

Ex-post evaluation

Water supply and wastewater disposal III/IV, Montenegro

Title	Water supply and wastewater disposal Adriatic coast III and IV				
Sector and CRS code	14020 Water, sanitation and wastewater management				
BMZ number	2006 66 198 (Phase III), 2008 65 139 (IV), 2007 65 479				
Commissioned by	BMZ				
Recipient and executing agency	Republic of Montenegro (Ministry of Finance), Vodacom D.O.O.				
FC financing volume and instrument	FC development loans (EUR 27.3 and 25.0 million) FC grant (EUR 4.5 million)				
Project duration	2007-2023	Reporting year	2025	Year of random sample	2025

Project objectives and implementation

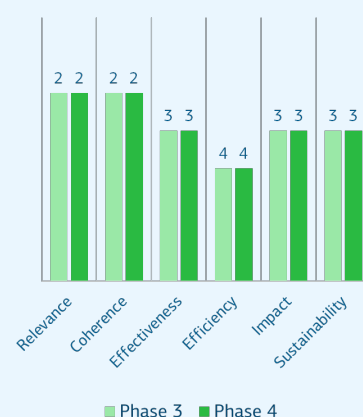
The objective at the outcome level was to achieve sustainability in wastewater disposal along the Adriatic coast of Montenegro (both phases). Phase III also aimed to ensure a year-round drinking water supply, even during peak tourist demand in the summer season. At the higher level of development policy, the objective was to contribute to Montenegro's economic development by promoting tourism and protecting the environment and resources.

Key findings

The project achieved significant improvements in drinking water supply, but above all in the area of wastewater disposal. However, the effectiveness of the project is impaired, particularly due to the incomplete implementation of the Herceg Novi wastewater treatment plant

- The project was highly relevant for resource protection and the further development of tourism in the project region. At the same time, it supports Montenegro, a candidate country for EU membership, in its efforts to meet EU standards.
- The project measures also supported the connection of the municipalities to the long-distance water pipeline to Lake Shkodra (financed by the World Bank and the EBRD). As a result, the supply is now largely uninterrupted, even during the summer months.
- The Kotor-Tivat wastewater treatment plant is in good operating and maintenance condition and has so far largely met the discharge parameters.
- The Herceg Novi wastewater treatment plant is also in operation, but due to the lack of sludge drying, the sludge cannot be landfilled and is instead discharged into the Bay of Kotor. This means that wastewater treatment only partially benefits the water quality in the bay.
- Lengthy coordination and approval procedures have significantly delayed implementation.
- With the exception of Tivat, the water supply is characterised by extremely high loss rates (60-80%). Together with water tariffs that are too low and continuing to fall, this jeopardises the financial sustainability of the supply companies.

Overall rating moderately successful



1: very successful – 6: completely unsuccessful

Conclusions

- The Vodacom special-purpose association provided effective support to the municipality during implementation. At the same time, Vodacom's ability to act was partially limited due to slow payment of contributions.
- There is no concept of sustainability for the disposal of sewage sludge.
- Changing political majorities and conflicts between the various municipalities led to difficulties in implementation. This could possibly be mitigated by requiring fundamental decisions (e.g. sewage treatment plant locations, operating concepts, sewage sludge disposal) to be agreed upon before financing commitments are made.

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Imprint

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List of abbreviations

AE	Wastewater disposal
PCR	Final completion report
GDP	Gross domestic product
BMZ	Federal Ministry for Economic Cooperation and Development
BOD	Biochemical oxygen demand
COD	Chemical oxygen demand
DAC	Development Assistance Committee
EPE	Ex-post evaluation
EUR	Euro
FC	Financial cooperation
FC E	FC Evaluation
GIZ	German Society for International Cooperation
HDI	Human Development Index
OECD	Organisation for Economic Co-operation and Development
PA	Project appraisal
PP	Project proposal
PPP	Private-public partnership
TC	Technical cooperation
USAID	United States Agency for International Development
USD	US dollar
ViK	Vodovod i Kanalizacija (water supply and wastewater disposal company)

Overview

General conditions and classification of the project

With around 620,000 inhabitants, Montenegro is one of the smallest countries in Europe. The economy has increasingly shifted from traditional agricultural and forestry structures towards services and tourism. Key sectors are tourism (as the most important source of foreign exchange), energy and mining (especially hydropower and coal mining) and agriculture. The unemployment rate is around 11 per cent (2024), with above-average youth unemployment.

GDP was around 6.9 billion euros in 2024, with nominal per capita GDP at around 11,000 euros. After a slump in growth during the COVID-19 pandemic (-15 per cent p.a. for 2020, followed by growth of +13 per cent p.a. in 2021), economic growth is now back to pre-coronavirus levels, most recently at +3.0 per cent p.a. (2024). Tourism accounts for around a quarter of total economic output. Around 2.6 million international visitors travelled to Montenegro in 2024, half of them from Serbia, Russia and Bosnia-Herzegovina. The project area on the Bay of Kotor is one of the most important destinations.

Montenegro is seeking EU membership; accession negotiations have been ongoing since 2012.

Montenegro is one of the most water-rich countries in the world. However, the availability of this resource is very unevenly distributed in both temporal and spatial terms, leading to shortages in the summer months, particularly in densely populated coastal regions. These shortages are exacerbated by often outdated or dilapidated infrastructure and high losses in the distribution network.

The project region, located on the Adriatic coast, is highly dependent on tourism during the summer months. At the time of the project appraisal, there were considerable shortcomings in the drinking water supply, which at times led to supply bottlenecks. In addition, only around two-thirds of households were connected to the sewage network, and due to a lack of sewage treatment plants, untreated sewage was discharged via sea outlets that were too short and in some cases defective. The resulting increase in pollution of Kotorbay and the coastal waters developed into a significant ecological problem. Together with the shortcomings in the drinking water supply, the sewage situation also posed a considerable threat to the development of the tourism sector, which is considered essential for poverty reduction in the region.

The primary aim of the evaluated FC projects was to improve wastewater disposal (and, to a lesser extent, drinking water supply) at the project sites in Tivat, Kotor, Herceg Novi, Bar and Budva, in particular to improve the quality of coastal waters and thus contribute to environmental and resource protection as well as to the economic development of the region.

Brief description

The overall project "Water Supply and Wastewater Disposal on the Adriatic Coast" aims to improve drinking water supply and wastewater disposal in five Montenegrin coastal communities. To this end, the expansion, renovation and new construction of municipal infrastructure is planned in several phases. The overall project is divided into various individual projects and includes both capital investments and personnel support measures. Phases III and IV of the project, which are evaluated here, aimed primarily at substantially improving wastewater disposal in the tourist areas along the Adriatic coast. To this end, the construction of sewage collectors and initial stages of wastewater treatment measures (sewage treatment plants in Herceg Novi and Bar) as well as rehabilitation measures at the sea outlets and sewerage networks were planned in the four coastal municipalities of Bar, Herceg Novi, Kotor and Tivat. The project also includes urgent investments in rehabilitation measures for distribution networks and pumping stations with regard to drinking water supply.

Breakdown of total costs

	Phase III (plan)	Phase III (actual)	Phase IV (plan)	Phase IV (actual)
Investment costs (total) in EUR million	68,3	59,0	42,5	35,3
Own contribution in EUR million	35,8	10,4	17,5	4,7
External funding in EUR million	32,5	48,6	25,0	30,6
of which BMZ funds in EUR million	32,5	48,6*	25,0	30,6*

Table1: Breakdown of costs

* Including reallocated FC loans and grants from subsequent phases totalling EUR 16.8 million. Despite multiple extensions of the disbursement period, only EUR 27.3 million of the development credit funds could be disbursed.

** Including reallocated FC loans from subsequent phases and reprogrammed residual funds totalling EUR 5.6 million.

The BMZ funds also include the deployment of experts (BMZ No. 2007 65 479). This was financed by a grant of EUR 4.5 million, which was paid out in full.

Map of the project region

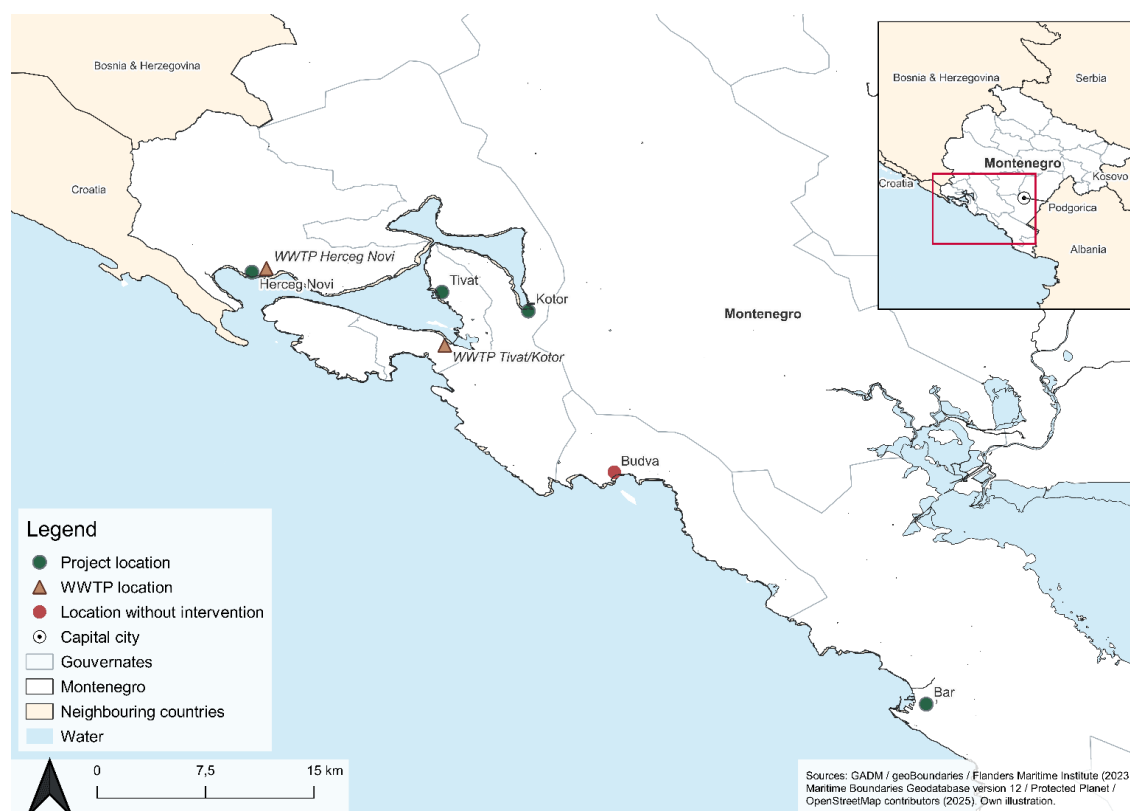


Figure 1: Map of the project region

Source: Own illustration.

Project-specific strengths and weaknesses of the project

The strengths include in particular:

- The establishment of the Vodacom special-purpose association has facilitated implementation and is viewed positively even by municipalities that are no longer part of Vodacom – particularly due to the municipalities' lack of experience with large-scale infrastructure projects.
- Despite the financial deficits of the utility companies – particularly due to high water losses and low tariffs – it can be assumed that the municipalities are willing and able to provide additional funding if necessary.

The weaknesses include in particular:

- The performance of the Vodacom implementation unit was at times significantly limited by a lack of financial resources due to late payments by members.
- Conflicts and conflicting interests among the municipalities involved have led to considerable delays.
- Changes in administration (e.g. as a result of a change of mayor) have also led to completed plans being called into question and, in some cases, being implemented in a modified form or not at all.
- From the perspective of the supply companies (ViKs), the minimum purchase quantities agreed within the framework of regional water supply reduce the incentive to combat technical and administrative water losses. Nevertheless, these water losses have a direct impact on the financial situation of the ViKs, which in turn limits their financial scope for action, e.g. for network rehabilitation.

General conclusions/lessons learned

- In order to avoid inter-municipal conflicts and time-consuming coordination processes during implementation, key parameters – locations, rights and obligations of the partners, operating concepts, etc. – should be defined in a binding manner before the start of the project, if possible. Particularly in the case of conflicting interests among multiple infrastructure owners (e.g. sewage treatment plant for several municipalities), the potential for conflicts during implementation should be minimised, especially in the wake of changing political responsibilities.
- Even in the case of implementation as an open programme (or the implementation of fixed packages of measures), care should be taken, where possible, to ensure that agreed plans and corresponding decisions are firmly anchored and cannot be revoked by subsequent administrations. However, it is important to weigh up whether and, if so, to what extent this could counteract the ownership of the administration in office at the time.
- When establishing additional structures for project implementation, it should be ensured, where possible, that their ability to function is financially secure and independent of political influences.

Assessment according to OECD DAC criteria

Relevance

1. Alignment with policies and priorities

The Montenegrin government gives top priority to water supply and wastewater disposal on the coast, which is important for tourism and thus for the country's overall economic development, which is essential for combating poverty. In doing so, it relies heavily on good cooperation with Germany.

Alignment with EU standards by 2035 poses considerable challenges in the environmental sector, particularly in the areas of waste and wastewater management, air quality and the promotion of renewable energies. External financing from international financial institutions and EU funds are key to achieving progress in this area.

At the time of the project reviews (2007 and 2008), the water/wastewater sector was defined as a priority area for German development cooperation in Montenegro. There is currently no strategic framework in the form of a priority strategy paper or country strategy. However, water and wastewater remain a priority area for German development cooperation and are part of the BMZ's core theme of "Protecting our livelihoods – environment and natural resources".

2. Alignment with the needs and capacities of stakeholders and beneficiaries

Deficits can be observed in the drinking water and wastewater sectors, among others. In 2024, only 86%¹ of the total population had access to treated drinking water. In urban areas, only about 55% are connected to a wastewater system, and in the entire country, this figure is only about 41%. Only 31% of the wastewater collected is treated in any way². There are only a few sewage treatment plants nationwide, so there is still a great need for investment.

At the time of the project appraisal, this was reflected in bottlenecks in the drinking water supply (especially in the summer months) and increasing pollution of the Bay of Kotor and adjacent coastal areas due to the discharge of untreated sewage. Long-term development prospects for tourism were therefore linked to the expansion of infrastructure in the water and wastewater sector. In this respect, the core problem was correctly identified as a bottleneck for further economic development in the region and as a starting point for improving water quality in the Bay of Kotor.

In addition, there was also significant potential for improvement in the operational management by the ViKs, for example in terms of pumping efficiency. At the time of the project reviews, this was only around 70%. This was taken into account and addressed as part of an A+F measure (A+F No. 2009 450).

All measures financed by the FC projects were planned and implemented in close cooperation with the municipalities and local water companies. This was to ensure that the investments met local needs. However, it should also be noted that the priorities and preferences of local administrations are strongly influenced by political considerations and are subject to considerable fluctuations (e.g. after a newly elected mayor takes office).

There were fears that the municipalities would be overwhelmed by the organisational and technical challenges of implementing the extensive investment measures. For this reason, the Vodacom special-purpose association was founded in 2005 with the support of the FC to assist the municipal administrations and ViKs with implementation.

The social acceptability of future tariff increases, which were necessary in view of the planned investments, was taken into account during the project review. In addition, solvency analyses during the detailed planning phase were to ensure the affordability of the tariffs.

The concept also included the construction of a sewage treatment plant for the city of Bar, but this was ultimately not realised. Even today, the utility company (ViK Bar) has doubts as to whether the construction of a sewage treatment plant makes sense as long as the separation between the sewage and rainwater networks has not been implemented³. The city of Budva, which was still intended as an investment location in the PV, withdrew from the project before measures began and financed a sewage treatment plant from other sources.

3. Appropriateness of design

The package of measures, consisting of the expansion of the sewerage system and selective improvements to the drinking water network, the construction of sewage treatment plants and personnel support for the utility companies, appears to be a logical

¹ WHU/UNICEF/UN SDG6 Data, 2025

² WHO/UN, SDG6 Data, 2025

³ It could be argued that during the summer months, when the cleaning performance of the sewage treatment plant is particularly important, there is usually little or no rainfall in the region.

and necessary approach to mitigating or resolving the deficits identified during the project review. The target system and the underlying impact logic also appear to be coherent from today's perspective. However, at the start of the project, there were important aspects that had not yet been conclusively clarified. These included a concept for sewage sludge disposal and an operating concept for the joint sewage treatment plant for the towns of Tivat and Kotor.

In short, the illustration of the chain of effects of the project can be described as follows: improving the sewage system will improve living conditions in the project cities and at the same time increase their attractiveness for tourism. This will contribute to the country's economic development. The reduction in the discharge of raw sewage into the Bay of Kotor and the open sea will also contribute to environmental and resource protection. The improved drinking water supply will also support tourism and thus the economic development of Montenegro. These chains of effects clearly illustrate the holistic approach of the project concept, which combines ecological and economic objectives.

4. Adaptability – response to change

The project underwent significant changes during its approximately 15-year implementation period. The changing priorities of the partners – as a result of changing local political majorities – were particularly decisive in this regard. The project was able to respond flexibly to these changing requirements, in particular by reallocating funds to other measures or locations. Nevertheless, these changes led to considerable delays in project implementation, and at the same time, important components could not be realised due to the withdrawal of the respective municipalities.

For example, the municipality of Budva decided to withdraw from the programme even before the first measures were implemented. In fact, a sewage treatment plant was commissioned there in 2014 as part of a PPP project. IPEX Bank, part of the KfW banking group, was involved in the financing. The funds freed up as a result were distributed among the remaining locations. The same applies to the Bar location, where the construction of a sewage treatment plant was planned and a tender process for the construction work had already been successfully completed. Nevertheless, the municipality ultimately decided not to build the sewage treatment plant, although here too the reasons are more to be found in local politics than in practical considerations. In this case, too, the funds that were freed up were redistributed to other locations.

Rating summary of relevance: successful (2, both phases)

The design of the measure pursued a combination of ecological and economic objectives that is still considered sensible today and specifically addressed significant deficits in the project locations.

Coherence

5. Internal coherence

Other German development cooperation actors were not active in the region's water/wastewater sector, so no coordination mechanisms were required. At a higher level, however, a complementary approach is evident. GIZ was involved in coastal management, cadastral and spatial planning, while DEG supported investments in the tourism sector. Information was exchanged regularly with GIZ.

The measure was consistent with the norms and standards applicable to German development cooperation.

6. External coherence

The project was designed to support the participating municipalities' own efforts, as reflected in the considerable (planned) financial contributions from the Montenegrin partners. However, this contribution was significantly reduced during the course of the project (from 40% to 16%). The COVID-19 crisis in particular limited the financial scope of the Montenegrin partners, who are heavily dependent on tourism revenues.

The division of labour among the international donors has been coordinated with the Montenegrin partners. For example, the European Investment Bank (EIB) is focusing on the water and wastewater sector in northern Montenegro, while the FC is working with the coastal municipalities. The approaches complement each other in a positive way. For example, the drinking water supply (primarily addressed in other phases of the project), especially in the summer months, relies on a water pipeline from Lake Shkodra, which was financed by the World Bank. Conversely, the project enabled the city to connect to this regional water supply through the construction of a reservoir in Bar. Last but not least, the improved drinking water supply provided by the long-distance water pipeline made it necessary to expand the wastewater disposal system.

USAID was in charge of sector reforms at the national level until early 2025. In the meantime, the World Bank and EBRD have begun to follow suit.

Rating summary of coherence: **successful (2, both phases)**

The division of labour among donors relevant to the sector appears appropriate. Appropriately coordinated measures have made it possible to combine the various approaches in a meaningful way (in the drinking water sector).

Effectiveness

7. Achievement of objectives

The objective at the outcome level was to achieve a sustainable improvement in wastewater disposal (both phases). Phase III also aimed to ensure a year-round drinking water supply, both for the population and in relation to peak tourist demand in the summer months.

The following indicators were used to measure the outcome objective:

Phase III

Indicator	Status at time of review	Target value at EPE (re-view)	Actual value at PCR	Actual value at EPE
(1) Lifting efficiency	55-80 %	90 %	104,3%	92-107 % Target value achieved
(2) Operating costs covered by tariff revenues	73-127 %	100%	104 %*	78-99% Target value not achieved
(3) Mechanical-biological wastewater treatment for residents and tourists	-	65.300 people	65.300	Target value achieved
(4) Number of additional residents and tourists connected to the wastewater networks	-	20.000	11.291**	Target value achieved

Table 2 : Outcome target achievement Phase III

Source: Vodacom/ViKs

Note: *excluding Kotor, as the KA had already commenced operations at the time of the PCR, but no fees had yet been collected; **excluding tourists

Phase IV

Indicator	Status at time of review	Target value at EPE (re-view)	Actual value at PCR	Actual value at EPE
(1) Annual elimination of BOD5 pollutant load in WWTPs in Tivat and Kotor	-	450 t p.a.	822 t p.a.	928 t p.a. Target value achieved
(2) Wastewater treatment capacity	-	72,000	72,500	72,500 Target value achieved

Table 3: Outcome target achievement Phase III

Source: Vodacom/ViKs

Significant progress has been made overall in terms of both collection efficiency and operating cost coverage. However, the operating cost coverage target has not been achieved, with a negative trend due to declining tariffs (see section on sustainability). In addition, even relatively high values such as those in Herceg Novi and Tivat (95% and 99% respectively) are misleading, as according to all ViKs, the operating expenses incurred for maintenance and operation are insufficient and necessary work has to be postponed to the future.

With regard to indicator III.3, it is highly likely that the target value of 65,300 people (residents and tourists) will be achieved. The total population of Tivat, Kotor and Herceg Novi is around 70,000, with the connection rate to the sewage network for all three municipalities close to 100%⁴.

Indicator III.4 is considered in a modified form due to a lack of reliable data. The information provided by ViKs generally refers to customer numbers⁵, and the number of "connected" tourists can only be estimated anyway. In terms of customer numbers, the figures for Tivat and Kotor increased from 1,400 to 6,174 (Tivat) and from 4,327 to 7,207 (Kotor) between 2010 and 2025. This means 7,654 additional wastewater customers, which, based on the average household size of 2.5 persons per household commonly used in the region, corresponds to an increase of 19,135 additional connected people. The figures for Herceg Novi and Bar must also be added. Although these figures are only available for slightly different reference years, they nevertheless indicate a total of approximately 9,600 additional wastewater customers (corresponding to approximately 24,000 people). Since the number of users, including tourists, is several times higher than the local population during the summer months, it is clear that the target increase in the coverage of wastewater disposal has been clearly achieved.

Both of the technically oriented indicators for Phase IV were met. The annual pollutant load at the Tivat/Kotor wastewater treatment plant is approximately 930 t/a with an elimination rate of 97%. This means that in 2024/2025, approximately 900 tonnes of BOD5 (biochemical oxygen demand after 5 days) pollutant load was eliminated at⁶. The wastewater treatment plant now exceeds the specified minimum amount of 450 tonnes/year (indicator IV.1) by a factor of two. The reason for this is not to be found in an increase in the capacity of the sewage treatment plant, but rather in the very low target value set for indicator IV.1. At the time of the audit, it was not assumed that almost all households would be connected in a short period of time and that, especially in Tivat, there would be such strong growth in the tourism sector. In addition to numerous holiday apartments and guest-houses, two large marinas with apartment complexes have been built there, which contribute to a wastewater volume in the summer months that corresponds exactly to the planning horizon for 2025.

This means that the capacity of the sewage treatment plant also corresponds to the value of 72,500 population equivalents specified for indicator IV.2. An analysis of the inflow and outflow values shows that the number of connected inhabitants fluctuates greatly over the course of the year. While the figure is around 30,000 in the winter months, the sewage treatment plant treats the wastewater of more than twice as many people during the holiday season. Although precise data on the number of connected tourists is not available, conclusions can be drawn about the connected population based on the inflow volumes and the biological load. However, the high proportion of extraneous water during the winter months must also be taken into account. With an estimated specific wastewater volume of 125 l/person/day and a load of 60 g/person/day BOD (105 g/person COD), it is clear that the plant is capable of treating the wastewater of up to 75,000 people during the summer months.

The drinking water-related indicators defined in PA were not pursued further due to the clear focus of the project on wastewater. Nevertheless, the drinking water situation at the time of the EPE is briefly discussed below.

The water supply in the municipality of Tivat is currently sufficient in terms of quantity. During the summer months, approximately 90-95% of drinking water must be sourced from the regional long-distance water pipeline, while during the rest of the year, this figure is around two-thirds of the total water volume. Despite temporary shortages in previous years – which, however, were due to coordination and communication problems with the regional water supplier – the supply is now uninterrupted, even during the summer months. The same applies to the municipality of Bar.

In the municipality of Kotor, too, the supply has been virtually uninterrupted in recent years. However, due to the salinisation of local springs, additional quantities had to be obtained from the long-distance water pipeline during the summer months.

In the municipality of Herceg Novi, the drinking water supply is also running without any bottlenecks. However, Herceg Novi does not normally draw water from the long-distance water pipeline from Lake Shkodra, but supplements the water obtained from local sources with water from Lake Bileca, which is about 30 km away.

8. Contribution to the achievement of objectives

The Tivat-Kotor wastewater treatment plant was commissioned in 2016, with the plant constructor initially taking over operations on a provisional basis. After a lengthy period of disagreement between the municipalities of Tivat and Kotor, a joint operating company was finally established, which took over operations from the plant constructor in 2020. To date, operations have been running satisfactorily and professionally. Only in 2025 were there still some unresolved problems with the biological processes in the treatment plant. As a result, the effluent values of the treatment plant were no longer within the norm at the time of the evaluation. The causes of this have not yet been clearly determined: one possible explanation is the temporary decommissioning of an aeration tank. Restoring a functioning biology in the tank takes time and requires the targeted inoculation of the sludge. The operator seems to be struggling with this, but is trying to compensate for it by exchanging experiences with other

⁴ Energy and Water Regulatory Agency Montenegro, Annual Utility Benchmarking Report 2021, Graph I.2.1.1 p. 40

⁵ Not to be confused with connection figures. In a multi-family dwelling, for example, there is usually one connection, but one customer per apartment.

⁶ Data for 2025 was extrapolated until the end of the year.

sewage treatment plant operators (Budva). In addition, saline water infiltrates the sewage system throughout the year. The effluent from the sewage treatment plant still contains salt levels of 0.2-0.4%, which is almost brackish water. The high salt levels can also have a negative impact on the biological treatment processes.

At the time of the evaluation, the Herceg-Novi sewage treatment plant was not fully operational, despite assurances to the contrary during the final inspection. Furthermore, neither UV disinfection of the wastewater nor sewage sludge dewatering is carried out. As a result, the sewage treatment plant is not being operated in accordance with the procedures. The (highly water-rich) sewage sludge is collected in a settling tank, treated with hydrogen peroxide and, if necessary, discharged into the bay via the existing seawater outlets. As a result, although the parameters of the treated wastewater meet the required values, a large proportion of the pollutant load is still discharged into the bay at intervals and in bursts. Although the addition of hydrogen peroxide reduces odour pollution within the sewage treatment plant and has a disinfecting effect, the suspended solids in the sludge also pollute the marine flora and fauna. The sewage treatment plant in Herceg Novi can therefore only make a limited contribution to the goal of sustainability in wastewater treatment.

The investment measures are therefore only partially realised in terms of the sewage treatment plants. The expansion of the sewage networks is being fully utilised.

The plans for the sewage treatment plant in Bar have been changed several times. Despite a successful tender for the construction work, construction has never begun. Unstable political power relations at the municipal level are likely to have played an important role in this. To date, there is no sewage treatment plant in Bar.

Nevertheless, the investments in the sewage network are seen as clear progress on the part of ViK Bar compared to the previously inadequate sewage collection, also with a view to the future construction of a sewage treatment plant. The collected, untreated sewage is discharged via several seawater outlets in Sutomore and Bar.

The financed investments (e.g. flood reservoirs as connection points for the regional long-distance water pipeline) have also helped to secure and improve the town's drinking water supply. The quantities purchased from the regional water supplier can be temporarily stored in the newly built Susanj 2 reservoir and distributed throughout the town's network in a pressure-optimised manner.

The improvement in water supply and sanitation was carried out without discrimination; poorer or otherwise disadvantaged areas were not disadvantaged. It is true that there are still residential areas (e.g. in the city of Bar) that have neither a drinking water connection nor a sewage system. However, this is because these buildings were constructed without permission and outside the authorised building zone. Tariffs are also comparatively low (currently less than EUR 2/m³, including sewage charges) and affordable for the population. Tariffs are now falling, and further reductions, ultimately determined by the competent regulatory authority, will take place in 2026 (see also the section on sustainability).

According to the municipalities involved, Vodacom's coordinating role has also had a positive impact on the achievement of objectives, particularly as there was little experience with such large-scale investment projects. The municipality of Bar, which has since left the Vodacom association, also provides a positive appraisal of the cooperation. In particular, the implementation of the project would have overwhelmed local capacities, according to its own statement. No criticism was expressed regarding the contributions to be made by the municipalities to Vodacom.

Political volatility in the municipalities had a negative impact, with direct consequences for project implementation. After new mayors took office, agreements were no longer honoured, decisions were delayed and existing plans were rejected. This led to considerable delays in implementation and ultimately to shortfalls in relation to the original objectives (e.g. lack of a sewage treatment plant in Bar).

9. Quality of implementation

The management and implementation were positively influenced by the role of Vodacom, while the local political environment made implementation significantly more difficult (see TC 8).

From the perspective of ViK Herceg Novi, the unfinished state of the plant is primarily due to mistakes made by the company commissioned to build the sewage treatment plant and the implementation consultant. However, it should be noted that since the sewage treatment plant went into operation (2016), there has been enough time for ViK/the municipality to complete the plant on its own. The cost of completion appears manageable and could have been carried out by ViK/the municipality itself since commissioning in 2016 (as assured by PCR). The inspection of the sewage treatment plant carried out in the course of the evaluation also indicates that the plant is operating at best mediocly and calls into question the interest in proper/procedural operation.

In addition, ViK also points to significant problems with the main sewage collector, through which large quantities of salt water are entering (which can also lead to problems with the biological processes in the sewage treatment plant) and in which deposits

are occurring due to incorrect dimensioning. In fact, the correct dimensioning is difficult to define, as the high number of tourists in summer must be taken into account, but this leads to oversizing for the rest of the year.

Even though the city of Bar has now left the Vodacom special-purpose association, it gives a positive appraisal of its cooperation with Vodacom. In particular, it says that the implementation of the project would have overstretched local capacities.

10. Unintended effects (positive or negative)

There are no indications of unintended effects.

Rating summary of effectiveness: **moderately successful (3, both phases)**

Despite the sometimes considerable operational problems at the Herceg Novi site, the evaluation concludes that the positive effects at the other sites outweigh the negative ones.

Efficiency

11. Production efficiency

The project funds were distributed among the sites as follows:

Phase III (EUR 59.0 million):

Herceg Novi	48% (wastewater treatment plant and wastewater disposal network)
Kotor	12% (primarily WW network, to a lesser extent TW network)
Tivat	10% (SE network)
Bar	19% (primarily AE network, to a lesser extent TW network)
Implementation consultant	11

Table 4: Distribution of project funds across locations, Phase III

Phase IV (EUR 35.3 million):

Herceg Novi	45% (wastewater treatment plant and AE network)
Kotor	22% (sewage treatment plant and AE network)
Tivat	24% (sewage treatment plant and AE network)
Bar	0.4% (distribution network)
Implementation consultant	9

Table 5: Distribution of project funds across locations, Phase IV

A total of 81% of the construction costs financed in phases III and IV were allocated to the sewage networks, 18% to sewage treatment and 1% to the drinking water network.

The project measures were awarded through tendering procedures, and the contract prices achieved appear reasonable or even low from today's perspective. Depending on the phase, the total costs of the implementation consultants amounted to between 9% and 11% of the total costs. In view of the considerable delays in project implementation, this figure still appears reasonable.

However, the efficiency of the FC funds used was impaired insofar as the share of own funds provided by the Montenegrin side was significantly lower than planned (16% instead of 48%).

The implementation was marked by considerable delays, with the final checks for both phases being carried out around ten years after the project end date forecast during the project audit (2022 instead of 2012 and 2023 instead of 2013). The reasons for this lie in the difficult search for suitable sites for sewage treatment plants, considerable problems with construction work in Herceg Novi, and extremely lengthy coordination and decision-making processes at municipal level in connection with changing political majorities. Even taking into account the COVID pandemic that occurred during the project period, these delays are too significant to still be able to speak of efficient project implementation.

In addition, costs were incurred for planning and tendering procedures that ultimately did not result in realised investments (Bar wastewater treatment plant).

The losses in the drinking water sector are discussed below. However, as the drinking water share of the evaluated phases is very low (< 2%), these are not included in the appraisal of efficiency. Nevertheless, these losses have economic consequences for the ViKs and thus also indirectly affect the sustainability of the investments made in the wastewater sector. With the exception of Tivat (loss rate approx. 30%), the drinking water supply is characterised by significant losses (NRW, non-revenue water). According to the ViKs, these range between 60 and 80%. With such high loss rates, it can be assumed that both technical and commercial losses as well as illegal or manipulated connections are the cause. Locating and decommissioning illegal or manipulated connections is associated with considerable problems because they are often located on private property and cannot be accessed without the owner's permission. It is often not possible to shut off the connections from the street, e.g. in the event of non-payment. Furthermore, these loss rates are problematic for efficient commercial operation because the water supply from the long-distance water pipeline incurs corresponding costs for the ViKs for each cubic metre purchased (currently EUR 0.43), but only a fraction of this water generates revenue for the ViKs.

The ViK Herceg Novi did not want to provide any information on drinking water losses.

In addition, all municipalities connected to the long-distance water pipeline must purchase minimum quantities. Although this is understandable from the perspective of financing the long-distance water pipeline, outside the summer months it means that the ViKs receive and have to pay for water they do not need. In some cases, this reduces the incentive for the ViKs to reduce their technical water losses, as the minimum purchase quantities have to be purchased anyway.

According to the regulatory authority's latest benchmarking report, the personnel intensity of the ViKs in the project area is consistently 5-6 employees per 1,000 customers, which is at the lower end of the scale in a national comparison and appears acceptable in this case.

12. Allocation efficiency

In view of the objectives of both projects, there are no plausible alternative approaches from today's perspective. The expansion of the sewage networks in the coastal region and the construction of sewage treatment plants were essential for economic and tourist development and for improving seawater quality. The fact that the Herceg-Novu sewage treatment plant has not yet been completed reduces its effectiveness (discharge of sewage sludge into the bay) and thus has a negative impact on Allocation efficiency.

The municipality of Tivat is currently looking for ways to equip the Tivat/Kotor wastewater treatment plant with an additional treatment stage in order to provide service water for a golf resort on the Lustica peninsula. The reuse of treated wastewater was not envisaged at the time the project was conceived. From today's perspective, it might have been advisable to investigate the possibilities for reuse. It should be noted, however, that the economic viability of an additional treatment stage for limited use during the summer months is not necessarily guaranteed.

Rating summary of efficiency: moderately unsuccessful (4, both phases)

The considerable delays in project implementation, which were largely due to local political factors, prevented the project from being implemented efficiently and meant that significant parts of the measures could only be put into operation 5-10 years later than planned.

Impact

13. Overarching developmental changes

The impact-level objective was

1. to contribute to Montenegro's economic development

2. to contribute to environmental and resource protection in Montenegro's coastal region.

The following indicators were used to measure the impact objective for phase IV, which is being adopted for both phases due to the same focus of phase III.

Indicator	Status at time of review	Target value at EPE (review)	Actual value at PCR	Actual value at EPE
(1) Change in income generated by tourism	-	EUR 700 million	1,267 million	Target value achieved

Table 6: Impact target achievement

Source: PCR, GTAI Economic Outlook Montenegro 01/2025, World Travel and Tourism Economic Impact 2024 Montenegro

Note: Only preliminary or contradictory data is available for income generated from tourism for 2023 and subsequent years (depending on whether indirect effects are included). However, there is agreement that tourism accounts for around 25% of GDP, which corresponds to income from tourism of approximately EUR 1.9 billion for 2024.

No specific environmental indicator has been defined, but ultimately the environmental situation is one of several factors influencing tourism development. Water quality measurements on the region's beaches can serve as an additional reference point (see below).

The target set by PV for tourism revenue has been significantly exceeded, even if the outlook is less positive from today's perspective. According to local residents and press reports, visitor numbers have been stagnating or declining since 2024. The reasons cited for this are the now high price level (especially in comparison to neighbouring Albania, but also to North Macedonia), including a VAT increase from 7% to 15%, which particularly affects the catering industry, as well as infrastructure deficiencies (especially the roads, which are completely congested in the summer months)⁷.

According to the responsible local institute (Institute for Marine Biology Kotor)⁸, the water quality in the Bay of Kotor has improved since the project was implemented. However, it should also be noted that although there were shortcomings previously, 70% of the samples taken at the various shore monitoring points still met the requirements for very good bathing water quality. This figure has now risen to 80% of samples, while 7% of samples no longer met EU bathing water quality standards. This represents a significant improvement. Further improvements may only be expected once the sewage networks have been connected to sewage treatment plants across the board (Bar and other smaller coastal communities). The Institute also gives a positive appraisal of the living conditions for marine life in the Bay of Kotor. However, the introduction of microplastics poses a serious threat to marine biology, for which there is currently no solution and which cannot be addressed even with the current state of development of sewage treatment plants.

14. Contribution to overarching intended developmental changes

The development of tourism revenues is influenced by a wide range of factors. From the EPE's point of view, inadequate wastewater infrastructure is a limiting factor for the development of tourism.

Before the project began, wastewater in the project locations of Tivat and Kotor was inadequately collected, which led to the occasional discharge of raw sewage into the Bay of Kotor. In addition, the collected wastewater was discharged untreated into the open sea. As a result, the improved sewerage system at these locations has contributed positively to water quality in the Bay of Kotor, while the Tivat-Kotor wastewater treatment plant has had a positive effect on coastal water quality in the Adriatic Sea.

According to the mayor of the municipality of Tivat, the wastewater treatment plant and the improved sewage network had a significant and very positive effect on the economic and tourism development of the city. The same statement was also made by the mayor of Kotor, who pointed to the improvement in water quality in the Bay of Kotor and the elimination of sewage odours in the historic city centre of Kotor (UNESCO World Heritage Site). In Bar, too, municipal representatives pointed to the very positive effects of the project on the development and quality of life in the city, thanks to reduced pollution of the sea water (fewer direct discharges near the coast) and the decline in sewage odours in the city.

In Herceg Novi, the collected wastewater was also discharged into the bay in the past. Here, the cleaning performance of the wastewater treatment plant, the extended sea outlet – as well as the improved sewerage system – have a direct impact on the water quality in the bay. However, this effect is impaired by the improvised operation of the WWTP (discharge of sewage sludge into the bay).

⁷ <https://montenegrobusiness.eu/montenegros-tourism-model-fails-as-high-costs-and-poor-policies-drive-crisis/>

⁸ It is noteworthy that the on-site evaluation mission led to the institute responsible for water quality measurement contacting the utility company responsible for wastewater treatment for the first time.

In principle, attracting new investors also depends on a reliable and functioning water supply and wastewater disposal system. In this context, several successful large-scale projects have been implemented in recent years, including Porto Montenegro in Tivat, Lustica Bay (resorts and golf course) and Portonovi (Herceg Novi).

Regardless of the actual water quality, connecting these locations to sewage treatment plants is of great importance for Montenegro, an EU candidate country, in order to comply with the relevant EU regulations (Chapter 27: Wastewater treatment for all settlements with 2,000 inhabitants or more by 2035). This also applies to connecting the population to sewage networks (93% by 2035)⁹. Supporting Montenegro in meeting the requirements for EU accession can also be seen as having a significant impact on the country's further development.

15. Contribution to overarching unintended developmental changes

The still unresolved issue of sewage sludge disposal poses a considerable problem. Currently, sewage sludge from the Tivat-Kotor wastewater treatment plant is disposed of in a landfill. The wastewater treatment plant currently being planned in Podgorica will face the same problem. There are currently signs of a joint solution for Tivat/Kotor and Podgorica, although no binding agreements have yet been reached.

As expected, the project has prevented negative impacts on tourism development. However, the development of tourism brings with it further challenges. In this respect, it has also indirectly contributed to the corresponding negative developments (air pollution, traffic congestion).

Rating summary of impact: **moderately successful (3, both phases)**

Even though the operation of the Herceg Novi wastewater treatment plant is unsatisfactory from an environmental protection perspective, the positive effects of the project nevertheless outweigh the negative ones (income from tourism, coastal water quality, water quality in the bay due to improved sewerage, support in approaching EU standards).

Sustainability

16. Capacities of beneficiaries and stakeholders

The Tivat-Kotor wastewater treatment plant is in very good operating condition and, despite certain shortcomings in its treatment performance, meets the requirements for professional operation. Nevertheless, from the point of view of the operating company and the participating ViKs, the lack of qualified (and unqualified) personnel is a significant problem. This applies in principle to all ViKs in the project area, for which the low availability of personnel (in conjunction with high staff turnover) represents another major challenge in addition to the financial viability of the operation.

In Tivat, the wastewater network is maintained by the ViK itself, while in Kotor, maintenance has been outsourced to a private service provider. In both cities, there are no indications of acute problems due to maintenance deficiencies.

In Bar, there is a lack of suitable equipment (flushing trucks) for maintaining the sewage network. At the same time, according to the company's own statement, it is operating in emergency mode due to insufficient financial and human resources – it can only respond to acute problems, and pre-emptive maintenance is not possible.

17. Contribution to supporting sustainable capacities

As part of the project, the ViKs were asked to build up reserves for future repairs or major maintenance expenses. At the time of the EPE, none of the participating ViKs had such reserves. Tariff revenues are only just sufficient to maintain ongoing operations. Furthermore, according to the providers, the creation of a separate maintenance budget (planned during project design) is problematic from a budgetary perspective.

The accompanying measures and the personnel support provided as part of the project are viewed positively by the ViKs. However, Vodacom points out that due to a lack of its own funds, future opportunities for conducting training courses/workshops are limited. For example, the cities of Herceg Novi, Bar and Budva are no longer members of Vodacom, which has reduced Vodacom's revenues accordingly.

The personnel support measures are viewed positively, as they have led to improvements, particularly in the commercial area (see also indicators for collection efficiency). GIS systems (MapInfo) were also implemented in the ViKs with the help of Vodacom.

⁹ Updated NDC for Montenegro, UNFCCC (https://unfccc.int/sites/default/files/2025-02/001_eng_NDC_Montenegro.pdf)

18. Durability of impacts over time

According to both municipalities, cooperation within the framework of the Tivat/Kotor joint sewage treatment plant is good, which is an essential prerequisite for future operation.

The ViKs incur financial burdens from the regional water supply. With the exception of Herceg Novi, all locations are dependent on water supplied via the regional pipeline during the summer months. Although the purchase price of currently around EUR 0.43/m³ is significantly lower than the ViKs' own water charges, there is also the energy cost for water distribution in the municipal networks. Above all, however, due to the very high water losses of 60-80% (with the exception of Tivat), only a fraction of the water purchased generates revenue. In addition, the municipalities are also contractually obliged to purchase minimum quantities from the long-distance water pipeline during the winter months (when local sources fully cover demand).

Until 2024, it was possible to cover the operating costs of the supply and disposal operations in Tivat through fee income. In 2024, however, the municipality had to subsidise the operation with a considerable amount. The main reason for this is that the tariffs set by the national regulatory authority (which also sets the binding criteria for determining tariffs) are too low and are set to fall even further from 2026 (to EUR 0.76/m³ plus EUR 0.21/m³ for wastewater charges for private individuals, which represents a 23% decrease compared to 2025). This jeopardises the financial sustainability of the operation. The municipality of Tivat, which as the owner of the supply infrastructure is responsible for replacement and expansion investments, also lacks the financial resources for major measures, as demonstrated by the planned additional treatment stage for the Tivat/Kotor wastewater treatment plant.

The situation in this regard is identical for ViK Kotor and ViK Bar, where significant losses are also expected in 2026. There is no regular financial support in Kotor either, but in 2024 the company received a one-off payment of around EUR 250,000 (which roughly covers the cost of water supplied from the long-distance water pipeline for one summer month). The situation is similar in Bar (from 2026: EUR 1.02/EUR 1.30 per m³ with/without sewage charges), where the utility company had to be financially supported by the municipality for the first time in 2025.

It is therefore foreseeable that the ViKs will have even greater problems in the future covering their operating and maintenance expenses (which are already too low today, see TC 16) from tariff revenues. However, it has been shown that the municipalities are willing and able to cover acute deficits in order to avoid bottlenecks in drinking water supply and wastewater disposal.

Rating summary of sustainability: moderately successful (3, both phases)

In particular, the excessively low (and continuing to fall) water tariffs are putting the ViKs under considerable financial pressure. Nevertheless, it is plausible that operations can be maintained at the current level in the future, as the municipalities will provide financial support to the utility companies in an emergency, not least to avoid losses in tourism revenue.

Overall assessment: moderately successful (3, both phases)

Despite the shortcomings described in terms of impact (poor operation of the Herceg Novi wastewater treatment plant), efficiency (very high water losses and considerable delays in implementation) and sustainability (too low tariffs), the positive effects of the urgently needed wastewater measures are considered decisive for the appraisal of the project. Positive economic effects (tourism) are linked to resource conservation in the Bay of Kotor.

Contribution to Agenda 2030

The project contributes to the achievement of Sustainable Development Goal (SDG) 6, "Ensure availability and sustainability of water and sanitation for all". Specifically, it contributes to sub-goal 6.3 ("By 2030, improve water quality by reducing pollution, ending the dumping of hazardous chemicals and substances, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally"). In doing so, it takes into account the principle of Agenda 2030, which is to consider the interplay between economic, ecological and social development, particularly through the connection between the economic importance of tourism and the resulting ecological challenges. The project will have an impact on environmental and resource protection, which will also have social implications as it will improve living conditions for residents. At the same time, protecting marine waters will ensure the region's attractiveness for tourism. The principle of inclusivity is also fundamentally guaranteed, as the target group is planned to include the entire population of the locations. The universal applicability of the SDGs is taken into account, as is the requirement for shared responsibility and accountability, as the project implements the universal goal of SDG 6.1 locally in cooperation with public institutions (ViKs and municipalities as operators and owners) and using their existing structures and strategies. It is directly linked to the activities of other donors in the sector, although no common systems for monitoring, learning and accountability are used.

Methodology

Evaluation methodology

The ex-post evaluation follows the methodology of a rapid appraisal, i.e. a data-based, qualitative contribution analysis, and represents an expert opinion. The project is attributed effects based on plausibility considerations, which are based on a careful analysis of documents, data, facts and impressions. Where possible, this also includes the use of digital data sources and modern techniques (e.g. satellite data, online surveys, geocoding). The causes of any contradictory information are investigated, attempts are made to resolve them, and the assessment is based on statements that are confirmed by several sources of information (triangulation), where possible.

The analysis of the effects is based on assumed causal relationships, documented in the impact matrix developed during the project appraisal and updated during the ex-post evaluation, if necessary. The evaluation report sets out arguments as to why certain influencing factors were identified for the effects observed and why the project under review probably made a certain contribution (contribution analysis). The context of the development measure is taken into account in terms of its influence on the results. The conclusions are put into relation to the availability and quality of the data basis. An evaluation concept serves as the reference framework for the evaluation.

The method offers a balanced cost-benefit ratio for project evaluations, on average, with a balance between knowledge gain and evaluation effort, and allows for a systematic assessment of the effectiveness of DFG projects across all project evaluations. Individual ex-post evaluations cannot therefore meet the requirements of a scientific assessment in the sense of a clear causal analysis.

The main objective of the evaluations (knowledge interest) is to measure impacts, provide accountability, promote transparency and enable institutional learning.

Note: due to the strong interdependencies between the two phases evaluated, III and IV – including the reallocation of financial resources between the different phases – an appraisal of both phases is not carried out. Instead, an aggregated appraisal of both phases is carried out.

Type of evaluation:

Trip to the project area.

Key questions of the evaluation according to the evaluation concept:

- Have the measures for wastewater collection and treatment led to a significant improvement in water quality in Kotor Bay?
- Are the facilities that have been built being operated and maintained properly, so that sustainability in the wastewater situation can be expected?
- Is the cost coverage of the operators sufficient for sustainability?
- Are the fees charged to the population affordable, and is ongoing subsidisation of operations necessary?
- Has a concept for sewage sludge treatment been developed and implemented?

Non-public (internal) documents

Internal project documentation (PV, AKs, return/monitoring notes), consultant reports, data from ViKs and Vodacom

Directory of public sources

Central Bank of Montenegro (2025): Real Economy Statistics. Available online at www.cbcm.me/en/statistics/statistical-data/real-economy

World Development Indicators database, Montenegro Tourism Statistics. Available online at databank.worldbank.org

Montenegro Energy and Water Regulatory Agency, (2022): Annual Utility Benchmarking Report for 2021

Sekulic, Cipranic, Ostojic, Calasan (2024): "The general state of water resources in Montenegro" in *Journal of Applied Engineering Science* Vol. 22, No. 2, 2024

Germany Trade and Invest (GTAI) Economic Outlook Montenegro 01/2025,

World Travel and Tourism Council (WTTC) World Travel and Tourism Economic Impact 2024

UNFCCC Updated NDC for Montenegro. Available online at: unfccc.int/sites/default/files/2025-02/001_eng_NDC_Montenegro.pdf

Data sources and analysis tools

Monitoring data from ViKs, satellite images

Project sites visited

Tivat, Kotor, Bar, Herceg Novi

Interview partners and modality (in person, virtual/by telephone, in writing)

PM and TE project management team, Vodacom management, ViK Tivat management, Head of ViK Kotor, Technical and Commercial Manager ViK Bar, Operating staff at Tivat/Kotor sewage treatment plant, Mayor of Kotor municipality, Mayor and Deputy Mayor of Kotor, Municipal representative of Bar, ViK Herceg Novi employee, Herceg Novi municipal employee, Head of Herceg Novi sewage treatment plant operating company, Head and Laboratory Manager of the Institute for Marine Biology Kotor (all in person).

The following aspects limited the evaluation

Neither the utility company (ViK) nor the municipality of Herceg Novi, which are no longer involved in the Vodacom implementation unit and will not participate in future phases, responded to contact attempts or requests for appointments. As a result, only very limited data was available for the Herceg Novi site. Nevertheless, it was possible to visit the Herceg Novi wastewater treatment plant, where an employee of ViK Herceg Novi and a municipal representative were present to answer questions.

Assessment methodology

A six-point scale is used to assess the project according to OECD DAC criteria, with the exception of the sustainability criterion. The scale values are as follows:

- Level 1** Very successful: results significantly above expectations
- Level 2** Successful: results fully in line with expectations, without significant shortcomings
- Level 3** Moderately successful: results below expectations, but positive results predominate
- Level 4** Moderately unsuccessful: significantly below expectations and negative results dominate despite recognisable positive results
- Level 5** Unsuccessful: despite some positive partial results, the negative results clearly dominate
- Level 6** Highly unsuccessful: the project is useless or the situation has deteriorated

The overall rating on the six-point scale is based on a project-specific weighting of the six individual criteria. Levels 1–3 of the overall rating indicate a ‘successful’ project, while levels 4–6 indicate an ‘unsuccessful’ project. It should be noted that a project can generally only be classified as "successful" in terms of development policy if both the achievement of objectives at the outcome level (effectiveness) and impact level, as well as sustainability, are rated at least as "moderately successful" (level 3).

The annex to this report is available upon request (German only).

Imprint

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