The Mini-Grid Policy Toolkit

Rationale, Approach, Content Highlights

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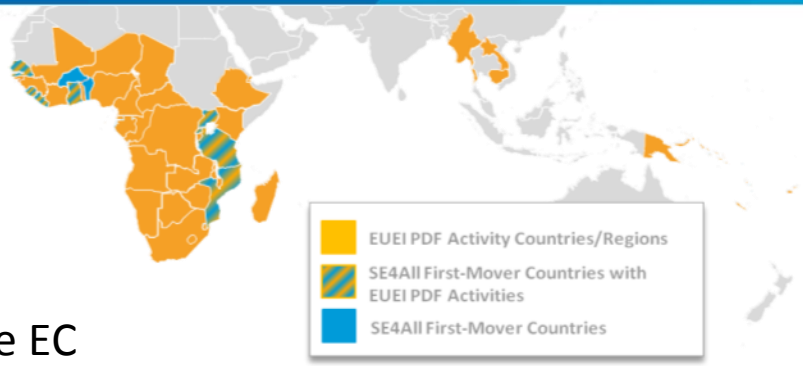
Background on EUEI PDF



An Instrument of the EU Energy Initiative

- Founded in **2005** by EU Member States and the EC
- International team, hosted by GIZ

Objectives

- Improve the **policy and regulatory environment** for private investments
- Build **institutional and thematic capacity** for effective partner structures

Activities

- **Service line 1**: Energy Policy and Strategy Development
- **Service line 2**: Support to the Africa-EU Energy Partnership (AEEP)

What Is a Mini-Grid?

- A mini-grid is a power system where the produced electricity is fed into a small distribution network that provides a number of end-users with electricity in their premises.
- Mini-grids are typically off-grid, less than 1 MW in capacity, and utilize diesel, renewable (+battery) or hybrid (combined) fuel sources to produce power.

The Rural Electrification Challenge

- In view of low electrification rates, economic and population growth, and large geographic areas with dispersed population, IEA has estimated that 60% of the additional generation capacity to be installed by 2030 will be off-grid.
- Rural consumer may pay over $0.70 per kWh for electricity from a small petrol or diesel generator, $1.20/kWh for power from a recharged car battery or even (much!) more for energy from kerosene, dry cells or candles.

Why Mini-Grids?

- Depending on the geographic and demographic situation, certain areas may not be economically supplied through grid extension.
- Abundant renewable energy sources in Africa, as well as drastic improvements on the technology side, make mini-grids increasingly viable.

Why Haven't Mini-Grids Taken Off yet?

- Hypothesis I: technology is not the issue (any more)
- Hypothesis II: traditional (utility / donor / CSR) ways of implementing mini-grids have inherent limits and will not suffice to meet the needs
- Hypothesis III: since viability of mini-grids is fairly recent, our understanding of viable business / operator models is lagging behind
- Hypothesis IV: this is intertwined with an inadequate understanding of how to create an attractive enabling environment (predominant situation in most countries)

Why Do We Need a Policy & Regulatory Framework?

- Defining the role of mini-grids in the national energy sector
- Establishing the institutional setup and the roles of stakeholders
- Laying out the rules of the game in legally binding terms

→ Providing public, private, or community-based promoters and investors with the confidence required for their commitment

while

→ Protecting the rights of mini-grid customers and the wider public, including balancing economic, social and environmental considerations

Why a "Toolkit" for Policy Instruments?

- The starting points are the assumptions that
  - Mini-grids offer real opportunities and benefits for rural electrification
  - Policy and regulatory frameworks for mini-grids require additional work in most African countries
  - Lacking awareness about benefits and opportunities, as well as a lacking understanding of how to effectively regulate (or not regulate!) the sector are at the root of the problem

- Existing literature and available documentation
  - Focuses predominantly on best practices or technical aspects of mini-grids and at project level,
  - Doesn't link policy & regulatory requirements to the various possible operator models,
  - Doesn't sufficiently provide systematic and holistic guidance on what can be done, and how to do it.

- The Mini-grid Policy Toolkit will attempt to provide policymakers and other stakeholders with an improved understanding, and concrete recommendations, on how to establish a conducive policy & regulatory framework

Project Overview

- Project Framework: AEEP's "Renewable Energy Cooperation Program" (RECP)
- Partners: Alliance for Rural Electrification – Shining a Light for Progress; REN21 Renewable Energy Policy Network for the 21st Century; euei pdf energy for development
- Geographical Focus: Africa (other regions in terms for experiences & best practices)
- Target audience:
  - Senior decision-makers as well as senior technical staff in public authorities
  - Development partners and donors, as well as rural electrification stakeholders and practitioners
- Approach

The Mini-Grid Policy Toolkit

Structure

- Introduction: Mini-Grids and Rural Electrification
- Mini-grid Technology
- Mini-grid Operator Models
- Mini-grid Policy and Regulatory Frameworks
- Enabling Mini-Grid Progress in Africa: Lessons and Recommendations
- Annexes, incl. literature / further reading, case studies, etc.

Format

- Short, condensed document with a lot of visualization elements
- Available in English and French

Content Highlight I: Mini-Grid Operator Models

	Model 1 Utility	Model 2 Hybrid (Utility & Private)	Model 3a Private (Unregulated)	Model 3b Private (Regulated)	Model 4 Community
Main driver for this model	Policy = public monopoly	Preference for utility involvement, but limited capacity	Absence of regulation	Willingness to involve private sector	Willingness to support bottom-up, community-based initiatives
Operator characteristics	Government or parastatal utility manages all aspect	IPP generates and utility distributes, or the reverse	Private companies manage all aspects on a "willing seller / willing buyer-basis"	Private company manages all aspects, in a regulated environment	Community members manage all /most aspects, usually with external support
Examples / case study	Kenya	Namibia	Somalia	India, Rwanda, Tanzania, Senegal	Cape Verde
Pros	• Relative ease to absorb public funds • Uniform tariffs	• As model 1 • Allows for gradual introduction of private sector	• Ability to deliver • Ability to attract private funding	• Ability to attract private funding …	• Higher chance to adress community interests
Cons	• Requires capable utility	• As model 1	• High costs • No consideration of safety, environmental etc. concerns	• … if the regulatory environment is functional • Lack of experience	• High risks in terms of sustainability • Often unclear ownership structure

Content Highlight II: Linking Models and Policy

	Model 1 Utility	Model 2: Hybrid (Utility & Private)	Model 3a and 3b: Private	Model 4 Community
Act of parliament	Topmost "authority": Acts / laws mandate institutions, delegate authority for specific regulation to government bodies (e.g. rural electrification agency, regulator), define roles			
Strategy / policy level	National electricity / electrification strategy and policies : • global decision designating operator model in the country • Some countries may encourage more than one operator model • Set out national strategy for rural electrification, including whether and where mini-grids will be applied			
General regulation	For example Environmental Impact Assessments, permits (e.g. water usage for hydro power); Import regulations; Technical standards (products and services) + their enforcement (!); taxation: e.g. VAT; quality of service regulation			
Support interventions	Can be anchored in policy framework: many options, for example CAPEX subsidy (financed through donors, taxes, or consumers), tax breaks, connection subsidies, direct support interventions, loan guarantees, etc.			
Specific operator model regulation (key examples)	• Public procurement • Tariffs (collected by utility)	• Specific licenses and permits; • IPP / PPA; • Tariffs (uniform tariffs?) • Concessions	• Specific licenses and permits; • Application and approval process (!); • Concessions; • Tariffs (uniform tariffs?) • Future grid connection	

Content Highlight III: Case Studies

Case Study	Mini-grid Technology	Operator Model
Cape Verde	Wind hybrid mini-grid	Model 4: Community Model (donor led grant-based)
India	Biomass-PV Mini-grids	Model 3b: Regulated Private sector PPP model (Subsidized private sector model with reducing subsidies and semi-commercial roll-out)
Kenya	Diesel gen-set with solar additions (fuel saver)	Model 1: national utility led model
Namibia	Hybrid inverter technology	Model 2: hybrid (utility and community aspects, and system design optimisation)
Rwanda	Hydro-based mini--grids that are subsequently connected to the main grid	Model 3b: regulated private sector led installations (incorporated into national grid)
Senegal	Hybrid inverter technology	Model 2: Hybrid (concession model)
Somalia	Diesel gen-set	Model 3a: unregulated private sector led
Tanzania	Biomass-/Biogas-based mini- grid	Model 3b: regulated private sector led (anchor client led model incorporated into national grid)

Preliminary Recommendations

(based on literature, expert interviews and research; selection)

- Rural electrification is expensive and requires cost-sharing, either through subsidies (taxpayers or donors) or through balancing mechanisms (tariff layovers)
- Mini-grids should have a clearly defined role; policies and regulations should be tailored to the desired operator model
- If private sector investment is desired, attractive and secure investment perspectives must be provided, while balancing with environmental, social, and economic considerations
- Regulation: as much as necessary, as little („light-handed“) as possible; all procedures and documentation should be simple and transparent (→ „bankability“)
- Future grid connection has benefits (e.g. for customers, but also grid stability), however, regulation must address risks arising for investors

Summary

- Mini-grids will – in addition to grid-extention / -densification on the one hand, and standalone systems (SHS, solar lanterns etc.) on the other – be one of the pillars of closing the energy access gap
- Economic viability of mini-grids has vastly improved driven by technology innovations; business model innovation and verification is lagging behind
- Policy & regulatory implications of promoting mini-grids still seem to be not fully understood
- Actual frameworks in most countries to this date not conducive to attracting substantial public / private investment → mini-grids should be “streamlined” at all policy levels
- Mini-Grid Policy Toolkit intended to support this; work in progress, ETA = February 2014; suggestions are welcome at any time

Thank you for your attention!

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RECP
Africa-EU Renewable Energy Cooperation Programme

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