

STC Technical Paper N°6: Green Mini-Grid (GMG) Africa Strategy

1. Background/Context

In the modern world, household electrification is essential for people in Africa to achieve minimum living standards. The use of safe lighting applications and essential communications, including TV, radio and telephones, are increasingly viewed as fundamental services that should not be denied to any member of society. Electrification also presents the prospect of powering appliances that can provide an opportunity to earn income and so escape from the poverty often associated with living in rural communities. Universal access to electricity has therefore become a priority for governments worldwide, with a particular focus in Africa where connection rates in many countries today remain low, especially in remote areas.

It is estimated that 645 million Africans, nearly 60%, do not have access to electricity. Half of those, or 325 million, come from only six countries: Nigeria, the Democratic Republic of Congo, Ethiopia, Kenya, Uganda and Tanzania. The latest SE4ALL Global Tracking Framework also highlights that there is a significant urban – rural divide, with access to electricity in urban areas in Sub-Saharan Africa (SSA) amounting to 69% compared to only 15% in rural areas.

There are three principal options for providing new connections to currently unserved populations in Africa, namely i) extension of the national grid, ii) installation of separate “mini” grids to operate independently from the main grid, and iii) stand-alone generating systems that supply individual consumers. Due to the large surface area of many African countries, and the associated dispersion of the population, the extension of the national grid to all potential end-users is usually not an economically viable approach. According to the International Energy Agency (IEA), by 2040 70% of new rural electricity supply in SSA will be from off-grid and mini-grids solutions, two thirds of which powered by renewables as a result of falling costs, technological advancements and more efficient appliances ¹

The most cost-effective approach for powering mini-grids is to use renewable energy sources, such as solar, wind, hydro or bio-energy, which are widely available across Africa. Green Mini-Grids (GMG) are “small” electricity networks developed by small businesses, communities or public utilities to provide renewable power to households, businesses and institutions in rural communities. GMGs generate their power from renewable sources of energy, such as solar, wind, biomass and hydropower, as well as hybrid combinations of any of the above, including diesel generators for back up and peak loads.

The SE4All Africa Hub at the African Development Bank designed and launched the

¹ “Africa Energy Outlook: A focus on energy prospects in sub-Saharan Africa”, International Energy Agency, 2014

Green Mini-Grid Market Development Programme (GMG MDP) in 2015 with grant funding from the Bank's Sustainable Energy Fund for Africa (SEF).² The first phase saw inter alia the launch on the GMG help desk for developers: [http:// greenminigrid.se4all-africa.org](http://greenminigrid.se4all-africa.org) .The GMG MDP aims to remove or reduce market barriers and strengthen the ecosystem for the scaling-up of GMG investments in SSA. The Programme will achieve this goal by:

- Promoting a pan-African network of expertise on GMGs;
- Ensuring coherence with SE4All Action Agendas and Investment Prospectuses;
- Strengthening capacity of developers to develop/operationalize GMG business models;
- Engaging project financiers and supporting the development of suitable financial solutions;
- Promoting a sound policy and regulatory environment;
- Providing an interface with leading sector participants and groups (including the High Impact Opportunity Secretariat, development partners, private sector industry associations and civil society organizations).

2. Challenges

The development of GMGs is not without challenges. Chief amongst these challenges is profitability and therefore sustainability. Just as for rural electrification more broadly, building a mini-grid is not inexpensive, with payback periods that are likely to be relatively long in rural African environments where households and businesses have limited consumption levels and ability to pay. Related to the challenge of profitability is, therefore, commercial financing of any mini-grid initiative. Banks are seldom interested in investments resulting in small margins and relatively long payback periods.

The GMG MDP recently commissioned a 'Gap Analysis', whereby mini-grid developers operating in SSA were interviewed in order to analyze the main barriers to the scaling up of green mini-grids in SSA and how developers are overcoming these barriers.

According to the conclusions of the study, there are five main barriers to the growth of private sector mini-grids in Africa. The most important one for developers are the *gaps in the policy and regulatory framework* , specifically issues around tariffs, licensing and arrival of the national grid. Other significant hurdles include the lack of proven business models, the lack of market data and linkages, the lack of capacity of key stakeholders, and the lack of access to finance.

GMGs cannot be successfully promoted in countries without enabling environments conducive to private sector investments in the clean mini-grid sector. The public sector is responsible for creating this enabling environment. Three principles are

² DfID's Green Mini -Grids Africa Program also includes programs for Kenya and Tanzania, GMG policy development through the Sustainable Energy Fund for Africa, and an Action Learning and Exchange component being implemented by the Energy Sector Management Assistance Program (ESMAP) at the World Bank.

especially critical: (1) simple licensing procedures, (2) cost-reflective tariffs, and (3) predictable outcomes in the case of main grid arrival.

(1) Simple licensing procedures

Getting licenses and permits for mini-grid businesses is often problematic. Many countries do not have specific mini-grid regulations. In those that do, the process of obtaining licenses is often lengthy, bureaucratic and unclear, in some cases taking up to 3 years for a single mini-grid. Separate licenses may be required for the generation, distribution and sale of electricity. In addition to the licenses, other documents that may be required include certificates of incorporation, land lease or ownership documents, construction permits, environmental and social impact assessments (ESIAs), health and safety certificates, water use rights (for hydro projects) and rights of way. There are a lot of government agencies involved and their responsibilities frequently overlap.

Unclear and/or burdensome licensing procedures for mini-grids discourage investment and prevent the GMG sector from developing. In Mali, one agency takes all the major decisions on mini-grids (AMADER) and this has played a big part in the successful deployment of mini-grids in that country. In Tanzania and Nigeria, mini-grids under 100kWp are exempt from licensing and regulation.

(2) Cost reflective tariffs

Most African countries have uniform national tariffs, which means that household consumers are charged the same tariff regardless of whether they are connected to the national grid or in remote rural areas served by a mini-grid operator. In a great many countries, main grid tariffs are fixed lower than the cost of delivering electricity by the national utility (with negative effects on the financial performance of most utilities). And electricity generated from mini-grids is generally more expensive to deliver than main grid power, which means state-owned mini-grids are cross-subsidized (either by the revenue of the main grid or by the government's treasury).

Private mini-grids have to cover their costs and make a return on their investment and therefore require cost-reflective tariffs that are higher than the uniform main grid tariffs, or they need government subsidies to be viable. Some countries allow cost-reflective tariffs (Tanzania, Nigeria, Cameroon, Rwanda, Madagascar), but many do not and this holds back the growth of the private mini-grid sector.

(3) Predictable outcomes in the case of main grid arrival

The risk of a mini-grid being taken over by an expanding national grid is a major concern for private investors. Most African governments provide little information on grid expansion plans and very few have clear rules on how mini-grids will be integrated into the grid and how mini-grid owners will be compensated if the grid arrives. These risks can be mitigated by selecting mini-grid sites that are located far from the main grid or in areas where expansion of the grid is not economically feasible, such as islands. However, these remote areas tend to have less economic activity to support the mini-grid.

Mini-grid developers and their investors need long-term certainty that their investment is protected, and that it will either continue to generate revenue or that the business will be fairly compensated in the case where a mini-grid is taken over by a main grid. In the absence of a predictable outcome, capital for investment will not be made available.

3. Issues to be discussed by STC experts

A draft GMG Africa Strategy, prepared under the fDB's GMG MDP, will be presented at the STC meeting. The Strategy will set out the key principles, policy recommendations and implementation considerations for scaling-up GMGs in Africa and will be tabled for endorsement by Ministers.

The purpose of the GMG Africa Strategy is to ensure the most effective and efficient uptake of GMGs across Africa. To do so, a framework – or a GMG Africa Strategy - is required in order to provide guidance, to increase awareness and understanding of the options available, and to build upon shared experience. An agreed upon Strategy is also essential so as to identify those African countries where the introduction of GMGs will be prioritized by the Governments, those that recognize the great potential benefits from access to electricity made possible by GMGs. Strong policy leadership, vision and an action plan with clear targets are all required to achieve the successful development of a GMG sector across Africa. Agreement to a common platform for GMGs in Africa will allow partnerships between the critical stakeholders to be established. Clear commitment from African Governments to some basic principles related to the operation of GMGs is needed to attract the required investment.

In addition to the specific policy issues outlined above, the Strategy also addresses GMG quality assurance, business models, financing and skills development. The contents of the Strategy were subject to inputs from many experts in the field of mini-grids.

Some questions that the STC experts may need to discuss are the following:

Does the GMG Africa strategy identify the most salient issues to be addressed by Governments in order to scale-up mini-grids in Africa?

What needs to be done at each country-level to put into place simple licensing requirements and procedures?

How can a country reconcile fairness between urban and rural electricity consumers with GMG developers need to charge a tariff that covers costs and produces a return on investment?

What is a desirable outcome in the event that the main grid arrives in an area served by a mini-grid?

4. Recommendations & Way Forward

The draft GMG Africa Strategy that will be circulated prior to the STC will make a number of recommendations relative to GMG sector development. The aim of the STC session on mini-grids is to arrive at a common understand of the issues facing GMGs, and an endorsement of the GMG Africa Strategy. Some of the key recommendations will include the following ones:

Governments should keep licensing requirements as light and as streamlined as possible. The number of agencies approving licenses and permits should be kept to a minimum and overlapping roles and responsibilities should be avoided. Regulations should allow single license applications for multiple sites.

Governments should introduce laws and regulations for cost-reflective mini-grid tariffs and consider providing tariff guarantees for a number of years to improve revenue certainty and attract long-term capital into mini-grids.

Governments should improve their communications relative to main grid expansion plans. They should establish technical standards for integration of mini-grids into the national grid. Governments should establish rules on financial compensation for the takeover of mini-grids by the main grid, and make sure any incentives such as feed-in tariffs are linked to the installation date of the mini-grid's generation assets and not to the date of connection to the main grid. Finally, governments should consider using grants for the construction of distribution systems of private mini-grids in order to ensure they are built to national grid standards.

After mutual agreement on the GMG Africa Strategy, the way forward will involve the subsequent development of work plans and support requirements for implementation of the recommendations made.

For further information contact:

African Development Bank

Abidjan

Ivory Coast

Attention:

Dr. Daniel-Alexander Schroth, SE4All Africa Hub Coordinator, D.SCHROTH@AFDB.ORG