

# UNCDF

## LOCAL FINANCE INITIATIVE (LFI)

### Case Study No.2: Mpale Village 50Kw Solar Micro Grid

#### Unlocking Public Finance

## INTRODUCTION

To realize inclusive growth, countries should have the capacity and resources to mobilize, allocate and account for capital flows to “last mile” pockets where poverty is entrenched, economic opportunities are limited, and development plans under-funded. Concurrently, local communities should have access to capital to fund their local development needs and respond to growing demands for better infrastructure, services, and jobs.

Yet, in many least developed countries (LDCs), local savings are not invested locally or limited investment is provided for local development because of lack of confidence from financiers and track record of successful transactions. Innovative financing mechanisms coupled with UNCDF risk mitigation instruments help reveal markets to a wider pool of investors; and thereby crowd-in non-traditional funders, public and private, into new areas.

In 2012, UNCDF launched the Local Finance Initiative (LFI), a “last mile” finance model aiming to unlock finance so that local development projects can get to “closure.” The purpose of LFI is to correct market failures and attract catalytic capital for the investments that are not being picked up by existing public or private investors. Therefore, LFI does not seek to crowd out the private sector and provide public subsidies for those investments that would be likely to attract investment without its support. This represents the foundation on which LFI investments are identified and how the selection process does not distort the market. UNCDF seeks to spark a demonstration effect where the public sector can replicate the blend, leveraging the private sector finance to take the business model to scale. The LFI approach and its risk mitigation strategies have

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Unlocking Public and Private  
Finance for the Poor





Mpale village located in the remote and mountainous area of Korogwe district, Tanga region, Tanzania. © UNCDF

proven that local development investments can access additional funds from domestic capital markets, which is in line with the call for action in the Addis Ababa Action Agenda and Sustainable Development Goal 17 (the means of implementation) to mobilize resources from multiple sources to finance development.

As the LFI investment pipeline is expanding rapidly, UNCDF would like to document and capture the knowledge, information, and lessons learned in a systematic manner. This series of case studies aims to demonstrate how LFI approach contributes to unlocking domestic capital and realizing transformational local impact.

Case study 2 covers LFI's facilitation of public financing for the Mpale Village 50Kw Solar Micro Grid in the Tanga region of Tanzania.

## PROJECT SUMMARY

**Name:** Mpale Village 50Kw Solar Micro-Grid

**Location:** Tanga region, northeastern Tanzania

**Sector:** Renewable energy

**Purpose:** Provide electricity to households in remote mountainous village of Mpale

**Total project cost:** USD 580,000 (Project developer's contribution + UNCDF seed capital grant + public finance)

## MARKET CONTEXT

In Tanzania, approximately 20% of its 45 million people have access to electricity. The situation is worse in rural areas, where over 70% of the population live but only 7% have access to electricity. Deploying grid lines to many parts of rural areas is not only technically difficult but also uneconomical due to weak demand potential in relation to high cost of grid extension and limited utility/state budgets to support such initiatives.

The market for grid electricity in Tanzania is monopolized by the Tanzania Electric Supply Company Limited (TANESCO), a state-owned and run company that generates, transmits, distributes and sells electricity to Tanzania mainland and Zanzibar. The Energy and Water Utilities Regulatory Authority (EWURA) is an autonomous multi-sectoral regulatory authority established by the Energy and Water Utilities Regulatory Authority Act. It is responsible for technical and economic regulation of the electricity, petroleum, natural gas and water sectors in Tanzania.

EWURA requires all energy projects with a capacity more than 1MW to be registered with the authority to safeguard it from potential conflicts relating to issues like land or energy resource use. The Rural Energy Agency (REA) is an autonomous body under the Ministry of Energy and Minerals of the United Republic of Tanzania. Its main role is to promote and facilitate improved access to modern energy services in rural areas of Mainland Tanzania. REA derives its powers from The Rural Energy Act no. 8 of 2005. As for regulatory framework, REA works closely with EWURA.



## DEVELOPMENT CHALLENGE

Mpale village is located in the remote Ward of Mpale in Korogwe District (Tanga region) along the arc mountain of north eastern Tanzania. Established as a communal village in 1972, Mpale has a population of 3,000 and 730 households. The village is economically vibrant; 98% of the population are farmers, with green tea, coffee, and cloves being the main cash crops. Since its establishment, the area has had no access to grid electricity.

Deploying grid lines to Mpale village is technically challenging given its geographical location (42km away from Korogwe Town) and land terrain (mountainous). High connection costs, combined with funding constraints experienced by TANESCO, make access difficult and less affordable. As a result, the local residents of Mpale village have been relying on expensive and unsustainable energy sources such as kerosene, battery, and diesel.

In 2015, in response to a request for proposal by UNCDF, Ensol Ltd<sup>1</sup> (project developer) proposed to develop a 50kW Solar Hybrid micro-grid plant to supply power to 250 households, public

facilities and small businesses in the village. The project consists of a stand-alone power generation plant with storage capacity and a standard 3-phases low voltage distribution grid. Ensol as the operator would be in charge of the operation and maintenance, including management of the basic energy services (charging station for mobile, lanterns, etc.) for the households not connected, and the implementation of demand side management for a smart and interactive management of the energy service. Flat rate electricity tariffs are deployed using an innovative management model called Energy Daily Allowance (EDA) where a consumer is provided with fixed daily energy and pays a monthly flat tariff for it. Since the project is below 1MW, it is not necessary to register with EWURA.

<sup>1</sup> Ensol Tanzania Ltd, a fully-owned Tanzanian company, was established in August 2001 as a partnership and subsequently became a limited liability company in January 2002.



The guest of honour Deputy Permanent Secretary of the Ministry of Energy (Dr. Juliana Pallangyo) together with the Head of UNCDF Tanzania (Peter Malika) and Project Manager of Ensol (Prosper Magali) officially launching the Mpale Village 50Kw Solar Micro Grid project. © UNCDF

## PROJECT RATIONALE

The Mpale 50kW Solar Village Micro Grid Project is vital in increasing rural electrification which will directly and indirectly impact 3,000 people in Mpale village. The project serves as a demonstration platform with a massive potential for replication and scale up in other villages, in the region, and also in other parts of the country. The project will contribute toward the sustainable and inclusive development of Korogwe District and beyond, by generating important transformative impacts.

For UNCDF, it was important to demonstrate the development impact of this off grid renewable power plant (as opposed to diesel generated power plants) at this most remote and difficult to reach mountainous villages in Korogwe district. Once this first one is built, the local developer can demonstrate to local banks and other investors that there is proof of concept and a successful track record.

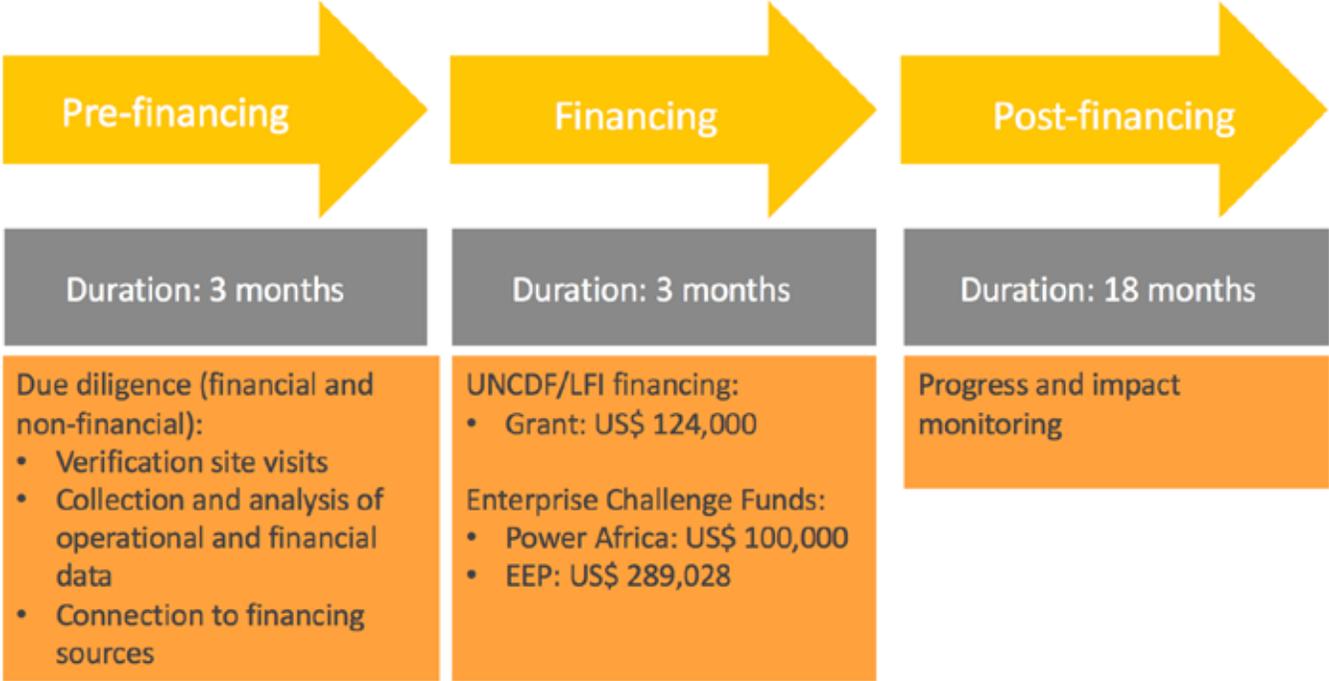
To serve rural and remote community with this kind of technology and solution, the developer must design a payment plan within the capacity of the community to pay. Considering the high investment costs and the lack of economies of scale (initially) to make such a project attractive to purely commercial financiers, there is a compelling need for development finance to subsidize catalytic development projects to prove concepts and demonstrate track record necessary for scale up.



Stakeholders and residents of Mpale village listening to a speech during commissioning of the power generation plant. © UNCDF

# PROJECT IMPLEMENTATION

LFI’s key activities under this project consists of three distinct phases (see Figure 1 below). The activities spanned a period of 24 months, and involved the participation of multiple stakeholders (project developer, an international technical consultant, village and district local government authorities, public finance institutions, UNCDF).



LFI used a mix of technical assistance and financial assistance during this project intervention. Unlike other LFI projects, the developer in this case (Ensol) did not require significant capacity building and technical support. Hence, the pre-financing and financing phases were relatively short, with the bulk of project implementation spent on ensuring the construction and operationalization of the power plant.

## Pre-financing

During this stage, LFI investment officers worked closely with the project developer to conduct due diligence of the project – collecting and analyzing all relevant operational, financial, and legal information. The key tasks included:

- Site visits to verify existence of project, meet with key stakeholders, and assess potential/expected impact of the project to the community.
- Review of the project’s technical and economic feasibility studies.
- Review of the project’s tariff structure and participation in village consultation meetings where the tariff structure was approved.

- Preparation of project information memorandum/business plan, and independent financial projections to assess viability of the project.
- Preparation of LFI’s internal investment documents to support the investment recommendation.
- Connecting the developer to Enterprise Challenge Funds to unlock additional sources of financing.
- Assistance to the developer in preparing documentation required by funding partners which led to the award of the Power Africa grant.

Throughout the due diligence process, UNCDF and Ensol consulted and collaborated closely with community members and the government to obtain the necessary permission and ensure buy-in. This was a key factor in garnering broad-based support for the project, at the technical and political levels.

## Financing

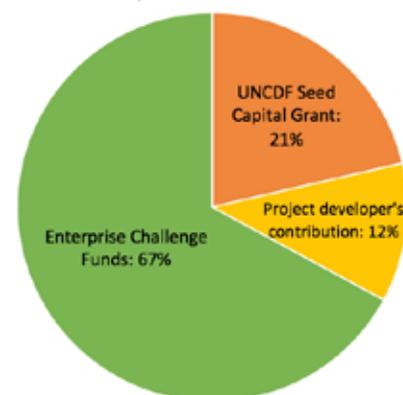
While there has been increasing private sector engagement and new innovative business models for financing renewable energy in least developed countries, investments in this space remain dependent on public financing. Other factors driving UNCDF’s decision to explore public rather than private financing include:

- The lack of economies of scale (due to the size of the project) making it a low return project that can’t afford/attract private capital during initial stages.
- The untested management model proposed by the project developer.
- The lack of interest by commercial banks to lend to greenfield projects.

UNCDF provided a US\$ 124,000 seed capital grant which helped to **unlock the remaining 67% of total project cost excluding labor** from two public financing sources: Power Africa partner the U.S. Africa Development Foundation (USADF)<sup>2</sup>, and the Energy and Environment Partnership (EEP) program<sup>3</sup>.

UNCDF’s technical support and financial support (as the anchor funder of the project) added credibility to the project in the eye of other funders. Moreover, since USADF and EEP funds are schemes that require the project developer to achieve specific milestones and expenditures in order to be reimbursed, the grant funding from UNCDF helped Ensol cover the project’s cashflow needs and start construction.

Percentage of financing unlocked by LFI  
UNCDF Seed Capital Grant: 21%



<sup>2</sup> USADF manages the Off-Grid Energy Challenge which awards grants of up to \$100,000 each to African enterprises providing off-grid solutions that deploy renewable resources and power local economic activities.

<sup>3</sup> The EEP Programme is a challenge fund supporting projects that contribute to poverty reduction by promoting inclusive and job-creating green economy and by improving energy security while mitigating global climate change.

## Post-financing

LFI's assistance does not end with the funding approval. UNCDF provided continuous technical support to ensure the smooth implementation of the project, including convening meetings with the Rural Energy Agency (REA) together with Ensol, which resulted in the issuance of a "no objection" letter for the project implementation. UNCDF will also will also perform impact measurement and reporting to as per international standards.

## RESULTS AND IMPACT

UNCDF's investment in the project played an important role in enabling the project developer to leverage additional financing from Enterprise Challenge Funds, with a leverage ratio of 1:3. The Mpale project is the first of its kind in the country to employ the energy daily allowance (EDA) system. The EDA concept assigns a daily fixed amount of electricity to each household. This amount is calculated and agreed upon with each household based on the number of appliances and number of hours each appliance needs to be powered through the mini-grid during a 24-hour cycle<sup>4</sup>. The technological and social innovation will allow for the transfer of knowledge and skills which will be vital in replicating the project in other parts of the country. Equally important, the initiative directly feeds into the country's objective of increasing the rate of electrification from 30% in 2016 to 100% in 2021.

More noteworthy is the multiplier effect that is unleashed by the modest amount of UNCDF funding. This is the first time that the Mpale community has seen electricity, which means that individuals no longer have to travel long distances to perform menial tasks like charging a mobile phone or fetching water (water can now be pumped up the mountain). In increasing access to affordable and clean energy, the project is having a transformative impact at several levels—economic, social, and environmental:



### Economic Growth and Improved Business Environment

Increased energy supply in the village is expected to contribute significantly to the improvement of rural livelihoods and the attainment of sustainable economic growth. The provision of cheaper and reliable electricity will be catalytic in improving operational efficiencies of small-sized businesses and enabling business expansion. For example, an owner of a mill indicated that his business expenses will decrease because he no longer has to buy diesel to run his milling machine.



### Job Creation and Poverty Eradication

The project used local labor in the construction of the power plant and also in the operation and maintenance of the plant, creating non-agricultural employment opportunities for members in the community and adjoining villages. Increased employment opportunities lead to higher household incomes and contribute to poverty reduction in the locality.

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<sup>4</sup> Based on the EDA, there is a flat rate electricity subscription per month.



### Increase in Purchasing Power

As a result of the new power plant, households are replacing their current energy sources, which are more costly and inefficient, with cleaner and more reliable solar energy. This will generate cost savings for users, increase their purchasing power, and improve their economic situation.



### Economic Diversification

Access to energy will enable the establishment of new processing enterprises (micro enterprises) and aid in the diversification of the local economy away from primary agriculture. This is especially important for the Mpale village which is currently losing out on opportunities for value-added agricultural production such as the processing of tea.



### Improvement in Social Service Delivery

Having continuous power means that the village health center can extend their operating hours so that more patients can receive health care services. Likewise, increased energy access means the village school can open longer and hold more classes in the evenings.



### Women Economic Empowerment

Access to electricity enables women to shift time spent on unpaid house work, such as collecting firewood and fetching water, toward income-earning activities and businesses. Lighting provides more security so women-owned businesses can extend their trading hours into the evening. Moreover, girls will be afforded more hours to study in the evening.



### Improvement in Public Health

The health of villagers will improve due to the reduced use of toxic kerosene and other sources of fuel that have adverse health effects. The health center also gains opportunities to expand the range of health care services delivered.



### Clean Energy and Reduced Carbon Emissions

Installation of the solar micro-grid promotes the use of clean energy in rural Tanzania and contributes to the reduction of carbon emission by replacing existing harmful energy sources like kerosene and wick lamps. It is expected that annual emission reductions of 23tCO<sub>2</sub>e will be achieved.



## Contribute to Global Development Agenda and National Strategy for Rural Electrification

The Mpale micro-grid is contributing to Sustainable Development Goal #7 related to affordable and clean energy, and is also in alignment with the Government of Tanzania's National Rural Electrification Program which aims to achieve 1.3 million connections in rural areas (including public facilities), and increasing the average access rate to electricity (both urban and rural) from the current 30% to 100% percent by 2021.



A resident demonstrating a new business opportunity that has emerged as a result of availability of electricity. © UNCDF

## LESSONS LEARNED

### **Unlocking public sector finance is as important as unlocking private sector finance.**

Not all local development projects will be able to attract private financing, especially small-scale projects that can unleash the local economic potential of a community but would require initial public funding to test its commercial viability. The Mpale project demonstrates that a small seed financing grant can unlock additional public financing schemes and generate a level of impact that is exponential to the size of the initial investment. Moreover, working in a locality that has seen minimal public or private investments due to its remote location and challenging terrain means that development assistance is applied where it is needed most—at the last mile.



Stakeholders and residents of Mpale village listening to a speech during the launch of the project. © UNCDF

*"I believe if it wasn't the support we received from UNCDF, this project would not be where it is today. We have received funding from other partners. But it is because of UNCDF technical support and catalytic seed capital grants that we have able to be noticed by other partners."*

Prosper Magali, Ensol

### **Financing is not the only significant challenge in implementing infrastructure projects.**

One of the unexpected challenges of the Mpale project implementation had to do with the construction of the power plant, which took almost a year to finish. The remoteness of the village lengthened the time taken to transport the construction materials and the topography posed technical challenges in building the power plant. The slow progress in construction also delayed the disbursement of funds from USADF and EEP; luckily, UNCDF grant funding helped to gap Ensol's cash flow needs.

### **Successful community projects require buy-in from local communities, village governments, district and central governments.**

From the onset, UNCDF and Ensol consulted and collaborated closely with the local government to ensure that there is appropriate ownership and buy-in for the project. Because the project entails the building of new infrastructure, coordination with the local government and the



Demonstration of multiple uses of power in Mpale village which have created new business opportunities for the residents. © UNCDF

community is critical. At every stage of the project, UNCDF and Ensol organized community meetings to inform villagers about the project, to discuss and agree on the tariff structure, etc. In the long run, local acceptance and ownership of the project ensures the long-term operation and maintenance of the local infrastructure.

### **Government policy changes can influence the development and scalability of micro-grid projects.**

Support for Mpale allows UNCDF to experiment with a new approach for expanding access to clean energy, test its commercial viability, and assess its potential scalability/replicability to other sites. While the demand and potential for village micro grids remains untapped, government policy towards these micro grids is uncertain and may discourage continued investments by existing developers such as Ensol, and may also delay the entrance of private funding.

# UNCDF & SUSTAINABLE DEVELOPMENT GOALS

**1 NO POVERTY** 

**17 PARTNERSHIPS FOR THE GOALS** 

LFI with impact on



## ABOUT UNCDF

The UN Capital Development Fund makes public and private finance work for the poor in the world's 47 least developed countries (LDCs).

With its capital mandate and instruments, UNCDF offers “last mile” finance models that unlock public and private resources, especially at the domestic level, to reduce poverty and support local economic development.

UNCDF's financing models work through two channels: financial inclusion that expands the opportunities for individuals, households, and small businesses to participate in the local economy, providing them with the tools they need to climb out of poverty and manage their financial lives; and by showing how localized investments—through fiscal decentralization, innovative municipal finance, and structured project finance—can drive public and private funding that underpins local economic expansion and sustainable development.

By strengthening how finance works for poor people at the household, small enterprise, and local infrastructure levels, UNCDF contributes to SDG 1 on eradicating poverty and SDG 17 on the means of implementation. By identifying those market segments where innovative financing models can have transformational impact in helping to reach the last mile and address exclusion and inequalities of access, UNCDF contributes to a number of different SDGs.



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