

CLEAN ENERGY HYBRID MINI-GRIDS IN REMOTE AREAS – AN INVESTMENT OPPORTUNITY



Background

Around 1.4 billion people across the globe do not have access to electricity, primarily in rural areas. Many of them rely on biomass or expensive, polluting fossil fuel solutions such as diesel generators. A new approach is required to bring affordable clean energy solutions to these people. Dedicated public and private sector financing is essential for such innovation.

The IEA has estimated that, in order to achieve universal electricity access, mini-grids will have to provide more than 40% of the new capacity needed by 2030. But mini-grid development remains slow, even though low carbon mini-grid options do exist.

Providing sustainable finance models (to enable energy access for consumers and sufficient returns for financiers) is the key challenge; the need for consideration of policy and technology issues during the development of such business models is a critical component that is often overlooked. To achieve a realistic investment opportunity from mini-grid applications in developing countries, a wide range of interrelated issues must be addressed including the assessment of feasibility in target locations, technology needs, policy advice, capacity building, and practical implementation in targeted local communities. A bottom-up approach to address customer demand is required.

Feasibility of Mini-Grids in Remote Areas

By saving the costs of extending the main grid, electricity from decentralised mini-grids can be affordable. There is global experience of hybrid RE mini-grids but their commercial operation, particularly in developing economies, has not yet been established. Innovative financing mechanisms are required to mobilise private sector investment by demonstrating sustainable business models.

Some issues that must be taken into account for any future mini-grids in developing countries:

- level of supply must be based upon an assessment of the real local needs
- the price must be sufficient for reinvestment; a finance model for long-term payment is required
- quality of supply is relative - a start for rural areas may be to provide electricity for some hours/day
- ultimate connection to the main grid should be considered during design and installation
- local ownership (contractual and emotional) from end-users and suppliers will be essential
- it may be useful to introduce combined services; links with telecoms suppliers should be considered
- support from Government is essential to avoid unnecessary delays

The Need for a Viable Business Model

UNEP's aim is to work with key local stakeholders to demonstrate a viable business model that enables sustainability and so attracts the necessary finance. Not on the basis of development assistance, but rather as an opportunity for reasonable return on investment. The first installations carry particular risk for private investors since there is broad uncertainty of the outcome. For this reason, public funding will play an important role in offsetting the initial risks.

An important starting point is clear understanding of the customer demand; a bottom-up approach must be the basis for any effective business model, rather than the often-attempted imposition of externally-developed products and services that may not reflect local conditions. But future customer demand will be difficult to determine due to limited customer awareness of the potential energy supply options. Significant awareness-raising efforts are required.



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Location for Hybrid Mini-Grids

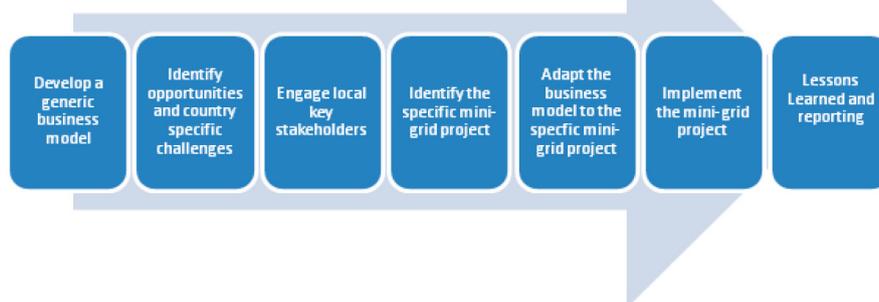
Key considerations when identifying target countries for hybrid mini-grid applications:

- all countries are different and present their own individual challenges but some common lessons
- a strong and well designed policy framework is essential to support rural electrification
- there is high risk due to the inexperience with such projects
- baseline information about the off grid areas is often non-existent – more research is needed
- there is a need to understand the socio-economic situation, to ensure returns on investment
- there is a lack of knowledge about energy access, mini grids, RE and the costs of electricity usage
- a local workforce should be trained and educated to execute all necessary O&M activities
- most important is the need for integration of all stakeholders into the project from the start

For any demonstration of a new concept for renewable energy mini-grid applications, in whichever countries are targeted for such an initiative, it is essential to recognize the range of stakeholders that must be engaged at relevant stages throughout the process. The future engagement of private sector investment will be dependent upon a stable local environment, which can only be achieved with the necessary buy-in from key target groups including local communities, technology providers, local financiers, national policy-makers, local government, local suppliers and installers

Conclusion

Here are the main steps to be undertaken in this demonstration of hybrid mini-grids:



UNEP's recent work on hybrid mini-grids has concluded the following:

- Much assessment of the issues surrounding mini-grids has been and continues to be undertaken, but there remain few examples of successful practical implementation in developing countries
- A priority to address is the need for an appropriate financial model that ensures affordability, thereby enabling energy access, but provides sufficient income to ensure the necessary O&M
- growing international interest in mini-grids means UNEP must find key gaps to add value; the practical demonstration of a commercially viable business model is one such opportunity

The intended result from this proposed demonstration will be a financial model that can be adapted to differing local conditions and therefore form the basis for sustainable future hybrid mini-grid installations in developing countries worldwide