

Green Mini Grids Market Development Programme - Market Intelligence business line

Summary presentation, 28th March 2017

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Overview

- › A programme of



- › Business line implemented by

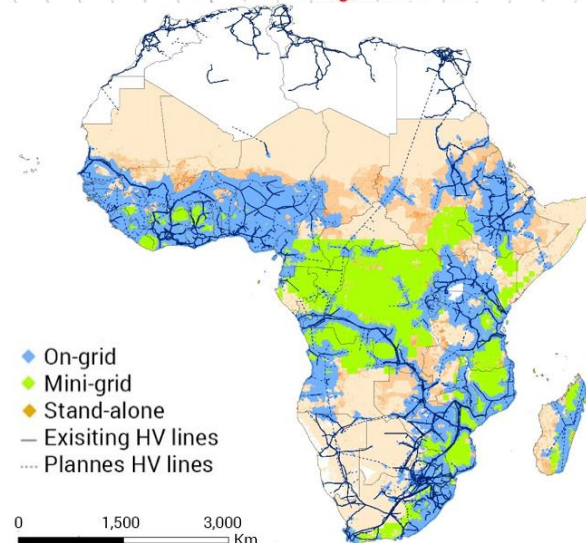
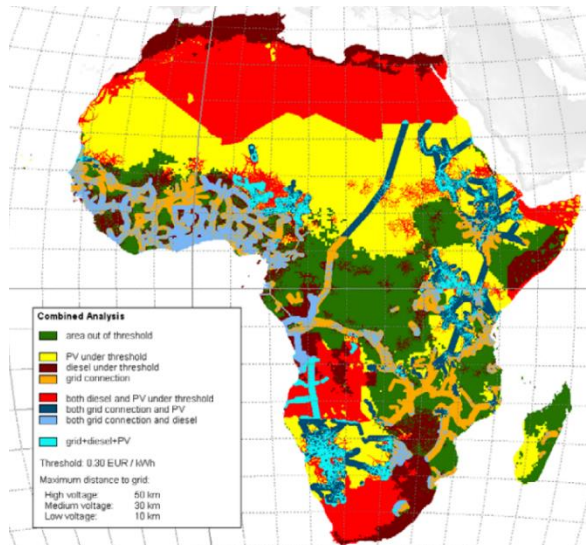


- › The MDP has the ultimate objective of fostering access to electricity across Africa by promoting the development of Green Mini Grids.
- › The Market Intelligence line had three phases:
 - › Phase 1: Evaluation of methodologies and best practices available for assessing GMG potential
 - › Phase 2: Creation of an opportunity assessment methodology to best address the needs of developers
 - › Phase 3: Deliver this methodology in five pilot countries, including reports with an analysis of the potential for GMG's in each country.

Phase 1 - Methodologies Assessed

	Name	Author(s)
GIS supported, Supply led methodologies		
A	GIS-based cost comparison of solar PV, mini-hydro, diesel and grid extension for Africa	EC Joint Research Centre
B	GIS-based comparison of solar, wind, domestic and centralised diesel and grid extension in the municipality of Lorca, Spain	Polytechnic University of Madrid
C	GIS-based lowest cost assessment of solar, wind, mini-hydro, biogas and diesel technologies against grid extension	KTH Royal Institute of Technology
D	GIS-based planning tool using the Network Planner Tool	Columbia University
E	GIS-based comparison of solar, wind and grid extension for Vietnam	Hanoi Institute of Energy
F	ECOWREX Mapping Tool and IntiGIS Planning Tool	ECOWAS / ECOWREX
GIS supported, Demand led methodologies		
G	GIS-based integrated rural electrification planning considering grid extension, small hydro and biomass	IED
H	The Master Plan Study on Rural Electrification by Renewable Energy in the Kingdom of Cambodia	JICA
GIS supported, Demand led methodologies. Grid extension focused		
K	GIS-based, Demand-Led Rural Electricity Planning Tool for Uganda	IT Power
L	GIS-based Electrification Planning Decision Support Tool for South Africa	Rural Area Power Solutions
Non GIS methodologies		
I	ClimateScope - Global Clean Energy Country Competitiveness Index	BNEF
J	Global Country Ranking Based on Suitability for Rural Electrification	Reiner Lemoine Institut GmbH

Phase 1 - Key Findings



- Most methodologies are based on complex calculations like the levelised cost of energy (LCOE)
- Hydro, biomass and wind resources are mostly not considered due to lack of identified sites
- These calculations require a large number of assumptions and approximations due to data quality and availability constraints
- This limits their relevance for practitioners
- There are already existing methodologies that produce a high level Africa-wide LCOE assessment – *UNDESA UNITE Electrification Access tool (left bottom)* and *EU JRC's Renewable Energies in Africa report (left top)*
- There is a need to re-assess practitioner requirements, including non-physical factors

Phase 2 - Stakeholder Consultations – Key Findings (1/2)

Assessment of physical factors:

- › Physical factors are rarely the key decision factors. Market size, demographic and grid extension are the most important physical factors.
- › Resource availability is not a key factor for solar, but is critical for hydro. Limited and poor data on sites is the critical limiting factor for hydro.
- › Mobile and mobile payment coverage is often a pre-requisite.

Assessment of other factors:

- › Local partner strengths and networks are often relied on much more than physical and non-physical factors.
- › A good proxy is found in the existence of other sector schemes and networks i.e. microfinance, agriculture or telecoms
- › Policy and regulatory factors and the ‘ease of doing business’ are key factors. This includes government visions and plans for off-grid vs grid electrification.

Phase 2 - Stakeholder Consultations – Key Findings (2/2)

Assessment of existing tools:

- › Most developers had never heard or used any of the tools from phase 1 and did not see more than partial benefits to using them.
- › This is mainly due to a lack of relevance to their organisation due to the assumptions and conditions applied as part of the analyses.

Assessment of outputs of this project:

- › Raw data is more useful than processed data: it allows practitioners to apply their own conditions and criteria, who often have in-house capability.
- › Provision of free, up-to-date, granular raw data will always be useful, especially for countries in which they are not operational.
- › Regular updating of any published sources is crucial to relevance.

Phase 2 - Our Approach

A hybrid approach will better address practitioner needs:

- › **High-level opportunity assessment** – incl. processed spatial maps
 - › Focused on key factors such as population density and grid extension plans
- › **Raw data** on physical and non-physical factors
 - › For practitioners to apply their own opportunity assessments
- › **Policy and regulatory environment analysis**
 - › Value is in facilitating easy and relatively complete country comparisons

Other aspects:

- › A platform is proposed to provide a single access point to the outputs of the Market Development Programme.
 - › Potential synergies with SE4ALL website and other programs.
- › All information will be made freely available, including raw data files.
- › Stakeholder outreach and dissemination will engage practitioners with the programme to ensure pickup and impact.

Phase 3 - Country Reports – Proposed elements

Raw Data (physical and non-physical) – *subject to availability*

- Existing and Planned Power Network
- Population Density and/or Population Centres
- Existing Off-Grid Projects
- Solar Average Annual Irradiation
- Average Annual Wind Speed
- Identified Potential Biomass Sites
- Identified Hydro Sites
- Any other sector networks available (agriculture, micro-finance)
- Service demand locations (hospitals, schools, municipal buildings)

Processed Spatial Maps

- Spatial split of grid, mini-grid or standalone electrification - based on distance from existing grid and population density
- Market potential (Population) based on population and the split of areas defined in map 1
- Market potential (USD) based on previous map, income data and consumption assumptions

Policy and Regulatory Analysis

Financial (Incentives, initiatives, access to finance, investment risk profile)

Technical (Accreditation and regulation, awareness of and access to international best practice technologies)

Institutional (Government prioritisation of mini-grids/rural electrification, existence of rural energy agencies or energy regulators / liberalised energy market, capacity/staffing for mini-grid activities)

Legal (Relevant laws and regulations)

Mozambique. Contents

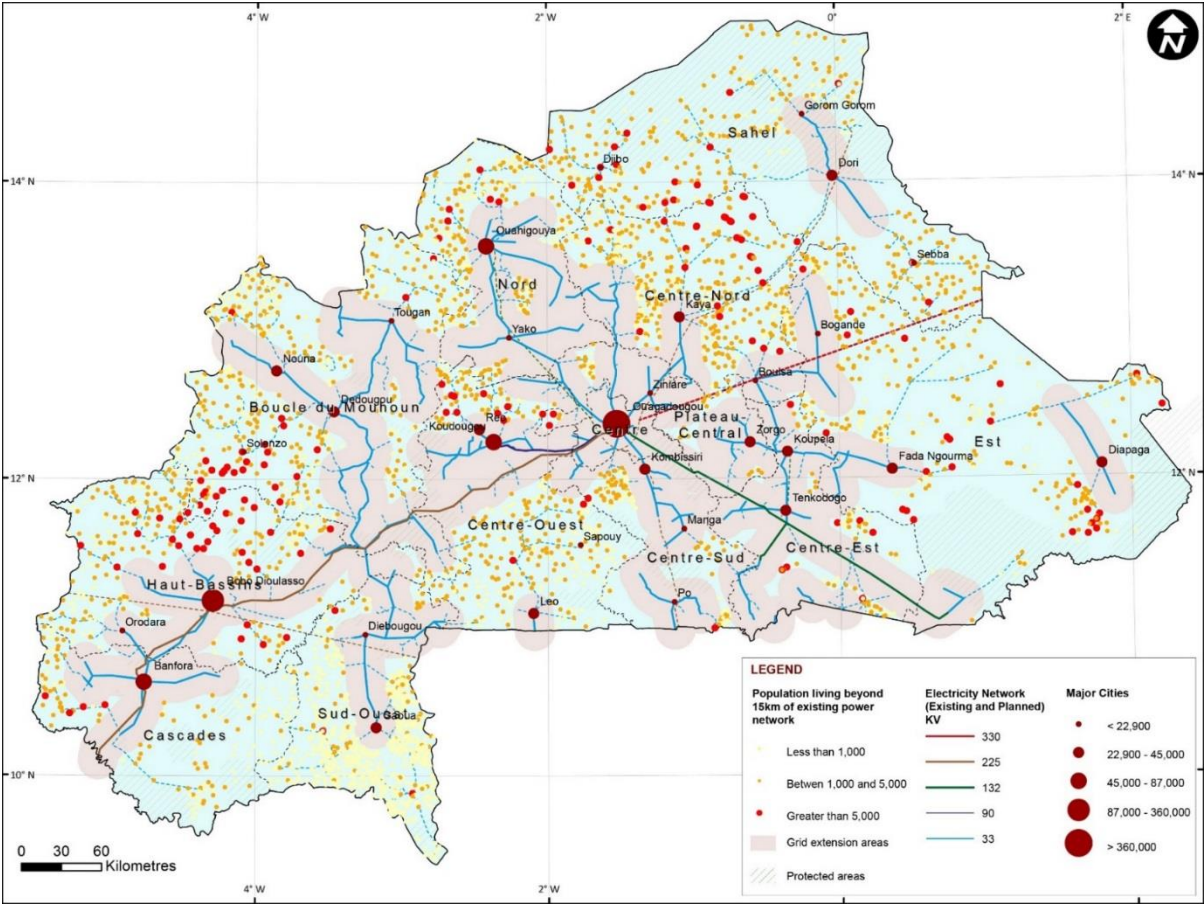
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Mini grid market opportunity assessment: *Mozambique*

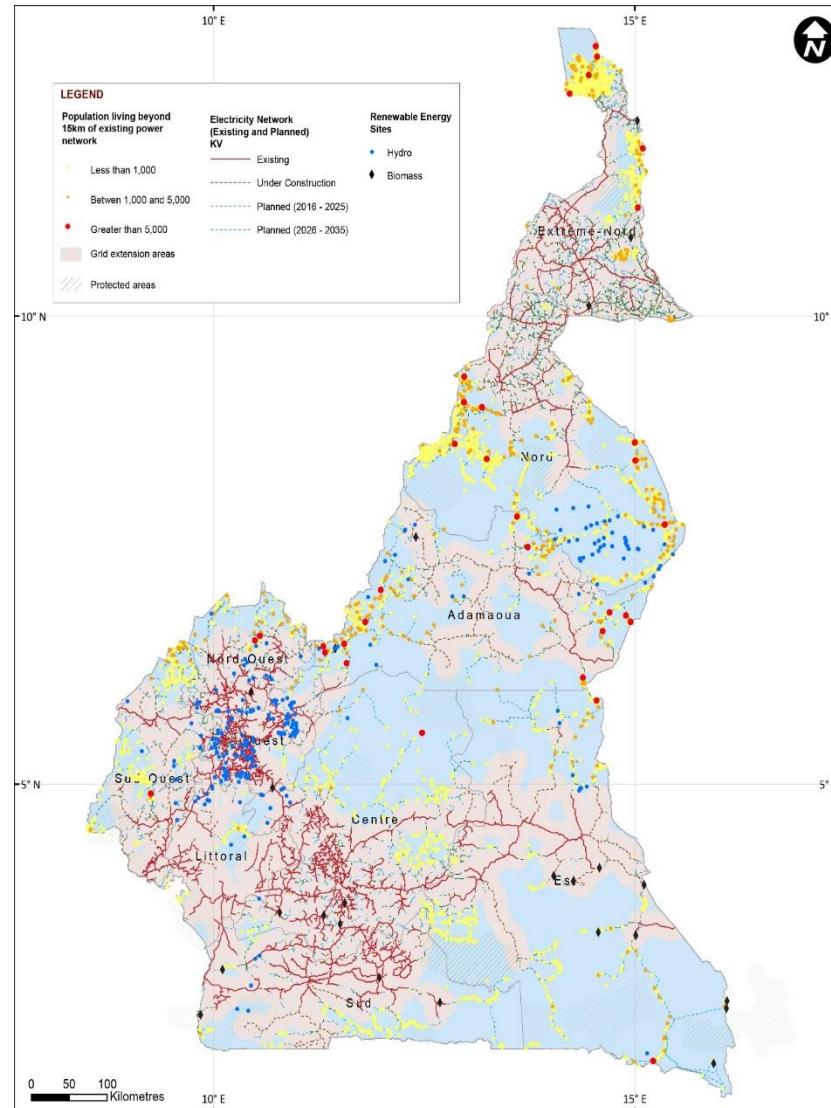
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Burkina Faso. Existing grid and population centres



Cameroon. Small hydro and biomass sites identified



Burkina Faso. Policy analysis

Burkina Faso 	Enabling Factors for the development of clean energy mini-grids	Limiting Factors for the development of clean energy mini-grids
Planning and institutional setting	<ul style="list-style-type: none"> • Dedicated rural electrification fund (FDE) and electricity regulator (ARSE) • Energy access targets • Distribution open to the private sector 	<ul style="list-style-type: none"> • Complex institutional setting • Most mini-grid concessionaires are operating as not-for-profits
Data availability	<ul style="list-style-type: none"> • Laws available online 	<ul style="list-style-type: none"> • Outdated GIS portal with no data processing • No regulatory portal for mini-grids
Licensing		<ul style="list-style-type: none"> • Low thresholds for mini grid projects to require administrative approval (10kW) and concession (25kW) • PV systems servicing more than 10 clients require authorisation • Projects below 10kW still require a declaration
Tariffs		<ul style="list-style-type: none"> • A nationally fixed tariff rate applies to mini-grids • Low tariffs do not cover costs
Subsidies and incentives	<ul style="list-style-type: none"> • FDE provides subsidies to cooperative mini-grid projects • Investment incentives for electricity companies 	<ul style="list-style-type: none"> • FDE subsidies are currently not available to private developers • Nearly all cooperatives are operating at a loss
Power purchase agreements		<ul style="list-style-type: none"> • The regulatory framework does not include standard PPAs
Arrival of the grid	<ul style="list-style-type: none"> • Mini-grid concessions are clearly delimited and protected by the legal framework 	<ul style="list-style-type: none"> • Lack of clarity over future grid extension plans and timeframes
Technical rules	<ul style="list-style-type: none"> • Mini-grid projects follow the general rules for electricity projects in the second segment 	
Mobile services	<ul style="list-style-type: none"> • Mobile money service available through Airtel 	Development hampered by the lack of retail distribution networks and a developed customer goods market

Main takeaways

Geographic data

- › Limited data exists
- › If data exists, is often not made available

Recommendations:

- › Make data available online (grid network, population distribution, RE sites, etc)
- › Collect data that is not available

Policies

- › High degree of variability in policies from country to country
- › Often, mini-grid policies far from optimal

Recommendations:

- › Review existing policies, following best-practices.
- › Recent AU GMG policy a good step on right direction