

Ex post evaluation – Georgia

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Sector: Water supply and sanitation – large systems (CRS Code: 14020)
Project: Rehabilitation of municipal infrastructure facilities in Batumi (BMZ No. 2004 66 136 (Inv., A1), 2004 70 484 (CM, A2), 1930 03 563 (A+F, A3), Municipal infrastructure Batumi II (BMZ No. 2006 65 802 (Inv., B1)*, 2006 70 299 (CM, B2)
Implementing agency: Municipality of Batumi



Ex post evaluation report: 2018

		Proj. A** (Planned)	Proj. A** (Actual)	Proj. B** (Planned)	Proj. B*** (Actual)
Investment costs (total)	EUR million	21.6	21.1	51.8	53.1
Counterpart contribution	EUR million	2.9	2.7	4.8	6.8
Funding	EUR million	18.7	18.4	47.0	46.3
of which BMZ budget funds	EUR million	18.7	18.4	30.0	29.1

*) Random sample 2017, **) Inv., CM and training, ***) Inv. and CM

Summary: The first phase of the programme (BMZ No. 2004 66 136) centred on the old town area of Batumi and was designed to promote qualitative and quantitative improvements regarding water supply and wastewater disposal for the local population. In the second phase (BMZ No. 2006 65 802) the rehabilitation work was gradually extended to include other parts of the city and coastal areas to the south, as well as measures focusing on the mechanical and biological treatment of wastewater. Parallel to these investment measures (Inv.), as part of the training measure (A&F) and the two complementary measures (CM), advisory and institution-building services were provided to the programme implementation unit of the City of Batumi, while the development of a new executing agency, Batumi Tskali, was supported.

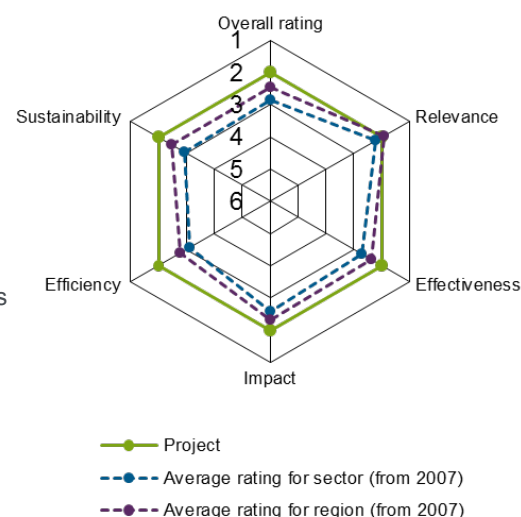
Objectives: The impacts (formerly development objectives) of the first phase were to contribute (1) to sustainable and environmentally friendly municipal development, (2) to the improvement of municipal hygiene and (3) to the improvement of living conditions for the population of Batumi. A contribution to economic development was added in phase II. The FC module objectives for phases I and II were (1) use of a sufficient and sustainable water supply throughout the year and (2) assurance of environmentally sound and hygienic disposal and treatment of wastewater for the urban population and the inhabitants of the neighbouring coastal towns.

Target group: The target group were the urban population of Batumi, the inhabitants of the neighbouring coastal towns and the tourists of the mentioned towns.

Overall rating: 2 (both projects)

Rationale: The programme objective indicators were completely fulfilled. With the help of personnel support, a new and efficient water and sewage treatment plant was created under the projects. The originally very high level of water loss was reduced by an ongoing water loss reduction programme, which got additional support by a subsequent FC programme through investments. In the field of sewage treatment, cost-effective trickling filter technology adapted to the conditions and an innovative solar sludge drying system are used. The success of the programme is limited slightly by the currently very high per capita consumption due to low charges for water and wastewater as well as the low cost recovery through tariff revenues, so the programme just narrowly rates as “good”.

Highlights: The projects successfully transformed an inefficient central water and sewage system into an efficient municipal business. The success factors of this transformation included the strong political will of the city of Batumi to make changes and replace almost of all its personnel.



Rating according to DAC criteria

Overall rating: 2 (both projects)

Ratings:

Relevance	2 (both projects)
Effectiveness	2 (both projects)
Efficiency	2 (both projects)
Impact	2 (both projects)
Sustainability	2 (both projects)

Breakdown of total costs

The total cost of the two investment measures, the training component and the two complementary measures, are broken down as follows:

in EUR million	Proj. A1 (Plan.)	Proj. A1 (Act.)	Proj. A2 (Plan.)	Proj. A2 (Act.)	Proj. A3 (Plan.)	Proj. A3 (Act.I)	Proj. B1 (Plan.)	Proj. B2 (Act.)	Proj. B2 (Plan.)	Proj. B2 (Act.)
Investment costs (total)	20.0	19.8	1.1	0.8	0.5	0.5	49.8	50.6	2.0	2.5
Counterpart contribution	2.9	2.7	0.0	0.0	0.0	0.0	4.8	6.8	0.0	0.0
funding	17.1	17.1	1.1	0.8*	0.5	0.5	45.0	43.8**	2.0	2.5***
of which BMZ budget funds	17.1	17.1	1.1	0.8*	0.5	0.5	28.0	26.6**	2.0	2.5***
of which KfW funds	./.	./.	./.	./.	./.	./.	17.0	17.0**	./.	./.

* Residual funds of EUR 0.3 million from proj. A2 (CM phase I) were used for project B2 (CM phase II).

** Residual funds of EUR 1.2 million from proj. B1 (investment measure phase II) were used for measures from phases III and IV.

*** Increase of EUR 0.2 million and addition of EUR 0.3 million from phase I (see above)

Relevance

During the PAs, the following core problems were identified for the two projects: due to the economic situation, no replacement investments were made in the water and wastewater systems for several years, with the result that the plants were in very poor condition.

Drinking water was taken mainly from bodies of surface water (the Chakvi and Chaisubani rivers). During heavy rainfalls, the water quality was a problem due to the high suspended matter content, the facilities were shut down and the groundwater wells close to the city were put into operation. Due to the very high water consumption (700–800 litres per capita per day (l/c/d)), the pumping capacities of these wells were so low that only a portion of the population could be supplied. There was also a lot of unaccounted for water due to leaks in the network and water theft. Water pressure was so low that many households purchased private booster pumps.

Furthermore, the existing wastewater system was in a dilapidated state. The intermittent supply and the use of booster pumps drew wastewater and contaminated groundwater into the drinking water network and endangered the health of the population. In addition, the many leaks in the wastewater network and the high groundwater level led to permanent filling of the rainwater system, which drained directly into the Black Sea. The old wastewater treatment plant was out of order, which meant that sewage was not treated.

The discharge of untreated wastewater into the Chorokhi river, which flows into the Black Sea, and at four points on the Batumi beachfront endangered the fragile ecosystem of the Black Sea and was harmful to the health of both residents and tourists.

Due to the poor quality of water services (water quality, continuity of supply), payment habits were poor. The water company, which at the time was run by the central government, was caught in a classic downwards spiral. Among other things, the company was inefficient, overstaffed and heavily indebted. The water company's affiliation with the Adjarian central government limited possible opportunities for reform within the framework of the project.

The results chain was coherent: the improvement of sanitation (gradual rehabilitation and extension of the wastewater network, construction of a new treatment plant adapted to local conditions) and of the water supply (including development of new, safe water sources, rehabilitation and expansion of the drinking water network), the support of a new municipal executing agency, Batumi Tskali, the raising of public awareness about low consumption and the introduction of water meters were intended to contribute to local development, reducing the environmental impact and improving the health situation. It should be noted, however, that municipalities have no influence over tariffs; this means that the incentive to prevent water wastage using low tariffs and the problem of tariff revenues which are insufficient to cover costs cannot be met with the project.

The donor co-ordination set out at the project design phase (general donor rounds, co-financing with the EU in the third phase (not part of this evaluation)) also contributed to the solution. The projects helped to ensure water treatment, safeguard the operation and management of the systems, and integrate rainwater drainage. As such, they were in line with the Federal Ministry for Economic Cooperation and Development's (BMZ) water sector concept. Since Batumi is the most important tourist centre in Georgia after Tbilisi, the projects were also of high priority for both the government of the semi-autonomous region of Adjara and the Georgian government.

From today's perspective, the relevance of both projects is assessed as good.

Relevance rating: 2 (both projects)

Effectiveness

The achievement of the programme objective indicators for phase I (city centre of Batumi, referred to as "Zone II") can be summarised as follows:

Indicator	Target value PA, Status PA (2006)	Ex post evaluation
(1) a) Sufficient drinking water is available in the rehabilitated urban area (zone II). b) (NEW) The specific water consumption is reduced significantly in the zones equipped with water meters.	a) min. 120 l/c/d over the day; PA; 8h per day b) max. 150 l/c/d; PA: > 400 l/c/d	a) In the rehabilitated zones, drinking water is available 24/7 (i.e. 24 hours a day, 7 days a week) and in a sufficient volume (> 120 l/c/d). b) In the zones equipped with water meters, the specific water consumption is 100 l/c/d. -> Indicator fulfilled or exceeded
(2) Unaccounted for water in the rehabilitated zones.	max. 30%; PA: 70%	Approx. 25% -> Indicator fulfilled
(3) The wastewater in the rehabilitated zone is collected	min. 90%; PA: 0%	> 95% of residents in the rehabilitated zones are connect-

and discharged in the proper way (see also the indicator for phase II) (connection rate to the new network as a percentage).		ed to the wastewater network -> Indicator fulfilled
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The achievement of indicators for phase II (further districts around the city centre, zones III and IV as well as coastal towns south of Batumi) was as follows:

Indicator	Target value at PA, Status at PA (2008)	Ex post evaluation
(1) a) Sufficient drinking water is available in the rehabilitated urban areas (zones III and IV). b) (NEW) The specific water consumption is reduced significantly in the zones equipped with water meters	a) min. 120 l/c/d over the day; PA; 40–100 l/c/d, <24h/day b) max. 150 l/c/d; PA: > 400 l/c/d	see above (Indicator 1, Phase I) -> Indicator fulfilled
(2) Batumi: Less than 30% unaccounted for water in the rehabilitated zones.	max. 30%; PA: 70%	see above (Indicator 2, Phase I) -> Indicator fulfilled
(3) The wastewater in the rehabilitated zone is collected and discharged in the proper way (see also the indicator for phase I).	90%; PA: no data	see above (Indicator 3, Phase I) -> Indicator fulfilled
(4) Treatment plant: proper wastewater treatment	COD 125 mg/l, BOD ₅ 25 ml/l, TSS 35 mg/l; PA: <i>J.</i>	The operation of the treatment plant complies with all agreed standards -> Indicator fulfilled
(5) Regular and appropriate sampling and analysis of public and private drinking water abstraction points. (NEW) The analysis results correspond to the national drinking water standards.	2 analyses per year; PA: no measurements by the supplier.	The drinking water laboratory regularly takes samples; the analyses for Batumi city and the northern coastal villages comply with standards. The value of the residual chlorine content is exceeded in the southern coastal villages, which is acceptable given that the villages are currently connected to the Batumi network. -> Indicator fulfilled
(6) Coast: proper collection/drainage of wastewater to the treatment plant; regular inspection and mobile disposal of cesspits/septic tanks.	80% of households; PA: no centralised wastewater collection; incorrect emptying of septic tanks.	According to the executing agency, 50% of households are connected to the wastewater system; the others have cesspits/septic tanks,

		most of which are emptied in the proper way. -> Indicator fulfilled
(7) More than 150,000 residents in Batumi and the coastal areas (in 2012) benefit from improved water and sanitation.	> 150,000; PA: ./.	All current inhabitants of Batumi and the coastal towns (154,000 in total in 2014) as well as tourists benefit from the programme. -> Indicator fulfilled

Indicator 6 (wastewater management in coastal towns) does not specify what percentage of households not connected to the central disposal network regularly empty their cesspits/sewage tanks. However, Batumi Tskali hires out its suction trucks to households at a very low cost, as these are mostly poor households. This service is used regularly.

The people (residents and tourists of Batumi and the coastal areas), who benefit from the project (indicator 7) now have a continuous drinking water supply, even in the non-rehabilitated zones. They also benefit directly from the treatment plant, as untreated wastewater no longer flows into the Black Sea which is used for bathing. A significant portion of the population lives in the rehabilitated zones.

Indicators for the phase I and II complementary measures were defined as follows:

Indicator	Target value / Status at PA:	Ex post evaluation
(1) Programme implementation unit strengthened and new executing agency Batumi Tskali founded.	n/a	The programme implementation unit of the municipal administration of Batumi has been strengthened. The new executing agency Batumi Tskali was founded in the legal form of a municipal enterprise. The relevant expertise has been assigned to Batumi Tskali. The municipality continues to possess the necessary internal knowledge and management capacities through the programme implementation unit. -> Indicator fulfilled
(2) Supply zones are formed and operated.	n/a	Currently there are 25 supply zones. Not all are functional, however, as not all areas have undergone rehabilitation yet. A large number of the supply zones are functional, and water inventories can be generated for these. -> Indicator fulfilled
(3) The GIS database for water and wastewater is regularly updated and used.	n/a	The GIS database was created, updated for the rehabilitated zones and is in use. -> Indicator fulfilled
(4) Sludge disposal concept in place.	n/a	The sludge disposal concept is in place. -> Indicator fulfilled

The process for disposing of the sludge that forms during the wastewater treatment process works well. The sludge is dried by an innovative solar sludge drying plant and then sold to farmers and the Batumi parks department. Demand is reportedly higher than the supply. The price for farmers is GEL 20/m³. Batumi Tskali carries out an extensive heavy metals analysis every 2 years – there have been no abnormalities to date.

The newly formed Batumi Tskali has become a top performer. In addition to the success indicators mentioned above (significant reduction in unaccounted for water and in per capita consumption), personnel efficiency has increased (previously 14 employees per 1,000 customers, now 4.8), personnel qualifications have improved, sales have increased from GEL 3 million to GEL 12 million, and water availability has increased from 8 hours to 24 hours a day.

This very positive development is due to the following success factors:

- Complete re-establishment of the executing agency, taking on only a minimum of the staff from the previous executing agency
- Sympathetic support from the political authorities in Batumi
- Slow and gradual recruitment
- Strong personnel support from a qualified international consultant throughout the development

Based on the results presented, we rate the effectiveness as good.

Effectiveness rating: 2 (both projects)

Efficiency

The investment costs amount to EUR 19.8 million for phase I, and EUR 50.6 million for phase II. The total cost of the phase I and phase II complementary measures is EUR 3.8 million. It is no longer possible to allocate the costs of the complementary measure to the individual phases ex-post. Consulting costs are reasonable at EUR 2.8 million for phase I (14% of total costs) and EUR 4.2 million for phase II (8.4% of total costs).

The combined per capita cost for phases I and II will be EUR 480 which will increase further after the completion of phases III and IV. However, taking into account that the projects included both water supply and wastewater disposal and treatment, and that construction costs are comparatively high in the region (e.g. wastewater disposal in Korçë, Albania is EUR 476 for wastewater alone), we consider these costs to be reasonable. A static analysis of the financial statements of Batumi Tskali revealed that the company has ensured operating cost coverage and almost full cost coverage, taking into account the operating subsidies received on a regular basis from the city of Batumi. This does not, however, take into account debt servicing for the FC loans provided by the city of Batumi. The city of Batumi has significant tourism revenues and can currently afford to spend on water and sanitation. We rate the production efficiency as good.

The collection rate is currently very good at 115% (this means that old debts are also being collected) for households and 95% for businesses and administrative bodies. The average household in Batumi pays an estimated GEL 6 per month (EUR 2.2) for water and wastewater. The average monthly income is GEL 700 (EUR 260). The charges are thus no more than 1% of household income. For poorer households, the fees can amount to a higher proportion. However, the delegation was informed that for very poor households, electricity, water and gas costs are borne by the city. The capacity to pay for water and wastewater is therefore completely covered.

The results of the feasibility study indicate that the chosen solution (trickling filter technology for sewage treatment) is the most suitable solution. This can also be confirmed from an ex-post point of view. The trickling filter technology used by the treatment plant is manageable by the partners and appropriate for the conditions in Batumi: it has low operating costs and complies with the purification standards for discharge into the Black Sea as agreed with the environmental authorities at the beginning of the programme. The allocation efficiency is therefore rated as good, and the overall efficiency is thus also good.

Efficiency rating: 2 (both projects)

Impact

The indicators for the overarching development objectives were defined as follows:

Indicator	Status PA, target value PA	Ex post evaluation
(1) Reduction in the number of reported water-borne diseases.		Decrease in intestinal bacteriological infections (170 cases in 2008, 37 cases in 2012), E. coli (170 cases in 2008, 37 cases in 2012) and hepatitis A (327 cases in 2008, 0 cases in 2012); Decline in diarrhoea between 2010 and 2012 (9,747 cases (2010), 5,885 cases (2012)). ¹ -> Indicator achieved
(2) Positive development of the number of beds in hotels and guest houses.	Tourist growth of 10% on average in the first 3 years after commissioning; PA: Batumi: 1,400 beds, coast: 240 beds	The number of beds increased between 8% and 72% and the number of overnight stays increased between 7% and 96% p.a. from 2012 to 2016. A further indicator of tourism growth is the increase in gambling tax revenue from GEL 20 million in 2015 to GEL 24 million in 2017. -> Indicator significantly exceeded
(3) Development of monthly household income.	By an average of 5% in the first 3 years after commissioning; PA: Batumi: GEL 610, coast: GEL 760	Increase by 3–7% p.a. between 2012 and 2016, however only marginal due to dubious data quality and influenceability of the project -> Indicator presumably fulfilled

The Black Sea Monitoring Department of the Ministry of Environmental Protection and Agriculture of Georgia measures on an irregular basis Black Sea parameters that could provide information about the effects of the treatment plant. The oral testimony of an employee suggests that there have been improvements in Batumi for certain parameters (such as E-coli bacteria, for example). However, there are many sources of pollution for the Black Sea. In Batumi, for example, the port is a major source of pollution that could not be captured by the project. The majority of the neighbouring coastal cities on the Turkish and Georgian side do not yet have wastewater treatment. It is therefore unrealistic that the individual project evaluated here could have a substantial impact on the quality of the seawater. Only the further construction of sewage treatment plants will have a measurable effect on water quality. Against the background of the highly sensitive ecological balance of the Black Sea – there is little exchange between the various layers of water – the project was nevertheless relevant thanks to the reduction of pollutant loads and represents a first step towards the protection of this unique biotope.

Above all, the project has contributed to a significant improvement in the general environmental situation in and around Batumi. The wastewater is collected from the rehabilitated areas and fed into the treatment plant. Rainwater in the city is systematically drained. Small, localised floods still occur during heavy rain-

¹ Source: Health Impact Assessment 2009 + 2013, MACS

fall; however, these drain off quickly and no longer create a health hazard as the rainwater no longer mixes with wastewater.

The laboratory at the wastewater treatment plant takes measurements of the bathing water quality around the point of discharge on a voluntary basis to be able to answer questions relating to this. However, as is usual in wastewater laboratories, the lab does not conduct E. coli measurements. The executing agency's drinking water laboratory, located elsewhere, would be able to take E. coli measurements. However, this lab does not take any treated wastewater or seawater samples due to hygiene regulations. The other measurement results for the bathing water comply with regulations. We have recommended that the executing agency should also take E. coli measurements.

Overall, however, it is very plausible that the health risk will be reduced by significantly improving the quality of drinking water and the duration of supply, and by preventing the discharge of untreated wastewater directly onto the beach in Batumi. In addition, wastewater is no longer drawn into the drinking water network. The municipality has seen significant development in the interim (e.g. rapid building activity, own renovation measures, etc.), but this is not necessarily attributable to the project.

We rate the overall impact as good.

Impact rating: 2

Sustainability

The water and wastewater charges in Batumi and the coastal towns are too low to cover the operating costs. For this reason, the municipality regularly and reliably grants subsidies to Batumi Tskali. The administration paid out GEL 1.9 million (around EUR 650,000) per year until the end of 2016; this increased to GEL 4 million (EUR 1.5 million) at the beginning of 2017. Taking these subsidies into account, Batumi Tskali generates a modest net income (i.e. full cost coverage). The cash flow (source: cash flow statement) is also positive. The city has relatively high revenues, so the payment of subsidies is not an issue.

All applications to increase water fees have thus far been rejected by the central regulatory authority; this is due to the continuing unaccounted for water, among other factors. The regulatory authority is heavily influenced by politics, however, and it is a declared aim of the government to reduce water tariffs.

No negative environmental effects have been observed. Drinking water is mainly drawn from the abundant surface waters. Wastewater sludge disposal is exemplary (see section on "Effectiveness"). The treated wastewater is piped into the Black Sea through a 1,100-metre-long discharge pipe. From today's perspective, the sustainability can be rated as good.

Sustainability rating: 2

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:

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).