Africa began with the 2003 White Paper on Renewable Energy. However, a more defined framework emerged with the Integrated Resource Plan (2010 – 2030), established in 2010. Building on this plan, the South African government launched the Renewable Energy independent Power Producer Procurement Programme (REIPPP) in August 2011 to stimulate investment in renewable energy. The development of renewable energy in South Africa, closely linked with the integration of independent power producers (IPPs) into the electricity market, is driven by four major factors.[131]

1. **Government recognition:** The government acknowledges that Eskom lacks the financial and technical capacity to meet the nation's electricity demand and ensure energy security. Thus, in 2003, aimed to source 30% of new power generation capacity from private developers, including renewable energy, coal, and gas.

2. **Cost reduction:** Introducing IPPs and developing renewable energy aims to lower electricity costs. In the short term, IPPs bear the cost and financial risk of new generation capacity. The proposed carbon tax supports the shift to greener technologies.

3. **Climate change mitigation:** Renewable energy technologies are integral to the government's strategies for climate change mitigation and the green economy. These technologies offer clean, low-carbon options to reduce the environmental impact.

4. **Economic development:** The renewable energy industry supports local economic development, targeting the creation of 400,000 new direct jobs by 2030 in green economy sectors, as outlines in the country's New Growth Plan.

The REIPPP procurement program's evaluation process consists of two phases:[132]

1. **In the first pre-qualification stage**, bidders must meet minimum criteria in six areas: financial, technical, commercial, and legal, land, economic development, and environment. Bidders must demonstrate project readiness, financial viability, and arrangements to meet economic development requirements. Additionally, 40% of the project company must be owned by a south Africa entity. Bids meeting these requirements move to the second stage.

2. **In the second stage**, bids are assessed based on weighted criteria: 70% of the price offer and 30% for additional contributions to economic development. The 30 points for economic development are distributed as follows:

    - Job creation (25%)
    - Local content (25%)
    - Ownership 15%)
    - Management control (5%)
    - Preferential procurement (10%)
    - Enterprise development (5%)
    - Socio-economic development (15%).

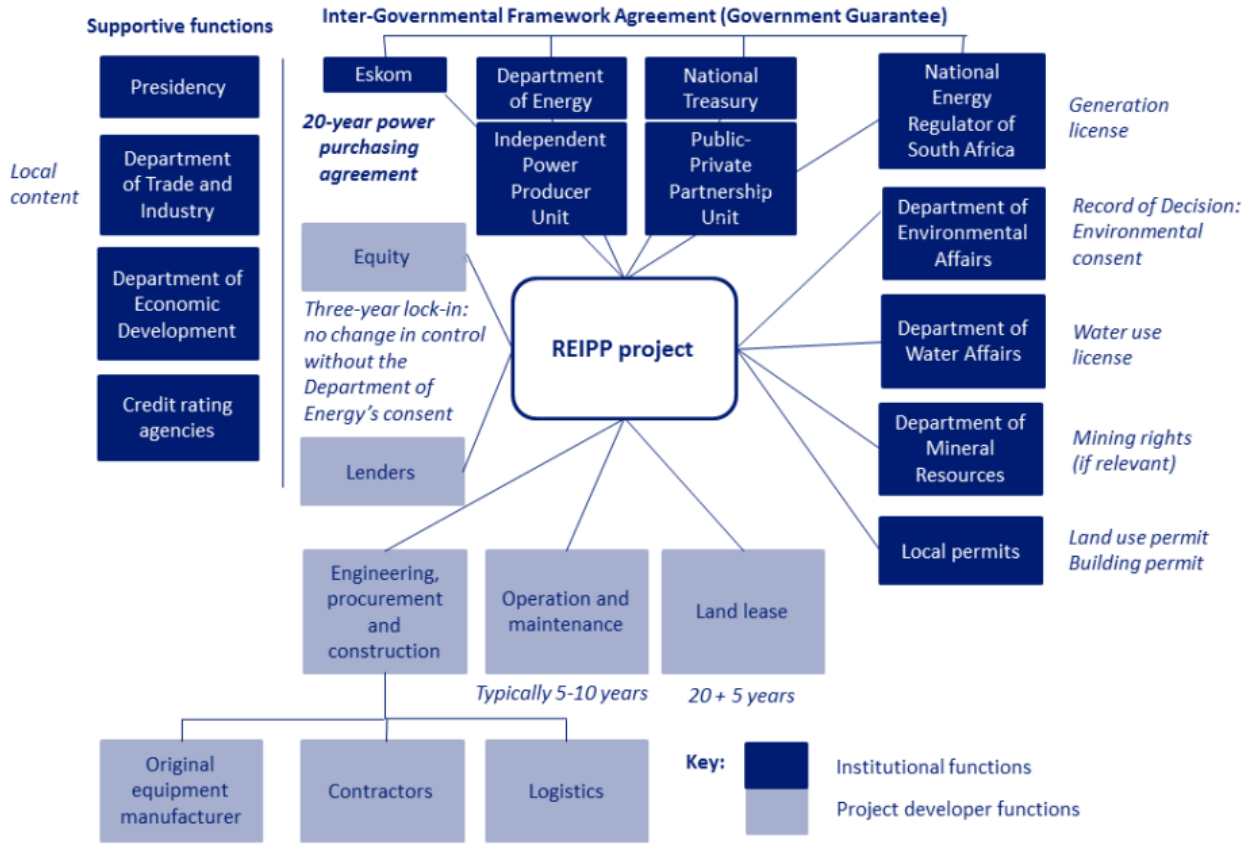
Points are allocated based on reaching targets above minimum thresholds, with a linear relationship determining the total points awarded. This system ensures minimum economic development contributions while encouraging higher targets.

The REIPP procurement programme operates under the oversight of South Africa's Department of Energy. The Department of Energy coordinates with the National Treasury, the Department of Environmental Affairs, and the Department of Trade and Industry to ensure compliance with legal, financial, environmental, and economic policies. The IPPO, a partnership between the Department of Energy, National Treasury, and the Development Bank of Southern Africa (DBSA), manages the bidding process, evaluation, and regulatory standards, promoting transparency and accountability in the procurement process.

[131] Lessons From South Africa's Renewable Energy Regulatory and Procurement Experience, June 2014

[132] Lessons From South Africa's Renewable Energy Regulatory and Procurement Experience, June 2014

Figure 64: Institutional arrangements of the REIPP procurement program



Source: Lessons From South Africa's Renewable Energy Regulatory and Procurement Experience, June 2014

6.1.1.4 Capital Markets in South Africa

In South Africa, renewable energy projects receive funding from a diverse range of sources, with Development Finance Institutions (DFIs) playing a dominant role. DFIs, such as the African Development Bank (AfDB), Industrial Development Corporation (IDC), and the Development Bank of South Africa (DBSA), provide both debt and equity financing, with a strong focus on sustainability and climate finance. These institutions typically offer ticket sizes ranging from R250 million per project (IDC) to smaller amounts under R70 million (DBSA) for early-stage ventures. DFIs remain critical in providing capital to high-risk projects, filling the gap where commercial financing is limited.

In addition to DFIs, private equity firms have become increasingly active in funding renewable energy initiatives. Firms like Metier Sustainable Capital and Inspired Evolution provide substantial equity investments, with ticket sizes exceeding USD 10 million. Private equity investors primarily target larger, scalable projects and focus on long-term returns.

Corporate banks, including Nedbank, Standard Bank, and HSBC, also contribute to the financing landscape, though they often focus on projects with proven business models and lower risk profiles. Their ticket sizes range from R25 million to R5 million, and they typically offer debt financing.

Finally, venture capital players like Persistent Energy Capital and Moshesh Partners provide funding to early-stage renewable energy projects, often with flexible terms suited for innovative, high-growth startups. Their ticket sizes typically range between USD 1.2 million and 2.5 million.

6.1.1.5 Independent Power Producers: Key Players and Funding Evolution

South Africa's Independent Power Producer market has evolved significantly, especially through the REIPPPP. Leading IPPs include Globeleq, African Infrastructure Investment Managers (AIIM), and Broadreach Energy. Initially, funding for IPPs was predominantly sourced from DFIs, which de-risked early-stage projects. However, over time, private equity and institutional investors like Revego Africa Energy and

Actis have entered the market, providing more competitive funding options. This has driven growth in the sector, shifting from early-stage project finance to scaling established renewable energy ventures.

Table 17: Funding sources for renewable energy projects in South Africa

Funding Source	Type	Key Players	Ticket Size	Funding Source
Development Finance Institutions	Debt, Equity	AfDB, IDC, DBSA, IFC	R70M - R250M	Development Finance Institutions
Private Equity	Equity	Metier Sustainable Capital, Inspired Evolution	USD 10M+	Private Equity
Corporate Banks	Debt, Equity	Nedbank, Standard Bank, HSBC	R5M - R25M	Corporate Banks

Source: Greencape Climate Finance Support Database July-2023

This table summarizes the major funding sources available for renewable energy projects in South Africa, highlighting the diversity of options for Independent Power Producers (IPPs) and other project developers. For more detailed table, see Table 49: Overview of funding sources for renewable energy projects in South Africa.

6.1.1.6 Norfund's investments in South Africa

Norfund's renewable energy investments in South Africa operate under the REIPP Procurement Programme framework. This alignment ensures that Norfund's contributions to the renewable energy sector in South Africa adhere to the socio-economic and local ownership mandates of the REIPPP, supporting broad economic development and transformation initiatives within the country.

Norfund has invested in a diverse portfolio of 17 renewable energy projects across South Africa (Table 18), with a total commitment of approximately NOK 2 billion, including from regional/global investments. These projects span various energy technologies including solar, wind, hydro, and biomass, reflecting a broad approach to sustainable energy generation with both environmental and socio-economic benefits.

These investments are made under Norfund's two mandates:

1. **Development Impact Mandate (DIM):** DIM encompasses 13 investments over the period, 8 of which are active and accounting for approximately NOK 1.1 billion of commitment as of Q4 2023.

2. **Climate Impact Mandate (CIM):** CIM encompasses investments totaling around NOK 1.1 billion through four investments that primarily utilize solar and wind technologies, including solar-battery hybrid systems.

Norfund's investments in South Africa primarily align with the CIM, which is part of its broader strategy to support the global transition to net-zero emissions. However, most of the projects executed so far fall under the Development Investment Mandate, reflecting a current emphasis on addressing immediate socio-economic challenges alongside long-term climate goals.

Table 18: Norfund's renewable energy investments in South Africa (2015 – 2023)

Investee	Mandate	Commitment year	Exit year	Committed in South Africa, NOK (as of Q4 2023)
Simacel 155 Pty Ltd	DIM		2018	0
Bronkhorstspruit Biogas Plant	DIM	2011	2022	0
Scatec Solar Kalkbult	DIM	2012	2018	0
Simacel 160 Pty Ltd	DIM	2013	2018	0
Bio2Watt Cape Dairy	DIM	2014		5,680,882
Globeleq	DIM	2014		470,514,915 (regional)
Renewable Energy Holdings	DIM	2014		4,511,608
H1 Upington	DIM	2015	2023	0

Investee	Mandate	Commitment year	Exit year	Committed in South Africa, NOK (as of Q4 2023)
Serengeti Energy	DIM	2017		39,959,923 (regional)
FEI - Facility for Energy Inclusion	DIM	2019		8,180,016 (regional)
Metier Sustainable Capital Fund II	DIM	2019		63,012,693 (regional)
Evolution Fund II (Through KNI)	DIM	2019		32,718,242 (regional)
H1 Capital	CIM	2021		212,745,464
H1 Pele SPV	DIM	2021		488,061,190
H1 EDF NFBII	CIM	2022		172,639,675
H1 Kenhardt	CIM	2022		388,889,600
Pele Green Energy	CIM	2023		363,809,200

Norfund's investment strategies in South Africa are centered on two main approaches:

- **Project Finance:** Norfund provides equity, loans, or convertible loans to support small and mediu-sized projects. This financing is secured by the project's own cash flows and assets, ensuring that the projects are financial self-sustaining and reducing risks to investors.

- **Platform Investment:** Platform companies refers to firms that serve as a foundation or "platform" upon which additonal investments or business activities can be built. These companies typically have a broad reach within their sector, providing a base for further expansion or the introduction of complementary services.

The objectives of these investments are twofold, reflecting Norfund's two mandates, namely DIM and CIM. The objectives of the DIM investments in South Africa are to stimulate socio-economic development by enhancing access to renewable energy, creating jobs, and fostering economic growth in underserved areas. The objectives of the CIM investments in South Africa are to reduce carbon emissions and promote the transition to renewable energy sources. This mandate aims to contribute to the global effort to achieve net-zero emissions by investing large-scale renewable projects and innovative technologies such as solar-battery hybrid systems.

The South African case study evaluates four renewable energy investments:

Table 19: South African case study investments

Investments	Mandate	Technology	Investment Instrument	Investment (NOK)	Status on Investment
Bronkhorstspruit Biogas Plant	DIM	Biogas	Loans equity	25,817,420	Exited, 2022
Stortemelk Hydro	DIM	Hydro	Loans	39,242,017	Exited, 2024
H1 Upington	DIM	Solar	Convertible Loan	192,904,208	Exited, 2023
Klipheuwel Wind Project (under Globeleq)	DIM	Wind	Equity	N/A	Active

6.1.2 Renewable Energy Holdings

In 2013, Norfund provided ZAR 33,3 million (about USD 3.2 million) as a mezzanine loan to Renewable Energy Holdings (REH) Group for part financing of the Stortemelk hydropower plant project which was completed in 2016. This project is part of the South African renewable energy procurement program Round II and has a 20-year government-guaranteed power purchase agreement with Eskom.[133]

REH, 70% owned by the Mertech Group, develops and operates small-scale hydropower plants in Southern Africa. At the time of Norfund's investment, REH had two projects in operation: Merino Hydro – 3.3 MW and Sol Plaatje Hydro – 2.5 MW on the Ash River under the subsidiary of Bethlehem Hydro Ltd. The Ash River uses water from the Lesotho Highlands water scheme – providing much of Gauteng and Johannesburg's water supply.

Table 20: Summary of Stortemelk Hydro Investment

Category	Description
Investee	Renewable Energy Holdings (REH) Group
Project Name	Stortemelk Hydro
Deal Type	Start Up
RE Technology	Hydropower – (Dam hydro) – Independent Power Producer
Location	Clarens, South Africa
Financial instrument	Mezzanine Loan
Investment structure	Mezzanine loan of up to ZAR 34 million at the holding company (sub-ordinated to senior debt at project level) with an interest rate of 13%- and 10-year tenor.
Disbursed amount	NOK 33 816 632 – ZAR 60 mill (ca. 7 MUSD)
Ownership	N/A
CIP date	12.12.2012
Approved date	10.03.2013
Committed date	03.02.2014
Exit Date	April.2024
Mandate	Development Impact Mandate
Greenfield	Yes
AC Seat	No
Board Seat	Yes
Norfund Strategy	To support promising business models in small scale hydropower
Objective (Development Impact)	▪ Expansion of renewable energy power in South Africa. ▪ Demonstration of viability of small-scale hydropower. ▪ Strengthening of a business with ability to expand in this area.
Additionality	Fully funded and additional equity to trigger debt financing

The Stortemelk project is a dam-type hydropower facility with a head of 14 meters and a water flow volume of 30 cubic meters per second. It has a generation capacity of 4.4 MW and is expected to produce 24 GWh of energy annually (priced at MZAR 5.8 per GWh, MZAR 31.4 per MW and ZAR 1.03 per kWh). The project is built to reduce emissions by 24,500 tons per year. The construction of the facility took two years. The total cost is MZAR 138, of which 30% (R54m) is financed through equity and 70% (R126m) through debt. Norfund provided a mezzanine loan for REH's equity share (at corporate level), while Vapotouch (owned by H1 Capital (91%) – a Black Economic Empowerment partner – and Combined Churches in Action (9%) – a Socio-Economic Development partner) has 30% shareholding in REH under Stortemelk Hydro SPV. Rand Merchant Bank provided the loan.

6.1.2.1 Impact and Effectiveness

By providing a mezzanine loan to co-finance the construction of a 4,2 MW hydropower plant, Norfund has supported sustainable business and achieved its development goals. As of May 2024, the plant has been reported to maintain 98% availability, generating 26 GWh per year, avoiding 24,500 tons of CO_2e

[133] D1227 REH note to IC 170426 (ID 235588)

emissions, and with a minimal ecological footprint. Furthermore, the plant secured a 20-year Power Purchase Agreement with Eskom under REIPPP Round II, generating R50 million in annual revenue, paying ZAR 703,490 in corporate income taxes, demonstrating its technical and commercial viability. As of the latest report in 2020, 13 direct jobs were created under operation and maintenance.

Table 21: REH's Development Outcome

Development Objectives	Development Outcomes	
	Planned	Actual
Expansion of renewable energy power in SA		
Renewable MW financed (Greenfield)	4.5 MW	4.2 MW
Tons CO2e avoided annually	-	24,500 tons
Electricity production GWh per year	24 GWh	26 GWh
Nr of households provided with electricity	N/A	N/A

Norfund's investment strengthened REH's ability to expand in the hydropower sector in South Africa. Prior to Norfund's involvement, REH owned two hydropower stations: Merino Hydro (3.3 MW) and Sol Plaatje Hydro (2.5 MW) under Bethlehem Hydro Ltd. However, the company lacked the necessary capital to expand its portfolio and did not receive support from other DFIs. Norfund provided a mezzanine loan, albeit at a high-interest rate, to ensure that REH had sufficient equity to expand its portfolio, attract additional debt financing, and thereby participate in the bidding process for Round II of the REIPPP. Additionally, Norfund appointed a hydropower expert, as a board observer for REH and SN Power staff as operations director to provide technical support for operations and maintenance. This combination of financial and technical support enabled REH to successfully bid for and win projects in both Round II, with the Stortemelk Hydropower Plant, and Round III, with the Boston Hydro (4.4 MW), which is currently under construction.

The investment into Stortemelk hydropower plant aligns with Norfund's Theory of Change (see annex 5,4). The plant, a greenfield grid-connected power, supplies renewable energy, reducing power outages, electricity prices, and energy costs while avoiding GHG emissions. Indirectly, it contributes to business production, job creation and, and tax revenue. It also has the potential to stabilize electricity for MSMEs and improve household access, enhancing study time, security, and social infrastructure. However, measuring the end-use impact is challenging since the offtaker is the utility firm Eskom, making it difficult to assess the direct benefoits to individual consumers and businesses.

6.1.2.1.1 Factors influencing engagement

The implementation of the Stortemelk Hydroplant has been successful, and this success can be attributed to a combination of strategic location, strong financial backing, technology, and environmental considerations, which enabled it to be selected as a preferred bidder in the second round of the renewable energy programme. This project marks REH's third small hydropower project in the country, following the 3MW Sol Plaatje plant commissioned in 2009 and the 4MW Merino plant commissioned in 2010.

The contributing factors are outlined in the following table:

Table 22: Factors influencing the success of the Stortemelk Hydropower Plant

Factors	Description
Strategic Location	The plant's location between Botterkloof Dam and Boston A Dam allowed it to leverage existing water management infrastructure efficiently, particularly the consistent water flow from the Botterkloof Dam, which is supported by the Lesotho Highlands Water Project. This reliable flow is essential for the plant's run-of-river design, which generates electricity using the natural river flow rather than relying on large reservoirs. By utilizing this infrastructure, the Stortemelk plant is able to minimize environmental and social impacts.

Factors	Description
Partnership	The partnership between Norfund, NuPlanet and H1 Holdings was crucial for the success of the Stortemelk Hydropower Plant. Norfund provided essential financial support, while NuPlanet led project development. H1 Holdings and REPP contributed additional funding, and Aurecon and Andritz Hydro supplied technical expertise and equipment.
Technology	The hydro power plant employs a run-of-river hydroelectric system. This technology generates electricity by harnessing the natural flow of the river without the need for large reservoirs, thus minimizing environmental impact. By avoiding the social and environmental issues associated with large dam projects, this method ensures a more sustainable and community-friendly approach to hydroelectric power generation.
Environment	The plant's compact intake structure and run-of-river design maintained a minimal ecological footprint, protecting fish populations and river ecosystems
Financial	Norfund's provision of a 10-year mezzanine loan with a 5-year grace period ensured the necessary capital for construction and start-up costs without immediate repayment pressure. This financial support de-risked the project for other investors and secured its financial viability. Additionally, H1 Capital's investment, facilitated by Norfund, fulfilled the mandatory Black Economic Empowerment requirements, aligning the project with South Africa's socio-economic policies.
Commercial	As the offtaker, ESKOM's demand guarantees a market for the electricity generated by the Stortemelk Hydro Power Plant, ensuring commercial viability and stable revenue for the project. Long-term power purchase agreements with ESKOM provide a secure and predictable income stream.
Regulatory	The hydro power plant benefits from the REIPPP in South Africa, which encourages private investment in renewable energy and the establishment of IPPs. Government support through favorable and competitive policies as well as streamlined permitting processes has created an enabling environment for the project.

6.1.2.1.2 Distributional impacts

Measuring the direct impacts of Norfund's investments on end users is challenging because the power is supplied to Eskom, South Africa's national utility. Additionally, Eskom lacks a targeted strategy to address the specific impacts of load shedding on different demographic groups. However, South Africa's renewable energy program mandates co-investment from Black entrepreneurs under BBBEE policy. As part of this policy, 30% of the equity is allocated to BEE partners under Vapotouch SPV, with 91% owned by H1 Capital and 9% by Combined Churches in Action - a collaborative initiative of local churches that support community welfare and children's care in Clarens, Free State (See Box 5: The Combined Churches in Action).

While allocating about one-third of the equity investment to formerly disadvantaged groups is a positive step towards promoting inclusivity, ensuring that these benefits reach the broader community remains a challenge. One of the key hurdles is the limited pool of eligible Black entrepreneurs in South Africa who possess the necessary financial and technical expertise to fully participate in such investments. Many potential beneficiaries from historically disadvantaged backgrounds may lack access to the financial resources, professional networks, and technical skills needed to engage in large-scale renewable energy projects. This results in a concentration of opportunities among a small group of qualified individuals, leaving a gap in broader community participation.

Female participation in Norfund's investment in REH's Stortemelk hydropower project is limited. As o the latest 2019 report, only 3 out of 14 total jobs (including 11 youth) created were occupied by females, with no female representation in senior management or on the board of directors. Additionally, the distributional impact by race, a crucial socio-economic equity factor in South Africa, is not reported. To enhance equitable distributional impacts, Norfund shall encourage both women and racial inclusivity in employment in its investment activities in South Africa.

Box 5: The Combined Churches in Action

The Combined Churches in Action (CCIA) in Clarens, established in 2002, is dedicated to community development in the townships of Kgubetswana and Kanana. CCIA's mission is to unite local churches in addressing community needs and fostering human potential. Their vision is to facilitate positive change in people's lives through coordinated efforts that leverage the collective resources and compassion of the church community.

Key initiatives by CCIA include the establishment of an Arts Center, which provides structured training in ballet, dance, art classes, and choir practices. Additionally, CCIA has introduced Counselling containers and Play Therapy rooms to address mental health and developmental needs among children. Currently, four trained play therapists provide approximately 400 hours of therapy per quarter to children from three primary schools.

The Stortemelk Hydropower Plant supports CCIA as part of the social and economic development requirements of the REIPPPP. This support enables CCIA to continue its vital services,

6.1.2.1.3 Impacts on corporate governance and/or value of the investee firms

Given that this was a project-level investment, evaluating impacts on corporate governance and the value of the investment firm does not apply. Furthermore, corporate governance is monitored by the Renewable Energy Independent Power Producer Procurement Programme, ensuring adherence to governance standards within the project's operations.

6.1.2.1.4 Unintended developmental, environmental, and social effects

Norfund's investment in the Stortemelk Hydro Power Plant has no reported unintended developmental, environmental, or social effects during the evaluation. The investment in the Stortemelk Hydro Power Plant is designed to be aligned with South Africa's Renewable Energy Independent Power Producer Procurement Programme framework and it is compliant with the environmental, social, and corporate governance standards.

6.1.2.2 Additionality

Norfund's investment in the Stortemelk shows strong additionality, particularly in mobilizing private investment, improving social and environmental standards, and supporting sectors with high development needs. The investment played a crucial role in de-risking the project, facilitating access to long-term financing, and ensuring compliance with stringent ESG standards. However, the investment aligns less with Norfund's traditional focus on the poorest countries and underserved segments, as South Africa is an Upper-Middle-Income Country with relatively better access to capital and credit.

Table 23: Additionality criteria for investing in the Stortemelk Hydropower Plant

Type	#	Additionality factors	Description	Score
Financial	1	**Investing in the poorest countries**	Norfund has a target of investing 33% of its portfolio in LDCs under its Development Impact Mandate; South Africa, although facing capital constraints, does not fall into this category. Thus, this investment does not strongly align with Norfund's focus on the poorest countries.	
	2	**Investing in the most capital constrained markets**	The South African renewable energy market, particularly for smaller hydropower projects, does face capital constraints. Traditional financing avenues often do not adequately support small-scale, innovative energy projects like Stortemelk. Norfund's investment provided essential capital that likely would have been challenging to secure otherwise.	
	3	**Investing in the riskiest markets**	South Africa is not considered one of the riskiest markets globally, but the energy sector does carry inherent risks, including political and regulatory uncertainties.	

Type	#	Additionality factors	Description	Score
	4	**Investing in sectors with high development needs**	South Africa's heavy reliance on coal and the frequent energy shortages makes renewable energy projects like Stortemelk essential for sustainable development.	
	5	**Investing in high-risk instruments**	Norfund's 10-year mezzanine loan, which includes a 5-year grace period, is a structurally subordinated loan, making it a high-risk and highly flexible product. This structure carries significantly more risk than senior debt from local banks. The subordinated position and long grace period increase the financial exposure compared to more secure debt instruments.	
	6	**Targeting underserved segments**	H1 Capital's involvement, supported by Norfund, was critical in meeting BEE compliance and ensuring broad-based economic participation.	
	7	**Mobilizing private investors**	By providing early-stage financing and de-risking the project, Norfund made it more attractive to other investors who might have been reluctant to invest without this backing.	
Value	8	**Taking an active role in investments**	Norfund's role extended beyond financing to active management and oversight of ESG compliance.	
	9	**Improving social and environmental performance**	The project required substantial due diligence and adhered to high ESG standards. Norfund facilitated knowledge sharing and provided business support, including the appointment of a hydropower expert as a board observer. Additionally, technical assistance on O&M was provided by Vigo Mossing, the operations director from SN Power.	
	10	**Supporting enterprise improvements**	Norfund provided support for enterprise improvements, including enhancing local capacities through H1 Capital's involvement.	

6.1.2.3 Sustainability

The outcomes of Norfund's investment in the Stortemelk Hydropower Plant are likely to continue due to the REIPPPP framework, coupled with technical support, regulatory compliance, community engagement, and financial viability, which ensure that the project remains viable and beneficial for South Africa's energy infrastructure and socio-economic development goals.

The following table shows the ex-ante conditions for sustainability areated in the design of the investment:

Table 24 : Ex-Ante Conditions created in the design of Stortemelk for Sustainability

Sustainability Factors	Ex-ante Conditios	Positives	Negatives	Score
Commercial	Secure a long-term PPA to ensure stable revenue and reliable energy production, despite potential high costs.	✓ Long-term Power Purchase Agreement with Eskom and stable energy production ensure commercial viability, though the project was expensive. ✓ Connected to the national grid via a dedicated 10km 22KV interconnection. ✓ Consistent energy production due to regulated river flow.	- High cost of energy due to REIPPPP ceiling tariff. - Dependency on Eskom's financial health	High
Financial	Ensure robust financial planning with a focus on high availability and cost-effective operations	✓ The plant's financial sustainability is robust, supported by consistent revenue from the PPA and strong operational performance.	- Financial health tied to Eskom and broader economic conditions in South Africa - Lack of business interruption insurance,	High

Sustainability Factors	Ex-ante Conditios	Positives	Negatives	Score
	to secure consistent revenue.	✓ Operates in a financially robust market with the possibility of secondary market liquidation and exit.	leading to unrecoverable revenue losses during downtimes, threatening the project's financial stability and overall viability	
Technical	Use high-quality equipment and proven technology to ensure reliable performance and plan for maintenance needs.	✓ High load factor and reliable performance with nearly 100% plant availability, using high-quality equipment - from Andritz Hydro and Indar Electrical for the plant's turbine, generator, and switchgear - informed by lessons from previous projects. ✓ Effective O&M routines established.	- N/A	High
Environmental	Implement a run-of-river design to minimize environmental impact and preserve biodiversity.	Minimal environmental footprint using existing infrastructure. ✓ Preservation of local biodiversity.	- Minor disruptions to local activities such as wild water rafting due to changes in water flow	High
Social	Ensure the project has minimal social disruption, focuses on local job creation, and fulfills community obligations.	✓ No resettlement required. ✓ Job creation during construction and operation phases. ✓ Ongoing community benefits.	- Limited direct community engagement beyond meeting regulatory obligations	High
Governance and Compliance	Establish strong governance structures with thorough due diligence	✓ Governance was robust with strong due diligence ✓ Adherence to high ESG standards. ✓ Board observer role ensured governance oversight.	- N/A	

Source: NS Energy and Hydropower Sustainability ESG Gap Analysis Tool

6.1.2.4 Mandate, positioning and operationalization

Mandate and operationalization

Norfund's investment in Stortemelk aligns with its mandate by creating jobs, supporting local economies, providing strategic financing, and promoting environmental sustainability through CO2 reduction and renewable energy projects like Stortemelk Hydropower Plant, ensuring adherence to developmental, economic, and environmental priorities**.**

Table 25: Alignment between Norfund's investment in Renewable Energy Holdings and its mandate

Priorities	Mandate	Alignment (Positive)	Score
Developmental	To promote sustainable development by creating jobs and supporting local economies.	✓ Generates 4.5 MW of clean energy, contributing to renewable energy generation ✓ Created approximately 30 jobs during construction and supports local economic development through infrastructure improvements. ✓ Supports local community development through job creation and ongoing socio-economic programs, aligning with Norfund's goals to foster viable, profitable activities that have positive impact on local communities.	

Priorities	Mandate	Alignment (Positive)	Score
Economic	To enhance economic growth by addressing financing gaps, stabilizing investment environments, and attracting private sector investments.	✓ Provided a 10-year mezzanine loan with a 5-year grace period in a high-risk market, stabilizing investment environment, and attracting private investment. ✓ Contributes to South Africa's economic goals by enhancing energy security.	
Environmental	Prioritize investments in projects that reduce greenhouse gas emissions and promote environmental sustainability.	✓ Expected to reduce CO2 emissions by approximately 18,000 tons annually. ✓ The 4,3 MW run-of-river plant has been recognized for its sustainability, receiving awards for its architecture and environmental performance. The plan has excelled in meeting 10 ESG performance criteria.[134]	

Coherence

There is no overarching Norwegian strategy in South Africa's energy sector. Norwegian development aid organizations are not active in South Africa's renewable energy sector. Norwegian private companies (such as Scatec, Aker Horizons, Magnora, and Norsk Renewables, operating directly or through subsidiaries like Mainstream Renewable Power, Africa Green Ventures, and Valinor) - operate independently within the South African market, focusing on various renewable energy technologies, including solar and wind.

Private companies are generally less willing to take on significant risks, preferring stable and profitable ventures. In contrast, **Norfund** provides risk capital and equity investments to promote sustainability and economic growth in high-risk areas. This approach enables projects to attract private sector investment by mitigating perceived risks. Additionally, Norfund addresses financing gaps and stabilizes the investment environment, thereby facilitating further private investments.

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6.1.3 Bronkhorstspruit Biogas Plant

Bronkhorstspruit Biogas Plant is a 4.6 MW waste-to-energy project in South Africa developed by Bio2Watt. The project utilizes biomass wasters in the Gauteng area in a small-scale power plant and sells power to the BMW factory by wheeling over the local municipal and ESKOM networks. Norfund provided preferred equity and shareholder loans to part fund the construction of the business and has subsequently provided additional loans for working capital and additional capital expenditure purposes. The plant became operational in 2015.

Table 26: Summary of Bronkhorstspruit Biogas Plant

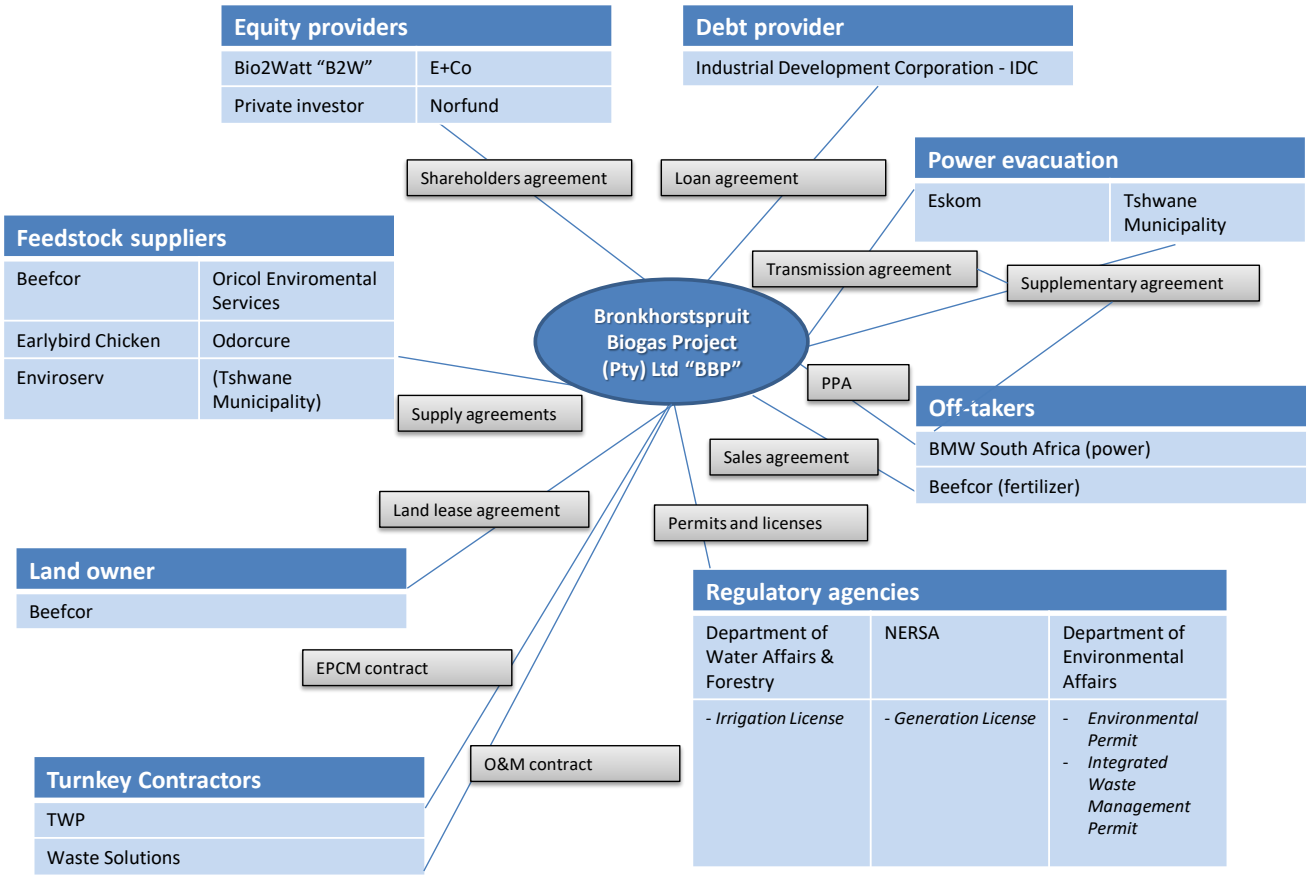
Category	Description
Investee	Bronkhorstspruit Biogas Project (Pty) Ltd
Project Name	Bronkhorstspruit Biogas Plant
Deal Type	Start Up
RE Technology	Biogas
Location	Bronkhorstspruit, South Africa
Financial instrument	Equity and shareholder loans
Investment structure	Mezzanine instrument with equity rights and a preferential fixed return
Disbursed amount	NOK 15 686 793
Ownership	11,40 %
CIP date	13.10.2011
Approved date	30.04.2013
Committed date	27.09.2013
Exit Date	27.05. 2022
Mandate	Development Impact Mandate
Greenfield	Yes
AC Seat	No
Board Seat	Yes
Norfund Strategy	To support promising business models in line with Norfund's renewable energy strategy and complements Norfund's existing renewable energy portfolio
Objective (Development Impact)	▪ Contributing to add competitively and predictably priced base load power to an important South African manufacturing business. ▪ Pioneering commercial scale biogas, an established technology with great potential and demonstration effect in Africa, as well as wheeling and private off-take model. ▪ Relatively labour intensive with substantial environmental benefits in terms of sustainable waste management and reduced CO2-emissions. ▪ BBBEE majority owned. ▪
Additionality	To allow the project to be fully funded and additional equity to trigger debt financing

Summary of contractual arrangements

The figure below presents the contractual arrangements in graphical form. Essentially these include:

- Finance: Both debt and equity
- Feedstock supply and land lease from local companies
- Off-take: Both access to the network and sales of products
- Construction contracts and O&M support

Figure 65: Contractual arrangements[135]



Source: Bio2Watt Clearance in Principle

6.1.3.1 Impact and Effectiveness

Norfund's investment in the Bronkhorstspruit biogas plant, through Bio2Watt, did not achieve the expected development outcomes. The project's intended goals – supporting BMW South Africa's expansion through commercially viable and competitively priced waste-to-energy technology and thereby creating 3,000 jobs – did not materialize due to technical failures that undermined the plant's financial viability.

Table 27: Bronkhorstspruit Biogas Plant Development Outcomes

Development Objectives	Development Outcomes	
	Planned	Actual
Expansion of renewable energy power in SA		
Renewable MW financed (Greenfield)	5 MW	4.6 MW
Electricity production GWh	-	100 GWh since inception
Tons CO2e avoided annually	-	8037,34 tons
Nr of households provided with electricity	N/A	N/A
Total jobs created as of 2017	15-20 permanent jobs	23

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The following figure illustrates the contractual arrangement of the Bronkhorstspruit Biogas Plant; however, it is important to note that the illustration is not the final structure and does not include all shareholders.

The 20-year PPA with BMW with a fixed tariff 15% higher than the Tshwane tariff, with escalations capped at the Consumer Price Index (CPI). This approach was expected to result in a more competitive tariff over time, as electricity prices were anticipated to increased significantly above CPI, aligning with BMW's expectations for cost-effective waste-to-energy. However, Eskom's tariffs did not increase as expected, leaving the PPA unfavourable to BMW and prompting the need for renegotiation. As a result, the biogas plant's energy remained more expensive and uncompetitive, leading to revenue shortfalls. Combined with existing technical issues, these financial challenges, along with the other shareholders' unwillingness to invest further, forced Norfund to exit the investment at a loss.

6.1.3.1.1 Factors influencing engagement

The Bronkhorstspruit Biogas Plant faced significant challenges due to the inexperienced EPC contractor, whose cost-cutting measures and lack of expertise led to poor construction quality and suboptimal operation. Despite strong financial support from Norfund and a strategic location, the plant operated at a fraction of its intended capacity, compromising its environmental and commercial goals. The overall performance of the plant was severely impacted by these factors, and the final scoring reflects the gap between the plant's potential and its actual outcomes.

Table 28: Factors influencing the success of the Bronkhorstspruit Biogas Plant

Factors	Description	Score
Partnership	The partnership between Norfund and Bio2Watt was strategic and aligned with broader goals of promoting renewable energy and empowering black businesses in South Africa. However, the choice of an inexperienced EPC contractor, by Bio2Watt led to significant challenges. This partnership highlights the potential for economic empowerment and renewable energy development but also underscores the risks of inexperienced in critical project roles.	
Regulatory	The plant operates within a supportive regulatory framework that encourages renewable energy projects.	
Strategic Location	The strategic location provides access to abundant agricultural waste, though the initial feedstock was not optimal. Over time, it was replaced with higher-quality feedstock to improve biogas production, ensuring a more reliable and efficient supply of organic material.	
Technical	The technology chosen for the Bronkhorstspruit Biogas Plant was appropriate for large-scale biogas production, but its execution was hindered by multiple factors. The Engineering, Procurement, and Construction (EPC) contractor, lacked experience in biogas projects and cut costs through value engineering, leading to compromised construction quality and the plant operating at only 25-30% capacity. The EPC contractor also managed O&M, but their inexperience in the sector further hindered performance, with availability remaining low. Operational setbacks stemmed from design defects and poor O&M contractors. Although another operator later took over O&M and increased availability to 50%, this improvement was insufficient. A 2019 incident, where cleaning foam damaged critical components, exacerbated operational challenges and increased financial strain.	
Financial	Norfund's financial backing was strong, but the plant's underperformance resulted in poor returns. The 2019 incident, where cleaning foam damaged critical components, further increased costs, and financial strain. Despite the initial investment, low availability meant the plant couldn't generate enough revenue to cover operational costs. Additionally, apart from Norfund, the other shareholders lacked the ability or willingness to fund the project's turnaround. As a minority investor, Norfund did not have the mandate to single-handedly restructure the investment, limiting its ability to address the financial challenges.	

Factors	Description	Score
Commercial	The plant's commercial viability was compromised by its operational inefficiencies, making it difficult to meet client demands and achieve financial sustainability.	
Environment	The plant was intended to mitigate up to 48,000 tons of CO2-equivalent emissions annually. However, due to its low operational capacity, it could only achieve a fraction of this target.	

6.1.3.1.2 Distributional impacts of Norfund's investments

The distribution impacts of Norfund's investment in the Bronkhorstspruit biogas plant are limited across gender; however, the plant's compliance with the REIPPPP requirements make it inclusive of diversity – a key socio-economic equity factor in South Africa. As of the latest 2018 report, the BBP created 25 direct jobs, with women occupying only two positions, indicating a significant gender disparity in employment. This highlights a need for more gender-inclusive practices within the project.

The investment in Bio2Watt, a black-owned business, supports South Africa's Black Economic Empowerment program, promoting entrepreneurship and the inclusion of historically disadvantaged groups in the economy. Additionally, the BBP engages in community development initiatives that benefits a broader demographic, including training programs for local students in engineering and support for youth education in Kanana.

Box 6: Distributional Impact of BBP

The Kanana informal settlement, located in Bronkhorstspruit, is home to about 3,000 people and lacks basic infrastructure, including access to electricity and clean water. The local youth face challenges accessing job opportunities due to a lack of skills. In response, a partnership between Knowledge Pele, Bio2Watt Energy Holdings, and Climate Investor Two launched the Renewable Energy Technologies (RET) skills program in August 2022. This initiative was tailored to equip local youth with essential skills in solar photovoltaic (PV) system design and installation, directly addressing the community's needs.

Key efforts include training three students from Kanana in engineering disciplines, providing a solar system to charge community phones, and involving 22 community members in a two-year, SETA-accredited solar PV training course. Out of these participants, 12 are on track to receive certification as PV technicians. Additionally, the program supports an aftercare initiative for children in grades 1-7, offering educational assistance and warm meals to keep them off the streets and reduce crime.

6.1.3.1.3 Impacts on corporate governance and/or value of the investee firms

Norfund's impact on corporate governance at Bronkhorstspruit Biogas Project (Pty) Ltd or Bio2Watt is limited, despite having a board seat. This is primarily due to the strong regulatory framework of South Africa's REIPPPP, which mandates strict governance standards, including transparency, accountability, and stakeholder engagement reflected in the annual reporting. These standards dictate the governance practices of renewable energy companies, leaving little room for external investors like Norfund to significantly alter corporate governance. Instead, Norfund's role is more about ensuring compliance with these pre-established standards, rather than shaping governance directly.

6.1.3.1.4 Unintended consequences

Norfund's investment in the Bronkhorstspruit Biogas Plant encountered significant technical and operational challenges, resulting in shortcomings in achieving its financial and environmental objectives. Financial instability due to business interruption and operational shortcomings limited the project's ability to provide sustainable economic benefits and achieve expected financial returns. The environmental goals of processing organic waste and reducing greenhouse gas emissions were not fully met due to the plant's reduced operational capacity and incidents like the 2019 membrane damage. Consequently, Norfund's discounted sale of its share to Climate Fund Managers underscored these issues.

However, the project was first of its kind in South Africa for using organic waste on this scale and the first to wheel power over distribution networks to sell directly to an industrial customer.

6.1.3.2 Additionality

Norfund's investment in the Bronkhorstspruit Biogas Plant demonstrated substantial additionality, both financially and developmentally. The investment played a crucial role in a capital-constrained and high-risk market, providing the foundation needed to secure further financing and advance the project. From a development perspective, the project contributed to environmental sustainability and promoted the circular economy, despite encountering significant operational challenges. Norfund's active involvement extended beyond financial support, although these efforts could not fully overcome all the project's risks and difficulties.

Table 29: Additionality Criteria for investing in the Bronkhorstspruit Biogas Plant

Type	#	Additionality factors	Description	Score
Financial	1	**Investing in the poorest countries**	Norfund has a target of investing 33% of its portfolio in LDCs under its Development Impact Mandate; South Africa, although facing capital constraints, does not fall into this category. Thus, this investment does not strongly align with Norfund's focus on the poorest countries.	
	2	**Investing in the most capital constrained markets**	The renewable energy sector in South Africa, especially biogas, is capital constrained. Norfund's equity investment was critical in establishing a solid equity base, enabling the project to attract necessary debt financing. This reduced the project's risk profile, which was crucial in a market where capital was hesitant.	
	3	**Investing in the riskiest markets**	South Africa is not considered one of the riskiest markets globally, but the energy sector does carry inherent risks, including political and regulatory uncertainties.	
	4	**Investing in sectors with high development needs**	Addressed energy shortages and waste management issues by investing in biogas, contributing to the circular economy, and reducing methane emissions.	
	5	**Investing in high-risk instruments**	Largest equity investor, a high-risk position necessary to attract other investors and secure project viability.	
	6	**Targeting underserved segments**	The investment targeted the biogas sector, an underserved segment within renewable energy in South Africa, aiming to demonstrate viability and attract further investments.	
	7	**Mobilizing private investors**	Norfund's role reduced risk, attracting additional private and public capital, though the extent of mobilization (additional investment required at later stage) was limited by project challenges.	
Value	8	**Taking an active role in investments**	Active involvement by appointing specialists and aligning interests, though operational challenges persisted.	
	9	**Improving social and environmental performance**	Yes, waste management and supporting community and farmers	
	10	**Supporting enterprise improvements**	Supported a black-owned business in a critical sector, but operational issues limited the full potential of these improvements.	

6.1.3.3 Sustainability

The outcomes of Norfund's investment in the Bronkhorstspruit Biogas Plant would likely not continue without the strategic investment by CFM, which purchased the plant at a discount and is now working to improve its operational performance and long-term viability. Although the project

incorporated key sustainability elements such as anaerobic digestion technology, diversified feedstock, cost-efficient financial models, and policy alignment in its design, technical issues resulting from value engineering led to the plant's technical and financial underperformance, ultimately culminating in an operational failure. Following the 2019 incident, key investors, including Norfund, were reluctant to continue funding a project that was both technically and financially underperforming. However, CFM's acquisition of the plant and its plans to expand and enhance operations have increased the likelihood of the project's outcomes continuing and achieving long-term sustainability.

The ex-ante conditions for sustainability in the Bronkhorstspruit Biogas Plant investment focused on key elements: technical, environmental, and financial aspects, all aligned with national policies. The design centered on anaerobic digestion technology to convert organic waste into biogas, capturing methane for energy production and environmental sustainability. It included a wheeling model[136] to reduce costs and ensure financial stability, supported by South African government policies and REIPPPP, which favor waste-to-energy initiatives. Additionally, the BBP aimed to reduce greenhouse gas emissions and support local communities through job creation and philanthropy. However, cost-cutting through value engineering undermined these sustainability elements, leading to compromised technical design, operational inefficiencies, frequent breakdowns, and financial underperformance, all further exacerbated by the absence of a Maintenance Reserve Account for essential repairs and maintenance.

The table below evaluates BBP's sustainability by outlining key commercial, financial, technical, and environmental factors, highlighting both strengths and weaknesses in the design.

Table 30: BBP Ex-ante Sustainability Condition Factors

Sustainability Factors	Positives	Negatives	Score
Commercial	✓ A power purchase agreement with a creditworthy private sector entity (BMW) as the offtaker, showing interest in plant expansion. ✓ Using the same entity for EPC and O&M, requiring it to have a stake in the investment, aligning its interest with the investment outcome. ✓ Aligns with South Africa's policies on waste-to-energy projects, with regulatory support.	- Insufficient professional liability insurance, inadequate warranty and maintenance obligations, and a weak balance sheet of the EPC. These factors compromised the EPC's ability to cover design errors, ensure long-term efficiency, and manage financial risks, jeopardizing overall project success	High
Financial	✓ Favorable financial terms, incl. a 20-year PPA with BMW featuring a fixed tariff 15% higher than the Tshwane tariff and linked to the CPI. ✓ Operates in a financially robust market with the possibility of secondary market liquidation and exit.	- Lack of business interruption insurance, leading to unrecoverable revenue losses during downtimes, threatening the project's financial stability and overall viability - Absence of a Maintenance Reserve Account compromised long-term financial planning, putting the plant at risk	Medium
Technical	✓ Utilizes anaerobic digestion technology to convert organic waste into biogas, ensuring a steady supply of feedstock (cattle manure, food, beer, and dairy waste). ✓ Utilizes a wheeling model to cut costs by leveraging ESKOM's and the municipality's existing grid infrastructure.	- Use of less experienced EPC and O&M contractors led to frequent breakdowns and inefficiencies. - Value engineering led to compromised quality and increased operational costs due to frequent repairs. - Issues with maintaining consistent production levels affected revenue stability.	Low

[136] In renewable energy, a "**wheeling model**" refers to the process of transporting electricity from a generator to a distant end-user via an existing grid, typically owned by a utility company. The generator pays a fee to use the grid, enabling direct power sales to consumers or businesses, regardless of distance.

Sustainability Factors	Positives	Negatives	Score
Environmental	✓ The plant captures methane and reduces greenhouse gas emissions by processing organic waste. ✓ Helps in managing waste by diverting organic waste from landfills. ✓ Generates renewable energy, contributing to the reduction of fossil fuel dependence.	N/A	High
Community support	✓ Supports local communities through job creation and philanthropy	N/A	High

Under the management of Climate Fund Managers (CFM), BBP is being restored and expanded, enhancing its long-term sustainability. CFM has committed $38.5 million through its Climate Investor One and Two funds to increase the plant's capacity from 4.8 MW to 9.8 MW and resolve previous technical and operational issues. Upgrades include repairs to the digestor tank heating system, membranes, pumps, and the fire suppression system, along with improvements in construction quality and adjustments to the feedstock mix.

A new power purchase agreement (PPA) with BMW has been signed to offtake the additional power, ensuring a stable revenue stream and highlighting the potential commercial and financial viability of the plant. The plant is expected to process 240,000 tons of organic waste annually and reduce 48,000 tons of CO_2 emissions, aligning with South Africa's Low Emission Development Strategy. However, the sustainability of these environmental and financial outcomes depends on the long-term effectiveness of the current upgrades and the plant's ability to maintain consistent performance.

6.1.3.4 Mandate, positioning and operationalization

Norfund's investment in the Bronkhorstspruit Biogas Plant demonstrates strong alignment with its developmental, environmental, and economic priorities. The project created employment, supported black economic empowerment, contributed to substantial CO_2 emissions reductions, and established a stable financial model through innovative business practices.

The following table and the scores reflect Norfund's effective alignment with its mandate, supported by concrete data on job creation, environmental impact, and economic sustainability

Table 31: Alignment between Norfund's investment in Bronkhorstspruit Biogas Plant and its mandate

Priorities	Mandate	Alignment (Positive)	Score
Developmental	To promote sustainable development by creating jobs and supporting local economies.	✓ Norfund's investment aligns with its developmental mandate by fostering local economic development, job creation, and supporting black economic empowerment in South Africa. The investment in BBP created over 120 permanent jobs and supports indirect jobs in waste management. It also promotes black economic empowerment by investing in Bio2Watt, a black-owned business.	
Economic	To enhance economic growth by addressing financing gaps, stabilizing investment environments, and attracting private sector investments.	✓ Norfund's investment effectively supports economic sustainability by fostering renewable energy production and reducing reliance on fossil fuels.	
Environmental	Prioritize investments in projects that reduce greenhouse gas emissions and promote environmental sustainability.	✓ The project strongly supports Norfund's environmental goals by addressing critical issues like waste management and emissions reduction. The BBP reduces greenhouse gas emissions by converting organic waste into biogas, capturing methane, and reducing landfill use. The plant is expected to process	

Priorities	Mandate	Alignment (Positive)	Score
		large amounts of waste sustainably, aiming to mitigate 48,000 tons of CO2 emissions annually under CFM's management. ✓ The 4,3 MW run-of-river plant has been recognized for its sustainability, receiving awards for its architecture and environmental performance. The plan has excelled in meeting 10 ESG performance criteria.[137]	

Coherence

Norwegian development aid organizations are not active in South africa's renewable energy sector. Norwegian private energy companies like Scatec, Aker Horizons, Magnora, and Norsk Renewables operate directly or through subsidiaries such as Mainstream Renewable Power, Africa Green Ventures, and Valinor. These companies do not collaborate with Norfund because their strategies do not align, and they are competitors, each focusing on expanding their own market share and capacity independently.

Norfund provides risk capital and equity investements to enhance sustainability and economic growth, playing a crucial role in high-risk areas where private capital is hesitant to invest. By providing necessary funding and risk mitigation, Norfund enables projects that later attract private sector investment once perceived risks are reduced.

Norfund's investment strategy focuses on addressing financing gaps and taking on higher-risk investments to promote sustainable development. It lays the groundwork for private sector companies by stabilizing the investment environment, facilitating subsequent private investments. In contrast, Norwegian private companies typically engage in projects with mitigated risks, leveraging the stable environments created by DFIs such as Norfund. However, Norfund and Scatec collaborated on the Upington solar project, demonstrating synergy in renewable energy investments. While Norfund stabilizes high-risk environments, private companies like Scatec scale operations in established markets, focusing on scalable and profitable ventures.

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6.1.4 H1 Upington

The projects Norfund invested in consist of three separate utility-scale solar PV plants: – Sirius, DK1 and DK2 with an installed capacity of 86 MWp each that Scatec developed and constructed under bid window 4 of the REIPPPP. The three PV plants are co-located on adjacent land 25 km southwest of Upington in the Northern Cape Province and evacuate power to the national grid. The projects have 20-year inflation-adjusted PPAs with Eskom on a take-or-pay basis – at a tariff of 0.999 ZAR/kWh at financial close – and supported by a government guarantee, as well as Implementation Agreements with the Department of Energy specifying the compliance and community development obligations.

The reason for bidding three separate projects from the same area was the 75 MW limit stipulated by Bid Window Four. Scatec invited Norfund's participation to meet the qualification criteria (net asset test). Norfund invested in the projects through an offshore structure – Scatec Solar South Africa BV (SSSA), owned by Scatec 70% and Norfund 30% – that enabled Scatec to consolidate the investments and therefore qualify.

The construction of the projects cost 1,890 MZAR and started commercial operation in early 2020. They were the first projects under the REIPPPP that were built as a cluster and that used bi-facial modules on single axis trackers. In 2022, once the PV plants were fully operational and further value creation was limited, Norfund decided to divest from the projects, in order to recycle the capital. Following a competitive process, Norfund sold its stake in SSSA, as well as its outstanding BEE loans, to Stanlib (a leading South African asset manager) in 2023 for an amount of 414 MZAR. Scatec followed suit and also sold its shareholding to Stanlib at the same time but remained involved with the project as O&M contractor.

Project structure

The three projects were funded mostly by loans (78%) that can only be repaid from the projects themselves, not from the company's other assets (non-recourse basis), with senior debt being provided by Standard Bank (350 MUSD over 17 years at an average all-in interest rate of 11.55%, DSCR of 1.3) and the Development Bank of Southern Africa (DBSA – 350 MUSD over 17 years at an average all-in interest rate of 11.55%, DSCR of 1.3). Equity was shared between SSSA (60%), BEE partner H1 (35%) and a community trust for each project (5%). The BEE and community trust equity was financed by SSSA via interest bearing loans. SSSA was equally invested in the three individual project SPVs and enabled them to reach financial close.

Figure 66: Shareholder structure

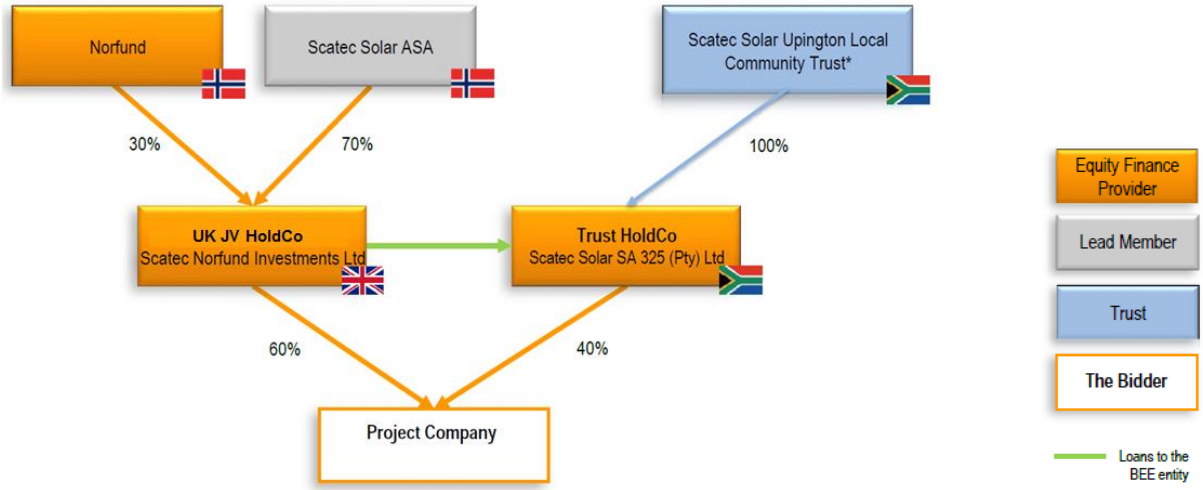


Table 32: Project Information Sheet

Category	Description
Investee	*Scatec Norfund Investment Limited (*SNIL)
Project Name	H1 Upington
Deal Type	Start Up
RE Technology	Solar
Offtaker	Eskom
Location	Upington, Northern Cape, SA
Financial instrument	Equity, loan, guarantee
Investment structure	Standard Bank provided non-recourse debt financing for 84% (79% senior and 5% sub-debt) of project costs. The remaining 15% equity funding requirement is split 60/40 between the SNIL and a local BBBEE shareholding through a local Community Trust HoldCo. The Scatec / Norfund JV investment vehicle (SNIL) had 60% equity ownership of the projects. The remaining 40% will be owned by local black empowerment trusts but financed by SNIL via interest bearing loans. Norfund will invest ZAR 280m for its 30% share in SNIL's funding commitment and provide a corporate guarantee undertaking to Standard Bank for this funding commitment. Norfund will provide corporate undertakings to Standard Bank on a joint and several basis with Scatec for ZAR 260m for a fee of 5% p.a.
Disbursed amount	85 566 356 (ZAR 280m)
Ownership	*30% of Scatec Norfund Investment Limited (*SNIL)
CIP date	-
Approved date	29.08.2016
Committed date	13.08.2015
Exit Date	31.05.2023
Mandate	Development Impact Mandate
Greenfield	Yes
AC Seat	No
Board Seat	Yes
Norfund Strategy	The investments are in line with Norfund's overall renewable energy strategy to invest with Norwegian partners in developing countries.
Objective (Development Impact)	- Increase electricity supply in South Africa - Jobs and technology transfers during construction and operation.
Additionality	- Norfund is playing a key role in helping turn Scatec Solar into a pan-African industrial solar PV player. - BEE financing

6.1.4.1 Impact and Effectiveness

Norfund's investment in the H1 Upington solar project achieved key outcomes, including increased electricity supply, job creation, and technology transfer during construction and operation, while meeting financial returns. The project has an installed capacity of 86 MW and a contracted capacity of 75 MW, with plant availability between 97-99%. Seasonal variations result in 50-60 MW output in winter and 75 MW in summer. This aligns with South Africa's decarbonization and load-shedding mitigation efforts. However, the investment case was based on a P50 yield of 648 GWh per year. In 2021, performance was closer to the P75 level, and by mid-2022, it approached the P90 level, indicating consistent underperformance relative to initial estimates. This raises concerns about the accuracy of forecasts and operational efficiency, which could impact the project's long-term financial sustainability.

Table 33: H1 Upington solar plant performance

	2020			2021			June 2022		
	Budget	Actual	Diff.	Budget	Actual	Diff.	Budget	Actual	Diff.
Production (MWh)	520,87	526,82	5,957	654	626,04	-27,96	307,58	286,14	-21,434
Revenue (ZARk)	520,97	551,22	30,253	713,9	706,47	-7,427	344,1	322,56	-21,542

In terms of local impact, the project employed local sub-contractors during construction, facilitating technology and skills transfer. Scatec's operations team is entirely South African, with over 90% recruited locally, ensuring ongoing employment and skill development. Vocational training and an internship program further enhance local employability.

The project also meets South Africa's renewable energy program requirements, with 35% ownership by BEE partners and 5% by community trusts. This structure supports socio-economic development and aligns with government priorities.

Table 34: H1 Upington Development Outcomes

Development Objectives	Development Outcomes (2022)	
	Planned	Actual
Expansion of renewable energy power in SA		
Renewable MW financed (Greenfield)	*86 MW*	*86 MW*
Electricity production GWh per year	*650 GWh*	*593 GWh*
Tons CO2e avoided annually	*xxx tons*	*634 639 tons*
Nr of households provided with electricity	*N/A*	*N/A*
Total jobs created as of 2017	*-*	*134*

Source: 240410 – Reporting template, MW financed and avoided emissions 2023

Box 7: Understanding P-Values in renewable energy

The terms **P50**, **P75**, and **P90** are commonly used in the context of energy production forecasting, particularly in renewable energy projects such as solar and wind power. These terms refer to different probability levels that estimate how much energy a project is expected to generate over a given period (typically a year).

- **P50:** 50% chance of achieving at least this energy yield—most likely scenario.
- **P75:** 75% chance of achieving at least this energy yield—more conservative estimate.
- **P90:** 90% chance of achieving at least this energy yield—most conservative estimate, often used for risk-averse decision-making.

Each of these P-levels helps stakeholders understand the range of possible outcomes for a project and manage expectations accordingly.

Key Differences and Implications

- **Risk and Uncertainty:** As ones move from P50 to P90, the estimates reflect increasing levels of certainty and decreasing levels of risk. P50 represents a balance point (most likely outcome), P75 adds a margin of safety, and P90 reflects a scenario with the least risk but also the lowest expected yield.
- **Financial Planning:** Investors and project developers use these different P-levels to assess risk. For example, a project that only meets its P90 estimate might still be financially viable but would generate lower-than-expected returns. In contrast, meeting or exceeding the P50 estimate would likely result in higher returns.
- **Decision-Making:** The choice of which P-level to use in decision-making depends on the risk tolerance of the stakeholders involved. For instance, a bank providing a loan might base its decision on P90 to minimize the risk of underperformance, while a developer might focus on P50 for a more optimistic view of potential returns.

6.1.4.1.1 Factors influencing engagement

The execution of the H1 Upington solar project has been successful and this success can be attributed to regulatory, commercial, financial, technological, and environmental factors.

Table 35: Factors influencing the success of the H1 Upington Solar Project

Factors	Description
Partnership	Norfund's partnership with Scatec and H1 was a key. Norfund financial backing and Scatec's technical expertise as well as H1's local ownership role made it the investment possible.
Regulatory	The Dyason's Klip I and II (H1 Upington) solar power plant benefits from the REIPPP in South Africa, which encourages private investment in renewable energy and the establishment of IPPs. Government support through favorable and competitive policies as well as streamlined permitting processes has created an enabling environment for the project.
Commercial	As the offtaker, Eskom's demand guarantees a market for the electricity generated by Dyason's Klip I and II solar power plants, ensuring commercial viability and stable revenue for the project. Long-term power purchase agreements (PPAs) with Eskom provide a secure and predictable income stream.
Financial	The project was financed with a mix of equity and debt, with senior debt provided by institutions such as Standard Bank and the Development Bank of Southern Africa (DBSA). This financial structure ensured that the project had the necessary support to cover construction and start-up costs while securing a stable revenue stream before loan repayments began.

Factors	Description
Technology	The solar power plants employ advanced photovoltaic (PV) technology, including bi-facial modules on single-axis trackers, which increases efficiency by maximizing energy capture from the sun. This technology leverages the high solar irradiance in the Upington area, making it a sustainable and efficient method of energy generation.
Environment	The location near Upington is ideal due to its high solar irradiance, providing consistent and reliable conditions for solar energy generation. The geographical features of the site make it an excellent location for solar PV plants, ensuring the necessary natural resources are available while minimizing environmental disruption.

6.1.4.1.2 The distributional impacts (i.e. impacts across diverse groups of people) of Norfund's investments

Measuring the direct impact of Norfund's investments on end users is challenging, as power from the H1 Upington solar project supplies Eskom, which does not target specific demographic groups in its load-shedding strategy. Local regulations mandate a percentage of local ownership, with H1 Holdings, a Black Economic Empowerment (BEE) investor, holding 35% of the project, and 5% allocated to community trusts. This 40% ownership by formerly disadvantaged groups under BBBEE policy is financed by loans from Scatec and Norfund. This structure secures substantial local ownership, which encourages Black entrepreneurship and local community acceptance, fostering economic empowerment and aligning with national goals of reducing inequality and promoting inclusive growth.

Female participation in the H1 Upington solar project is limited, and the distributional impact by race, a key socio-economic equity factor in South Africa, is not reported. As of the latest 2020 report, the construction phase employed 492 workers, of whom 51 were female (approximately 10.4%). Among the three senior managers, only one was female. In the O&M phase, 42 out of 135 employees were women, representing about 31%. The board of directors consists of four members, none of whom are female. To enhance equitable outcomes, Norfund could either prioritize gender and racial inclusivity in its employment practices within its South African investments or improve its reporting on these factors.

Box 8: Community support of H1 Upington solar project

Scatec, adhering to South Africa's REIPPPP, allocates a portion of the H1 Upington solar project's revenue to community development, with Veers Group as the implementer. Specifically, 0.6% of the project's revenue is directed toward Enterprise Development, aimed at supporting local businesses through training and capital grants. Additionally, 1.5% is allocated to Socio-Economic Development, focusing on initiatives in education and healthcare in collaboration with local government departments. These efforts also involve commitments to job creation, demographic diversity in hiring, and prioritizing local suppliers. These programs are reviewed quarterly, with annual adjustments based on revenue fluctuations to ensure ongoing alignment with community needs.

A specific example of these initiatives is the support provided to the Ubunele Primitive Co-operative, a Black women-run business. The Veers Group, as the implementing partner, has facilitated Ubunele's expansion into areas such as producing masks during the COVID-19 pandemic and supplying eco-friendly sanitary products to students. While this support addresses immediate needs, it prompts critical reflection on whether such targeted interventions sufficiently advance broader goals of gender and

6.1.4.1.3 Impacts on corporate governance and/or value of the investee firms

This is a project-level investment; therefore, evaluating impacts on corporate governance and the overall value of the investment firm is not applicable. Furthermore, corporate governance rules in South Africa are part of the Renewable Energy Independent Power Producer Procurement Programme, with 30% of the selection criteria weighed on governance during the procurement process. As such, strict adherence to governance standards within the project's operations is part of the program's requirements.

In Q2 2022, Norfund initiated an exit process and hired Ikarus Capital as advisors. Four qualified bidders—Stanlib (via its subsidiary Greenstreet 1 Proprietary Ltd), Revego, Gaia, and AIIM—were invited to submit non-binding offers. Norfund reports that all bidders were local South African investors with existing investments in the South African renewable energy sector. **Following Norfund's exit approval report,**

Stanlib was chosen due to a perceived lower closing risk compared to the other bidders. Stanlib provided certainty of funds, had previous engagements with Norfund, and promised a smoother process with Scatec.

Stanlib has offered to acquire 100% of Norfund's interest in Scatec Solar South Africa BV, and outstanding loans to Scatec Solar SA 325 proprietary limited, comprising Norfund's entire economic interest in the project companies Sirius Solar PV Project One (RF) Proprietary Limited; Dyason's Klip 1 (RF) Proprietary Limited; and Dyason's Klip 2 (RF) Proprietary Limited. The purchase price was anticipated to be R370 million on a cash-free basis based on a locked box date of 31 December 2021 with a ticking fee of 10%. The expected completion payment assuming closing 31 March 2022 is estimated below with final expected results of 2-3% price movement.

Table 36: Completion values (MZAR)

	ZARm	Comment
Asset value	370,0	Stanlib's offer price
Cash as per 31 December 2021	37,7	NWC position as of 31/12/2021
Notified Leakage	(27.2)	Estimated distributions from Jan 2022 to closing
Ticking fee:	47,4	Over period 1/1/2022 - 31/3/23
Transaction costs:	(13,9)	Advisor, legal, technical, VDR fees
Completion Payment (31/3/23)	**414,0**	

Source: *Scatec Upington Exit final approval (ID 383004)*

6.1.4.2 Additionality

Norfund's involvement in the H1 Upington solar project was both financially and developmentally additional, addressing gaps that private and non-DFI investors could not fill. At the time of the 2014 bid round for renewable energy projects in South Africa, the investment landscape for large-scale renewable energy projects was challenging.[138] The REIPPPP had attracted significant interest from private investors, but the scale and capital requirements of certain projects, like those undertaken by Scatec, exceeded what could be managed by a single private entity. Scatec indicated that without Norfund's participation, they would have been unable to meet the qualification criteria required by the South African government, particularly the net asset test,[139] which was crucial for moving forward with the projects.

Norfund's investment also had significant development impacts. By financing the BEE Trusts' equity participation, Norfund facilitated local ownership, aligning with South Africa's objectives of promoting economic inclusion and addressing historical inequalities. This support also contributed to building local capacity and ensuring broader community involvement, particularly among historically disadvantaged groups. Table 37 highlights Norfund's financial and developmental additionality in H1 Upington Solar project.

Table 37:Additionality Criteria for investing in the H1 Upington Solar Project

Type	#	Additionality factors	Description	Score
Financial	1	**Investing in the poorest countries**	South Africa, although facing capital constraints, does not fall into LDC category. Thus, this investment does not strongly align with Norfund's focus on the poorest countries.	
	2	**Investing in the most capital constrained markets**	The renewable energy sector in South Africa during the 2014 bid round was highly capital constrained with limited private sector appetite for large-scale investments like Upington. Norfund's capital was crucial.	

[138] Review of the South Africa Renewable Energy IPP Process, May 2014

[139] The **"net asset test"** is a financial assessment used to evaluate a company's financial health by determining whether its total assets exceed its total liabilities. It essentially measures the net worth of a company.

Type	#	Additionality factors	Description	Score
	3	**Investing in the riskiest markets**	South Africa is not considered one of the riskiest markets globally, but the energy sector does carry inherent risks, including political and regulatory uncertainties.	
	4	**Investing in sectors with high development needs**	The energy sector in South Africa, dominated by coal, required diversification. Investing in renewable energy was critical for environmental sustainability and meeting the country's energy needs. Norfund's investment directly addressed this need.	
	5	**Investing in high-risk instruments**	Norfund's involvement was crucial, providing long-tenor financing, equity contributions, and guarantees that were essential for the project's success. Their financial support, including project development funding and loans to BEE Trusts, enabled the Upington Solar Complex to move forward by offering necessary local currency financing, long-term investment security, and risk mitigation unavailable from the private sector.	
	6	**Targeting underserved segments**	At the time, the Independent Power Producer sector and solar technology were underserved in South Africa. Norfund's investment supported the growth of these sectors.	
	7	**Mobilizing private investors**	Norfund played an important role in helping Scatec meet the stringent qualification criteria set by the South African government, which were essential for advancing the project. For example, Norfund supported the project in meeting its equity requirement, securing debt from a private bank and providing loans to BEE Trusts, thereby involving local communities in the ownership structure.	
Value	8	**Taking an active role in investments**	Norfund took an active role in the investments, but the value added was limited since Scatec was already an established company.	
	9	**Improving social and environmental performance**	The investment does improve social and environmental, although this	
	10	**Supporting enterprise improvements**	Norfund's investments have played a key role in transforming Scatec Solar into a pan-African industrial solar PV player. The Scatec-Norfund joint venture aimed to build a portfolio of assets providing a solid cash flow as a basis for growth and new investment in other renewable energy initiatives across Africa. The divestment from the Upington projects, to recycle capital, has enabled Scatec to invest in larger projects, such as the Kenhardt PV+BESS projects (540 MW PV + 1100 MW storage), which is currently the largest facility of its kind on the African continent. This strategic move supports the expansion and scaling of renewable energy infrastructure across Africa.	

Table 38: Renewable IPPPP - Bid Window 4 Preferred Bidders

Project Name	Contracted Capacity	Fully Indexed Price (R/ MWh)	Partially Indexed Price (R/ MWh)	% of Portion Indexed	ED Score (out of 30)
Aggeneys Solar Project	40 MW	R 777	1073	33%	16,96
Bokamoso	67,90 MW	857	1283	20%	17,81
De Wildt	50 MW	870	1314	20%	17,88
Droogfontein 2 Solar	75 MW	833	1282	20%	17,69
Dyason's Klip 1	75 MW	772	1182	20%	21,52
Dyason's Klip 2	75 MW	776	1193	20%	21,46
Greefspan PV Power Plant No. 2 Solar Park	55 MW	835	1298	20%	17,69

Konkoonsies II Solar Facility	75 MW	786	1087	35%	18,10
Sirius Solar PV Project I	75 MW	771	1169	20%	21,65
Solar Capital Orange	75 MW	830	1255	20%	13,13
Waterloo Solar Park	75 MW	859	1296	20%	18,20
Zeerust	75 MW	860	1281	20%	17,97

Source: IPP Projects

6.1.4.3 Sustainability

The H1 Upington Solar complex was designed with several ex-ante conditions to ensure sustainability, focusing on mitigating commercial, financial, technical, environmental, and community risks. While the investment was well-structured, particularly in its financial and environmental aspects, some weaknesses, such as the reliance on Eskom and potential social tensions, required careful ongoing management to maintain sustainability. Overall, the project scores highly across all categories, reflecting a well-considered and balanced approach to sustainability.

Table 39: BBP Ex-ante Sustainability Condition Factors

Sustainability Factors	Positives	Negatives	Score
Regulatory	✓ Stable regulatory environment provided by the REIPPPP, with strong government support and clear policies.	- Regulatory changes or shifts in government policy could introduce new risks, though current frameworks are strong.	High
Commercial	✓ Strong market demand for renewable energy in South Africa, supported by government policies like the REIPPPP. ✓ The project has a long-term Power Purchase Agreement (PPA) with Eskom, ensuring stable demand and predictable revenue.	- Dependence on Eskom as the offtaker posed significant commercial risks due to its financial instability, impacting the reliability of PPAs.	High
Financial	✓ The financial structure includes a mix of equity and debt, supported by institutions like Standard Bank and DBSA.	- Reliance on Eskom, which faces financial instability, poses a significant commercial risk to the project's revenue.	High
Technical	✓ The project employs advanced PV technology, including bi-facial modules on single-axis trackers, and uses local sub-contractors for construction and maintenance.	- Complex technology requires specialized maintenance, potentially increasing operational risks if not managed effectively. But Scatec has well trained O&M team.	High
Environmental	✓ The plant complies with stringent environmental regulations and uses sustainable solar technology, which minimizes environmental impact. The high solar irradiance in Upington supports efficient energy generation, reducing environmental risk.	- Potential for unforeseen environmental impacts, such as land degradation, which is monitored on ongoing basis. .	High
Community support	✓ Strong community involvement through BEE Trusts and local ownership provided socio-economic benefits and aligned with South Africa's objectives of economic inclusion.	- N/A	High

6.1.4.4 Mandate, positioning and operationalization

Norfund's investment in Dyason's Klip I and II align with Norfund's mandate, which includes sustainable development, enhancing economic growth, and prioritizing environmental sustainability.

Table 40: Alignment between Norfund's investment in H1 Upington and its mandate

Priorities	Mandate	Alignment	Score
Developmental	To promote sustainable development by creating jobs and supporting local economies.	Norfund's investment in Dyason's Klip I and II created jobs through the use of local sub-contractors for construction, operation, and maintenance. It also promoted local economic development by involving community trusts and Black-owned businesses, ensuring socio-economic benefits and skill transfer within the local community.	
Economic	To enhance economic growth by addressing financing gaps, stabilizing investment environments, and attracting private sector investments.	The investment addressed financing gaps by providing essential capital and securing long-term PPAs with Eskom, which stabilized the investment environment. It also attracted private sector investments by involving H1 Capital, a Black-owned investment firm, thereby promoting economic growth and compliance with BBEEE regulations.	
Environmental	Prioritize investments in projects that reduce greenhouse gas emissions and promote environmental sustainability.	The solar PV park added 258 MWp of clean energy capacity to the grid, reducing greenhouse gas emissions. The project is expected to cut emissions by approximately 300,000 tons of CO2 annually. The use of advanced PV technology and the strategic location in Upington, with high solar irradiance, ensured efficient and sustainable energy generation, aligning with environmental sustainability goals.	

Coherence

Norway lacks a unified strategy for South Africa's energy sector, and no Norwegian development aid organizations are active in its renewable energy sector. Norfund's investment and Scatec's involvement in Dyasons Klip I and II Solar PV Park show complementarity with minimal substitutability.

- **Complementarity**: Scatec develops, builds, operates, and maintains renewable energy projects but faces financial limitations and risk constraints. By collaborating with Norfund, Scatec leverages Norfund's financial resources and risk tolerance to undertake larger and riskier projects. Norfund provides essential capital and technical support, ensuring project viability and attracting additional investment from local Development Finance Institutions like the Industrial Development Corporation. This partnership also ensures compliance with South Africa's Broad-Based Black Economic Empowerment (BBEEE) policy by including H1 Capital as a stakeholder.

- **Substitutability**: **Scatec and Norfund are two different entities with distinct roles, expertise, and missions; therefore, they are not substitutable.**

  Scatec's role and expertise include specializing in developing, building, operating, and maintaining renewable energy projects. Their technical capabilities and operational experience ensure efficient project execution and long-term sustainability. Norfund, on the other hand, provides financial support and strategic investments in renewable energy projects. Their expertise includes mitigating financial risks, offering technical support through board advisors and technical experts, and ensuring compliance with socio-economic policies like BBEEE.

6.1.5 Globeleq

This case study examines Norfund's investment into platform company Globeleq, but also assesses the impacts and sustainability of the investment at asset level for the Klipheuwel wind farm.

Globeleq was established in 2002 by CDC Group (now BII), the UK government's development finance institution, as a platform to develop, own, and operate power projects in Africa. In 2009, CDC sold Globeleq to the Actis Infrastructure Fund II, a fund managed by Actis, a pan-emerging market investor. In 2015, Actis divested its stake in Globeleq, transferring the ownership to a new entity jointly owned by Norfund, the Norwegian investment fund for developing countries, and CDC[140]. Norfund acquired a 30% stake in Globeleq for approximately US$225 million, while CDC, which already held a majority indirect investment through the Actis fund, transferred its interest into the new joint venture with Norfund.

The rationale for Norfund's investment into Globeleq is to partner with an industrial player that has a strong presence in Africa to achieve its goals of improving energy generation. The aim is to develop and implement up to 1,000 MW of greenfield projects.[141] Initially, the focus was on gas-fired projects; however, Globeleq has since pivoted towards renewable energy.

Globeleq's portfolio currently (2023) contains 16 active operating assets, and two under construction. Of these 18 projects, 14 are brownfield assets through acquisition by current shareholders, Norfund and BII, and four are greenfield assets.

Table 41: Globeleq's Portfolio as of 2022

Type/Nr of investment	Energy Source		Technology	Nr of projects	Status	Installed capacity	Under construction	Actual production (GWh) in 2022	Avoided GHG emissions (2022)
Brownfield (14)	Clean energy	Renewable Energy	Solar	9	Active	351		538	496 323
			Wind	2		165		463	495 040
		Natural Gas	Natural Gas	3	Active	1 119		6 375	0
	Fossil Fuel	Heavy Fuel Oil	Heavy Fuel Oil	1	Active	88		170	0
Greenfield (4)	Clean energy	Renewable Energy	Solar	2	Active	71		114	65 626
			Geothermal	1	Under Construction		35		
		Natural Gas	Natural Gas	1	Under Construction	0	450	0	0

This portfolio consists of a total installed capacity of 1,794 MW operating assets and 485 MW under construction. The total actual production in 2023 was 7,028 GWh, and the avoided GHG emissions were 991,616 tons.The projects are spread across many African countries:

Table 42: Geographical distribution of Globeleq's investments

Countries	Capacity installed (MW)	Percentage
Cameroon	304	13 %
Côte d'Ivoire	713	31 %
Egypt	91	4 %
Kenya	87	4 %
Mozambique	510	22 %
South Africa	384	17 %
Tanzania	190	8 %
Total	2 279	100 %

Klipheuwel Wind Farm

In the context of Globeleq's platform strategy, the acquisition of Brookfield's South African renewable energy assets, including the Klipheuwel Wind Farm, represents a strategic step to

[140] Later renamed British International Investment (BII)

[141] Investment Committee, Final Approval, November 2014

strengthen its position in the country's renewable energy market. Globeleq's purchase of Brookfield's shareholding in the 11-MW Aries, 11-MW Konkoonsies, 31-MW Soutpan photovoltaic (PV) parks, 66-MW Boshof Solar Park as well as the 27-MW Klipheuwel Wind Farm, aligns with its broader objective of expanding its operational footprint and enhancing its energy generation capacity across diverse technologies.

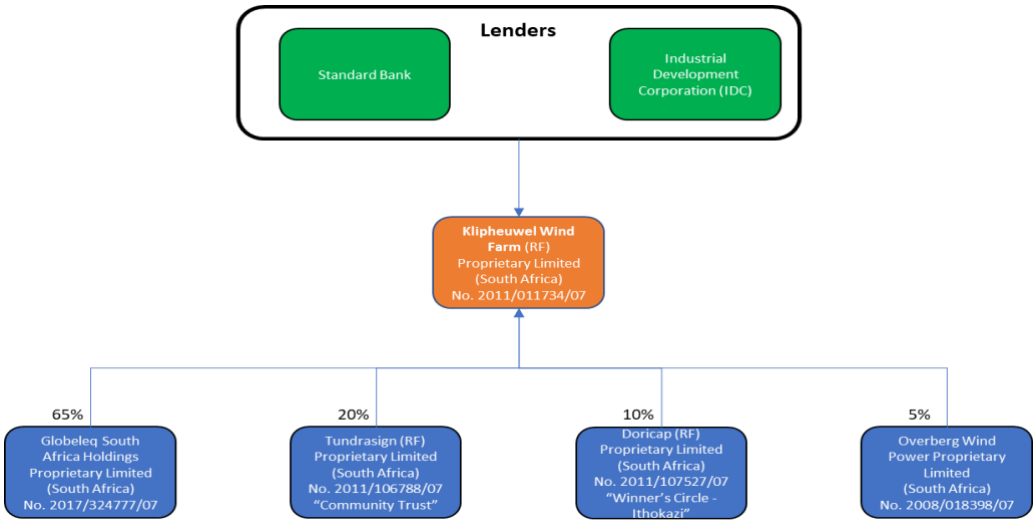
The 27 MW Klipheuwel Wind Farm ('Klipheuwel') covers an area of about 350 hectares and is located 5 km west of Caledon in the Overberg region of the Western Cape, in the Theewaterskloof Local Municipality. The wind farm comprises of nine Sinovel SL3000/113 wind turbine generators – each with a rated power output of 3 MW, a rotor diameter of 113.3m and a hub height of 90m – that generate approximately 86 GWh of electricity per year which is sufficient to power more than 19 000 average South African homes. The power is evacuated into Eskom's 66 kV network on the power line between Houwhoek and Caledon. The project has a 20-year Power Purchase Agreement (PPA) with Eskom – at a set ZAR tariff that is adjusted annually for inflation, which offsets the exchange rate risk – as well as an Implementation Agreement with the Department of Energy that specifies the compliance and community development obligations.

Table 43: Klipheuwel project details

Project	Technology	Status	Capacity installed (MW)	Actual production in 2022 (GWh)	Actual production in 2022 (MWh)	Efficiency Rate	Avoided GHG emissions
Klipheuwel	Wind	Active	27	71,31	71 310	30,15 %	76 317

The Klipheuwel wind plant operates under Klipheuwel Wind Farm (RF) Proprietary Limited, owned by Globeleq and supported by both national and international stakeholders. Globeleq acquired the Klipheuwel plant in 2019 as part of an asset portfolio from Brookfield, together with 5Finland PV plants. Globeleq provides engineering and technical management oversight, while a third-party operator handles day-to-day operations. In compliance with REIPPP requirements, 20% of the project company is held by Tundrasign Proprietary Limited. Tundrasign is in turn owned by three trusts . The other two shareholders are Overberg Wind Power Proprietary Limited (5%) and Doricap Proprietary Limited (10%).The offtaker is Eskom, the South African electricity public utility. Together, these parties constitute the key stakeholders of the Klipheuwel wind farm.

Table 44: Klipheuwel Wind Farm Proprietary Limited Farm Stakeholder Structure



6.1.5.1 Impact and Effectiveness

Norfund's investment in Globeleq is progressing as planned, meeting the goals set by the final investment committee. The key objective was to increase energy generation in Africa by developing up to 1,000 MW of new projects, initially focusing on gas-fired plants. Since Norfund's investment into Globeleq,

the platform has added 1 087 MW to its portfolio, including two gas-fired power plants (Azito IV with 253 MW and Temane with 450 MW) and 11 renewable energy projects (nine solar projects with a combined capacity of 322 MW, one wind project with 27 MW, and one geothermal project with 35 MW). Four of these new assets are pure greenfield developments with a combined capacity of 556 MW (51%), Azito IV was a brownfield development with 253 MW (23%), and eight were acquisitions with a combined capacity of 278 MW (26%).

The greenfield projects include the Cuamba solar plant in Mozambique with 19 MWp installed which was commissioned in September 2023; the Malindi solar project in Kenya with 52 MWp, which produced 100 GWh in 2023 and avoided 44,278 metric tons of GHG emissions; the Menegai geothermal project in Kenya with 35 MW under construction; and the Temane natural gas project in Mozambique with 450 MW under construction.

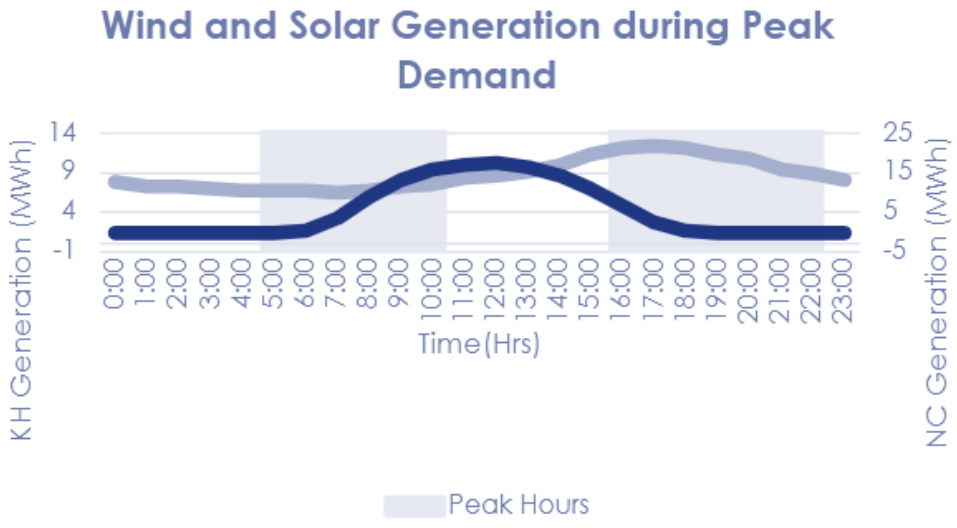
Table 45: Globeleq's Non-acquisition investment projects (Development outcome)

Project name	Capacity installed (MW)	Capacity under construction	Technology	Country	Actual production (GWh) 2023	Avoided GHG emissions	Avoided GHG emissions from Greenfield RE
Azito IV	253		Natural Gas	Côte d'Ivoire			
Cuamba	19		Solar	Mozambique	n/a	n/a	n/a
Malindi	52		Solar	Kenya	100	44,278	44,278
Menengai		35	Geothermal	Kenya	n/a	n/a	n/a
Temane		450	Natural Gas	Mozambique	n/a	n/a	n/a

Globeleq's investment in Klipheuwel Wind Farm (RF) Proprietary Limited addresses South Africa's generation capacity shortfall by producing an average of 86 GWh of electricity annually. This output reduces the reliance on fossil fuels and avoids 76,317 tons of greenhouse gas emissions each year. The energy profile of the plant is valuable to the national system, as 32% of its energy is generated during peak demand, helping to stabilize the grid and reducing reliance on more costly peaker plants.

Additionally, the wind farm generates revenue that supports community development and black economic empowerment (BEE) initiatives. This aligns with broader socio-economic goals while contributing to the energy sector's financial sustainability, especially as Eskom's tariffs gradually increase to reflect the true cost of service.

Figure 67: Wind and Solar complementarity profiles



During the critical peak demand hours, Klipheuwel Wind Farm generates 32% of its total energy generation, compared to 12% for a typical Northen Cape Solar park.

6.1.5.1.1 Factors influencing engagement

Norfund's achievement of adding over 1,000 MW of energy capacity through its investment in Globeleq was enabled by four key factors:

1. **The Partnership**: The acquisition of Globeleq was key to reaching the 1,000 MW target, as its expertise in energy development across Africa provided a solid foundation for new projects. Norfund leveraged Globeleq's experience in project management, construction, and operations for efficient project rollouts. The partnership with BII was also crucial, with BII contributing capital, experience, and local expertise in African infrastructure and renewable energy. By combining Norfund's risk capital and BII's long-term investment focus, the partnership accelerated project implementation and strengthened the development of a robust project pipeline.

2. **Acquisition of Projects**: In addition to greenfield developments, the acquisition of existing projects played a key role. Norfund, through Globeleq, expanded its portfolio by acquiring projects that were already in advanced stages or operational. These acquisitions included solar and wind projects, which helped accelerate capacity expansion and contributed to the overall energy production portfolio.

3. **Demand for Gas Projects**: The demand for reliable energy in Africa, particularly gas-fired power plants, was a crucial factor. Gas projects like the Temane and Azito IV plants addressed the need for consistent baseload power. These plants played a major role in increasing Globeleq's energy capacity, with gas being seen as a transition fuel that complements renewable energy sources. The growing need for gas-fired plants in Côte d'Ivoire and Mozambique created the right conditions for these developments.

4. **Brownfield Expansion – Azito IV**: The expansion of the Azito gas-fired plant in Côte d'Ivoire, which added 253 MW to Globeleq's portfolio, was a significant component of the overall capacity growth. The Azito plant had been operational since 1999, and the expansion (Azito Phase IV) involved adding a new combined-cycle turbine that increased the plant's total capacity to approximately 710 MW. This brownfield expansion was critical in helping meet local energy demands while also contributing significantly to Globeleq's overall portfolio growth.

These factors combined to enable Norfund and Globeleq to meet their 1,000 MW capacity target, contributing to energy security and addressing electricity shortages in various African markets.

6.1.5.1.2 The distributional impacts (i.e. impacts across diverse groups of people) of Norfund's investments

The offtaker of the power produced by Klipheuwel Wind Farm is Eskom, which makes the direct measurement of distributional impacts on the end-users or beneficiaries challenging. However, this report examines the broader stakeholders and assesses how Norfund's investment in this platform impacts the wider stakeholders both directly and indirectly. Globeleq reports that it operates 2 corporate offices and employs 83 individuals across 5 provinces in South Africa. 94% of its workforce is South African, with employee engagement score of 7.9/10. Gender diversity is a priority, with 32% of senior management positions held by women and 44% of the entire workforce being female. Globeleq reports that supported indirectly 1,502 jobs through power-enabled activities and invested R31.9 million in economic development. Additionally, the company has reached 33,300 people through educational programs. Globeleq South Africa operates under the REIPPPP framework, which mandates compliance with its rules and regulations, including fulfilling enterprise development and socio-economic development requirements. These initiatives benefit the community by fostering local businesses, creating jobs, and supporting social programs, ultimately contributing to the economic growth and improved quality of life for the community. The following box illustrates Globeleq's engagement.

Box 9: Community Ownership and Financial Benefits

The Klipheuwel Wind Farm includes community trust ownership, providing 20% of the equity. This ownership structure ensures financial benefits through Enterprise Development (ED) and Socio-Economic Development (SED) contributions, allocating 0.25% and 0.34% of revenue, respectively.

Globeleq manages ED and SED programs benefiting local communities within a 50 km radius, including Genadendal, Caledon, Botriver, Grabouw, Hermanus, Kleinmond, Riviersonderend, Tesselaarsdal, and Villiersdorp.

Enterprise Development Initiatives

The ED program focuses on local economic access, exemplified by providing a 100kVA backup generator to a Botriver fruit packaging business, ensuring continuous operation during load shedding. Globeleq also partners with Standard Bank and the Theewaterskloof Local Municipality to support SMEs through a business competition offering registration costs and equipment.

Socio-Economic Development Initiatives

Under the SED program, Globeleq funds Elgin Community College to train 11 early childhood development practitioners and upgrade three ECD centers. The training is accredited by the Sector Education & Training Authority (SETA), enabling employability and eligibility for government subsidies for registered ECD centers.

6.1.5.1.3 Impacts on corporate governance and/or value of the investee firms

Corporate Governance

As a 30% shareholder in Globeleq, Norfund plays an active role in decision-making. According to Norfund, the shareholders' agreement gives Norfund a level of involvement closer to a joint venture (JV), with strategic decisions being shaped by a collaborative approach. The board is structured to include non-shareholder employees, with an independent chair, ensuring balanced governance and decision-making across shareholders.

Globeleq's operational model has shifted from managing individual assets to a platform management model that consolidates resources like engineering, finance, and administration to improve operational efficiency. Recent upgrades to the ERP system have also enhanced Globeleq's focus on maintenance management, alongside finance and HR functions. Additionally, the restructuring of corporate offices, now split between London and Cape Town, reflects a regionally focused and cost-efficient operational model. Senior management and key operational staff are increasingly based in South Africa, aligning the company closer to its operational priorities.

Impact of the investee firm

In 2015, ACTIS sold its stake in Globeleq Africa to a consortium of Norfund and CDC Group (now British International Investment, BII), with Norfund acquiring a 30% stake for approximately $225 million. The strategic goal of this partnership was to provide capital and enable Globeleq to engage in early-stage project development, supporting the growth of MW capacity across Africa's power sector. By leveraging the expertise of a professional team and offering patient capital, Norfund and BII aimed to foster the development of energy projects that could be implemented successfully, helping create a "proof of concept" for other developers to replicate and accelerate the energy transition.

This strategy was broader than just financial returns, focusing on enabling the growth and implementation of renewable energy projects to contribute meaningfully to Africa's energy needs. While recent market conditions—such as rising inflation and interest rates—have affected investor appetite and the viability of certain projects, Globeleq has continued to expand its portfolio. For example, in South

Africa, Globeleq added 146 MW through the acquisition of six renewable energy assets, aligning with its decarbonization goals and efforts to reduce load shedding.

The challenges presented by shifting market conditions have influenced not only asset valuations but also the overall ability to bring projects to financial close. Nonetheless, Norfund's involvement has aimed to support long-term growth by empowering early-stage project development, thus enabling other developers to follow suit and implement similar projects based on lessons learned and successful structures.

In recent years, Globeleq successfully refinanced six of its eight South African renewable energy assets, including De Aar, Droogfontein, and Jeffreys Bay in August 2021, the Soutpan solar plant in January 2022, and Aries and Konkoonsies in January 2024. This refinancing reduced the cost of debt, leading to lower wholesale electricity prices from the plants. The restructuring also created a more efficient capital structure, allowing for the release of funds that shareholders could reinvest in the power sector. Additionally, it accelerated equity distributions to the communities and BEE shareholders, supporting local economic development and participation.

6.1.5.2 Additionality

At the time of the investment, the REIPPPP was newly established. The renewable energy sector was perceived as risky by private investors and financial institutions, with limited collateral and guarantees.

Table 46: Additionality Criteria for Investing into Globeleq

Type	#	Additionality factors	Description	Score
Financial	1	**Investing in the poorest countries**	Norfund typically focuses on LDCs; South Africa, although facing capital constraints, does not fall into this category. Thus, this investment does not strongly align with Norfund's focus on the poorest countries.	
	2	**Investing in the most capital constrained markets**	The renewable energy sector in South Africa was highly capital constrained with limited private sector appetite for large-scale investments. Norfund's capital was crucial.	
	3	**Investing in the riskiest markets**	South Africa is not considered one of the riskiest markets globally, but the energy sector does carry inherent risks, including political and regulatory uncertainties.	
	4	**Investing in sectors with high development needs**	The energy sector in South Africa, dominated by coal, required diversification. Investing in renewable energy was critical for environmental sustainability and meeting the country's energy needs. Norfund's investment directly addressed this need.	
	5	**Investing in high-risk instruments**	Norfund invested Equity in Globeleq	
	6	**Targeting underserved segments**	At the time, the Independent Power Producer sector and wind technology were underserved in South Africa. Norfund's investment supported the growth of these sectors.	
	7	**Mobilizing private investors**	The investment was made on platform level and the plant was acquired. No mobilizing factor.	
Value	8	**Taking an active role in investments**	Norfund is actively engaged in the investment, but is a minority shareholder.	

Type	#	Additionality factors	Description	Score
	9	**Improving social and environmental performance**	Klipheuwel Wind Farm was an acquisition rather than a new development, limiting Norfund's additionality. As a result, Norfund's social and environmental contributions are minimal.	
	10	**Supporting enterprise improvements**	No major improvement of Globeleq as this was already an established platform.	

Globeleq has expanded its South African portfolio by acquiring six renewable energy assets, adding 146 MW of capacity. These assets not only contribute to decarbonization efforts but also help alleviate load shedding issues in the region.

Norfund's renewable energy investments have aimed to drive sustainable development, but they have also resulted in some unintended effects. These include:

1. **Developmental Effects:** To meet REIPPPP's local ownership requirements, Globeleq has partnered with former Eskom employees and other local stakeholders. While this leverages industry expertise and fulfills regulations, it may limit opportunities for a wider range of local businesses, reducing diversity in stakeholder engagement.

2. **Social Effects:** The reliance on former Eskom employees as local partners could limit the inclusion of new local entrepreneurs and businesses, potentially impacting community development and reducing the broader social benefits intended by renewable energy projects.

3. **Environmental Effects:** Globeleq's Enterprise Development Initiatives include providing a 100kVA backup diesel generator to a fruit packaging business in Botriver. Although this generator supports business operations, it has negative environmental impacts due to diesel emissions, which can counteract the environmental benefits of renewable energy investments.

6.1.5.3 Sustainability

Ex-ante conditions for sustainability created in the design of the investment

Globeleq is exposed to various risks that could impact its operations and financial stability. These risks include construction, market, operational, fuel supply/resource, social, environmental (S&E), reputational, and financial risks. To ensure continued stability and sustainability, the company has implemented specific mitigation strategies for each type of risk.

Table 47: Sustainability factors of Globeleq

Risk Factors	Description	Mitigation Strategies	Score
Construction	Cost overruns and delays during construction.	Utilization of fixed price turn-key EPC contracts with a single contractor responsible for all aspects of the project or split contracts for specific project needs, such as turbine supply and balance of plant in the South African wind farm.	High
Market	Long-term contracts with financially weak public utilities and the risk of payment delays or breaches of contract.	Long-term take-or-pay contracts with inflation-adjusted prices and government guarantees, along with MIGA insurance in countries like Cote d'Ivoire and Cameroon.	High
Operational	Inefficient operation and maintenance of assets.	Internal O&M management or partnerships with equipment suppliers, with due diligence ensuring adequate operating budgets and proper alignment of O&M with plant management.	High
Resource	Variability in renewable energy resources and fuel supply issues.	Contracts for renewables without penalties for underperformance; thermal plants secure fuel supply through state entities or medium-term contracts with price pass-through.	High

Risk Factors	Description	Mitigation Strategies	Score
S&E and Reputational	Potential negative social, environmental impacts, and reputation damage.	Compliance with IFC Performance Standards and enforcement of a strict anti-corruption policy.	High
Financial	Interest rate fluctuations and currency risks.	Loans are secured at fixed interest rates. Revenues are predominantly in USD or EUR, except for South African projects, where revenue is in Rand but adjusted for inflation to account for exchange rate movements.	High

Ex-ante conditions for sustainability and suitability of the set-up for CIF investments

Norfund will continue to use globeleq as a platform for further investments in South Africa, maintaining its involvement until market conditions change in its favor for exit. This ongoing engagement ensure that Norfund remains flexible and ready to adapt to shifts in the renewable energy market. However, South Africa's renewable energy sector has matured, with numerous market participants, which somewhat reduces the incremental impact of new investments.

South Africa's grid capacity has reached its limit, making it difficult to expand renewable energy without significant upgrades to the transmission infrastructure. However, the transmission segment is currently a public monopoly and is not open to private sector investments. As a result, Norfund does not invest in transmission projects in South Africa. Should these regulations change in the future, this may open up opportunities for Norfund and other private sector investors to participate in the necessary grid infrastructure expansions. For now, Norfund's focus remains on renewable energy generation and access.

Emerging developments present new opportunities for Climate Investment Fund (CIF) investments. Innovations such as electricity traders and virtual wheeling will allow large-scale projects to serve multiple smaller private off-takers, reducing reliance on single large off-takers. Eskom's virtual wheeling policy, set to launch by late 2024, alongside an evolving regulatory landscape—including the finalization of IRP2023 and REIPPPP bid windows—will help shape the market.Projections indicate a potential market of 6 GW for solar PV and 4 GW for wind by 2030, with an investment opportunity of R214 billion. These factors highlight significant potential in South Africa's renewable energy sector, contingent on regulatory and infrastructural advancements.[142]

6.1.5.4 Mandate, positioning and operationalization

Norfund's investment in Globeleq and its indirect investment in Klipheuwel Wind Farm aligns with Norfund's mandate.

Table 48: Alignment with DIM strategy

Priorities	Mandate	Alignment	Score
Develop-mental	To promote sustainable development by creating jobs and supporting local economies.	Generates 27 MW of clean energy, powering more than 19,000 average South African homes. Supports local community development through job creation and ongoing socio-economic programs, including enterprise development and socio-economic development initiatives, aligning with Norfund's goals to foster viable, profitable activities that positively impact local communities.	
Economic	To enhance economic growth by addressing financing gaps, stabilizing investment environments, and attracting private sector investments.	Provided financing structure with a 70/30 gearing ratio and long-term, inflation adjusted PPA with Eskom, stabilizing the investment environment. Attracted private investments from IDC, Standard Bank, and minority shareholders. The project's stable revenue stream and proactive financial risk management strategies align with Norfund's economic priorities.	

[142] Large-scale-RE-MIR-2024-digital.pdf (greencape.co.za)

Priorities	Mandate	Alignment	Score
Environ-mental	Prioritize investments in projects that reduce greenhouse gas emissions and promote environmental sustainability.	Expected to reduce CO2 emissions by approximately 24,080 tons annually (481,600 tons over the project lifetime). The project complies with IFC Performance Standards and collaborates with local communities to mitigate environmental impacts, such as bird and bat strikes. Recognized for environmental stewardship, the Klipheuwel project aligns with Norfund's environmental priorities by promoting renewable energy and sustainability.	

Coherence

Norway lacks a unified strategy for South Africa's energy sector, and no Norwegian development aid organizations are active in its renewable energy sector. Few Norwegian private companies, such as Scatec, Aker Horizons, Magnora, and Norsk Renewables, operate in the South African market, primarily focusing on solar technologies and competing rather than collaborating. Unlike these private companies, Norfund invests in wind, hydro, and biogas projects, providing risk capital and equity investments. Norfund's approach mitigates risks, addresses financing gaps, and stabilizes the investment environment, encouraging private sector participation in high-risk areas and promoting sustainable economic growth.

Table 49: Overview of funding sources for renewable energy projects in South Africa

Name of disbursement channel	Type of Disbursement Channel	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	Ticket Size
Africa Finance Corporation	DFI		Debt	Equity	Sustainability	Energy	Climate Finance	
New Development Bank (BRICS Bank)	DFI		Debt	Equity	Sustainability	Energy	Climate Finance	
Climate Investment Funds (CIFs) and Climate Change and Green Growth Department	DFI	Grant	Debt	Equity	Sustainability	Energy		
The African Development Bank (AfDB)	DFI	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	
World Bank	DFI		Debt		Sustainability	Energy	Climate Finance	
International Finance Corporation (IFC)	DFI		Debt	Equity	Sustainability	Energy		
Nordic Development Fund (NDF)	Impact Investor	Grant			Sustainability	Energy	Climate Finance	
European Investment Bank (EIB)	DFI		Debt	Equity	Sustainability	Energy	Climate Finance	
Financial Sector Deepening Africa (FSD Africa)	DFI	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	
German Bank for Reconstruction and Development (Kreditanstalt fur Wiederaufbau - KfW)	DFI	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	
The Danish Climate Investment Fund (KIF)	Impact Investor		Debt	Equity	Sustainability	Energy	Climate Finance	
The World Bank (as GEF Trustee)	DFI	Grant			Sustainability	Energy	Climate Finance	
The World Bank (as GEF Trustee); United Nation Development Programme (UNDP)	DFI	Grant			Sustainability	Energy	Climate Finance	up to USD50'000
Industrial Development Corporation (IDC)	DFI		Debt	Equity	Sustainability	Energy		R250M per project for max 3 years
Development Bank of South Africa (DBSA)	DFI		Debt	Equity	Sustainability	Energy	Climate Finance	<R70M
Mpumalanga Economic Growth Agency (MEGA)	DFI		Debt	Equity	Sustainability	Energy		
Embassy of Finland	DFI		Debt	Equity	Sustainability	Energy	Climate Finance	
Entreupreuneurial Development Bank of Netherlands (FMO)	DFI		Debt	Equity	Sustainability	Energy	Climate Finance	< €10M
German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB)	DFI	Grant			Sustainability	Energy	Climate Finance	
Japan Bank for International Cooperation (JBIC)	DFI		Debt	Equity	Sustainability	Energy	Climate Finance	
Japan International Cooperation Agency (JICA)	DFI	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	

Name of disbursement channel	Type of Disbursement Channel	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	Ticket Size
PROPARCO	DFI	Grant	Debt		Sustainability	Energy	Climate Finance	
Nedbank	Corporate Bank		Debt	Equity	Sustainability	Energy		
Merchant West	Corporate Bank		Debt	Equity	Sustainability	Energy		<R 25M
Development Bank of South Africa (DBSA)	DFI		Debt		Sustainability	Energy	Climate Finance	R 250K - R 5M
Standard Bank	Corporate Bank		Debt	Equity	Sustainability	Energy	Climate Finance	
HSBC	Corporate Bank		Debt	Equity	Sustainability	Energy		
NinetyOne	DFI		Debt		Sustainability	Energy		
GroFin	Institutional Investor		Debt		Sustainability	Energy	Climate Finance	USD100K-1.5M
Revego Africa Energy	Private Equity			Equity	Sustainability	Energy		
African Infrastructure Investment Managers (Pty) Ltd (AIIM)	Private Equity			Equity	Sustainability	Energy	Climate Finance	ZAR17 441 M
Metier Sustainable Capital	Private Equity		Debt	Equity	Sustainability	Energy	Climate Finance	>USD10M
Actis	Private Equity			Equity	Sustainability	Energy		
Inspired Evolution	Private Equity			Equity	Sustainability	Energy		R 1 billion - R1.5 billion
Moshesh Partners	Private Equity		Debt	Equity	Sustainability	Energy	Climate Finance	USD1.2M -2.5M
Persistent Energy Capital (PEC)	Venture Capital				Sustainability	Energy	Climate Finance	R 750M - R 1B
Private Financing Advisory Network (PFAN)	Private Equity			Equity	Sustainability	Energy	Climate Finance	USD1M-US50M
Edge Growth	Private Equity		Debt	Equity	Sustainability	Energy	Climate Finance	R1M - R 20M
GreenTec Capital Partners	Venture Capital			Equity	Sustainability	Energy		
US Plus	Private Lender		Debt	Equity	Sustainability	Energy		
Ethos	Private Equity			Equity	Sustainability	Energy	Climate Finance	
Ethos	Private Equity		Debt	Equity	Sustainability	Energy	Climate Finance	
Maia Capital	Private Lender		Debt	Equity	Sustainability	Energy	Climate Finance	
five35	Private Lender			Equity	Sustainability	Energy	Climate Finance	
Green Outcomes Fund	Private Lender	Grant	Debt		Sustainability	Energy	Climate Finance	
Global Innovation Fund (GIF)	Impact Investment Fund	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	
Renewable Energy and Energy Efficiency Partnership (REEEP)	Public Funding				Sustainability	Energy	Climate Finance	
SEFA	Development Finance		Debt		Sustainability	Energy		
Savant	Venture Capital		Debt	Equity	Sustainability	Energy		
Infra Impact	Impact Investor		Debt	Equity	Sustainability	Energy		
Norfund	DFI		Debt	Equity	Sustainability	Energy	Climate Finance	
Bill and Melinda Gates Foundation	DFI	Grant			Sustainability	Energy	Climate Finance	
Mergence	Venture Capital		Debt	Equity	Sustainability	Energy	Climate Finance	
TIA - Technology Innovation Agency	Development Finance		Debt	Equity	Sustainability	Energy	Climate Finance	
Pegasys Capital	Fund Managers				Sustainability	Energy	Climate Finance	
Green Create Finance	Private Equity			Equity	Sustainability	Energy	Climate Finance	
BII	DFI	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	
FutureGrowth Asset Management	Fund Managers		Debt	Equity	Sustainability	Energy	Climate Finance	~USD1M
Mahlako Investment Management	Fund Managers			Equity	Sustainability	Energy	Climate Finance	
Sanlam	Fund Managers		Debt	Equity	Sustainability	Energy	Climate Finance	
Broadreach Energy	Private Equity		Debt	Equity	Sustainability	Energy	Climate Finance	
Community Investment Holdings	Private Equity			Equity	Sustainability	Energy	Climate Finance	
NESA Capital	Impact Investment Manager			Equity	Sustainability	Energy		
The Department of Trade, Industry and Competition (DTIC)	Development Fund	Grant	Debt		Sustainability	Energy	Climate Finance	
Serengeti Energy	Impact Investor	Grant	Debt	Equity	Sustainability	Energy		USD5-15M
University Impact (UI)	Impact Investors	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	

Name of disbursement channel	Type of Disbursement Channel	Grant	Debt	Equity	Sustainability	Energy	Climate Finance	Ticket Size
African Rainbow Capital - ARC	Venture Capital			Equity	Sustainability	Energy	Climate Finance	
Ushiri	Venture Capital		Debt	Equity	Sustainability	Energy	Climate Finance	
Impact Capital Africa	Impact Investors		Debt	Equity	Sustainability	Energy	Climate Finance	USD0.2M – 25M
Industrial Development Corporation (IDC)	DFI	Grant			Sustainability	Energy		

Source: Greencape Climate Finance Support Database July 2023

Figure 68: Globeleq's assets, existing and under construction

6.2 Case Studies Madagascar

6.2.1 Background

Madagascar is home to approximately 30[143] million inhabitants in 2023, predominantly young and rural. Despite its rich biodiversity and mineral resources, the country grapples with extreme poverty, with over 80% of the population subsisting on less than $2 per day[144]. The economy is primarily agrarian, dependent on commodities like vanilla and cloves, with tourism as a secondary pillar. While Madagascar possesses significant mineral wealth, including nickel, gold, titanium, graphite, and cobalt, its potential remains largely untapped.

Inflation, which peaked at 12.3% in March 2023, has been on a decline due to the high base effects from a fuel price hike in 2022 and tighter monetary policy. The central bank raised interest rates twice in 2023, contributing to this trend. The fiscal deficit is estimated to have decreased from 6.4% of GDP in 2022 to 4.9% in 2023[145], partly due to a recovery in petroleum tax arrears. However, the tax-to-GDP ratio remained below the budget target.

Government spending has increased, including significant transfers to JIRAMA, the public water and electricity utility. The budget deficit was mainly financed by concessional external financing, and the risks of external and public debt distress remain moderate. Looking ahead, growth is expected to flatten 4% in 2023 and inflation at 10.5%[146], driven by structural reforms and increased private investment, though poverty is expected to remain high, with about 24.8 million people projected to remain in poverty[147],.

The island nation is acutely vulnerable to climate change and faces substantial infrastructure deficits. Energy access is a critical challenge, with only 36% of the population has access to electricity in 2022[148], primarily in urban areas. Rural electrification rates are significantly lower, highlighting the stark disparity between urban and rural living conditions. JIRAMA, the national utility, struggles to provide reliable electricity even in serviced areas.

Madagascar has committed to ambitious climate goals under the Paris Agreement, and has submitted its Nationally Determined Contributions. The country aims for a 14%[149] reduction in greenhouse gas emissions by 2030. To achieve this, the country is prioritizing renewable energy, energy efficiency, and reforestation.

In response to the energy deficit, a nascent private sector is emerging, with several companies leading the charge in mini-grid and solar kit solutions such as WeLight and Baobab+. However, the sector faces hurdles such as extreme poverty, low population density, limited household electricity consumption, and dispersed settlements, hindering grid expansion efforts.

6.2.1.1 Malagasy energy landscape

Public actors

JIRAMA: A legacy of challenges

Madagascar's national water and electricity company, JIRAMA, was established in 1975 from the merger of Société Malagasy des Eaux et Electricité (SMEE) and Société des Energies de Madagascar (SEM). Since the liberalization of the electricity sector in 1999, JIRAMA no longer monopolizes electricity

[143] UNFPA Data Portal: Population Data Portal (unfpa.org)

[144] The World Bank in Madagascar: Madagascar Overview: Development news, research, data | World Bank

[145] The World Bank in Madagascar: Madagascar Overview: Development news, research, data | World Bank

[146] IMF country report No: 23/239: fourth review under the extended credit facility arrangement, request for waiver etc.

[147] The World Bank in Madagascar: Madagascar Overview: Development news, research, data | World Bank

[148]Tracking SDG7 the energy progress report, 2024(sdg7-report2024-0611-v9-highresforweb.pdf (esmap.org))

[149] BNCCREDD+ : Accord de Paris - CBIT Madagascar (cbit-madagascar.mg)

production but retains control over transmission and distribution, acting as the government's intermediary in developing the country's electricity infrastructure.

One of JIRAMA's main issues is its outdated infrastructure. The energy and water distribution networks are often in poor condition, with most systems dating back to the 1960s, leading to frequent breakdowns. Power stations and water treatment plants were originally designed for a population of around 200,000 to 300,000, far below the current demand. Additionally, corruption and embezzlement are significant problems; the latest scandal in March 2024 involved accusations against top managers for embezzling about 1.5 million euros through overbilling.

Despite these challenges, JIRAMA has substantial opportunities for expansion. According to a report from the Ministry of Energy, the electrification rate in zones covered by JIRAMA is only 54%. The company aims to electrify 85% of its active zones by 2030, requiring approximately 140 million euros to reach this target.

ADER and ORE: Facilitators and regulators

The Agency for the Development of Rural Electrification (ADER) is a public administrative establishment created in 2002 under the technical supervision of the Minister of Energy. ADER oversees national planning, particularly rural electrification, playing a crucial role in identifying non-electrified zones. Once these zones are identified, two electrification approaches are possible:

1. **Top-down Process**: Based on government geographical priorities, ADER organizes a tender process to collect technical and financial offers to electrify a specific zone. The best offer is chosen based on a "best value for money" process. However, this approach does not always result in stable electrified areas, especially if the government has not secured sufficient funding before launching the tender process.

2. **Bottom-up Process:** Private operators interested in rural electrification can directly submit their technical offers to ADER for specific zones. This approach is usually more efficient since operators typically have secured both the technical aspects and the necessary budget before submitting their proposals.

Once an offer is approved by ADER, it must also be approved by the Office for the Regulation of Electricity (ORE). ORE is responsible for drafting technical regulations, setting electricity pricing, monitoring compliance with service quality standards, overseeing competition, and controlling the execution of production and distribution concession and authorization contracts. Pricing regulations are relatively flexible, with electricity prices divided between connection costs and consumption charges. Some actors offer very competitive connection prices but higher consumption rates.

Although the Electricity Regulatory Office (ORE) has developed a well-documented tariff-setting methodology, it does not include a written formula that prescribes how end-user tariff levels should be determined. And according to the Africa Energy Portal[150], a regulatory accounting model has not been developed to guide electricity companies in their actions. And, the regulator has not conducted a cost-of-service study to ensure that tariffs align with the costs incurred by electricity operators. This can undermine the transparency and credibility of the tariff-setting process.

Regulatory environment

Energy policy

The Government of Madagascar (GoM) has developed a comprehensive New Energy Policy (NPE) for the period 2015-2030. This policy aims to increase the electrification rate **from 15% to 70%** and ensure that **80%** of energy production comes from **renewable sources** by 2030. The NPE provides a strategic framework for the deployment of renewable energies and aims to create a favorable investment environment through various programs (partnerships with microfinance institutions to cover the costs of solar panels for

[150] Africa Energy Portal: Madagascar | Africa Energy Portal (africa-energy-portal.org)

example) and tax incentives (tax reductions for eligible companies). Yet at this stage, the NPE states the way forward with specific actions to put in place, but the resources to deploy the NPE are still lacking.

Legislation and regulation

For about 40 years after the country's independence, Madagascar's electricity production and distribution was solely managed by the national company. There was no competition within the sector. Nonetheless, since 1999, Madagascar's electricity sector has been **liberalized** to encourage private sector participation and promote free competition in production. This initial liberalization laid the groundwork for significant reforms and the establishment of a regulatory framework that supports market liberalization and renewable energy integration.

The NPE introduced in 2015 builds upon these early reforms. The NPE sets ambitious targets for electrification and renewable energy adoption, providing a strategic framework for the sector's development. To support the objectives outlined in the NPE, the Electricity Code aims to **simplify procedures** and **strengthen market liberalization**, particularly in transmission and distribution.

Box 10: Complementarity between SHS and Minigrids

According to interviewees the technologies are complementary:

Mini grid

The objective behind the model is to propose a service level as close as possible to the urban network service. This requires infrastructure which is often more difficult and costly to deploy. Sites must be thoroughly analyzed before investment to make sure that demand exists and can grow.

Solar kits

Solar kits are easy to install and serve as an effective solution where mini-grids are not viable and as a complement to mini-grids and unreliable grid systems. These kits are divided into small units, mainly providing basic lighting, and larger units that power appliances like refrigerators and TVs, addressing basic or primary needs. Often described as "pre-electrification solutions," solar kits are particularly advantageous in rural areas where private operators have yet to establish a presence. Additionally, they can be used on the outskirts of mini-grids, where the grid cannot reach all potential beneficiaries due to financial constraints, lack of interest, or geographic distance. However, solar kits are not fully suitable for income-generating activities, and their quality has often been criticized by users.

As described before, key regulatory bodies include the Agency for the Development of Rural Electrification (ADER and the **Electricity Regulatory Office (ORE)** and the**)**. These bodies oversee the implementation of the NPE, ensure fair competition, and facilitate the integration of renewable energy sources into the national grid.

Private actors

Several private sector companies are actively involved in providing access to renewable energy in Madagascar, offering both mini-grids and solar home systems. These solutions serve as the primary energy source for households and businesses, particularly in rural and peri-urban areas, and as a complement to JIRAMA in urban areas where the electricity supply is often unreliable. Below, we provide a few examples.

Minigrid developers

Companies like **Anka**, **Nanoé**, and **Africa Green Tec** develop mini-grids to provide urban-level service, requiring **substantial infrastructure investment** and thorough **site analysis**.

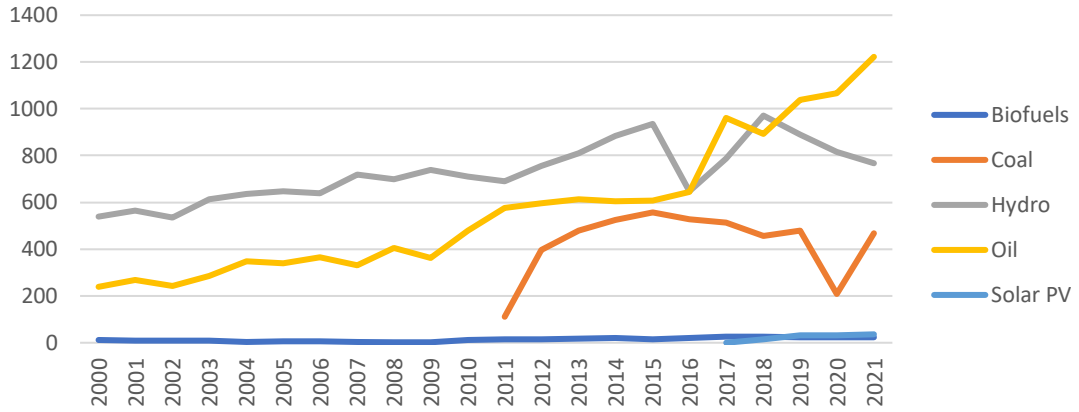
Solar kit providers

Companies like **JiroVe**, **Heri** Madagascar, and **Mbalik** provide solar kits for basic needs, described as pre-electrification solutions.

6.2.1.2 Energy infrastructure and composition

Madagascar's energy infrastructure is a mix of hydroelectric and diesel power plants, with a total installed capacity of approximately 506 MW. Most of this capacity comes from hydroelectric sources (356 MW) and thermal sources (150 MW). However, much of this infrastructure is outdated and in poor condition, necessitating significant investment for modernization and expansion to meet the growing energy demands of the population. Hydropower was the dominant source of electricity in Madagascar until 2015. However, a shift began around 2016, and by 2020, oil had become the primary source of electricity generation. This trend was confirmed in 2021, when 49% of the country's electricity was generated from oil, compared to 30% from hydropower. Coal still represents 18.6% of electricity generation in the country. This marked a change in Madagascar's energy landscape, with oil solidifying its position as the dominant source of electricity.

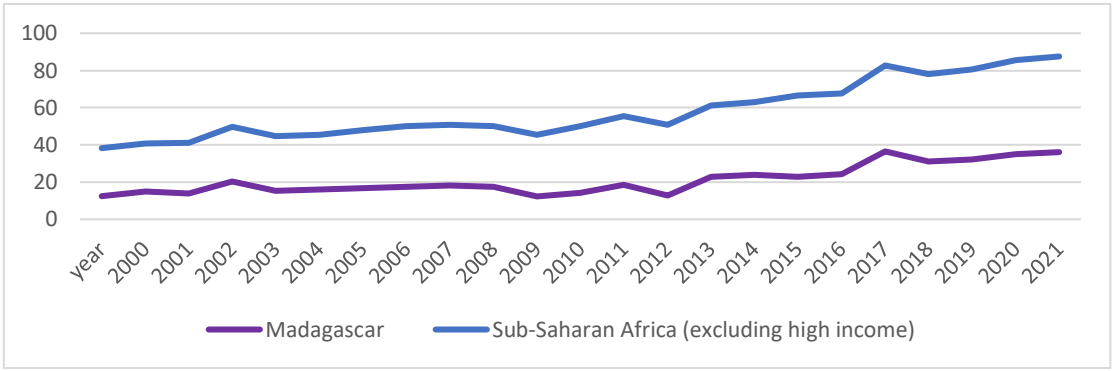
Figure 69: Evolution of electricity generation in GWh in Madagascar since 2000



Source: International Energy Agency[151]

At the current rate of progress, more than 22.5 million of an expected population of 35 million people are expected to still be without electricity by 2030. Recent electrification efforts have focused on areas near existing JIRAMA networks and the development of solar mini-grids. However, Madagascar's demographic characteristics, including low population density, low household electricity consumption, and widely dispersed communities, present financial and operational challenges to a purely grid-based approach to connectivity.

Figure 70: Access to electricity in percentage of Malagasy total population



Source: World Bank[152]

[151] International Energy Agency website : Madagascar - Countries & Regions - IEA

[152] World Bank website: Access to electricity (% of population) - Madagascar | Data (worldbank.org)

6.2.1.3 Norfund's investments in Madagascar

Norfund has invested in four companies with operations in Madagascar: Klinchenberg, CrossBoundary Energy, WeLight and Baobab+. All companies have regional operations with presence in Madagascar in addition to other countries. As of Q4 2023, the calculated commitment share going to Madagascar from those companies was NOK 270 million. The evaluation team has selected Madagascar for an in-depth analysis of these investments, with detailed case studies on both WeLight and Baobab+ Madagascar presented in sections 6.2.2 and 6.2.3..

Investee	Mandate	Commitment year	Exit year	Committed in Madagascar, NOK (Q4 2023)
WeLight	DIM	2019		119,425,484 (regional)
Baobab+	DIM	2021		20,610,809 (regional)
Klinchenberg	DIM	2021		78,457,990 (regional)
CrossBoundary Energy	DIM	2022		51,401,658 (regional)

6.2.2 We Light

	WeLight
Mandate	DIM
Approved IC	25.06.2019
Sector	Energy off-grid
Norfund investment (million NOK)	119.4 (in Madagascar; 132.7 in total)
Instrument	Equity and SHL
Description	Roll-out of mini-grids to support the expansion of affordable electricity
Case study asset	WeLight LTD

Introduction

Founded in 2018 through a strategic partnership between Axian, Sagemcom, and Norfund, WeLight is a pioneering company specializing in the development and operation of mini-grids, primarily targeting underserved communities in Madagascar. The company's mission is to empower rural communities by providing access to clean energy, thereby improving living standards, stimulating economic growth, and fostering sustainable livelihoods.

Building on its success in Madagascar, WeLight expanded its operations to other parts of Africa. In 2022, the company launched its first sites in Mali and is currently planning to deploy its first solar mini-grids in Nigeria, Africa's leading growth market, by 2024. According to Norfund, by the end of 2024, WeLight aims to have deployed 172 sites in Madagascar and 14 sites in Mali. With 186 operational sites expected by the end of 2024, WeLight is on track to become a leader in the mini-grid market in Africa, with more than 38,000 connections, as reported by Norfund..

Governance and Business Model

WeLight's governance is managed by a board composed of representatives from its three founding partners: Axian, Sagemcom, and Norfund. The company's business model revolves around the development and operation of solar-powered mini-grids designed to provide reliable electricity to remote and off-grid communities. By leveraging cutting-edge technology, WeLight combines renewable energy sources like solar power with battery storage to ensure uninterrupted electricity supply. The company employs a Prepaid system, allowing customers to pay for electricity in small, manageable increments.

In addition to its core focus on solar mini-grids, WeLight has diversified its product offerings to include appliances such as freezers and equipment for entrepreneurs, including huskers, welding machines, and woodworking tools. This diversification aims to increase electricity usage and contribute to the company's financial sustainability.

Scope of case study

WeLight is a global company operating in three countries, including Madagascar, Mali and Nigeria. Although Norfund's investment has been made in WeLight Group at a global level, this evaluation focuses specifically on their operations in Madagascar subsidiary. The facts and analysis provided below pertain to WeLight Madagascar unless otherwise specified.

6.2.2.1 Impact and Effectiveness

Development Outcomes

WeLight 2023 impact report estimates that 2,525 Small and Medium Entreprises have been connected in Madagascar[153]. Increased electricity availability allows businesses to extend their operating hours and creates opportunities for new income-generating activities that rely on electrical equipment and services as witnessed during site visits by the evaluation team to grocery stores, carpenters, and millers. The

[153] WeLight: WeLight Africa Impact Report 2023

construction, operation, and maintenance of these mini-grids have reportedly created 4,700 temporary jobs within the communities. While 234 technical and sales managers have been recruited regionally.

WeLight's impact supports other dimensions of Norfund's mandate. Improved services to citizens, leading to better living standards, by providing electricity to approximately 560 public institutions. According to WeLight's impact reports, this includes health facilities and public schools, enabling extended service hours and enhanced access to education and healthcare.. In addition, 1,320 customers have now access to refrigeration reporting access to safer food through better conservation, empowered women through new opportunities as 2,800 women have reportedly gained employment, and strengthened communities contributing to sustainable development, aligning with Norfund's goals of improving essential infrastructure services. During focus group discussions, women confirmed that electricity provided by WeLight helped increase their sales, and the results of the survey shows that 24% of new jobs are directly linked to WeLight.

Table 50: Development outcome:

Development Objectives	Development Outcomes
Expansion of renewable energy power in SA	
Renewable MW financed (Greenfield)	3156 KWc
Tons CO2e avoided annually	860 tons
Electricity production GWh per year	24 GWh
Nr of households provided with electricity	19 651

WeLight has reached a significant milestone towards business profitability by achieving break-even profits in June 2024, with around 20,000 connections across 87 active sites. This achievement indicates the potential of their business model and approach. According to data shared by WeLight, as of December 2023, there were 87 mini grids in service across 18 regions of Madagascar, distributed across 37 districts, providing a total of 3,156.3 kWc. There were no sites established in 2022 because of Covid-19 pandemic.

Box 11: Interview results

The results of surveys conducted across four WeLight sites revealed that businesses related to multimedia services experienced notable growth following WeLight's installation, with 61% of additional appliances or equipment being multimedia devices. In terms of sales, 50% of income-generating activities (IGAs) reported an increase in their sales. Moreover, 20% of respondents noted an improvement in their economic activities through extended working hours, allowing them to operate late into the night. A smaller portion (9.5%) saw a reduction in energy expenses, with savings on diesel costs ranging from 49% to 66%.

However, the impact on profit varied among IGAs. Very small businesses found that electricity costs nearly matched their revenue, leading to minimal profits, while larger IGAs were able to expand their activities and increase revenue due to enhanced productivity. The influence of WeLight on new business creation was limited, with 76.2% of businesses interviewed having existed prior to WeLight's arrival.

Table 51: Number of WeLight sites per region per year

Regions	2019	2020	2021	2023	Total
Alaotra-Mangoro				6	6
Analamanga				1	1
Analanjirofo	1	8		8	17
Antsinanana	1	1			2

Regions	2019	2020	2021	2023	Total
Atsimo Antsinanana				1	1
Atsimo Atsinanana				1	1
Atsinanana				3	3
Boeny				1	1
Bongolava				4	4
Diana	3	4		2	9
Fitovinany				3	3
Itasy	2			3	5
Menabe				1	1
Sava		3	4	11	18
Sofia			8	4	12
Vakinankaratra				1	1
Vatovavy				1	1
Vatovavy-Fitovinany				1	1
Total	7	16	12	52	87

Source: WeLight

EBITDA (excluding subsidies) was positive for Q1 2024, largely due to delayed costs related to sales agents, staff recruitment, and communication HQ activities. WeLight generated EUR 0.9 million in revenue. This included EUR 0.5 million in subsidies, primarily from UEF (EUR 0.4 million) and GIZ (EUR 0.1 million), with an additional EUR 0.4 million in subsidies postponed to Q2 2024. Revenue from consumption increased by EUR 0.3 million, up EUR 25.9k from Q4 2023, driven by new sites from Phase 3A (+24 sites in Q1 2024). Subscription revenue contributed EUR 0.1 million, although it was slightly below budget due to delays in door-to-door campaigns. Operating expenses (Opex) were EUR 0.2 million, with commercial expenses exceeding the budget by EUR 0.1 million, mainly due to the postponement of WeLight Tours. SG&A expenses were under budget by EUR 0.2 million, with recruitment and communication HQ costs delayed to Q2 2024.

Norfund's involvement has contributed to making WeLight profitable. As a co-founderalmost from the beginning, Norfund provided crucial financial investment that enabled WeLight to establish itself, kick start its operations and scale to reach more communities. In addition to the financial support the management of WeLight reported that Norfund has contributed to improve their business model including pricing to make sure it can achieve profitability. Additionally, the association with Norfund, as reported by management, brought global recognition and trust, enhancing WeLight's credibility and opening doors to further opportunities and partnerships. This could be linked to several grants received contributing to further expansion and reduction of price to attract more customer and increase consumption.

Beyond financial support, Norfund's experience and rigorous standards helped refinine WeLight's business model. Although the requirements of Norfund have sometimes slowed down WeLight's desired fast pace, this scrutiny helped the company develop a more robust and sustainable business approach. Norfund's challenges pushed WeLight to improve their strategies, ultimately making the business model more effective and sustainable.

Success factors

Madagascar's public electricity provider, JIRAMA, faces significant limitations in reaching the vast majority of the population. With 80% of the country's approximately 31 million people living in rural areas and rural electrification at a mere 16%, JIRAMA's struggles, and the decentralized nature of Madagascar have created a significant void for alternative solutions like WeLight's mini-grids to thrive. Despite JIRAMA's aspiration to achieve 70% national electricity access by 2030, the current national rate of 33% highlights the challenges in reaching remote areas.

WeLight benefits from strong support from its board of directors, which includes influential figures in Madagascar who can facilitate relationships with the government and industry. In addition to Norfund, the other two co-founders, Axian and Sagemcom, are well-established companies with significant

experience and resources. This collaboration brings together government relations, technological expertise, and substantial capital, providing a solid foundation for WeLight's operations.

The current legal and regulatory framework in Madagascar is enabling for WeLight. The company was allowed to determine a tariff and pricing in collaboration with the Ministry of Energy and the regulator, ensuring that it accounts for both operating expenses (Opex) and capital expenditures (Capex) to support cost recovery. This flexibility has allowed WeLight to establish prices that support breakeven and financial sustainability. Even though the price can be significantly higher than the one offered by JIRAMA.

WeLight's business model is a key success factor. From the beginning, it was designed to achieve financial sustainability without relying on subsidies. The model includes careful site selection, a prepaid system, and professional assistance and marketing services. The abundance of densely populated villages in Madagascar played a role in WeLight's business model, which requires villages of 3,000 to 6,000 inhabitants. Madagascar has between 8,000 to 10,000 such villages, providing ample opportunities for expansion. To ensure successful implementation, each village has dedicated technical and commercial personnel responsible for regular follow-up. While closely monitoring from the headquarters on a daily basis. WeLight invested in digitalization, allowing them to identify those who do not consume enough and arrange a wake-up call, highlighting the importance of effective consumption for sustainability.

Although Norfund's rigorous standards and thorough due diligence processes initially delayed some progress, these measures have been recognized as beneficial. This rigor has enhanced WeLight's credibility and operational sustainability, positioning it well for long-term success. In return, the reputational gains have helped Welight attract funds from different global partners both financial and developmental institutions. WeLight has also received B Corp certification with a score of 148.5, placing it among Africa's top five based on B Corps scores, further validating its commitment to social and environmental responsibility.

Table 52: Areas that Norfund looked at during due diligence as part of the decision-making process:

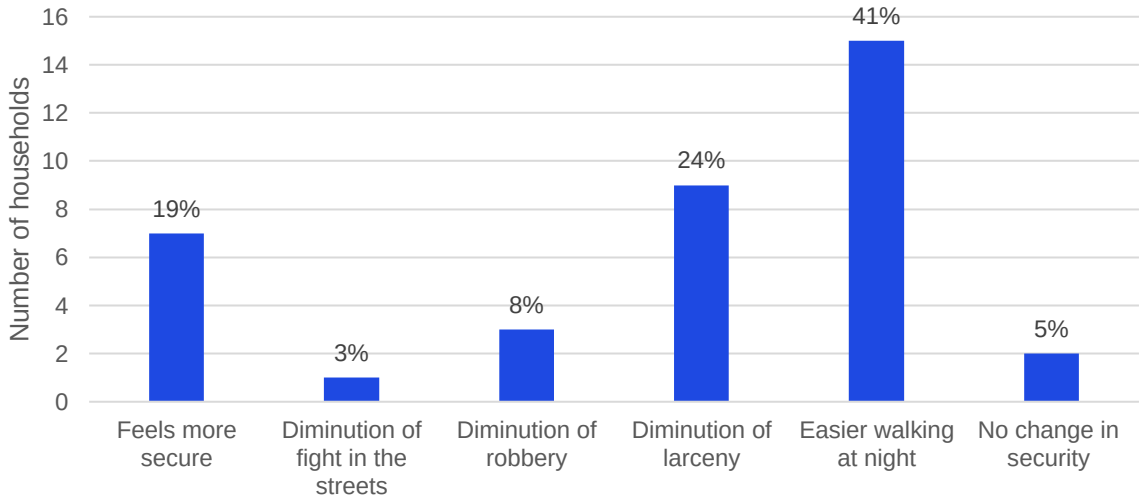
Technical		Mini-grid adapted to need and partners with required competencies
Legal and Financial		Greenfield business with limited historical data
Political/Regulatory		Enabling regulatory environment and strong buy in from government
Sponsor/Partner/Management		Strong in technical and contextual competencies
Commercial/Market		Very low electrification of rural areas but very poor population with limited purchasing power
ESG		Provision of green energy with limited negative impact on environment

Distributional impact

WeLight's village selection process influences the distribution of electricity access. The criteria used to select villages typically include population size, economic potential, and existing infrastructure. Villages with populations ranging from 3,000 to 6,000 inhabitants are preferred to ensure economic viability and efficient service delivery. Additionally, socio-economic factors are considered to identify villages with the potential for productive use of electricity, such as small businesses and community services. This selection approach, while crucial for achieving financial profitability, may also risk excluding the most vulnerable and impoverished individuals.

Electrification through WeLight has multiple benefits for women, particularly in terms of security, maternal health and business opportunities. Improved lighting in households and public spaces enhances the feeling of safety in general, especiallyfor women, while potentially reducing the risk of accidents and crime. Additionally, reliable electricity in health facilities enables better maternal health services, such as safe childbirth and emergency care. By providing a safer environment and better healthcare services, WeLight's initiatives contribute to empowering women and improving their quality of life in rural communities.

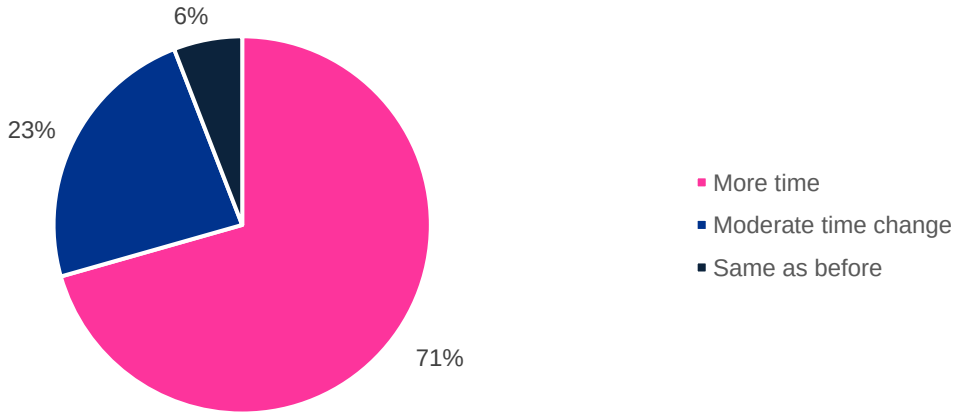
Figure 71: Perception of change in security following the introduction of WeLight (22 households surveyed)



Source: Interviews with households

The availability of electricity could impact children's education both at school and at home. According to several interviewees the electrification of schools allows for extended study hours, the use of electronic learning tools, and a more comfortable learning environment. At home, improved lighting has enabled children to study in the evening. By supporting both school and home environments, WeLight is playing a role, theoretically, in improving educational outcomes for children in rural villages. It is, however, recommended to conduct an impact assessment in a few years to better appreciate the impact of access to electricity on different groups, as most of the sites are relatively new.

Figure 72: Perception of change in study time since WeLight (17 households with children at school)



Source: Interviews with households

WeLight has improved living conditions by providing reliable electricity to rural communities. With 2,000 streetlights installed, residents experience improved safety at night, fostering a sense of security and encouraging outdoor activities. Additionally, 660 public buildings are now connected, enhancing the functionality and reliability of essential public services including education and healthcare for children and women. The data collected confirms that the electricity provided by WeLight has been reported to contribute to extended hours for health services and additional study time. However, there is no evidence indicating its use for the conservation of medicines or its impact on school performance.

WeLight supports job creation through local economic activities and growth. It has reported the creation of 234 contracted employment opportunities, boosting local economies and empowering

communities by developing skills and providing stable jobs. It has connected 2,525 SMEs[154] and businesses to reliable energy supply to sustain business operations, enabling extended operating hours and increased productivity. And it has provided temporary jobs for thousands of people during the construction phase of the sites. Ten percent of the businesses interviewed confirmed hiring additional staff, and 24% of these businesses did not exist before WeLight's involvement.

Governance

Norfund plays an active role in the governance of WeLight. Comprised of representatives from Norfund, Axian, and Sagemcom, the board provides strategic guidance and oversight. Meeting on a quarterly basis and ad hoc for investment committees, the board validates the strategic direction and priorities, helps unlock financial and human capital resources and expertise to execute the strategy, and heads the investment committee to approve investments. This diverse and experienced board facilitates strong government relationships, technological expertise, and access to capital. Their regular engagement and collective influence helped WeLight navigate regulatory frameworks effectively and maintains robust governance practices.

Norfund pushed WeLight to adhere the IFC Performance Standards on Environmental and Social Sustainability which has influenced its governance. These standards are designed to help businesses manage environmental and social risks and impacts responsibly. WeLight follows these standards, including:

Assessment and Management of Environmental and Social Risks and Impacts: WeLight conducts impact assessments to identify and manage potential risks and impacts, ensuring that their projects are sustainable and socially responsible. And they communicate the collected information publicly.

Labor and Working Conditions: WeLight appears to ensure safe working conditions for its technical employees, promoting labor rights and well-being. Indicators of this commitment include the provision of professional gear, such as helmets, and motorized transport for employees.

Community Health, Safety, and Security: By improving community infrastructure and providing reliable electricity, WeLight enhances community health and safety.

Unintended outcomes

One unintended consequence of Norfund's investment in WeLight is the company's rapid scale-up, leading it to become the largest mini-grid operator in Africa. By the end of this year WeLight would have electrified 172 villages in Madagascar alone and close to 200 all markets combined. While this growth aligns with the initial hopes for the company, it was not fully anticipated that WeLight would achieve this position so quickly. This success is partly due to WeLight's unique backing by two industry leaders: Sagemcom, which provides strong technical expertise, and Axian, which brings deep local knowledge. Despite the company's strong foundation, the rapid achievement of becoming the continent's largest mini-grid operator was an unforeseen outcome of the investment.

WeLight succeeded in mobilizing local debt from a commercial bank. In 2022, WeLight secured approximately EUR 2 million in debt financing from BNI Madagascar. This achievement is significant, as it demonstrates the growing confidence of local financial institutions in WeLight's business model and its potential for long-term sustainability. The ability to access local debt financing is a strong indicator of WeLight's credibility and the robustness of its operations, further supporting its expansion and impact in the country.

Despite WeLight's rapid success and high impact in electrifying villages across Madagascar, the company has struggled to attract donor funding in the form of grants. Grants can help WeLight scale and reduce price to enable access to electricity to the most vulnerable. Norfund has expressed surprise at this, considering WeLight's capacity, expertise, and the substantial progress it has made in expanding access to electricity in underserved areas. Even with Norfund's strong reputation, which was expected to catalyze additional funding, the company has only managed to secure minimal donor support. Efforts to

[154] Welight: WeLight Africa Impact Report 2023

mobilize grants, including from Norad, have fallen short of expectations. Highlighting a disconnect between the high-impact potential of the project and the practical support it receives from donor.

6.2.2.2 Additionality

Financial additionality

At the time of Norfund's investment, very few companies were operating in the mini-grid sector in Madagascar. The country has limited domestic credit provided to the private sector standing at just 12%—half the average for sub-Saharan Africa. Madagascar is ranked 161 among 190 ecnonomies in the ease of doing business in 2020. The early engagement of Norfund in 2019 provided EUR 4.5 million investment, constituting 45% of the initial funding round of EUR 10 million. This has positioned WeLight for long-term by scaling up a promising pilot phase. The scale and technology offered by WeLight stand out in this context, as the company benefits from strong partners, with Axian to faciliate scale up in complex environment and Sagemcom which provides superior technical expertise. These partnerships allowed WeLight to expand rapidly and offer more advanced and scalable solutions compared to other operators, positioning it as a leader in the sector.

Norfund's early investment in WeLight provided needed early-stage capital in a high-risk sector. Madagascar is one of the poorest countries in sub-Saharan Africa with more than 75% of the population lived below the national povertywhere capital is scarce with difficult business environment. Many potential investors are hesitant to engage in the mini-grid sector in developing countries due to significant uncertainties and capital requirements. According to the International Energy Agency, about 1.4% of the electricity generated in Madagascar is from solar. Norfund's commitment of EUR 4.5 million, comprising EUR 1.5 million in equity and EUR 3 million in debt, was risk measured and essential in validating WeLight's business model. This early investment, representing 45% of the initial EUR 10 million funding round, enabled WeLight to initiate operations and attract future investors.

The patient capital allowed WeLight to prioritize long-term sustainable growth over immediate financial gains. The provision of patient capital contrasts with the strategies of impact or private equity (PE) investors who typically seek quicker returns. Norfund's long-term investment perspective aligns well with the developmental goals of WeLight, allowing the company to focus on operational stability and expansion without the pressure for rapid profitability. This approach is crucial for projects in developing regions where market maturation and revenue generation can take longer.

The investment structure included both equity and shareholder debt, providing a balanced capital structure that enhances financial flexibility:

- Equity Investment: EUR 1.5 million, representing a 30% equity stake post-investment.
- Debt Investment: EUR 3 million, structured as shareholder loans with a 6% interest rate and a six-year tenure.

Norfund's enabled WeLight to test its business model and scale it as initially planned through its contribution to the EUR 10 million total funding round, split equally between equity and debt, was crucial for building and operating mini-grids in Madagascar and piloting expansions in other countries. This initial funding covered both capital expenditures (EUR 8 million) and operational and financial expenses (EUR 2 million), ensuring the viability of the initial projects.

Norfund, along with co-founders Sagemcom and Axian, continued to invest beyond the first round. In December 2022, a bridge round of EUR 2 million was split equally among the three founders. Subsequently, an actual funding, third round, of EUR 16.14 million was also equally split among Norfund, Sagemcom, and Axian. Brining the investment of Norfund in WeLight to 1,5 million in equity and 9,88 in shareholder loan for a total of 11,38 million euro. This continued commitment from the initial investors helped to catalyze EUR 19 million of debt funding from the European Investment Bank (EIB), Triodos Investment Management, and EDFI ElectriFI. Additionally, WeLight received subsidies from various donors for its projects, further enhancing its financial position and capacity for expansion. WeLight is now actively seeking to mobilize private investment outside of its three co-founders for the first time, driven by its expansion plans in Madagascar and beyond.

During the project preparation phase, Norfund screened for other companies operating in the mini-grid sector in Madagascar and conducted due diligence on WeLight. To reach its investment decision, Norfund undertook a due diligence process that included assessments of technical, political, regulatory, commercial, and ESG factors supplemented by a detailed financial analysis. While a few other companies operating in the mini-grid sector were identified, Norfund concluded that WeLight offered a superior opportunity due to the partners involved in the deal, Axian and Sagemcom ,and the quality of its management team. However, it remains unclear which specific alternatives were considered and what detailed framework was used to rule them out, beyond these two primary factors.

Non-financial additionality

Norfund advocated for the adoption of environmental and social standards and contributed lessons learned from challenging markets like Myanmar. By pushing for high E&S standards, enhancing governance and professionalization, Norfund has played a key role in strengthening WeLight's operations and ensuring its long-term success. Norfund's investment in WeLight has reportedly significantly advanced the company's commitment to environmental and social (E&S) sustainability, guided by the rigorous IFC Performance Standards. These standards ensure that WeLight adheres to international best practices in managing E&S risks and impacts.

Norfund challenged the initial strategies proposed by the company and helped refine it. Upon joining, Norfund reviewed the business plan and pushed the WeLight team to revise it, ensuring that the financial estimates were more realistic and that pricing strategies were better aligned with market conditions and the profitability aspiration. In addition to these adjustments, Norfund introduced a stronger focus on risk mitigation, recognizing the inherent challenges and uncertainties in operating within a risky business sector like renewable energy in least developed countries. The investee acknowledges that Norfund's contributions, particularly in bringing a more cautious and balanced approach to the business plan, have contributed to making WeLight achieve profitability and ensuring the long-term sustainability of the company.

Limited capacity building provided to WeLight to enhance its value, including the following areas of capacity building:

- **Training and Development**: there has been no training programs for local staff to take on managerial positions that are supported by Norfund.
- **Resource Allocation:** Norfund is not allocating resources for capacity-building initiatives.

WeLight already creates local employment opportunities by contracting and training residents in the communities as sales and technical agents. Enhancing these initiatives can have a profound impact:

- **Employment Creation:** We light relies on 240 local agents. Expanding training programs to include local agents has the potential to improve demand and service delivery while boosting local economies by creating job opportunities.
- **Community Involvement:** Engaging locals in the operational aspects of mini-grids fosters community ownership and support, which is crucial for the sustainability of the projects.

The data shows that WeLight's scale and profitability are unprecedented in Madagascar. Currently, WeLight is on track to cover 172 villages, reaching more than 300,000 clients. The company has also expanded operations into Mali and plans to launch in Nigeria in 2024. WeLight has successfully attracted both grant and debt financing to fuel its growth, including €19 million in funding secured in 2023 from the European Investment Bank (EIB), Triodos, and ElectriFi. This financing, which carries interest rates around 8% with a grace period of two years and maturity until 2030, will be used to develop solar mini-grids in over 120 villages, expanding WeLight's coverage from eight regions to 17 in Madagascar. While there is no concrete data on the demonstration effect of WeLight's success on the sector, it theoretically is a potential catalyst for attracting other investors to the sector.

6.2.2.3 Sustainability

WeLight reached breakeven in June 2024, marking a significant milestone, indicating a healthy and sustainable business model. Achieving breakeven means that WeLight is likely to be profitable, demonstrating the viability of its operations and financial strategies. This profitability is a strong indicator of

the solid business model built on prioritizing cost recovery over lowering tariffs, which has been pivotal in reaching breakeven. This strategy ensures that the company's operations are financially sustainable in the long term. The regulatory environment, influenced positively by the political leverage WeLight has through its board, reduces associated risks. However, while aligning with government objectives of increasing electricity access, the high tariffs could lead to future tensions regarding affordability for end-users.

While WeLight has demonstrated that mini-grids can work and there is a business model ensuring profitability, but achieving sustainability may still require subsidies especially in environments like Madagascar—and potentially other African countries – to ensure affordability. Currently 3% of the subscriptions are inactive because of economic reasons. WeLight acknowledges the need for embedding subsidies to make electricity more accessible. The company has initiated the integration of subsidies in a strategic manner by spreading these resources across all projects and over a long period. WeLight avoids over-reliance on subsidies while gradually reducing tariffs. This approach helps maintain financial sustainability and operational efficiency while enhancing affordability for end-users. This model can serve as a blueprint for other mini-grid initiatives across the continent, balancing financial viability with social impact.

Table 53: Sustainability matrix WeLight investment

Sustainability factor	Score	Description
Financial Success	High	WeLight's achievement of breakeven signifies financial success, crucial for its continued operations and future growth.
Political/regulatory vulnerabilities minimized	Medium	Through strategic partnerships, especially with Axian long time presence and business track record in Madagascar, WeLight is navigating the political and regulatory landscapes, minimizing risks and ensuring compliance. But the risk remains as they do not have control external factors because in a volatile country.
Risks minimized	Low	Risk rating "High" in the investment documents
Alignment with Government Priorities	High	The investment aligns with government priorities by enhancing electricity access. Nevertheless, the high tariffs required for cost recovery might challenge this alignment regarding affordability.
Have an Exit Strategy	Medium	Norfund and other investors are prepared for high risks, understanding that the investment is about market creation rather than market exit. This readiness to lose funds if necessary highlights the high-risk, high-reward nature of the investment. Despite several funding rounds it is not clear though whether the cofounders are motivated about further investing.
Market Creation	High	WeLight, supported by Norfund, is focused on market creation and expansion rather than exiting. This strategy supports its ambition to become the largest mini-grid operator in the world, providing electricity to more people across Africa.
Management Quality Improvement	Medium-High	Norfund's involvement included ensuring that governance and management practices are strengthened, though specific improvements including hiring the right people. More could be done in building competencies through other mechanisms that can be offered by Norfund.
Competitive Pricing	Medium-High	WeLight's tariffs are high compared to JIRAMA, which is not available to the deserved populations, but more competitive than diesel generators and Solar Home Systems and other traditional sources.

Sustainability factor	Score	Description
Demonstration Effect:	High	WeLight's unique position in Africa as the largest mini-grid company and the one that is proving profitability is achievable provides significant potential for a demonstration effect, showcasing the success and scalability of decentralized renewable energy projects.

Norfund has been key in refining WeLight's business model around achieving financial sustainability without relying on subsidies. From the outset, the business plan focused on sustainability. Norfund has also brought rigorous standards and experience have challenged WeLight to improve and adapt their strategies. Norfund's push for using the IFC Performance Standards framework has further professionalized WeLight's operations, ensuring they meet international standards for sustainability and governance. This combination of a robust business model and professional management has positioned WeLight for long-term success.

WeLight's strategic roadmap for the next four years includes two primary phases:

- "Ambition 2025": Strengthening and expanding current operations in Madagascar and Mali, optimizing debt costs, preparing for the next growth phase, and exploring mergers and acquisitions.
- "Ambition 2028": Expanding geographical reach in two additional countries, potentially including DRC, Tanzania, Uganda, and Kenya, and investigating new operational models such as metro-grid and hydro projects.

The current fundraising round aims to raise approximately EUR 35 million to support these ambitions. Based on achieved positive EBITDA in Madagascar in 2024 and positive group EBITDA ambition by 2026. WeLight intends to achieve its goal of connecting 100,000 subscribers, directly reaching 700,000 people, and impacting 1.5 million people directly and indirectly. Although the expansion may lead to selecting sub-optimal villages with smaller sizes and reduced economic activity.

6.2.2.4 Mandate, positioning and operationalization

Norfund's investment in WeLight ustainable businesses, particularly in the renewable energy sector, which in turn fosters environmental benefits and job creation. By establishing solar-powered mini-grids in remote areas of Madagascar, WeLight directly addresses the challenge of limited energy access, bringing clean energy to 87 villages and improving access for about 82,650 people. This initiative not only supports the environmental goal of reducing reliance on fossil fuels but also drives economic development by creating a profitable business that provided employment for more than 300 people. Norfund's role in governance and its financial support throughout various investment rounds have been crucial in scaling WeLight's operations and ensuring the creation of both social and economic value in these underserved communities.

From an environmental perspective WeLight has averted 860 TCO2 emissions, significantly contributing to climate goals by reducing reliance on fossil fuels and promoting renewable energy solutions. The business model includes strategies for managing waste, particularly through the recovery and recycling of batteries used in their mini-grids, which supports environmental sustainability. Additionally, WeLight's renewable energy projects reduce the importation of fossil fuels, contributing to energy independence and decreasing foreign exchange outflows. While providing a reliable energy for both residential and commercial activities sustaining economic growth.

While WeLight's projects are primarily developmental, they also hold potential for financial returns for Norfund. Achieving breakeven and positive EBITDA milestones indicates a clear pathway to profitability, though the primary focus remains on developmental impact. Specifically, providing clean energy sources to remote areas of Madagascar empowers marginalized communities and supporting the Agenda 2030 goal of leaving no one behind. More importantly, the success of the mini-grid model in Madagascar demonstrates its potential to scale profitably, potentially having disruptive effects on a much larger scale.

Table 54: WeLight alignment with DIM mandate

Priorities	Mandate	Alignment (Positive)	Score
Developmental	To promote sustainable development by creating jobs and supporting local economies.	✓ Created approximately 310 permanent jobs from which 76 are internal and hundreds of temporary jobs during the establishment of sites. ✓ Supports local community development through job creation, better living conditions by providing streetlight and enabling longer hours for education and access to health services during nighttime.	
Economic	To enhance economic growth by addressing financing gaps, stabilizing investment environments, and attracting private sector investments.	✓ Provided patient financing through Equity, Shareholder loans and bridge funds in greenfield business and a high-risk market, helping test new business model with high potential demonstration effect. ✓ Contributes to Madagascar goal of attaining 70% of access to electricity while preserving the environment.	
Environmental	Prioritize investments in projects that reduce greenhouse gas emissions and promote environmental sustainability.	✓ Produces 4 GWh of clean energy, contributing to renewable energy generation. ✓ Reportedly averting 860 tons of CO2 emissions. ✓ The investment in solar mini grid promotes environmental sustainability by relying upon a technology known for its low environmental impact.	

Assessed against Norfund's internal strategy for the DIM, the investment is highly aligned. The project is designed mostly in line with the main guidance for DIM investments.

Table 55: WeLight alignment with DIM strategy

Strategy dimension	Score	Assessment
Geography	Medium-High	Fund has global activities, all of them in LCD countries but Madagascar is not a core country
Segment/ technology	High	Strategy emphasizes distributed generation and off-grid supply, both of which are targeted by the Fund
Instruments	High	Use of funds explicitly focused as new strategic area
Additionality	High	Financial and non-financial additionality verified.
Catalytic	Medium-High	Norfund investment is yet to mobilize other participating investors while it helped mobilize a large amount of debt provided by EIB, EDFI and Triodos.

Coherence

There are no other Norwegian businesses in the Mini grid sector identified in Madagascar that overlap with WeLight's projects. Norfund has, however, several investments in Madagascar with two of them in off-grid (Baobab+ and WeLight) the others are in independent power producing sectors. Baobab+ and WeLight utilize different technologies and can be seen as complementary in their approach to providing energy access. While WeLight targets villages with a certain level of population density and economic activity, Baobab+ focuses on reaching more dispersed populations at the margins of villages and in urban areas that are not suitable for mini-grid coverage. Otherwise, there is no overarching strategy for supporting the energy sector in Madagascar by the Norwegian government. WeLight is currently applying for grant funds through the Norad Energy Support Scheme. This grant funding can complement Norfund's efforts by enhancing the scalability and sustainability of WeLight's projects, potentially allowing for reduced prices, and enhanced higher access to electricity especially by the poorest.

6.2.3 Baobab+

Project Infor	Baobab+
Mandate	DIM
Approved IC	15.06.2021
Sector	Solar power off-grid
Norfund investment (million NOK)	20.6 (in Madagascar; 108.4 in total)
Instrument	Equity and SHL
Description	Provide access to basic electricity services, create jobs and tax income locally.
Case study asset	Baobab+ SAS

Introduction

Baobab+ is a social enterprise established in 2015 by the Baobab Group with the aim of expanding access to energy and digital solutions across Africa. Initially focused on providing solar energy, Baobab+ has diversified its offerings to include clean cookstoves, freezers, generators, digital devices, as well as financial products targeting both households and small entrepreneurs.

The company operates in six African countries: Senegal, Madagascar, Ivory Coast, Mali, Nigeria, and DR Congo. Through partnerships with international corporations and local telecommunications operators, Baobab+ reports that it has distributed over 310,000 solar products and 36,000 clean cookstoves, benefiting approximately 1.86 million people and contributing to the reduction of 333 tons of CO2 emissions.

Governance and Business Model

The governance structure of Baobab+ includes a supervisory board consisting of six members: a Chairman, the CEO of Baobab Group, the CFO of Baobab Group, an Independent Director, a member appointed by Norfund, and the CEO of Baobab+ Group. The company's business model is built on providing access to energy and digital products through a Pay-As-You-Go (PAYG) financing system, which allows customers to make weekly or monthly payments to acquire ownership of the products. This model is supposed to be effective in reaching low-income populations who may not have access to traditional financial services. In addition to energy products, Baobab+ reports that it has equipped 200,000 households with digital devices, aiming to bridge the digital divide in Africa. The company employs 820 staff and works with 900 sales agents across its operating countries.

Scope of case study

Baobab+ is a global company operating in six countries, including Côte d'Ivoire, the Democratic Republic of Congo, Madagascar, Nigeria, and Senegal. Although Norfund's investment has been made in Baobab+ Group at a global level, this evaluation focuses specifically on their operations in Madagascar subsidiary. The facts and analysis provided below pertain to Baobab+ Madagascar unless otherwise specified.

6.2.3.1 Impact and Effectiveness

Development Outcomes

Norfund's investment in Baobab+ promotes job creation and improved livelihoods. In Madagascar, the company currently employs 180 people, with 53% of the workforce being women, and uses 127 advisors. In addition, by providing access to solar power, Baobab+ empowers entrepreneurs to extend their business hours and utilize tools that require electricity. Reportedly, 2% of Baobab+ clients use the solar system exclusively for business purposes, while an additional 10% use it for both home and business, making the total percentage of users who utilize the system for business purposes up to 12%. This has the potential to create jobs and improve the livelihood for many Malagasy people, directly supporting Norfund's objective of fostering economic growth and development in underserved regions.

The investment contributes to improved financial inclusion. Baobab+ offers financing solutions that make solar energy and digital tools more accessible, especially for those who cannot afford the upfront costs. This approach targets underserved populations and enhances their economic opportunities. Baobab+'s "Pay-As-You-Go" financing model further aligns with this goal by making these solutions accessible to low-income populations, thereby promoting economic inclusivity. Furthermore, the partnership with the Baobab Group, the Bank of Africa and micro finance institutions enables clients who were previously ineligible for microfinance can now access financial services through the credit history they build with their Pay-As-You-Go product purchases. The regularity of their payments generates risk scores, which can be leveraged to secure financing from Baobab banks, thereby fostering financial inclusion.

Norfund's investment promotes the use renewable energy and therefore environmental sustainability. Baobab+ provides solar energy solutions that reduce reliance on fossil fuels, contributing positively to climate goals. The business model includes strategies for the recovery and recycling of batteries used in their solar home systems, supporting environmental conservation efforts. In the context of Madagascar, it is understood that a complete transition to renewable energy is challenging to achieve in the short term. Therefore, in addition to solar solutions, Baobab+ offers modernized cooking systems that use solid fuels. These systems are designed to reduce smoke emissions by up to 75% and decrease charcoal usage by up to 75%, thereby contributing positively to both the environment and the health of the population.

The investment is targeting scalable enterprises in key regions. Baobab+ operates in areas central to Norfund's mandate, such as renewable energy and scalable enterprises, ensuring that the investment addresses critical needs in Madagascar, a core investment country for Norfund. Given Madagascar's limited access to electricity, particularly in rural areas, Norfund's investment in Baobab+ helps fill a significant gap where private investment might be scarce. This investment ensures that Norfund's resources are used to generate significant developmental impacts, thereby fostering long-term, sustainable development in underserved communities.

Baobab+ Madagascar has successfully provided access to almost 200,000 products, including over 160,000 solar products, which contribute more than 50% to the total solar products sold across the six countries where the company operates. Additionally, Baobab+ Madagascar has sold 26,000 digital products and 2,300 clean cookstoves. While these efforts have certainly contributed to reducing emissions, the exact amount of emissions avoided cannot be precisely assessed by the evaluation team, and there are no specific estimates provided by the company for Madagascar. However, at the global level, Baobab+ Group has estimated the CO2 emissions avoided at 333 tons. Finally, we do not have data on the number of clients who have achieved financial inclusion facilitated by the purchase of Baobab+ products in Madagascar.

Business sustainability

Baobab+ Group is struggling to achieve financial sustainability due to several factors. The most significant challenge appears to be coming from the expansion into the large and complex markets of Nigeria and the DRC at the same time. Norfund identified and highlighted this risk from the beginning without intitally resisting the expandion. Baobab+ proceeded with the expansion despite apparently lacking the capacity to manage these markets effectively. Become more aware of the challenge, in 2022 Norfund tried to shut down the DRC operations, but failed to convince management and other investors to do this until long later. While the venture in Nigeria turned out to be a success, the operation in the DRC was a failure, and the company is now considering closing its business there. The most damaging pressure has reportedly came from the devaluation of the Naira in Nigeria, high inflation rates, and the coup d'état in Mali, which forced the company to close multiple sites. These factors have placed significant strain on the company.

Baobab+ Madagascar has experienced financial ups and downs but aims to achieve financial profitability excluding subsidies in 2024. The company sells around 2 to 3 thousand energy products and over 400 smartphones per month, generating an average monthly income of approximately $400,000. Currently, 10% of sales are unpaid, 1% are written off, 1% are recovered, and 15% face payment challenges. Baobab+ Madagascar achieved profitability with subsidies in 2021 and 2022 but failed to do so in 2023. The strategy to achieve profitability in 2024 focuses on better cost management and increasing the proportion of large systems by 5%, which currently stand at 15% of the portfolio. This shift is intended to reduce by 5%. the small systems, which make up 80% of the portfolio, However, it should be noted that the government plans to provide 400,000 free solar home systems, funded by the World Bank. This initiative, which is almost three times the number of solar home systems provided by all providers combined per year, may jeopardize Baobab+ Madagascar's intentions to achieve financial sustainability.

The Solar Home System (SHS) sector, particularly using the pay-as-you-go (PAYG) model, faces significant challenges in achieving profitability. These challenges are similar to those encountered in the microfinance industry, including high operational costs, due to the large number of small-scale clients, and the risk of default. It has been reported that 15% of the clients face payment challenges, 10% unpaid, 1% have been recovered and 1% written off. Especially in Madagascar where a significant portion of the population is impoverished with limited purchasing power. For Baobab+ Madagascar to achieve profitability, scale is crucial. Increasing sales volume by diversifying product offerings is key. Currently, the company offers a wide range of products including solar home systems, refrigerators, generators, cookstoves, and smartphones, with multiple types under each category to cater to the broadest possible customer base. This diversification could help meet varying customer needs and enhances the potential for higher sales.

Success factors

JIRAMA's limited electricity coverage, with only 34% of Madagascar's 26 million population having access to electricity, is especially severe in rural areas where only 14% have access. This vacuum, combined with frequent power outages in urban and peri-urban areas, has created a significant demand for alternative energy solutions. These challenges have opened a substantial market for off-grid energy providers like Baobab+.

Baobab+ Madagascar is pursuing a strategy based on diversity of offerings, a performant client service, and better cost management.

- Achieving profitability and sustainability on solar home systems (SHS) alone has proven challenging, especially in the Malagasy context. For SHS to be profitable with the pay-as-you-go system, the management believes that it must be combined with other products and services, leveraging data collected to offer targeted products and services. The Madagascar subsidiary is attempting to diversify its offerings and leverage its data for better targeting. However, success in this area is still to be proven.

- The satisfaction rate of clients with Baobab+ support is relatively low, with 30% of clients reporting challenges and 60% of them stating that their issues were not resolved. To address this, Baobab+ Madagascar is leveraging its internal call center composed of 60 staff members working in three shifts of 20 people each, operating 24 hours a day.

- Additionally, the Malagasy population's dominant economic status affects the quality of the portfolio, with 80% consisting of small-scale kits. Therefore, the objective is to better manage operational costs by covering the operational fixed costs through cash revenue at 25% and increasing the number of large kits compared to small kits.

The value of Baobab+ Group has been declining over the past few years, a trend that continued since Norfund's involvement. This decline has been attributed to several factors, including the decision to enter the large and complex markets of Nigeria and the Democratic Republic of Congo (DRC), which strained the small team. The business in DRC failed, in the pilot phase, and although the Nigerian venture remain attractive, the challenging economic context, including hyperinflation and currency devaluation of Naira have been critical to the group’s financial stability. The devaluation of Ariary in Madagascar further impacted the group's value although at a much smaller scale than Nigeria. Additionally, the political instability in Mali led to the closure of several sites until the situation improves.

While donors have historically helped private sector companies achieve profitability and scale in Madagascar's solar home system (SHS) market, recent political actions supported by donor money are a source of concern. Madagascar's government-led, donor-funded large-scale distribution of free solar home systems (SHS) risks undermining the long-term sustainability of the sector. This approach, supported by development partners, risks undermining the private sector, which is crucial for innovation, job creation, and ongoing service delivery beyond the funded projects. Historically, the World Bank has supported private SHS providers through initiatives such as result-based financing, aiming to stimulate market growth. However, the recent funding of large-scale free distribution may indicate political pressure combined with a loss of patience with private sector performance, potentially endanger the sector's resilience and the sustainability of businesses like Baobab+.

Box 12: Baobab+ offerings

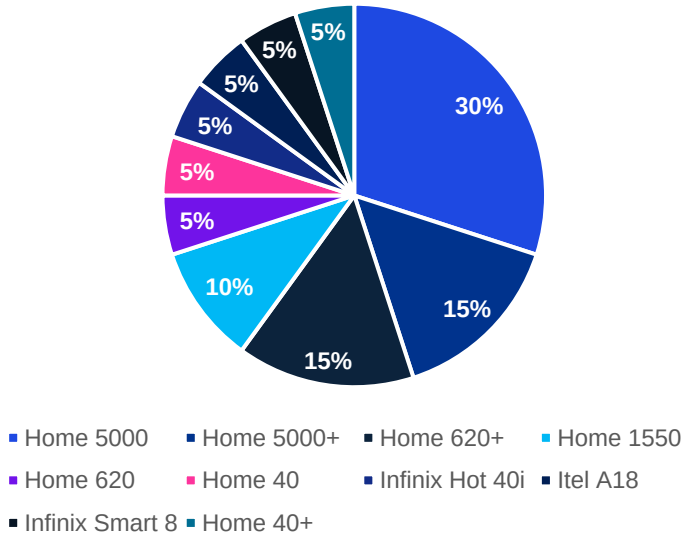
- **Home 40+:** 2 hanging lamps, 5.5 Watt solar panel, USB cable + adapters compatible with several types of phone, up to 35h autonomy, 2,550 mAh, 252K AR (min 1K AR/day and initial deposit 30K AR);
- **Home 600 & 620+:** 3 hanging lamps, one with motion detector, 6 W solar panel, USB cable + adapters compatible with several types of phone; 1 USB output + FM radio, 1 3000 mAh battery + 1 integrated lamp, 4H to 17H depending on light intensity, 445K AR (min deposit 50K AR + weekly payments 9K);
- **Home 1550:** 3 hanging lamps, one with motion detector, 15 W solar panel, USB cable + adapters compatible with several types of phone, 2 USB outputs + FM radio, 1 x 10,000 mAh battery + 1 integrated lamp, 10H to 36H depending on light intensity, 597 AR (different payment methods but min deposit 69K AR + weekly payments 13K AR);
- **Home 5000 & 5000+:** 32" TV screen, 4 hanging lamps, 50W solar panel, USB cable + adapters compatible with several types of phone, 1 lithium-ion power battery 10,000mAh, 7.2H autonomy with TV and 1 lamp simultaneously, 2M AR (minimum deposit 250K AR + weekly payments 33K AR);
- **Congélateur maxi (maxi freezer):** 208L capacity, 5h charging time, 22h autonomy, 14M AR (initial deposit min 1M AR, then 186K AR/week);
- **Smartphone (Infinix & Itel):** Dual sim, android 18 , 5000 mAh battery, 600k Ar payable within 6 months. The first deposit is 102k.

Distributional impact

The customer base of Baobab+ is poor, although it does not entirely reflect the national distribution leaving a large part of the population behind. While 82% of Malagasy live under USD 1.25 a day, only 31% of Baobab+ customers fall into this category. Furthermore, 58% of Baobab+ customers live below USD 2.50 a day, compared to 96% of the national population living under this threshold. Despite Baobab+ having a geographic reach that covers the entire territory with 250 sales points, affordability seems to be a challenge. About 31% of customers consider the payments to be somewhat heavy to a heavy burden, and 8% report that they had to reduce their household food consumption to make repayments. This financial strain is also correlated with the duration the systems remained disabled, indicating that households were unable to access electricity during those times.

Baobab+ products are reaching a diverse client base with varying needs. The impact and results evaluation conducted by Baobab+ Madagascar in 2022 indicates that 52% of the customers are female, and 86% of the clients report that they do not have access to alternative energy solutions. Therefore, the products are reaching the people that are in most need. Additionally, 36% of the customers stated that it was their first time accessing a solar home system. The BioLite 5000 system, which is a 50W product that comes with a TV, has a higher rate of customers (68%) reporting prior access to SHS. This suggests that many customers are upgrading from smaller to larger systems. Conversely, buyers of the Sunking 40Z system, a 4W product, report a 59% prior use of solar home systems, indicating that most new subscribers are opting for smaller systems initially. This correlation highlights the tendency of users to start with smaller systems and potentially upgrade to larger ones as their needs and circumstances change.

Figure 73: Baobab+ products per household (17 households interviewed)



The Baobab+ SHS is primarily used by customers in rural areas who have higher than primary school education. Most Baobab+ users, representing 57%, are in villages or countryside areas, followed by 24% in peri-urban areas and 19% in urban areas. This distribution highlights varied needs; rural customers rely on the system as their main source of electricity, while peri-urban and urban users primarily use it during JIRAMA outages. Additionally, data indicates that individuals with higher than primary (lower secondary to tertiary) education are more inclined to access electricity, 92%, compared to those with primary or no education, 8%, likely due to relatively higher incomes and a stronger motivation to provide electricity for their children's education. Our survey suggests that leisure is the primary reason for using Baobab+ products. In contrast to WeLight, where productive energy is used to power relatively heavy machinery for productive purposes, Baobab+'s productive use mainly comes from providing night lighting, which extends working hours for businesses like restaurants and bakeries.

Governance

Norfund promotes good corporate governance through active participation on the Baobab+ Group board. They insisted on making sure that board membership reflects ownership interests and identified candidates for Norfund representation. Norfund appointed an external candidate, as a board member. The board consists of six directors:

- Three appointed by the Baobab Group (including the CEO of Baobab+ Group)
- Two independent directors proposed by the Baobab Group, one of whom Norfund must approve
- One director appointed by Norfund

Norfund’s right to appoint or confirm two out of six directors exceeds its 25% shareholding. Additionally, Norfund has nominated an internal board observer.

Norfund proactively played a role in governing Baobab+ by showing extensive knowledge and support. They actively facilitated the search for an independent chairman and the creation of a supervisory board using a skill matrix. They make sure that the proposed candidates were well-suited for their roles. Norfund's representatives possess valuable experience from Africa, including Nigeria, and a strong background in finance. Their constructive and supportive approach included setting high expectations while maintaining a positive influence through their global reputation in the sector. Norfund's presence on the board and participation in the audit and risk committee, as well as strategic committees, allowed them to challenge Baobab+ on various aspects. They emphasized unit economics, insisted on discontinuing unprofitable products, and advocated for necessary pricing adjustments to enhance financial sustainability.

Baobab+ Value

The value of Baobab+ Group has decreased in the last few years and the company is currently in financial distress. While we are not able to estimate exactly the current value of the company it is understood that the value has decreased substantially especially because of the devaluation of the hyperinflation in Nigeria and the subsequent devaluation of the Naira.

Unintended outcomes

Although the primary focus of Norfund's investment is to enhance access to off-grid electricity, the product range offered by Baobab+ in Madagascar has expanded significantly. For instance, Baobab+ now offers energy-efficient cooking stoves that use charcoal and achieve up to a 75% reduction in both energy consumption and smoke emissions compared to traditional cooking methods. This diversification has had positive unintended effects, including environmental benefits through reduced charcoal use and significant health impacts by lowering users' exposure to harmful smoke and particulates.

Another unintended effect of Norfund's investment is the facilitation of access to microfinance for Baobab+ customers. Through the pay-as-you-go model, customers establish a payment history that can be used to generate risk scores, demonstrating a lower risk of insolvency. These scores can then be leveraged to access microfinance through Baobab+ partners, thereby promoting financial inclusion and economic empowerment for the customers.

6.2.3.2 Additionality

Financial additionality

Norfund was one of several investors interested in investing in Baobab+ Group and was preferred due to the alignment of objectives. Baobab+ had an impact-oriented mission with a long-term vision, which matched Norfund's development impact goals and patient capital orientation.

Norf**und's investment in Baobab+ Group was sufficient to expand operations in existing countries and help open two additional countries - Nigeria and DRC**. The funding occurred in three stages:

1. **Initial Investment:** Subscription of a preferred share in the capital and a EUR 7.5 million bond redeemable in shares, completed on October 5, 2021.

2. **Second Tranche:** Granting of a second tranche of EUR 2.5 million, subject to financial criteria by Q3 2022.

3. **Conversion:** Conversion of the bonds redeemable in shares took place in January 2023, involving a capital increase of EUR 1.3 million and a share premium of EUR 6.0 million. The remaining amount (EUR 2.7 million) remained as a shareholder loan (SHL).

Additional financial support included:

- In December 2023, EUR 2.7 million of SHL was converted into equity, of which EUR 0.7 million of Norfund's SHL.

- A EUR 5.0 million waiver of shareholder debt was recorded in December 2023, of which EUR 1.2 million of Norfund's SHL.

- A new SHL conversion of EUR 2.5 million into equity was approved by Baobab+'s Board at the end of May, of which EUR 0.6 million of Norfund's SHL.

- In addition to the EUR 10.0m equity and SHL, a EUR 2.4m bridge loan was granted in June 2023. This loan was repaid in full (with accrued interest) in December 2023.

These investments demonstrate Norfund’s cautious approach because of the risk attached to this sector but at the same time a commitment to supporting Baobab+ through various stages of financial backing, emphasizing their shared vision for long-term impact and sustainability.

Norfund's investment was considered sufficient at the time to scale operations in existing markets and enter new ones. However, neither Baobab+ nor Norfund anticipated the financial distress the company

faces today. Due to decisions made and the challenging context previously described, the group is currently approaching several banks to raise debt. Consequently, the financial support is now considered moderately additional.

Non-financial additionality

Norfund supported Baobab+ Group beyond financial investment, contributing to strategic planning, capacity building, and facilitating access to additional funding sources. In terms of technical support, Norfund contributed EUR 100,000 for the Blunomy project, a strategic advisory consultancy with the objective to improve the overall strategy of the group carried out in 2023 with a total cost of EUR 200,000. Additionally, Norfund provided EUR 30,000 for the second phase of the Paygo Lab project, which focuses on capacity building for better credit risk monitoring related to the pay-as-you-go challenges faced mainly in Cote d'Ivoire and Senegal, with a total project cost of EUR 61,000.

Norfund's reputable standing in the financial sector aided Baobab+ Group's debt-raising efforts. The investment by Norfund was perceived as a sign of credibility by lenders such as Symbiotics for Baobab+ Holding, Cygnum Capital (OGEF) for Baobab+ Senegal, and Triple Jump for Baobab+ Côte d'Ivoire. Norfund's direct support for Baobab+ Nigeria is also under consideration, potentially through the issuance of a guarantee for the subsidiary's local financing.

Norfund's support for Baobab+ Group extended beyond financial investment, but due to this evaluation's focus on Madagascar, the non-financial additionality cannot be verified, as the support was primarily directed towards operations in Senegal and Côte d'Ivoire.

6.2.3.3 Sustainability

The financial sustainability of Baobab+ Group has not yet been achieved. The company faces numerous challenges across different countries. The viability of the pay-as-you-go model for solar home systems (SHS) is being questioned, prompting the need to diversify the product portfolio. Although Baobab+ has achieved some success in certain countries, it has also encountered significant issues, particularly due to capacity constraints during its expansion and the recent economic context marked by hyperinflation and currency devaluations in several countries. Additionally, political instability in Mali has led to the closure of several sites, further impacting the group's financial stability.

The financial profitability of Baobab+ Madagascar excluding subsidies is targeted to be achieved in 2024. Although the company reached profitability in 2021 and 2022, it failed to do so in 2023. The plan to regain profitability in 2024 hinges on better cost management and improving the quality of the portfolio by increasing the sales of larger, more profitable kits. The lack of profitability in 2023 has been attributed to inflation and the associated devaluation of the Ariary in Madagascar, mirroring challenges faced in other countries.

Achieving sustainable profitability in Madagascar could be further complicated by the government's ongoing plans, supported by the World Bank, to provide free access to SHS. The government in Madagascar has a history of supporting free access to off grid electricity especially solar home systems as a form of political leverage. And the planned delivery of more than 400,000 system for free using resources from world Bank can put extra pressure on companies in the sector. It is important to note that the profitability achieved in Madagascar to date has included subsidies, and demonstrating profitability without these subsidies remains a significant challenge. This adds another layer of complexity to the financial sustainability efforts of Baobab+ in the country.

There do not seem to be plans by Norfund to exit now, in line with the initial investment plans to retain shares in Baobab+ Group for at least seven years. While there is discussion within the Baobab Group about a partial exit, Norfund continues to show support and understanding of the situation. This includes assistance provided to the group to raise debt and leverage its network globally and at the national level to facilitate the continuation of its operations.

Table 56: Sustainability matrix Baobab+ investment

Sustainability factor	Score	Description
Financial Success	Medium	Baobab+ Madagascar achieved financial profitability in 2021 and 2022 but failed to do so in 2023. The company plans to regain profitability in 2024 through better cost management and promoting larger, more profitable kits.
Political/regulatory vulnerabilities minimized	Medium	The lack of political clarity and consistency presents an additional challenge for achieving financial profitability and sustainability. Especially the current plans to provide free of charge SHS supported by World Bank funds.
Risks minimized	Low	Risk rating “High” in the investment documents
Alignment with Government Priorities	Medium-high	The electrification of rural areas aligns with government priorities to achieve 70% of electrification. However, the government's approach of providing free solar home systems may undermine Baobab+'s operational sustainability.
Have an Exit Strategy	Medium-Low	Norfund initially planned to stay involved for 7 years showing its preparedness for high risks, understanding that the investment may take long to be profitable. However because of the current situation the exit strategy is no longer clear. Meanwhile, Baobab Group is showing signs of impatience.
Market Creation	Medium	The expansion of Baobab+ Group into Nigeria and DR Congo has been challenging. While it has been decided to withdraw from DRC the group remains committed to remaining in Nigeria. In Madagascar, the company is diversifying its product offerings and improving portfolio quality by promoting larger kits.
Management Quality Improvement	Medium	The group is facing challenging times with the departure of the founding CEO and several key staff. However, the team in Madagascar appears to be stable. Norfund minority share limits its capacity to influence decisions.
Competitive Pricing	Medium	Solar home systems are reported to be costly to acquire, particularly due to the initial investment required, which amounts to 18% of the total system cost. Difficult to compare pricing because of the lack of competition in this specific segment.
Demonstration Effect:	Low	The current financial distress and challenges faced by Baobab+ Group and its country offices may hinder the demonstration of positive effects at this point of time.

6.2.3.4 Mandate, positioning and operationalization

Norfund's investment in Baobab+ Group is structured with focus on balancing risk and return. The investment employs an 80:20 equity-to-debt ratio, mirroring Baobab Group's overall capital structure, which provides a balanced risk-return profile. Norfund's 50% preference on equity proceeds offers substantial downside protection. The staged investment approach, with a 75% initial investment followed by a 25% disbursement upon achieving revenue a certain level of revenue targets, introduces a performance-based element to the investment, thereby mitigating risk and aligning incentives. The ratchet mechanism further ties valuation to sales volumes and payment performance, ensuring a fair valuation and alignment of interests.

Although Norfund recognized from the beginning the challenges of opening two large new markets such as Nigeria and DRC, there is no data indicating any resistance to this plan. Ultimately, the expansion into these markets overwhelmed the company, which was operating with a thin layer of staff. The operations in DRC appear to have failed and are expected to be closed. Despite Nigeria's promising market potential, the operations in the country are facing challenges, and the subsidiary is currently raising debt from local banks with Norfund’s support.

Table 57: Baobab+ alignment with DIM mandate

Priorities	Mandate	Alignment (Positive)	Score
Developmental	To promote sustainable development by creating jobs and supporting local economies.	Norfund's investment in Baobab+ Madagascar has contributed to job creation and potentially economic growth. With over 250 sales points across the country, Baobab+ has created numerous employment opportunities, particularly in rural and peri-urban areas. The company employs more than 300 people in total, all of them locals, supporting the local economy and promoting economic development in underserved regions.	
Economic	To enhance economic growth by addressing financing gaps, stabilizing investment environments, and attracting private sector investments.	✓ Patient capital provided to expand operations and reach more customers. The regulation in Madagascar prohibits down payments for imports and only allows payment for goods upon their arrival in the country. Therefore, the initial tranche of payment made by the group is critical for the operations of the Madagascar subsidiary. ✓ Contributes to Madagascar goal of attaining 70% of access to electricity while preserving the environment. ✓ No additional private financing attracted so far	
Environmental	Prioritize investments in projects that reduce greenhouse gas emissions and promote environmental sustainability.	✓ The company's energy-efficient cookstoves reduce energy consumption and smoke emissions by up to 75%. ✓ Additionally, solar home systems helps decrease reliance on polluting sources of energy.	

Assessed against Norfund's internal strategy for the DIM, the investment is mostly aligned. The project is designed mostly in line with the main guidance for DIM investments.

Table 58: Baobab+ alignment with DIM strategy

Strategy dimension	Score	Assessment
Geography	Medium-High	Fund has global activities, all of them in LCD countries but Madagascar is not a core country
Segment/technology	High	Strategy emphasizes distributed generation and off-grid supply, both of which are targeted by the Fund
Instruments	High	Use of funds explicitly focused as new strategic area
Additionality	Medium	Financial additionality is low and non-financial additionality cannot be fully verified because of the focus on Madagascar.
Catalytic	Medium-high	Norfund's investment in Baobab+ was seen as a sign of seriousness by lenders such as Symbiotics for Baobab+ Holding, Cygnum Capital (OGEF) for Baobab+ Senegal and Triple Jump for Baobab+ Côte d'Ivoire.

Coherence

There are no other Norwegian businesses in the Solar Home System sector identified in Madagascar that overlap with Baobab+'s investment. Norfund has, however, several investments in Madagascar with two of them in off-grid (Baobab+ and WeLight) the others are in independent power producing sectors. Baobab+ and WeLight utilize different technologies and can be seen as complementary in their approach to providing energy access. While WeLight targets villages with a certain level of population density and economic activity, Baobab+ focuses on reaching more dispersed populations at the margins of villages and

in urban areas that are not suitable for mini-grid coverage. Otherwise, there is no overarching strategy for supporting the energy sector in Madagascar by the Norwegian government. WeLight is currently applying for grant funds through the Norad Energy Support Scheme. This grant funding can complement Norfund's efforts by enhancing the scalability and sustainability of WeLight's projects, potentially allowing for reduced prices, and enhanced higher access to electricity especially by the poorest.

6.3 Case studies: India

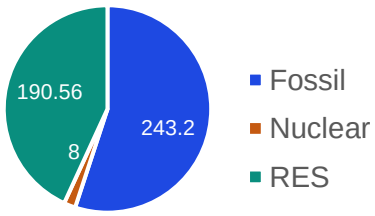
6.3.1 Background

6.3.1.1 India's renewable energy market

India is the 5th largest economy in the world and boasts a substantial energy demand. Its final energy demand in 2022-23 is 552 Million of tons of oil equivalent (Mtoe) and it has grown at a compound annual growth rate of 3.37% from 2012-13 to 2022-23 due to strong growth in economy, expanding population, urbanization, and industrialization[155]. Its primary sources of supply are coal, crude oil, natural gas, nuclear and renewable energy with conventional sources (coal, crude oil, natural gas) constituting ~95% of the total energy supply as of 2022-23[1]. Due to substantial share of conventional energy in India's energy mix, India has a massive carbon footprint of ~2.83 Billion tons of CO2 in 2022[156]. India is also heavily reliant on imports for Crude Oil and Natural Gas. In terms of final energy demand, electricity constitutes ~22% of the final energy consumption with balance ~78% constituted by coal, oil products and natural gas[1]. To promote energy security and decarbonization, India has set ambitious targets of being Net Zero by 2070 and achieving 500 GW renewable energy in its total installed capacity by 2030[157]. There is a strong push towards being energy efficient, increasing electrification wherever possible and increasing the share of renewables for electricity production and production of other clean energy fuels.

India has a total installed electricity capacity of 442 GW as of March 2024[158], which is rapidly growing. India's electricity mix has been seeing an impressive shift from conventional sources of energy to integration of more renewable and clean sources of energy, with installed capacity of renewable energy (including large hydro) constituting ~43% of all India installed capacity as of March 2024[159] and ~21% of total electricity generated in energy terms in FY 2023-24[160]. India is the fourth largest producer of renewable energy capacity globally[161]. India's solar power installed capacity increased ~29 times from 2.82 GW to 81.81 GW since 2014[162]. The wind capacity increased ~2.18 times from 21 GW to 45.88 GW since 2014[6]. Renewable energy capacity (including large hydro) has increased at a compound annual growth rate of 9.20% from FY 2019 to FY 2024[6]. The C&I sector has also surged and around 24 GW of projects have been set up across the country. About 30% of these installations pertain to rooftop solar while the rest are under Open Access mechanism[163].

Figure 74: Capacity Mix - GW (Mar'2024)



Source: CEA Installed Capacity Reports
**RES refers to renewable energy sources which include, solar, wind, hydro, biomass, pumped storage, waste to energy plants, etc.*

[155] Provisional numbers as per MOSPI Energy Statistics India 2024

[156] Running sum of CO_2 emissions produced from fossil fuels and industry measured in tons (land-use change is not included) – as per India: CO2 Country Profile - Our World in Data

[157] https://pib.gov.in/PressReleasePage.aspx?PRID=1795071

[158] As per CEA - IC Mar-2024 (allocation-wise).xlsx (cea.nic.in)

[159] As per CEA - IC Mar-2024 (allocation-wise).xlsx (cea.nic.in)

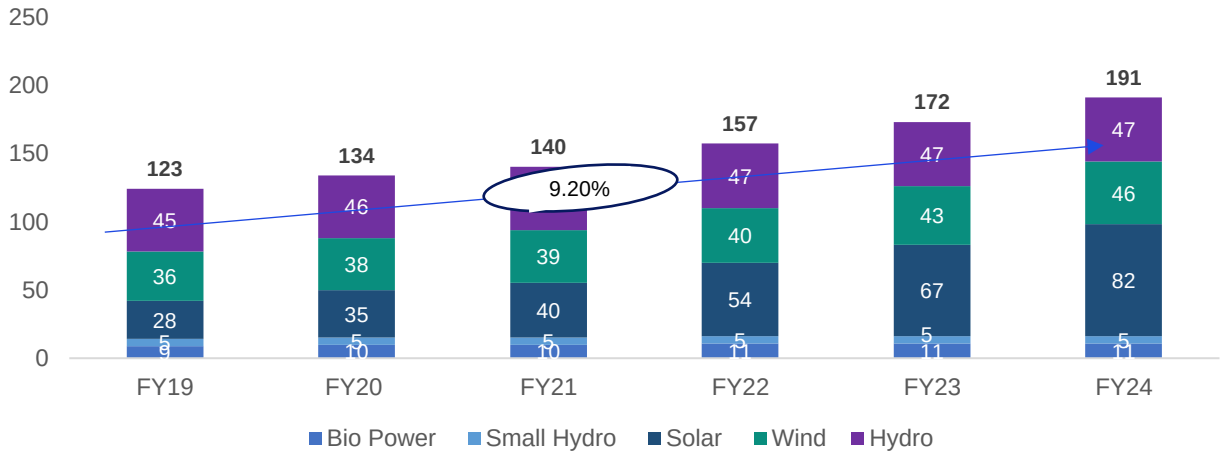
[160] As per CEA monthly renewable energy generation report, March 2024

[161] https://www.irena.org/Publications/2024/Mar/Renewable-capacity-statistics-2024

[162] Corroborated from installed capacity data furnished by CEA

[163] As per JMK Analysis

Figure 75: Growth in RE Installed Capacity including Large Hydro



Source: CEA Installed Capacity Reports; Bio-power includes waste to energy capacity

As the country advances economically, the need for reliable and consistent power supply has become more critical. This surge in demand is reflected in the electricity requirement which is expected to increase by ~5-6% along with peak electricity demand to touch ~350GW by FY30. Most of this increase will have to come from renewable energy, reflecting India's commitment to ambitious targets in COP 26[164]:

A. Reach 500GW non-fossil energy capacity by 2030

B. 50% of its energy requirements from renewable energy by 2030

C. Reduction of total projected carbon emissions by one billion tons from now to 2030

D. Reduction of the carbon intensity of the economy by 45 per cent by 2030, over 2005 levels

E. Achieving the target of net zero emissions by 2070

Higher penetration of renewable energy backed by storage solutions would be crucial in meeting these targets. As per India's Central Electricity Authority (CEA), India would need a total of 817 GW of installed capacity by 2030 and 27 GW of battery energy storage to achieve optimal generation mix. ~64% of the installed capacity is estimated to be from non-fossil sources, with major contribution coming from solar (280 GW) and wind (140GW). Storage energy solutions in the form of 10 GW of pumped hydro storage and 27 GW of battery energy storage is also necessary to achieve optimal generation mix[165].

The Government of India has had and continues to play a prominent role in governing and shaping the Renewable energy sector. It has rolled out variety of instruments to incentivize the maturity and growth of RE sector. After a slump in activity between 2019 and 2022 due to global price shocks and supply-chain issues brought on by the COVID-19 pandemic and Russia's invasion of Ukraine, the utility-scale and open access market has rebounded and gone from strength to strength. In FY2024, bidding for utility-scale renewable energy projects outstripped the government's ambitious target of 50GW with a record 69GW[166] bids primarily due to market growth potential, Central Government support in terms of targets, and regulatory frameworks. The Central Government and various State Governments have also been supporting the adoption of renewable energy through various policies and regulations enabling open access like the Electricity (Promoting Renewable Energy Through Green Open Access) Rules, 2022 for supporting open access for green energy.

The growth of India's RE sector is attributed to strong policy and regulatory support by Government of India as well as inflow of capital by domestic and foreign investors. Other important factors include continuous technology improvement and cost reductions. India is an attractive market for investments in this space among emerging markets as it has immense renewable energy potential and has substantial electricity demand, thereby providing adequate scale of deployment. Also, the long-term Power Purchase

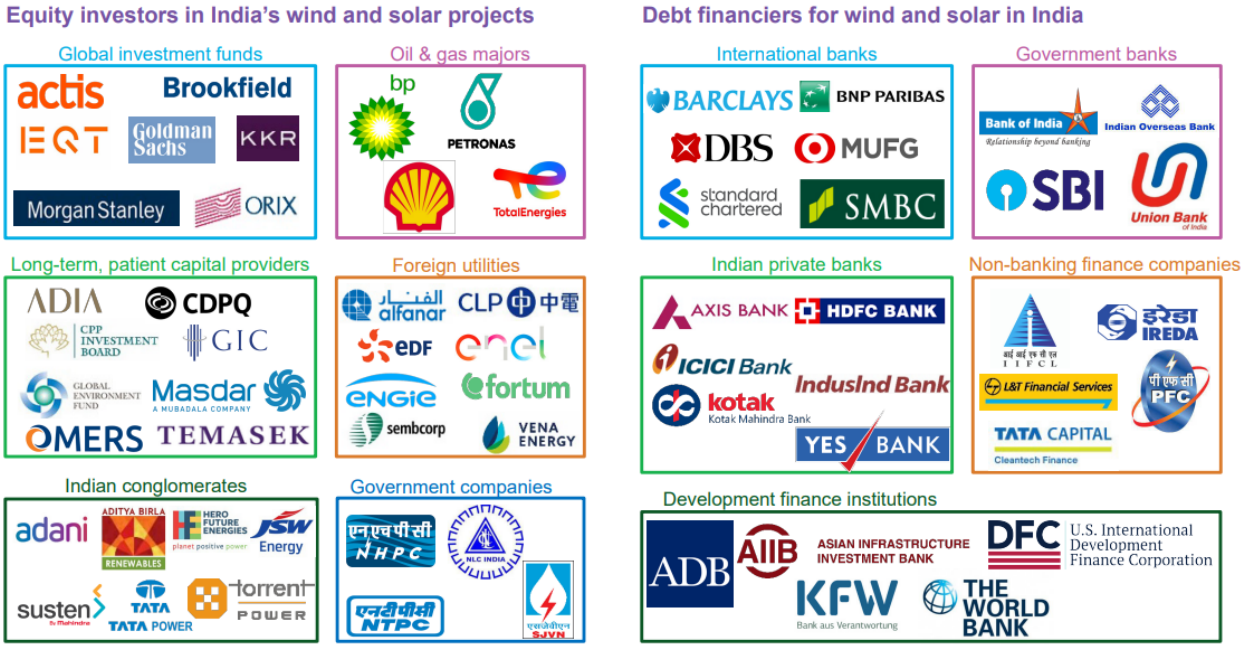
[164] Press Information Bureau (pib.gov.in)

[165] Optimal_mix_report_2029-30_FINAL.pdf (cea.nic.in)

[166] JMK Analysis

Agreement construct with utility provides cushion for de-risking the cash flows, making it attractive for investors to invest in yield type cash flows. India is one of the top 10 economies for energy transition investments, with an investment of ~$31.4 billion in 2023[167] spanning across renewable energy, power grids, electrified transport, dominated by investments in renewable energy.

The India renewable energy sector contains a large number of varied private and public sector players. Different kind of companies such as pure Independent Power Producers (IPPs), conventional Oil & Gas players, thermal power producers, public & private conglomerates, Public Sector Undertakings, players with substantial in-house captive demand are entering and diversifying into clean energy. These players are backed by diverse investors spanning across private equity firms, pension funds, sovereign funds, existing shareholders, promoter groups etc.



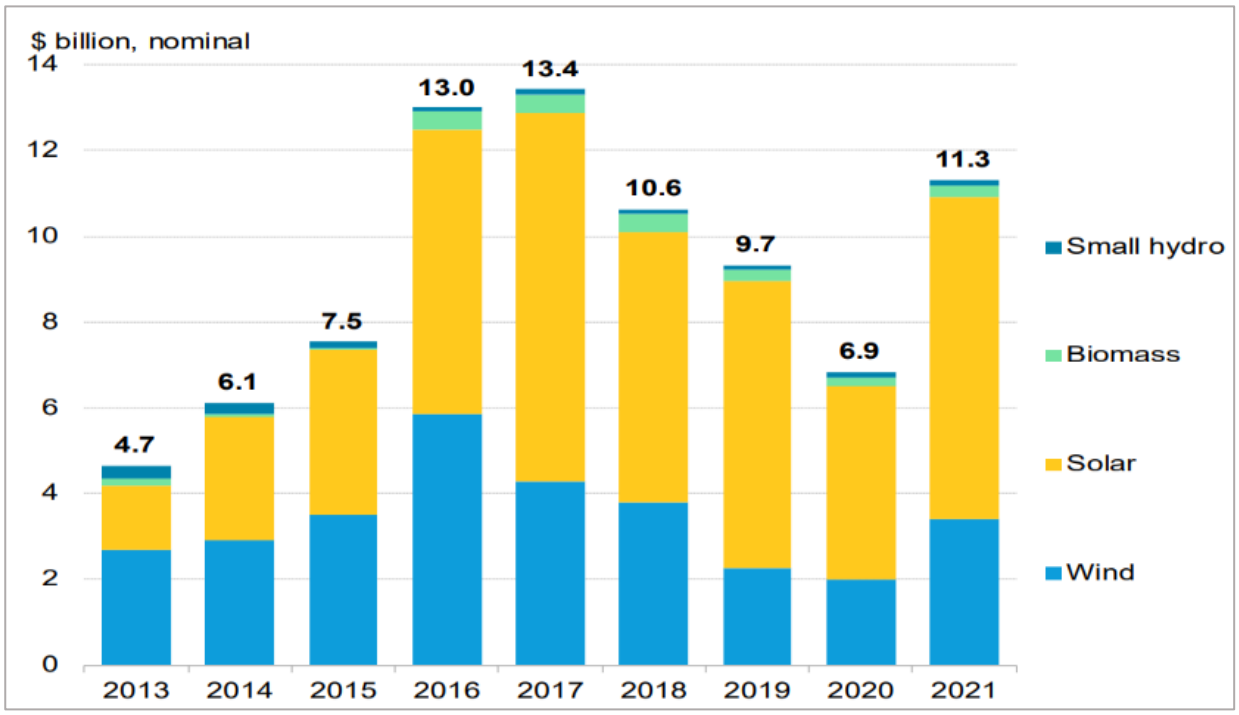
Source: Referred from BNEF report titled "Financing India's 2030 Renewables Ambition"

Investments in renewable energy in India have seen consistently high levels the last 10 years. As per BNEF, ~$11.3 billion of investments were estimated to be made in 2021 to construct greenfield projects, with significant amount flowing in the solar projects followed by investments in wind and minimal investments in small hydro and biomass projects. Investment in greenfield projects has grown at an impressive compound annual growth rate of ~12% over 8 years from 2013 to 2021 with >90% of the investments in solar & wind projects. If we also include mergers & acquisitions, in FY2021-22, investment in RE totaled a record US$14.5bn, an increase of 125% from FY2020-21 of US$6.4bn and 72% from pre-pandemic times in FY2019-20 of US$8.4bn[168].

[167] Bloomberg NEF

[168] As per report titled "Renewable Energy Investment Surges in India" by Institute for Energy Economics and Financial Analysis

Figure 76: Annual debt and equity investments in greenfield renewable energy projects India 2013-2021



Source: Bloomberg NEF.

Despite large inflows of investments, the financing gap in India is still very large. Currently standing at ~82GW of solar and 46GW of wind as of March 2024 necessitates adding additional 198 GW of solar and 94 GW of wind during the ~6 years from 2025 till 2030, translating to adding at least 33 GW of solar and ~16 GW of wind each year considering linear capacity additions. An estimated USD 223 billion is estimated to be required over eight years from 2022-29 to just meet India's solar and wind capacity targets[19]. Approximately USD 193 billion is projected to be required from 2025-29 for building new projects and batteries between 2025-29 to meet CEA's estimated optimal capacity mix 2030[19]. Assuming a 40% share of the C&I segment in subsequent annual solar and wind installations, approximately an additional 120 GW of C&I RE capacity is required to be set up by 2030. This translates to US$89 billion worth of investments flow into the sector between 2024 and 2030[169]. Finally, additional investment of ~$106 billion is estimated for transmission and distribution grid to support growth in power generating capacity[170].

6.3.1.2 Norfund's renewable energy portfolio in India

As of Q4 2023, Norfund had a total of 12 active renewable energy investments with assets in India, for a total commitment of NOK 3.5 billion. Historically, Norfund has not had a strong active engagement in India, but some regional and global investments under DIM have had a presence in India, and India is listed under the 2019-2022 Norfund Strategy as an *extended reach* country. This changed with the establishment of CIM in 2022, whose strategy has India as a *core country*, at the same time as India was removed as a focus country for DIM in its new DIM 2023-2026 strategy. Today (Q4 2023), CIM investments count for NOK 2.4 billion out of the NOK 3.5 billion of the total commitments, with the remainder being from global and regional DIM investments and one India-specific DIM investment in Fourth Partner Energy (Table 59).

[169] As per report by JMK titled "Financing Trends in the C&I RE market in India, June 2024"

[170] As per BNEF report titled "Financing India's 2030 Renewable Ambition"

Table 59: Investments

Investee	Mandate	Commitment year	Exit year	Committed in India, NOK (as of Q4 2023)
Statkraft International Hydro Invest AS	DIM	2002	2017	-
E&Co (Persistent Energy)	DIM	2009	2020	-
ICCF	DIM	2010		4,860,902 (regional)
d.light	DIM	2016		19,664,323 (regional)
responsAbility ACPF	DIM	2019		56,693,733 (regional)
Evolution Fund II (Through KNI)	DIM	2019		25,605,581 (regional)
Schneider Electric Energy Access Asia	DIM	2019		20,614,700 (regional)
Fourth Partner Energy	DIM	2021		905,168,844
Enel Thar Solar	CIM	2022		276,523,066
Enel Coral	CIM	2022		430,236,047
SAEL	CIM	2022		1,126,507,122
Koppal Narendra	CIM	2022		61,879,367
Gadag Transmission	CIM	2023		107,322,831
Fourth Partner Energy	CIM	2023		431,514,820

6.3.1.3 Case study investments

Three investments were selected for case studies India, representing both DIM and CIM activities in India. Table 60 summarizes the three investments. Note that Fourth Partner Energy is an investee of both Norfund directly and indirectly through the ResponsAbility ACPF fund, so the asset examined for both investments is the same physical project (Gondal).

Table 60: India case study investments overview

Project information	Enel Coral	ResponsAbility ACPF	Fourth Partner Energy[171]
Mandate	CIM	DIM	CIM
Approved IC	11/2022	08/2019	06/2023
Sector	Wind	Multi	Solar / Distributed Energy
Norfund investment (million NOK)	430.2	56.7 in India, 111.2 total	431.5
Instrument	Equity	Fund (Equity)	Equity
Description	IPP SPV with PPA to government utility off taker. 80 Turbines, 168 MW.	Energy access and C&I fund focusing on Africa and Asia	Leading C&I provider, wind and solar, on-site and off-site, multiple investment models
Case study asset	Avikiran Solar India Pty Ltd[172]	Gondal project (Fourth Partner Energy)	Gondal project

[171] Note that Norfund has invested in Fourth Panrter Energy through both the DIM and CIM. The investment under study in the case study is the CIM investment of 2023.

[172] Somewhat confusingly, the SPV used for the investment is named Solar, but the plant is based on wind turbines

6.3.2 Enel Coral

Project information	Enel Coral
Mandate	CIM
Approved IC	11/2022
Sector	Wind
Norfund investment (million NOK)	430.2
Instrument	Equity
Description	IPP SPV with PPA to government utility off taker. 80 Turbines, 168 MW.
Case study asset	Avikiran Solar India Pty Ltd[173]

The Enel Coral project is a 168MW greenfield wind turbine park co-funded with the international renewable energy company Enel Green Power (EGP). The investment from the Norfund CIM was made together with the Norwegian pension fund KLP (through an entity called KNI India AS). Norfund signed a joint investment agreement with EGP in 2020, which serves as a strategic basis for Norfund jointly finance, build, and operate individual projects together with EGP. Under the agreement, Norfund commits to replace "bridge" construction funding provided by EGP during the construction phase. Both parties take macro-economic risks from the bidding phase, while EGP takes the construction risk until commercial operation date. In effect, this means Norfund (KNI in this case) transfers funds that EGP has been "fronting" for the construction, for already constructed projects, but the commitment from Norfund is there already from bidding. In the case of Enel Coral, KNI provided equity financing amounting to a 49% minority share in the project, which was injected after commissioning in 2022. The project started through an auction-based procurement round in 2018 from the off-taker, the state-owned utility SECI, where Enel was awarded a 285MW contract at INR 2.51 per unit. The project currently provides renewable energy to SECI under a 25-year INR PPA.

6.3.2.1 Impact and effectiveness

Development outcomes

The Norfund investment is on track to meet its objectives as approved in the final investment committee document. The target production capacity of 168 MW has been achieved, and the annual CO2 emissions avoided are almost on target – a bit below due to poorer than expected wind conditions (see Table 61). It should be noted, however, that the original project as proposed to the investment committee in 2019 and 2020 targeted a production capacity of 285MW, but the original project was scaled down because of issues with the Engineering, Procurement, and Construction (EPC) subcontractor during the construction phase. This (285MW) is also the capacity under the original PPA as awarded to the project in 2018[174]. The reason the Norfund investment so quickly met its targets (investment approved in 2022, full targets on capacity met in 2023) is that the construction was already completed by the time the investment was approved, due to the structure of the financing deal (see above).

Table 61: Investment targets and achievement (as of 2023), Enel Coral

	Baseline	Target	Achieved (2023)
Renewable MW financed (greenfield)	0	168	168
Tons CO2 avoided annually	0	572,934	530,447

Factors conducive to the investment's success (in hindsight) include a strong investee and good conditions for investments. Firstly, Enel is a global leading energy company with abundant experience, and makes for a strong partner for development and execution of IPP projects in India. Secondly, government regulations, the powerful off-taker in the form of SECI, competitive bidding processes, availability of land and evacuation, etc., make for very good enabling environment for renewable energy IPPs

[173] Somewhat confusingly, the SPV used for the investment is named Solar, but the plant is based on wind turbines

[174] SECI/C&P/WPD/2000MW/T4/RfS/022018 dated 05.02.2018

in India (compared to other countries). Some challenges were posed by external factors, notably the EPC not being able to supply equipment as scheduled, which caused the reduction from 285MW to 168MW.

There are indications of very minor unintended positive as well as negative externalities associated with construction and operation of the project. Examples of positive outcomes include building access roads for accessing the site, creating employment for local people, as well as the CSR activities including supporting social causes such as tree plantation, rainwater harvesting etc. Although the evaluation team did not explicitly follow up on reports of negative externalities, various sources have reported risks to local ecosystem, habitats, flora and fauna, as well as noise pollution[175]. The company has set up a grievance redress mechanism which has received a number of smaller concerns, but they have mostly been addressed.

6.3.2.2 Additionality

The investment was made in a highly competitive market with large flows of both domestic and international private capital, but also large funding gaps. India's renewable energy market has been booming in recent years, on the back of government push and regulatory incentives, as well as large inflows of capital. As discussed above, India has set ambitious renewable energy targets by 2030, which require a considerable scaling up of investments, and there is still a large and persistent financing gap to be filled by investors. At the same time, India has a strong projected pipeline of new developments, with ~108 GW to be commissioned in 4 to 5 years, with another ~70 GW under the bidding phase as of March 2024[176]. Government policies provide for special treatment of FDI[177] in the renewable energy sector in order to meet its ambitious targets, with 100% FDI being allowed under automatic route with no prior government approval. According to a 2023 UN report, India is the largest recipient of FDI in developing countries in Asia region[178]. A prominent BloombergNEF report calls India "the most attractive investment destination for renewables among emerging markets" in 2021, having consistently ranked first due to its "[t]ransparent market mechanisms, supportive policies and ambitious government targets" (p.11.)[179]. As seen in the introduction to this case study, India has seen annual investments in greenfield renewable energy projects around USD 7-14 billion between 2016 and 2021.

The investment committee documents do not argue the case for additionality very strongly. The justifications for additionality in the documents are very brief, and mainly limited to the mobilization aspect. On the additionality calculator, very low scores on the market and sectors are achieved (1 out of 5), with the rest of the score coming from instrument used (equity), mobilization and non-financial additionality (see Table 62). Without the non-financial additionality, the investment would have been at the threshold for special justification of additionality, which ideally should prompt an additional pressure to provide a strong qualitative justification for the financial additionality. The documents could do a better job as justifying why a Norfund investment is needed in a competitive market with already large flows of FDI (see background above). The evaluation team has not been privy to further documents or evidence of further or more detailed market assessments arguing for financial additionality.

Table 62: Enel Coral investment additionality scores according to Norfund additionality calculator

Financial Additionality indicator	Score
Investing in the poorest countries	0.5
Investing in the most capital constrained markets	0.5
Investing in the riskiest markets	0
Investing in sectors with high development needs	0
Investing in high risk instruments	1.0
Targeting underserved segments	0
Mobilizing private investors	1.0
Financial Additionality score	**3.0/7.0**

Non-financial Additionality indicator	Score
Taking an active role in investments	1.0
Improving social and environmental performance	1.0
Supporting enterprise development	1.0
Non-financial additionality score	**3.0/3.0**

[175] See for example Robberstad (2024) https://www.duo.uio.no/handle/10852/112203

[176] As per JMK report titled "RE Update Q1 2024"

[177] India is already the 8th largest recipient of FDI globally in 2021-2022, and third largest in terms of number of greenfield projects (UNCTAD WIR 2023)

[178] UNCTAD WIR 2023

[179] https://assets.bbhub.io/professional/sites/24/BloombergNEF-Financing-India%E2%80%99s-2030-Renewables-Ambition-2022.pdf

It is difficult to prove whether Enel could have raised financing from other providers than Norfund or not. Enel was looking for a specific investor with specific sets of priorities and objectives in India at the time of signing the Joint Investment Agreement, which made Norfund a good fit. Norfund was willing to provide patient capital, take a large minority stake, and ready to go into investment opportunities as they arose (through the framework agreement). In addition, there are indications that Norfund provided funding on the very best financial terms available (in terms of low Norfund IRR), which made it the financially best available option for Enel, compared to alternatives. At the same time, Enel Coral is not a particularly unconventional project, it enjoys the stability of a strong and stable off-taker (SECI), it is supported by very supportive enabling political environment for renewable energy in India, with land and connectivity secured, and the sponsor (Enel) has a proven track record, which suggests it should not have been difficult for Enel to secure funding for a project such as Enel Coral. However, it can be argued that given Enel's specific requirements for investors, they might not have been able to implement projects in the competitive market without Norfund (or another investor on similar beneficial terms), as Norfund's lenient terms allowed Enel to offer low tariffs.

However, it is not obvious that the project would not have been built by other competitors, thus achieving the same development effects on similar terms. As described above, the IPP sector in India is highly competitive, and marked by a downward push on prices. The PPA with the utility to the Enel Coral was awarded on the basis of a competitive auction process, where 2,000MW of energy was awarded to a total of 8 companies. The winners are shown in Table 63, and illustrate the competitiveness of the market, with multiple bidders achieving a contract on similar tariffs. It is difficult to argue that in the absence of the Norfund investment and the Enel bid on this contract, the 168MW outcome of the Norfund project would not have been obtained by some other competitor (albeit for 0.01 rupee more per kWh).

Table 63: SECI Selection of 2,000MW Wind Power Projects Tranche 4 (2018)

Bidder's Name	Bidder's Quantity (MW)	Tariff (INR/kWh)	Awarded capacity (MW)
Srijan Energy Systems Private Limited	250	2.51	250
Sprng Energy Private Limited	300	2.51	300
[Enel Coral]	**285**	**2.51**	**285**
Betam Wind Energy Private Limited	200	2.51	200
Inox Wind Infrastructure Services Limited	100	2.51	100
Adani Green Energy (MP) Limited	250	2.51	300
Mytrah Energy (India) Private Limited	300	2.52	300
Renew Wind Energy (TN) Private Limited	300	2.52	265
Colossal Power Private Limited	200	2.52	None
Hero Wind Energy Private Limited	298.2	2.6	None
Orange Saundatti Wind Power Private Limited	100	2.67	None

Source: SECI/C&P/WPD/2000MW/T4/RfS/022018 dated 05.02.2018

It is difficult to determine to what extent Norfund brought material non-financial additionality to the project. As an active owner, Norfund has participated on the Board of the SPV, and voted on policies, strategies and procedures. However, it is difficult to determine what the Board would have looked like with another minority shareholder. The co-investor Enel (one of the world's leading renewable energy IPPs, managing 64GW of renewable energy capacity across 30 countries) already has strong policies, procedures, E&S practices, ESG standards and so on, that potentially limits the value add of Norfund. According to Norfund, some aspects provided by Norfund include "enforced % limit on turbines nearing wildlife sanctuary" and "enforced need for additional critical habitat studies and additional CSR activities within the local community."

No specific signs of demonstration effects have been observed with Norfund's investment in this project as India has been an attractive market for RE investments in these kind of projects for different kind of investors including international investors even before Norfund entered the Indian market. But due to the presence of Norfund, it can be deduced that the incoming investors would be more interested to co-invest or buy the stake in the Norfund's investee company considering Norfund's high quality

standards along with its ability and expertise to de-risk the companies as well fine tune the governance and ESG standards.

6.3.2.3 Sustainability

The project was created with strong conditions for sustainable impacts over the medium term. The project is likely to be commercially successful, considering the long PPA, strong government utility off-taker (SECI) and operations to date. Government policies on renewable energy are highly conducive to investments and operations of renewable energy and are not likely to change over the near term.

Table 64: Sustainability matrix Enel Coral investment

Sustainability factor	Score	Description
Project has to be financially successful	High	Some risk of the downscaling from 285MW to 168MW might impose financial losses
Political/regulatory vulnerabilities minimized	High	No political or regulatory vulnerabilities identified
Risks minimized	Medium	'Medium' risk rating in investment documents
Alignment with government priorities	High	Highly aligned with India government plans for increasing renewable energy
Have an exit strategy	Medium	The original plans for exit have been disrupted to some extent by recent business developments in Enel[180]
Investing in existing market	High	Renewable IPP sector well established
Improving management quality of project (By providing technical assistance (business support))	Medium-High	Enel already had strong processes and project management capacity. Sustainability-wise this is a good indication, but attribution to Norfund can be questioned (see Section 6.3.2.1)
Price vs alternative technology/energy sources	Medium	Some risk of technological disruption making existing technology in Enel Coral more expensive than alternatives (i.e. cheaper technology becoming available within the 25 year span of the PPA)
Potential for demonstration effects	Low	Market was already established, and both technology and business model were demonstrated to be viable already

6.3.2.4 Mandate, positioning and operationalization

The investment's objectives are highly aligned with the CIM mandate, and broader project design is mostly aligned. The investment's objectives are squarely within the CIM mandate of producing renewable energy and reducing emissions. However, as argued above, the investment is not convincingly in line with the mandate's focus on additionality. See Table 65.

Table 65: Enel Coral alignment with CIM mandate

CIM mandate	Score	Assessment
Contributes to reducing or avoiding greenhouse gas emissions by investing in renewable energy in developing countries with extensive emissions from coal-based and other fossil-fuel power generation	High	Direct impact on renewable energy available. India is highly coal-based.
Promote investments in renewable energy that would not otherwise take place	Low	See Section 6.3.2.2 on additionality above
Focus shall be on profitable projects, investment shall be based on commercial terms	High	Project commercially profitable and won competitive auction on market terms.
Investments in accordance with the national energy and climate plans of investment countries	High	Highly aligned with India's policies on renewable energy.

Assessed against Norfund's internal strategy for the CIM, the investment is mostly aligned. The project is designed mostly in line with the main guidance for CIM investments in the CIM strategy (Table 66).

[180] Details are confidential

Table 66: Enel Coral alignment with CIM strategy

Strategy dimension	Score	Assesssment
Geography	High	Priority country (India)
Segment/technology	High	Priority segment (IPP)
Risk/return profile	Medium-Low	Technology commercialization risk not particularly high
Investment type	High	Investment through partnership (Joint investment agreement with Enel, KNI co-financing platform with KLP)
Project development	Medium-Low	The project is arguably not early-stage project development, but rather operations. However, according to Norfund they were involved also in the development phase, influencing the design of the project.
Instrument	High	Priority instrument (Equity)
Ownership/ticket size	High	Within special bounds of "accept up to 49% [stake] with strategic partners"
Mobilization	High	Mobilization through partnership (KNI co-financing platform with KLP)
Exit	High	Exit planned

Coherence

The Norfund investment has successfully mobilized commercial funding from KLP. Through the co-investment facility KLP Norfund Investment AS (KNI), Norfund has been able to mobilize large amounts of commercial funding for the project, which in effect implies leveraging capital to achieve larger development effects for less Norfund commitment. KLP prefers to invest with investment managers including DFIs in order to leverage their expertise and networks, however in theory it does not strictly have to be Norfund, and Norfund does not provide any political protection or de-risking to the project beyond what a commercial investment manager could theoretically provide.

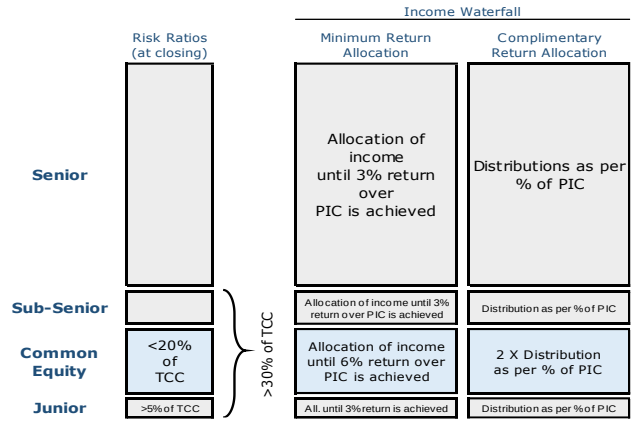
There is no evidence of coordination, collaboration or cooperation with other Norwegian development actors, and this is not seen as within Norfund's mandate. Although the Norwegian MFA has an explicit strategy for cooperation with India (Norway – India 2030: The Norwegian Government's strategy for cooperation with India), which indeed does have Energy as one of five priority areas, Norfund is not mentioned or envisioned in this strategy. Stakeholders on either side (Norfund or Norwegian development establishment) do not consider explicit cooperation or coordination part of their mandate.

6.3.3 ResponsAbility ACPF

	ResponsAbility ACPF
Mandate	DIM
Approved IC	08/2019
Sector	Multi
Norfund investment (million NOK)	56.7 (in India; 112.4 in total)
Instrument	Fund (Equity)
Description	Energy access and C&I fund focusing on Africa and Asia
Case study asset	Gondal project (Fourth Partner Energy)

The Norfund investment is an equity position in a USD 160 million debt-fund, Access to Clean Power Fund (ACPF). The fund, managed by ResponsAbility, targets access to energy and distributed generation through C&I and provides 3-8 year debt to companies in Asia, Africa and Latin America. It is a follow-up from an earlier pilot fund managed by ResponsAbility, the Energy Access Fund. Norfund has a USD 12 million share in the mezzanine tranche, the second most junior of four tranches; the tranches determine risk and profits from the fund (see figure 77). The fund is mainly funded by other DFIs, impact investors and foundations.

Figure 77: Risk and income structure, ACPF



Norfund has in addition contributed grant money to the fund's Technical Assistance Facility (TAF), which supports its portfolio companies to streamline processes, conduct studies etc. to be able to operate effectively and efficiently. It is intended to help its portfolio companies through independent technical assessments, capacity building in financial models, environmental and social risks management, data generation and benchmarking, technical and E&S risks assessments in new markets etc.

The asset examined under ACPF is through the fund's investment in Fourth Partner Energy, which is also a direct investee of Norfund. Further details on Fourth Partner Energy can be found in Section 6.3.2.

6.3.3.1 Impact and effectiveness

Development outcomes

Tracking of development outcomes for ACPF has been challenging as the fund does not align reporting practices with Norfund's frameworks and procedures. Norfund requires development effect data reported in March, but ACPF normal reporting is not before end of June. Therefore, the fund manager submits a separate preliminary dataset to Norfund in March, but this does not contain all indicators. Combined with low data quality of data received, and constantly updating data systems in Norfund, this leads to a patchy set of indicator data. The analysis therefore instead relies on the Annual Report data from ACPF.

Most of the investment's objectives have already been met as of performance in 2023. Apart from direct job creation, all five core objectives of the investment are achieved under the current portfolio. As they are mostly annual targets, this does not mean they will necessarily continue to be met, but there is little to suggest that performance will be reduced. It should be noted that the indicator values are what is reported

from ACPF's client companies, but they show a value at a certain date (with no regards to baselines), and the totals can not be attributed to ACPF[181]. In order to capture the investment's outcomes and impacts it would perhaps be more meaningful to provide cumulative targets as opposed to annual targets.

Table 67: Results framework ACPF

Objective	Achieved (2023)[182]
Finance at least 20 borrowers within the C&I and energy access space	20
Over 6000 jobs	4,516 (full time employees)
170 GWh of clean energy produced per annum	468.7 GWh
300,000 tons of CO2eq avoided per annum	629,090 (Annual CO2 savings)
6 million people getting improved access to electricity	18 million (No of people with improved energy access)

The fund has shifted its focus somewhat compared to the original plan from access to energy towards C&I. While the fund was set up to target both access to energy and C&I (climate impact), the balance has been skewed somewhat during implementation towards the latter, due to market conditions (energy access companies suffered more during COVID, especially in Africa; the market for C&I has expanded much faster and offers more interesting investments for the fund)[183]. This has, on the margin, led to the fund performing better on the objective of climate impact and worse on the access to energy objective, but based on the results framework, both are achieved in absolute terms.

Norfund's investment in the fund can be considered a success as it has been able to successfully meet its development impact targets. It has been able to achieve so due to tie up with an experienced fund manager with proven track record & strong market position. The presence of senior tranches provide gearing effect to increase common equity returns with the first loss protection from junior tranche. Also, the fund managers gained on ground experience through its earlier pilot fund, ResponsAbility Energy Access Fund - "REAF", which lent USD 34m to 10 companies in this segment with no losses.

Unintended outcomes

None reported

6.3.3.2 Additionality

It is difficult to assess the ex-ante additionality conditions for the fund's investments because of the broad scope and large number of investments. On the one hand, in terms of country conditions, ACPF is a global fund, the planned target regions were Africa, Asia and Latin America, with quite different conditions in terms of investment flows and capital needs. On the other hand, the energy access and C&I segments were *generally* across these countries (in particular in 2019) relatively small markets. This was also identified during the pilot predecessor fund.

The investment documents do not make a strong case for the additionality of the investment. The final investment document, approved in August 2019, is from before the adoption of the new additionality framework, however the CIP does contain a rudimentary proto-version of the framework. This does not give a very comprehensive description or case for why Norfund's investment is additional, however. The main argument presented is that Norfund's funding is needed to close the mezzanine tranche. Beyond this there is hardly any mention of the challenge of additionality outside of this in any document, and it does not appear this was discussed to any extent during the IC meetings.

There is limited evidence that the Norfund investment in the ACPF fund was additional, but it is also difficult to prove that investment definitely was not. The Fund is structured in four tranches, with increasing risk the more junior the tranche. The Norfund investment was one of multiple investments at the common equity tranche (commonly referred to as *mezzanine tranche*), albeit the largest one, composing 12

[181] For perspective, ACPF provides the value of both the total renewable energy capacity provided by investee companies (1,593MW) and the attributable capacity (288MW)

[182] As per ACPF Impact Report 2023

[183] The changes were met with varying reception from investors in the fund (some wanted more energy access, some wanted more C&I)

out of the 32.3 million USD in the tranche (see Table 68). While the evaluation team has not able to map the precise chronology of the Fund's fundraising, from interviews with stakeholders it is clear that i) many of the funders continued from the pilot fund (Energy Access Fund) to the ACPF, which suggests a small role for Norfund in terms of additionality, and ii) the presence of IFC in the shareholder structure made a distinct impact on reassuring other funders, which also suggests a small role for Norfund. However, the Fund did also spend some time fundraising (- December 2019), and the mezzanine funding provided by Norfund needed to be filled by *someone* in order complete the equity structure, which suggests the Norfund investment *might* have been additional[184]. At the same time, while fundraising is not easy for a new fund with specific narrow mandate like ACPF, it is certainly true that identifying the junior tranches is more difficult than the mezzanine tranche funders. This is further evidenced by the fact that ResponsAbility's new fund requires DFIs to bring 'junior money' with their 'senior money'. In any case, it is clear that most of the financing in the fund is from DFIs, and so it is difficult to determine "who mobilized who", and who were additional compared to others. It might also suggests that commercial investors have less interest, and thus Norfund being additional. In summary, the additionality of the investment is undetermined.

Table 68: Investor composition ACPF

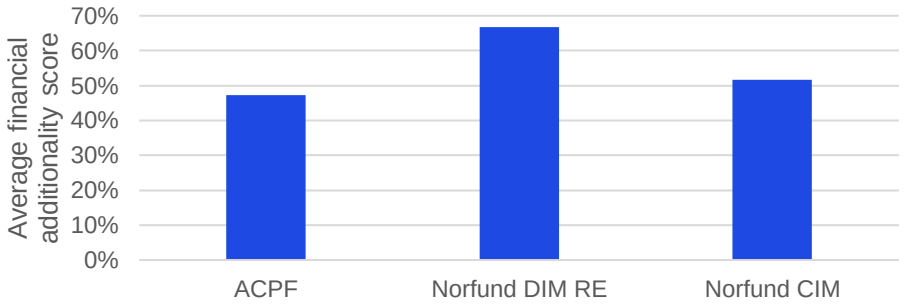
Investor	Investment (million USD)
Junior tranche	**9.0**
Luxembourg Government (via EIB)	5.5
Shell Foundation (SF)	2.0
USAID (via Shell Foundation)	0.75
responsAbility Investments AG	0.75
Common equity Tranche	**32.3**
Norfund	***12.0***
FMO	7.8
OeEB	5.0
Bank of America (possibly via Calvert Foundation)	4.0
Lundin Foundation	1.5
Sahee Foundation (HNWI - via OnValues)	1.5
responsAbility Investments AG	0.5
Sub-Senior Tranche	15.0
CTF via IFC	15.0
Senior Tranche	**103.7**
IFC	30.0
EIB	30.0
OeEB	15.0
FMO	14.7
Triodos	5.0
Calvert Foundation	5.0
Various Institutional	2.0
Sahee Foundation	2.0
TOTAL	**160.0**

Individual investments under ACPF vary in their anticipated financial additionality, but one would not expect them to be as additional as Norfund's direct investments, as the fund doesn't have the same additionality mandate. Unlike Norfund's own portfolio, the ACPF is not mandated to strictly do additional investments that no other investor would do. The fund is, however, mandated to target certain geographic areas and segments (access to energy and C&I) which are, by proxy, likely to be additional in many markets. But an analysis of the portfolio shows that the aggregate additionality score of the ACPF investments are lower than the Norfund RE portfolio (Figure 78). One obvious difference from the broader Norfund RE portfolio is that all the ACPF investments are in debt, which is considered less additional in Norfund's internal

[184] This is also the formal justification for additionality in the Norfund CIP: "Norfund's investment is required to complete the mezzanine tranche of the fund, that is needed to trigger the full funding of the senior and sub-senior investors".

additionality framework. A second factor is that some investments are clearly outside the Norfund mandate and score poorly on the additionality calculator, including investments in Thailand and Seychelles (which account for around 5% of the portfolio size).

Figure 78: Average (unweighted) financial additionality scores ACPF, Norfund DIM RE, and Norfund CIM[185]



The extent of additional non-financial value in terms of standards and ownership is limited in a fund already crowded with other DFIs, but Norfund did support the technical assistance program. Most DFIs are quite aligned in terms of ESG and other standards (following IFC performance standards), so it is difficult to prove that Norfund contributed anything more than the already existing DFIs. On the other hand, Norfund was one of few DFIs supporting the fund's technical assistance facility (TAF) which supports the portfolio companies through knowledge dissemination, capacity building, undertaking risk assessments etc. Furthermore, Norfund also held a seat on the Investor Advisory Committee, but again it is difficult to determine what Norfund's contributions were compared to other DFI investors.

6.3.3.3 Sustainability

The extent of sustainability factors being built into investments vary by project. ACPF is a closed end fund, scheduled for closure after 10 years, i.e. 2029, by when the funding will be returned (with profits) to investors. The hope is that investee companies will continue operations after they have repaid debts to ACPF.

Table 69: ACPF sustainability matrix

Sustainability factor	Score	Comment
Project has to be financially successful	High	Good prospects for commercial success, that has been borne out in practice
Political/regulatory vulnerabilities minimized	Medium	Large variations between countries, but general mandate of fund is to invest in countries with some political vulnerabilities
Risks minimized	High	'Low' risk rating in investment documents
Alignment with government priorities	Medium	Some targeted countries have stronger government backing of C&I/Access to energy projects than others
Have an exit strategy	High	Fund is designed with sunset clause, set to close by 2029. Loans to end clients are time bound.
Investing in existing market	Medium	Large variations between countries
Improving management quality of project (By providing technical assistance (business support))	High	Where this is applied, it is reported to have strengthened businesses
Price vs alternative technology/energy sources	Medium	Some risk that small scale off-grid solutions eventually will be replaced by grid solutions, even smaller risk in the case of C&I
Potential for demonstration effects	High	Large variations between countries, depending on existing market, but general trend is that off-grid access to energy is underdeveloped in most countries

[185] ACPF projects have been scored according to Norfund's additionality calculator. Due to data availability, scores are calculated across only 6 of the 10 indicators: Investing in poorest countries, investing in capital constrained markets, investing in riskiest markets, investing in sectors with high development needs, investing in high risk instruments, targeting underserved segments.

6.3.3.4 Mandate, positioning and operationalization

The investment is to a large extent in line with the DIM's mandate. The objective of the investment, to "provide access to energy services to an underserved population in core investment countries" fits squarely with the DIM mandate of developing sustainable business and industry in developing countries. As discussed above, however, it is not clear that the DIM mandate of additionality is convincingly established.

The investment is to a large extent in line with the operationalization of the mandate in the form of the DIM strategy[186]. Renewable energy is one of the four core sectors for the DIM strategy, and the strategy specificallyemphasizes (i) energy access and (ii) distributed energy, which together constitute the two pillars targeted by ACPF. However, investments under ACPF vary in their focus on access to energy versus or distributed generation (C&I), with varying degrees of linkage with the ultimate goal of the DIM (improving living standards). Distributed generation is likely more effective at reducing emissions (as they produce more energy, and more likely to be in countries with already high emissions), but this is strictly speaking not really ultimate goal of DIM (unlike the CIM). As an example, the clients of the Indian C&I company Fourth Partner Energy (which is receiving funding from ACPF) already have access to energy, but they want to change coal-based grid electricity to renewable energy. It is not clear that this drives towards the DIM objective of "creating jobs and improving lives." It is notable that the CIM has later invested in Fourth Partner Energy with equity, which might be a better fit strategy-wise (see Case Study 6.3.4).

Table 70: ACPF alignment with DIM strategy

Strategy dimension	Score	Assessment
Geography	Medium	Fund has global activities, Strategy has allowance for "extended reach countries" for Funds, but the fund includes investments in countries like Thailand and Seychelles that are outside the geographical scope of the strategy. 51% of fund investments by value are in India, which is not core country for DIM Renewable Energy.
Segment/technology	High	Strategy emphasizes distributed generation and off-grid supply, both of which are targeted by the Fund
Instruments	High	Use of funds explicitly focused as new strategic area
Additionality	Medium-Low	Case for both financial and non-financial additionality is unverified.
Catalytic	Medium-Low	Norfund investment not likely to have mobilized the other participating investors

Coherence

There is no evidence of cooperation, collaboration or coordination with either Norwegian development actors or private Norwegian commercial actors. Because the investment activities and decisions are outsourced and not controlled by Norfund, there is in any case little Norfund could have done to actively align the Fund's operations with Norwegian development cooperation.

[186] We consider here the 2019-2022 DIM strategy, as that is when the investment was made

6.3.4 Fourth Partner Energy

Project Information	Fourth Partner Energy
Mandate	CIM
Approved IC	06/2023
Sector	Solar / Distributed Energy
Norfund investment (million NOK)	431.5
Instrument	Equity
Description	Leading C&I provider, wind and solar, on-site and off-site, multiple investment models
Case study asset	Gondal project

Fourth Partner Energy (FPEL) is a leading India C&I company, providing a large range of on-site and off-site renewable solutions for customers. FPEL has installed around 1.4GW worth of assets, mostly in India and recently in South East Asia. The company sells renewable energy solutions to customers, including on-site projects (such as rooftop solar) and off-site projects, where wind and/or solar projects are constructed remotely and 'wheeled' through the grid to the customer. Projects work in a variety of shareholder structures where customers own shares of the assets individually or in groups, and it offers both "build operate" and "build own operate" models. For customers, captive projects such as these offer much cheaper tariffs than the normal on-grid utility tariffs, and it allows customers to increase renewable energy shares in their energy mix.

The 2023 Norfund CIM investment in Fourth Partner Energy (FPEL) is Norfund's second investment in the company after a 2021 DIM investment. With the initial 2021 investment, Norfund became a large minority shareholder of 45%, with the other majority shareholder, TPG[187], holding 50%. In 2022 the company embarked on a fund-raising exercise, which was ultimately unsuccessful, which prompted the need for Norfund's 2023 investment, as a bridge funding round designed to provide capital to the company while it raises a larger round of funding from other investors. This financing round was announced in August 2024, when a consortium of IFC, ADB and DEG commited to a USD 275 million equity investment[188].

For the case study, the evaluation team examined in closer detail a specific asset, the Gondal project in Gujarat. This is an off-site project, combining 38MW of wind and 20MW of solar. Each specific asset (wind turbine or PV rack) is associated with one of the seven customers involved, who either individually or as a group owns a share of the asset (which is a common and established way to get around tax regulations), and has PPAs tied to individual assets. The assets are spread over more than 100 acres of non-contiguous plots of land across multiple villages, some of which is leased from the government and some from private land owners. The area of these villages also contains a large patchwork of wind turbines from other companies, in addition to FPEL's. All of FPEL's generators are pooled in a shared substation, which in turn evacuates the power to a utility-owned sub-station nearby.

6.3.4.1 Impact and effectiveness

Development outcomes

The results framework for the investment is made less clear by the fact that the targets for the investments include the projected production under an envisioned subsequent external investment. The investment's objectives are described in terms of new energy production capacity (MW). However, where the previous investment (2021, under DIM) funded a targeted 1,305MW with its equity of NOK 870 million, the second investment (2023, under CIM) targets a production of 4,452MW with a smaller investment (NOK 468 million). This is because targets are given in terms of total capacity under FPEL by the time of exit, as opposed to in terms of MW production capacity constructed by the Norfund-provided funds. As the second investment was explicitly a bridge financing round, the results framework includes targets financed

[187] TPG is a US-based private equity firm. The investment was made from TPG's Rise Fund.

[188] https://pressroom.ifc.org/all/pages/PressDetail.aspx?ID=28327

by a projected injection of USD 380 million from other investors[189]. While it can be argued that Norfund M&E policies explicitly say they don't track attribution from investments, this setup arguably does make it more difficult for Norfund to track its achievements. The targets (and in theory future results reporting, which is normally based on this) is extremely skewed and gives an unrealistic picture of the project's influence, especially considering the bridge financing provided by the investment has already been spent (as of September 2024), and the close association between the bridge financing and project financing for specific projects (i.e. it is possible to track quite closely which specific projects were financed by the Norfund-provided bridge financing). Norfund has informed the evaluation team that in this case a manual override has been enacted in order to avoid the overstimation. The reported capacity financed for this investment is 324 MW.

Table 71: Results framework indicators for CIM investment in Fourth Partner Energy (as of 2023)

	Baseline	Target	Achieved (2023)
MW financed (greenfield)	679	4,452	891
Renewable MW financed (greenfield)	679	4,452	891

Factors conducive to the investment's success include a strong investee, good conditions for growth, and active ownership. Firstly, FPEL is an experienced and strong partner for development and execution of RE projects in India, partly due to Norfund's previous engagements with the company. FPEL has also received from other valued investors such as TPG and BII, which have also provided support and guidance. Secondly, the C&I renewable energy market in India is rapidly expanding and faces increasing demanding from customers. Thirdly, Norfund's investment has also not only provided critical financial support but also brought valuable guidance and expertise, which has strengthened Fourth Partner Energy's operations and market position.

It is difficult to determine distributional impact, as the power is sold directly to C&I customers through long-term contracts, based on demand from clients. The objective of the investment is reduced emissions through renewable energy, which is a global issue. On the local level, as evidence for example in the Gondal project, FPEL is supplying continuous electricity to the nearby villages as compared to previously being provided by an unreliable grid power, which has improved their access to stable electricity (although the contracts for the electricity are with the C&I customers, the physical electricity is added to the grid locally, benefiting the local villages indirectly). It has also successfully created impact in terms of development of rural remote areas through project development, creating employment opportunities for local villagers, including women.

Unintended outcomes

The case project selected for this case study illustrated minor benefits to the local stakeholders, which may be representative of other projects. In the case of the Gondal project, the plant now supplies continuous electricity supply to nearby villages that previously relied on unreliable grid energy, with the effect that the village now has more reliable access to electricity (even though they are not directly involved in the project). There has also been development of remote rural areas through the construction of access roads, creating employment opportunities for local residents, and supporting social initiatives like temple wall painting.

6.3.4.2 Additionality

FPEL works in two sub-segments of the India C&I space, on-site and off-site, both of which are quickly expanding markets. As of 31st March 2024, C&I entities in India have set up RE projects of around 24 GW capacity and approximately an additional 120 GW of C&I RE capacity is required to be set up by 2030, translating to a gap of roughly USD 90 billion worth of investments. The India government has implemented a large number of policies and regulations to promote further development of the C&I market[190,191]. Competition in the market is strong, as noted both by interviews with FPEL's clients (who report having a large number of competing providers to choose from) and with FPEL stakeholders, as well as the

[189] Note that the investment closed in August 2024 is for USD 275 million, which is projected to result in a 3.5GW capacity, which would mean Norfund's projections are not on track

[190] https://timesofindia.indiatimes.com/blogs/voices/the-ci-market-for-renewables-will-explode-over-the-next-decade/

[191] https://ieefa.org/wp-content/uploads/2020/07/Untapped-Opportunities-in-Indias-Rooftop-Solar-Market_July-2020.pdf

investment committee's June 2023 final approval paper's description of the "Increasingly competitive market for rooftop solar C&I players" noted as a "key weakness." Similarly, the approval paper for the previous 2021 investment also notes that "the strength of competition is a risk to the business", including in the off-site (open access) space. According to one source, the rooftop solar sub-segment alone saw almost USD 1 billion in foreign equity investments between 2015-2021[192]. In recent years, C&I investments have changed from on-site projects towards open access, with open access constituting 88% of USD 1.7 billion investments in C&I from 2020-23 due to larger scale and favorable governing regulations[193]. Examples of large-scale investments in similar businesses include a USD 360 million investment from Brookfield in CleanMax[194], and a U.S. Bank USD 155 million debt and equity investment in Amp Energy[195]. In Norfund's assessment of the investment, exit prospects are looking promising, as "India has a very active market for trade sales and with the overall growth of the sector a potential listing of a sizeable C&I player is plausible."

Investment documents do not make a clear case for why the investment is additional. While the quantitative additionality calculator was used (see Table 72), no qualitative explanation for additionality is provided anywhere in the document. From interviews and investment documents, there is no documentation suggesting that further analysis of the broader market was conducted, outside the financing position of FPEL.

Table 72: Additionality scores, FPEL (2023)

Additionality indicator	Score
Investing in the poorest countries	0.5
Investing in the most capital constrained markets	0.5
Investing in the riskiest markets	0.1
Investing in sectors with high development needs	1.0
Investing in high risk instruments	1.0
Targeting underserved segments	0.5
Mobilizing private investors	0.0
Taking an active role in investments	1.0
Improving social and environmental performance	1.0
Supporting enterprise development	0.0
Additionality score	**5.6**

Norfund provided bridge financing at a time where it is plausible that the company would not have been able to secure other new equity funding. FPEL had been looking for a large fundraising round through equity since 2022, and while it had some leads with large global investment funds, none of these had materialized, which was the impetus for Norfund providing an additional round of funding (on top of its 2021 DIM investment). The Norfund bridge funding was explicitly meant to fill the gap in new funding flowing into the company before a larger and longer-term investor could be found. This would ensure continued expansion during this bridge period. Norfund itself deemed that without the Norfund bridge funding, FPEL would face liquidity challenges and potentially default. It is difficult to say what would have happened to FPEL without the bridge financing, as that would presumably have given a stronger push for FPEL to negotiate with other investors and accept a 'worse' deal, but this is difficult to prove. FPEL has a preference for working with long-term investors that can fund multiple rounds, as they have now done with both TPG and Norfund, and based on the first investment's investment documents, it does not appear that FPEL is short of options on financiers (in the 2021 investment, Norfund did not offer the best financial terms, but were chosen for other 'qualitative' reasons). The fact that after two years of fundraising, FPEL ended up with a new equity round from DFIs might suggest that DFI investments (including Norfund's) are additional (as no private commercial financiers were identified). However FPEL does not see it like this; they prefer to go with DFI for other non-financial reasons, and would have been able to settle for another financier if the new consortium was not available.

However, considering the crowded market, it is likely that the assets and outcomes could have been achieved by competitors in a scenario without the Norfund bridge funding. As described above, the C&I space in India is very competitive. In investment documents for the bridge financing round, Norfund

[192] https://jmkresearch.com/majority-of-equity-investments-in-indias-rooftop-solar-segment-are-from-foreign-entities/

[193] As per report by JMK titled "Financing Trends in the C&I RE market in India, June 2024"

[194] https://www.cleanmax.com/media/cleanmax-raises-dollar-360-million-from-brookfield.php

[195] https://www.amp.energy/news/amp-energy-secures-tax-equity-and-debt-financing-for-155m-community-solar-plus-storage-portfolio-in-repeat-transactions-with-u.s.-bank-and-keybank

claims that the “Company should be able to sell several of its development projects” in the case of financial issues. FPEL clients told the evaluation team that other competitors are able to offer marginally better rates than FPEL, but there are other qualitative reasons why they go with FPEL, such as more flexibility on ownership structure. In the off-site sub-segment, FPEL is facing challenges such as a running out of both good sites to build on[196] and evacuation options for the energy (i.e. grid access). In other words, an expanding number of players want to construct off-site projects on a finite number of suitable sites. In the face of this, FPEL has started expanding to other countries such as Vietnam, Sri Lanka and Indonesia[197]. Assets in these countries are more likely to be additional, as they are built in less developed C&I markets with fewer other competitors.

Since its first engagement, Norfund has provided significant non-financial benefits to FPEL. Norfund has played a valuable role in helping Fourth Partner develop its ESG strategy and requested FPEL establish a formal ESG team for the first time, in order to mitigate project risks. Before Norfund, the extent of ESG was limited to safety, but with the expansion of the company and its move into off-site projects, more detailed E&S guidance was requested. With Norfund’s help, the company has streamlined its Health Safety and Environmental practices by implementing an ESMS (Environment and Social Management System) and ESAP (Environmental and Social Action Plan). Norfund has also supported FPEL through knowledge sharing, including help in framing land acquisition policy, and supply chain traceability. Other co-investors such as BII has also supported these policies, but from interviews, there is a sense that Norfund has played a unique and crucial role. Good ESG standards and the other support received from Norfund has made FPEL more attractive to other investors as well as clients, and has improved the company also financially, in face of the competitive markets. Norfund has acted a very hands-on shareholder in a rapidly growing company, which was exactly what FPEL was looking for.

However, it is not clear that a second round investment adds much to the already existing engagement. For one, by the second investment, many of the fundamental large scale overhauls to the systems were already in place, with the low-hanging or most crucial fruits already implemented. This suggests the relative importance of areas Norfund put off until 2023 are lower. On the other hand, the company keeps evolving and expanding, which continuously presents new challenges. However, even without the second investment, Norfund would have remained a shareholder (albeit with a smaller share, and without board chair position) from the first investment, which would have allowed them to continue pushing for improved standards and to continue being an active owner. While Norfund is very likely providing non-financial additionality to the company, it is not clear what the second investments allows for in terms of adding this as opposed to continue from the first investment.

Given the competitive market and established models, there are no specific signs of demonstration effects from the investment. By the time of the investment in 2023, the market, model, and companies in the space were already established, and so there is little evidence of demonstration effects, as the viability of the products and models were already demonstrated.

6.3.4.3 Sustainability

The investment is overall considered to have ex-ante conditions for sustainability, but some risks could be detrimental to this. The investment is overall in line with government policies and in an established market, which implies that the impacts should last longer the investment. The investment itself faced some commercial risks (largest of all the failure of the larger funding round), but even in the case of commercial failure, the assets would presumably be sold[198] and thus continuing to produce the green energy. In hindsight we see that the larger funding round was successful (with the consortium investment being signed in 2024), which now considerably improves the prospects for sustainability.

[196] In particular land plots with good wind conditions

[197] The evaluation team notes that the international expansion is not a *result* of the shrinking marketspace

[198] In cases where the assets have not already been transferred to FPEL’s customers

Table 73: Sustainability Assessment

Sustainability factor	Score	Assessment
Project has to be financially successful	High	Business plan and financial prognosis for investment provided solid evidence of expected returns for the investment. FPEL was already established as strong market player.
Political/regulatory vulnerabilities minimized	Medium-High	Relevant policies change frequently, which presents mostly opportunities to FPEL, but can also be challenging.
Risks minimized	Low	Risk rating “High” in the investment documents
Alignment with government priorities	High	Government policies conducive to C&I space, increasingly positive.
Have an exit strategy	Medium-High	Various exit options provided depending on fundraising round, but exit is to some extent outside Norfund’s control. A sale of assets should not be too challenging considering the investment activities in the sector.
Investing in existing market	High	Market is well established (see above).
Improving management quality of project (By providing technical assistance (business support))	Medium	Norfund is an important active shareholder, but the second investment likely to add relatively less value compared to the first (see above).
Price vs alternative technology/energy sources	High	FPEL business model already proven successful, market set to expand. Active in both solar and wind, on-site and off-site.
Potential for demonstration effects	Low	Market already well established by the time of the investment, no new technology or instruments. Business to a large extent continued business as usual.

6.3.4.4 Mandate, positioning and operationalization

The investment’s objectives are highly aligned with the CIM mandate. Table 74 summarizes the investment and project’s alignment with the general mandate of CIM investments.

Table 74: Fourth Partner Energy case study investment alignment with CIM Mandate

CIM mandate	Score	Assessment
Contributes to reducing or avoiding greenhouse gas emissions by investing in renewable energy in developing countries with extensive emissions from coal-based and other fossil-fuel power generation	High	Direct impact on renewable energy available. India is highly coal-based.
Promote investments in renewable energy that would not otherwise take place	Medium-Low	See section on additionality above
Focus shall be on profitable projects, investment shall be based on commercial terms	High	The original Norfund investment (2021) was not the cheapest offer in financial terms. Followed in the 2023 investment.
Investments in accordance with the national energy and climate plans of investment countries	High	Highly aligned with India’s strong push for renewable energy and recent regulations opening the C&I market

Assessed against Norfund’s internal strategy for the CIM, the investment is mostly aligned. The project is designed mostly in line with the main guidance for CIM investments in the CIM strategy (Table 75).

Table 75: Fourth Partner Energy case study investment alignment with CIM Strategy

Strategy dimension	Score	Assesssment
Geography	High	Priority country (India)
Segment/technology	High	Priority segment (C&I)
Risk/return profile	Medium-Low	Technology commercialization risk not particularly high
Investment type	High	Efficient use of finances by funding already invested-in platform (Fourth Partner)
Project development	High	Investment involves large amount of project development
Instrument	High	Priority instrument (Equity)
Ownership/ticket size	High	Within special bounds of "accept up to 49% [stake] with strategic partners"
Mobilization	Medium-High	Other private commercial funders are invested, but it is not straightforward to prove that these have been mobilized by Norfund
Exit	Medium	Various exit options provided depending on fundraising round, but exit is to some extent outside Norfund's control.

Coherence

There is no evidence of coordination, collaboration or cooperation with other Norwegian development actors, and this is not seen as within Norfund's mandate. Although the Norwegian MFA has an explicit strategy for cooperation with India (Norway – India 2030: The Norwegian Government's strategy for cooperation with India), which indeed does have Energy as one of five priority areas, Norfund is not mentioned or envisioned in this strategy. Stakeholders on either side (Norfund or Norwegian development establishment) do not consider explicit cooperation or coordination part of their mandate. There are noted episodes of Norfund gaining access to government entities through the Norwegian embassy, but it is not clear what if any impact this has had on FPEL's operations. It also does not appear to be a plan of a wider strategy or approach, but rather ad hoc.

7. Annex 4: Quantitative analyses

7.1 Company value

7.1.1 Setup

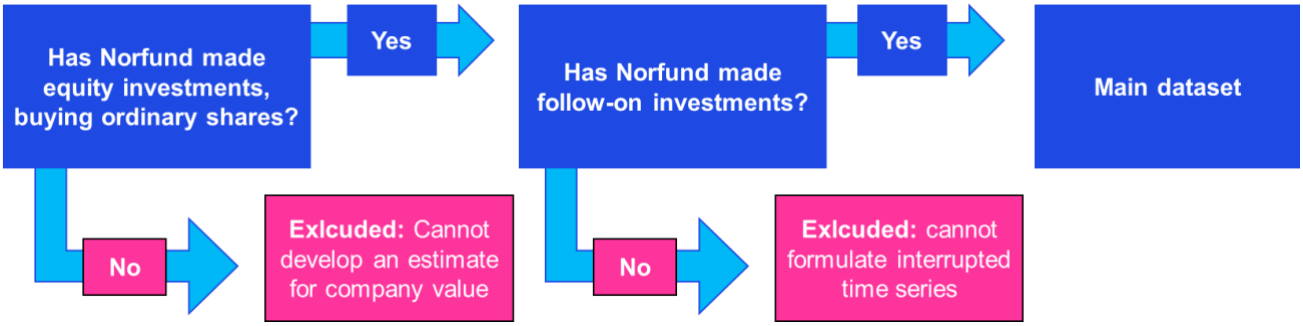
This analysis relates to evaluating the effect of a Norfund investment on creating successful local businesses and value. To isolate the "Norfund effect", it was decided to look at the local currency valuation of investments. This was done to avoid positive/negative effects of currency fluctuations that arise from undertaking conversion over time. To do this, all local currencies were converted to NOK using exchange rates from 2024.

As most of Norfund's investments are not in listed companies, company values must be estimated. As an approximation, it was decided to quantify company value as the value of an equity investment[199], relative to Norfund's ownership stake. The valuation of equity investments is updated over time. For company i, this means that the value of the company is in year t equates to:

$$Value_{it} = \frac{Value\_equity_{it}}{Ownership\ stake_i}$$

The implication of this approach is that the value of companies cannot be estimated in instances where no equity investments have been made. Furthermore, only companies where Norfund has made follow-on investments can be included. The reason for this is that data on company valuation is required both before and after a Norfund investment to estimate the associated effect. Since there is no historic data on company valuation prior to the first Norfund investment, the analysis uses the first investment to generate "historic" or "pre-intervention" data for the second investment (the follow-on investment). See for a depiction.

Figure 79: Inclusion and exclusion criteria



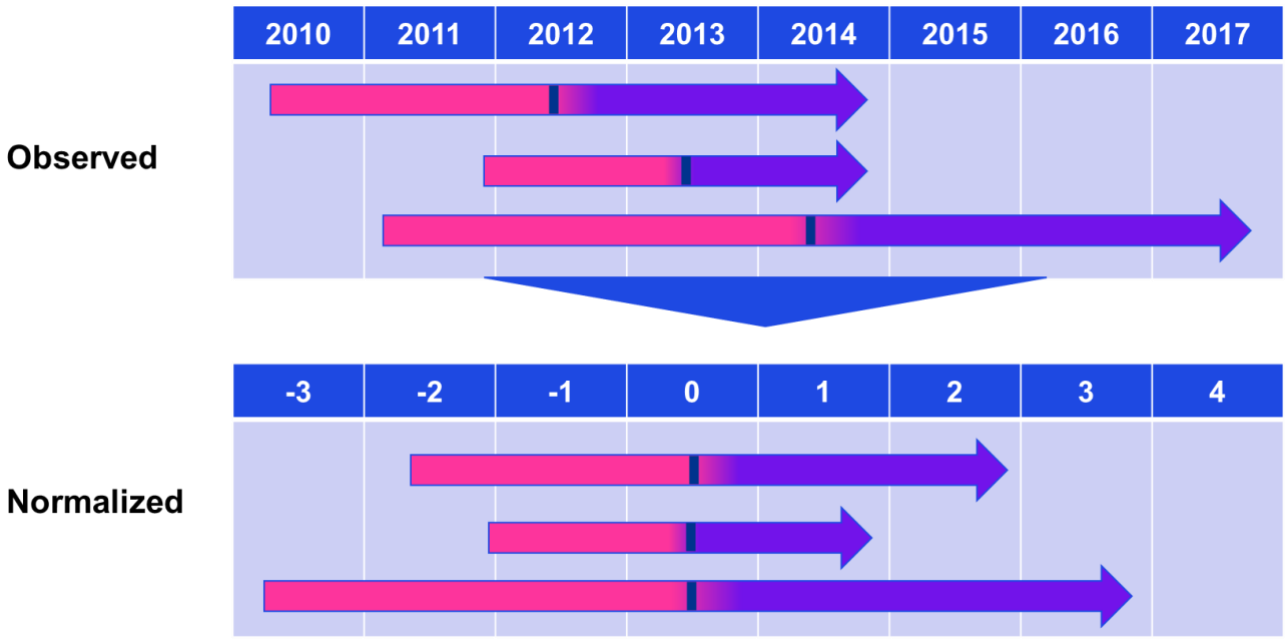
To estimate the effect of a Norfund Investment, an "Interrupted time series analysis" (ITS) was used. This is a quasi-experimental method that may be used in instances where randomization is not possible. More specifically, the method is used to evaluate the impact of an intervention or event on a time series of data

[199] The formula was only used for "ordinary shares". Other equity instruments such as "preference shares", "compulsory convertible notes" and "shareholder loans" do not give ownership rights except in case of a future conversion.

(thus the name “interrupted time series”). It involves collecting data points at multiple time intervals before and after an intervention. The goal is to detect whether the intervention significantly changes the outcome variable, altering the trend, level, or both. If specified correctly, the method controls for pre-existing trends and isolates the effect of the intervention from other factors. In this instance, the percentage change in valuation of a company from one year to the next was used. This was to avoid that single projects drove the results due to their size.

The challenge of the data is that the “Norfund intervention” takes place at different points in time for companies. To allow for comparison and isolate the effect, the analysis normalized the second intervention. To do this, the time for the second investment was denoted “year 0” and the year before (after) was denoted “year -1” (year 1). Figure 80 provides a depiction.

Figure 80: Depiction of normalization of dataset



In the final dataset, only time periods that had a minimum of 5 observations for renewable energy were included. This was done to reduce to risk of extreme observations affecting the outcome and focus the analysis on a relevant time period. SME Funds were also excluded because this department only included one investment that met the inclusion criteria. For Renewable Energy, only companies that were in the portfolio post 2015 were included[200].

Formally, the model is defined in the equation below[201]. $Value_t$ represents the percentage change in value of a company, compared to the previous year. T_t is the timing of the investment normalized (denoted ITS_time in the results), Inv_2_t reflects whether the second investments has taken place (=1) or not (=0), thus representing the “post intervention period” (or the purple period in figure 2). Specifically, the time of the second investment is defined as the commitment date. Finally $T_t Inv\_2_t$ represents the interaction term and u_i the error term. A significant effect of β_2 would indicate an immediate (level) increase in the value, whilst a significant effect of β_3 would indicate a change in the trend following the intervention.

$$Value_i = \beta_0 + \beta_1 T_t + \beta_2 Inv\_2_t + \beta_3 T_t Inv\_2_t + u_i \quad (2)$$

In a second analysis, each of the ITS terms were also interacted with “department.” This was to see whether the effect of the second investment differed across departments. The reason for doing this was that there may be attributes of companies that have multiple investments, explaining changes in valuations over time.

[200] To have enough datapoints, observations for from 2010 onwards were included for these companies.

[201] Builds on Linden (2015)

By comparing across departments, we would be able to explain differences are observed for the renewable energy portfolio.

7.1.2 Results

Figure 81 presents a depiction of the increase in valuation of a company, from one year to the next[202]. It shows that the change in company value is slightly reduced in the year of the second investment (as denoted by the red dotted line). The large confidence intervals suggest that it is difficult to draw any form conclusions, however. For the same reasons, one cannot say whether there are differences in company performance over time across departments.

Figure 81: Effect of second investment[203]

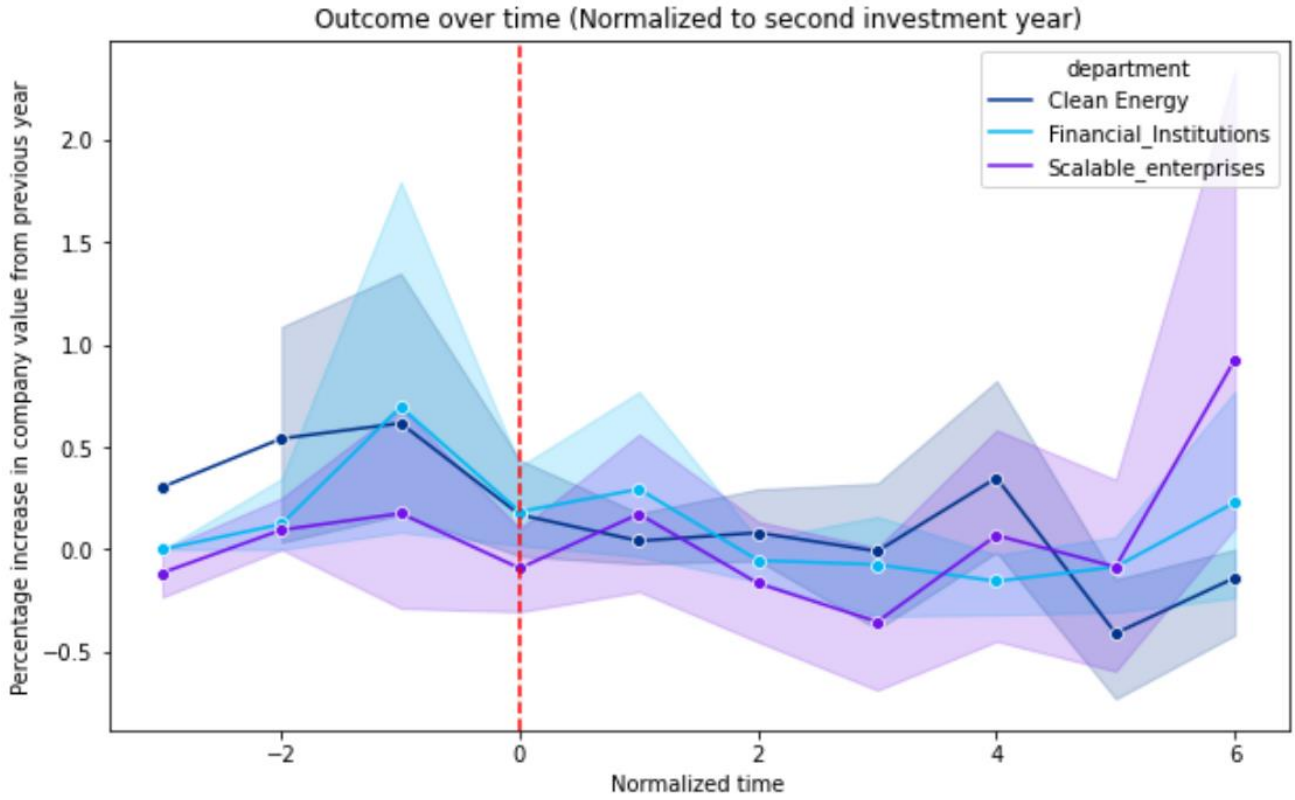


Table 76 presents the regression results of the ITS analysis.

- The geographical dummies, represent the effect of investments being in various regions compared to the baseline ("Africa" in this regression).
- "loan" represents the effect of one or more post-intervention investments being loans (as compared to equity).
- "Num_commitments" represents the number of Norfund investments being made in total[204], and ownership stake represents the effect of having a higher stake.
- "ITS_time" represents the underlying trend prior to the intervention, "post_intervention" shows level changes, and the interaction shows changes in trend. If there was indeed a "Norfund effect" on the valuation of companies from the second Norfund investment, one would expect significant estimates (denoted by stars*) in the two latter of these coefficients. As the results in the table shows, this is not found. None of the control variables show significant effects either, with the exception of higher value of companies invested in when in Asia & the Pacific, compared to Africa .
- The R-squared indicates that the model explains around than 10% of the variation in pct change in company value. The insignificant effects are therefore not surprising.

[202] Because the first observation for a given project does not have a comparator, this means that this observation is not included

[203] One extreme observation of pct_change=11 was removed

[204] I.e. some projects have multiple loans or equity investments, beyond the second we define as the "intervention".

In a second analysis these ITS variables were interacted with "department" to investigate whether there were differences in the "Norfund effect" across departments. These results (not shown here) were all insignificant.

Table 76: Regression results (company value)

	Coefficient	Standard Error
Intercept	0.2983	0.4935
Geo region **(reference = «Africa»)**		
geo_region[T.America]	0.2148	0.2246
geo_region[T.Asia & Pacific]	0.5494*	0.2381
geo_region[T.Global]	0.0*	0.0000
loan	-0.1804	0.1539
num_commitments	0.0506	0.0591
ITS_time	0.1291	0.2005
post_intervention	-0.7107	0.3906
time_post_intervention	-0.1347	0.2044
ownership_stake	1.1431	0.7835
clean_energy	0.0874	0.1816
N	198.0000	
F-statistic	2.4207*	
R-squared	0.1038	
Adjusted R-squared	0.0609	

***Note**: *p < 0.05*

Altogether, the econometric analysis cannot discern an effect on the second Norfund investment, and no statistically significant effects are observed across departments. One major limitation of this analysis is the inadequate data available. Because the analysis had to condition on equity investments having taken place, to be followed by at least a second investment, the sample is very limited. Moreover, the dependent variable itself may not be accurate, because valuation of investments is not routinely updated and often reflects the book value rather than the value if sold. The effect of multiple Norfund investments (beyond the 2nd) is also somewhat ignored. Whereas the number of commitments is included as a control, the regression does not investigate the effect of third or fourth investments triggering larger changes. A final note of caution relates to the bias in sampling; the investees receiving follow-on investments are generally thought to be low-performers because they need additional capital.

7.2 Development effects

7.2.1 Setup

To understand which factors predict whether projects are successful in achieving development effects, a linear regression was undertaken. To simplify the analysis, the data was limited to the Norfund portfolio. Moreover, it was decided to focus on MW financed, as one it was considered one of the key KPIs. MW financed is equal to the sum of actual capacity installed and capacity under construction. To normalize the effects according to the size of investments, MW financed was analyzed relative to commitment size[205].

Formally, the dependent variable rel_DE_i is defined as follows, where DE_i is the last observed reporting of MW financed for project i, and $Agg\_commitment_i$ is the aggregated commitments at the same point in time[206]. In both instances, this is the last reporting date for that investee.

$$rel\_DE_i = \frac{DE_i}{Agg\_commitment_i}$$

An Ordinary Least Squares (OLS) regression was undertaken to identify predictors of a relative high MW financed. In equation 1 below, the model is formulated. Here, rel_DE_i represents the MW financed in a given regression, as defined above. Other variables include; $years_i$ which is represents the number of years passed since the first investment; $Project\_status_i$ refers to whether Norfund has disbursed, partially

[205] An attempt was made to look at achievements relative to targets, but the data on targets was scarce.

[206] I.e. all previous commitments towards that project.

disbursed, committed or exited; $sector_i$ refers to whether the investment falls under either 'Other/hybrid renewables', 'Solar power', 'Biomass', 'Renewable energy fund', 'Hydropower', 'Wind power', 'Energy' or 'Renewable-enabling Transmission infrastructure'; $loan\_share_i$ refers to the loan share of aggregate commitments and $commitment\_size$ refers to a project's tertile ("low", "medium", "high") with regards to aggregate commitments207. Number of commitments refers to the number of instruments that Norfund has committed in total. The coefficients $\beta_1 - \beta_6$ refer to the marginal effects of the independent variables. β_0 is the constant and u_i is the error term.

$$rel\_DE_{i_i} = \beta_0 + \beta_2 Project\_status_i + \beta_3 sector_i + \beta_4 loan\_share_i + \beta_5 commitment\_size_i + \beta_6 number\ of\ commitments_i + u_i \quad (1)$$

7.2.2 Results

The results from the regression is presented in Table 77[208]. Overall, the model appears to perform satisfactory, as indicated by a significant F-statistic[209]. The variables that have significant effects are denoted with stars. Beyond the intercepts, these are "Other/hybrid renewables" (compared to Solar power) and a higher share of loans. The latter effect suggests that equity investments yield more MW relative to the size of commitments than loans. Beyond, the analysis could not establish any significant effects of larger, size of commitment number of commitments, or the project status. The analysis is based on limited data, and should therefore be interpreted with caution. There are also several outliers in our dataset, possibly biasing the results. In summary, the results presented should be interpreted with caution and do not represent causal relationships.

Table 77: Regression results (development effects)

	coef	std err
Intercept	2.8296*	0.511
C(project_status, Treatment(reference="Exit"))[T.Committed]	-1.0278	0.532
C(project_status, Treatment(reference="Exit"))[T.Disbursed]	-0.8818	0.748
C(project_status, Treatment(reference="Exit"))[T.Partially Disbursed]	-0.2520	0.600
C(sector, Treatment(reference="Solar power"))[T.Biomass]	-1.0115	1.415
C(sector, Treatment(reference="Solar power"))[T.Hydropower]	-0.7052	0.530
C(sector, Treatment(reference="Solar power"))[T.Other/hybrid renewables]	1.6176*	0.764
C(sector, Treatment(reference="Solar power"))[T.Renewable energy fund]	-0.9539	0.988
C(sector, Treatment(reference="Solar power"))[T.Wind power]	-0.2552	0.802
C(total_com_tertiles, Treatment(reference="low"))[T.high]	-0.9796	0.521
C(total_com_tertiles, Treatment(reference="low"))[T.medium]	-0.5263	0.519
num_commitments	-0.2945	0.149
share_loan_com	-1.0250*	0.450
Adj. R-squared:	0.249	
F-statistic:	2.133*	
Prob (F-statistic):	0.0470	
N	42	

***Note**: *p < 0.05*

[207] Tertiles refer to the categorization of continuous data into three groups, each containing an equal number of observations.

[208] A number of sensitivity analysis were undertaken, including for Number of years, ownership stake and geographical region. The inclusion of these variables led to poorer model performance.

[209] I.e. a p-value below 0.05

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