Georgia: Emergency Aid Programme Energy I, II and III

Ex-post evaluation

OECD sector	23062 / Electricity generation/gas-fired power plants 23040 / Electricity transmission 23062 / Electricity generation/gas-fired power plants	
BMZ project ID	1995 65 375 (Phase I) 1996 66 223 (Phase II) 1996 65 480 (Phase III)	
Project-executing agency	Sakenergogeneratsia (implementation) Georgian State Electricity System (GSE) Sakenergogeneratsia (implementation); GSE	
Consultant	Veag Power Consult BEA Consulting Veag Power Consult; BEA Consulting	
Year of ex-post evaluation	**2003**	
	Project appraisal (planned)	**Ex-post evaluation (actual)**
Start of implementation	Q 2 1995 Q 4 1995 Q 3 1996	Q 2 1995 Q 4 1995 Q 3 1996
Period of implementation	6 months 13 months 12 months	6 ½ months 13 ½ months 18 months
Investment costs	EUR 15.85 million EUR 6.75 million EUR 21.99 million	EUR 20.96 million EUR 7.26 million EUR 70.29 million
Counterpart contribution	EUR 0.51 million EUR 0.10 million EUR 1.53 million	EUR 0.46 million EUR 0.61 million EUR 3.33 million
Financing, of which Financial Cooperation (FC) funds	EUR 10.26 million EUR 6.65 million EUR 20.45 million	EUR 15.34 million EUR 6.65 million EUR 20.44 million
Other institutions/donors involved	EBRD None None	EBRD None World Bank
Performance rating	Overall sufficient degree of developmental effectiveness (rating 3) Overall sufficient degree of developmental effectiveness (rating 3) Clearly insufficient degree of developmental effectiveness (rating 5)	
• Significance / relevance	Not evaluated	
• Effectiveness	3	
• Efficiency	3	

Brief Description, Overall Objective and Project Purposes with Indicators

The three projects constituted emergency aid programmes for which the German Federal Ministry for Economic Cooperation and Development (BMZ) waived the application of sector-specific criteria for providing assistance, an extensive analysis of the executing agency and all standard calculations of profitability (restricted evaluation assignments). The project measures comprised the rehabilitation of units 9 (phase I) and 10 (phase III) of the Gardabani thermal power plant, which is located near Tbilisi, and smaller measures at various substations to ensure that the electricity generated by the Gardabani power plant is transmitted properly (phases II and III). The overall objective of phase I was to contribute to generating power at the Gardabani power plant during two winters as of 1995/96. The project purpose was to get unit 9 of the power plant ready for operation before the start of winter 1995/96 and to repair the fire damage at unit 10. 50% availability of unit 9 as of winter 1995/96 was defined as an indicator for the achievement of the project purpose.
The overall objective of phase II was to make a substantial contribution to the economic development of Georgia. The project purpose was to maintain and ensure the transmission of electricity from the Gardabani plant to greater Tbilisi. Plant-related failures leading to shutdowns of less than two hours per day were defined as an indicator for the achievement of the project purpose.
The overall objective of phase III was to make a major contribution to reinstating adequate minimum supplies of electricity and, in this way, to contribute for a limited period af time to Georgia's economic development. The project purpose was to contribute to stabilizing power supplies, especially in winter, and to ensuring reliable transmission to the main demand center of greater Tbilisi. 80% availability of unit 10 of the Gardabani plant as of autumn 1997 was defined as an indicator for the achievement of the electricity generation component. The indicator defined to measure the achievement of the transmission component, was shutdowns of less than two hours per week due to plant-related failures.

Project Design / Principal Deviations from the original Project Planning and their main Causes

Phase I was designed as an open programme. The individual measures were defined during the implementation. The measures that were in fact financed mainly involved the replacement and improvement of a control centre for units 9 and 10 with all of the key measuring, controlling and regulating equipment. In addition, to stabilize the operation of unit 9 a rehabilitation programme was carried out, allowing for all of the key operating factors to be monitored from the control centre and for the unit's reliability to be increased. Consulting services and a cross-project training measure (training measure 1996 167) in order to create internal training capacity for instrument and control technicians were also financed.

The measures financed in phase II, which was also designed as an open programme, and the transmission component in phase III included several 500 kV and 220 kV switchboard plants and two small hydropower plants, Jinvali and Sahessi. They mainly comprised the replacement of defective switches, the delivery and/or rehabilitation of transformers, the installation of air compressors, the supply of battery equipment and also consulting services. In connection with the above mentioned training measures a maintenance programme was designed for the main substations.

The generation component of phase III involved the rehabilitation of unit 10 of the Gardabani power plant. It was co-financed by the World Bank. The measures were split up into five lots. Lot A, which was financed out of German Financial Cooperation (FC) funds, comprised the control technology, the main control centre and the the burner system. Lot B, which was financed by the World Bank, comprised the electrical technology, the boiler, the turbine and the

generator. Lot C comprised smaller counterpart contributions by the former project-executing agency, and lot D, which was mainly financed out of FC funds, covered the consulting services while lot E comprised the buildup of fuel reserves.

Since all three phases were open programmes whose individual measures had not yet been defined during the project appraisal, it cannot be determined whether there were any deviations from the original planning. The items originally chosen for financing remained unchanged. For phase I, in 1995 the budget was increased accordingly in order to increase the scope of the measures. During the appraisal of the rehabilitation of unit 10 of the Gardabani power plant (phase III), it was known that the measures required would be much more extensive than for unit 9. The financing was not secured at that time. Fortunately, the gap in the financing was filled at short notice by a loan from the World Bank.

Unit 10 of the Gardabani plant, which was rehabilitated during phase III, resumed operation in March 1999. However, in December 2001 the boiler exploded, since which time the unit has again been out of operation. It is questionable whether it will ever be repaired again. After being rehabilitated it had been in operation for less than three years.

Since the project appraisals, there have been major changes in connection with the project-executing agencies. Originally, the state-owned energy supplier Sakenergo was the project-executing agency for all three phases. At the end of the 1990s, international donor organizations applied pressure to have the company restructured vertically and horizontally. Following various reorganizations the installations to be financed in the three phases were split up among a total of five operating agencies. Units 9 and 10 of the Gardabani power plant were purchased by the US company AES, which founded AES Mktvari for this purpose. AES has since ceased doing business in Georgia, and both units were sold to the Russian company RAO UES. The transmission utility founded during the course of the sector reforms, GSE, took over most of the substations for which components had been funded in phases II and III. The publicly owned company Tbilsresi, which owns units 1-8 of the Gardabani plant, is responsible for the operation of the Gardabani substation, for which several components had also been financed in phase II. For the Sahessi and Jinvali hydropower plants, only one voltage transformer i.e. one battery system was financed with limited funds. Both hydropower plants have since become legally independent and have their own operating organization.

Initially, plans called for the Georgian government to on-lend the loan funds to Sakenergo in the form of a grant. During the course of the restructuring of Sakenergo, it was later agreed to on-lend the loans to the respective operators of the plants at transfer conditions, with the operators assuming the exchange rate risk. However, the operators have not yet assumed the debt service for various reasons.

Key Results of the Impact Analysis and Performance Rating

The three projects must be seen in the context of a serious economic crisis that took hold of Georgia after the collapse of the Soviet Union and that had serious consequences for the performance of the country's electricity sector. When the project appraisals were conducted in the mid-1990s, the Georgian electricity sector was in a desolate state. The systems were outdated and poorly maintained, leading to numerous system failures. As a result, there were considerable generation and transmission bottlenecks. In particular, the supplies for greater Tbilisi were precarious since attempts to maintain adequate reserves at the hydropower plants were not successful.

The development to date can be summarized as follows:

- The technical performance of the sector has stagnated at a low level.

- The institutional organization of the sector has changed drastically and now corresponds to current expectations of how the sector should be organized (vertical and horizontal organization, commercialization, participation of the private sector, regulation).

- In spite of this, efforts to limit supplies solely to meet the demands of customers who are able and willing to pay for the electricity have not yet succeeded. The result is a serious lack of liquidity in the sector, which makes the companies active within the sector unable to maintain their facilities.

- The donors applied pressure to appoint private, foreign management at three key institutions (the transmission company GSE, the energy market and the main distribution company outside of Tbilisi). This brought about gradual improvements in the area of collection and overall transparency. However, efforts to solve the problems have still not achieved a real breakthrough.

The minimum sector requirements (operational appraisal criteria) were not fulfilled at the time of the project appraisals, and they still have not been met to this day. The minimum standards for production efficiency have not been fulfilled (low availability of the power plants, system losses of around 35%), nor is the macroeconomic cost recovery ratio via effective tariff revenues - which is the key criterion for allocation efficiency – satisfactory in the least. In the cases at hand, the German federal government decided in favor of limited evaluation assignments, waiving the application of the principles of promotion in the sector. Surely this was brought about by the fact that in the mid-90s, the depth and duration of the transformation problems in the successor states of the Soviet Union were still underestimated by all parties involved. Not only the elaboration of the goals but also the extremely limited selection of indicators clearly reflect the nature of the projects as emergency aid programmes.

Unit 9 of the Gardabani plant, which was rehabilitated during phase I, resumed operation in December 1995. Until the local ex-post evaluation was conducted, its level of operation was low, yet it was available for a sufficient amount of time. In winter 1995/96 and 1996/97 some 380 GWh and 450 GWh of gross electrical energy, respectively, were generated and fed into the grid after the energy required for the unit's own consumption was deducted. Thus, the overall objective and project purpose for phase I have been met. The impacts of the project are still felt today, so that the very tight restriction on the impacts that had been defined in the target system was not applied.

The measures related to the transmission system (phase II and transmission component for phase III) contributed to the decline in the number of transmission-related shutdowns (based on the statistics that are available) and helped ensure that the target indicator would definitely be met. Thus, the project purpose for phase II and the partial component of phase III were fulfilled. The limited duration of the impacts was obvious in the local ex-post evaluation, however, since at practically every substation that was examined its operation could only be maintained with difficulty. A contribution to the economic development of Georgia (overall objective of phase II) can be presumed, yet it would require a great deal of effort to determine whether one was indeed made.

After being in operation for less than three years, unit 10 of the Gardabani power plant – which had been rehabilitated in phase III – was again damaged. Even if the target system was geared towards limited impacts, during the project appraisal unit 10 was surely expected to be in use for more than three years - otherwise, the extensive rehabilitation costs would not have been

justified. Therefore, neither the project purpose nor the overall objective set for phase III was achieved.

Compared to the situation prevailing when the Gardabani power plant was operated by Sakenergo, the operational situation of unit 9 improved as a result of the project. Progress was made by AES in the fields of staffing efficiency, technical efficiency and available capacity. Overall, the activities of AES in Georgia are still rather critical. The reasons for this are: the low purchase price for the two plant units (USD 5 million), the high transaction costs connected to the sale (USD 6 million), the damage caused to unit 10 that was possibly due to an error by the operator, the non-performance of the debt service and the fact that AES has also withdrawn a considerable amount of liquidity from the electricity sector by servicing loans from its parent company at inflated interest rates.

The operational situation of the substations for which components were financed in phases II and III is, overall, desolate. Operation can only be maintained with great difficulty. At nearly every substation equipment has broken down, spare parts and even raw materials are lacking. This is due mainly to the serious liquidity bottlenecks afflicting the operating company GSE, which is one of the main companies affected by the poor payment morale in the sector.

No calculations of profitability were performed, neither during the project appraisals nor during the ex-post evaluations. The additional energy supplies made possible by the project serve mainly to satisfy consumer demand, which accounts for more than 50% of total demand in Georgia. Therefore, it can be said that the macroeconomic impacts are limited accordingly.

As was the case with most projects in the electricity sector, the three projects at hand are far from having reached the target group. As a result, their socio-economic and socio-cultural impacts are minimal. It should be mentioned that in Tbilisi, most of the households use electrical energy for heating, and the additional energy supplies help make this possible. It is not possible to distinguish gender-specific impacts.

The measures financed under the three projects made a moderate contribution to supplying electricity consumers in greater Tbilisi, mostly for a limited period of time. With the exception of the generation component in phase III, the projects met most of the expectations.

The evaluation of the projects in development-policy terms must take into account that the evaluation assignments were limited. The limitation released KfW from having to assess issues specific to the sector and to the project-executing agencies and also from making profitability calculations. This led to the definition of certain goals that are far behind the usual expectations. This particularly applies to the overall objective, so that we did not evaluate the project's developmental relevance and significance. The assessment of its efficiency is based solely on the efficiency of the implementation as well as on the adequacy of the costs.

Phases I and II have fulfilled most of their low goals. Therefore, their effectiveness is sufficient. Time and cost schedules were adhered to. Efficiency in the sense mentioned above was also sufficient. Overall, the developmental effectiveness of the two programmes was sufficient (rating 3). Owing to the low level of expectations for the projects, we cannot offer a better evaluation.

75% of the costs for phase III were for the rehabilitation of unit 10 of the Gardabani power plant, and 25% were for the transmission component. Therefore, the assessment focused mainly on the generation component. The damage to unit 10 occurred after less than three years of operation, and so the high rehabilitation costs were not justified. As a result, the efficiency is clearly insufficient. Since the unit helped to supply power in Tbilisi during the winter for only a very limited time, the achievement of the project purpose and therefore also its effectiveness are

clearly insufficient. As a result, the developmental effectiveness of phase III must be classified as clearly insufficient (rating 5).

General Conclusions applicable to all Projects

Ten years after German Financial Cooperation began in Georgia's electricity sector, the results of the financial support are, overall, sobering. Despite all the efforts and the close coordination among the external donors, only partial success was achieved with regard to improving the institutional/legal framework. The physical performance of the sector, however, did not improve. Looking back, the question arises as to whether the commencement of financial support in the mid-1990s was justified since at that time the entry criteria defined in the operational appraisal criteria were clearly not met. And yet, the very purpose of these criteria is to prevent investments in electricity supply systems that suffer from serious structural deficits. Only if these deficits are of a temporary nature does it make sense to carry out emergency aid measures with a low aspiration level.

Legend

Developmentally successful: Ratings 1 to 3	
Rating 1	Very high or high degree of developmental effectiveness
Rating 2	Satisfactory developmental effectiveness
Rating 3	Overall sufficient degree of developmental effectiveness
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 the "developmental effectiveness" of a project and its classification during the ex-post evaluation into one of the various levels of success described in more detail below 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, organisational and/or technical support has come to an end.