Ex post evaluation – Georgia

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Sector: Energy (including energy efficiency, renewable energy (CRS code. 2321000 Energy generation, renewable sources – multiple technologies)
Project: Renewable Energy Programme,
BMZ no.: 2000 65 367*
Implementing agency: Municipal Development Fund of Georgia (MDF)

Ex post evaluation report: 2019

All figures in EUR million	Project (Planned)	Project (Actual)
Investment costs (total)	10.72	8.95
Counterpart contribution	3.23	3.84
Funding	7.49**	5.11
of which BMZ budget funds	5.11	5.11

*) Random sample 2017
**) Initially a UNDP contribution of USD 2 million was planned, but was not provided.

Summary: The project comprised the financial resources of the Georgian Renewable Energy Fund (REF) for a) refinancing loans granted by selected programme banks for investments in the rehabilitation of small hydropower plants (< 10 MW) and b) consulting support for the programme banks, in particular for staff training. Over the course of the programme, the fund's resources were used indirectly via the two programme banks to finance the rehabilitation of three small hydropower plants (Ritseula, Khadori 2 and Pshavela). The project was supported by a UNDP-financed and managed component to help the Georgian government improve its legal and institutional framework.

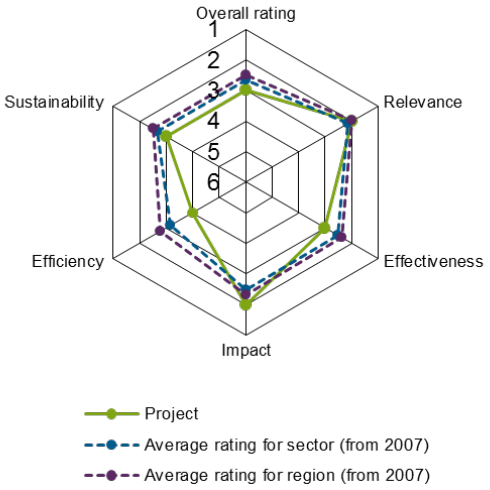
Objectives: The objective at outcome level was to use renewable energy sources to generate electricity, hot water or heat energy by financing investments in small hydropower plants or geothermal plants in need of rehabilitation by the programme banks. The programme was thus intended to contribute to climate change mitigation, improving the energy supply and thus to Georgia's economic development potential (impact).

Target group: The direct target group comprised private and municipal operators of existing small hydropower plants or geothermal plants as well as the participating programme banks. The indirect target group was the population of Georgia in rural areas where the eventual benefit of a better electricity supply was supposed to accrue.

Overall rating: 3

Rationale: The project tackled a significant development shortage in Georgia. After rehabilitation, the hydropower plants, two of which had almost completely stopped producing electricity, are generating electricity at the expected level and are repaying the loans extended to them as stated in the agreement – even though one of the power plants has significant structural deficiencies and falls far short of expectations with regard to production. The rehabilitation measures were implemented cost efficiently. The project helped both the power plant owners and the programme banks to broaden their know-how, so that the programme banks are now providing financing for hydropower plants from their own funds at lower interest rates. However, due to its complexity and the large number of partners involved, the selected project structure was weak and there were significant delays in implementation.

Highlights: Although the programme banks were not the primary focus of the project, there was a significant development in this area. For the first time, the programme provided independent financing for RE projects by the programme banks, which was significantly expanded in the following years.



Rating according to DAC criteria

Overall rating: 3

Ratings:

Relevance	2
Effectiveness	3
Efficiency	4
Impact	2
Sustainability	3

Relevance

At the time of the programme appraisal in 2003, the Georgian energy sector was confronted with a number of problems, particularly as a result of the isolation of its national electricity market following the collapse of the Soviet Union. Regularly occuring power outages and shortages in the electricity supply, especially in the months when heating was required, had to be compensated for by imports, mainly from Russia and Armenia. Most of the existing infrastructure dates back to the Soviet era. The economic crisis triggered by the civil war in Georgia in the mid-1990s exacerbated the situation, as necessary maintenance measures in the power plants were not carried out due to the lack of spare parts. Therefore, the generation capacities of individual power plants were reduced to virtually zero owing to inadequate maintenance.

With respect to the impact on electricity production, it was correctly assumed that the shortages in production, which were mainly caused by hydropower plants (HPPs) (around 60% of the total generation capacity at the time of the programme appraisal), would largely be eliminated by restoring existing generation capacities as outlined in the programme proposal (PP), especially as they are already connected to the grid. Rehabilitating the capacities that still exist in the sector (including the remaining human capital) was correctly regarded as an appropriate way of revitalising the existing infrastructure (output) and thus contributing to eliminating the shortfalls in the electricity supply (outcome) as well as the plausible impacts (climate-friendly economic development) expected as a result.

With regard to the impact of the project on the financial sector, the private local banks had little or no expertise in financing projects in the renewable energy sector at the time of the programme appraisal and, therefore, such loans were not granted (since the power plants had previously been financed by the government). As a result, the HPPs identified as being in need of rehabilitation in the programme proposal (PP), some of which date back to the 1920s, were in fact not eligible for financing outside the project. The project, which envisaged lending to HPPs through private, local banks, thus served as a kind of pilot project and potential demonstration effects on the financial sector were expected.

The possibility of rehabilitating geothermal power plants, also included in the programme proposal, was less relevant as there was already no demand for these types of projects from the banks at the time.

In the context of the accompanying component to support the staff of the Georgian government in improving the legal and institutional framework, close coordination with the UNDP was planned (donor coordination).

At the time of the programme appraisal, the project was aligned both with the strategy of the Georgian government for the energy sector and with the development policy priorities of the German Federal Government.

From today's perspective, the core problems were correctly identified. The project started at a relevant point both with regard to energy generation and the impact on the financial sector.

The complex project structure chosen, which envisaged the involvement of many institutions, especially at government level, merits criticism. As a result of unclear responsibilities and necessary approval processes, there were significant delays over the course of the programme. These could have been anticipated to

a certain extent in the programme design due to the complex structure with the involvement of three Georgian ministries (two of them as project-executing agencies).

From today's perspective, the programme would no longer be relevant. Not least due to support from the project, the financing options for HPPs have improved considerably in recent years. Local commercial banks are now granting loans for RE projects from their own funds. At the same time, interest rates for loans in this area have fallen considerably.

Relevance rating: 2

Effectiveness

To achieve the programme objectives, the programme banks received loans from the Renewable Energy Fund (REF). The REF was set up specifically for this purpose and exclusively administers the funds made available by the Federal Ministry for Economic Cooperation and Development (BMZ) for this project (EUR 5.11 million). According to the PP, the REF was planned as a revolving fund, i.e. after the first funds were used, a decision was to be made jointly with the UNDP and the Georgian government on how the other funds would be used. The aim was to continue funding renewable energy projects. The REF is administered by the Municipal Infrastructure Fund of Georgia (MDF). The MDF was founded in 1997 as a public institution and carries out various infrastructure projects in cooperation with the private sector in Georgia as an implementation organisation working on behalf of the Georgian government.

The achievement of the objectives at the outcome level can be summarised as follows:

Indicator	Status PA, Target PA	Ex post evaluation
(1) Total electricity production in the small rehabilitated HPP plants* (fed into the grid)	Status PA: Khadori 2: 0-3 GWh; Pshavela: <1 GWh; Ritseula: 20-30 GWh Target value PA: approx. 40-50 GWh/a	Achieved: - Production 2016: 55 GWh Of which: Khadori 2: 28.6 GWh; Pshavela: 10.1 GWh; Ritseula: 16.1 GWh - Production 2017: 46.8 GWh Of which: Khadori 2: 25.7 GWh; Pshavela: 8.5 GWh; Ritseula: 12.6 GWh

*) Indicator reformulated during the evaluation.

The planned generation of electricity was achieved by rehabilitating three HPPs. Depending on the power plant, the rehabilitation measures comprised, for example, construction measures at the water intake, the repair of a pressure pipe (Ritseula), new turbines and generators (Pshavela) and the construction of a new powerhouse (Khadori 2). The PP project aimed to rehabilitate 4-7 HPPs. The planned commitment of USD 2 million in fund resources by the UNDP did not materialise, however[1], meaning that there are fewer funds available than planned. Consequently, this reduced the number of rehabilitated HPPs. On a positive note, the target value of the indicator for electricity production was still reached. The auxiliary conditions specified in the PP for necessary counterpart contributions of the power plant owners (at least 30%) and the cap on the installed capacity of the plants at 10 MW were all satisfied.

Two of the HPPs are in good condition and have been producing energy since rehabilitation at a constant level and without major technical problems or prolonged shutdowns. The additional useful life of 10-15 years defined in the PP and expected as a result of the rehabilitation appears realistic. The Ritseula power station is not in a satisfactory condition, either visually or technically speaking. After talking to the operator and owner, it became apparent that only the most necessary investments are being made to maintain

1 During project implementation, it emerged that the UNDP is not allowed to participate in loan programmes. Most of the funds were reallocated in favour of the supporting component for which the UNDP is responsible.

operation. As a result, the power plant has been undergoing repairs on a regular basis since the rehabilitation measures, which took place between 2010 and 2015, were completed. In 2013, production was stopped for 4 months due to a damaged pressure pipe. The access road to the water intake is in poor condition, which poses safety risks for employees when driving on the road. Energy production fluctuates over time as the power plant is not used continuously. The reason is the second power plant (HPP Racha) installed in the same powerhouse, for which the offtake agreements are more profitable according to the operator. Thus, Ritseula is only started when the second power station is operating at full capacity. At partial capacity, only the second power plant is operated. Indeed, this must be viewed critically, especially because the technical structure of Ritseula would enable much more efficient electricity production even at partial capacity compared with the second power plant. The construction measures were generally overseen by a technical consultant financed by the REF. Due to the financing of the HPPs by private programme banks, however, the consultant only played an advisory role and was only able to exert a very limited influence on the construction measures which had already been carried out inadequately at the beginning.

The production at Khadori 2 and Pshavela HPPs,increased markedly from a very low level. This increase can be seen as additional due to the low starting levels and the extended operating times. This kind of increase did not occur at the Ritseula HPP for the reasons stated. All three power plants are largely operated manually, which is why the implementation of automated control and monitoring systems was recommended as part of the evaluation mission. However, the plants all have access to the public electricity grid and can easily feed the energy they produce into the grid.

All HPPs have to date repaid the loans received from the programme banks as agreed (one indicator was eliminated due to the cluster risk with only three loans granted). The power plant operators confirmed that there were no alternative financing possibilities at that time.

Due to inadequate experience in the sector, the programme banks had specific requirements related to the creditworthiness of the power plant operators and also required collateral. Small power plant operators with weak finances therefore only had very limited access to loans from the programme banks. Consequently, only HPPs of larger industrial companies that owned several HPPs and in most cases were also active in other business sectors, were financed under the project. These companies had the creditworthiness required by the banks and were familiar to the banks thanks to their existing business history. Nevertheless, the project financing can be seen as a first step by the banking sector in the direction of the HPP sector.

Effectiveness rating: 3

Efficiency

The timeline for implementation was subject to numerous delays. Seven years elapsed between the time the negotiating mandate was issued in 2003 and the conclusion of the first loan agreement with a HPP and another five years until the rehabilitation measures were completed. The main reasons for the delays were: a) the necessary ratification of the financing agreement by the Georgian parliament, b) unclear responsibilities relating to the structure and management of the REF due to the involvement of three Georgian ministries, c) necessary coordination with the UNDP as the body responsible for the supporting component, d) difficulties in identifying suitable alternative HPPs, as the power plants initially selected had dropped out during the project due to the aforementioned delays. The Supervisory Committee made up of representatives of the Georgian government, KfW, and the UNDP, as envisioned in the PP, was designated to be entrusted with supervising implementation of the programme and could possibly have speeded up the overall process. However, the Committee only convened very sporadically, if at all.

In 2008, the Municipal Development Fund of Georgia (MDF) was entrusted with the fund management of the REF. The two programme banks were selected the following year (the banks were not previously involved in the project and therefore did not wait for the commited financing), making it possible to grant loans to HPPs from this point on.

After the very long and inefficient phase of the programme until the MDF was commissioned, the credit approval process between the programme banks and the REF was generally considered to be streamlined and smooth. Further, this also applies to the process between the HPPs and the programme banks.

In retrospect, the loan terms offered (interest rate: max. 8% fixed, term: 7 years) were described by the HPPs as attractive and were all within the scope defined in the PP. The same applies to the terms granted by the REF to the programme banks. Another positive aspect mentioned by the banks was the support provided by the consultants financed by the REF. At the present time, however, these terms would no longer be attractive, at least from the perspective of the HPPs, due to the lower interest rates on the Georgian financial market.

The costs for rehabilitation and thus for increasing electricity production and extending the operating lives of the power plants boast a very good ratio of EUR/kW installed capacity (Khadori 2: 759 EUR/kW, Pshavela 448 EUR/kW, Ritseula 555 EUR/kW; in each case related to the total rated capacity of the HPP). However, it should be noted that the individual feasibility studies conducted in the run-up to the project were partly financed by the UNDP component supporting the project. It is no longer possible to allocate the costs to specific projects.

The power plant owners have confirmed that even from today's perspective, rehabilitating the existing power plants was still significantly more cost-efficient than building new ones. Since their rehabilitation, the financed HPPs have all been able to operate profitably. This also currently applies to the Ritseula HPP, but due to its poor general condition and the lack of investment in maintenance, it is doubtful that profitable operation will also be possible in the future. Since the Ritseula power plant accounts for a significant part of the total investment, we rate the efficiency of the project as unsatisfactory, even though cooperation with the partner banks was efficient after they were selected.

Efficiency rating: 4

Impact

The overarching development policy goal (impact) was to contribute to mitigating climate change and improving the energy supply, and thus to the development potential of Georgia's economy. The project actually contributed to improving Georgia's energy supply by generating additional electricity at two out of three HPPs and thus also contributed to Georgia's development as a net electricity exporter. The share of electricity generated by HPPs in Georgia's total electricity production is currently high at around 80% and the country's electricity production is comparatively low in emissions (low emission factor). On the basis of the electricity production in the three rehabilitated HPPs totaling around 50 GWh per year, approx. 25,000 tCO2 are saved every year (equivalent to roughly a quarter less if Ritseula's electricity production is not regarded as additional).[2]

At the level of the rehabilitated HPPs, the project led to improved know-how (with the exception of the Ritseula HPP), in particular on the basis of the advisory support provided by technical consultants. It can therefore be assumed that this also contributed to the rehabilitation of further HPPs of these owners outside the project.

With regard to the impacts of the programme on the financial sector, it should be noted that even at the time the programme banks were selected in 2009, they had little or no experience financing renewable energy projects. As the sector was still new for the programme banks, the projects financed under the programme were not assessed on the basis of the profitability of the power plant (project finance) but on the creditworthiness and collateral availability of the owner (corporate finance) (see also effectiveness). However, the project helped the banks to gain experience in this area and broaden their know-how by a) financing renewable energy projects for the first time at the programme banks and b) supporting the banks with consultants. This is another reason why the number and volume of HPP financing at the programme banks, which at the time of the evaluation had a market share of around 40% and were thus major market players, have grown strongly to this day. One programme bank already has a renewable energy portfolio in the low three-digit million range (USD); there is also a significant project pipeline for future projects. Projects are now financed from the bank's own funds, i.e. no longer financed by development banks; moreover, no longer in the form of corporate finance, but in many cases on the basis of project fi-

2 Based on the emission factor of the Institute for Global Environmental Strategies (IGES) for 2017, which is based on the respective electricity mix of Georgia.

nance, so that economically viable projects that do not have large owners with a strong financial standing can also gain access to finance.

In summary, at the level of the rehabilitated power plants, the additional electricity production from renewable energy at two HPPs achieved a good development policy impact overall, which has been diminished by the failure to implement recommendations from the project completion report (PCR) relating to, among other things, fish ladders and occupational safety (see sustainability), and due to the deficiencies at the Ritseula power plant.

At the level of the programme banks, however, the financing of investments in HPPs from counterpart contributions achieved a very good development policy impact, which is why we still assess the overall impacts as good.

Impact rating: 2

Sustainability

The rehabilitation of three HPPs led to a sustainable increase in Georgia's electricity production. Based on the findings of the site visit,the two power plants can be expected to achieve the additional lifespan of 10-15 years defined in the PP. The condition of the Ritseula power plant is relatively poor in terms of machinery and structures and is undergoing continual rehabilitation, meaning it is not sufficiently sustainable (which is reinforced by the reduced use at partial capacity).

The power plant operators were given recommendations on how to improve their maintenance processes and automatization of control and monitoring systems. Most of the recommendations in the project completion report in 2016 were not implemented. Thus, this concerns all three rehabilitated power plants. The operators indicated that they still wanted to implement the recommendations, but it is uncertain whether this will be done.

The project has helped to ensure that financing capacity for hydropower projects is firmly established in the banks. As a result, the market for financing in the HPP sector has developed well in recent years, with the result that a) there is now a wide range of financing options available from the programme banks and b) interest rates have fallen below the level of the project. On the basis of the current pipeline of planned financing for renewable energy projects, it can be assumed that the programme banks will continue to provide corresponding financing in the future.

As already mentioned, the REF was planned in the PP as a revolving fund, the resources of which were to be used after repayment to finance additional renewable energy projects. This plan is not reflected in the contracts, so it must be assumed on the basis of the information currently available[3] that the funds cannot be used on a revolving basis for the intended purpose. Rather, they will flow back to the Georgian Ministry of Finance and will generally no longer be available for reuse. At REF level, there is therefore insufficient sustainability as the revolving use of funds is not firmly enshrined in the contract.

In view of the development in the two programme banks, which now finance HPPs from their own funds, it does not make sense for German FC to continue its commitment to promote HPP plant financing at present. Possible future project approaches include promoting other technologies in the field of renewable energy (solar and wind power).

Sustainability rating: 3

3 The issue was discussed with the MDF. The MDF has expressed its willingness to clarify the possibility of appropriate reuse of funds with the MoF.

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

Projects 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:

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

Rating levels 1-3 denote a positive assessment or successful project while rating levels 4-6 denote a negative 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. Rating levels 1-3 of the overall rating denote a "successful" project while rating levels 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" (level 3).