

**Mozambique: Rehabilitation of Power Supply Systems**

**Ex post evaluation report**

<b>OECD sector</b>	23040 / Electrical transmission and distribution	
<b>BMZ project ID</b>	2000 65 649	
<b>Programme executing agency</b>	Electricidade de Moçambique (EDM)	
<b>Consultant</b>	COWI/SWECO	
<b>Year of ex post evaluation report</b>	<b>2007</b>	
	<b>Programme appraisal (planned)</b>	<b>Ex post evaluation report (actual)</b>
<b>Start of implementation</b>	3 <sup>rd</sup> quarter 2000	3 <sup>rd</sup> quarter 2000
<b>Period of implementation</b>	24 months	56 months
<b>Investment costs</b>	USD 16.0 million	USD 14.4 million
<b>Counterpart contribution</b>	-	-
<b>Financing, of which FC funds</b>	USD 16.0 million USD 4.6 million (EUR 5.1 million)	EUR 14.4 million USD 4.6 million (EUR 5.1 million)
<b>Other institutions/donors involved</b>	DANIDA, NORAD	DANIDA, NORAD
<b>Performance rating</b>	2	
<b>• Significance/relevance</b>	2	
<b>• Effectiveness</b>	2	
<b>• Efficiency</b>	2	
<b>• Overarching developmental impact</b>	2	
<b>• Sustainability</b>	3	

**Brief description, overall objective and project objectives with indicators**

The project was an emergency aid programme. In view of that, the German Federal Ministry for Economic Cooperation and Development (BMZ) waived the sector-specific criteria for providing assistance and the requirements for a comprehensive analysis of the executing agency and for economic viability calculations (limited scope of appraisal). The programme measures included the rehabilitation of power supply facilities in the provinces of Maputo, Gaza, Sofala, Inhambane and Manica which had been damaged by floods and cyclones in the spring of 2000. In addition, electricity connections were installed in newly developed settlements for people who were unable to return to their homes because of flood damage. The programme was jointly funded with DANIDA and NORAD using a basket financing approach. Under the joint agreement, DANIDA acted as lead donor and also funded the implementation consultant of the emergency aid programme.

The programme objective was to restore reliable power to all consumers who had been cut off by floods and cyclones. This objective was defined to be achieved if the number of connections after the

implementation of the programme was no lower than before the disaster (approximately 190,000 connected consumers).

The overall objective was to contribute to restoring the conditions of life that had prevailed prior to the disaster, and providing protection against future natural disasters. No indicators were defined to measure the attainment of this overall objective.

The target group of the project was made up by the power consumers who had been connected to the public power grid before the disaster.

### **Project design / major deviations from the original programme planning and their main causes**

The project was designed as an open programme. After taking stock of the damage, the programme executing agency Electricidade de Moçambique (EDM), with the support of a consultant, drew up an overview of required rehabilitation measures, which were divided into reasonable tendering lots depending on the priority they had been given (prioritisation by extent of damage, number of consumers affected, impact of damage on other grid components, cost benefit estimate). Investment measures included the installation and replacement of grid components such as pylons and poles, transmission line conductors, cross girders, controls, pole transformers and switchgear, the laying of underground cables that had been exposed by the flood, the restoration of household connections, the supply of pre-paid meters and the rehabilitation of buildings and office equipment for the energy utility. The bundle of measures selected for the programme was intended not only to restore the original installations but also to implement complementary measures and changes that would help improve the reliability of power supplies in future natural calamities.

As far as their substance was concerned, the programme measures were implemented as planned, but there were substantial delays due to administrative issues (in importing goods) in Mozambique and to the comprehensive coordination efforts that became necessary in drawing up the supply contracts. All told, the programme implementation phase lasted from June 2000 to March 2005, which was 32 months longer than originally planned. However, the delays did not result in any cost increase that would have led to underperformance of the project.

### **Key results of the impact analysis and performance rating**

The project made an important contribution to repairing the damage caused by cyclones and floods. In addition, the modern technology that was provided helped improve the availability of power supplies, reduce power losses or potential losses and enhance the standard of life in new settlements, not least because this effort was complemented by infrastructure development undertaken by other donors. The project's support for an early restoration of reliable power supplies provided access to electricity for private consumers, public institutions and companies in the areas hit by the disaster, and had a positive impact on the underlying local conditions. We have not considered the macroeconomic effects of the project on the basis of a cost benefit analysis of the investment, because it is not possible to quantify the benefits and assign them to the individual measures in a comprehensible manner.

The target group was the entire population of the region who had been connected to the public power grid before the disaster. They benefited directly from the rehabilitation of the power infrastructure, because at least electricity supplies were restored to pre-disaster supply levels. In addition, a large number of new connections were installed in housing estates where numerous refugees from flooded areas had resettled and where the original inhabitants had not had any access to electricity. The project's efforts to repair damage focused on the major economic centres of the country so as to make

sure that long-term economic development in important growth regions would not be adversely affected by the consequences of the disaster.

The project pursued general development policy goals. It was not aimed at environmental protection or preserving natural resources. Nor did the project have any potential to promote gender equality. Yet it is important to note that women and men have equal access to the electrical power supplied.

The programme was not intended to promote good governance or participatory approaches.

As part of a summary evaluation, we have arrived at the following conclusions regarding the project's developmental efficacy:

**Relevance:** There was a critical need to rehabilitate the power supply installations that had been damaged by the natural disaster, and the measures could not have been implemented more effectively under any alternative project design. The core issues were correctly identified and appropriately addressed. The numerous individual measures introduced by the programme were designed to provide a long-term basis for securing and complementing the power supply system, which had only been provisionally restored immediately after the disaster. The project also was in keeping with Mozambique's national emergency programme for the reconstruction of the damaged social and economic infrastructure. The Scandinavian donors operating in the sector deserve special credit for their cooperation, which is reflected in the fact that a basket financing approach was selected to fund the project. Under this joint financing scheme, which was considered highly innovative at the time, DANIDA, NORAD and KfW decided jointly how to use the available funds. Like NORAD and DANIDA, KfW Entwicklungsbank had a strong focus on energy sector projects at the time and was, therefore, well placed to assess the supply constraints that had resulted from the disaster. The donors' quick response capabilities and early provision of funds helped introduce the emergency measures in a timely manner. The project managed to address the damage to the power supply system comprehensively and appropriately. Overall, the relevance of the project may, from today's point of view, be rated as good (**sub-rating 2**).

**Effectiveness:** The programme objective was to restore reliable power to all consumers who had been cut off by floods and cyclones. The ex post evaluation of the project comes to the conclusion that the project objective was defined realistically and has been achieved, since the indicator of 'the number of consumers connected to the public power grid after the implementation of the programme is at least at the same level as in 2000' has been reached. The installed equipment and distribution grid are, for the most part, in good condition and have been operating without interruption since the conclusion of the programme. Appropriate complementary measures were introduced to expand the power grid in some places, providing access to electricity for refugees who had moved to hitherto unelectrified settlements. Important interfaces (such as switching stations, transformers etc.) that are crucial for improving the reliability of power supplies were rehabilitated or replaced. Transmission lines that had to be rehabilitated were sometimes re-sized and/or re-routed to prevent future damage resulting from natural calamities. In view of that, the measures implemented went beyond the scope of emergency assistance by providing protection against future damage as well. The individual measures taken under the programme made appropriate contributions to achieving the programme objectives. As a result, the effectiveness sub-criterion is rated as good (**sub-rating 2**).

**Efficiency:** Rather than analysing production and allocation efficiency, which would be the standard criteria for FC projects in the electricity sector, we have reviewed the investment cost per connection to evaluate the efficiency of the project. The investment cost per connection ranges between USD 12 and USD 100 depending on the region and the rehabilitation effort involved. We consider this range to

be acceptable for emergency measures in the electricity sector. The delay that occurred did not lead to any cost increases or underperformance and did not have any adverse effect on cost efficiency. As a result, the efficiency of the project is rated as good **(sub-rating 2)**.

**Overarching developmental efficacy:** The project's overall objective was appropriate; it was defined as making a contribution to restoring the conditions of life that prevailed prior to the disaster and providing protection against future natural disasters. The ex post evaluation comes to the conclusion that the resettlement of refugees in housing estates where new power connections were installed produced positive developmental effects. In the greater Maputo area, a new housing estate was developed shortly after the disaster, using funds from other donors (particularly NGOs) to build new houses and other infrastructure. In recent years, schools, pharmacies, a marketplace and numerous small shops have opened. Other areas which had access to electricity prior to the flood have registered an influx of new inhabitants thanks to the improved availability of the power grid, and the use of energy for production purposes has also risen. In Beira, for example, an airport and a hospital have been integrated with a ring-type line, which enhances the reliability of power supplies. The major part of individual measures under the project concentrated on the economic centres of the country in Maputo, Beira and Xai-Xai, contributing indirectly to the economic development of the project region. As a result, the developmental efficacy of the project is rated as good **(sub-rating 2)**.

**Sustainability:** In recent years, the executing agency has pursued a positive business policy and shown a positive development. Technical expertise and operational planning are up to current standards, and the staff is well qualified. EDM, which continues to receive support from the World Bank and Scandinavian governments (particularly Sweden and Norway), adopted a five-year plan in 2006 that points in the right direction. The current status and operation of the funded rehabilitation measures may be rated as positive. All facilities have been operating in accordance with the instructions, and the large facilities have been maintained according to schedule. However, maintenance of some of the small transformers needs to be improved; otherwise the service life of such installations might be reduced. Access control to protect the facilities against unauthorised intruders was a point of criticism in the final inspection report, and this criticism is still valid. Moreover, it is important to note that EDM is still experiencing difficulties in finding appropriate ways to clean up facilities that are no longer functional. In order to evaluate the sustainability of the emergency measures, we have also taken account of the current sector conditions. Mozambique's energy sector is characterised by system losses (27%) above the 20% standard requirement for FC projects. What is more, the proportion of electricity used for production purposes is too low (approximately 40%). But as it is difficult to distinguish between real companies and households that are involved in production activities (informal sector), this point needs to be qualified. Also, 95% of the LRMC is covered, and full cost coverage is expected by 2009. As the World Bank and Scandinavian donors continue to provide long-term support to the national power utility EDM, we expect structural deficits in the sector to be further reduced. This will also be helped by the positive development of the Mozambican economy. In summary, it is fair to say that the emergency measures were implemented in a sector context that was essentially characterised by positive developments. This is, however, contrasted by the Mozambican government's attempts to exert political influence on EDM. The sustainability is rated as satisfactory **(sub-rating 3)**.

After weighting the sub-ratings for the individual criteria, we arrive at a good overall performance rating for the project **(overall rating 2)**.

## **General conclusions and recommendations**

Two general conclusions may be drawn from the project. First, if FC projects use less stringent requirements to provide emergency assistance in response to natural disasters or political crises, it is important to make sure that the project is not confined to short-term emergency measures only. The project should either include complementary measures to enhance protection against future disasters and should also take account of ongoing efforts to implement sector reforms by the government, or the emergency measures should be followed up by a proper follow-up project. This would substantially improve the sustainability potential of the emergency measures.

Second, we are unreservedly positive about the basket financing approach. Although lengthy FC procedures (particularly with regard to intergovernmental agreements on German Financial Cooperation) had to be complied with by the emergency aid programme, too, the objective of a quick response to the disaster was achieved, not least because DANIDA and NORAD pre-financed urgent deliveries and services, assuming that FC funds would be made available in due course. In the end, FC funds were released no sooner than eleven months after the preparation of the project appraisal report. Therefore, the basket financing approach also makes sense in future disasters, particularly if other donors that are involved can release their funds more quickly due to simpler procedures.

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

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

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

A rating of 1 to 3 is a positive assessment and indicates a successful project while a rating of 4 to 6 is a negative assessment and indicates a project which has no sufficiently positive results.

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 an improvement is very unlikely. 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. A rating of 1 to 3 indicates a “successful” project while a rating of 4 to 6 indicates an “unsuccessful” project. In using (with a project-specific weighting) the five key factors to form a overall rating, it should be noted that a project can generally only be considered developmentally “successful” if the achievement of the project objective (“effectiveness”), the impact on the overall objective (“overarching developmental impact”) and the sustainability are considered at least “satisfactory” (rating 3).