



Supportive framework conditions for mini-grids employing renewable and hybrid generation in the SADC Region

Guidelines on Planning & Development Process and Role Clarity

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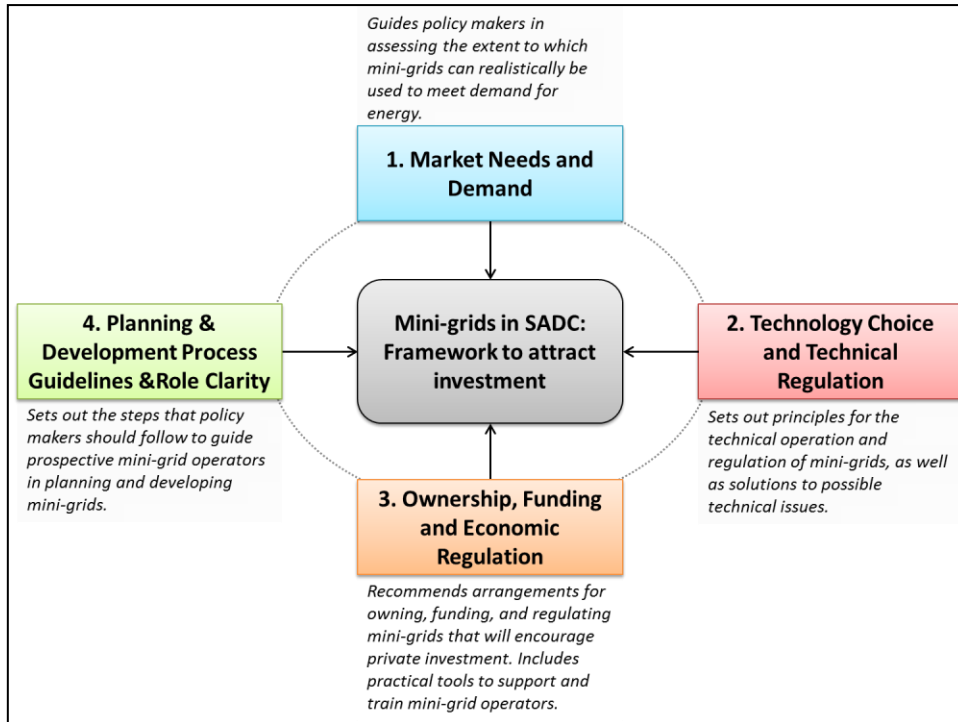
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Acronyms and abbreviations

EU	European Union
EUEI PDF	European Union Energy Initiative Partnership Dialogue Facility
EWURA	Energy & Water Utilities Regulatory Authority of Tanzania
kW	kilowatt
kWh	kilowatt-hour
LP	Large project
MW	Megawatt
NWEC	North West Energy Company, Zambia
PA	Practical Action
RERA	Regional Electricity Regulators Association of Southern Africa
SADC	Southern Africa Development Community
SEA	Sustainable Energy Authority (Sri Lanka)
SHP	small hydro power
SPP	small power project
SPPA	Standardised Power Purchase Agreement
SSP	Small-scale Project
STM	Standardised Tariff methodology
VSSP	Very small-scale Project

Executive Summary

The supportive framework conditions for mini-grids employing renewable and hybrid generation in the SADC region address four focus areas as summarised in the figure below:



The instruments which are provided in this document are addressing the fourth focus area – Planning & Development Process and Role Clarity. Good policies and regulations can fail to achieve their objective if the key stakeholders are unaware of these and of the process for getting the necessary approvals.

Policy makers need to define clear objectives, strategies and plans and allocate resources and provide incentives for mini-grid development. Regulators must facilitate the implementation of the policy objectives through procedures and regulatory compliance requirements that are as light handed as possible. Project developers (investors) must use community based planning approaches that involve participation by administrators, civil society and target beneficiaries. The key service providers that are required are producer and consumer financiers, technically skilled personnel, skills trainers, local manufacturers and contractors.

It is necessary to have a project champion in the form of an institution that can coordinate all the stakeholders by documenting process guidelines, managing the project approval process, provide capacity building for project developers and facilitate the administration of financial and other incentive schemes. Such a mini-grid project coordinating agency (MPCA) can be an existing institution such as a government department, regulator or electrification agency.

The Guidelines outline the steps which the policy makers and the MPCA should follow in documenting the planning and development process. The Guidelines also provide an extensive checklist of stakeholders and their role in mini-grid development, describe a mini-grid classification system that helps to direct policy and regulatory approaches that are appropriate to the size, location and ownership of mini-grids. A generic project approval process is outlined that involves planning, energy and general business permits and monitoring and review of project implementation.

1 Introduction

This document is for the use of policy makers and regulators in developing guidelines to inform stakeholders on the steps and approvals that are required in planning and developing mini-grids in any country within the SADC region.

1.1 Stakeholder role clarity

There are many stakeholders involved and a generic listing is given in Appendix A1. They comprise both energy sector and non-energy sector players who have the following key roles in mini-grid development:

- ❑ **Policy makers:** define the energy access and environmental protection mission and vision of mini-grids; define the policies and plans that facilitate demand and productive use required to realise the mission and vision; establish the legal and institutional framework for implementation of the policies and plans; decide the allocation of public financial and other resources and incentives required to support mini-grid development
- ❑ **Regulators:** energy regulators facilitate the implementation of policies and plans for mini-grids through (a) light handed regulations comprising standardised tariff methodologies and project agreements to minimise transaction costs and time for investors; (b) product and service quality standards for consumer protection. Non-energy sector regulators provide resource utilisation permits, ensure minimum adverse environmental and social impacts, and ensure compliance with tax, standards and other business compliance requirements.
- ❑ **Administrators and civil society:** concerned with the protection of the interests of the host community and of the public in general. Mini-grid developers therefore need skills in community based planning approaches (see Annex A3.2.2 for details).
- ❑ **Target beneficiaries:** these are the households, social and administrative and business institutions that are the principal source of funding for mini-grids. Project developers must include considerations of gender and youth in assessment of mini-grid benefits.
- ❑ **Investors:** the communities, public and private utilities involved on their own or in partnership to finance, develop, operate and maintain mini-grids.
- ❑ **Service providers:** support investors by providing producer and consumer finance, technical assistance for feasibility studies and project design and implementation, research and development, skills training, manufacture, construction, operation and maintenance services.

1.2 Project champion

The coordination of the various stakeholders requires a project champion in the form of an institution, preferably an existing one, whose role will be:

- ❑ ***Development, documentation and publication of mini-grid planning and development process guidelines:*** this should be done through a stakeholder consultation process which creates a forum for educating the stakeholders on their roles. There should be a periodic review and update of the guidelines based on implementation experience and changes in policies and regulations.
- ❑ ***Managing the Project approval process:*** the institution designated as the project champion, or mini-grid project coordinating agency (MPCA) should take the lead role in facilitating the planning and development of the mini-grids. *It should ideally be the one-stop centre through which both energy and non-energy approvals are processed.*
- ❑ ***Capacity building services for project developers and other stakeholders:*** the agency should periodically review the efficiency and effectiveness of the planning and development process to identify and implement necessary capacity building programs.
- ❑ ***Facilitates administration of financial and other incentive schemes for mini-grids:*** the agency could also have the role of providing financial support and guarantees to eligible projects.

Depending on national policy, this institution can be a government department, a regulatory agency or an electrification agency. The designation of an institution as the **Mini-grid Project Coordinating Agency (MPCA)** does not necessarily imply that this becomes its sole mandate. This designation is with respect to mini-grid development rather than to the overall mandate of the organisation.

The legislation in some countries makes it easy to identify the MPCA. In *Madagascar* the agency responsible for rural electrification is the designated off-grid regulator which can be the mini-grid project champion since the major objective of mini-grid development is to serve areas where the main grid is not competitive. The Rural Electrification Fund Act in *Zimbabwe* has a legal mandate to identify, train and finance rural electrification project promoters and sponsors so that they are able to implement rural and renewable energy projects cost effectively and efficiently. That mandate is a logical basis for designating the Fund as the MPCA for Zimbabwe.

2 Preliminary Steps for developing process guidelines

The ministry responsible for energy shall:

- ❑ Review existing policies and laws to establish if it is permissible for electricity to be supplied to retail customers by players other than the main grid operator: if it is not permissible the relevant policy and legislation needs to be put in place before proceeding to the next steps.
- ❑ Identify the institutions and individuals that are likely to be involved or affected by mini-grids: Appendix A1 provides a checklist for stakeholder identification.
- ❑ Designate an institution that will act as the mini-grid project coordinating agency (MPCA) as described above.

3 Draft guidelines

The MPCA, through a stakeholder consultation process, must then gather information to draft the guidelines which will typically have the following content:

- ❑ **Definition and classification of mini-grids:** a recommended classification system is described in Appendix A2.
- ❑ **Extracts of electricity access and renewable energy policies, laws and regulations:** the guidelines must explain the latest government policies and targets for access and renewable energy development and the role of the main grid and mini-grid operators in achieving the targets; with reference to renewable energy resources, the relevant resource entitlement requirements such as water rights must be explained.
- ❑ **Extracts of non-electricity sector policies, laws and regulations that also need to be complied with:** this includes but is not limited to environmental and social impact assessments, company and tax registration, land title or lease requirements and local authority by laws.
- ❑ **Description of fiscal and other incentives for mini-grid development:** potential developers need to understand if there are any incentives such as capital subsidies, loan guarantees, grants, tax concessions for mini-grids and, if so, how they can be accessed.
- ❑ **Description of the project development and approval process:** a generic process is described in Appendix A3 and a typical process is described in the Guidelines on “Ownership, Funding and Economic regulation”.
- ❑ **Definition of the licensing procedures and requirements for the different mini-grid classes:** should be consistent with the Guidelines on “Ownership, Funding and Economic regulation”
- ❑ **Description of the tariff and technical regulations applicable to the different mini-grid classes:** should be consistent with the Guidelines on “Ownership, Funding and Economic regulation” and Guidelines on “Technology Choice and Technical regulation”.

Guidelines for Development of Small Power Projects (SPPs) for Tanzania¹ published by the Energy and Water Utilities Regulatory Authority (EWURA) (refer to Box 1) and Renewable Energy Project Development Guideline for Sri Lanka² published by the Sustainable Energy Authority (SEA) are good models for the format of the mini-grid guidelines. Box 1 highlights the table of contents for the EWURA guidelines. The guidelines are being reviewed on the basis of experience and will now incorporate mini-grids as well as SPPs.

¹ www.ewura.go.tz

² www.energy.gov.lk/sub_pgs/develop_energy.html

Box 1 EWURA Guidelines for Development of Small Power Projects

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 5. SEQUENCE OF IMPLEMENTATION
 6. SPP COORDINATING UNIT
 7. COMMUNICATION
- APPENDENCES

Source: EWURA, www.ewura.go.tz

Other examples of process guidelines are the *Electricity Regulations on New Generation Capacity, May 2011* and *Non-grid Household Electrification Guidelines, March 2012* published by the Department of Energy (DOE), in *South Africa* which help investors to know how large power generation projects are developed and the incentives available for off-grid electrification.

4 Final guidelines

- ❑ **Stakeholder validation:** the draft guidelines should be presented to a stakeholder workshop for validation.
- ❑ **Publication:** the final guidelines should be widely distributed and also accessible through the website of the MPCA, Ministry of energy, regulator and electrification agencies.

A1 Identification and role of stakeholders

The following table summarises the stakeholders likely to be involved with mini-grid development in all the countries. In developing country-specific guidelines the actual designation of institutions is used in place of the generic terms given.

Table 1 Summary of Typical Mini-grid Stakeholders

Stakeholder Group		Generic Role	Role in mini-grid development
Policy makers	Economic and social sector ministries including rural development	National economic and social development policy and planning	Identification of productive and social applications which define the context of national energy policy and plans
	Energy ministry	Defining the energy sector mission and vision Administration of energy legislation; National Energy Policy and Planning Public resource allocation	Definition of institutional framework for energy development which permits multiple utility service providers; includes the designation of the mini-grid project coordinating agency Definition of relevant national strategic goals that stimulate mini-grid development e.g. universal access, renewable energy targets, incentives for enhancing access and renewable energy technologies Development of rural and renewable energy masterplans that help to identify grid and off-grid areas Definition of licensing thresholds for mini-grids
Regulators	Energy regulators	Facilitating the implementation of the energy sector mission and vision Technical and economic regulation of energy services; dispute resolution	Light-handed licensing and limited mini-grid tariff regulation; Standardised tariff methodology, power purchase and other project agreements; System and service quality standards;

Stakeholder Group		Generic Role	Role in mini-grid development
			Main-grid interconnection requirements
	Resource management agencies	Sustainable utilisation of natural resources such as land, water, forests,	Resource utilisation permits e.g. land title, water rights,
	Standards agencies	Certification of equipment	Equipment standards acceptable for mini-grids
	Natural environmental regulators	Environmental protection	Light handed environmental compliance requirements for mini-grids
	Business Environment regulators	Facilitation of business operations	Company registration, tax requirements
Administrators and Civil society	Political institutions	Public policy development	Determine stability of investment policies
	Central government institutions	National public administration	Fiscal management agencies have role in implementing incentive framework for mini-grids
	Local government institutions	Local public administration	Land use authorisation;
	Community and traditional leaders	Community leadership	Community mobilisation and protection of cultural values and customs that may be affected by mini-grid projects
	Civil Society	Protection of stakeholder interests and environment	Information for monitoring compliance
Target Beneficiaries	Households	Family subsistence	Consumers and customers of mini-grid services
	Social & administrative institutions	Non-profit Social and administrative services e.g. schools, clinics, offices	Consumers and customers of mini-grid services
	Businesses	Service provision for profit	Consumers and customers of mini-grid services
Investors³	Communities	Target beneficiaries	In-kind contribution for mini-grid development

³ The different investor groups are based on institution and financing approaches (refer to GVEP International, 2011. *The History of Mini-grid Development in Developing Countries*. www.gvepinternational.org.)

Stakeholder Group	Generic Role	Role in mini-grid development	
Public utilities	Generate income for service provision	Provide equity for own mini-grids;	
Private utilities	Provide services to generate profit for shareholders	Provide equity for own mini-grids;	
Hybrid business models (PPPs; multiple-owner mini-grids)	Investment risk sharing	Shared ownership of mini-grids or multiple owners trading at arms-length	
Service providers	Development finance institutions	Long term project financing	Project finance; risk guarantees for project development
	Development agencies	Economic and social development financing	Grants and soft loans and technical assistance for project development Capacity building for productive use applications
	Commercial banks	Short to medium term project financing	Project finance and working capital
	Universal Access Funds	Facilitate electrification of remote and low income areas	Grants and soft loans and technical assistance for project development Capacity building for productive use applications
	Micro-finance institutions	Consumer finance	Finance for connection and appliance purchases
	Utilities	Technical assistance	Technical support to mini-grid developers
	Consultants	Technical assistance	Project feasibility studies
	Contractors	Project implementation, operation and maintenance	System integration; Engineering, procurement and construction Operation & maintenance services
	Community Based NGOs	Community development	Capacity building for productive use applications
	Equipment manufacturers and vendors	Manufacture and sale of electrical supply and end use equipment	Equipment sales and after sales support
Universities and Research	Teaching and	Technology development and adaptation to local	

Stakeholder Group	Generic Role	Role in mini-grid development
institutions	research	conditions
Regional Institutions	Regional Coordination	Technical skills training Information sharing & capacity building Access to regional development funds Harmonisation of standards

A2 Classification of mini-grids

A2.1 Classification system

The size, location and ownership of the energy source provide a convenient way of classifying mini-grids as summarised in the following table:

		Energy Source for the mini-grid			
		Vertically integrated		Non-vertically integrated	
		Main-grid	Off-grid	Main-grid	Off-grid
Size of energy source	Very small-scale project (up to 1 MW)	(Part of main grid)	Type 1	Type 4	Type 7
	Small-scale project (> 1 - 10 MW)	(Part of main grid)	Type 2	Type 5	Type 8
	Large project (> 10 MW)	(Part of main grid)	Type 3	Type 6	Type 9

Three sizes are recommended on the basis of the following considerations: (a) there is a cut off for licensing in most countries for the very small projects, (b) there is a cut-off size for small projects which are subject to light handed regulation, and (c) there are large projects that are subject to normal regulation. The suggested cut-offs in the table are based on regional and international best practice.

Tanzania exempts projects below 1MW from licensing. Namibia uses 500 kW as the cut off while several countries such as Zimbabwe use 100 kW as the cut off. Many private sector developers indicated that 1 MW cut off size would encourage increased investment. Internationally, many developing countries with electricity systems of the size of SADC countries use 10 MW as the cut off for schemes promoting small power projects.

The different sizes can be further classified according to whether they are grid connected or off-grid and whether the energy source and network have the same or different ownership. Noting that the vertically integrated grid connected mini-grids are part of the main grid we have the following nine different mini-grid classes:

- **Vertically-integrated off-grid mini-grids:** these represent the traditional definition of a mini-grid.

- ❑ Type 1: Very small scale mini-grids supplied by the owner
- ❑ Type 2: Small-scale mini-grids supplied by the owner
- ❑ Type 3: Large mini-grids supplied by the owner
- ❑ **Mini-grids supplied by the main-grid:** these are also called small power distributors (SPD) and *are likely to be the easiest and most viable mini-grids to develop in SADC*. Such mini-grids could have started as off-grid projects that are then interconnected to the main-grid but continue as independent business operations.
 - ❑ Type 4: Very small scale mini-grids supplied by the main-grid
 - ❑ Type 5: Small-scale mini-grids supplied by the main-grid
 - ❑ Type 6: Large mini-grids supplied by the main-grid
- ❑ **Off-grid mini-grids supplied by a separate small power producer:** these represent the traditional hybrid ownership mini-grids where risks are shared between different developers. Policy and regulatory options depend on size as follows:
 - ❑ Type 7: Very small scale mini-grids supplied by another operator
 - ❑ Type 8: Small-scale mini-grids supplied by another operator
 - ❑ Type 9: Large mini-grids supplied by another operator

A2.2 Example of a Grid-connected mini-grid

The North West Energy Company of Zambia (Box 2) is a good example of an outsourced supply mini-grid taking supply from the main-grid on the basis of a bulk supply contract. Significant private sector financing for distribution infrastructure was achieved with this arrangement.

Box 2 North West Energy Company (NWEK), Zambia

The NWEK operates a grid-connected mini-grid which purchases power in bulk from the national utility, ZESCO, and distributes it to a mining residential area. It spent US\$10 million to build the distribution network. The company is licensed by the regulator and charges its own regulated tariffs that are different from those charged by the national utility.

Source: www.postzambia.com/post-read_article.php?articleId=24454

Many countries in SADC have rural electrification programs focussing on main grid extension to rural administration and business centres and to social institutions such as schools and hospitals. The promotion of grid-connected mini-grids can help in increasing electricity access from the same network by mobilising private sector

financing for building small scale distribution networks to supply the villages and smaller centres that are along the existing lines. The main-grid operator becomes a wholesaler, focussing on investments to ensure that there is adequate power on the main grid to support the mini-grid demand.

A3 Project development and approval process

Lessons from the SPP development experiences of countries such as Tanzania and Sri Lanka indicate that the project approval process should involve the following generic phases:

- ❑ *Pre-licensing or planning phase*
- ❑ *Energy business permit phase*
- ❑ *General business permit phase*
- ❑ *Project development monitoring and review phase*

The applicable fees for each phase and other required reports such as environmental impact assessments can add up to a significant proportion of the project costs. The MPCA needs to ensure that the total fees paid are not a deterrent to mini-grid development.

A3.1 Planning phase approvals

This is a two step process that involves the following:

- ❑ *Screening to establish site availability and developer credibility:* when a developer identifies a potential mini-grid site he must notify the MPCA of his intentions by submitting a project concept proposal. The MPCA must verify and advise whether the site is available for the proposed project, after checking on land ownership and the existence of any prior applications or approvals. The credibility of the developer is assessed based on whether the project concept proposal demonstrates technical, administrative and financial capacity to undertake the development. The applicant must therefore provide evidence of knowledge and experience.
- ❑ *Exclusive right to plan:* If site is available and the developer is judged to be credible, he or she is given the right in the form of a provisional approval from the regulator or MPCA to undertake the necessary project planning studies within a defined time period. During that period no other developer will be given the same site for the same purpose. It is a period granted to allow the developer to fulfil the requirements for applying for an energy business permit.

A3.2 Energy business permit phase

A3.2.1 Project feasibility studies

The developer should prepare and present feasibility study reports with sufficient details demonstrating economic, environmental and social viability and the financial and project development plan. Any project documents such as power purchase agreements and financing agreements are also submitted. Non-energy sector

planning approvals such as environmental, land use and building permits must also be presented.

A3.2.2 Community-based planning

The planning phase should involve the target beneficiaries using the community based planning (CBP) or similar approach. The CBP approach as used in Zimbabwe involves the following approximate steps undertaken over a week for a typical rural community⁴:

- ❑ Step 1: Contact the Community Leadership (councillor or village heads) to explain the objectives of the proposed project and the planning process. It is assumed that there would have been prior contacts before the kick off meeting in the area.
- ❑ Step 2: A community launch meeting is arranged by the community leaders for the project developer to provide the same information to the broader population and to agree the logistics for the planning process (e.g. proposed dates and venue for meetings, accommodation and meal arrangements, key information – population, socio-economic groups and activities, availability and cost of current energy sources, etc, key informants). The selection of informants who are social group representatives is critical for the validity of information to be provided.
- ❑ Step 3: Information gathering, situational or baseline analysis and validation at a community meeting involving all social groups. Social groups take account of gender, age, economic activity, and organised groups for various interests – recreation, religion, etc.
- ❑ Step 4: Visioning process for different socio-economic groups and identification of priority needs that are within the ability and willingness to pay of the different groups. The promotion of energy technologies that improve the welfare of women and you should be given particular attention.
- ❑ Step 5: Action Planning and validation at a community meeting mobilised by the community leaders

A3.2.3 Granting of an energy business permit

The energy business permit may be in the form of a license or simple registration depending on which is applicable. Very small scale projects only need to be registered. The registration certificate or license must include the right to use the necessary resources and must specify any mitigation measures required.

⁴ Community Based Planning Manual 2010
(http://practicalaction.org/.../CBP_MANUAL_20May_2009).

A3.3 General business permit phase

The mini-grid project developer will then need to obtain the general approvals required to do business such as company registration, local authority and community permits. National laws and regulations define this for each country.

A3.4 Project development monitoring and review phase

To ensure that the project is developed in accordance with the timescale and specifications agreed it is necessary to have a formal progress assessment process. The objective of the regulator or MPCA is to ensure that the developer is complying with the planning and permit conditions. During this phase the regulator or MPCA can be assisted by a Project Review Committee comprising electricity and non-electricity sector representatives. The representatives must be sufficiently senior to be able to take any necessary corrective action in their area of jurisdiction.

A3.5 Fees and time scale

The fees and time scale applicable for each phase must be designed to achieve a balance between affordability and the need to have serious developers and eliminate speculators. As a general guideline, fees and other development costs should not exceed 1-2% of the total costs of the project. Time is a major costs and it is necessary to ensure that procedures and approvals do not take time that is beyond the minimum required. The issue of affordability is important especially with respect to non-electricity sector permits where the relative difference between a project with a generation capacity of 100 kW and 100 MW may not be evident. That is why it is important for the MPCA to develop the guidelines through a stakeholder consultation process.

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