



Komani Dam Safety

State Sector Project Assessment

Prepared in line with the EBRD's Access to Information Policy¹

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Sector	Power and Energy
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Operation Description

The Komani Dam Safety Project (the "Project") consists of a EUR 12.7 million sovereign loan provided by the EBRD (the "Bank") to the Republic of Albania (the "Borrower") for the benefit of the state-owned power utility company Korporata Elektroenergjitke Shqiptare Sh.A ("KESH", or the "Company") to finance several components of a program to improve the safety of the Komani Hydropower Plant Dam, the largest KESH-operated hydropower plant ("HPP").

KESH is a joint-stock company established in Albania on the 17th of October 1995, incorporating already existing electricity generation, transmission and distribution entities. These three functions remained bundled until 2004, when the transmission arm of KESH was unbundled into a separate legal entity. In 2007, the distribution arm of KESH was also unbundled into a separate legal entity. Between 2009 and mid- 2016, KESH encompassed both the power generation and wholesale public supplier functions. The wholesale public supplier function entailed KESH acquiring all energy from domestic IPPs and importing the necessary amount of energy to meet all regulated domestic demand. The wholesale public supplier function was removed from KESH in 2016.

KESH manages three large hydropower plants located in the Drin river – the Drin river cascade. The three hydropower plants (Fierza, Komani and Vau I Dejes) comprise 1,350 MW of installed capacity and account for 70% of total domestic generation.

Komani Hydropower Plant ("Komani HPP") is the second and most powerful hydropower plant in the Drin River cascade with an installed capacity of 600 MW (4x150 MW). In terms of installed capacity, position and volume of the reservoir, this HPP plays a key role in managing the entire cascade and

¹ As required by Section IV paragraph 1.4.8 of EBRD's Directive on Access to Information (2019), the Bank shall disclose information (excluding Confidential information) contained in Operational Performance Assessment (OPA) reports for State Sector Projects selected for extended review, within 60 calendar days after completion of the relevant OPA report.

provides for a substantial portion of KESH's total generation. Komani HPP is the largest hydroelectric power plant in the country.

Given the considerable concern about the condition of the dams at the hydropower facilities on the Drin Cascade and whether they were sufficiently strong to withstand extreme weather conditions (exacerbated by climate change), and flood events in Albania and the region, a feasibility study was carried out to assess the need for safety improvements in the Drin Cascade. The study, prepared by Poyry Consultants and funded through a SECO grant, identified a number of safety hazards and deficiencies at the dams, such as:

- threats from natural hazards i.e. earthquake, floods, rock falls on the dam structure;
- the hydraulic design of the dams not complying with internationally recognised standards;
- hydro-mechanical equipment being inadequately maintained and operated;
- a lack of satisfactory dam monitoring systems; and
- a lack of sufficient dam safety procedures and organisation.

This led to the preparation of an investment programme, amounting to EUR 72.26 million, which included safety measures for the three hydropower plants located on the Drin River cascade (the "Drin River Dam Safety Project"). The Drin River Dam Safety Project is co-financed by other International Financial Institutions ("IFIs") and donors, including World Bank ("WB"), KfW and SECO.

It should be noted that the KESH-operated HPPs were built in the 1970s and 1980s and were not subject to any rehabilitation prior to this program. This made the Drin River Dam Safety Project an essential and priority investment for the sector not only to ensure continuous domestic supply, but also to prevent floods or failures due to poor safety of the dams.

The Bank financed the following components related to the Komani HPP Dam Safety for a total amount of EUR 12.7 million:

- I. Reinforcement of the damn toe and left bank scour area – EUR 5.62million;
- II. Strengthening of the rock fall protection measures – EUR 0.83 million; and
- III. Rehabilitation of spillways – EUR 6.12 million (added at a later stage through a change in use of proceeds approved by the Board in November 2017).

The Project was structured as a sovereign loan to the Government of Albania, with KESH being the beneficiary. The Bank was cautious about the financial performance of KESH and the power sector in general at the time hence the decision not to lend to KESH directly.

Initially, the Bank was to finance only the first two components listed above amounting to EUR 12.7 million, which were successfully completed within December 2016. However, due to the changes in the project design and the lower-than-expected volume of works to be performed, the actual contracted amounts for the Project were significantly lower than estimated at project original approval and amounted to EUR 6.45 million, generating loan savings amounting to EUR 6.12 million.

The savings from the loan were used to finance a third component of the Drin River Dam Safety Project, namely the rehabilitation of the spillways of Komani HPP. The change in use of proceeds was approved by the Board in November 2017.

The rehabilitation of the Komani and Fierza hydropower plants' spillways was an important component of the Drin River Dam Safety Project, essential to the achievement of increased and improved safety in the Drin cascade hydropower plants. This component was initially foreseen to be financed entirely with World Bank funds. As such, the procurement for the rehabilitation of spillways for Komani and Fierza hydropower plants was performed under the World Bank's procurement policies and procedures (The

EBRD Board of Directors approved an exception under paragraph 2.4 of the EBRD's PP&Rs to allow the use of the World Bank's procurement policies and rules for the Komani HPP spillways rehabilitation).

Current operations with KESH include:

KESH Restructuring Project (DTM 48132) – a EUR 218 million sovereign guaranteed loan to refinance the short term sovereign guaranteed overdrafts which KESH has entered into with commercial banks on an emergency basis. This project is linked to a comprehensive program of reforms of KESH and the Albanian energy sector.

Previous projects include:

1. Vlore Thermal Power Generation (DTM 33833) – A EUR 40.0 million senior debt loan, sovereign guaranteed, provided to KESH for purposes of constructing a thermal power plant in Vlora.
2. Albania Power Distribution Rehabilitation (DTM 23830) - a completed project signed in 2002. The project relates to a EUR 24 million sovereign guaranteed senior loan provided to KESH for the upgrade of the power distribution infrastructure.
3. Albania Power Sector Reconstruction (DTM 8345) - a completed project signed in 1999. The project relates to a EUR 30 million sovereign guaranteed senior loan, provided to KESH for the modernization of two hydropower plants, and the construction or improvement of distribution and transmission lines. Total project cost was EUR 60 million.

Relevance The project's strategic relevance is rated fully satisfactory. The rationale for the Bank's involvement was properly outlined in all approval documents in the backdrop of the then-Government of Albania's reform strategy in the energy sector as well as the Bank's Country Strategy for Albania.

At approval, the Project was consistent with the Country Strategy for Albania in that it promoted the following objective of the strategy: "Working with WB and other IFIs, contribute to enhancing sustainability of the power sector". It was also consistent with the Energy Strategy in that: "EBRD will promote the adoption of best international standards in environmental, health and safety and social practices as well as in transparency and corporate governance.

The project is consistent not only with the country but also with the sector strategy, as the Borrower has been able to adopt and comply with the relevant EBRD standards in terms of environmental, health and safety practices for the Project on the basis of compliance with the Environmental and Social Action Plan ("ESAP"). In addition, the Project has adequately helped to increase sector sustainability in that it has brought forth a more efficient management of the Drin River cascade and flood risk reduction.

The Project continues to be relevant to the Albania country strategy: "Enhance resilience of infrastructure to climate change as part of infrastructure development projects" as it has built climate change resilience through flood protection, advancing thus the Green Economy Transition ("GET") initiative in Albania. The Project remains relevant to the Energy strategy: "Promoting the switch to cleaner and resilient generation sources: Technologies and practices to enhance resilience (for example, dry-cooling, hydrological modelling and turbine upgrades)".

The structure of the Project is considered as suitable for the client. The Project design and structure provided for efficiency and effectiveness, as the Bank invested alongside other IFIs contributing to joint action and swift coordination, while at the same time propelling the Bank's agenda in sector reforms by leveraging on this joint effort. The Project objectives were designed to improve the Borrower's sustainability and performance, while contributing to climate risk mitigation through flood prevention; the latter indirectly benefitting a part of the Shkodra population subject to floods from

the Drin river. In addition, structuring the Project to concurrently run several key components across the Drin River proved essential in preventing disruptions to KESH operations and as a consequence to domestic power supply.

The structure of the deal allowed enough flexibility for KESH to allocate the proceeds to those areas that were important for the safety of the HPPs operated by the Company. The initial financing related to only two components of the Komani HPP Dam Safety, however the Bank was able to meet the client's need by expanding the scope of the Project and including a third component. Moreover, by accepting WB procurement rules for the third component, the Bank's mobilisation was fast and targeted, enabling short implementation time for the spillways without causing business interruptions for KESH.

The sovereign structure was adequately chosen as it provided for additional oversight by the Albanian authorities, incentivizing KESH to maintain momentum and adhere to strict monitoring. The establishment of a centralised Project Implementation Unit ("PIU", its creation was a condition for effectiveness for the Project) provided a streamlined information and reporting line, which proved key to rapid action by KESH and better alignment and coordination among all IFIs. The Project's reporting covenants were also key in achieving such streamlined information, as the PIU prepared and distributed a thorough quarterly implementation, supervision and funding report for the Project overall and for each component separately, which allowed each IFI to monitor not only the progress of its specific funded component, but also the progress of all the combined components.

Furthermore, the condition that qualified consultants' support KESH during project implementation helped the Client provide on-the-job trainings for its staff, facilitating knowledge transfers.

This Project did not involve any donor funding or policy dialogue from the EBRD. The Drin River Cascade Project however received the following donor funding:

- i) by SECO for the implementation of the Drin River Dam Safety Project; and
- ii) by KfW for expert services on monitoring.

The success of this Project would be assessed in terms of its physical implementation and transition impact related to the Project implementation (rather than sector reform). Both physical implementation objectives and TI benchmarks were adequately designed and sufficiently detailed to measure successful implementation of the Project, but also transfer of skills/knowledge and implementation of the broader Drin River Dam Safety Project.

Physical performance indicators were clearly identified including adherence to standards and specifications (including ESAP), monitoring and control of changes, and compliance with budget and work schedule. The first two components of the project were successfully completed by December 2016, in line with established timelines and significantly below budget creating sufficient savings for a key additional safety measure to be implemented (the third component). The third component is expected to be finalised shortly. The Project was implemented in line with the agreed ESAP and the Company regularly reported on environmental and social performance.

Physical Parameter	Base Line	Achieved
Reinforcement of the damn toe and left bank scour area	<ul style="list-style-type: none"> - Local erosion of the Dam Toe and significant erosion of the left bank scour area due to the floods in 2009/2010. - Dam leakage beyond safety levels. 	<ul style="list-style-type: none"> - Physical reinforcement of Dam Toe and Left bank scour area, hence enhancing their sustainability. - Monitoring and constant oversight of dam leakages, so they are in compliance with safety levels.
Strengthening of the rock fall protection measures	Constant threat of rock falls.	Improvement of rock fall protection measures provide safety for people, power plant assets, equipment, and roads.
Rehabilitation of spillways	<ul style="list-style-type: none"> - Gates almost fully amortised. - No sensors at gates to monitor the level of the water in the dam. - Water loss and leakages at GWh 11 per annum. 	<ul style="list-style-type: none"> - Gates lifetime extended for another 30 years. - Monitoring system and sensors implemented at the gates corresponds to international standards, allowing detecting any anomaly in the early stage. - Water loss and leakages caused by malfunction of the gates reduced to zero. - The operational spillway capacity ready for winter/rainy season is back to the designed capacity (3,600 m³/sec) at Komani HPP.

Key transition impact objectives included: (i) demonstration of new replicable behavior, (ii) setting standards for corporate governance, and (iii) transfer and dispersion of skills.

All the TI benchmarks have been achieved. The TI benchmarks included: the completion of the emergency preparedness plan for the Drin and Mat River cascades, an improved interface between local authorities and National Civil Emergency Centre, and continuing on-the-job training provided to KESH's dam operators and technical staff by the two Drin River Dam Safety Project consultants. Moreover, the preparation of damn surveillance manuals for each of the dams were completed in 2015 using SECO funds. The Potential Failure Mode Assessment was adopted and implemented at three (out of five) largest HPPs. The remaining two HPPs have been privatised and the benchmark is now considered partially achieved. A modern water alarm system has also been established.

The principal risk to achieving transition impact was the project implementation risk. This risk has been mitigated through: (i) drawing on the lessons learnt in the previous similar projects implemented by the Bank; and (ii) hiring technically qualified consultants to assist KESH in the implementation. Lessons learned from past Bank experiences were properly referenced and applied by making sure that the technical specifications for the project were reviewed and assessed by the Panel of Experts, and in the specification of the qualifications needed when selecting the consultants. In addition, the design and structure of the larger Drin River Dam Safety Project minimized the risk of project implementation as pooling IFI resources into concurrent components ensured that none of the components were delayed or otherwise poorly implemented, otherwise it would affect the rest of the components and jeopardize the implementation of the larger Drin River Dam Safety Project.

Demonstration of additionality is rated fully satisfactory. Albania continues to rely on IFIs as the main source of infrastructure financing, as commercial financing for infrastructure projects is not available. The Bank's financing of the Project was considered, after all available soft loans and grants were utilized; other IFIs were involved as well. In addition, the Bank's local knowledge and presence, as well as its

significant involvement in the Albania's power sector and expertise in similar projects were essential to support the Project.

EBRD attributes:

EBRD was invited to participate due to its existing experience in the electricity sector, as well as in a number of existing projects with the Client financed in conjunction with the WB and donors.

Furthermore, the Project contributed to the know-how transfer through the application of the EBRD PP&R and Environmental Policy.

Effectiveness The Project's expected outputs were related to project completion and the delivery of the transition impact benchmarks. The two initially approved components were implemented in December 2016, while the third component (approved in December 2017) is expected to be finalised shortly. The TI benchmarks have been fully achieved since end 2019.

The Project was initially rated as Good in terms of TI rating (60). As transition impact risk decreased, the overall ETI/PTI was upgraded to 90.

The transition impact achieved by the Project was further enhanced when the spillway rehabilitation component was added to the Project's use of proceeds. Firstly, the rehabilitation of spillways for the Komani HPP has a demonstration effect, as it is the first material rehabilitation programme for the spillways of this hydropower plant since its construction in 1985. Secondly, the rehabilitation of the spillways of Komani HPP addresses important concerns on dam safety and flood risk in the Drin cascade. Hence it provides an additional GET component to the Project, as it contributes towards the mitigation of climate risk. The spillway rehabilitation has substantially reduced the flood risk, enhancing not only our compliance with the GET agenda but also would also the Transition Impact of this Project.

Expected Impact	Actual
KESH will benefit from the expertise of the contractor and significant know-how transfer will happen during day-to-day exchanges.	On-the-job training and the transfer of skills is being provided on an every-day basis, not only from the project managers of the contractors (Andritz, Porr and Can), but also from the owner's engineers. In addition, as per the contract signed with the contractor for the Komani's spillway rehabilitation, the mechanical engineers and staff were provided a two weeks training in Turkey on spillways maintenance and at the end were provided the relevant certification.
The rehabilitation of the spillways at Komani hydropower plant will contribute to improved water management and thus contribute to the increased resilience of the Drin River cascade towards increasing flood risk due to climate change.	The electromechanical rehabilitation works for Komani HPP is fully completed on March 2019; The refurbishment and rehabilitation

	<p>of all four units have increased the power plant's:</p> <p>(i) reliability - the availability of units is high and the benefit from the cascade operation during good hydrology is significant; and</p> <p>(ii) efficiency - water leakages are eliminated and the estimated GWh 11 lost during a year is reduced to zero.</p> <p>The operational spillway capacity ready for winter/rainy season is back to the designed capacity (3,600 m³/sec) at Komani HPP.</p>
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Please see below for more details on TI benchmarks.

		Status	Comment
1	Demonstration of new replicable behaviour activities		
	1.1. Establishing of a modern water alarm system consisting of acoustic sirens and alarm centres equipment both at KESH's HQ (main alarm centre) and at the HPPs (secondary alarm centre).	Achieved	The alarm centre was completed during the last quarter of 2019 and is currently fully operational. The implementation of the Drin River Cascade Monitoring and Dispatch Centre, financed by KfW, is ongoing.
	1.2 Emergency Preparedness Plan for the Drin and Mat River cascades.	Achieved	Emergency preparedness plan for the Drin and Mat River cascades are completed with World Bank funding, on time, as per contract provisions.
2	Setting standards for corporate governance		
	2.1 Preparation of a Dam Surveillance Manual for each of the dams, inundation maps and an evacuation plan for the people being threatened by the flood wave.	Achieved	Preparation of Dam Surveillance Manual was completed in the course of 2015 using SECO funds. The contract for Prefeasibility Study, Feasibility Study, for Providing Safe Flood Management of the Drin River Cascade Hydropower Plants is in implementation process.
	2.2 Improved interface between local authorities and National Civil Emergency Centre.	Achieved	Achieved and cooperation to be extended so that KESH can benefit from data obtained from the National Civil Emergency Centre re water flows.
3	Transfer and dispersion of skills		
	3.1 On-the-job training to be provided by a specialised consultant to KESH's dam operators and technical staff and the members	Achieved	On-the-job training and the transfer of skills is being provided on an every-day basis, not only from the project managers of the contractors (Andritz, Porr and Can), but also from the owner's engineers. The project managers and other key staff of the

	of Albanian Commission of Large Dams.		contractors are located on site and are aided in their work by the local staff of the Komani HPP, thus cooperation and interaction is maximal. Furthermore, the owner's engineers have had numerous and frequent discussions also with the Albanian Commission of Large Dams, ensuring exchange of ideas and knowledge. Two consultants were hired for the purpose.
	3.2 The Potential Failure Mode Assessment to be adopted and implemented in 5 largest HPPs.	Achieved	Potential Failure Mode Assessment is prepared and included in the Emergency Preparedness Plan at three HPPs operated by KESH. The remaining two HPPs were privatized after the approval of the Project.

Business Results requirements are considered as fully satisfied. The third Project component will be completed shortly. Two Project components have been already completed, on time and substantially below budget. The Project's expected outputs were related to the physical implementation of the Project components, which in turn will enhance the resilience of the cascade towards increasing flood risk due to climate change and is fully in line with the Bank's work on climate risk management with KESH under Operation ID 48132 and the priority policy objectives for Albania. Specifically, the rehabilitation of spillways will improve KESH's ability to respond to heightened water flows in the cascade and to minimise the risk of flooding.

Measuring and Monitoring Success	
<i>Performance Indicators</i>	
<p><u>Physical performance</u></p> <ul style="list-style-type: none"> • Control of design changes impacting on works costs • Compliance with construction budget and completion schedule in accordance with construction contracts • Compliance with the Environmental and Social Action Plan 	<p>Physical performance indicator is rated as fully satisfied.</p> <p>The first two components of the EBRD financing have been successfully completed within its envisaged timeline - as of December 2016, while the third component, will be finalised shortly. The COVID-19 crisis has affected the Project implementation in multiple ways, but the Project timeline and costs were only marginally affected.</p> <p>As mentioned above, the works carried out on the Komani HPP spillways for the implementation of the third Project component have caused the operational spillway to increase to meet its designed capacity (3,600 m³/sec) at Komani HPP. In addition, the availability of units is high and the benefit from the cascade operation during good hydrology is significant, whereas, water leakages are eliminated and</p>

	the estimated GWh 11 lost during a year is reduced to zero.
<u>KESH Performance</u> Compliance with financial covenants	KESH has been in compliance with ESAP. Despite difficulties caused by a sector crisis in 2013 – 2014, KESH has managed to comply with most of its financial covenants, as covenanted in the Project's documentation at initial approval.
Reporting Requirements	
<ul style="list-style-type: none"> • Standard quarterly progress reports, prepared by the PIU, and covenanted in the loan agreement • Monthly reports prepared by the supervising engineer to be provided by the Client • Annual Environmental and Social Reports • IFRS audit reports and other financial reports to be provided by KESH 	<p>Delivery of reporting requirements has been satisfactory.</p> <p>A quarterly report is prepared by the PIU and distributed to all the Drin River Dam Safety Project financiers. Monthly reports were prepared by the supervising engineer and submitted to each financier as part of the disbursement documentation.</p> <p>Compliance with the Project agreed ESAP has also been satisfactory and the company regularly reported on environmental and social performance.</p> <p>KESH has been strengthening its financial management capacity to develop and maintain financial management systems and reporting in compliance with IFRS standards. This was part of a technical assistance provided by WB. IFRS audit reports have been produced on an annual basis, while management financial reports have been produced on a quarterly basis and provided at the request of the financiers.</p>

There were no EBRD policy dialogue activities nor donor funding provided by EBRD related to this Project.

Efficiency

Overall, the Bank's handling of the project is rated excellent. The Bank has engaged closely with KESH, PIU, the consultants and other IFIs during all the stages of the project, starting from inception, structuring, procurement, implementation and monitoring.

The Bank has a long standing relationship with KESH and is the leading IFI working with KESH, having financed some of the largest KESH projects. Such Bank's position proved to be extremely helpful in pushing for KESH's compliance with covenants, receiving timely relevant information and aligning the TI objectives of the various Bank-financed projects. Further, KESH's experience with Bank-led and Bank-financed projects provided adequate knowledge for KESH to comply with the Bank standards and requirements.

The Bank has closely monitored the Project, with frequent site visits and regular exchanges with other IFIs, especially the WB. ESAP implementation has also been frequently monitored on site and the Bank's proactive environmental and social monitoring has contributed to a swift ESAP implementation. In addition, the Bank acted fast to advance procurement streams for the Project. The two initial components of the Project were undertaken in line with EBRD's PP&R, while the spillway rehabilitation is conducted as per WB's procurement rules using International Competitive Bidding (ICB) procedures.

The Project's results are deemed sustainable as they related not only to improvements in infrastructure, but to flood risk mitigation and considerable skills transfer. The Project's physical implementation objectives related to: (i) structural safety, (ii) safety monitoring, (iii) operational safety, (iv) emergency planning and (v) climate risk mitigation. The magnitude and scope of works performed under the Drin River Dam Safety Project is far-reaching and it is unlikely that an investment program of this magnitude can be performed in the near term. With that in mind, the Drin River Dam Safety Project has been designed so that its components have a long-lasting effect. The intended consequences of flood risk prevention and climate risk mitigation have been the key themes featured in the Projects' design ensuring the Project's relevance in the future.

The Project's completion of (i) the rock fall protection measures; (ii) the dam toe and left bank scour area; and (iii) spillways rehabilitation are allowing Komani HPP to work at its full capacity and preventing potential dam failures. In addition, the Project's TI builds upon the resilience quality and it is reflected in the successful implementation of i) the emergency preparedness plan for the Drin and Mat River cascades, ii) an improved interface between local authorities and National Civil Emergency Centre; iii) the preparation of dam surveillance manuals for each of the dams; iv) the Potential Failure Mode Assessment adopted and implemented at three state owned largest HPPs; and v) a modern water alarm system.

Further, the Project has positively impacted KESH's corporate responsibility and governance as it spearheaded KESH's accreditation process. As a result, KESH started the process of obtaining accreditation/certification in UNI EN ISO 9001 Quality Management System, UNI EN ISO 14001 Environmental Management System, OHSAS 18001 Occupational Health and Safety Management System and UNI EN 50001. Systematic environmental management during production activity processes is carried out based on international best practices in accordance with ISO 14001 and all environmental requirements imposed by funding institutions and donors.

Implementation Summary The Project introduced the first dam safety improvement program in Albania, contributing not only to improving flood risk prevention and climate change mitigation, but also allowing for more efficient management of the Drin River cascade and increase in renewable generation. Despite the complexity and novelty of the program, its components were implemented on time, generating substantial savings subsequently used to finance the essential component of spillways rehabilitation at the Komani hydropower plant.

The project also ensured adherence to strict environmental and social standards. KESH implemented the Environmental and Social Action Plan in full and on time and has embarked on an important path of accreditation and certification in environmental and social ISOs.

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As a part of Transition impact, the Project has contributed to the demonstration of new replicable behaviour as well as transfer of skills. The Project has a significant demonstration effect, as it is the first rehabilitation program in the largest cascade in Albania. It has been implemented without disruptions to the domestic supply.

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