

Norfund

DEVELOPMENT IMPACT
CASE STUDY

CENTRAL SOLAR DE MOCUBA MOZAMBIQUE

ABOUT NORFUND

Norfund is Norway's Development Finance Institution (DFI). Our mission is to create jobs and to improve lives by investing in businesses that drive sustainable development. We invest in business areas and countries in which we can have the greatest impact, where support from the private sector is weak, and where access to capital is scarce. We concentrate our investments in sectors that are important drivers of development: Clean Energy, Financial Institutions, Green Infrastructure, and Scalable Enterprises.

CLEAN ENERGY



**DEVELOPMENT
RATIONALE**

Investing in **clean energy generation** enables economic growth, job creation and mitigates climate change. Better, more reliable energy supplies, resulting in fewer and shorter outages are helping to foster job creation and economic growth as new businesses are established and productivity improves. 79% of businesses in Sub-Saharan Africa experience electrical outages and 53% depend on generators for their electricity need.¹ Renewable energy can substitute fossil energy and mitigate climate change.

Investing in **access to clean energy** improves living standards by reducing indoor air pollution, giving access to communication and information, improving health care, security as well as educational outcomes. 1.1 billion people worldwide are still lacking access to electricity.



**INVESTMENT
NEED**

To meet the estimated demand level in 2040, SSA will need to build 300 GW of capacity over the next 20 years. This means that more than \$490 billion will need to be invested in additional power generation capacity by 2040.² However, new clean electricity generation is not expanding quick enough in high risk and capital constrained markets in the absence of DFI support.³ One of the key barriers to wider deployment and diffusion of clean and renewable energy is inadequate supply of well-prepared, 'bankable' projects available to investors, including Norfund.



**NORFUND'S
STRATEGY**

Norfund invests in grid-connected power plants, distributed generation and off-grid supply. Our core focus in the strategy is to increase our equity investments in renewable power generation in our target markets, largely building on current platforms and partnerships. In distributed generation, we will seek commercial and industrial captive power opportunities as well as supporting off-grid and mini-grid commercial actors. Investments in clean energy account for around half of Norfund's portfolio.

CASE STUDY

CENTRAL SOLAR DE MOCUBA

Investment year: 2015

Sector: Clean Energy

Deal type: Greenfield

Original committed: Project Dev. Facility: USD 0.9 million. Guarantees: USD 7.5 million
Equity: (22.5 percent through KLP Norfund Investment): USD 2.1 million



FIRST LARGE SOLAR POWER PLANT IN MOZAMBIQUE

Central Solar de Mocuba is Mozambique's first solar power plant. The 40 MWs of power capacity is helping to secure the supply of electricity and to stabilise the grid.

Mozambique achieved a prolonged period of sustained growth, averaging seven percent for almost two decades (1995-2015).⁴ Despite this, the nation is one of the poorest in the world. Approximately 50 percent of the nation's 30 million inhabitants live on less than \$1.90 a day.⁵ Mozambique ranks 180 out of 189 countries on the Human Development Index, and is still struggling after years of civil war and unrest.⁶ The country's macroeconomic stability has been further compromised in the last five years by an untenable debt situation and has resulted in a tight fiscal context.⁷

INVESTMENT CONTEXT

Severe power deficits continue to hamper economic and social development in the

country. Providing reliable and efficient electricity and expanding the generation and transmission capacity to meet current and future demands, are key challenges.⁸ Mozambique's five-year Government Plan (2015–2019), called for the expansion of access to electricity services for all Mozambicans by 2030 to facilitate new job opportunities for the country's growing population.⁹

Vast energy resources

The power sector in Mozambique is dominated by hydroelectric generation (78 percent of the capacity mix in 2019), which is utilised largely for power exports to two neighbouring countries, South Africa and Zimbabwe, via the Southern African Power Pool (SAPP).¹⁰ Mozambique has the largest power generation potential of all Southern

African Countries: 187 GW capacity of unexploited power from coal, hydro, gas, and wind resources.¹¹ In addition, Mozambique has more than 2.7 GW of potential solar resources.¹²

Mozambique's power market is structured around Electricidade de Moçambique (EDM), a state-owned and vertically integrated utility responsible for the transmission, distribution and sale of electricity.¹³ The 2.1 GW Cahora Bassa Hydropower plant is a cornerstone asset for the sector and for the country, and the Mozambican government is the majority owner.

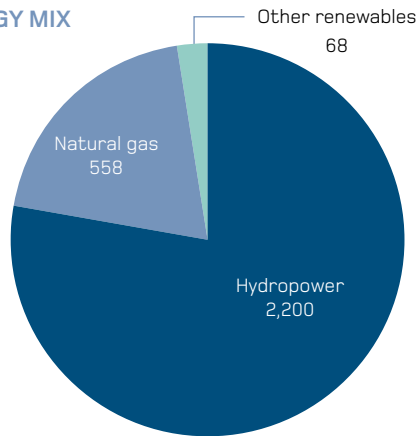
Power sector challenges

Access to electricity has increased sharply in Mozambique, rising from eight percent in 2006, to 31 percent in 2018. However, the

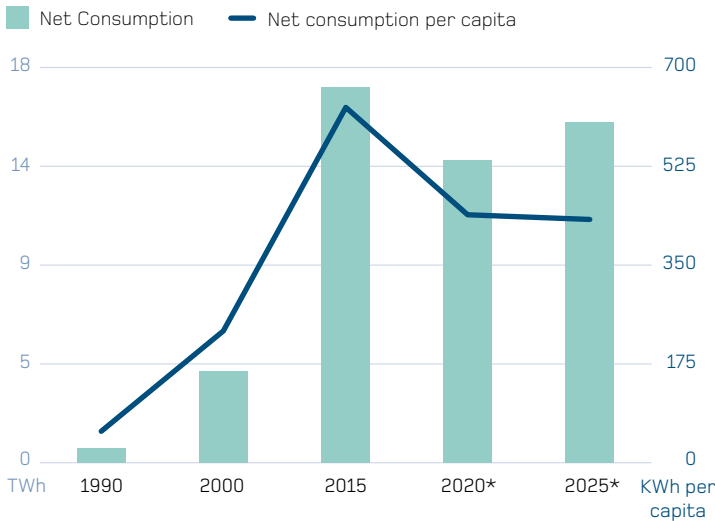
MOZAMBIQUE'S ENERGY MIX (2019), MW CAPACITY

Hydropower dominates the energy mix in Mozambique, but more natural gas and solar power is coming online.

Sources: IRENA, EIA, Fitch Solutions



ELECTRICITY CONSUMPTION PER CAPITA IS SUBDUED



Electricity consumption has historically grown at a high rate (from a low level), but due to issues in the power sector it is expected to be subdued going forward, particularly in per capita terms.

*Estimate
Sources: EIA, Fitch Solutions

power sector faces significant challenges. Access remains lower than the Sub-Saharan African average, and significant disparities exist between urban and rural areas: 54 percent of the urban population has access to electricity compared with only six percent of people in rural areas.¹⁴ Many areas in the country are not yet connected to the national grid, and the fragility of the system has been aggravated by poor maintenance. Transmission losses are high – 23 percent in 2014.¹⁵

The distances between points of generation and consumption in Mozambique are large and dependent on single, vulnerable lines of transmission. The northern provinces (Zambézia, Nampula, Niassa and Cabo Delgado), for example, receive power via a single line. With no local generation facilities as alternatives (apart from a few diesel-fired stand-by plants), approximately 15 million people are therefore at risk. In 2013, 59 hours of transmission interruptions occurred. The average interruption time (duration) increased from 30 minutes in 2009, to 68 minutes in 2013.¹⁶ In 2015, floods damaged the transmission line to the northern provinces, leading to four weeks of widespread electricity outages.¹⁷

Mozambique's transmission system has reached its capacity limit. This means that short- and long-term economic growth prospects are constrained, and that the growth of small and medium sized enterprises is being negatively impacted.¹⁸ In 2014, EDM completed a least-cost supply study to assess how best to respond to the rapid increase in the energy demands of Mozambique's northern provinces. Investment in renewable energy generation, in the form of solar power, was one of the recommendations. The recommended sites were at the towns of Mocuba, in northern Mozambique's Zambezia Province, and Metoro in Cabo Delgado Province.

CENTRAL SOLAR DE MOCUBA

Central Solar de Mocuba (CESOM) is Mozambique's first utility-scale solar power plant with 40 MW of electricity generation capacity. Situated 13 kilometres from Mocuba's city centre, the 126-hectare site is near Mocuba's existing substation.

The project company, CESOM, is an independent producer that has been contracted to sell power under a 25-year Power Purchase Agreement (PPA) to EDM. Scatec Solar is the majority investor in CESOM with a stake of 52.5 percent. EDM has a 25 percent stake, and Norfund, through KLP Norfund Investments AS, has a 22.5 percent stake. The IFC, the Climate Investment

Funds, Emerging Africa Infrastructure Fund as well as the Private Infrastructure Development Group have provide debt and grants for the project.

Mocuba was declared a Special Economic Zone by the Government in May 2014.¹⁹ Building Mozambique’s first utility-scale solar power plant here was therefore seen as an important way to support Mozambique’s economic and social development initiatives. The power plant will help to improve the security of supply for Mozambique’s northern region and stabilise the grid’s electricity supply during the day.

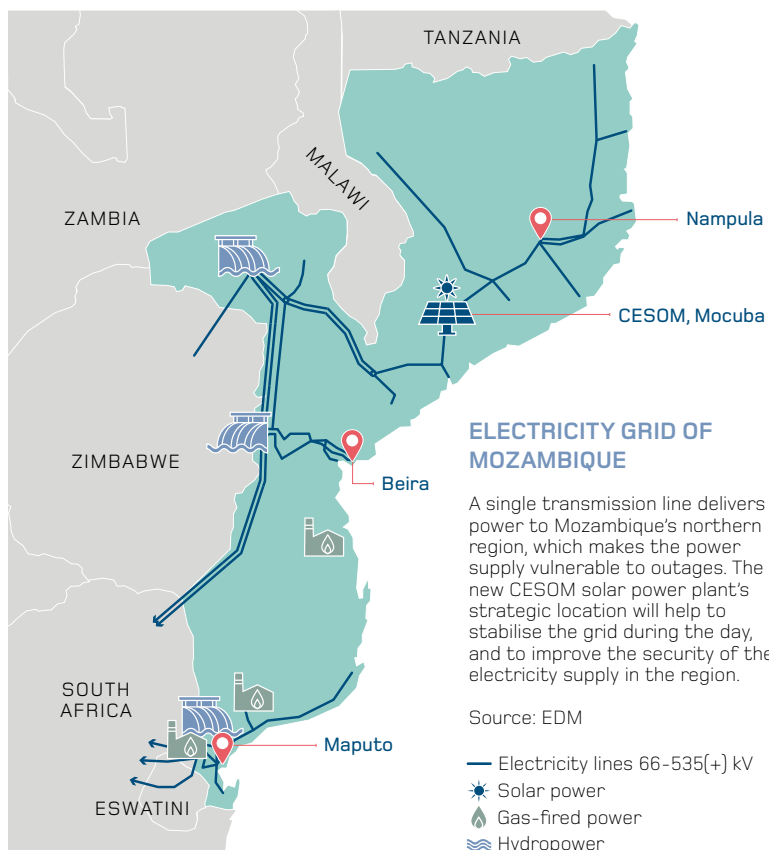
Initial screening

Scatec Solar, Norfund and EDM signed an agreement in December 2014 to undertake a pre feasibility investigation into the potential establishment of a solar power plant near Mocuba. Norfund and Scatec Solar had already successfully developed several solar power projects together, and Norad supported the feasibility study with a grant.

With the viability of a solar PV project at Mocuba confirmed, a Joint Development Agreement was executed in March 2015 and Scatec Solar and Norfund committed USD 2.5 million to the development budget.

The investment was in line with Norfund’s strategy of providing risk capital in commercially viable renewable energy projects in LDCs in the SSA region. Mozambique’s deteriorating credit rating and severe restrictions on the use of USD due to its debt crisis, were deterrents to investors and creditors. It would have been challenging for Scatec Solar to finance this project without DFI support. According to Norfund’s additionality scoring card, the project scored on all additionality indicators.

AMBITION		
Financial	Investing in poorest countries	✓
	Investing in capital constrained markets	✓
	Investing in risky markets	✓
	Investing in difficult business environments	✓
	Providing scarce capital	✓
	Contributing to starting new business activity	✓
	Mobile private investors	✓
Value	Taking an active role in investments	✓
	Promoting social and environmental standards	✓
	Supporting enterprise improvements	✓



Due diligence

Norfund’s project team conducted due diligence assessments on a range of issues: environmental, social and governance (ESG), financial and commercial, legal and integrity, as well as technical and insurance due diligence. Norfund rated the overall risk of the CESOM project as “high”.

Key risks to the project were:

- Financial and commercial: The state-owned utility EDM was a high credit risk counterparty, and the macroeconomic situation in Mozambique was deteriorating. The increased exchange rate risks and convertibility risks contributed to protracting and complicating the financing process. The plant was also the first of its kind in the country. This posed extra risks on a number of fronts, including import arrangements, logistics and licensing.
- ESG: The complexity of the land replacement allocation process, the large number of project affected people (PAPs), and the long-term environmental and social obligations with the local community.

The consultancy Environmental Resources Management (ERM), in partnership with Projectos e Estudos de Impacto Ambiental Lda (IMPACTO), conducted an environmental and social impact assessment for the construction and operation of the solar power plant. This included an evaluation of both environmental and social concerns. The main negative impacts identified included: the use of farmland for the construction of the power plant, potential erosion effects, impacts on animals in the area, and potential traffic accidents because of traffic during the construction phase. Potential positive impacts included job creation and improvements to the local economy. The study also identified a range of mitigation measures to minimise the impacts identified. These included hiring local people, preparing a compensation plan for those affected, and controlling the speed of vehicles.

Project preparation

Project preparations included further impact assessments, community consultations, a stakeholder engagement plan, third party assessments, and the development of compensation and livelihood restoration plans, implemented by CESOM and Scatec Solar, and monitored by IFC and Norfund. The Royal Norwegian Embassy in Maputo provided funding for a transmission line from the solar plant to the grid, and an upgrade of the existing transformer substation near Mocuba.

Final approval for the project was given by Board of Norfund in 2016. However, Mozambique's unfolding debt crisis extended the period of negotiations with lenders and caused further delays. In March 2018, the project finally reached financial close and construction began a week later.

The Mocuba solar project was evaluated in 2017 as part of an evaluation of human rights in Norwegian private sector development cooperation by KPMG on behalf of the Norad Evaluation Department. The evaluators were satisfied with the project execution, and commented specifically that "the project preparation has been a long process but seems to have been conducted in a good manner with impact assessments, community consultations, third party assessments and development of compensation and livelihood restoration plans."²⁰

COMPENSATION PROCESS & LIVELIHOOD RESTORATION PLAN

The social and environmental assessment of the solar power plant construction near Mocuba identified 223 households – or Project Affected People (PAPs) – who were using the designated area for small-scale farming, thus, a question of compensation for economic displacement. Under the IFC's Performance Standards on Environmental and Social Sustainability, projects must ensure that the livelihoods of those affected are maintained and, preferably, improved. Mitigating actions for the project included the preparation of a compensation plan to compensate for the loss of any physical assets in the area, and for the provision of replacement land to allow PAPs to continue to farm.

Several consultations were held in the communities affected. These included visits to all the households affected and the collection of data about the land and the crops that were being cultivated.

The Mocuba District Government allocated two replacement land sites, namely Igaru and Medhatube. Fifty-five PAP households were categorised as "most vulnerable", including elders, widows and the disabled. These PAPs were given priority relocation to the Medhatube area, because it was closer to the local village. During the compensation process, the Igaru site was found to be unsuitable as replacement land. Consequently, CESOM, together with Impacto, members of the provincial government, and the village examined alternatives for the remaining 168 PAPs. This was a time-consuming process but, finally, in 2017 CESOM managed to purchase alternative land from a local entrepreneur. Though this was located further away and the commuting time was longer, the solution was accepted by the PAPs. To mitigate for the longer travel distance, bicycles and shelters at the plots were provided. Improvements were made to the road and two new bridges were built to improve access to the land.



The newly allocated land was split into plots about twice the size of the old ones and assigned to the PAPs. An important part of the compensation process was the allocation of land titles, which they did not have at their previous site. This gives security of tenure and increases the value of the land.

The project has employed a Community Liaison Officer, based in Mocuba, who is responsible for sustaining a positive working relationship between the community and CESOM. The role of the Officer is to consider the views of the community, resolve issues of concern, and to manage expectations. The dialogue between CESOM and the local community has been frequent and positive.

A Technical Working Group, including representatives from PAPs and community leaders, was established in 2016. Its role is to represent community members in matters concerning the project, and to document and follow-up the complaints received.

After the economic compensation project was completed, the CESOM Community Liaison Officer received a number of grievances about the replacement land process (such as claims on land, alleged failure to recognize crops/trees, soil quality). These grievances were resolved.

Livelihood Restoration Plan

From October 2016 to April 2018, the international NGO, ADRA, which is locally present in Mocuba, developed and implemented a Livelihood Restoration Plan. The NGO's role was to help to reduce the economic displacement vulnerability of the 223 PAPs. This was achieved through agricultural training to ensure food security, the introduction of a savings scheme, and through financial training for members of the local community. ADRA also ran a programme for those unable to do agricultural work, which would allow PAPs to mill grains as a business at two local micro-mills provided by CESOM. A voluntary home-based micro business programme was also started. Attendance at these programmes and trainings was high.

The Livelihood Restoration Plan oversaw the construction of two bridges and two new drinking water boreholes. CESOM has also contributed to a cyclone response programme, school facility improvement initiatives, and a malaria programme. 0.75 percent of the revenues of the power plant over the 25-year concession period will be used to fund further Corporate Social Responsibility initiatives in the local community.

Representatives from the PAPs raising concerns, but also giving praise, to the CESOM Community Liaison Officer at a community meeting. The good and frequent communication between the local community and the CESOM project team has been a key success factor. Photo: Norfund



Two bridges were constructed and the road was improved in order to make the replacement land more accessible to the PAPs.
Photo: Norfund

NORFUND'S ROLE IN CENTRAL SOLAR DE MOCUBA

Norfund has played an active role in developing the solar power plant, providing early-stage project development financing, equity capital, and financial support to mitigate risk. Our role helped to improve the bankability of the project. We have also provided expertise and business support.

Providing flexible financing

Norfund led the financing processes from the start of the project, to its financial close. Norfund helped the project in three key ways:

- **Early-stage project development:** Norfund contributed to the funding of the development phase of the project in 2015, via a project development facility – a loan that is converted into equity if the project develops. Few commercial sources of finance are available for this early stage due to the high levels of risk involved.
- **Equity:** In 2016, Norfund took a 22.5 percent stake in the project company CESOM, through KLP

Norfund Investments. KLP Norfund Investments is a co-investment vehicle financed jointly by the mutual insurance company KLP and by Norfund.

- **Guarantees:** Norfund issued three guarantees to make the project bankable and also helped to reduce the project's PPA tariff, lowering the power price to Mozambique's electricity consumers. These were:
 - **A contingent equity guarantee:** Norfund provided a guarantee to cover potential cost-overruns during the project's construction phase
 - **A DSRA guarantee:** Lenders insisted that the financial reserves available to the project company should be doubled because of the high credit risks associated with the project, and because of the weak macro-economic conditions (particularly the acute shortage of USD currency). Norfund ensured these reserves were available via a parent company guarantee.
 - **A performance guarantee:** Norfund provided a guarantee on behalf of the project company should the project not perform as required under the concession agreement.

Interaction between funding agencies

The development of the solar power plant at Mocuba is the result of the long and close cooperation between Norway and Mozambique, and also demonstrates the benefits of cooperation between different funding agencies.

- The Royal Norwegian Embassy in Mozambique supported EDM's technical project preparations, including supporting the negotiation and planning of the Power Purchase Agreement
- Norad provided financial support for Scatec Solar's feasibility study
- Norfund financed the project's development, enabled the financial close of the project using equity and guarantees, and is now a project co-owner
- The Embassy funded EDM's 25 percent equity share in CESOM
- Finally, the Embassy financed the development of a transmission line connecting the new plant to the grid, and the upgrading of the transformer substation

Securing proper E&S standards

Norfund ensures that the companies it works with adhere to the highest environmental and social standards. The Central Solar de Mocuba project was developed in compliance with both Mozambican law and the IFC's Performance Standards. Norfund's E&S expert was actively involved in the compensation and land replacement processes through bi-weekly meetings and monitored the project closely throughout all its phases.

Supporting E&S initiatives through Business Support facility

Together with Scatec Solar and CESOM, Norfund's Business Support facility has funded several E&S initiatives with \$80,000 including:

- Extension of NGO's engagement to ensure continuity of the Livelihood Restoration Program
- Malaria Vector Control programme
- Owner engineer appointment to oversee the construction of bridges
- Consultant appointment to implement the Livelihood Restoration Plan for vulnerable PAPs



One of the PAPs commuting between the village and the new plot on a bike provided by the project to mitigate for the longer travel distance. The PAPs were allocated land titles for the new plots; giving security of tenure and increased value of the land. Photo: Norfund



LOCAL COMMUNITY CHIEF

Herminio Louveira Marqueza is one of the representatives in the Technical Working Group. According to Mr. Marqueza, there has been good and frequent dialogue between the Technical Working Group and CESOM, in particular the Community Liaison Officer. The solar power plant has brought income opportunities to the local community. Some have bought proper roof sheeting and motorbikes with the money they earned during the project; others bought small businesses.



CONSTRUCTION WORKER

Margarida Paulo Vittorino's work during the construction phase included mounting solar panels. She is from a local village near Mocuba and had no prior formal work experience. She went from being a team member to a well-respected work team leader.



MAYOR IN THE MOCUBA DISTRICT

Joaquim Fernando Pahare is very proud of the project and believes it has had positive impacts. He says that the district is now more economically attractive to industries and businesses. It has also given people hope and will inspire their entrepreneurial spirit.

Norfund's development rationale and ambitions

Investing in clean energy generation enables economic growth, job creation and mitigates climate change.

Ambitions (2019–2022)

- 5,000 MW new capacity financed, of which 4,000 MW renewable
- 1.5 million new households provided with access to electricity

DEVELOPMENT EFFECTS

The solar power plant will increase the supply of energy, improve energy security, create jobs, as well as strengthen private sector investments and technology transfer.

Increasing supply of renewable energy

Central Solar de Mocuba has increased the country's energy generation capacity by 40 MW. The renewable energy plant will produce approximately 79 GWh per year – equivalent to the electricity consumption of more than 170,000 households in Mozambique. The project will reduce energy transmission losses and improve the security of energy supply in northern Mozambique. The project will also help to diversify Mozambique's energy mix and stabilise the grid. It is estimated that the new solar power plant's connection to the EDM grid, will result in a seven percent improvement in the network fault level.²¹

The solar power plant will also result in a reduction of approximately 79,000 tonnes of CO2 emissions annually, compared to standard national grid emissions.²²

Although the project will increase the supply of electricity, it will not increase access to electricity directly. Many of the small villages surrounding the power plant remain unconnected to the grid. In the longer term, capacity added onto the grid will allow for more expansion of the distribution networks - and additional connections to the grid.

Creating jobs

DIRECT JOBS: A power production project generates many jobs during the construction phase, both on-site and in the supply chain. However, once a plant is online, fewer people are needed in the operation and maintenance phase.

At the peak of construction, 1,209 people worked on the site: 1,052 were hired locally, 96 of whom were women. During the construction phase, CESOM made a conscious effort to recruit (unskilled) workers from the surrounding villages. The job opportunities were announced in local media and the potential workers went through an application process. On-site jobs included construction work such as mounting solar panels, connecting cables, installing fencing, in addition to cutting grass and various kitchen chores. The project created additional jobs through contracts with local suppliers such as catering, housing and transport companies.

In contrast, the Mocuba project now only employs four people in full-time operation and maintenance roles,

and security, mowing and cleaning work is undertaken by contract services providers.

JOBS IN THE WIDER ECONOMY: The job creation impact of power projects are created mainly through their effects on the wider economy and can only be estimated. Better, more reliable energy supplies, and fewer and shorter outages are helping to foster job creation and economic growth as new businesses are established and productivity improves.

A Steward Redqueen study of “The Link Between Power and Jobs in Uganda”²³ showed that a reduction in power outage time from 28 to 12 hours per month resulted in an estimated:

- 2.6 percent increase in GDP (about a fifth of the total GDP increase of 12.2 percent over that period)
- Creation of approximately 201,600 jobs

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Strengthening private sector investments

The CESOM project has strengthened private sector investment in one of Mozambique’s targeted sectors and development zones, and provided much needed foreign direct investment. The project involved transfer of technology and was also an opportunity for EDM to gain technical, commercial and practical experience with private investments in utility scale solar PV projects. New renewable energy laws and guidelines were developed in Mozambique as part of the project development.

THE WAY FORWARD

The CESOM power plant reached commercial operation on August 6th 2019. The new Metoro solar power project, located further north, recently reached financial close. The building of this additional plant will further strengthen the security of Mozambique’s energy supply. ■



Norfund’s ambitions in Clean energy are aligned with the UN Sustainable Development Goal 7 “Affordable and clean energy”. This goal is central to achieving many of the other SDGs. More specifically, our investments contribute towards target 7.1 and 7.2.

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NORFUND'S INVESTMENT IN CENTRAL SOLAR DE MOCUBA

