

Ex-post evaluation

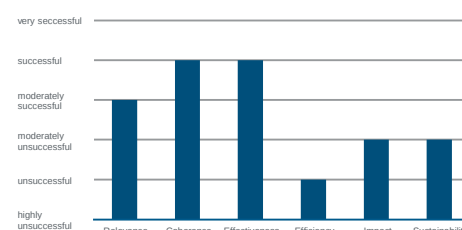
Energy efficiency through environmentally sound coal quality management, Serbia

Title	Energy efficiency through environmentally sound coal quality management in Serbia		
Sector and CRS code	Energy; 2331000		
Project number	BMZ No.: 2006 65 935 / 2010 65 648 / 2006 70 311 (Accompanying measure)		
Commissioned by	Federal Ministry for Economic Cooperation and Development (BMZ)		
Recipient/Programme executing agency	Elektroprivreda Srbije (EPS)		
Project volume/ Financing instrument	Investment: 47.5 million EUR mixed financing and 25.0 million EUR interest-reduced loans; Accompanying measure: 1.5 million EUR grant financing		
Project duration	2012 - 2020		
Year of report	2025	Year of random sample	2024

Objectives and project outline

The objective on outcome level was to improve the quality of coal supplied to power plants. The objective on impact level was to achieve more sustainable electricity generation in Serbia. The project mainly financed a coal separator, a coal quality management system with various hardware and software, and consulting services. This was intended to increase the degree of homogenisation of the coal extracted so that the power plants supplied could produce more sustainable electricity.

Overall rating:
moderately unsuccessful



Key findings

Overall, the project is considered to be moderately unsuccessful. Insufficient data availability hampered the evaluation. In detail, the assessment is based on the following key aspects:

- At the time of conception, the project and its objectives were in line with Serbian and German policy strategies. The concept was fundamentally suitable for helping to solve the core problem of inefficient power plant operation due to the fluctuating calorific value of coal from the Kolubara basin. The preparation was consistent with an EBRD project.
- The planned effects in terms of coal quality were achieved and the effectiveness indicators were fulfilled. However, this was only partly attributable to the measures financed by the project.
- The efficiency of the project is unsuccessful. The outcomes were achieved even without the financed homogenisation storage facility. In addition, a technically inadequate coal breaker was purchased in retrospect.
- At the impact level, the objective was not achieved. The use of heavy fuel oil in the power plants supplied increased despite the higher degree of coal homogenisation, which is attributable to complex factors that were largely beyond the project's control. On a positive note, the experience gained from coal homogenisation on the conveyor belts is expected to serve as a pilot for other opencast mines.
- Some of the employees trained through the accompanying measure are no longer with the company, which limits the sustainability of the measure.

Conclusions

- A precise specification of the technical requirements and their control within the framework of tenders is essential to prevent difficulties in later operating phases.
- The use of an EPC contractor serves to reduce the complexity of the tendering process, prevents delays and high coordination costs, and mitigates risks arising from any errors through the EPC contractor's liability function.
- Regular training, even after completion of projects, is important to ensure that the knowledge acquired is retained even when personnel changes.

Ex-post evaluation – assessment according to OECD DAC criteria

Overview of the rating per criterion:

Relevance	3
Coherence	2
Effectiveness	2
Efficiency	5
Overarching developmental impacts	4
Sustainability	4
Overall rating:	4

Abbreviations:

AERS	Energy Agency of the Republic of Serbia (Agencija za energetiku Republike Srbije)	H _u	Lower heating value
AFD	Agence française de Développement - French Development Agency	JICA	Japan International Cooperation Agency
CQMCOM	Coal quality management	kg	Kilogram
FI	Final inspection	kJ	Kilojoule
GDP	Gross domestic product	MDG	Millennium Development Goals
AM	Accompanying measure	million	million
BMZ	German Federal Ministry for Economic Cooperation and Development	MW	Megawatt
DAC	Development Assistance Committee	PA	Project appraisal
EBRD	European Bank for Reconstruction and Development	PAR	Project appraisal report
ECS	Excavator, Conveyor Belt, Spreader	PP	Project proposal
EIB	European Investment Bank	SDG	Sustainable Development Goals
EPS	Elektroprivreda Srbije	SECO	Swiss State Secretariat for Economic Affairs
ESAP	Environmental and Social Action Plan	SEP	Stakeholder Engagement Plan
EU	European Union	TENT	Termoelektrane Nikola Tesla
EUR	Euro	TWh	Terrawatt hours
FC	Financial Cooperation	TC	Technical Cooperation
FZ E	FZ Evaluation	USD	US Dollar
HDI	Human Development Index		

General conditions and classification of the project

At the time the project was reviewed in 2012, Serbia's energy sector was characterised by low efficiency and a high need for technical renewal. Energy supply was heavily state-controlled and not very diversified, with energy demand mainly covered by lignite and oil. The efficiency of lignite-fired power plants was low at 32 % to 36 %, while pollutant emissions and environmental impacts were high. Due to a lack of domestic energy resources, lignite could only have been substituted by importing expensive gas and oil. In view of the implementation of the EU's Acquis Communautaire, which required a drastic reduction in emissions from all thermal power plants, the Serbian government was faced with the challenge of maintaining existing power generation capacities, making them more efficient and environmentally friendly, and at the same time creating new capacities based on

renewable energies. At the time of the project appraisal, installed electricity generation capacity in Serbia was around 7,124 MW, of which 55 % based on lignite-fired power plants. The second most important energy source for electricity generation was hydropower. Annual electricity generation in 2010 was around 35,855 GWh. After deducting own consumption and transmission losses, the electricity consumed by end customers amounted to 27,051 GWh. Serbia imported an additional 755 GWh of electricity and exported 1,286 GWh.

In 2005, the independent regulatory authority Energy Agency of the Republic of Serbia (AERS) was established, which is responsible for tariff setting in the electricity and gas sectors. Despite tariff increases prior to the project appraisal in 2008, 2010 and 2011 to 6 cents_(EUR) /kWh, electricity tariffs remained the lowest in the region and barely covered costs. The tariff level weighed on the financial situation of the state-owned utility Elektroprivreda Srbije (EPS) and restricted the financing of new investments. According to EPS estimates, an increase in average tariffs of around 20 % would have been necessary to finance the required level of new investment.

The project executing agency, Elektroprivreda Srbije (EPS), is a vertically integrated company for electricity generation, distribution and sales and still has a quasi monopoly in this sector. Prior to the evaluated project, cooperation with EPS already existed within the framework of financial cooperation (FC) in various areas of the energy sector. The EPS subsidiary MB Kolubara was responsible for implementing the evaluated project. It is the operating company of the Kolubara opencast mine. MB Kolubara supplies lignite to EPS power plants and is paid according to the quality of the coal.

The coal from Kolubara has a lower heating value (H_u) of 9,000 to less than 5,000 kJ/kg. These enormous fluctuations in coal quality pose major technical challenges for power plant operations, as low-quality coal (i) leads to incomplete combustion in power plants, (ii) increases CO₂-emissions, as more coal has to be burned to generate the targeted amount of electricity, and (iii) requires the addition of heavy fuel oil for constant combustion. The Nikola Tesla A and B power plants are designed for a H_u of 6,700 kJ/kg +/- 10 %, within which efficient operation without heavy fuel oil is possible. For the project developer MB Kolubara, coal quality is crucial for financial returns. Higher quality means higher payments, while a H_u below 5,250 kJ/kg does not generate any remuneration from the power plants supplied. The maximum amount is reached at 8,000 kJ/kg. An average H_u of 6,700 kJ/kg +/- 10 %, as required by the power plant design, enables MB Kolubara to mix low-quality coal with high-quality coal and thus maximise profits, as the mixing also allows low-quality coal to be used.

Brief description of the project

Taking into account the widely varying coal quality in the Kolubara mine, the objective of the project was to improve the quality of the coal leaving the mine, measured by its degree of homogeneity. The homogenisation of the coal extracted was intended to ensure a constant calorific value in the long term. This was intended to prevent efficiency losses and reduce harmful emissions while securing MB Kolubara's earnings position.

The project was financed through two loans in the form of mixed financing (BMZ No. 2006 65 935) and a low-interest loan (BMZ No. 2010 65 648) totalling EUR 74 million. The accompanying measures were financed through a budgetary grant. The project was implemented in the form of co-financing with the European Bank for Reconstruction and Development (EBRD). The EBRD loan of EUR 80 million financed an excavator, a spreader, a conveyor system¹ the associated power supply system for part of the mine, as well as consulting services. The FC project comprised three financing components: (i) a spreader for the Tamnava West mine (component 1), (ii) a coal quality management (CQM) system consisting of hardware and software, infrastructure, a crusher, a conveyor belt, a spreader, a portal scraper, a homogenisation storage facility and a power supply system (component 2) and (iii) consulting services to support the implementing agency in implementing the investment measures (component 3).²

The target group included all Serbian electricity consumers and, in particular, the population living in the vicinity of the power plants and the mine, who would be less exposed to pollutants.

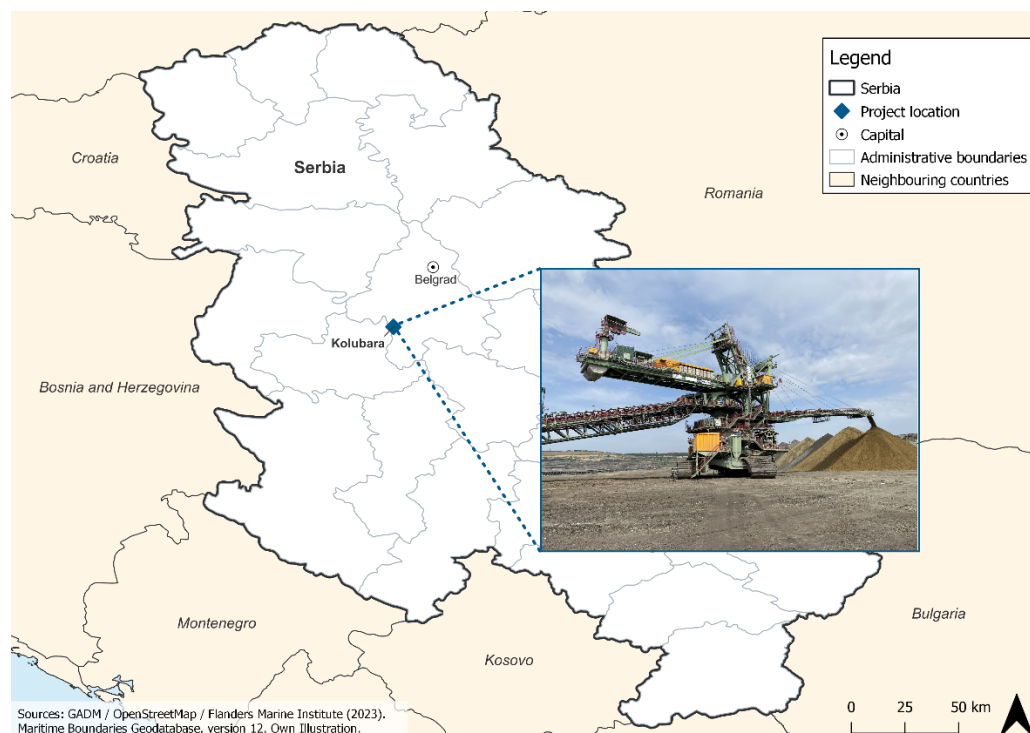
¹ A group of machines consisting of an excavator, a conveyor belt and a spreader is also called an "ECS system" (Excavator, Conveyor Belt, Spreader).

² At the heart of the project is the coal quality management system (CQM system), which is based on the creation of a computer-assisted 3D geological model of the rock strata in the Kolubara Basin. This model is used for mining planning and excavator control. On the excavators and the subsequent conveyor belts, the coal is checked for quality using an X-ray system and the results are compared with the 3D model. The coal is then collected in a so-called "homogenisation storage facility", where the different quality grades are systematically stacked so that when the stockpile is removed by a scraper, the desired qualitative mix of chemical properties is automatically produced. The homogenised coal, which has a relatively constant calorific value, is then delivered to the power plants.

Breakdown of total costs

In million EUR	Inv. (plan)	Inv. (actual)	AM (plan)	AM (actual)
Total costs	180.5	175.6	1.5	1.5
Personal contribution	28.0	23.1	-	-
EBRD financing	80.0	80.0	-	-
KfW mixed financing	47.5	47.5	-	-
KfW interest subsidy	25.0	25.0	1.5	1.5
<i>of which BMZ funds</i>	<i>72.5</i>	<i>72.5</i>	<i>1.5</i>	<i>1.5</i>

Map of the project country incl. project areas



Source: Own illustration, map basis see map legend.

Rating according to OECD DAC criteria

Relevance

1. Alignment with policies and priorities

The objective of the project was in line with the Serbian government's energy sector goals at the time, which were to meet growing energy demand in an environmentally friendly manner, improve energy efficiency and promote convergence with EU standards. EU's *acquis communautaire* in the environmental sector was of particular importance for the Serbian government's objectives. According to the EU Large Combustion Plant Regulation, the emission values of all thermal power plants above 50 MW had to be drastically reduced. With its energy strategy, the Serbian government sought to maintain existing capacities and make them more efficient, environmentally friendly and climate-friendly, while also building new capacities that meet modern standards and use renewable energy sources wherever possible. One result of these efforts is the EPS's "Green Book" and "White Book," which (i) list the importance of energy efficiency and environmental measures in the energy sector and their positive effects, and (ii) discuss the potential of renewable energies in Serbia.

For the Serbian government and EPS in particular, the project also fits in well with the medium- and long-term plan³ for the energy supply of the Serbian population at the time of the evaluation. The modernisation of existing coal-fired power plants and the phasing out of coal remain central to this plan. Serbia wants to invest heavily in expanding renewable energy generation and also change the legal situation to make investment in renewable energies more attractive to private companies. However, the predicted increase in renewable energy generation by 2050, at 38 % of national generation capacity, is modest compared to the status quo (2020: 20 %). The amount of electricity generated by conventional thermal power plants is expected to remain largely at current levels in 2050⁴. Efficiency gains in the existing power plant portfolio are therefore essential to achieve the NDCs (13.2 % fewer emissions by 2030 compared to 2010).

The project was agreed upon as part of the German-Serbian cooperation's focus area of energy. It was embedded in the development cooperation programme activities, which, in addition to environmental measures in mines and thermal power plants, also included improving the supply of district heating and financing hydropower plants. The project's objectives were in line with the BMZ's sector strategy at the time, "Sustainable Energy for Development", which called for limiting harmful environmental impacts and prioritising energy projects that reduce CO₂-emissions, and correspond to the BMZ's sectoral objectives in the energy sector at the time of the evaluation (core theme "Climate and Energy, Just Transition", action areas 1 "Climate protection and adaptation to climate change" and 2 "Renewable energies and energy efficiency").⁵ However, it should be noted that the specific measures of the project no longer appear eligible for funding at the time of the evaluation.⁶

The current German-Serbian development cooperation programme "Climate and Energy, Just Transition" covers the key topics of renewable energy and energy efficiency with a wide range of projects, including the FC cooperation with the EPS in projects to expand renewable energies (RE Kostolac, BMZ No. 2013 66 582 and BMZ No. 2013 70 220).

The project's objectives were based on the Millennium Development Goals (MDGs). The project contributed and continues to contribute to the 2030 Agenda, in particular to Sustainable Development Goal (SDG) 7 ("Affordable and clean energy") and SDG 13 ("Take urgent action to combat climate change and its impacts"). Conceptually, the project is consistent with the Paris Climate Agreement of 2015 and the corresponding follow-up agreements, as it aims to reduce greenhouse gas emissions.

The choice of EPS as the implementing agency was appropriate, as the company owns the mine through its subsidiary MB Kolubara and acts as a quasi-monopolist on the Serbian electricity market. This monopoly position still

³ See the Serbian government's National Energy and Climate Plan with an outlook for the period 2030-2050: INECP_Serbia_ENG_13.06.23.pdf.

⁴ See *ibid.*, p. 217.

⁵ See, among others: (i) No. 100 of the BMZ materials "Renewable Energy for Sustainable Development and Climate Protection" (10/1999), (ii) BMZ strategy paper "BMZ Concepts 145 – Sector Concept Sustainable Energy for Development" (01/2007), (iii) BMZ core strategy: "Responsibility for our planet – climate and energy" of June 2021 (action area 2 "Renewable energies and energy efficiency"): [BMZ core strategy: "Responsibility for our planet – climate and energy"](#).

⁶ See BMZ core strategy: p. 16: "The BMZ also continues to advocate that the German government decide on a comprehensive exclusion of fossil fuels from its international and national financing." FC financing based on KfW's [Paris-compatible sector guidelines](#) would also be hardly conceivable.

exists and is expected to continue in the coming years. A key task for EPS will be to efficiently manage the transition to a more environmentally friendly energy supply and to align the decarbonisation of the electricity sector with the goals of the Republic of Serbia. The company plans to gradually reduce coal production in line with government guidelines while increasing the share of renewable energies. EPS is also involved in projects that promote social acceptance of the transition to a low-carbon economy.

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

The target group included all electricity consumers in Serbia, but in particular the population living near the power plants supplied, who suffered from pollutant emissions. In addition to the effects of reducing CO₂-emissions, the population living near the power plants will benefit from the targeted reductions in sulphur dioxide and nitrogen oxide emissions.⁷

The main problem with Serbia's electricity supply is its dependence on inefficient and environmentally harmful lignite-fired power plants, which generate over 70 % of the electricity, especially for base load supply. These power plants are characterised by low efficiency of 32-36 % and high pollutant emissions. The coal from the Kolubara basin burned in these power plants has highly variable (lower) calorific values, leading to incomplete combustion, increased CO₂-emissions and frequent (partial) power plant outages. At the time of the project appraisal, the power plants were (almost exclusively) fired with coal extracted from the Kolubara mine. At the time of the evaluation, imported coal is also being burned, depending on the world market price for coal. Currently, a complete switch to imported coal is not planned, partly in order not to increase import dependency.

The problem of geologically induced strong fluctuations in the calorific value of coal from the Kolubara mine, particularly in the Tamnava West coal field, remains in 2024. These fluctuations cause operational problems in the power plants, particularly in units A and B of the Nikola Tesla thermal power plant (Termoelektrane Nikola Tesla, TENT for short), which cannot be operated efficiently as a result. To compensate for the fluctuating calorific values, environmentally harmful heavy fuel oil must be burned, which further increases pollutant emissions. The project aims to ensure a stable calorific value of the coal by introducing a coal quality management system, thereby enabling more efficient operation of the power plants. The need for coal homogenisation will remain of great importance for Serbia's electricity supply, as coal-fired power plants and the coal available in the country will continue to play an important role in Serbia's energy production planning.

When the project was designed, all Serbian electricity consumers were defined as the target group, with a particular focus on those living in the immediate vicinity of the power plants and opencast mines. In retrospect, it can be said that the immediate neighbours were not the main focus; rather, the project was geared towards the development needs of electricity consumers as a target group (see section on "Appropriateness of the design"). Since an improved and more environmentally friendly electricity supply benefits all population groups equally, gender aspects were not given particular emphasis in the design and objectives of the project. This also applies to the needs of particularly disadvantaged or vulnerable parts of the target group. At the time of the project appraisal, no impact on gender equality was expected, nor was a measurable increase in the female employment rate anticipated.⁸ At the time of the evaluation, the intended effects of the project are considered gender neutral. Further gender impact potential through a different design is also not apparent ex post.

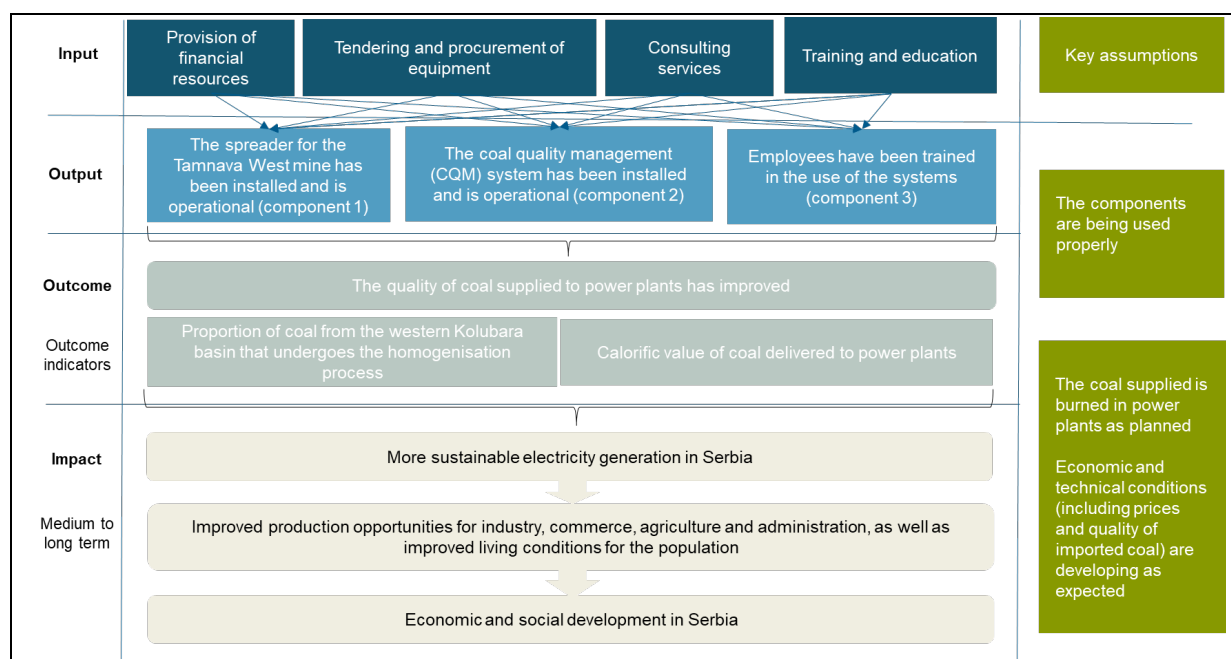
3. Appropriateness of the design

The fundamental impact assumptions on which the project was originally based were plausible. The impact level of the FC module was relevant to the DC programme. As explained in the previous section, the selected indicators did not reflect the needs of the population living near the mine and the power plants. For example, no emission data (e.g. dust, ash, sulphur or nitrogen oxides) were collected directly at the opencast mine or in the vicinity of the power plants. MB Kolubara does not collect data on the generation of pollutants and emissions, which is why improvements or developments in this area cannot be monitored. As part of the evaluation, a modified theory of change was therefore assumed compared to the project appraisal (Figure 2).

⁷ When coal is burned, around 4.1 standard cubic metres (nm³) of flue gas are released per kilo of coal. Flue gas in turn contains approx. 1.8g of sulphur dioxide per nm³ and 0.4g of nitrogen oxide per nm³.

⁸ For the basic status of women's rights in Serbia, see, among [others, Country Fact Sheet | UN Women Data Hub](#).

Figure 1: Theory of Change



Source: Own illustration.

During the project design phase, a need for action in relation to the EIA was identified. Even before the project appraisal, MB Kolubara had already taken comprehensive measures to reduce the environmental impact of lignite mining in the Kolubara Basin and to compensate for social impacts. These included the resettlement of 545 households with appropriate compensation and the renaturation of mined-out areas. In addition, it was to be ensured that all activities complied with national and international environmental and social standards in order to minimise the negative impacts on the affected communities. The project was primarily intended to achieve emission reductions through efficiency gains. The gaps between the measures already implemented and the national requirements were to be closed by an Environmental and Social Action Plan (ESAP) and a Stakeholder Engagement Plan (SEP). Both plans were drawn up and reviewed by the project team. Compliance with these plans was a prerequisite for implementation by KfW. The evaluation did not reveal any evidence of deviations from the plans.

At the time of the evaluation, FC involvement in the coal sector was possible in order to improve energy supply. From today's perspective, however, the project measures would no longer be eligible for FC financing due to internal guidelines that effectively rule out involvement in fossil fuel energy production.

4. Adaptability - Response to changes

With the exception of the general impact of the COVID-19 pandemic (see section "Efficiency"), the main framework conditions of the project have not changed during implementation. At the conceptual level, there was therefore no need for adjustments during the implementation of the project.

Rating Summary

At the time of appraisal, the project and its objectives were in line with Serbian and German policy strategies. The concept was in principle suitable for helping to solve the core problem of inefficient power plant operation due to the fluctuating calorific value of coal from the Kolubara basin. Given the high importance of coal-fired power generation, particularly for covering the base load in Serbia at the time of the project appraisal, the relevance was also evident in comparison with investments in renewable energies. In view of the growing importance of renewable energies, which are also part of Serbia's energy policy, the relevance of the coal sector will decline in the long term. The Kolubara mine and the power plants it supplies are expected to remain in operation until 2040. Nevertheless, the thematic relevance at the time of the evaluation is considered to be low in view of the need to expand renewable energy sources. From today's perspective, the project would no longer be implemented within the framework of German financial cooperation. The selection of indicators in the project design did not reflect the

needs of the ex-ante selected target group. Overall, the relevance of the project is assessed as moderately successful.

Relevance: 3

Coherence

5. Internal coherence

The project was embedded in the German-Serbian development cooperation programme in the energy sector. It was closely linked to the projects for the rehabilitation of coal mills in TENT A (BMZ No. 2004 65 895) and for the modernisation of the ash landfill in TENT A (BMZ No. 2011 66 073). At the time of the evaluation, there was no connection with German technical cooperation activities in the Serbian energy sector. In terms of sectoral focus, the design and implementation of the project were in line with the relevant BMZ guidelines and the fundamental orientation of German development cooperation (see section on relevance).

At the time of project planning in 2011, BMZ's human rights concept had just been adopted, but the human rights guidelines had not yet been published. During the evaluation, no information came to light about inconsistencies with this concept or other international norms and standards to which German development cooperation is committed.

6. External coherence

At the time the project was designed, other international donors were active in Serbia's energy sector. These included the World Bank, the Japanese development agency JICA and the EBRD, which focused on supporting EPS. The project evaluated was designed as co-financing with the EBRD. A valid loan agreement between EPS/MB Kolubara and the EBRD was a prerequisite for the disbursement of FC to MB Kolubara. The project was also linked to the installation of desulphurisation units in the Nikola Tesla A and B power plants, which were financed by JICA. Beyond the project preparation phase, there was no further exchange with the EBRD, whose project was implemented between 2013 and 2016. The EBRD-funded project was implemented in another section of the opencast mine, with which there was no direct overlap. Joint reporting would not have been appropriate in terms of content. In a broader sense, the project was embedded in donor coordination within the framework of the European Energy Community.⁹

At the time of the evaluation, a large number of other donors (in particular the World Bank, EIB, EBRD, AFD and SECO) were active alongside German development cooperation. The portfolio is broadly diversified and includes projects in energy efficiency and renewable energies, but also topics such as climate-friendly reforms of Serbian policy. In some projects, EPS is the direct project partner of these donors.

The Serbian government supported the evaluated project with a planned contribution of around EUR 28 million. Of this, around EUR 23.1 million was actually made available. Overall, the principle of subsidiarity was upheld, as the project effectively complemented the activities of the Serbian government.

Rating Summary:

The project was designed and implemented within the framework of the priorities set at the time for German-Serbian cooperation. It was well coordinated with other FC measures; German TC was not active in the specific area of intervention of the project, so there was no potential for synergies. The internal coherence achieved is complemented by successful external coherence, thanks in particular to coordination with the EBRD during the preparation of the project. In summary, coherence can be assessed as successful.

Coherence: 2

⁹ See [Energy Community Homepage \(energy-community.org\)](http://energy-community.org).

Effectiveness

7. Achievement of (intended) objectives

The objective, adjusted for the evaluation, was: "The quality of coal supplied to power plants is improved." The number and wording of the original indicators selected during the project appraisal were partially updated and clarified during the evaluation. The achievement of the objective at outcome level can be summarised as follows in Table 2.

Table Target Achievement Outcome

Indicator	Status at PA	Target value according to PA/evaluation	Actual value at FI	Actual value at evaluation
(1) Share of coal originating from the western Kolubara basin that undergoes the homogenisation process	0	≥ 80 % before the coal is delivered to the power plants.	88 % (2021)	88 % (2023) Indicator fulfilled
(2) Calorific value of coal delivered to power plants	varying	Average lower calorific value (H_u) at least 6,700 kJ/kg ± 10 % According to laboratory reports from the Nikola Tesla A and B thermal power plants and Kolubara A on 15 January, 15 April, 15 July and 15 October of each year	6,608 kJ/kg (2021)	6,533 kJ/kg (2023) Indicator fulfilled

8. Contribution to the achievement of objectives

All equipment financed by the project has been installed and commissioned in 2020. However, the two crusher units of the CQM system have significant shortcomings compared to their theoretical design capacity (see analysis of indicator 1 below). This is the main reason why the homogenisation storage facility cannot make the planned contribution to the homogenisation of the coal.¹⁰ No solution to this problem had been found at the time of the evaluation. MB Kolubara estimates that, under optimal conditions, approximately 40 % of the crushers' design capacity of 5,000 t/h can be utilised continuously. However, at the time of the ex-post evaluation, only approximately 15 % of the design capacity was being achieved. MB Kolubara is therefore much more dependent on homogenisation directly on the conveyor belts than originally planned. This "manual" homogenisation on the conveyor belts is an improvised measure to compensate for the reduced performance of the homogenisation storage facility. The data provided indicates that manual homogenisation is successful.

Indicator 1

All equipment financed by the project contributes to the CQM system. Of the approximately 50.8 million tonnes of coal extracted from the mine in 2021, 2022 and 2023, a total of around 5.5 million tonnes were homogenised via the homogenisation storage facility over the three financial years. The majority of the coal (around 90 %) was homogenised manually on MB Kolubara's conveyor belts. The analysis and modelling components, such as sensors and belt scales, which were financed as part of the CQM system, are used for manual homogenisation. MB Kolubara can thus mix the desired calorific value of the coal directly on the conveyor belts. Strictly speaking, 100 % of the coal leaving the Kolubara mine undergoes a homogenisation process. However, MB Kolubara only considers coal that reaches the lower threshold value for calorific value to be successfully homogenised. MB Kolubara therefore reports a value of 88 %.

¹⁰ Normally, large metal hammers rotate in the crushing units, breaking up the coal on the wall of the unit. However, the high proportion of fines often blocks the rotating hammers, causing the crushing units to stick and requiring manual cleaning. During cleaning, the coal supply to the homogenisation storage facility comes to a complete standstill.

The homogenised coal from the mine has a minimum calorific value of more than 85 % and is therefore suitable for use in power stations. Even if the indicator value is not reached by 100 %, it can still be concluded that the quality of the coal supplied to power stations has improved.

Despite the hacker attack and the limited capacity of the homogenisation storage facility, MB Kolubara is able to achieve the set threshold value for the majority of the coal with the help of the equipment financed by the project. MB Kolubara can largely compensate for the reduced performance of the homogenisation storage facility financed by the project with the equipment financed by the project.

Indicator 2

The average lower calorific value (H_u) achieved in each of the three years since commissioning at the end of 2020 was within the target range of 6,700 kJ/kg $\pm$ 10 %. Only 10-15 % of the total amount of coal delivered to the power plants was below the threshold value of 6,030 kJ/kg. The indicator is therefore considered to have been achieved.

Table Distribution of coal into energy classes

	2021		2		2	
Energy class	Number Trains	Proportion	Number Trains	Percentage	Number Trains	Proportion
> 7,370 kJ/kg	522	8.8 %	55	8.8 %	271	4.6 %
6,030-7,370 kJ/kg	4,452	75.6 %	5,040	80.8 %	4,860	82.0 %
< 6,030 kJ/kg	918	15.6 %	648	10.4 %	793	13.4 %
Total	5,892	100 %	6,238	100 %	5,924	100 %
Average calorific value		6,608		6,669		6,533

Source: Own illustration, data provided by EPS.

The accompanying measure aimed to train employees to ensure the correct operation of the CQM system. The evaluation found that employees are sufficiently well trained to operate the financed equipment. The accompanying measure helped to ensure the proper operation of all funded equipment.

Overall, it can be concluded that the measures financed by the project have improved the homogeneity of the coal delivered from the opencast mine to the power plants.

9. Quality of implementation

According to MB Kolubara, the technology used is still considered *state of the art*. The project executing agency expressed general satisfaction with the financed equipment, with particular emphasis on the spreader. This is particularly noteworthy as a fire broke out on one of the spreader's conveyor belts in 2022, damaging the spreader and putting it out of operation for almost a year. The spreader was repaired using own funds after the project was completed and has been running continuously ever since. As part of the evaluation, the installed equipment was inspected on-site, and the evaluation confirmed that all equipment financed by the project has been installed and is operational. However, there are problems with the use of the homogenisation storage facility, which is operating well below its technical design capacity (see section "Efficiency").

With regard to the effectiveness of the accompanying measure, it should be noted that many MB Kolubara workers had reservations about the project measures. It can be assumed that the following aspects played a role here: a) scepticism about changing the familiar way of extracting lignite and b) concerns that fewer staff might be needed once coal quality management system is fully implemented. At the time of the evaluation, the management of MB Kolubara and EPS seem to be fundamentally convinced that coal quality management is the right way forward for the operation of MB Kolubara. Looking at the achievement of the project indicators, which also require well-educated and trained workers, it can at least be assumed that most workers are able to deal with the coal quality management system and have accepted it as part of their everyday work.

10. Unintended effects (positive or negative)

No significant unintended effects, either positive or negative, were identified during the evaluation.

Rating Summary

In summary, it can be stated that, based on the information available, the two objective's indicators have been largely or fully achieved. However, it should be noted that the coal crushers cannot be used as planned. Overall, we consider the effectiveness of the project to be just about successful.

Effectiveness: 2

Efficiency

11. Production efficiency

The total investment for the capital expenditures amounted to €175.6 million. Of this, the EBRD financed EUR 80 million, while EPS made a contribution of EUR 23.1 million. EUR 74.0 million was provided by the FC.¹¹ Due to the conservative initial cost estimate, the actual costs were therefore around EUR 4.9 million (approx. 2 %) below the planned costs.

Consulting costs amounted to approximately 7 % of the FC-financed project volume. It should be noted that the consultant acted both as an implementation consultant and was tasked with building sustainable capacity at the project promoter through training courses as part of the BM. Due to the longer implementation period of the project, consulting costs also rose, accounting for a larger share of the project volume than planned. The consultant's work was positively assessed by the project promoter in the evaluation. The share of 7 % of the total project volume is therefore appropriate. The own contribution of EPS/MB Kolubara appears reasonable.

After completion of the project in 2020, MB Kolubara incurred additional costs, in particular for the repair of the spreader, which was damaged by a fire (see above). These costs amounted to around EUR 3.7 million.

In addition to the equipment directly required for the analysis and homogenisation of the coal, modern mining equipment with sufficient capacity and precision for the CQM was purchased through international public tenders. The project executing agency decided to divide the project components into a total of five separately (construction) lots.¹² In addition, the sustainable operation of the system was planned through targeted training of the responsible employees with the assistance of the implementation consultant.

The financing agreements for the project components were signed in 2012, but there were significant delays in the supply contracts, which were not concluded until between 2014 and 2016. The project, originally planned for completion by the end of 2015, was not completed until 2020 with the commissioning of the equipment. The implementation of the project thus took significantly longer than planned, with a total delay of almost five years, more than doubling the project duration compared to the original schedule. The reasons for the delays were the complex procurement process and, among other things, flooding in the mine, customs problems with a radioactive screener and the COVID-19 pandemic.

During the evaluation, MB Kolubara noted that, in retrospect, dividing the investment items into several construction lots and involving an implementation consultant had not proved to be an efficient approach. The division into several contracts was originally intended to save costs compared to an approach with a single EPC contractor. The evaluation mission shares MB Kolubara's analysis, as the use of an EPC contractor would have made the project easier to manage and could have avoided or reduced the delays and additional costs caused by the number and complexity of the contracts.

In retrospect, it can be said that the technical requirements for the coal crushers were insufficient in one key parameter: only the average clay content of the coal was specified, and the coal crushers were designed accordingly. Since the coal crushers are not designed for the actual clay content (see also section "Effectiveness") and the actual clay content during operation sometimes deviates significantly from the average value, the coal crushers are frequently interrupted due to clay clogging. The frequent shutdowns required to remove the clogging from the coal breakers leads to a less than planned use of the homogenisation storage facility. This can be considered

¹¹ As the part of the project financed by the EBRD was geographically completely separate from the part financed by the FC, only the part of the project financed by KfW was relevant for this evaluation.

¹² Lot 1: Settlers with a capacity of 12,000 m³/h, Lot 2: Hardware and software for the CQM system, Lot 3: Infrastructure of the CQM, Lot 4: Electromechanical equipment for the operation of the CQM system and Lot 5: Implementation consultant.

a consequential error: if the coal breakers are shut down before the homogenisation storage facility, the storage facility cannot be used. For this reason, MB Kolubara often has to mix the coal directly on the conveyor belts.¹³ The evaluation was unable to conclusively clarify why, despite the previous investigations and the coal field models based on them, the design based on the average value proved to be inappropriate and whether this could have been noticed ex ante.

The low utilisation of the homogenisation storage facility has a negative impact on allocation efficiency. At almost EUR 31 million, the homogenisation storage facility accounted for over 40 % of the FC funding. As described above, MB Kolubara is currently unable to operate the homogenisation storage facility at the planned capacity. This means that most of the coal is currently homogenised directly on the conveyor belts and will continue to be so in the foreseeable future. Homogenisation on the conveyor belts is satisfactory overall. However, the effect currently observed could also have been achieved without the homogenisation storage facility with EUR 31 million less project finance. If an EPC contractor had been used, the financial loss would probably have been covered by its liability.

At the same time, MB Kolubara emphasised during the evaluation that the low contribution of the homogenisation storage facility to the overall homogenised coal quantity was only a snapshot. Once the downtime caused by cleaning the coal crushers has been reduced, the homogenisation storage facility will be able to take on its originally planned share of coal homogenisation. MB Kolubara plans for the homogenisation storage facility to reach its design capacity in the future. The role of the storage facility is regularly emphasised in internal plans, particularly regarding the opening of a new opencast mine. The coal from this new field is planned to be homogenised in the homogenisation storage facility together with the coal from the field currently in operation. According to MB Kolubara, the homogenisation storage facility is of great importance for this. However, MB Kolubara's statements on the necessity of the homogenisation storage facility cannot be conclusively assessed, as MB Kolubara is currently achieving its homogenisation targets with virtually no contribution from the facility. Whether the homogenisation storage facility can be operated as planned at all depends, firstly, on whether a technical solution can be found for the crusher units that allows them to be adapted to the existing clay content in the coal. Secondly, EPS/MB Kolubara must decide whether they want to implement this solution, depending on the costs of the possible solution. The functioning status quo at least raises questions as to whether retrofitting will take place if the costs of a solution are significant.

12. Allocation efficiency

Alternative approaches to achieving the outcome-level objective, i.e. improving coal quality, were not discussed during the project appraisal. In retrospect, this is also considered understandable. The intended financial additivity of the accompanying measure was achieved during the course of the project. The budget of EUR 1.5 million is considered to have been well and sensibly used in the evaluation. The implementation of the accompanying measure, which focused primarily on training employees and long-term capacity building at MB Kolubara, was successful.

Rating Summary

Overall, the significant delay in the project was well absorbed by EPS in economic terms. The overall cost planning was realistic, and the share of funding for the consultant also appears appropriate. However, the share of funding used for the homogenisation storage facility is inefficient in terms of its contribution to overall homogenisation. Even if the use of the homogenisation storage facility increases in the future, the effects of the project could have been achieved with considerably less expenditure. In addition, coal crushers that were technically inadequate were procured ex post, which led to considerable inefficiencies. Therefore, the production efficiency of the project at the time of the evaluation must be assessed as unsuccessful. It also seems rather unlikely that the infrastructure procured will be used in the future.

Efficiency: 5

¹³ The coal crushers break up the coal before it is stacked in the homogenisation storage facility. From the homogenisation storage facility, specific layers of coal, which are mixed there according to their different calorific values, are to be fed into the trains via portal scrapers and conveyor belts.

Overarching development impact

13. Overarching (intended) development changes

The impact-level objective underlying the evaluation of the project was "Serbia's electricity generation is more sustainable". The achievement of the objective at impact level can be summarised as follows in Table 4:

Table Target Achievement Impact

Indicator	Status PA	Target according to PA	Actual value at FI	Actual value at evaluation
(1) Consumption of heavy fuel oil in power plants TENT A, TENT B and TPP Kolubara	TENT A: 17,000 t/p.a.	TENT A: < 17,000 t/p.a.	TENT A: 49,554 t/p.a. (2021)	TENT A: 63,573 t/p.a. (2023) Indicator <u>not</u> fulfilled.
	TENT B: 17,000 t/p.a.	TENT B: < 17,000 t/p.a.	TENT B: 31,078 t/p.a. (2021)	TENT B: 12,111 t/p.a. (2023) Indicator fulfilled.
	TPP Kolubara: 5,000 t/p.a.	TPP Kolubara: < 5,000 t/p.a.	TPP Kolubara: 5,600 t/p.a. (2021)	TPP Kolubara: 4,691 t/p.a. (2023) Indicator fulfilled.

14. Contribution to overarching (intended) development changes

The project's overarching development policy impacts focused on the ecological and economic dimensions of sustainability. To measure the achievement of the objective at impact level, the consumption of heavy fuel oil in the power plants is used as an indicator:¹⁴ Heavy fuel oil is needed in the coal-fired power plants supplied to compensate for fluctuations in the lower calorific value of the coal, especially when it falls below the technical design range of the power plants of 6,700 kJ/kg +/- 10 %. Homogenised coal reduces heavy fuel oil consumption in power plants and contributes significantly to increasing the efficiency of power plants and thus to increasing the energy efficiency of electricity generation (see also Theory of Change in the "Relevance" section). An increase in efficiency is directly proportional to the reduction in CO₂- and other emissions such as SO₂- and NO_x, as less fuel – regardless of whether it is coal or oil – is burned.

Contrary to the original objective, the demand for heavy fuel oil at the TENT A power plant has increased significantly compared to the time when the project was appraised. The indicator is not fulfilled. At first glance, the increased consumption of heavy fuel oil is counterintuitive, as the homogenised coal should have led to a reduction in heavy fuel oil consumption. Due to its complexity, a detailed investigation of the power plant's operations to determine the causes of the increased heavy fuel oil consumption could not be carried out as part of the evaluation, and no relevant operating data is available.¹⁵ The analysis is therefore based on the following plausibility considerations: The low calorific value of the coal supplied from the Kolubara opencast mine does not appear to be the decisive factor, as the target for the lower calorific value range is achieved (see section "Effectiveness"). According to EPS, the achievement of the target values for the indicators for the TENT B and TPP Kolubara power plants is due to the increased use of imported coal. The share of imported coal that is (co-)fired in the individual power plants remained unclear. The achievement of the target values for the two power plants TENT B and TPP Kolubara is significantly overshadowed by the drastic increase in heavy fuel oil consumption in TENT A. At the time of the evaluation, a total of 80,375 tonnes of heavy fuel oil per year were being burned across all three power plants, far exceeding the combined target value of 39,000 tonnes per year.

The evaluation confirmed that, contrary to the situation at the time of the project appraisal, EPS purchases coal on the international market and uses it in its power plants when the market price is attractive and lower than domestic cost of production. The imported coal usually has a higher calorific value than domestic coal. With a power plant design based on a calorific value of around 6,700 kJ/kg, mixed firing, i.e. with domestic and imported coal,

¹⁴ Consistent data on the development of various emissions was not available, so no emission-specific indicators could be established.

¹⁵ An increase in heavy fuel oil consumption could also be partly influenced by wear and tear on the lignite boilers. Without the operating data from the power plants, it is not possible to estimate the impact of wear and tear.

requires the increased use of heavy fuel oil in order to compensate for the different coal qualities and to meet the power plant design specifications.

As with the emission data, the available data on efficiency trends do not allow any indicators to be formulated. Selected data on the efficiency of the three power plants supplied can be found at Table 5.

Table Development of efficiency levels of power plants supplied by MB Kolubara in %

Power plant	2	20	2
Tent A	29.03	29.05	28.62
Tent B	31.09	31.29	32.21
TPP Kolubara	26.11	20.30	20

Source: Own illustration, based on data from EPS.

The data show that efficiency has only improved at the TENT B power plant. The noticeable increase in efficiency at TENT B is most likely due to the increased use of Indonesian coal. Efficiency at the other power plants supplied has deteriorated significantly in some cases.

However, from the evaluation's point of view, the improvement in efficiency at the TENT B power plant is not due to the measures financed by the project. Rather, external factors that were not foreseeable when the project was appraised are responsible. In particular, the operation of the power plants, including the decision to co-fire imported coal of completely different composition and quality, is beyond the scope of the project.

It is positive that the lessons learned from the project are to be extended to other opencast mines.

15. Contribution to overarching (unintended) development changes

The fact that heavy fuel oil is now once again being used in large quantities in the power plants is to be regarded as a negative, unintended effect. The use of heavy fuel oil is not only harmful to the environment (e.g. through increased SO₂- and NO_x- emissions), but also for the power plant itself, as burning heavy fuel oil places greater demands on the power plant's technology than burning coal alone. It can therefore be assumed that the situation for residents living near the power plants has not improved, as emissions of harmful substances such as SO₂- and NO_x still appear to be significant. The deterioration in efficiency at TENT A and TPP Kolubara suggests an increase in CO₂-emissions. The positive development in efficiency at TENT B is at a comparatively low level.

Rating Summary

Instead of falling as planned, heavy fuel oil consumption in the power plants has risen significantly. The target values for the indicator could not be achieved. This is mainly due to external factors beyond the project's control. Some of the lessons learned from the project measures are to be transferred to other opencast mines. Overall, the overarching development policy impacts are considered to be moderately unsuccessful.

Overall developmental impact: 4

Sustainability

16. Capacities of stakeholders and beneficiaries

EPS and MB Kolubara have the necessary financial resources to maintain the long-term operation of homogenisation at the Kolubara mine. Current operations show that MB Kolubara is able to achieve homogenisation even under adverse conditions.

EPS reported that the training courses conducted by the implementation consultant were well received after initial scepticism, particularly among more experienced employees. These training courses were crucial in familiarising staff with the new systems and processes, thereby contributing to the successful operation of the capital goods. MB Kolubara emphasised that the project was particularly successful in terms of changing attitudes among middle management. The realisation that coal quality is at least as important as the quantity delivered has the

potential to secure the positive effects of the project in the long term. This change in mindset could help ensure that the workforce continues to value coal quality in the future, which is crucial for long-term efficiency and environmental sustainability. However, one problem is that many of the trained employees have since retired or left the company, which jeopardises the sustainability of the accompanying measure. Another risk is that MB Kolubara is finding it difficult to recruit new employees and that practical knowledge of proper operations is being lost, even though theoretical training can be provided on the basis of the relevant documents.

17. Contribution to supporting sustainable capacities

During the evaluation in June 2024, all KfW-financed equipment, with the exception of the coal crusher of the CQM system, was operational as planned and the staff was able to operate the CQM system satisfactorily. This shows that the training and implementation of the systems were successful. A conveyor belt financed from EPS's own funds is not yet in operation, but commissioning was planned for the end of 2024. Overall, the evaluation concludes that MB Kolubara is ready and able to further improve the efficiency and effectiveness of coal homogenisation.

As part of the project's sustainability strategy, the contracts stipulated that, from an environmental perspective, disused opencast mines from which the recoverable coal had been extracted must be renaturalised. This provision therefore had the character of a disbursement condition. During the evaluation, the evaluation mission was presented with a map showing the areas where the former opencast mines had already been renaturalised. MB Kolubara has complied with this agreement.

18. Durability of impacts over time

The economic added value for MB Kolubara is high, so it can be assumed that the homogenisation of the coal will be continued on a permanent basis. The CQM system in the Kolubara basin is to be extended to other opencast mines as a concept for coal homogenisation. This underlines the positive pilot character of the project. It is not known in what form this expansion will take place, for example without a homogenisation storage facility or on the basis of correct specifications for the coal crushers with a homogenisation storage facility.

With regard to the effects over time, it should be noted that coal homogenisation alone is not responsible for whether or not the efficiency of the power plants supplied is actually improved. Even if coal homogenisation continues to be successful and the system is expanded to other opencast mines, it is reasonable to assume that neither the efficiency of the power plants supplied will necessarily improve in the long term, nor that the closely related CO₂-, SO₂ and NO_x-emissions will be reduced.

Rating Summary

EPS and MB Kolubara are financially capable and willing to maintain the long-term operation of homogenisation at the Kolubara opencast mine. It can be assumed that the maintenance and operation of the remaining financed capital goods will also be secured in the long term, so that a sustainable impact at the outcome level appears plausible. The training courses showed signs of a sustainable impact, even if natural staff turnover remains a challenge. The project has contributed to learning processes at management level. In addition, the learning experiences, albeit initially negative, also have a pilot character for other opencast mining projects. At the same time, it should be noted that the financed homogenisation storage facility has had little or no impact at the time of the evaluation and that the effects at the impact level will not be satisfactory in the medium term. Overall, the sustainability of the project is therefore assessed as moderately unsuccessful.

Sustainability: 4

Overall rating

While the project was fundamentally in line with the political priorities of the Serbian government and the BMZ's guidelines at the time of the appraisal, its design and compatibility with German development policy in the energy sector showed weaknesses at the time of the evaluation. The project was well coordinated with other FC measures, potentials for synergies with German technical cooperation were available. Due to the good coordination with the EBRD during the preparation of the project, coherence is assessed as successful. The effectiveness of the project is assessed as just barely successful overall. The outcome-level objectives were achieved, and the

homogenisation of coal is working satisfactorily overall. However, it should be noted that the coal crushers financed cannot be used as planned and the positive results at the outcome level were achieved in an unplanned manner. This is reflected in the project's poor, largely unsuccessful efficiency assessment. Since the homogenisation storage facility contributes little to the overall success of the homogenisation process, a good 40 % of the investment volume is virtually ineffective. The project could have achieved roughly the same result with around EUR 31 million less funding. The achievement of the impact-level objectives is also assessed as moderately unsuccessful. The objective of reducing heavy fuel oil consumption was clearly missed, although it should be noted that the achievement of the impact-level objectives was influenced by numerous external factors. The sustainability of the project is also assessed as moderately unsuccessful: Even though it can be assumed that the sustainability of the effects at the outcome level appears to be financially secure over time and that pilot-scale learning experiences have been gained, it should be noted that the financed homogenisation storage facility shows no or only minor effects at the outcome level at the time of the evaluation. Effects at the impact level will not be satisfactory in the medium term either. Overall, the project is considered to be moderately unsuccessful.

Overall rating: 4

Contributions to the 2030 Agenda

The international community has agreed on the Sustainable Development Goals (SDGs) of the 2030 Agenda (UN, 2015) and on the implementation of the Paris Climate Agreement (UNFCCC, 2015). SDG 13 focuses on measures to combat climate change, while SDG 7 aims to ensure access to affordable, reliable, sustainable and modern energy for all. The Paris Agreement and its follow-up agreements aim to limit global warming to well below 2°C, ideally to below 1.5°C, compared to pre-industrial levels. The use of homogenised coal will generally increase the efficiency of the power plants supplied. This increase in efficiency goes hand in hand with a reduction of CO₂- emissions. If it functions as intended, the project can therefore contribute to achieving these SDGs and support global climate targets.

Project-specific strengths/ weaknesses and general conclusions/ lessons learned

The strengths and weaknesses of the project include in particular:

- At the time of the appraisal, the project was well aligned with the political objectives of Serbia and Germany, particularly with regard to the targets for improving energy efficiency and reducing emissions.
- The training courses and implementation of the coal quality management system (CQM) contributed to a long-term increase in the capacities of EPS and MB Kolubara, both in terms of the technical operation of the system and the management's conviction to focus more on CQM.
- The coal crushers at the homogenisation storage facility could not be used as planned, which impaired the efficiency of the coal storage facility. It became apparent ex post that the technical design of the coal crushers was inappropriate for the average clay content of the coal actually mined. This led to frequent interruptions in the operation of the coal crushers. Despite technical challenges, MB Kolubara was able to achieve the homogenisation targets by making manual adjustments to the conveyor belts.
- Heavy fuel oil consumption in the power plants increased, which counteracted the intended reduction in emissions.
- The implementation of the project took longer than planned. High coordination costs for the separate tenders on the part of MB Kolubara were considered inefficient. The use of an EPC contractor appears to be sensible in retrospect.
- The loss of trained employees and difficulties in recruiting new staff jeopardise the long-term sustainability of the training measures.

Conclusions and lessons learned:

- Precise specification of technical requirements and their verification in tenders is essential to prevent difficulties in later operating phases.
- The use of an EPC contractor serves to reduce the complexity of the procurement process, prevents delays and high coordination costs, and mitigates risks arising from errors.
- Regular training, even after projects have been completed, is important to ensure that the knowledge acquired is retained even when staff changes occur.

Evaluation approach and methods

Methodology of ex-post evaluation

The ex-post evaluation follows the methodology of a rapid appraisal, i.e. a data-supported, qualitative contribution analysis and represents an expert judgement. This involves attributing impacts to the project through plausibility considerations 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). Causes of any contradictory information are investigated, attempts are made to eliminate them, and the assessment is based on statements that are – if possible - confirmed by several sources of information (triangulation).

Documents:

Internal project documents, secondary specialist literature, strategy papers, context, country and sector analyses, comparable evaluations, media reports.

Data sources and analysis tools:

data collection on-site, monitoring data from the partner, GPS data, satellite images.

Interview partners:

Representatives of the project sponsor and the ministry.

The analysis of impacts is based on assumed interdependencies documented in the impact matrix developed during the project appraisal and, if necessary, updated during the ex-post evaluation. The evaluation report presents arguments as to why influencing factors were identified for the identified results and why the analysed project presumably made which contribution (contribution analysis). The context of the development project is taken into account with regard to its influence on the results. The conclusions are set into relation to the availability and quality of the data basis. An evaluation design is the reference framework for the evaluation.

For project evaluations, the method offers a – on average – balanced cost-benefit ration, in which the knowledge gained, and the evaluation effort are in equilibrium, and allows for a systematic assessment of the effectiveness of FC projects across all project evaluations. The individual ex-post evaluations can therefore not fulfil the requirements of a scientific assessment in the sense of a clear causal analysis.

The following aspects limited the evaluation:

Insufficient data, particularly with regard to data from power plants.

Methodology of the performance evaluation

A six-point scale is used to assess the programme according to OECD DAC criteria. The scale values are assigned as follows:

- Level 1** Very successful: results significantly above expectations
- Level 2** Successful: results fully in line with expectations, without significant deficiencies
- Level 3** Moderately successful: below expectations, but positive results dominate
- Level 4** Moderately unsuccessful: is 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 worsened

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" if the achievement of the project objectives ("effectiveness") and the impacts at the overall objective ("overarching developmental impacts") as well as the sustainability are rated at least as "Moderately successful" (level 3).

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

Imprint

FC E

Evaluation Department of KfW Entwicklungsbank
FZ-Evaluierung@kfw.de

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KfW Banking Group
Palmengartenstraße 5-9
60325 Frankfurt am Main, Germany