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Risk Management for Mini-Grid deployment in Rural Areas

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Abstract

A significant challenge for mini-grid deployment is a communication and language gap between mini-grid developers and investors about mini-grid risks and their management. While investors usually think in financial risk/return dimensions and are often unaware of the specific challenges in the field of mini-grid electrification, project developers and mini-grid operators have immense expertise in overcoming these specific challenges in terms of preventing threats but often do not use risk management tools as usually expected by bankers and investors.

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1. Risk Management for Mini-grids

1.1 Introduction

For the year 2014, the International Energy Agency (IEA) estimated the number of people without access to electrical energy at 1.3 billion. The IEA also forecasts that in Africa, the number of un-electrified people will probably even increase from 589 million to 689 million. This estimate is mainly caused by population growth being higher than the increase in the electrification rate. Private investments in renewable energy have increased significantly worldwide over the years 2004 to 2012 demonstrating a market opportunity resulting from the falling prices of individual technologies like Solar Photovoltaic.

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Benefitting from these trends, the decentralized electrification sector is also seeing an emergence of investor interest. Improving policy and regulatory frameworks in certain regions is drawing the attention of entire business communities and requiring the electrification industry to engage in the sector more actively and with greater professionalism. With increased private sector interest in the operation of rural electrification facilities and higher accountability requirements by financiers, the pressure to develop strategies that reduce the risk of electrification schemes failing is high. Trends like these are expected to facilitate more professional engagement of rural electrification actors and draw more investment to the rural electrification sector. Today, holistic business models are already being piloted around the world. Rural electrification project developers in East Africa and South Asia are innovating by taking different stakeholder demands into account and catering to various types of customers, leveraging managerial expertise and employing solid financial planning.

1.2 Scope for Risk Management

Mini-grids offer a promising approach for rural electrification due to the fact that they can serve the demand for electricity of households, public services and local economy in rural and remote areas. Nevertheless, mini-grid developers and operators have to invest a lot of effort in order to ensure the effective functioning of the system and if necessary recover investments. By offering a reliable source of electricity, mini-grids can also create an impact on livelihoods in rural areas by enabling productive uses and thus supporting the development for small businesses and micro-enterprises. Managing productive loads on a mini-grid system is another task which requires appropriate strategies and business model adjustments. If operated effectively and efficiently mini-grids are able to provide the necessary infrastructure to foster local economic growth at a competitive cost. The financial viability of mini-grids often improves with the streamlining of functions of the operator and the economy of scale achieved through larger demand for electricity and high number of customers.

Translating this great potential into a real business success story has turned out to be extremely challenging. Deployment of mini-grids involves complex financial and organizational questions which can be assigned to challenges in the fields of sales, technology and finance. A successful business model satisfies the demand of the customers with high quality and 24/7 availability based on sound pricing models, and relies on adequate funding. Ideally, the funding should be both from the private and public sectors, and regarding the technology it should operate reliably and be easy to maintain.

1.3 Basic aspects of risk management

At the present time, there is no general valid risk management approach for mini-grids available. Different industries elaborated their own strategies and approaches according to their requirements and specific understanding of risks. BASEL III, for example, is a concept to mitigate financial risks related to banks, COSO ERM is widely used by the industry whereas the ISO 9001 classification focuses on issues related to quality management. As rural electrification markets display a high degree of complexity, it is obvious that this sector requires its own tailor-made risk-management approach. It has to be pointed out that risk management processes are generally faced with underlying basic challenges, (see figure 1) such as complexity, uncertainty and lack of awareness.

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