

Ex Post-Evaluation Brief
MOSAMBIQUE: Rehabilitation of rural power distribution infrastructure in Gorongosa district



Sector	Electricity transmission & distribution (CRS: 23040)	
Project/Client	Rehabilitation of rural electricity distribution infrastructure in Gorongosa district – BMZ No. 1999 65 724 *	
Project executing agency	Electricidade de Moçambique (EDM)	
Year of sample/ex post evaluation report: 2013/2014		
	Appraisal (planned)	Ex post-evaluation (actual)
Investment costs (total)	EUR 4.35 million	EUR 4.27 million
Counterpart contribution (company)	EUR 0.77 million	EUR 0.63 million
Funding, of which budget funds (BMZ)	EUR 3.58 million EUR 3.58 million	EUR 3.64 million ** EUR 3.64 million **

* random sample 2013; ** Incl. balance funds from other projects

Short description: Restoration of electricity supply infrastructure destroyed by civil war in the district of Gorongosa. The development measures essentially comprised of constructing a power transmission line between Inchope and Gorongosa, building a transformer station and repairing / constructing a local distribution network.

Objectives: Overall objective: Contribute to establishing a secure, environmentally friendly and economically efficient electricity supply and thereby support reconstruction and sustainable economic development in a post-conflict environment. **Project objective:** To provide consumers in Gorongosa district with a reliable and environmentally friendly electricity supply, particularly for productive purposes, but also for social and administrative use.

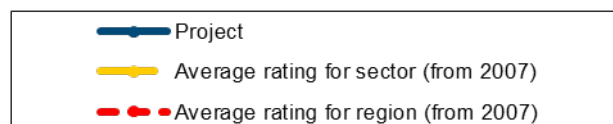
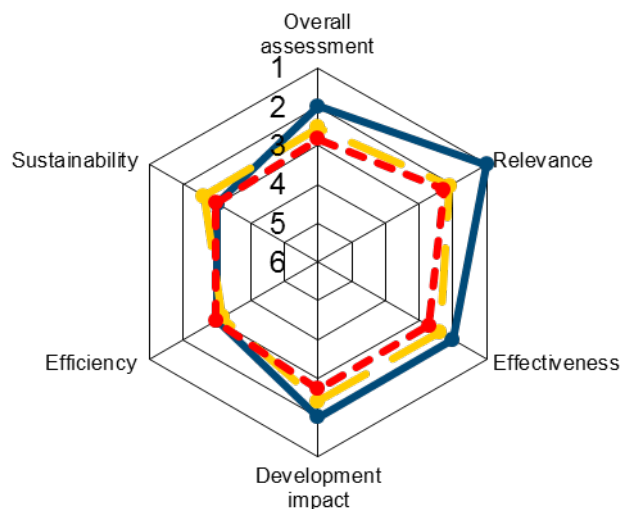
Target group: All electricity consumers in the supply area with a connection to the public network productive users, whose consumption share is over 80%, were expected to predominate in the first instance.

Overall rating: 2

Following the end of a lengthy civil war, a substantial economic and developmental stimulus is being provided. This is presently accompanied by weaknesses in collection efficiency, while electricity demand is more sluggish than expected and economic efficiency at a microeconomic level remains positive. The politically driven tariff system (a social tariff) largely fails to cover costs and leads to a loss of income at EDM. This is being compensated by cross-subsidisation (usually in the form of debt release decreed at short notice). This is acceptable in principle, but current practice is leading to elements of planning uncertainty for EDM.

Points to note: Past experience pointing to a predominantly low microeconomic viability of extending rural power networks in has been borne out. In such cases, an efficient, targeted plan for cross-subsidisation within the context of the overall system is required. It is also apparent that, in a post-conflict situation, estimates of long-term demand involve elements of considerable uncertainty.

Rating by DAC criteria



EVALUATION SUMMARY

Overall rating

The project demonstrates a high degree of relevance and still shows a good standard of effectiveness. Shortcomings in efficiency have served to lower the mark awarded; isolated economic weaknesses are not unusual in rural electrification. Compensation is provided on a long-term basis from the national budget for loss of income due to any non-recoverable accounts. These deficiencies contrast with substantial macroeconomic benefits and good developmental impacts. In view of the fact that sustainability, though subject to risk, is ultimately satisfactory, we rate the project as good overall. Principal areas for action are tariff structure adjustments, subsidisation practices, investments required for power generation as well as transmission and distribution.

Rating: 2

Relevance

Mozambique's electricity supply is inadequate in terms of both quantity and quality and constitutes a major barrier to the country's development. Over 60 % of the population have no access to a modern electricity supply. Since project appraisal, improving this situation has grown in importance for the Mozambique government and EDM. Furthermore, in 2011 the German government formulated ambitious targets for improved energy access as part of its contribution to the UN initiative "Sustainable Energy for All (SE4All)". Donors active in the various areas within the energy sector apparently are working together in a concerted fashion to achieve energy policy objectives.

Access to electricity in the large region covered by this project stands at around 14%. This is still well below the national average; hence the choice of target region was appropriate. Even from today's perspective, the overall concept of these development measures was suitably determined. As a follow-up to this project, EDM has used its own resources for further electrification work within the region, erecting low-tension power lines and installing house connections.

The developmental relevance of this project is even higher now than at the time of project appraisal. Reinstating the electricity supply was essential for economic and social development after the civil war had ended. Rehabilitating the road from Inchope to Gorongosa, which was carried out in parallel, also positively contributed to development. The project's approach – improving the region's economic development by building new power lines, in the absence of any appreciable local potential for electricity generation – targeted a major developmental constraint. Despite the small size of the target group compared to the total population, we rate the project's relevance as "significantly above expectations".

Sub-Rating: 1

Effectiveness

The project objective – a trouble-free, cost-efficient electricity supply, especially for small local businesses in the agricultural sector but also for local government as well as social and physical infrastructure facilities – was achieved to the extent possible. From the current perspective however, the objectives, although fundamentally appropriate, would have to be complemented by considerations of access for households and an environmentally friendly electricity supply.

The average annual number of unplanned supply interruptions (six) and their duration (approx. five minutes) is acceptable and roughly conforms to the level seen in comparable projects. The indicator for power line availability selected at project appraisal (over 97.5 % after commissioning, long-term) is largely being fulfilled. Apart from the period between 2006 and 2008, when it was necessary to replace electricity pylons which had been attacked by termites, availability has been in excess of 99 %. In 2013, it only reached around 95%, due to essential repairs to the substation in Inchope. However, it is expected that the indicator will once again be met on a long-term basis from 2014 (for cost efficiency, see "Efficiency").

From today's perspective, the indicator chosen for availability does not go far enough, in that it targets the results level and thus focuses solely on power line construction. For assessment purposes this has been supplemented by including the number of consumers connected and power line load (a minimum of 35 % seven years after commissioning, assessed on an annual basis).

From the figures available, growth in the customer base was underestimated at the time of project appraisal. However, consumption estimates proved too optimistic: growth in the number of users connected (which rose from 60 customers in 2005 to around 1,560 in 2013) has been very positive. In contrast, the power lines' Load presently stands at only approx. 15 %, according to EDM data. The main reason for this shortfall is the failure of the largest maize mill in Gorongosa. Supplies to the mill were stopped in 2011 because of overdue payments and it later became insolvent. It should be noted at this point that – due to the post-conflict situation which prevailed at the time – there were no usable comparison values, and relevant forecasts were inevitably burdened by elements of uncertainty. The volume of CO₂ emissions avoided for 2011 is calculated at around 1,800 t, due to diesel-generated electricity being replaced by hydropower. This is not in line with forecasts because demand was lower than expected. Although both the load and CO₂ indicators will not be fulfilled as early as planned, the projects overall effectiveness is nonetheless considered to be still good.

Sub-Rating: 2

Efficiency

At the time of final review, costs were some 2 % below the initial estimate. The overall implementation time of 57 months exceeded the original plan by 21 months. The main reasons

for this were the difficulties which the main contractor (ABB) experienced with the subcontractor, who failed to perform on time and, in some instances, failed to perform altogether. Progress was also slowed by delays in customs clearance and theft of materials.

As a "least-cost approach", the project was cost-efficient. At the time of project appraisal, building power lines was shown to be a more advantageous solution than an isolated diesel-based network. This was also the case at the time of EPE due to a disproportionate rise in diesel prices. Profits have not turned out totally in line with expectations. Essentially, there are two reasons for this: (1) Despite a marked rise in the connection ratio, the demand for electricity significantly lagged behind the anticipated trend, principally caused by the demise of the largest maize mill in the area (cf. "Effectiveness"). (2) The population living in the project region predominantly belongs to poorer strata. Their social tariff, which is fixed nationally at 1.07 MT/kWh (approx. 3.5 US cents/kWh) is set very low, with the result that average revenues are still well beneath the national average (cf. "Sustainability"). Collection efficiency (in the form of the collection rate) stood at around 97% nationally (in 2010) compared with roughly 54 % in the region. At an isolated economic level, the project, with its low internal rate of return – and without taking into account collection efficiency – can be assessed as only just positive. It should be taken into consideration here that one pessimistic scenario at project appraisal even showed a negative internal rate of return, when the risk of a lower electricity demand was already the subject of discussion. This is understandable given the specific background of a post-civil war situation which fought the demand forecast with a high degree of uncertainty to. In addition, the missing contribution to cost recovery is being compensated long-term by state subsidies paid to EDM (cf. "Sustainability").

In macroeconomic terms, the project has provided a development stimulus in numerous ways, although this can be neither quantified nor valued in monetary terms at a reasonable cost (see "Overarching impact"). With regard to allocative efficiency, it is essential to note that the national average tariff of around 8 US cents/kWh covers less than 80 % of the system's estimated marginal costs. Reaching the lower threshold value can be confidently excluded for the project region.

In view of the above considerations, this criterion is assessed as only just satisfactory.

Sub-Rating: 3

Impact

At project appraisal, the overall objective was defined as contributing to the establishment of a secure and economically efficient electricity supply and thus helping to satisfy a basic precondition for sustainable economic development in the Gorongosa district. This was achieved. The following indicators were defined: "Maintaining operational performance criteria" both regionally and nationally:

- a) The average actual charges collected cover the long-term marginal costs of generation, transmission and distribution nationally.

- b) Within the supply area, the proportion of electricity consumption for productive use is at least 60%.
- c) Following project completion, technical and non-technical supply and distribution losses in the supply area do not exceed 20 %.

The formulation of the selected overall objective indicators is no longer up to date as compliance with these serves more as a prerequisite for the target achievement. Indicator a) is explicitly also formulated at a "national" level. However, the project is confined to a particular region and does not contain any measures which would influence the tariff.

Indicators b) and c) can serve as assessment criteria (see "Efficiency" and "Effectiveness" above). The figure of 60% defined as the minimum proportion for electricity consumption attributable to production use is just being achieved at a national level, but not in the project region, where it stands at approx. 50 %. However, it should be taken into consideration here that the data from EDM does not allow for a precise distinction between consumptive and productive use under the prevailing circumstances (e.g. small-scale commercial use by the "informal sector"). The level of technical losses determined by the final review in the project area remains unaltered at 3 %. Non-technical losses, which then stood at 12 %, climbed substantially in view of a deteriorating collection rate. Within the project region the rate reached its lowest point, only around 54 %, in 2010 (cf. "Efficiency").

From an environmental perspective, connecting the supply region to the central grid, which is mostly fed by hydropower stations, replaced decentralised diesel-powered electricity generation. This prevented local environmental pollution resulting from the leakage of oil or diesel and also avoided CO₂ emissions of around 1,800 t p.a.

The following positive effects (which cannot be quantified or valued in monetary terms without considerable expense) are worth highlighting – especially considering the post-conflict situation after a lengthy civil war. Providing electricity has significantly improved educational opportunities: firstly, thanks to better lighting, evening courses are now on offer; and secondly, modern educational subjects, such as computer knowledge, can be disseminated. In the area of medical provision, treatment available at the hospital in Gorongosa has improved as a result of the availability of lighting and an in-house laboratory. The introduction of street lighting has contributed importantly to security and significantly helped to reduce traffic accidents. The large number of decentralised maize mills has particularly benefited women and saved them time in meal preparation. Thanks to the electricity supply, a bank branch office opened in Gorongosa in 2009. This saves customers a journey of several hours to the next nearest bank and represents a substantial efficiency gain within the local business cycle. In addition, a hotel has opened in the Gorongosa National Park. This attracts affluent foreign tourists in particular and was dependent on a connection to the electricity network. Furthermore, the National Park administration is now better able to carry out its monitoring and conservation duties. A total of over two hundred new jobs have been created in the National Park alone.

The development in the project region may not have taken place in such a dynamic fashion without this project.

Overall, with further economic development not just in Mozambique but also in the project region, an increase in electricity demand is likely. As a result, the effects intended will come to pass – somewhat delayed, but nonetheless in their entirety. The overarching developmental impact is thus rated as good.

Sub-Rating: 2

Sustainability

The sustainability of the effects achieved is exposed to certain risks: in order to satisfy electricity demand securely, EDM needs to invest heavily in new generating capacity and renegotiate its existing supply contracts.

Servicing and maintenance are satisfactory, despite financial constraints. The politically driven process of electrification has led to a fall in average electricity consumption per connection, and hence to a fall in cost recovery for the investments needed. The relief granted to EDM by the government – generally on an *ad hoc* basis, through rescheduling debt servicing and converting debt to equity – results in planning uncertainties for the utility. Significant tariff increases, especially for users with higher consumption figures, combined with simultaneously putting in place a more targeted arrangement for cross-subsidisation (which has been practised to date in an erratic fashion) are seen as unavoidable to strengthen EDM over the long-term. A more robust financing model would put EDM in a better position to pursue the challenges of expanding its generating and transmission capacities. It is worth highlighting that the costly, politically driven plans to expand the network (supplying all district capitals by 2014) will in all probability be achieved.

The project's sustainability has been assessed overall as "satisfactory". A slight reduction in the developmental impact achieved to date cannot be ruled out, but overall the impact will remain positive.

Sub-Rating: 3

Notes on the methods used to evaluate project success (project rating)

Projects (and programmes) are evaluated on a six-point scale, the criteria being relevance, effectiveness, efficiency and overarching developmental impact. The ratings are also used to arrive at a final assessment of a project's overall developmental efficacy. The scale is as follows:

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|---|---|
| 1 | Very good result that clearly exceeds expectations |
| 2 | Good result, fully in line with expectations and without any significant shortcomings |
| 3 | Satisfactory result – project falls short of expectations but the positive results dominate |
| 4 | Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results |
| 5 | Clearly inadequate result – despite some positive partial results, the negative results clearly dominate |
| 6 | The project has no impact or the situation has actually deteriorated |

Ratings 1-3 denote a positive or successful assessment while ratings 4-6 denote a not positive or unsuccessful assessment

Sustainability is evaluated according to the following four-point scale:

Sustainability level 1 (very good sustainability): The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability): The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected).

Sustainability level 3 (satisfactory sustainability): The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.

Sustainability level 4 (inadequate sustainability): The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and is very unlikely to improve. This rating is also assigned if the sustainability that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

The overall rating on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. Ratings 1-3 of the overall rating denote a "successful" project while ratings 4-6 denote an "unsuccessful" project. It should be noted that a project can generally be considered developmentally "successful" only if the achievement of the project objective ("effectiveness"), the impact on the overall objective ("overarching developmental impact") and the sustainability are rated at least "satisfactory" (rating 3).