

Malawi: Kapichira Hydropower Plant

Ex-post evaluation

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| OECD sector | 23065 - Hydropower plants | |
| BMZ project number | 1995 65 623 | |
| Project-executing agency | Electricity Supply Corporation of Malawi (ESCOM) | |
| Consultant | TAMS Consultants, USA, in cooperation with Knight Piésold & Partners, UK | |
| Year of ex-post evaluation | 2003 | |
| | Project appraisal (planned) | Ex-post evaluation (actual) |
| Start of implementation | Q 1 1995 | Q 1 1995 |
| Period of implementation | 60 months | 66 months |
| Investment costs | USD 155.7 million | USD 131.1 million |
| Counterpart contribution | USD 39.9 million | USD 21.9 million |
| Financing, of which Financial Cooperation (FC) funds | EUR 10.2 million | EUR 12.1 million |
| Other institutions/donors involved | World Bank, European Investment Bank (EIB), Commonwealth Development Corporation (CDC), Dutch Financierings-Maatschappij voor Ontwikkelingslanden (FMO) | World Bank, European Investment Bank (EIB), Commonwealth Development Corporation (CDC), Dutch Financierings-Maatschappij voor Ontwikkelingslanden (FMO) |
| Performance rating | 4 | |
| • Significance/relevance | 5 | |
| • Effectiveness | 4 | |
| • Efficiency | 3 | |

Brief Description, Overall Objective and Project Purposes with Indicators

The **Kapichira hydropower plant** project was part of the hydroelectric expansion of the Shire River. The goal of the project was to build the Kapichira hydropower plant with a capacity of 64 MW (2 x 32 MW) including the related infrastructure (access road, residential building) and a 60-km-long, 132-kV transmission line to the established grid in southern Malawi. The overall objective was to play a role in the economically efficient supply of power in Malawi. The following indicators of achievement of the overall objective were defined: a share of commercial power sales of over 60% and a cost cover ratio through tariff revenues of over 80% at the end of the year 1999 at the latest. The project purposes were to generate reliable, cost-efficient and

environmentally friendly electrical power and to feed this power into the national grid. The following indicators of achievement of the project purposes were defined: development of demand, increase in the peak load and in power sales according to projections and a loss rate of below 15%.

Project Conception / Major Deviations from the original Project Planning and their main Causes

The project measures that were implemented include the completion of the first stage of expansion of the Kapichira hydropower plant, which is the lowest of currently three hydropower plants along the Shire River (Nkula, Tedzani and Kapichira). There were no major changes in the design of the plant overall. From today's point of view as well the technical design of the hydropower plant is very well adjusted to the topographic and geological conditions at the project site and is therefore appropriate. The measures provided the project-executing agency with a functioning hydropower plant with an installed capacity of 64 MW and an average annual working capacity of 432 GWh.

Key Results of the Impact Analysis and Performance Rating

The individual risks identified during the project appraisal include an insufficient cost cover ratio owing to the fact that the tariffs set by ESCOM were too low, to the poor payment record of power customers owned by the State, and the further devaluation of the local currency leading to a correspondingly high need for an adjustment in the power tariffs. Every one of these risks incurred during the project, and they can only be eliminated through profound, long-lasting reforms in the power sector. Nearly all major areas of Malawi's power sector and in particular the financial performance of ESCOM have worsened considerably since the project appraisal. Key risks to the project involve the financial bottlenecks of ESCOM, making it impossible to repair and maintain properly and adequately the infrastructure needed for power generation, transmission and distribution. A further risk involves the overall allocation efficiency, which is no longer given. Currently only 68% of the long-run marginal costs of power generation, transmission and distribution are covered by tariff revenues. The coverage of the long-run marginal costs is experiencing a downwards trend. Thus, the requirement for equal long-run marginal costs and average economic yield was definitely not fulfilled. Furthermore, Malawi is not pursuing a convincing strategy to bring the cost cover ratio back up to the required level of 80% in the medium term.

Under the given circumstances in the sector, the project's sustainability is at great risk and can only be ensured if reforms are implemented consistently in the power sector, enabling Malawi's power plants to be operated and maintained properly. Although the financed hydropower plant can still produce tangible results in the form of power for many years despite the current unfavourable conditions in the sector and without sufficient repairs and maintenance, in the long run its sustainability can only be assured by a sector that is oriented towards commercial principles. The main keys to sustainability are the implementation of the reform programme along with financial and organizational autonomy for the sector.

We estimate the technical risks to the operation of the Kapichira hydropower plant to be minimal. Operating staff, workshop capacity and replacement parts are all available. A prerequisite for adequate maintenance and sustainable operation is the financial and institutional rehabilitation of both the project-executing agency and the sector.

In analyzing the project's success it must be taken into consideration that most of the intended goals were not achieved. In a summarized assessment of all future impacts and risks we have arrived at the following rating of the project's developmental effectiveness:

As regards the overall objective of efficient power supply in overall economic terms for the entire country, only the condition that the plant's share of commercial power sales must exceed 60% was fulfilled. The results fell far below the requirement that coverage of the long-run marginal costs of power generation and provision by at least 80% through average tariff revenues – which had been defined as an indicator of achievement of the overall objective. We deem the achievement of the overall objective to be clearly insufficient and, accordingly, rate the project's **significance/relevance** as clearly insufficient (**partial evaluation: rating 5**).

When evaluating the project's **effectiveness** we had to take into account that the expected development of power generation and peak demand could not be realized and that the grid losses of 21% exceeded the 15% limit set as an indicator of achievement of the project purpose. Owing to the loss of generation capacity and the fact that the power generation performance was, consequently, lower than expected, the hydropower plant had no excess capacity, yet the generation potential available at Kapichira was sold in full. Against this background, we consider the achievement of the project purpose to be no longer sufficient overall. Accordingly, we rate the project's effectiveness as slightly insufficient (**partial evaluation: rating 4**).

In view of the given difficulties regarding allocation efficiency, the project's **efficiency** can only be rated as sufficient on the basis of the extremely low incremental costs of the Kapichira hydropower plant (production efficiency) (**partial evaluation: rating 3**).

Based on the criteria of significance/relevance, effectiveness and efficiency we rate the project "Kapichira Hydropower Plant" as **having a slightly insufficient degree of developmental effectiveness overall (rating 4)**.

General Conclusions applicable to all Projects

No new FC commitments should be undertaken in Malawi's power sector until reform steps are initiated and the general cost cover ratio is increased. In principle, measures that contribute to (i) an increase in the number of connections, (ii) a decrease in technical transmission losses, (iii) the establishment of a regional interconnected grid, and (iv) the promotion of privatization are all worth supporting.

This project confirms the experience gained in other projects as to the importance of close donor coordination from the start of implementation of a co-financing project, in particular if the sectoral conditions worsen. Only close donor coordination offers sufficient leverage through dialogue with the government and with the project-executing agency. In order to make adequate use of the implementation capacity of the project-executing agency, an attempt should be made to reconcile the procedures of the individual financing partners that apply to the project as far as possible.

The experience gained with the project illustrates how important it is to combine investments in infrastructure with sector reforms. Individual sector reform steps are to be agreed with the executing agency and/or the government prior to project implementation, when the project is being appraised and when the willingness of local partners to implement reforms can be documented.

Legend

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| Developmentally successful: Ratings 1 to 3 | |
| Rating 1 | Very high or high degree of developmental effectiveness |
| Rating 2 | Satisfactory degree of developmental effectiveness |
| Rating 3 | Overall sufficient degree of developmental effectiveness |

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| Developmental failures: Ratings 4 to 6 | |
| Rating 4 | Overall slightly insufficient degree of developmental effectiveness |
| Rating 5 | Clearly insufficient degree of developmental effectiveness |
| Rating 6 | The project is a total failure |

Criteria for the Evaluation of Project Success

The evaluation of a project's "developmental effectiveness" and its classification during the final evaluation into one of the various levels of success described below in more detail concentrate on the following fundamental questions:

- Are the project objectives reached to a sufficient degree (aspect of project effectiveness)?
- Does the project generate sufficient significant developmental effects (project relevance and significance measured by the achievement of the overall development-policy objective defined beforehand and its effects in political, institutional, socio-economic and socio-cultural as well as ecological terms)?
- Are the funds/expenses that were and are being employed/incurred to reach the objectives appropriate and how can the project's microeconomic and macroeconomic impact be measured (aspect of efficiency of the project conception)?
- To the extent that undesired (side) effects occur, are these tolerable?

We do not treat **sustainability**, a key aspect to consider for project evaluation, as a separate category of evaluation but instead as a cross-cutting element of all four fundamental questions on project success. A project is sustainable if the project-executing agency and/or the target group are able to continue to use the project facilities that have been built for a period of time that is, overall, adequate in economic terms or to carry on with the project activities on their own and generate positive results after the financial, organizational and/or technical support has come to an end.