

Position paper on rural and peri-urban electrification for the ACP-EU Energy Facility

I. Context

The rate of electrification in rural areas is lower than 10% in most of ACP countries, hampering social and economic development in these areas. The reasons are mainly a combination of three drivers - the density and dispersion of population, the distance to the network and the income of the population - which are very unfavourable in these areas. Other reasons include the difficult financial situation of many national utilities which doesn't allow them to invest sufficiently in rural electrification.

Access to electricity is problematic for peri-urban areas as well, even if the conditions there are more favourable in terms of distance to the network and density of population. But there, in addition to the low income of the population, other issues are crucial for a sustainable supply, notably at the management level, as well as the dubious legal status of many of these peri-urban settlements.

Two ongoing studies on "Best Practice of Rural Electrification Funds" and "Enabling Increased Energy Investment in Africa" have been launched by the European Commission. Preliminary results from these studies have been taken into account in this document.

The purpose of this paper is to provide guidance for projects to be supported by the ACP-EU Energy Facility aiming at increasing access to electricity in rural as well as in peri-urban areas in ACP countries

II. Issues to be addressed

There is a serious problem of **lack of investment** in the ACP energy sector in general and in rural electrification in particular. Both local and foreign private companies have shown limited interest in this domain. This is due to financial as well as governance issues but also some technical issues.

1. Financial issues¹:

- *Rural electrification is often not a profitable business*, and there will be limited interest to engage in such activities from a purely financial point of view, in particular since many countries require that a uniform (nation wide) tariff be applied. On the other hand very good results in rural electrification (in Africa and elsewhere) have been achieved where there has been a strong government policy imposed on the national utility allowing for cross-subsidization²
- *Inadequate tariffs*: as it is politically inopportune to raise them, the tariffs are in many cases not adequate to the financial sustainability of the economic models (for national utilities as for independent producers).
- *The investment capacity of the national utilities* is often limited, which restricts their intervention to the maintenance of the existing network and in the best case, to

¹ Financial issues are sometimes closely linked to governance issues

² This is the case of South Africa (Eskom) or Morocco (ONE)

commercially viable grid extensions. The financial situation of these utilities is often weak due to a combination of factors: inadequate tariffs (see above), low levels of revenue collection (commercial losses), technical losses, inefficiency and obsolescence of the power systems due to inadequate maintenance, low level of consumption, low rate of interconnection and poor protection against higher fuel prices and climatic disturbances in hydro-power generation,

- *Lack of financing schemes*, or poor implementation of existing schemes, dedicated to increased investments in rural access, such as cross-subsidies between urban and rural areas, special levies to benefit rural electrification and public guarantees for loans.
- *Inadequate size of projects*: most of the time, the programmes³ are too small to be attractive to financing institutions and even more so to international private investors
- *Independent power producers in rural and peri-urban areas (local concessionaires, community operated systems, co-operatives, etc) face specific barriers*:
 - o *lack of interest from local banks* for rural electrification, due to a lack of knowledge and of confidence in this sector, which can be explained with the fact that local financing institutions are used to work in sectors they know quite well and whose risks they could measure and charge for, on a short term period, with clients they know... Local loans are expensive and the short term not suitable to financing of these long term assets.
 - o *lack of credit enhancement schemes such as different types of bank guarantees and co-financing instruments* for private investment in rural electrification
 - o *risk of unmanageable escalation of exploitation costs* (due to higher price of fossil fuel for example): even if allowed to be passed on to the tariff, such escalation may cause a loss of customers and therefore a reduction of receipts and prevent planned expansion.
 - o *the exchange risk* for imported goods, paid in foreign currencies, while the receipts are in local currency

The two main challenges for financing rural electrification are:

- **How to ensure financial viability of such service in the long run**, as even with a substantial subsidy to the initial capital cost (which is normally a basic requirement for rural electrification), the revenues may not be sufficient for covering operating, maintenance and depreciation expenses and even less for reinvesting profit into expansion of the services?
- **How to divide the risks among stakeholders** in a sustainable way? Generally, while a private operator may be willing to fully endorse the technical and operational risk, it may be reluctant to assume full responsibility for the market risk (i.e. that there is a sufficient demand, given that cost reflective tariffs would have to be applied). Also - with the little experience of operators until now in this area – there is a high degree of uncertainties at the time a concession contract is signed.

³ In some countries, there are big programmes for rural electrification. But in this case, they are still in the institutional and learning phase...

2. Governance issues:

Some governance issues⁴ are particularly important for rural electrification:

- *Insufficient attention to rural electrification in the country's regulatory framework.* Normally the regulatory framework (technical standards, concession conditions, tariff setting principles etc) is focused mainly on the performance of the national power operator and, where they exist, on the independent power producers selling power to the network. Suitable (light handed) regulation, for small electricity distributors are often not at hand.
- *Inadequate coordination* between the national utility and the rural electrification agency/fund. Experience shows that the organisational setup is often inadequate and incomplete and is therefore an obstacle for the service extension.
- *Weak planning and organisational capacity of the public authority:* lack of adequate planning, concrete strategies and quantified programmes for rural electrification. Available planning tools are weak as regards the most adapted technological options and the prioritisation of investments to areas with high development potential and locally available renewable resources.
- *Lack of respect to commitments made in concession contracts :* (i) *by the public part:* lower level/volume of subsidy, lower number of clients, tariff adjustments, tax on fuels, commitments on future developments, etc. and (ii) *by the private part:* level of services delivered, investments realised compared to investments foreseen...
- *Political interference* in the choices made by the company: geographical scope, route of local networks, etc.
- *Low capacity of local authorities:* they are not prepared to play the role of locally promoting and supporting the interventions required to extend access to energy services for the population.
- *In peri-urban areas, the reduction of non technical losses (unpaid electricity) is a huge challenge to power utilities.* This is particularly important because peri-urban areas will probably be main centres of poverty in the next decades (and increasing). The challenges there are not technical, but rather management of the proposed services and the pricing of the services which will have to be adapted to low income populations and a largely informal business sector.

3. In addition to the financial and institutional issues described above, there are also a number of technical challenges, such as:

- Improving the capacity of private local actors in various technical matters, notably for decentralised electrification solutions
- Support to the development of new management modalities (including the use of prepaid metering, block metering, fixed monthly rates for restricted supplies, etc...)
- Provision of technical education adapted to new technologies (PV, SWER⁵ networks...)

⁴ Some of them are already stressed in the position paper on governance

- Training of qualified staff in the utilities.

Scale up the pilot projects is a real challenge: many small and/or pilot projects have been very valuable in demonstrating good examples of institutional and organisational changes. However these pilots do not lead themselves to larger scale implementation for two main reasons: (i) such pilot often rely on fully subsidised investments, whereas on many projects (especially for electrification of secondary centres), given the scarcity of subsidy in this sector, loans have to be used whenever possible to increase leverage on the number of beneficiaries; (ii) such pilots do not allow for a “viable” market with a minimum size to be financially⁶ viable for operators.

III. Methodology / Approach for access to electricity

To address these issues, past experience shows that planning of rural electrification services has to be done at three levels:

- (i) **Comprehensive long run rural planning** has to be undertaken for all rural zones, in order to assess economic / financial benefits and costs based on local context and national priorities and criteria; this rural planning approach could include the development of small industries, which could both benefit from rural electrification and contribute to its sustainability.
- (ii) **Technical planning**, all technical options, alone or in combination, have to be taken into account systematically at early stage of planning (feasibility study): grid extension, mini grid and off-grid, renewable as far as possible, fossil fuel if needed as back-up; energy efficiency has to be promoted, from power generation to the use of electricity. These technical options have to be put in place and managed in a professional and sustainable way.
- (iii) **Financial planning**, whereby financing schemes with a suitable mix of complementary resources (states, donors, NGO, local community, beneficiaries, loans / grants / guarantees ...) are made available to project implementers. Such schemes should allow the sharing of the burden of electricity access costs through cross-subsidies among clients but also time (short term high return schemes may pay for lower return schemes developed later on). Financial schemes must consider the revenue requirements of the operator during the whole life cycle of the programme and carefully assess the viability of proposed tariff schemes and demand projections to ensure sustainability: it is not sufficient to finance first investments, it has to be maintained in the long run, including for maintenance and replacement needs, at least until the exploitation reaches a critical size.

Operational implementation of an increased access to electricity may be differentiated in three categories depending on technical, economical and institutional specificities:

- **Provision of electricity to dispersed populations in isolated areas:** this category will most probably not be connected to the national grid within a foreseeable future. Populations in such isolated areas have a low level of willingness to pay. Such programs would mainly aim social impacts (access to the poor and regional equity);

⁵ SWER, Single wire earth return, is a single-wire transmission line for supplying single-phase electrical power from an electrical grid to remote areas at low cost

⁶ Financial viability criteria in electricity access may not induce to have full recovery costs but operating costs shall as much as possible be covered

- Electrification of rural growth centres: focussing on zones with relatively high density of population and/or potential development of economic activities (possibly including several villages). These investments can achieve certain level of profitability and therefore ensure sustainability. These schemes may therefore achieve high levels of both economic impacts (activities development) and social impacts (access rate). Electricity access in such zones may be achieved through national operator or through new concessionaires;
- Access for poor population in peri-urban areas: in these areas, the actors are known and the economic benefits more easily realized because of the nearness of markets and knowledge. Specific schemes have to be developed to allow low income population to have access to electricity (including e.g. the application of prepaid meters etc.). This would imply cultural and organisational changes and would need to be accompanied by a social promotion activities possibly financed through public support.

Prerequisites / Principles:

- regulatory frameworks adapted to these contexts should be developed; notably, the set-up of rural electrification agencies and funds could contribute to tackle some issues mentioned above (size of projects and markets, ...)
- institutional capacity should be developed for all types of stakeholders including not only ministries, governmental agencies (rural electrification agency, regulatory body) and national operators, but also local actors and private sector (operators, equipment suppliers or small industries);
- financial tools should be mobilised and combined in order to leverage impacts, to finance access projects: grants are scarce and have to finance in priority technical assistance to support all stakeholders in project elaboration and implementation and to finance investments when dealt with low level of return and social impacts; private investments are particularly requested; at an intermediary level, (soft) loans could help financing the investments whenever possible (with sufficient level of return);
- Projects should combine « social » clients and more creditworthy clients to increase the financial sustainability of the rural electrification schemes;
- In order to scale up and maximize the impact, projects & programmes should be conceived to reach a maximum number of households, handicrafters, shopkeepers, administrations, public services... In particular, customer connection fees should be set at an appropriate level, allowing for payment over time, to achieve maximum economic benefits. Projects which do not respect these conditions and structurally exclude a large part of the population should not be supported by public resources, as they might ban for a long time other initiatives in the concerned area.

IV. Possible actions to be supported by the EF

1. General principles

An integrated approach for rural development will be particularly sought for: projects which would allow not only the supply of electricity per se but also with a demonstrated impact on agriculture-related and other economic activities, health, education and the other sectors. Electrification projects, which include income generating activities, would be particularly appreciated as they both create a real economic development and help the scheme to be financially sustainable.

Packaging of small projects would be encouraged as they may create economies of scale in management or financing.

Renewable sources of energy are highly encouraged for these projects.

Innovative solutions at the technical, organisational and financial level are encouraged.

To be eligible, projects have to be in line with national rural electrification programmes (in terms of planning and priorities, as well as technological options) decided by the government when such programmes exist, or at least prove the involvement or the approval of the agencies or institutions in charge of rural electrification. This concerns particularly investment projects.

2. "Soft" activities⁷:

- Actions aiming at improving policies and legislation
- Actions aiming at putting in place innovative financing and organisational schemes;
- Actions aiming at improving tariff regulation allowing for sustainable rural electrification;
- Training of entrepreneurs, development of markets, awareness campaigns in rural electrification and renewable technology;
- Actions likely to encourage private national and foreign companies to be more involved in rural electrification, such as developing and implementing new financing models (e.g. risk guarantee funds);
- Actions promoting communication and exchanges of views dedicated to capacity development for various type of stakeholders in the rural electrification sector;
- Actions aiming at promoting small and medium enterprise to engage in small scale power generation (renewable energy), distribution networks, operation and maintenance of decentralized systems etc.

3. Provision of electricity to dispersed populations in isolated areas

The actions supported by the Energy Facility for this type of projects will be decentralized systems mainly based on renewable sources of energy and projects implementing innovative solutions and setups.

⁷ Cf. position paper on Governance and capacity development

- Small solar / wind / bio-energy / hydro power plants in combination with a rural distribution network;
- Projects demonstrating technical innovations for rural electrification in areas such as: bio-fuels for village diesel motors (multifunctional platform), micro-hydro, new types of electricity distribution technology, decentralised grids, etc.;

4. Electrification of rural growth centres

- Projects aiming at implementing decentralized solutions, based on renewable energy, for rural growth centres and surrounding areas (which in a later phase might be connected to the national grid);
- Rural electrification through local electricity generation based on renewable energy sources, with electricity surpluses potentially sold in the mid-term to the national grid. Such a project could benefit from blended funding (e.g. a loan for generation investment, a grant for distribution lines extension and technical assistance for the local private operators);

5. Access for poor population in peri-urban areas

- For this type of projects, aiming at peri-urban areas, the actions supported by the Energy Facility will focus on institutional set-up and management of electricity supply in these difficult areas.
- Investment projects could however be supported by the Energy Facility, especially when proposing innovative solutions.

6. Support to rural electrification funds and agencies:

- Actions to improve the key functions of these funds (planning, project design, management, control, reporting...) and their capacity to negotiate with financial institutions;
- Co-financing of investment projects (with the possible involvement of Member States and European Financing Institutions)
- Technical assistance to rural electrification funds
- Co-financing of projects/programmes aiming at creating a rural electrification scheme covering a regional concession area, including renewable technologies and decentralised solutions.