Renewable Energy Mini-Grid Market Development Facility

Concept idea by the NDC Support Cluster

Draft version
Executive Summary

The REMMDF will have 3 principal functions:

*Figure 1. Three Principal Functions of the REMMDF*

A) Develop project proposal documents
- With high-potential project developers (including those that have ‘graduated’ from trusted incubator programmes) to shape prospective projects into consistently structured mini-grid proposal documents that are well understood by a finance provider. Following development of these documents, shaping of term sheets to underpin deals with finance providers.

B) Build a network of finance providers
- Providing access to a variety of financial instruments (e.g., debt, equity, grants and guarantees). Proposal documents that meet the facility’s quality standards will be shared with finance providers whose investment preferences and criteria are aligned with the funding required by the project.

C) Act as a bridging link to connect these two communities
- This will accelerate funds flowing to projects. Finance providers will come to trust the MMDF as a source of consistently structured, high-quality projects. The project developers will come to see as MMDF as a route to access specialized funding which would otherwise be difficult to tap as an independent entity. Funds will not be directly handled by the facility, but it would provide guidance on the term sheets ultimately agreed by the parties.

The REMMDF could follow two parallel tracks: one focused on project-based support and another on assisting project developers to increase overall funding for their businesses. The two tracks will be mutually reinforcing – projects are more likely to get financing from credit worthy businesses and businesses can get investment if they have a solid project portfolio.

Under track one on project-based support, the REMMDF would have an initial aim to assess 50 projects in the first year of operation, with a view to working with 10 high-potential projects and presenting them to finance providers within the first year. This aim will continue on a yearly basis. The longer term aim will be for 5 projects per year to securing funding for implementation within 3 years of them initially engaging with the facility.

Under track 2, the REMMDF would focus on providing support at the company level, e.g., via angel investors. This track would build of track one to determine what company financing level of support is needed to achieve viability of both this and future projects for the business. The REMMDF would seek to assess 10 companies and identify 3-4 potential leading companies reading for company-level investments that can be targeted towards mini-grid projects, ideally supporting 10-12 projects.
Introduction

Objectives and target group

The ultimate objective for the Renewable Energy Mini-Grid Market Development Facility (REMMDF) is to support the mobilization of private sector capital towards mini-grid companies and/or projects in an effort to enable countries to implement their Nationally Determined Contributions (NDCs) and Low Emission Development Strategies (LEDS) and to reach both, overall national clean energy targets and development targets such as access to energy for all and rural development. Investments into mini-grids of clean energy (primarily solar but could include other renewable energy technologies such as wind, biomass and biomass) are a mean to achieve these different targets because they serve populations isolated from the national grid, create jobs and spread CO2-emission-free power generation. Mini-grids are a set of small-scale electricity generators (10kWh to 10 MW) and possibly energy storage systems, interconnected to a distribution network that supplies electricity to a localized group of customers.

The primary function of the REMMDF is to bridge the gap between project developers and finance providers. Next to connecting the two spheres, it will provide technical assistance to project developers and identify high-potential entrepreneurs. Furthermore, it will build a network of finance providers that offer a variety of financial instruments (debt, equity, grants, guarantees etc.).

The main objective is to establish the REMMDF that primarily focuses on accelerating minigrid investments and enabling affordable access to DRE. Thus, the facility once established will require to be refined in line with national policies and programmes. Structurally, various arrangements and scenarios shall also be required to be tested before landing on an optimized solution that will enable the objectives of the REMMDF be met in an efficient manner. This state of play shall be vital to extract valuable lessons on how to establish and structure an incubation facility that shall pave the way to consider initiatives for similar investments that can be made in DRE (Bio-Mass, Solar PV, etc) or even other sectors (Industry/Agriculture/etc). It is thus important that the establishment focuses on minigrids so to extract lessons that shall be used to replicate or scale similar initiatives.

The intent behind this paper is to outline how the REMMDF could operate, the barriers that it could help to address, the benefits that it could deliver and the initial steps that need to be taken. The primary audience for this concept is the NDC Cluster Finance Working Group, the LEDS Global Partnership (LEDS GP) Finance Working Group, the African Mini-Grid Community of Practice and regional platforms of LEDS Partnership, and other practitioners which could serve as lead implementing institutions. More specifically the LEDS GP Finance Working Group and the Microgrid Catalytic Investment Fund (MCIF) could play an advisory role to the REMMDF. The Mini-grid Investment Accelerator could also act as one of the possible investors within the REMMDF and bring in additional investors through its network. The Finance Working Group can also help identify potential partners to the REMMDF and share lessons learned through regional events and others means.

Potential sponsors include the finance and investment community, such as development finance institutions. Additional supporting implementing organizations include providers of non-financial support to companies promoting and implementing mini-grid projects, like incubators, accelerators and other programs providing support to entrepreneurs.
The REMMDF implementing team will also explore potential connections with other major mini-grid related initiatives, such as Power Africa, the African Development Bank’s Green Mini-Grids program and others to ensure there is no duplication and to also understand possible partnership opportunities, including exchanging experiences and working together to share models and networks.

Assumptions

Key assumptions behind the concept for the REMMDF include that:

- Mini-grids are aligned with current government NDC and LEDS priorities
- Current mini-grid project development and financing is insufficient to meet country clean energy development targets without additional support
- There is sufficient private sector interest in placing additional capital towards mini-grid projects and that viable business models have been shown to work in the right enabling environment
- There is a gap in current development partner and private sector initiatives in providing capacity building and network facilitation to mini-grid start-up businesses
- The development and finance community has interest in supporting this effort and it aligns with their support priorities

Challenges and barriers tackled

Implementation of a mini-grid system essentially happens on the ground and in most cases where grid power is not accessible, thus project sites are typically rural and in places that economically underdeveloped. Against this background, it is important to appreciate the challenges the private sector faces when considering making marginal profits from these kinds of investments. Currently, mini grid investments remain largely unattractive for the private sector for the following reasons:

*Figure 2. Challenges and Barriers in Mini-Grid Development*

- High capital expenditure costs followed by a long project payback period
- Rural and scattered setting increases project development costs
- Lack of capacity in developing bankable proposals to attract private sector investment in mini grids
- Lack of appropriate financing mechanisms
- Lack of sufficient subsidies and clear regulatory environments
- Inconsistent cashflows from typical low-income customers and poorly understood risk profiles for investors
- Variety and diversity of business models applied in the mini-grid sector
- High dependence on local (national) conditions, which makes a localization of the business model necessary
The Facility shall be established to focus and address key challenges and barriers identified within the mini-grid spectrum. The specific barriers addressed will include:

- **Lack of relationships and therefore trust between developers of small-scale projects and providers of finance** for these projects (e.g., banks, development finance institutions, foundations, venture capital/angel investors). This prevents access to company level funding for operational support as well as suitable blends of capital for a project’s specific needs.

- **Limited experience of potential investors** (banks, foundations, venture capital, etc.) with financing of mini-grid projects or companies developing and operating mini-grids

- **Difficulties for developers to efficiently navigate complex ecosystem of financiers** with differentiated return and impact requirements and potential mismatches between small project sizes and financier’s larger investment thresholds.

- Also, perhaps to a lesser extent, a **lack of bankable projects being shared with providers of finance in a consistent format** e.g., a term sheet providing the data points that a financier requires to make a decision. One possible tool to help address this issue in part is the Quality Assurance Framework (QAF) for Mini-grids, which could be a source to pull from to support document standardization. The REMMDF could build on this framework to add specifications for certain geographical contexts and technology implications. See [https://www.nrel.gov/docs/fy17osti/67374.pdf](https://www.nrel.gov/docs/fy17osti/67374.pdf) for more information on the QAF.

The Facility shall be the bridge between government, investors, banks, development partners and project developers. Key to the facility’s objective shall be:

- **Engaging with existing incubators, accelerators, research institutions and the academia to identify and support potential project developers in providing technical assistance to develop a bankable mini-grid investment proposal**; Examples of relevant incubators and accelerators include the Miller Center for Social Entrepreneurship, IFC, and Shell Foundation.

- **Provision of service quality assurance** for the end user and efficient revenue collection mechanisms, including support in routine operations and maintenance of the systems installed.

- **Engagement with development counterparts to source grant financing to implement mini-grid systems as a test pilot project** in areas where there is limited private sector interest. The project in effect shall be a test run to warrant profitability for the private sector to delve in and replicate the pilot project in a bigger scale. The Africa LEDS Partnership Mini-grids Community of Practice could potentially serve as the platform for this activity, in conjunction with the REMMDF.

- **Partnerships with multilateral and local banks to access long-term loan provisions** for the project developer to be able to payout the investor in a short period of time. This shall in effect decrease the payback period making the project more attractive for the private sector.

- **Collaboration with the private sector and project developer in defining attractive term sheets** that warrants the amount of funding and scheduled disbursement, return on investment, payback period, etc.
Proposed Approach

Description
The REMMDF will anchor itself around a small team, which would seek to further refine this concept, identify funding, initiate implementation, and share experiences and learning. The team could consist of organizations with experience implementing development programs, technical and businesses knowledge of mini-grids, business and government networks in target regions, expertise in working in the incubator/entrepreneurial field, and experience facilitating peer learning. The team take a couple of different possible structures. One potential structure could be based at the financial centre of the facility’s focus region (e.g., Nairobi for East Africa). Another potential structure would be anchoring the REMMDF around the Africa Mini-grids Community of Practice, with the focus area being made up of member countries to the Community of Practice.

For both tracks, the Africa Mini-grids Community of Practice could serve as a platform for helping identify potential projects or developers. For example, using a competitive process, the Community of Practice would work with developers to submit proposals with the selection of projects/developers being based on review of viability of the concept and the developer with an eye towards diversity across countries.
Innovative characteristics and key features

Development of a consistent template for project documents. The REMMDF will invest time in establishing templates for proposal documents, term sheets and other required supporting investment documents, and build its capacity to instruct project developers to complete each part of the template. Finance providers will become familiar with these templates over time, and it will also enable easy benchmarking of projects against past projects approved for funding.

Specified focus, enabling identification of consistent projects. The REMMDF will focus on projects that conform to established criteria. These may include a maximum generating capacity, specified geographic scope, types of offtaker (e.g., paper mills, domestic usage). The geographic scope will be defined to be large enough to enable a sufficient number of proposed projects, and may encompass multiple countries. This will enable the REMMDF to develop a specialization in this field, and target finance providers that have a specific interest in the space. However, the REMMDF will also need to consider differences in policy/regulatory/enabling environments within a particular country and the trade-off with enabling flexibility across markets to target multiple countries.

Filtering large number of projects to identify small number to present to finance providers. It will be important for the facility to build its credibility and trust with finance providers by only sharing high-quality projects. The facility will therefore be critical in its review of prospective projects looking for funding – ensuring that only those projects that successfully fill out the designated mini-grid proposal document template with robust analysis will be shared with finance providers. The REMMDF will do this by developing a streamlined appraisal process, which may result in access being given to selected finance providers as cooperation partners.

Emphasis on project ownership for the developers. The main services provided by the facility are the review of a wide range of projects and instruction on how to complete the templates, rather than direct technical assistance. This will keep the costs down and prevent overreliance on the facility.

Varied network of finance providers developed, each with their own distinct preferences and needs. The facility will build relationships with different types of finance provider, such as banks, private equity, foundations, development finance institutions, and impact/angel investors. The facility will commit time to understand in detail the investment preferences of those finance providers interested in engaging with the project. This will help to direct project towards them that suit their preferences (e.g., a mini-grid in a particularly vulnerable community may suit an impact investor’s preference than a more commercially viable venture).
Sharing knowledge between peers. The facility will enhance its impact by sharing lessons learned, business models, sample documentation and other materials through peer networks, such as the Africa LEDS Partnership Mini-grids Community of Practice. This will enable developers and local investors to learn from and be inspired by each other and identify good practices.

Proposals developed under the facility would include analysis seeking to clarify the following technical specification. Additional specifications could be incorporated from the Mini-grids Quality Assurance Framework, section 4.2: https://www.nrel.gov/docs/fy17osti/67374.pdf/, and potentially further elaborated to include additional geographical and technological considerations.

*Table 1. Initial Potential Project Specifications*

<table>
<thead>
<tr>
<th>General Project Classification</th>
<th>Plant Size</th>
<th>Technology planned</th>
<th>Extent of the grid</th>
<th>Location of the mini grid relative to existing grids</th>
<th>Target Market/s</th>
<th>Service Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand Side</td>
<td>kWh per month / annum</td>
<td>Price per kWh for the different customers / service categories</td>
<td>Connection service fees</td>
<td>Other income</td>
<td>Number of customers per service category</td>
<td>Estimated off-take per customer, per service category</td>
</tr>
<tr>
<td>Costings</td>
<td>Estimated capital expenditure for power generation</td>
<td>Estimated capital expenditure for distribution</td>
<td>Assumed cost of capital</td>
<td>Operating cost per kWh</td>
<td>EBITDA / Free cashflow</td>
<td>Estimated internal rate of return</td>
</tr>
</tbody>
</table>
Key stakeholder groups

Figure 3 describes the REMMDF’s main partners, including project developers, finance providers, regulators/policymakers, and learning platforms.

- **Project developers** whose projects align with the facility’s technical specification. E.g., existing networks such as the Africa Mini-Grid Developers Association (AMDA) and the Kenyan Mini-grid Integration Lab
- **Finance providers** interested in providing capital for off-grid in the specified focus region, but that currently lack the relationships/local expertise to source high-quality investment opportunities
- **Regulators / policy makers** designing the enabling environment for countries within the focus region who may influence the viability of projects developed by the facility
- **Learning platforms** such as the NDC Finance Cluster Working Group; the LEDS GP Finance working group, the Mini-grids Community of practice, and regional platforms; other LEDS/NDCs practitioners

**Figure 3. Primary Stakeholder Groups**

Existing Good Practices, Scalability and Replicability

There are a number of good practices that can be replicated for the REMMDF:

- First, project proponents will work with groups like CTI-PFAN which have facilitated investment match-making and supported capacity building to clean energy project developers in emerging markets to understand their approach and what was particularly effective.
- Second, the mini-grid market will partner with existing incubator programs to identify how best we can work with them to provide a continuity of their efforts while also avoiding overlap and ensuring value-add. Similarly, the mini-grid market will consult with financiers and other development partners to understand how our efforts can be shaped to be most useful to the investment community.
- Third, the Mini-grid market will work with learning platforms to get input on how to design the REMMDF to provide the most value add and also work with these partners to share experiences and models for replication. This can include exchanging insights with implementation partners through the NDC Finance Cluster and LEDS GP; and sharing approaches and how the mini-grid market supports NDC implementation with government counterparts via the LEDS GP and Africa Mini-Grid Community of Practice.
The REMMDF will initiate its efforts with an initial group of partner countries, potentially leveraging the membership from the Africa LEDS Partnership Mini-grids Community of Practice or focusing in a specific sub-region in order to test its approach to developing incubator and financier networks and facilitate in-depth technical advice and guidance to its market participants. Starting with a pilot effort and then expanding would also match to increased support from either the development and/or financial community.

By tapping into robust networks of incubators, financiers, practitioners, and governments, the REMMDF can have impacts beyond its direct interventions by enabling replication of approaches, development of standardized terms sheets and project development checklists or other tools, business model development, and creation of active private sector markets.

The proposed facility shall be established to specifically support and accelerate private sector investment in the mini-grid sector and thus support NDC implementation. To this end, the success of this facility can also be replicated in other sub-sector areas vis a vis water/transportation etc., to mobilize private investment to implement NDCs.

Figure 4. Summary Visual of REMMDF

Conclusion and Next Steps

The intent behind this paper is to describe the concept of the SMMDF so that it may be circulated and refined by interested stakeholders to ideally adjust and carry forward towards implementation, even if in an altered form.

In summary, key next steps include obtaining input from the NDC Finance Cluster, LEDS GP finance working group, Africa Mini-grids Community of Practice and broader development community. Pending verification with the group, the Africa Mini-grids Community of Practice could be an initial platform for refining and launching the REMMDF approach by incorporating elements of the concept into existing proposals to deepen and expand the community’s work. Once the concept is further refined, a group of champions will work with potential donors to develop proposals for funding.
Potential funders include development banks, financial institutions, bilateral donors, and philanthropies. Our initial estimate anticipates the need for initial seed funding of USD 1 million per annum, scaling to 3-5 million; however, further scoping is required to fully understand the scale of resources required.

Annex

Background

[To be added: \ workshop, methodology used, group setting
Possibly more information/material on the existing good practices]

Implementation option - Piloting a mini grid project on the ground

The Facility, in addition to addressing the challenges and barriers that have been identified under section two, would benefit more if it also implemented a pilot mini-grid project. Literatures and various case studies are available on mini grid systems, however, there are no practical guidelines to outline the steps and requirements that needs to be taken before having a functional mini-grid system on the ground. Budget and timing required to plan, design and implement a mini–grid system are also largely unavailable.

It is therefore essential that the Facility builds its own experience and understands the context and provide tailored and pragmatic support to investors and project developers. To this end, various studies have been reviewed by the writers of this report and in general a budget amount of Euro xxx and time frame of xxx months would be required to purchase, import and install a mini-grid system that is able to generate 2MW of solar power. Details of the budget breakdown has been included in the annex and the writers foresee a +/- 20% engineering estimate to the suggested budget to accommodate for fluctuations in currency/fuel/logistics charges. *(Someone needs to be sourced to budget this in detail)*

This pilot project would essentially help in appreciating and endorsing the challenges identified, map new ones not yet identified and recommend practical solutions to potential project developers and financiers.

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