

Ex post evaluation – Bulgaria

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Sector: Road transport (2102000)
Project: Vidin-Calafat Danube Bridge (BMZ No. 2001 40 657*)
Implementing agency: Ministry of Transport and Communications (MoTC)



Ex post evaluation report: 2019

All figures in EUR million	Project: (Planned)	Project: (Actual)
Investment costs (total)	Max. 190.00	260.50
Counterpart contribution	Min. 15.00	89.20
Funding**)	162.05	171.30
of which BMZ budget funds	17.05	20.05

*) 2017 random sample; **) by other donors

Summary: The project involved the construction of a combined road and railway bridge across the Danube between Vidin in Bulgaria and Calafat in Romania, links to existing infrastructure as well as the border clearance and service facilities for operating the bridge.

Development Objectives: The objective of the project was to use the safe, time-saving and cost-effective Danube crossing for transporting goods and passengers (outcome). At the impact level, the efficient transport service along Corridor IV – which stretches from Turkey/Greece via Bulgaria and Romania and through Hungary and the Czech Republic to Germany – was intended to contribute to better regional integration, especially between Bulgaria and Romania.

Target group: The target group consists of road and rail users in general – especially the residents of the region, who will benefit from a cost-effective way of crossing the Danube thanks to the much reduced tolls planned for frequent users. From a development policy perspective, however, the project is not bound to the target group.

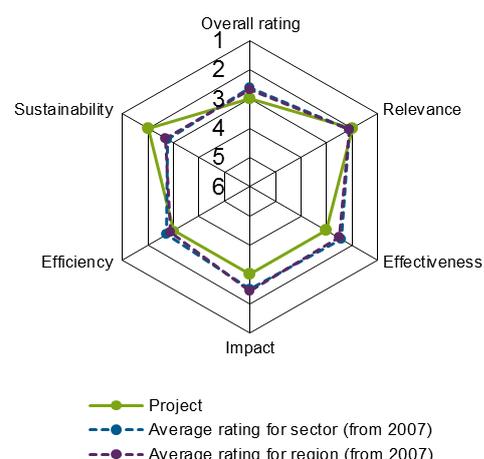
Overall rating: 3

Rationale:

The bridge is still highly relevant for the country and for the pan-European transport system. The road link is used more heavily than originally expected, while the rail link carries much less traffic than planned. The bridge's operating company is very well organised and prepared in terms of road and bridge maintenance and repair. The Bulgarian railway company has also developed a maintenance plan, which is now being implemented. Consequently we can assume this central infrastructure will have sustainable positive effects.

Highlights:

Since it is associated with Corridor IV the project is highly visible and has a political dimension. Negative results include delays and cost increases, although these do not undermine the developmental impacts.



Rating according to DAC criteria

Overall rating: 3

Ratings:

Relevance	2
Effectiveness	3
Efficiency	3
Impact	3
Sustainability	2

Relevance

Prior to the construction of the project bridge there was only one bridge across the Danube for road and rail transport between the two countries, connecting Ruse and Giurgiu (roughly 300km downstream). Between Vidin, Bulgaria, and Calafat, Romania, there was only a ferry service for road and rail transport, with two ferries running all day long. Crossing the Danube by ferry was a time-consuming process, mainly because of the long waiting times caused by the limited capacity of the ferries. Without waiting time, crossing the Danube took between 30 and 45 minutes. Generally speaking, the waiting time to board the ferry could be up to 5 or 6 hours, while in the summer months lorries could even have to wait several days. Nevertheless, the ferry connection was heavily used in the years before the change in political regime. In the 1990s, however, the volume of road transport dropped significantly, while rail transport collapsed almost entirely. This was partly due to the general economic downturn throughout the entire region, but was also caused by the fact that transporting goods by rail over distances in excess of 100km was no longer obligatory after the collapse of the planned economy. This meant that many customers favoured road transportation as it was much cheaper and faster than using the railway. Moreover, most of the remaining road traffic at this time used the bridge in Ruse, which was also because the appeal of Vidin as an industrial location had fallen sharply over time.

At the conference of European transport ministers on Crete in 1994, ten pan-European transport corridors were defined. One of these transport corridors, Corridor IV, went from Turkey/Greece via Bulgaria and Romania and through Hungary and the Czech Republic to Germany. The crossing of the Danube was a major bottleneck for Corridor IV. As part of the preliminary studies on defining the ten pan-European transport corridors, various alternatives for a suitable location of a bridge over the Danube were examined. In 1994, the crossing at Vidin/Calafat was finally decided upon as part of Corridor IV. The political significance of the project rose further as a result of the war between Serbia and Bosnia. The fighting in the former Yugoslavia meant that Corridor X, offering an alternative route to Corridor IV, was mostly closed for three years on the section from Serbia towards Greece and Turkey.

The results chain underlying the project rests on sound logic ("construction of a combined road and railway bridge across the Danube and construction of access infrastructure → operational bridge link across the Danube and connection of bridge to existing transport infrastructure → safe, time-saving and cost-effective Danube crossing → efficient transport service along Corridor IV → use of the bridge across the Danube → better regional integration → better conditions for economic revitalisation of the disadvantaged region"). When constructing a road and railway bridge, it can plausibly be assumed that this will improve the integration of transport policy within the region, even if it is mainly used for mass transit. Furthermore, it can generally be assumed that smaller businesses (snack stands, kiosks, tyre-change centres, etc.) will establish themselves along a transport corridor, thus contributing to the economic revitalisation of the region. Although the construction of the combined road and railway bridge in this project only removed a bottleneck on the existing Corridor IV in use, an economic rejuvenation of the region is plausible due to the forecast increase in traffic.

This link has been structurally important for the Bulgarian government, which is also reflected by its high priority in the investment plans (Priority for Road Infrastructure 2014-2020). The project was in line with

the German Federal Government's developmental objectives for the integration of the new EU Member States. It is also a politically important and visible project for the regional integration intended by the Stability Pact for South Eastern Europe. For the Romanian government, on the other hand, this corridor has not been a priority, because it went directly to Western Europe via Timisoara or Cluj, and only touched the Romanian capital Bucharest via a detour (Arad - Bucharest - Constanta). The rail link has been of less relevance to both countries since at least the collapse of the planned economy. From today's perspective, this reality is also reflected in the much lower usage figures. Politically speaking, the focus on an environmentally friendly transport policy and the associated priority of rail transport meant that there was and is no alternative to an additional expansion as a railway bridge (see also Effectiveness).

The relevance of the project is evident from today's perspective, especially because of the rapid development of road transport on this route. Although the resolution of the conflict meant Corridor X could be used again, and thus Corridor IV was no longer as important as it originally was, new traffic has developed alongside the existing traffic on Corridor X and the Ruse crossing.

Relevance rating: 2 (road: 2, rail: 3)

Effectiveness

The objective of the measure was to use the safe, time-saving and cost-effective Danube crossing between Vidin and Calafat for transporting goods and people. The achievement of the objective at outcome level was measured using the following indicators:

Indicator	Status PA, Target value	Ex post evaluation
(1) The volume of traffic per day rises to at least 2,465 vehicles and at least 10 trains.	Status PA: 400 vehicles/day (2000, ferry) Target: at least 2,465 vehicles/day and at least 10 trains/day since 2015 for goods and passenger transport.	Achieved (road): Average of 3,136 vehicles/day (2016-2018) Not achieved (rail): Average of 6 goods trains/month (2017-2018), 2 passenger trains/day (since 2017)
(2) No later than two years after the commissioning of the bridge, it can be used all year round.	Status PA: not achieved Target: can be used all year round	Achieved (road and rail)
(3) The waiting time at the toll booth is no more than 15 minutes on a maximum of 10 days per year.	Status PA: n.a. Target: ≤ 15 minutes on max. 10 days/year	Achieved (road and rail)
(4) Traffic safety with regard to number of accidents on the project section of road is below the Bulgarian average.	Status PA: n.a. Target: fewer accidents than the Bulgarian average of 0.1 accident per 10 million kilometres driven on national roads.	Achieved (road) No statement can be made (rail)
(5) Travel costs: reduction of travel costs for crossing the Danube.	Status PA: Car: EUR 17.41 Lorry up to EUR 81 depending on type of lorry Target: reduction of costs for crossing the Danube by at least 10%	Achieved (road): EUR 6 per lorry (-65%) Up to EUR 37 per lorry depending on type of lorry (-55%) No statement can be made (rail)

Indicator 1: Road transport over the bridge has improved overall. The four-lane extension of the road between Botevgrad (northeast of Sofia) and Vidin, as planned by the Bulgarian government, is expected to increase use of the bridge further. Comparisons with the volume of road traffic over the bridge in Ruse that existed before the project was launched make it clear that there has been no shift in traffic volume between the bridges. While traffic on the Vidin-Calafat bridge has risen by around 6% per year, traffic over the bridge in Ruse has remained largely constant. The indicator for the use of the rail link was not achieved. This is presumably attributable in part to the collapse of the planned economy and to the changed conditions overall in this context. Only in connection with the preparation of the EU's 2011 white paper on environmentally-friendly transport did at least the political focus on rail freight transport increase again (see Relevance). One further reason for the inadequate use of the railway link is probably the fact that both Bulgaria and Romania have repeatedly delayed the extension of the railway access to the bridge, which has now resulted in deteriorating transport conditions, especially on the Romanian side between Calafat and Craiova, where trains travel at less than 40km/h. This makes rail freight transport via Corridor IV less appealing for regional and international forwarders.

Indicator 2: Since it was commissioned, the bridge has only been closed once, for four hours, to carry out maintenance work. All other planned and unplanned work – following accidents, for example – has been carried out by closing a single lane, thereby keeping the bridge open to traffic.

Indicator 3: In the planning phase, the toll booth was combined with border and passport checks.¹ The toll payments and the checks take place at the same stop in the same building. Overall, the waiting time for freight trains, especially at weekends, can be approximately 5-6 hours (estimated for the period since the opening of the bridge and confirmed by measurements by the operator from March 2019). On weekdays the waiting time for freight trains is roughly 2-3 hours (estimated). However, this depends primarily on customs checks, and to a lesser extent on border controls. Random checks revealed that it takes about 1-2 minutes to process the toll, and that the toll is usually paid by the drivers while they wait at passport control. A new railway station was built for rail traffic in which all of the formalities are taken care of, plus the change of driver and locomotive. It takes about 2-3 hours to go through all the checks and controls (estimated). This is normal for cross-border rail transportation outside of the Schengen Area. There is no waiting time for toll payments.

Indicator 4: Since the opening of the bridge there have only been two accidents with material damage on the project section of road, according to the operator. In 2017, official statistics² registered 6,888 accidents nationwide, in which 682 people died and 8,680 were injured. Accidents involving material damage only were not recorded in the statistics. With more than 3.7 million registered vehicles, the average national accident rate is 0.1 accidents/million kilometres driven. Since there were only two accidents with material damage on the project section of the road, the accident rate on the bridge is much lower than the Bulgarian average. There are no national statistics for rail transportation, but there has been no accident on the Vidin-Calafat crossing since the bridge opened.

Indicator 5: The toll costs are EUR 6 for cars (with one passenger) and up to EUR 37 for lorries (depending on the type). The toll for freight is reasonable, and cheaper than the former cost of crossing by ferry (up to EUR 81). Although the car toll, at EUR 6 per car, is much cheaper than crossing by ferry (EUR 17.41), the amount of the car toll is currently under debate. A citizen's initiative has been created for local car transport that wants to see a reduction of the toll to EUR 3 (amount of toll for the Ruse bridge). No statements can be made about lowering the costs for the rail crossing because each crossing was and is calculated individually, and the tariffs were and are dependent on the weight, length and number of wagons. Since the passenger trains have only been running since 2017, it is not possible to make comparisons for passenger rail transport between today (by bridge) and before the project (by ferry).

Overall we give the effectiveness a rating of 3, despite the underuse of rail transportation at the moment, because the development of road transport has far exceeded the forecasts and the other indicators for road traffic have also been achieved. For rail transport, the main indicator of use has not been achieved. However, for political reasons and in connection with the European sustainable transport policy, it would

¹ Both Bulgaria and Romania have been EU Member States since 2007, but are not (yet) part of the Schengen Area, which is why there are still border controls between these two countries.

² National Statistical Institute, Annual Report on Traffic Accidents 2017

not have been possible to consider building the bridge without a rail component. In the context of the EU's intention to promote environmentally-friendly transport, we assume that the route will also be used more by rail in the future. However, this does depend heavily on the expansion of rail access infrastructure on both the Bulgarian and the Romanian side.

Effectiveness rating: 3 (road: 2, rail: 4)

Efficiency

The preparatory phase was extended by 36 months, from 24 months to a total of 60 months. The time required for the construction was lengthened by 26 months, and thus totalled 56 months. The delays in the preparations were attributable to various studies that had to be conducted. Additional technical studies in particular as well as the environmental impact studies were carried out relatively late (between 2003 and 2005). Changes to the FC contracts and the tender documents for awarding the construction and consulting services led to further delays with the preparations, since these were not implemented through parallel financing from the various donors, as originally planned, but through joint financing. In 2006 the work was finally tendered based on a "design and build" procedure (FIDIC Yellow Book). The construction contract was signed with the Spanish company FFC in December 2007. There were further delays during the construction, mostly caused by costly approval procedures, so the bridge could only be opened in June 2013.

The total investment costs (including supervision of works) rose by approximately 37%, from EUR 190 million to EUR 260.5 million. Almost one third (EUR 26 million) of the overall cost increase of EUR 70.5 million is attributable to a change in the foundation of the bridge, which is needed for stability purposes. In addition there is a maximum amount of EUR 14 million in unpaid contractor claims, which are currently being clarified in court proceedings with the Bulgarian Ministry of Transport. Consulting costs (including works supervision) rose by nearly EUR 14 million, from EUR 9 million to about EUR 23 million. This was partly due to higher costs brought on by delays in construction and the hiring of a consultant to support the PIMU (costing EUR 2 million), which was not planned at the time of the appraisal. This means that the consulting costs amount to 8.8% of the construction costs after the cost increases. For standard projects in the industry, consulting costs amounting to 5% of the construction costs are deemed appropriate. Given the complexity of the project, the level of consulting costs is appropriate. In the "design and build" procedure (FIDIC Yellow Book), which is still favoured by the executing agency today, the bidders propose various bridge concepts. It is possible that a standard tender (FIDIC Red Book) would have facilitated better cost control here.

At around EUR 75 million per kilometre of bridge with a total length of 1.2km, the production costs were very high compared to the generally assumed costs per kilometre of motorway bridge (EUR 20 million). However, it must be taken into account that the costs of a combined road/rail bridge have to be correspondingly higher. Yet it is difficult to make a meaningful comparison here because the very different parameters (length, breadth, number of lanes, cycle paths, pedestrian paths, access infrastructure, etc.) mean there are few really comparable projects. For example, the production costs of three road/rail bridges used as comparisons are very different. The costs of the Bogibeel Bridge in India total around EUR 150 million per kilometre with an overall length of 4.49km, the Taramakau Bridge in New Zealand comes in at EUR 80 million per kilometre with an overall length of 250m, while a 25km-long bridge in Saudi Arabia produced a figure of EUR 32 million per kilometre.

The toll costs (see Effectiveness) were not calculated on the basis of an economic study, but based on the prevailing tariffs for the ferries and the Ruse bridge, and assuming a loan repayment period of no more than 20 years. The feasibility study mentions an internal rate of return (IRR) of 11% in a conservative scenario for traffic volume and a discount rate of 6%. The final study by the European Investment Bank (EIB) calculates an IRR of 9% in the conservative scenario on traffic volume and a discount rate of 6%. This means the allocation efficiency is positive, but this is mainly due to road transport increasing by more than was forecast. The allocation efficiency for the railway line, on the other hand, is far from adequate.

The operating company is very well organised (see Sustainability). Routine maintenance and the routine measures required are carried out on a regular basis. Additionally, there has barely been any unscheduled maintenance required since the commissioning of the bridge, which results in high revenues with low operating costs.

Overall, despite the delays and the cost increases that are very common for large-scale projects of this size, we rate the efficiency of the project as satisfactory, thanks also to the good allocation efficiency (road traffic). For rail transport, on the other hand, the efficiency is rated unsatisfactory. In comparison, the road component is weighted more heavily, due partly to the political conditions mentioned in the Effectiveness section.

Efficiency rating: 3 (road: 3, rail: 4)

Impact

The objective of the measure at the impact level was to contribute to better regional integration, especially between Bulgaria and Romania, by means of an efficient transport service along Corridor IV. The achievement of the overall development goal, which was adjusted during the ex post evaluation (EPE), can be summarised as follows:

Indicator	Status PA, target PA	Ex post evaluation
(1) Reduction of transport costs (freight and passengers) over the entire route	Status PA: n.a. Target: Transport/travel costs reduced by at least 5%.	Achieved (road transport): 12% (for direct connections across the bridge) Not achieved (rail transport)
(2) Notable regional transport	Status PA: 150 cars/day (Economic Feasibility Study 2003) Target: Increase in regional traffic between Bulgaria and Romania by at least 10%.	Achieved (road): Average of 430 cars/day (286%) Not achieved (rail)

Indicator 1: In terms of road transport the indicator was achieved for the road sections on Corridor IV where the direct route crossed the Vidin-Calafat bridge. When comparing the route from Sofia, Bulgaria, to Timisoara, Romania, using the Orahovo ferry or using the Vidin-Calafat bridge, the average savings on the Danube bridge are 12% (for cars, lorries and buses). No statement can be made with regard to indicator 1 for Corridor IV as a whole, as there are too many factors which have a positive or negative influence on travel costs (including time costs). As a result, it is not possible to attribute a certain percentage reduction in travel costs to the bridge as an individual project. Nevertheless, it is plausible to assume that the bridge also has a positive influence on travel and time costs throughout Corridor IV, since the crossing of the Danube was defined as a major bottleneck when establishing Corridor IV. For rail transport, the indicator is also not achieved for sections where the direct connection leads over the Vidin-Calafat bridge. In the direct vicinity of the bridge this is primarily due to the poor rail access infrastructure on the Romanian side. This means that the main bottleneck for rail transport has shifted since the building of the bridge from the Danube crossing to the section after the bridge in Romania.

Indicator 2: Regional traffic has risen since the bridge was built and has reached the intended increase of 10%. Mass transit still accounts for the largest proportion of the traffic. Although transport integration has undoubtedly made some positive steps following the construction of the bridge between the two countries, there is little evidence of comprehensive socio-economic integration between Vidin and Calafat or between Bulgaria and Romania. The good cooperation between the two governments in the project and within the operating company also contributes to the regional integration. In the operating company, jobs are filled equally by Romanians and Bulgarians, with good daily cooperation on both sides. Few long-term jobs were generated outside the operating company, as, surprisingly, no shops, petrol stations, hotels, restaurants, etc. were established along the route. The first petrol station was just being constructed at the time of the evaluation - almost five years after the bridge was opened. That said, economic revitalisation was not an explicit objective at the impact level.

In terms of road transport, the bridge made an important contribution overall to the development of Corridor IV; these hopes were not fulfilled with regard to rail transport, which is due in particular to the poor state of repair of the railway access infrastructure on the Romanian side. Given the different priorities of

the Romanian government regarding the expansion of its transport network, this situation will presumably not change in the short to medium term. Based on the political conditions and the assumptions regarding the development of rail transport (see Effectiveness), we rate the impact of the project as just satisfactory overall.

Impact rating: 3 (road: 2, rail: 4)

Sustainability

The bridge and the access infrastructure are managed by the public operating company, Vidin-Calafat Bridge JSC, which is owned in equal measure by the Bulgarian and Romanian states. The agreement between the governments that also regulates the activities of the operating company was signed for 30 years and will be in force until 2043.

The operating company has a very efficient structure and organisation. The majority of its staff is involved in toll collection. The ratio between management and employees is reasonable and very good by international standards. The number of technical maintenance employees is also appropriate. This is mostly carried out by subcontractors, thereby meeting the international standard of efficient maintenance. According to the agreement there is a “maintenance fund” in a separate account to cover unscheduled repairs. 10% of revenues prior to the disbursement of dividends are channelled into this fund, but no payments have been made from it since the bridge was opened. Routine interventions were paid from the operating budget in a special budget category. Expenditure has been low here so far, as expected, since the bridge, as a new structure designed to last 120 years, requires little maintenance in the early years. The operating company is very profitable on the whole. Staff costs that account for more than 70% of total costs appear high at first glance. Yet in absolute terms they are quite appropriate.

At the time of the evaluation the bridge was in a very good condition. The bridge is continuously maintained, and a detailed inspection takes place every three years. This is in line with both European and international practice, Bulgarian regulations and the maintenance concept of the operating company.

We can assume that the sustainability of the measure is ensured thanks to the regular maintenance. There are also no reasons to assume that the positive development in road transport, even exceeding forecasts, will turn negative in the future, which is why the bridge should be able to be used for road traffic in the long run. In terms of rail transport, we can assume that there will be a positive development in use thanks also to the growing importance of rail freight transport (see Effectiveness). Consequently, and based on the very efficient structure at the operating company, we give the sustainability a rating of 2, marked down slightly due to the lack of a long-term maintenance plan. Although it is plausible to assume that there will be no unscheduled maintenance – at least in the medium term, due to the long service life of the bridge and the short time that has passed since it was commissioned – such a long-term plan does make sense and meets international standards for planning maintenance measures from both a financial and technical perspective.

Sustainability rating: 2 (road and rail)

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).