ADB

Report and Recommendation of the President to the Board of Directors

Project Number: 46418
November 2013

Proposed Grant
Republic of Tajikistan: Golovnaya 240-Megawatt Hydropower Plant Rehabilitation Project

Asian Development Bank

CURRENCY EQUIVALENTS
(as of 28 October 2013)

Currency unit	–	somoni (TJS)
TJS1.00	=	$0.209
$1.00	=	TJS4.77

ABBREVIATIONS

ADB	–	Asian Development Bank
CAREC	–	Central Asia Regional Economic Cooperation
EPC	–	engineering, procurement, and construction
IEE	–	initial environmental examination
O&M	–	operation and maintenance
PMU	–	project management unit
SOPI	–	sector operational performance improvement

WEIGHTS AND MEASURES

GWh	–	gigawatt-hour
km	–	kilometer
kV	–	kilovolt
MW	–	megawatt

NOTES

(i) The fiscal year (FY) of the Government of Tajikistan and its agencies ends on 31 December.

(ii) In this report, "$" refers to US dollars unless otherwise stated.

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CONTENTS

PROJECT AT A GLANCE

1. Project Name: Golovnaya 240MW Hydropower Plant Rehabilitation Project **2. Project Number:** 46418-001

3. Country: Tajikistan **4. Department/Division:** Central and West Asia Department/Energy Division

5. Sector Classification:

Sectors	Primary	Subsectors
Energy	√	Large hydropower

6. Thematic Classification:

Themes	Primary	Subthemes
Economic growth	√	Promoting macroeconomic stability
Regional cooperation and integration		Trade and investments

6a. Climate Change Impact

No Climate Change Indicator available.

6b. Gender Mainstreaming

Gender equity theme (GEN)	
Effective gender mainstreaming (EGM)	
Some gender elements (SGE)	
No gender elements (NGE)	√

7. Targeting Classification:

General Intervention	Targeted Intervention		
	Geographic dimensions of inclusive growth	Millennium development goals	Income poverty at household level
√			

8. Location Impact:

National	High
Regional	High
Rural	Low

9. Project Risk Categorization: Low Risk

10. Safeguards Categorization:

Environment	B
Involuntary resettlement	C
Indigenous peoples	C

11. ADB Financing:

Sovereign/Nonsovereign	Modality	Source	Amount ($ Million)
Sovereign	Project grant	Asian Development Fund	136.0
Total			136.0

12. Cofinancing:

No Cofinancing available.

13. Counterpart Financing:

Source	Amount ($ Million)
Government	34.0
Total	34.0

14. Aid Effectiveness:

Parallel project implementation unit	No
Program-based approach	No

I. THE PROPOSAL

1. I submit for your approval the following report and recommendation on a proposed grant to the Republic of Tajikistan for the Golovnaya 240-Megawatt (MW) Hydropower Plant Rehabilitation Project.[1]

2. The proposed project will increase supply of renewable energy to national and regional power systems. The project will refurbish electric and mechanical equipment for power generation and transmission at the Golovnaya hydropower plant in Tajikistan. This will increase the availability of clean power for domestic sales and for export to Afghanistan. The project will increase the generation capacity and operational efficiency of the power plant.[2]

II. THE PROJECT

A. Rationale

3. The total installed generation capacity of Tajikistan is 5,055 MW. Most (98%) of the country's generation is hydropower, which is impacted by hydrologic fluctuation, resulting in summer surpluses and winter deficits. Tajikistan's power generation assets have outlived their useful economic and technical life. Maintenance has been insufficient because of a lack of spare parts and funding at Barki Tojik, the vertically integrated state power utility. The power sector regional master plan, prepared in 2012 under the Central Asia Regional Economic Cooperation (CAREC) program,[3] found that nearly 80% of the country's generation and transmission assets needed to be replaced in order to meet demand and eliminate the winter power deficit. The master plan identified rehabilitation of Golovnaya hydropower plant as a priority project. The country partnership strategy, 2010–2014 for Tajikistan identifies rehabilitation of existing hydropower plants as a key area of intervention.[4] Reliable and secure operation of the large generation plant and high voltage transmission network is essential to the reliability of the interconnected regional grid, and a prerequisite for power trade with neighboring countries.

4. Golovnaya hydropower plant is situated 80 kilometers south of Dushanbe. It has an installed generation capacity of 240 MW, making it the fourth-largest hydropower plant in Tajikistan after the Nurek (3,000 MW), Sangtuda 1 (670 MW) and Baipaza (600 MW) hydropower plants. Construction of the Golovnaya hydropower plant began in 1956 and the last unit was commissioned in 1964. Since then, no major improvements or modernization has been carried out to maintain the original performance in terms of efficiency, reliability and safety, or to reduce operation and maintenance (O&M) costs, except on one power generation unit. The condition of the plant's main electro- and hydro-mechanical equipment is now very poor. In 1993 and 1994, unit 2 was partially flooded because of the failure of the hydraulic system to operate the main spillway gate and six sediment sluice gates, which have flood discharge capability. If upstream hydropower plants must spill water in an emergency, Golovnaya hydropower plant could be flooded. In addition, because of an original design deficiency, the power plant lacks oil

[1] The design and monitoring framework is in Appendix 1.

[2] The project is a follow-up to ADB. 2006. *Project Preparatory Technical Assistance: Power Rehabilitation Phase II.* Manila (PPTA-4596). Due diligence and a feasibility study for the proposed project was prepared by the sector operational performance improvement consultants under ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Republic of Tajikistan for the Regional Power Transmission Project.* Manila.

[3] ADB. 2009. *Technical Assistance for the Central Asia Regional Economic Cooperation: Power Sector Regional Master Plan.* Manila.

[4] ADB. 2010. *Country Partnership Strategy: Tajikistan, 2010–2014*. Manila.

containment facilities for the main transformers, which is standard emergency safety equipment.

5. Over 2005–2012, Golovnaya hydropower plant generated an average of about 840 gigawatt-hours (GWh) per annum; average annual generation has decreased since 2003 because of the increasing frequency of generation unit breakdowns. There are 52,560 available working hours for the six units per year. In 2011 they operated for 24,720 hours, were under repair and/or emergency shutdown for 27,135 hours, and were on standby for 705 hours. Unit 4 failed and was rehabilitated in 2012.[5] It is expected that the remaining units will fail in 5 years or less if major rehabilitation works are not undertaken urgently.

6. The transformers and the 110/220 kilovolt (kV) switchyard of the Golovnaya hydropower plant play a vital role in the region, because: (i) they allow the production of hydropower plants to be evacuated to the transmission system—this is the only switchyard that allows power to be evacuated from downstream hydropower plants at Perepadnaya (30 MW) and Centralnaya (15 MW); and (ii) they are used to connect the 220-kV and 110-kV networks, and supply power to about one million people and 30% of Barki Tojik's industrial and commercial customers.

7. The Golovnaya hydropower plant rehabilitation project is also important regionally. In 1987, the first power transmission interconnection was established between the Geran substation in Tajikistan and Kunduz in Afghanistan. Until today, the Geran–Kunduz 110-kV line is the only source of power for Kunduz. Tajikistan exports power through this line throughout the year, with exports increasing by 30% on the average per year since 2008, reaching 106 GWh in 2011. Golovnaya switchyard is the only source of power for Geran substation, and further exports to Kunduz. The demand in northern Afghanistan is expected to grow as the Government of Afghanistan intends to expand the distribution network in the region. A new 220-kV substation in Kunduz is under construction, which will be supplied by power from the newly constructed 220 kV overhead transmission line from Tajikistan.[6] However, due to compatibility issues, the network in Kunduz will, in the interim, be split into two islanded grids; one supplied by the old Geran–Kunduz 110-kV line and another by the new 220-kV line.

8. The financing of the project was requested by the Government of Tajikistan. The proposed project is in line with ADB's country partnership strategy, 2010–2014.[7] The project is included in the country operations business plan, 2013–2014 for Tajikistan,[8] and in the medium-term priority projects list of the CAREC Energy Sector Coordinating Committee.

B. Impact and Outcome

9. The impact of the project will be an increase in the supply of renewable energy to national and regional power systems from 743 GWh in 2012 to 1,130 GWh in 2026. The project outcome will be an increased weighted average generation efficiency of the power plant, from of 83% to 89%.

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[5] The Islamic Development Bank, cofinancing ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Loans, Technical Assistance Grants, and Administration of Grants for the Regional Power Transmission Interconnection Projects in Afghanistan and Tajikistan*, supported upgrade of Golovnaya's unit 4 under this loan.

[6] ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Loans, Technical Assistance Grants, and Administration of Grants for the Regional Power Transmission Interconnection Projects in Afghanistan and Tajikistan.* Manila.

[7] ADB. 2010. *Country Partnership Strategy: Tajikistan, 2010–2014*. Manila.

[8] ADB. 2012. *Country Operations Business Plan: Tajikistan, 2013–2014*. Manila.

C. Outputs

10. The project output will be a rehabilitated Golovnaya hydropower plant and its switchyards, with generation capacity increased from 240 MW to 252 MW. The rehabilitation of the hydropower plant envisages full replacement of units 1, 2, and 5 and is expected to bring substantial improvements in power generation, including during the winter power deficit season. The average annual generation is expected to be 1,130 GWh in 2021, based on hydrologic averages over the last two decades. The amount of electricity generated will increase because of more efficient turbines and generators. Currently, the old units have a maximum efficiency of 83%, discharging 180 cubic meters of water per second per turbine. After the rehabilitation, the efficiency of the new units will increase to 92%, while discharging only 120 cubic meters of water per second per turbine, because of the higher efficiency curve of the new turbine-generator.[9] Replacement of the turbines and generators enables 9% percentage point increase in efficiency, while reducing water discharge by 33%. The rehabilitation will also include the installation of two new transformers with oil containment facilities to prevent oil spills in the case of an emergency. The project will also install new control system for all six units, replace the spillway gate and sediment sluices; and rehabilitate electric and control equipment in 110/220 kV switchyards.

D. Investment and Financing Plans

11. The project is estimated to cost $170 million.

Table 1: Project Investment Plan
($ million)

Item	Amount[a]
A. Base Costs[b]	
Golovnaya Hydropower Plant Rehabilitation	129.4
Subtotal (A)	**129.4**
B. Contingencies[c]	**26.0**
C. Financing Charges During Implementation[d]	**14.6**
Total (A+B+C)	**170.0**

[a] Includes taxes and duties of $19.4 million to be exempted by the government.
[b] In mid-2013 prices.
[c] Physical contingencies computed at 15% of the base costs excluding taxes and duties. Price contingencies computed at 1.8% on foreign exchange costs and 7% on local currency costs; includes provision for potential exchange rate fluctuation under the assumption of a purchasing power parity exchange rate.
[d] Includes interest for subloan to Barki Tojik calculated at 5%, to be financed from Barki Tojik resources.
Sources: Asian Development Bank and sector operational performance improvement program consultant from the Ministry of Energy and Industry.

12. The government has requested a grant not exceeding $136 million from ADB's Special Funds resources to help finance the project. The grant will be onlent to Barki Tojik through a subsidiary loan agreement to fund the investments. The onlending is for a term of 25 years, with a 5-year grace period, and interest rate of 5% per annum. Barki Tojik will be responsible for foreign exchange risks, an established practice between the Ministry of Finance and Barki Tojik. The government and Barki Tojik will contribute $34 million. For its contribution, the government will either (i) allocate additional funds from the budget to cover value-added tax and customs duties accrued on project expenditures, or (ii) exempt the project from such taxes and duties.

[9] Details on turbine-generator efficiency can be found in the Project Feasibility Study (accessible from the list of linked documents in Appendix 2).

13. The financing plan is in Table 2.

Table 2: Financing Plan

Source	**Amount** ($ million)	**Share of Total** (%)
Asian Development Bank (ADF)	136.0	80.0%
Government and Barki Tojik	34.0	20.0%
Total	**170.0**	**100.0%**

ADF = Asian Development Fund.
Sources: Asian Development Bank and sector operational performance improvement program consultant from the Ministry of Energy and Industry.

E. Implementation Arrangements

14. The implementation arrangements are summarized in Table 3 and described in detail in the project administration manual.[10]

Table 3: Implementation Arrangements

Aspects	**Arrangements**		
Implementation period	February 2014–July 2020		
Estimated completion date	31 July 2020		
Management			
(i) Oversight body	Ministry of Energy and Industry		
(ii) Executing agency	JSC Barki Tojik		
(iii) Implementation unit	Project Management Unit for Electro-Energy Sector under the President of the Republic of Tajikistan		
Procurement	Method	Contracts	Amount
Plant design, supply, and install contract for rehabilitation works	ICB	2	$101.3 million
Consulting services	Method	Person-months	Amount
Project implementation consultants	QCBS (90:10)	638 person-months	$8.7 million
Retroactive financing and/or advance contracting	Advance contracting for procurement of consulting services is requested.		
Disbursement	The grant proceeds will be disbursed in accordance with ADB's *Loan Disbursement Handbook* (2012, as amended from time to time) and detailed arrangements agreed upon between the government and ADB.		

ADB = Asian Development Bank, ICB = international competitive bidding, JSC = joint stock company, QCBS = quality- and cost-based selection.
Sources: Asian Development Bank and sector operational performance improvement program consultant from the Ministry of Energy and Industry.

15. The executing agency will be the 100% state-owned power utility Barki Tojik. The project will be managed by an independent project management unit (PMU) that coordinates and implements power projects that are funded through loans and grants from bilateral donors and international financing institutions. The PMU has performed satisfactorily in implementing five previous ADB projects.[11] Lessons from previous and ongoing projects (footnote 12) with regards

[10] Project Administration Manual (accessible from the list of linked documents in Appendix 2).

[11] ADB. 2000. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Republic of Tajikistan for the Power Rehabilitation Project.* Manila; ADB. 2002. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Republic of Tajikistan for the Emergency Baipaza Landslide Stabilization Project.* Manila; ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Loans, Technical Assistance Grants, and Administration of Loan by OPEC Fund to the Islamic Republic of Afghanistan and the Republic of Tajikistan for the Regional Power Transmission Interconnection Project.* Manila; ADB. 2008. *Report and Recommendation of the President to the Republic of Tajikistan for the Nurek 500 kV Switchyard Reconstruction Project.* Manila; ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Republic of Tajikistan for the Regional Power Transmission Project.* Manila.

to implementation arrangements, procurement, funds flow, safeguards, and the implementation schedule have been analyzed and incorporated in the project.

16. Two turnkey engineering, procurement, and construction (EPC) contracts covering the entire project will be procured by Barki Tojik. Procurement will follow international competitive bidding (ICB) procedures using standard bidding documents for plant design, supply, and install contracts. The EPC contract for rehabilitation of generation units will use a two-stage bidding procedure without prequalification due to the technical complexity typical for hydropower plant rehabilitation projects. The EPC contract for rehabilitation of switchyards will use a single-stage two-envelope bidding procedure without prequalification. The Ministry of Energy and Industry consultants, funded under the Regional Power Transmission Project,[12] will assist the PMU in preparing bidding documents and bid evaluation and also provide additional hands-on training to the PMU procurement staff.

17. Barki Tojik will employ a project implementation consultant firm. This consultant will provide technical, financial, and administrative support to the PMU during the entire project implementation period. ADB grant proceeds will cover the cost of the project implementation consultants. The consultant recruitment will follow ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). The quality- and cost-based selection method with a quality:cost ratio of 90:10 will be applied to the selection of project implementation consultants due to technical complexity associated with hydropower plant rehabilitation projects. ADB's prior approval is needed for changing the selection method. Ministry of Energy and Industry (MOEI) consultants will assist the PMU in the recruitment of consultants.

18. To expedite project implementation, ADB management has approved advance contracting for consulting services. Advance contracting allows the government to start procurement activities at its own risk, prior to the signing of the grant agreement, but does not allow signing a contract with a firm before the grant has become effective. ADB informed the government that such advance contracting (including advertising) must comply with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time), and informed the government and Barki Tojik that approval of advance contracting does not commit ADB to finance the proposed project.

19. The project will be implemented over a 77-month period from February 2014 to July 2020. The implementation consultant will prepare a detailed implementation schedule during the preconstruction phase of the project and submit it to ADB.

III. DUE DILIGENCE

A. Technical

21. ADB and the Ministry of Energy and Industry conducted in-depth technical due diligence on the investment proposal to minimize the cost overrun risk usually associated with hydropower plant rehabilitation projects. The inspection work included complete dismantling and related inspection of one of the units; testing of the spillway gate and stop log operations, sediment sluice operations, the canal siphon bypass operation, unit synchronization, and gantry and power house operations; and inspection of electric equipment and control of switchyards. The technical due diligence also assessed the condition of the civil structures and dam stability. The inspection found that the structures satisfy the operational requirements of the hydropower

[12] ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Republic of Tajikistan for the Regional Power Transmission Project*. Manila.

plant and no significant deterioration or movement has occurred over the last 50 years. A stability assessment of the main water-related structures, the powerhouse, and the spillway concluded that both sections meet dam safety requirements for sliding and the position of resultant and foundation stresses under normal and flood load conditions. Various cost estimation methods were used to obtain up-to-date quotations for water-to-wire equipment, which comprise a major portion of the rehabilitation works. The project implementation schedule was prepared taking into account the annual seasonality of water flows to minimize flood risk.

22. ADB is satisfied with the quality of the cost estimates, cost structures, appropriateness of the technology, and the execution plan. The "readiness" level is high and the proposed technical solutions are assessed to be more cost-effective than the alternatives. Barki Tojik's operational and maintenance staff is familiar with the proposed design concepts. The technical proposals do not represent a shift from existing practices.

B. Economic and Financial

23. The project's economic internal rate of return is 17.3%, confirming the project's economic viability. The project will extend the economic life of Golovnaya hydropower plant, increase generation capacity, and enhance energy output. The project's cost streams (i.e., capital investment and O&M), which reflect the costs of delivering the expected benefits (i.e., power consumption and export sales), were compared with the cost streams under a "without-project" scenario based on 2013 constant prices for the project life of 50 years. The without-project scenario assumes no significant rehabilitation takes place and the existing units fail to operate one by one during the next 30 years according to the expected life of each unit. The incremental benefits attributable to increased output are measured based on willingness to pay and export sales after taking into account technical losses and summer surplus. The sensitivity analysis confirms the robustness of the project's economic viability under adverse conditions, including increased capital and O&M costs, and reduced benefits.

24. The financial analysis confirms the financial viability of the project. The financial internal rate of return of 4.3% is higher than the weighted average cost of capital of 2.2%. Based on the with- and without-project comparison, the project cash flow, measured at 2013 constant prices for the project life of 50 years, reflects the costs (capital investment and O&M) and revenues (domestic sales and exports of electricity) attributable to the project, taking into account system losses and taxes, from the Barki Tojik perspective. The project remains financially viable under the assumption that the end-user tariffs continue to increase at the current rate of 16% per annum in real term. The sensitivity analysis also confirms the project's financial sustainability under adverse conditions.

C. Governance

25. ADB's Anticorruption Policy (1998, as amended to date) was explained and discussed with the government and Barki Tojik. Consistent with its commitment to good governance, accountability, and transparency, ADB reserves the right to investigate, directly or through its agents, any allegedly corrupt, fraudulent, collusive, or coercive practices relating to the project. To support these efforts, relevant provisions of ADB's Anticorruption Policy are included in the loan regulations and the bidding documents. In particular, all contracts financed by ADB in connection with the project shall include provisions specifying the right of ADB to audit and examine the records and accounts of the executing agencies and all contractors, suppliers, consultants, and other service providers as they relate to the project. The specific policy

requirements and supplementary measures are described in the project administration manual (footnote 11).

26. The recent financial performance of Barki Tojik has been weak and unstable, generating losses for FY2007–FY2009, profits for FY2010–FY2011, and losses again in FY2012. Barki Tojik's financial management capacity requires significant improvement. External auditing for FY2011 and FY2012 based on international audit standards indicate major issues with (i) valuation of inventory, (ii) revaluation of assets, (iii) records on account receivables and payables, and (iv) data conciliation of revenues.[13] Barki Tojik's accounting policies, procedures and financial reporting follow International Financial Reporting Standards, which is required under the Law of Accounting and other decrees of the government.[14] Each of the 30 subordinate entities under the holding company prepares its own financial report, and these are consolidated at the holding company level. Barki Tojik has an internal audit unit established at the head office, but with limited independence. External independent auditors are engaged to undertake auditing based on international auditing standards for the holding company in compliance with the statutory requirements.[15]

27. Substantial efforts are being made to strengthen the financial management capacity. In 2011, the government has initiated a comprehensive program to restructure Barki Tojik. The sector operational performance improvement (SOPI) program is extensively supported by ADB to improve commercial operations and financial performance of the utility and strengthen its capacity to service debt while providing high-quality services.[16] It includes institutional strengthening and reorganization of Barki Tojik using a phased approach (phase 1 involves sector assessment, phase 2 preparation of a detailed restructuring plan, and phase 3 the restructuring itself). The program addresses governance, financial management, control and audit, legal and regulatory frameworks, management systems, and organizational structure. The program also addresses technical operations and planning to optimize the future investments and allocate sufficient funds for system maintenance. On 11 June 2013, the government approved (i) the assessment report prepared under the SOPI program; (ii) the intervention plan prepared by the SOPI program consultant; and (iii) the new structure of Barki Tojik, with three departments under the same legal entity (generation, transmission, and distribution). New heads of the generation, transmission, and distribution departments were appointed on 28 August 2013. Preparation of the detailed restructuring plan is ongoing and is expected to be completed in December 2013.

28. Separately, Barki Tojik is in the process of recruiting international consultants to revaluate assets in accordance with the International Financial Reporting Standards and assess issues related to account receivables and payables. The project is funded by the World Bank.[17] Automated accounting and billing system are being introduced, starting in major cities such as Dushanbe and Khujand. Continued effort is needed to steadily increase the tariff level, improve tariff collection efficiency through the adoption of computerized accounting and reporting systems, and modernize and rehabilitate productive assets through investment. It is expected

[13] External audit of Barki Tojik by independent auditors has resulted in a disclaimer of opinion for FY 2010–2012.
[14] Government's Decree 428 of 4 November 2002 for "International Financial Reporting Standards"; Government's Decree 231 of 2 May 2010 for "Additional Arrangements for Implementing International Financial Reporting Standards in the Republic of Tajikistan"; and President's Decree 702 of 25 March 2011 for the "Law of Accounting."
[15] President's Decree 626 for the "Law on Financial Management and Internal Control"; and President's Decree 631 for the "Law on Internal Audit."
[16] ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Republic of Tajikistan for the Regional Power Transmission Project.* Manila.
[17] World Bank. 2005. *Energy Loss Reduction Project 2005–2014.* Tajikistan.

that there will be positive changes in Barki Tojik's accounting procedures, financial reporting, and management reporting systems in 2014–2016.

D. Poverty and Social

29. A reliable supply of electricity brings significant benefits to communities (especially those that are poor), including enhanced incomes and livelihoods, improved health and education, better security, and a generally higher standard of living. In Tajikistan the winter months are particularly difficult for those who lack a reliable supply of electricity, and cannot afford adequate alternatives. Women in particular will benefit from the project because of their household and family responsibilities, including gathering fuel for cooking, heating, and processing water; and caring for children, the sick, and the elderly. Electricity also offers women many more opportunities for home-based enterprise and income generation, and has positive impacts on public facilities such as schools and health centers.

30. However, because this project will refurbish electrical and mechanical equipment at the hydropower plant, which will then supply electricity to the entire grid, the benefits (although substantial) are generalized and indirect, and do not target particular communities. Similarly, there will not be specific power-supply benefits for the area surrounding the Golovnaya plant, nor for particular social groups such as women or the poor, beyond those that accrue to electricity consumers in general. The technological nature of the project allows little scope for social components, and the project provides no opportunities for pro-poor initiatives.

E. Safeguards

31. The project is classified as Category B for environmental impacts. The initial environmental examination (IEE) and environmental compliance audit report prepared by Barki Tojik are in accordance with ADB's Safeguard Policy Statement (2009). Anticipated adverse environmental impacts of the project are related to temporary shortages of electricity supplies due to replacement of generating units, solid waste utilization, and health and safety issues. Adequate mitigation measures will be incorporated into the project design and will be implemented through an environmental management plan. The IEE includes provisions for increasing the safeguards capacity of the PMU. The environmental management plan stipulates that an environmental management development program for Golovnaya hydropower plant staff will be implemented through training workshops at the preconstruction and construction stages. A public consultation was conducted on 6 September 2013. The IEE and the environmental compliance audit report were disclosed on the ADB website on 20 September 2013. A climate change risk assessment will be conducted during pre-construction phase to identify operation and maintenance measures aimed at increasing the climate resilience of the hydropower plant.

32. Land acquisition and resettlement impacts are not envisaged, because all activities will be confined to the power plant premises; therefore a category C classification has been assigned for both involuntary resettlement and indigenous peoples safeguards. Because the facility was commissioned in 1962 and has existed and been operational since then, a social compliance audit for the existing facility was undertaken to determine if there are outstanding land acquisition and resettlement issues; the social compliance audit confirmed there are no outstanding or remaining issues.

F. Risks and Mitigating Measures

33. The integrated benefits and impacts are expected to outweigh the costs. Major risks and mitigating measures are summarized in Table 4 and described in detail in the risk assessment and risk management plan.[18]

Table 4: Summary of Risks and Mitigating Measures

Risks	Mitigating Measures
Transportation of large and heavy equipment to Golovnaya Hydropower Plant and risk of equipment damage in transit	Bid documents will specify that the contract include a detailed transportation logistics plan, and that goods be insured from point of origin to installation onsite.
Manufactured equipment does not fit during installation, resulting in delays and claims	The bid documents will clearly define responsibility, and sufficient time will be allocated for the turnkey contractor to take measurements before manufacture.
Delay in project implementation and cost overruns	The PMU has experience with similar projects. The project implementation consultant will supervise installation, manage contracts and finances, and monitor environmental programs and report. Bid documents will envisage lump sum payment with significant penalties for late completion.
Risk of flood	The project implementation schedule will take into account annual fluctuation in water flow to minimize flood risk during the rehabilitation works.
Staffing deficiencies and insufficient capacity of Barki Tojik and PMU to manage procurement and contract administration	ADB's SOPI consultants will address staffing deficiencies through extensive training. Separately SOPI program consultant under the Tajikistan Regional Power Transmission Project [a] will be assisting in the recruitment of the implementation consultant and turnkey contractor. The implementation consultant will be actively involved with the project after the contract award.
Weak financial management, funds flow, accounting procedures and audits	ADB's SOPI program consultant under the Tajikistan Regional Power Transmission Project[a] will assist Barki Tojik in corporate restructuring to improve the efficiency of utility operations. Restructuring will be further supported by the World Bank's program addressing the introduction of IFRS, asset valuation, receivables, and billing. These measures will result in improved financial management, including allocation of maintenance funds. The direct payment and letter of commitment methods will be used, with no imprest account.
Operation and maintenance	The project implementation consultants in conjunction with Barki Tojik staff will develop a plant operation and maintenance plan that will be approved by Barki Tojik management before commissioning of the first rehabilitated unit.

ADB = Asian Development Bank, IFRS = international financial reporting standards, PMU = project management unit, SOPI = sector operational performance improvement.

[a] ADB. 2010. *Report and Recommendation of the President to the Board of Directors: Proposed Grant to the Republic of Tajikistan for the Regional Power Transmission Project.* Manila.

Sources: Asian Development Bank and sector operational performance improvement program consultant from the Ministry of Energy and Industry.

[18] Risk Assessment and Risk Management Plan (accessible from the list of linked documents in Appendix 2).

IV. ASSURANCES AND CONDITIONS

34. The government and Barki Tojik have assured ADB that implementation of the project shall conform to all applicable ADB policies, including those concerning anticorruption measures, safeguards, gender, procurement, consulting services, and disbursement as described in detail in the project administration manual and legal documents.

35. The government and Barki Tojik have agreed with ADB on certain covenants for the project, which are set forth in the grant and project agreements.

36. No withdrawal shall be made from the grant account until (i) a subsidiary loan agreement, in form and substance satisfactory to ADB, has been duly authorized or ratified by, and executed and delivered on behalf of, the government and Barki Tojik; and (ii) an appropriate legislation has been passed to provide exemption from taxes and duties on project expenditures or the government has made budgetary allocation to Barki Tojik for the costs of such taxes and duties.

V. RECOMMENDATION

37. I am satisfied that the proposed grant would comply with the Articles of Agreement of the Asian Development Bank (ADB) and recommend that the Board approve the grant not exceeding $136,000,000 to the Republic of Tajikistan from ADB's Special Funds resources for the Golovnaya 240-Megawatt Hydropower Plant Rehabilitation Project, on terms and conditions that are substantially in accordance with those set forth in the draft grant and project agreements presented to the Board.

Takehiko Nakao
President

5 November 2013

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Increased supply of renewable energy to national and regional power systems	Hydro generation supply increased from 743 GWh in 2012 to 1,130 GWh in 2026	Barki Tojik annual reports Annual reports of state statistics departments Annual report of power utility in Afghanistan	**Assumption** Government policy will continue to support regional energy trade **Risk** Power purchase agreement is not enforceable due to worsening security condition in Afghanistan
Outcome Increased operational efficiency of Golovnaya hydropower plant	The weighted average generation efficiency increased from 83% in 2012 to 89% in 2020	Barki Tojik annual and audit reports Project implementation consultants' progress reports	**Assumption** Barki Tojik corporate restructuring effectively implemented and efficiency of utility operations achieved
Output Rehabilitated electric power generation and transmission equipment of the Golovnaya hydropower plant	Golovnaya hydropower plant commissioned in 2020 Plant installed generation capacity increased from 240 MW in 2012 to 252 MW in 2020	Barki Tojik annual reports Commissioning certificate Project implementation consultant's completion report	**Assumption** Qualified bids for the turnkey contract received on time

Activities with Milestones	Inputs
Rehabilitation of Golovnaya Hydropower Plant 1. The implementation consultant engaged by October 2014. 2. The contractor for the rehabilitation of switchyards contracted by May 2015. 3. The contractor for the rehabilitation of generation units contracted by June 2015. 4. Golovnaya Hydropower Plant switchyards rehabilitated and commissioned by October 2018. 5. Golovnaya Hydropower Plant generation units rehabilitated and commissioned by July 2020.	**ADB (ADF Grant): $136 million** **Government/BarkiTojik: $34 million**

ADB = Asian Development Bank, GWh = gigawatt-hour, MW = megawatt.

LIST OF LINKED DOCUMENTS
http://www.adb.org/Documents/RRPs/?id=46418-001-2

1. Grant Agreement
2. Project Agreement
3. Sector Assessment (Summary): Energy
4. Project Administration Manual
5. Contribution to the ADB Results Framework
6. Development Coordination
7. Financial and Economic Analysis
8. Country Economic Indicators
9. Summary Poverty Reduction and Social Strategy
10. Initial Environmental Examination
11. Risk Assessment and Risk Management Plan

Supplementary Documents

12. Project Feasibility Study
13. Financial Management Assessment
14. Procurement Capacity Assessment