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Report No: PAD5083

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED GRANT

IN THE AMOUNT OF SDR 11.7 MILLION
(US$15 MILLION EQUIVALENT)

TO THE

REPUBLIC OF TAJIKISTAN

FOR A

TECHNICAL ASSISTANCE FOR FINANCING FRAMEWORK FOR ROGUN HYDROPOWER PROJECT

December 12, 2022

Energy & Extractives Global Practice
Europe And Central Asia Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective October 31, 2022)

Currency Unit =	Tajik somoni
TJS 10.215 =	US$1
US$1.282 =	SDR 1

FISCAL YEAR
January 1 - December 31

Regional Vice President: Anna M. Bjerde

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ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
BT	Barqi Tojik Open Joint Stock Holding Company
CAPS	Central Asian Power System
CASA	Central Asia – South Asia Power Transmission and Trade Project
CCAP	Climate Change Action Plan
CCGT	Combined Cycle Gas Turbine
CO2	Carbon Dioxide
CPF	Country Partnership Framework
DRC	Democratic Republic of Congo
DSA	Debt Sustainability Analysis
DT	Diversion Tunnel
EBRD	European Bank for Reconstruction and Development
E&S	Environmental and Social
ECA	Export Credit Agency
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
EPC	Engineering, Procurement, and Construction
E&S	Environmental and Social
ESCP	Environmental and Social Commitment Plan
ESF	Environmental and Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESS	Environmental and Social Standard
FDI	Foreign Direct Investment
FIDIC	Fédération Internationale Des Ingénieurs-Conseils
FMM	Financial Management Manual
GBAO	Gorno-Badakhshan Autonomous Oblast
GDP	Gross National Product
GNI	Gross National Income
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
GWh	Gigawatt-hour
HPP	Hydropower Plant
IDA	International Development Association
IFAS	International Fund to Save the Aral Sea
IMF	International Monetary Fund
JSC	Joint Stock Company
LMP	Labor Management Plan
masl	Meters Above Sea Level
MOU	Memorandum of Understanding
MW	Megawatt
NPV	Net Present Value
OHS	Operational Health and Safety
O&M	Operation and Maintenance

OP	Operational Policy
PAMP	Public Employment for Sustainable Agriculture and Water Management Project
PAP	Project Affected People
PDO	Project Development Objective
PMC	Project Management Consultant
PMF	Probable Maximum Flood
PMG	Project Management Group
POE	Panel of Experts
PPA	Power Purchase Agreement
PPSD	Project Procurement Strategy for Development
PV	Photovoltaic
RAP	Resettlement Action Plan
SEP	Stakeholder Engagement Plan
SDR	Special Drawing Right
SIB	Shabakahoi Intiqoli Barq Joint Stock Company
SOE	State Owned Enterprise
STB	Shabakahoi Taqsimoti Barq Joint Stock Company
TA	Technical Assistance
TALCO	Tajikistan Aluminium Company
TEAS	Techno-Economic Assessment Studies
TGEM	TajikGidroElectroMontaj
TJS	Tajik Somoni
TWh	Terawatt-hour
ZIRMIP	Zarafshon Irrigation Rehabilitation and Management Improvement Project

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Tajikistan	Technical Assistance for Financing Framework for Rogun Hydropower Project	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P178819	Investment Project Financing	High

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[ ] Performance-Based Conditions (PBCs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	[ ] Hands-on Enhanced Implementation Support (HEIS)

Expected Approval Date	Expected Closing Date
12-Jan-2023	31-Dec-2026

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The project development objectives are to strengthen Rogun HPP Project's financial and commercial frameworks, enhance its environmental and social sustainability, improve the transparency, and support establishment of Rogun HPP Project's benefit sharing program

Components

Component Name	Cost (US$, millions)
Component 1: Development of macroeconomically sustainable financing plan and a commercial framework for Rogun HPP project	4.80
Component 2: Improvement of the dam safety	4.00
Component 3: Strengthening of E&S framework and benefit sharing aspects of Rogun HPP Project	7.00
Component 4: Strengthening of institutional capacity of Rogun PMG and Rogun JSC	4.20

Organizations

Borrower:	Ministry of Finance
Implementing Agency:	Project Management Group for Energy Facilities Construction

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	20.00
Total Financing	20.00
of which IBRD/IDA	15.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	15.00
IDA Grant	15.00

Non-World Bank Group Financing

Other Sources	5.00
Asian Infrastructure Investment Bank	5.00

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	SML Amount	Guarantee Amount	Total Amount
Tajikistan	0.00	15.00	0.00	0.00	15.00
National Performance-Based Allocations (PBA)	0.00	15.00	0.00	0.00	15.00
Total	**0.00**	**15.00**	**0.00**	**0.00**	**15.00**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2023	2024	2025	2026	2027
Annual	3.00	4.00	4.00	3.00	1.00
Cumulative	3.00	7.00	11.00	14.00	15.00

INSTITUTIONAL DATA

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Substantial
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	High

8. Stakeholders	Substantial
9. Other	Substantial
10. Overall	Substantial

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Environmental and Social Standards Relevance Given its Context at the Time of Appraisal

E & S Standards	Relevance
Assessment and Management of Environmental and Social Risks and Impacts	Relevant
Stakeholder Engagement and Information Disclosure	Relevant
Labor and Working Conditions	Relevant
Resource Efficiency and Pollution Prevention and Management	Relevant
Community Health and Safety	Relevant
Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Relevant
Financial Intermediaries	Not Currently Relevant

NOTE: For further information regarding the World Bank's due diligence assessment of the Project's potential environmental and social risks and impacts, please refer to the Project's Appraisal Environmental and Social Review Summary (ESRS).

Legal Covenants

Sections and Description
The Recipient shall and shall cause the Project Implementing Entity to ensure that the Dam Safety Panel of Experts and the Environmental and Social Panel of Experts are operated and maintained throughout Project implementation, with functions, resources, and terms of reference satisfactory to the Association

Sections and Description
The Recipient shall ensure that the Project Implementing Entity has installed an accounting software satisfactory to the Association, no later than February 1, 2023 (or such later date as the Association has established by notice to the Recipient).

Sections and Description
The Recipient shall adopt a macro-fiscally sustainable Rogun HPP Project financing plan acceptable to the Association, no later than May 31, 2023 (or such later date as the Association has established by notice to the Recipient).

Sections and Description
The Recipient shall complete the independent assessment of corporate governance structure of Rogun Joint Stock Company under the terms of reference acceptable to the Association and start implementing the recommendations from the assessment in a manner acceptable to the Association, no later than December 31, 2023 (or such later date as the Association has established by notice to the Recipient).

Conditions

Type	Financing source	Description
Effectiveness	IBRD/IDA	The Subsidiary Agreement has been executed on behalf of the Recipient and the Project Implementing Entity in a manner acceptable to the Association
Type	Financing source	Description
Effectiveness	IBRD/IDA	The Project Implementing Entity has hired qualified staff and provided adequate resources to support management of environmental and social (E&S) risks with terms of reference and qualifications satisfactory to the Association as further elaborated in the ESCP
Type	Financing source	Description
Effectiveness	IBRD/IDA	The Project Implementing Entity has: (i) established and started the operation of a grievance redress mechanism for Project workers, as

		described in the Labor Management Plan, and consistent with the Environmental and Social Standard 2; and (ii) established, publicized, maintained, and started the operation of accessible grievance mechanism, to receive and facilitate resolution of concerns and grievances in relation to the Project, promptly and effectively, in a transparent manner that is culturally appropriate and readily accessible to all Project-affected parties, at no cost and without retribution, including concerns and grievances filed anonymously, in a manner consistent with Environmental and Social Standard 10; all in accordance with the ESCP
Type Effectiveness	Financing source IBRD/IDA	Description All conditions precedent to the effectiveness of the PUFR Agreement have been fulfilled and the Recipient has confirmed that all internal procedures under the laws of the Republic of Tajikistan have been completed and that no additional internal steps procedures are pending under the laws of the Republic of Tajikistan

I. STRATEGIC CONTEXT

A. Strategic and Country Context

1. **The proposed US$15 million Investment Project Financing provides technical assistance (TA) to improve the financial and commercial framework of the Rogun Hydropower Project (HPP) currently under construction, which once completed, would be transformative as it would stimulate growth and welfare for Tajikistan and Central Asia.** At completion, Rogun HPP Project will have an installed capacity of 3,780 MW and a 335-meters high dam. Rogun HPP Project started construction with number of stop-and-resume cycles driven by economic consequences of major geopolitical events, and more intently from 2016 onwards. To date, the Government has committed significant public resources to finance the Rogun HPP that constrained spending on social, healthcare and educations sectors. As per the Financing Options Study (November 2021), prepared by the World Bank following the Government request, a mix of concessional donor financing and commercial financing in the later stages of the project will be needed to complement government budget financing. This interplay of resources is necessary not only to complete the construction of Rogun HPP, but also to manage the fiscal threshold within the debt sustainability parameters and create space for social spending. As development partners are considering providing financial support to the Rogun HPP, the proposed TA is timely to enable Rogun HPP to have a macroeconomically sustainable financing plan, improve its environment and social performance, strengthen the commercial framework, and increase transparency.

2. **For Tajikistan, Rogun HPP would provide affordable, reliable, and sustainable energy, enhance the resilience of the entire energy production of the country and provide much needed exports revenues.** Once completed, the Rogun HPP would provide reliable electricity supply to meet growing domestic electricity demand at affordable costs. The large reservoir would improve the resilience of the entire Vakhsh cascade of HPPs, which represents 96 percent of domestic hydro capacity, against flooding risks (as measured by the Probable Maximum Flood, or PMF). As Rogun HPP would create excess surplus energy during the summer months, it will be designed as an export-oriented project, with 62 percent of its energy exported to provide affordable and clean firm energy into the power networks of Central Asian countries. As such, it would provide a source of export revenues for years to come. Tajikistan's hydropower potential is ranked the eight largest in the world at 527 Terawatt-hour (TWh) per year, which is 25 times higher than what is currently utilized.

3. **At the regional level, Rogun HPP would also serve to decarbonize the electricity grids of Kazakhstan and Uzbekistan, enhance energy security, and provide a building tool to revive the Central Asian regional power market.** In the International Energy Agency's (IEA) assessment of net-zero emissions, hydropower is the backbone of global electricity security and the most cost-effective, dispatchable and flexible low-carbon electricity technology option to integrate solar and wind. In fact, the IEA net zero scenario estimates that dispatchable renewable energy such as hydropower need to reach 125 Gigawatt (GW) by 2030. For the decarbonization scenarios of Central Asia, which is currently highly dependent on coal and gas for power generation, the Rogun HPP should be attractive for the following reasons: (i) its green and reliable energy will contribute to lower costs of energy transition in Kazakhstan and Uzbekistan; (ii) it will promote the greater integration or renewable energy (RE), such as solar and wind, in the country; and (iii) it will contribute to energy security through further development of the Central Asia regional power market, including through signing of firm and long term power purchase agreements (PPAs), which has been a key step in the development of power pools globally. Finally, Rogun HPP qualifies for the European Union's (EU) Global Gateway Initiative as it seeks to ensure lasting benefits for local communities through a benefit sharing mechanism. The Bank and other development partners share many of the same objectives of the EU Global Gateway that promotes high-quality, transparent and sustainable infrastructure.

4. **As it is an integral part of the Vakhsh cascade, Rogun HPP Project also has the potential to contribute to enhancing water security, not only for Tajikistan, but for the Central Asia region.** With commitment of adherence to requirements of water sharing agreements among riparians, significant economic benefits may accrue to the region in terms of energy supply, flood mitigation and enhanced reliability of water supply for irrigation and domestic uses. This is especially critical in the context of climate change where the impacts on the hydrology (total volumes, flood peaks, seasonal timing due to glacial and snow melt, increased water scarcity) are already being observed including on downstream riparian water demands. The future operating protocols will need to consider the economic tradeoffs for operating the cascade across flood management, irrigation, and energy generation objectives and for different riparians in the basin. Finally, given the experience already with shared and jointly managed infrastructure in the region, there are opportunities for the Rogun HPP to contribute to the regional water management cooperation in the region. This includes potentially managing storage volume shares in the Vakhsh cascade to riparian priorities, opportunities to trade water use efficiency improvements, and regional investments in watershed management to better control sedimentation to extend the operational life of reservoirs for shared benefits. There exists a functional regional institution on water sharing (International Fund to Save the Aral Sea, IFAS) that could play a future role in facilitating these discussions that are being addressed in parallel. See Box 1 for details.

Box 1: Water Sharing Agreement between Riparians and World Bank Support for Improvement of Water Resource Management

During the Soviet period, water resources were shared among the five Central Asia republics based on master plans for water resources development in the Amu Darya and Syr Darya River basins. With the establishment of the Interstate Commission for Water Coordination (ICWC) in 1992, the newly independent states prepared a regional water strategy (Agreement of February 18, 1992), but continued to respect existing principles until the adoption of a new water-sharing agreement. The agreement included the construction of Kambarata 1 reservoir in Kyrgyz Republic and Rogun reservoir in Tajikistan. The new agreement - "Agreement on joint actions to address the problem of the Aral Sea and socio-economic development of the Aral Sea basin" - was signed by the Heads of the five states in 1996. The ICWC meets twice annually to set surface water withdrawal quotes, taking into account the main rivers' water flow prognosis for the October–March and April–September seasons.

The Bank has been supporting Tajikistan to improve efficiency of water resource management including on the Vakhsh basin. Specifically, the Bank support commenced with emergency projects focused on irrigation expansion for rural livelihoods—first, Ferghana Valley Water Resource Management Project (P102150) in the Ferghana Valley of Syr Darya basin, then the first Public Employment for Sustainable Agriculture and Water Management Project (PAMP-I, P119690) in the Lower Kofarnihon basin. Subsequently, the focus shifted toward institutional strengthening and sector reforms under PAMP-II (P133327) also in the Lower Kofarnihon and under the Zarafshon Irrigation Rehabilitation and Management Improvement Project (ZIRMIP, P158576) in the Zarafshon basin. PAMP-II retained the PAMP-I design but tackled a larger geographic area over a longer implementation period. Less emphasis was put on temporary employment and more on infrastructure rehabilitation. ZIRMIP shifted the focus toward reforms and institutional strengthening but continued with rehabilitation of critical infrastructure. Tajikistan Strengthening of Water and Irrigation Project (SWIM, P175356) is currently helping the Government to: (a) strengthen the national and basin-level water resources policy and planning; (b) improve the irrigation planning and management; and (c) improvement of small, medium and large-scale irrigation schemes. This operation can support the development of operational protocols for the Rogun HPP in the context of the Vakhsh cascade.

5. **Under the current financing model, macroeconomic difficulties may impact the construction of Rogun HPP, which has been overwhelmingly financed by the Government budget.** The total project cost of Rogun HPP completion, as per the current construction schedule, is estimated at US$4.8 billion.[1] In 2007-2020, the Government spent about US$3 billion on Rogun HPP Project, which was entirely financed by the government budget. Since 2007, the Government has been primarily relying on the state budget's fiscal revenues to finance Rogun HPP. Through a

[1] Updated by the World Bank as part of the Rogun Financing Options Study (November 2021).

domestic public offering in 2010, Rogun JSC also raised about TJS 900 million (US$80 million) from different Tajikistan citizens and legal entities. In 2017, the Government also issued US$500 million Eurobond with a coupon rate of 7.125 percent to finance capital investment of the project. Except for the Government direct funding, there was limited interest from development partners or commercial banks to finance Rogun HPP mainly due to the lack of a credible and fiscally sustainable financing plan, commercial arrangements for electricity sales, and the lack of a lead development partner to play a convening role for the required financing and to provide implementation support during construction. In addition, some of the downstream riparians raised concerns about the project from 2011 to 2016. Since then, however those countries did not raise any further concerns. The table below shows total investments in the project, between 2007 and 2020, as per the Bank's Financing Options Study. Further, starting from 2020, the Government has been struggling to finance the construction of the project from the state budget as a result of the macroeconomic impacts of COVID-19 and the economic implications from the ongoing difficult international situation.

Table 1: Total Investments in the Rogun HPP Project, 2007–2020 (TJS millions)

	2007-10	2011-13	2014-16	2017	2018	2019	2020	Total (2007-20)
Total spending	2,138	2,915	5,950	5,251	4,758	3,416	3,182	27,610[2]
State budget, including Eurobond proceeds and other public resources	1,318	2,716	5,950	5,251	4,758	3,416	3,182	26,591
Equity	820	199	-	-	-	-	-	1,019
Total spending (percent of GDP)	2.3	2.8	3.9	8.6	6.9	4.4	4.0	

Source: World Bank team estimate.

6. **Because of its size relative to the economy, Rogun HPP needs to be completed and operated under sustainable macro-fiscal and commercial frameworks**. So far, partial financing of the project has been done using the state budget. Going forward, the financing of the full amount required for completion would be very challenging for the state budget and would not allow to increase other priority expenditures. At an average annual cost of 5 percent of GDP during 2017-2020, investments in the Rogun HPP Project have been outpacing public spending in any other sector, including social sectors. It accounted for almost 45 percent of the public investment program (PIP) in 2017-2019 (Figure 2), up from 20 percent of total PIP before 2017. A project of this size has not been an easy fit for the limited fiscal space of Tajikistan. To accommodate construction of the project, the Tajik government incurred commercial debt, delayed spending decisions in other sectors, and squeezed tax revenues.

7. **The Rogun HPP should also contribute to Tajikistan's development, where per capita income remains at about US$1,100 – slightly above the lower-middle income (Gross National Income, Atlas method).** The poverty rate fell from 17.8 percent in 2015 to about 13.9 percent in 2021. Tajikistan's economy relies heavily on primary commodity production and exports, with limited economic diversification. Domestic investment and consumption depend on migrant remittances, which are about a third of Gross Domestic Product (GDP), thus leaving the economy highly vulnerable to external shocks.

8. **As development partners are considering providing financial support to towards completion of Rogun HPP Project, the proposed TA is timely to enable Rogun HPP Project to have a macroeconomically sustainable financing plan, improve its E&S performance, strengthen the commercial framework, and increase transparency**. The dedicated TA will follow a number of critical steps to ensure that Rogun HPP meets established international standards and practices, including transparency measures. The Bank is already supporting the Government in its efforts to improve the financial sustainability and enabling environment for private sector investments in the electricity sector through the support to the Government's program for financial recovery of electricity sector under the Power Utility

[2] About US$3 billion.

Financial Recovery Program-for-Results and its additional financing (P168211). The Government, through an official letter, confirmed its commitment to: (a) broader electricity sector and SOE reforms including improved sector governance and fiscal risk management; and (b) strengthening of the financial and commercial frameworks of Rogun HPP, improving its environmental and social sustainability, increasing the transparency, and introducing a benefit-sharing program using a portion of Rogun HPP's revenues.

Figure 1: Trends in Total Capital Expenditures and Investments in Rogun HPP Project, 2013–2020

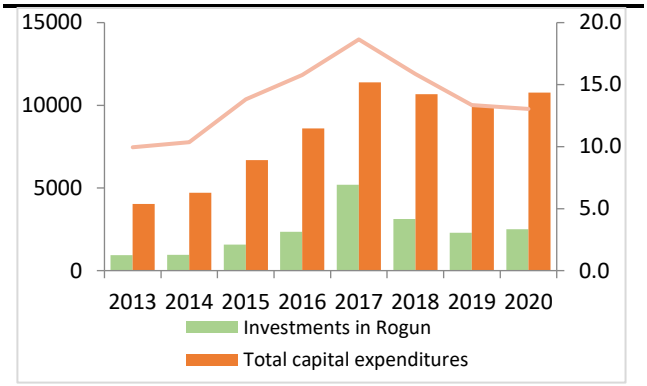
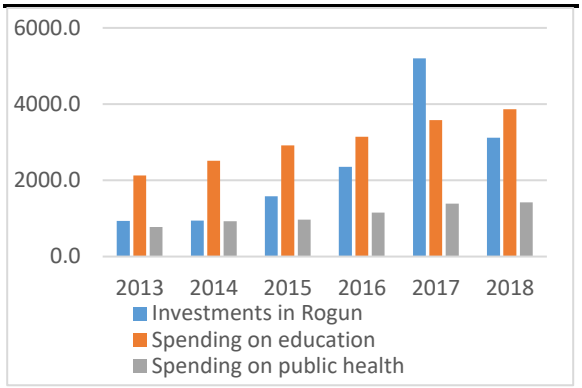


Figure 2: Investments in Rogun and Public Spending on Health and Education (TJS millions)



Source: "Harnessing the Power of the Rogun Project: Reshaping Financing Structures and Economic Policies," World Bank, Jun 2020.

B. Sectoral and Institutional Context

Electricity Sector Background

9. **The power sector is comprised of two state-owned electricity generation companies, two independent power producers (IPPs)[3], electricity transmission and distribution companies, and a concession in Gorno-Badakhshan Autonomous Oblast (GBAO) combining electricity generation and distribution**. Barqi Tojik Open Joint Stock Company (BT) is the state-owned generation company which owns and operates all utility-scale generation plants in the country except for GBAO. Rogun Joint Stock Company (JSC) is the majority state-owned[4] company responsible for construction and operation of the 3,780 MW Rogun HPP Project. Two of the IPPs – Sangtuda-1 and Sangtuda-2 HPPs – were commissioned in 2006 and 2011 respectively to help the country address the issue of electricity supply shortages. Sangtuda-1 and Sangtuda-2 IPPs have 20-year PPAs with BT. Rogun JSC has a PPA with BT which is renewed each year. In June of 2019, the Government established the new state-owned electricity transmission and distribution companies - Shabakahoi Intiqoli Barq (SIB) Open Joint-Stock Company (OJSC) and Shabakahoi Taqsimoti Barq (STB) OJSC respectively. Pamir Energy Company (PEC) generates and supplies electricity to around 245,000 people as well as public and commercial sector consumers in GBAO under a 25-year concession agreement, which expires in 2027.

10. **The electricity supply mix is dominated by hydropower**. The total installed generation capacity of Tajikistan is 6,125 MW and HPPs account for 88 percent. The 3,000 MW Nurek HPP, with a seasonal reservoir and average annual generation of about 11,000 GWh, is the largest operating plant and accounts for about 50 percent of the total annual electricity supply. The 3,780 MW Rogun HPP is the largest project under construction and, once its completed and the reservoir reaches the fully supply level in 2035, its annual average generation is expected to be around 14,400 GWh, which would be about 50 percent of total projected electricity demand.

[3] Ownership structure of IPPs is the following: Sangtuda-1: Rosatom (Russia) – 62 percent, Republic of Tajikistan – 25 percent, and InterRAO (Russia) – 13 percent; Sangtuda-2: Farad company (Iran) is the sole owner. Sangtuda-2 is a Build-Own-Operate-Transfer (BOOT) project.

[4] Republic of Tajikistan – 97 percent; various local legal entities and individuals – 3 percent.

11. The thermal power plants are primarily operated in winter to supply electricity and heat given: (a) high winter electricity demand, which accounts for 60 percent of annual demand; and (b) limited winter generation by HPPs due to reduced winter flows. The bulk of thermal energy-based generation comes from the new 400 MW coal-fired Dushanbe-2 combined heat and power plant (CHP), which was completed in 2017. The coal is sourced from local coal mines given that Tajikistan has significant coal resources.

12. **The key challenge in the sector is financial distress of BT** as a result of: (a) below cost-recovery tariffs; (b) unsustainable and increasing debt levels; (c) low collection rates for billed electricity; (d) operational inefficiencies; (e) lack of opportunities for realization of full export potential; and (f) depreciation of TJS vs US$ in 2015-2021. The financial distress of the electricity sector impacted the reliability of electricity supply, which deteriorated due to obsolescence and under-maintenance of main power generating plants and T&D networks. Specifically, only 77 percent of the generation capacity of Nurek HPP is operational because generating units require refurbishment given the age and technical condition.

13. **The Government Program for Financial Recovery of Electricity Sector for 2019-2025[5] identified policy, financial, and operational measures aimed at improving financial viability of the electricity sector and increasing reliability of electricity supply.** The key measures in the Government Program include: (a) gradual increase of tariffs to reach cost recovery, including 50 percent increase of tariff for one of the largest consumers in the country - Tajikistan Aluminum Company (TALCO, a state owned enterprise) - and publishing of five-year tariff reform plan; (b) restructuring of loan agreements between MOF and BT; (c) conversion into equity of BT's fines and penalties for overdue principal repayments and interest under BT's debt to MOF; (e) use of technically, economically, and financially sound principles for investment decision-making in generation, transmission, and distribution; (f) strengthening of the sector governance including consistent implementation of the escrow account mechanism to manage cash flows in the sector; and (g) improved operational and financial transparency of the electricity sector timely rehabilitation and upgrade of key electricity T&D assets.

14. **The Government made some progress with implementation of these sector reform measures supported by the Bank financed Program for financial recovery of the sector as well as Asian Development Bank (ADB), European Investment Bank (EIB), and European Bank for Reconstruction and Development (EBRD)**. Those include consistent electricity tariff increases since 2017[6] with the most recent average increase of 13 percent that became effective on October 2022; (b) restructuring of TJS 4.9 billion or about US$480 million of debts between MOF and BT including conversion into BT's equity of fines and penalties for overdue debt service; (c) introduction of boards of directors at newly-created electricity transmission and distribution companies (SIB and STB) and the required committees; (d) involvement of a management contractor in operation of STB; (e) optimization of expenses through better inventory management and reduction of unnecessary fuel processes; and (f) strengthening of the capacity of Anti-Monopoly Service (AMS) that is responsible for review of tariffs. Moreover, as part of the broader reform agenda required for successful implementation of Rogun HPP, the Government committed to continuation of tariff reforms, improvement of SOE performance and governance, signing of long-term contracts for sale of Rogun electricity, development of macro-fiscally sustainable financing plan for Rogun HPP, strengthening of SOE fiscal risk management, and other measures. Several of those (50 percent tariff increase for Tajikistan Aluminum Company, SOE fiscal risk management program for 2022-2026, disclosure of audited financial statements for 17 largest SOEs, better inclusion of SOEs under public procurement) also included as Prior Actions under the Bank's Resilient and Sustainable Development Policy Operation (DPO, P177930), which is under consideration.

[5] Which was updated due to COVID19 impacts and currently covers a period of 2022-2031.
[6] The tariffs were not increased only in 2019 and 2020 due to COVID19 impacts.

15. **Electricity exports have been increasing, and regional connectivity is improving**. Electricity exports increased from 1,350 GWh to almost 2,400 GWh in 2021 due to resumption of exports to Uzbekistan. There is adequate electricity transmission capacity on existing interconnections with Uzbekistan, which can allow to substantially increase electricity exports once synchronization with Central Asian Power System (CAPS) is completed. However, there is a further need to increase electricity exports to enable larger exports that would be required to ensure financial viability of Rogun HPP Project. Several actions are necessary to position Rogun HPP as a regional export-oriented project and to ensure financial viability of the project without continuing to burden the state budget. The following efforts are underway to expand electricity exports.

a. ***Synchronization of Tajik electricity network with CAPS***. Synchronization with CAPS would allow to supply electricity to all countries of Central Asia without network management and other operational challenges. This project, which is supported by the ADB, is in advanced stage of implementation and includes strengthening of the relay protection, installation of System Control and Data Acquisition system for high-voltage equipment, and emergency control systems, and would thus enable synchronization of Tajikistan power system with CAPS. The connection to CAPS is expected to be completed by the end of 2023.

b. ***Construction of 1,300 MW Central Asia South Asia (CASA-1000) Interconnection***. This project is aiming at exports of surplus electricity from Kyrgyz Republic and Tajikistan to Afghanistan and Pakistan during summer period when surplus energy is available. The transmission line and substation construction works in Tajikistan and Kyrgyz Republic are in advanced stages. The substation and line construction activities have also accelerated in Pakistan. However, the construction activities have stopped in Afghanistan since mid-2021. This was due to recent political developments that have taken place in Afghanistan and the resulting constraints faced by financiers to continue financing of the project activities. Currently, various options are under consideration to resume the construction activities. There is no clarity on the project commissioning due to the significant uncertainties.

c. ***Signing of new PPAs for exports of electricity from Rogun***. The Government has made progress towards securing long-term agreements for the sale of Rogun electricity. Specifically, a detailed Memorandum of Understanding (MOU) was recently signed with the Government of Uzbekistan specifying the annual maximum quantities of electricity exports from the project. A similar MOU is in the final stages of negotiation with the Government of Kazakhstan. The work on drafting and negotiation of long-term PPAs will commence shortly and the PPAs are expected to be signed by early 2023. Preparatory work for securing long-term PPAs will be financed under the proposed TA.

16. The Bank has also been recently active in supporting the Central Asian countries in creating a regional real-time electricity market. A roundtable was held during April 2022 Spring Meetings in Washington, DC, with the country delegations to launch the grant funded and the Bank-executed TA activity which could eventually morph into a recipient-executed TA to help pilot real-time power exchanges among the Central Asian countries as well as create a project preparation facility. Rogun HPP will feature as a key initiative in the Central Asia power market, and could be a model for future collaboration in the region

Rogun HPP Background and Potential Benefits

17. **Rogun HPP was designed in the mid-1960s and construction started in the 1970s**. Construction progressed with number of stop-and-resume cycles driven by economic consequences of a major geopolitical event - dissolution of Soviet Union - and the calamities caused by the civil war in Tajikistan in 1990s. Small-scale construction activities

resumed in 2007 with financing from the state budget and accelerated in 2016 with selection of the contractor for the Main Dam - Salini Impregilo (Italy).[7]

Table 2: Snapshot of Rogun HPP Project Development Milestones

Milestones	Dates
Field investigations and surveys of the Project started	1967
Construction activities started	1976
Vast majority of geological and geotechnical investigations completed	1978
Construction discontinued due to collapse of Soviet Union and civil war in Tajikistan	1992
Small-scale construction activities resumed	2007
Commencement of Techno-Economic Assessment Study (TEAS) under the World Bank project	2011-2014
International tender for procurement of contractors for main lots launched	2015
Contract for construction of the Main Dam signed with Salini Impregilo, later renamed to Webuild (Italy)	2016
Contract for design, supply, and installation of electr-mechanical equipment (Voith Hydro, Austria) signed	2021
Contract for Right Bank Structures (TGEM, Tajikistan) signed	2021

Source: World Bank team based on data from Rogun PMG.

18. **Rogun HPP design and configuration were re-evaluated in 2011-2014 and detailed Environmental and Social (E&S) assessments were carried out following the Government's request to the Bank to finance the project**. In 2011, the Government commissioned a detailed TEAS of Rogun HPP Project and E&S assessments, which were financed under a Bank project.[8] Two independent Panels of Experts (POE) - one for dam safety issues and the other for E&S issues - were appointed by the Bank to provide expert advice for the duration of the two studies. After an assessment of pertinent factors, the previously selected dam site and the axis were confirmed to be technically justified. The TEAS results showed that the highest dam alternative at 1,290 meters above sea level (masl) is justified considering the technical, economic, and E&S considerations.

19. **The Government proceeded with construction without the Bank or other development partners' support**. Rogun Joint Stock Company (JSC) drew upon the outputs from TEAS and relied on standard terms and conditions of engineering, procurement, and construction (EPC) contracts of the Fédération Internationale des Ingénieurs-Conseils (FIDIC) – the industry standard – to proceed with procurement of contractors for the project. Three out of four main EPC contracts for Rogun HPP have already been signed. There is an experienced international consultant (Tractebel-ELC/France-Italy) supporting Rogun JSC with technical supervision of works under some of the contracts as well as management of the interface among the various contractors. The development partners did not finance the project or provide other support to the Government after completion of TEAS, in large part, because of the concerns raised by some of the neighboring countries regarding Rogun HPP's impacts on the availability of water once the Rogun dam is constructed. The Government was undertaking significant efforts to address those concerns and significant progress was made in 2018-2020. Since then, based on the information available to the Bank, the neighboring countries have not been objecting to construction of Rogun HPP Project.

20. **The Bank is engaging into the Rogun HPP Project midstream with legacy procurement, technical, environmental and social, and transparency issues and lack of adequate commercial framework**. Such an engagement, even at TA level, poses challenges and risks. The following summarizes the key legacy challenges and issues.

[7] Became Webuild in 2020.

[8] Additional Financing under Energy Loss Reduction Project (P089244).

a. ***The procurement process of several existing large contracts had shortcomings***. After completion of TEAS, the Government launched an international tender in 2016 to procure contractors for all four main lots under the Rogun HPP Project: electro-mechanical equipment (Lot 1), main dam (Lot 2), right bank structures (Lot 3), and left bank structures (Lot 4). The procurement process had several shortcomings, which led to effectively direct negotiated contracts for Lots 1-3. The good practice core procurement principles (value for money, economy, integrity, fit for purpose, efficiency, transparency and fairness, and acceptable governance arrangements) may not have been consistently and fully observed. This conclusion is the result of the high-level review carried out by the Bank and was based on assessment of: (a) applied procurement processes and procedures, (b) adherence to published procurement strategy, (c) bidding, selection and award criteria, (d) justifications for any deviations to those, fairness and equal opportunity provided to all bidders, and (e) clarity of negotiations and consistency of documentation provided to the Bank for review. Therefore, detailed review of the procurement process and signed contracts will be carried out by development partners,[9] which may be interested in supporting construction of the Rogun HPP, to determine whether the existing contracts can be financed. Nothing in this paper should be construed as a recommendation or suggestion concerning the alteration of any existing contracts or the execution of future contracts. In case changes might be required to existing agreements, the Bank defers to the judgment of the Government of Tajikistan in its consultations and negotiations with the relevant parties, taking into consideration the economic costs of, and any other relevant factors related to, such amendments.

b. ***The quality of technical solutions and designs has not been reviewed since the start of major contracts in 2016***. As part of the TEAS work in 2011-2014, international consultants carried out review of the existing civil works to ensure those can be considered to meet the specified technical requirements and quality standards and dam safety POE was engaged. The review at that stage confirmed that the quality of works was adequate. However, Rogun HPP did not retain the dam safety POE and there has been no detailed review of the detailed design and completed works after the Lot 1-3 contractors commenced their activities. Therefore, it would be essential to hire a dam safety POE to: (a) carry out an audit of the completed designs and works; (b) identify improvements that may be needed to bring Rogun HPP Project into compliance with applicable technical standards and requirements; and (c) provide advice on dam safety and other technical issues throughout implementation of Rogun HPP Project. The Projects Management Group of the Power Plant Construction under the President of the Republic of Tajikistan (Rogun PMG), which will be responsible for implementation of various TA, has already engaged the dam safety POE.

c. ***The current E&S performance of Rogun HPP Project is not aligned with requirements of Environmental and Social Framework (ESF)***. The review, carried out by the World Bank in 2021, identified that: (a) the existing E&S instruments of Rogun HPP Project, several of which were prepared in 2011-2014 with financing from the World Bank, need to be updated to align them with the requirements of Bank's ESF; and (b) Rogun HPP has several issues that need to be addressed in order to improve its E&S performance. The main issues include: (i) absence of adequate project-specific E&S requirements in construction contracts; (ii) Insufficient staffing to manage and supervise E&S and OHS performance; (iii) soil contamination at the Rogun HPP tank farm; (iv) inadequate documentation of resettlement and livelihood restoration program; (v) inadequate reporting on E&S performance; (vi) lack of rregular independent assessments of design, construction and E&S activities; (vii) inadequate supervision of contractors' labor management practices; (viii) delay in commissioning of biodiversity surveys and plans; and (ix) lack of E&S POE.

[9] European Union, EIB, Asian Infrastructure Investment Bank, ADB, United States Agency for International Development and the US Embassy in Tajikistan, Islamic Development Bank, Eurasian Development Bank, Kuwait Fund for Arab Economic Development, Saudi Fund for Development, UK Foreign, Commonwealth and Development Office, EBRD, and Kreditanstalt Für Wiederaufbau.

d. ***Rogun HPP did not publicly disclose any project related information till 2016 because it was considered confidential by the law***. Rogun OJSC and the Government historically disclosed very limited information and data regarding the physical construction progress of the project, financing and sources, procurement packages and contract awards, as well as environmental and social performance. This was due to the fact that information was considered confidential due to strategic nature of the project and other complications at that time. However, since signing of large contracts in 2016 and change in other sensitive circumstances, the transparency has increased, but still remains insufficient.

e. ***Lack of long-term contracts for sale of Rogun's electricity*.** Currently, there is only one PPA between Rogun JSC and BT for sale of about 1,000 GWh of electricity per year (renewed on annual basis). However, new PPAs are required for the sale of Rogun electricity given that the project is only economically and financially viable if about 62 percent of total generation is exported.

21. **Rogun HPP could generate significant economic, social, and environmental benefits for Tajikistan and broader Central Asia region if its development continues in commercially, financially, environmentally, and socially sustainable manner**. Rogun HPP is located on the Vakhsh River upstream of the Nurek HPP. It is a project with a large reservoir capable of providing seasonal regulation (the details are presented in Annex 1). The main benefits include.

a. ***Domestic supply reliability for Tajikistan*.** Rogun HPP will help Tajikistan to increase its generating capacity to meet the projected increase in electricity demand, especially during the winter period (November-April) when existing generation capacity is barely adequate to meet the demand. The details are presented in the section related to Economic Analysis of the project.

b. ***Improved flood protection for entire Vakhsh cascade of HPPs***. The large reservoir of Rogun HPP could improve the resilience of the entire Vakhsh cascade, which represents 96 percent of domestic hydro capacity of Tajikistan, against the Probable Maximum Flood (PMF).

c. ***Larger electricity export revenues for Tajikistan***. The Study estimated that Rogun HPP can be a cost-competitive exporter of clean electricity for entire Central Asia region considering the projected average electricity generation costs in the region under base case electricity expansion scenarios. The results of economic analysis also suggest that for Rogun HPP should export about 62 percent of total generation.[10] The potential markets may include, but not be limited to Central Asian countries, including Uzbekistan and Kazakhstan, which are large power systems with aggregate demand of more than 62,000 GWh and 110,000 GWh respectively in 2020 compared to about 14,400 GWh of average annual generation from Rogun HPP.

d. ***Increasing resilience of entire Central Asian power system to allow for integration of more solar PV and wind***. Several Central Asian countries are planning to significantly expand their solar PV and wind capacity, which would increase the demand for balancing services, which large hydropower plants with reservoirs are well-suited to provide. The Government of Tajikistan is undertaking efforts to reconnect with CAPS to increase those exports. Discussions are underway to bring countries together to design an electricity market for Central Asia.

e. ***Broader positive economic development impacts of Rogun HPP***. The completion of the project's construction under a macroeconomically sustainable financing plan would allow for more rapid increase of the project's revenues, which may be channeled earlier and therefore has the potential to contribute to broader economic development by allowing the Government to increase the spending on education, healthcare, and social services, which have been underfunded for years due to the project's financing needs.

[10] Average annual in 2022-2040.

f. ***Contribution to decarbonization of electricity sectors in Central Asia.*** The Study estimated the reduction in CO2 emissions from Rogun HPP at about 22 million tCO2e over 2022-2040. The total global benefit from reduction of those emissions, valued at shadow cost of carbon, is estimated at US$2.6 billion. Those are comprised of reduction of fossil fuel generation in countries that are expected to import electricity from the Rogun HPP (Central Asian countries, Pakistan, and Afghanistan) and avoided emissions from domestic power system in Tajikistan. In 2021, in Uzbekistan gas and coal-fired generation accounted for 75 and 12 percent of supply mix respectively, and Kazakhstan relied on gas and coal for 20 percent and 70 percent of its total annual electricity generation respectively. Both countries have significant potential for decarbonization with efforts underway. The Bank has ongoing decarbonization dialogue with Central Asian countries, including the under-preparation Country Climate and Development Report in Kazakhstan.

22. The above potential benefits can be realized only if: (a) the construction of Rogun HPP Project is completed with a financing plan that is macroeconomically sustainable and financially viable; (b) a proper commercial framework is put in place; (c) the project is environmentally and socially sustainable in accordance with global standards; (d) there is enhanced transparency on financing aspects and contracts; (e) well-functioning benefit sharing program to ensure befits from Rogun HPP filter down to the population to contribute to their prosperity; and (f) operating protocols of the Rogun HPP consider downstream water security needs.

23. **The Bank's TA engagement will ensure that Rogun HPP benefits from the most up-to-date technical solutions and know-how, becomes macro-fiscally as well as environmentally and socially sustainable**. Specifically, the Bank's engagement would enable to hire a dam safety POE and therefore the project would benefit from the most up-to-date standards on design and construction as well as ensure solid just-in-time technical advice on all key issues that may arise during implementation. Additionally, the proposed TA engagement would support update of the project's financing plan to ensure it does not jeopardize overall macroeconomic stability considering the large size of the project compared to Tajikistan's economy. This engagement also presents an opportunity to strengthen the commercial framework, which entails helping the Government and Rogun PMG preparing and negotiating bankable long-term PPAs for exports and sale of electricity in domestic market. The project would also benefit from strengthening of E&S systems and performance considering its scale and impacts to ensure that it is implemented according to the best practices.

24. **The Bank's engagement would strengthen the pro-poor focus of Rogun HPP Project by helping design and implement a benefit sharing program**. Ongoing construction benefits residents and small business in the project's surrounding communities in form of jobs and livelihood. However, that is not sufficient, and the Bank's engagement is an excellent opportunity to introduce a formal mechanism for sharing of benefits from the project through design and implementation of a proper benefit-sharing program that would draw upon the global lessons of such programs in other large hydropower and infrastructure projects, including but not limited to the use of the portion of the project's revenues for economic, social, educational, and other needs of communities. This would ensure that the project's benefits trickle down to the most vulnerable groups of population and therefore contribute to poverty reduction and shared prosperity.

25. **The Bank's engagement would also help to strengthen the gender angle of this large infrastructure project**. The proposed TA would provide technical and/or leadership trainings for female employees of the Rogun PMG to strengthen their opportunities to progress in their careers. Other actions will be added based on the findings of a baseline assessment of women's employment in the energy sector in four Central Asian countries that is planned to be completed by end of 2022.[11] Actions may include strengthening existing (or creating new) internship programs in

[11] This assessment, financed by an ESMAP grant, will provide a baseline on women's employment in technical and managerial jobs in the

collaboration with relevant academic institutions to attract more female engineers, providing trainings for managerial and technical staff at Rogun PMG on gender inclusion, providing childcare services and/or facilities to reduce possible barriers to women's retention at the companies, etc.

26. **The Bank's decision on financing of construction will be made in due course once the Government demonstrates progress with implementation of TA activities and meets the requirements that are critical inputs for such a decision-making**. Specifically, the Bank would be evaluating the progress with the following key activities prior to considering the financing of the construction and, in case of absence of satisfactory progress, the Bank may decide not to be involved in the financing of Rogun HPP construction.

a. Adoption and publication of the revised macro-fiscally sustainable project financing plan.

b. Establishment and retention of dam safety and E&S POEs.

c. Signing of MOUs for sale of Rogun HPP electricity and progress with negotiations on long-term PPAs.

d. Ensuring that all existing and future contractors meet the technical and financial qualification requirements for their respective scope of contracts. If there are issues of non-compliance, then the Government should propose alternative solutions to ensure there are no risks to the project.

e. Strengthening of E&S performance of the project to comply with ESF requirements including the E&S instruments, E&S provisions in contracts, grievance redress mechanisms (GRM), E&S capacity of Rogun PMG and Rogun JSC, as well as E&S performance supervision and reporting.

f. Design and launch of benefit sharing program for Rogun HPP Project.

g. Progress towards achievement of cost recovery tariffs in electricity sector with clear trajectory to be reflected in the 5-year tariff reform plan.

h. Adoption of the performance improvement program for BT, SIB, STB and Rogun JSC and improvement of SOE fiscal risk management.

i. Implementation of recommendations from the Public Finance Management Modernization Project 3 (P172924) that will further support improvement of the quality of financial reporting and auditing standards, assist with improving SOE's accountability, and strengthen the oversight functions of MOF.

j. Improvement of the coverage of Public Procurement Law to include larger number of SOEs.

k. Improvement of SOE transparency, including disclosure of the audited financial statements of at least 17 SOEs as well as technical, construction progress, financial, and procurement information related to Rogun HPP Project.

27. **The Bank will cooperate with other development partners in the Rogun Coordination Group to ensure continued alignment among partners on all key issues**. The Rogun Coordination Group is led by the Bank and includes European Union, EIB, Asian Infrastructure Investment Bank, ADB, United States Agency for International Development and the US Embassy in Tajikistan, Islamic Development Bank, Eurasian Development Bank, Kuwait Fund for Arab Economic Development, Saudi Fund for Development, UK Foreign, Commonwealth and Development Office, EBRD, and Kreditanstalt Für Wiederaufbau. It's a coordination mechanism to ensure consistency and alignment between development partners on advice provided to the Government on key issues related to Rogun HPP Project and broader energy sector reforms. The Bank will also ensure that required resources are allocated to ensure strong

energy sector, including women's experience in pursuing engineering studies, and in entering and advancing their careers in the energy sector.

implementation support to ensure success of the TA project.

Summary of Main Contracts and Status of Rogun HPP Project Construction

28. **The EPC contracts for the main civil works, equipment, and consulting packages, except for Lot 4, have already been signed**. The key contracts are summarized hereunder. The implementation status of main goods and works contracts are also presented as of September 30, 2022.

Table 3: Overview of Main Contracts

Lots	Type	Size	Contractor	Scope
-	Pre-contract works	US$1.7 billion[12]	Several relatively small contracts with local and international contractors over the period of 2014-2022. Nearly entire scope is largely completed.	Rehabilitation of the diversion tunnel-1 (DT-1) and DT-2 diversion tunnels on the Left Bank; installation of hydromechanical equipment for DT-1 and DT-2; construction of an additional diversion tunnel, DT-3 on the Right Bank; strengthening of the stability of the powerhouse complex excavations; early generation works, etc.
Lot 1	Electro-Mechanical Equipment	€370 million	Jan 2021; Voith Hydro (Austria); started as a competitive process and was concluded through direct negotiations	Installation of four new generating units; upgrading of the runners of two early generating units that have temporary runners, supply of transformers, installation of the balance of plant and control equipment
Lot 2	Main Dam	US$1.95 billion	Jul 2016; Webuild (Italy); started as a competitive process and was concluded through direct negotiations	Construction of an upstream cofferdam; treatment of the salt wedge that exists beneath the dam; construction of the 140 m high Stage 1 dam and the 335 m main dam; and grouting of the foundation and abutments
Lot 3	Right Bank Structures	US$1.64 billion	Jul 2021; TGEM (Tajikistan); direct contract	Series of tunnels and spillways that provide adequate flood discharge capacity as the height of the Main Dam increases and lower tunnels can no longer be safely used due to the excessive head
Lot 4	Left Bank Structures	US$772 million[13]	Main contract not awarded yet; procurement to start in January 2023; some early works are carried out by various small contractors. Those were carried out to avoid slope stability issues and delays to the Lot 1 and Lot 2 works	Headrace and tailrace civil works required to provide inflows for the generating units
	Project Management Consultant	US$42 million	Tractebel-ELC (France-Italy); international competitive	Technical supervision of construction works; management of interface among various contractors
	Right and Left Bank Structure Design	US$11 million	AFRY (Switzerland); direct contract	Design of right and left bank structures

Source: Rogun JSC.

[12] In 2014-2021. Those works are almost entirely completed with 98 percent physical completion rate.
[13] Currently being updated.

29. **Status of Pre-contract works.** The physical implementation progress is 98 percent. The main works carried out to date are as follows: completing rehabilitation and strengthening of the two left bank diversion tunnel DT-11 and DT-2; stabilization measures for the powerhouse and transformer caverns; rehabilitation of existing facilities and plant including access roads, access tunnels, batching plants, aggregate plants, telecommunication system, etc.; construction of the pre-cofferdam and the upstream cofferdam; construction of the right bank diversion tunnel DT-3; extracting and stockpiling coarse material from a quarry that would be flooded at an early stage of construction; other activities necessary for river diversion; and activities to facilitate early generation.

30. **Status of Lot 1 contract**. The physical implementation progress is 9 percent. The main works carried out to date are as follows: basic design of the replacement runners for Units 5 and 6; start of manufacturing of the replacement runner for Unit 6; hydraulic design and design of the embedded parts for Unit; design of the embedded parts for Units 1-4; model manufacturing and Unit 4 model test. The Lot 1 contract schedule has already slipped compared to the contract program. The delay is estimated at 6 months.

31. **Status of Lot 2 contract**. The physical implementation progress is 23 percent. The main works carried out to date are as follows: Vakhsh River diversion; detailed designs for various components; construction of the upstream cofferdam to its full height (crest elevation at 1,065 masl); development of borrow areas; treatment of salt wedge; Stage 1 Dam constructed to elevation of 1,125 masl (height of 145 meters); reservoir impounding up to elevation of 1,070 masl; construction of the downstream part of the main dam carried out to elevation of 1,039 masl; works on main dam foundation; start of construction of concrete pad in the main dam foundation. Overall construction on Lot 2 is behind the schedule with the completion date currently estimated to be delayed by 3-4 years.

32. **Status of Lot 3 contract**. The physical implementation progress is 8 percent. The main works carried out to date are as follows: detailed designs for DT-4 and DT-5; detailed designs for various other components; 48 percent of works on DT-4; and 12 percent of curtain grouting. Overall, implementation of the contract is significantly delayed.

Estimated Completion Cost of Rogun HPP Project and Financing Scenarios

33. **The Government's current construction schedule with Rogun HPP construction completion date of 2029 (and the reservoir filling to full supply level by 2036) was estimated to be macroeconomically non-sustainable**.[14] The current schedule requires a total of US$4.8 billion[15] to complete the project construction. Out of this amount, about US$3.8 billion was estimated to be required by 2025 with annual needs ranging between US$500 million and US$1 billion. It was estimated that raising such amounts of financing would be non-sustainable from a public debt perspective. Thus, the Bank Study prepared a preliminary revised schedule, which assumes an overall 3-year extension of the project completion date to 2032.[16] Under the revised schedule, the project construction completion cost was estimated at US$4.9 billion, assuming it is financed with a large share of grants and concessional loans in early years to be followed by some private financing once the macro-fiscal situation allows for that. The revised schedule is assessed to be manageable from a macro-fiscal perspective (see Annex 3: Table 4: Matching of Financing Needs and Financing Sources).

34. **Completion of the Rogun HPP, as per the revised schedule, would require significant grants and other types of concessional financing under an optimal scenario**. Specifically, it would require around US$660 million in grants and

[14] Rogun Financing Options Study, November 2021.
[15] All Project completion cost estimates are as of June 30, 2021, and do not include about US$3 billion in capital costs incurred prior to this date. This number excludes the financing cost.
[16] Additional water withdrawals from Vakhsh by Tajikistan are expected within the limits of Tajikistan's allocation consistent with the water sharing agreements with riparian countries. However, as these withdrawals would be above and beyond current usage, an assessment to evaluate impacts would be needed during update of ESIA, and subsequent discussions with riparian countries may be required to resolve any issues that may arise.

US$1.3 billion in concessional loans from development partners to be complemented by commercial financing once the public debt is sustainable. As agreed between the Government and development partners, more detailed update of the schedule will need to be prepared to ensure it reflects the macro-fiscal of the country while ensuring the project is not exposed to excessive safety risks.

35. **Completion of construction under the revised schedule could possibly be financed with sequenced public and private financing, consisting of a combination of state budget spending, grants, concessional loans, and commercial debt.** This scenario seeks to coalesce a broad range of resources and stakeholders considering debt sustainability thresholds. This scenario would result in a revised construction completion schedule of 2032 to match financing flows with expected revenues (which is an extension of three years from the current schedule), which increases the project construction completion cost from US$4.8 billion to US$4.9 billion exclusive of financing costs due to additional costs from potential price adjustments. The estimated annual concessional borrowing amounts under this scenario would pass the concessionality test with the grant element of 56 percent.[17] Under this scenario, revenues would come from secured PPAs from domestic anchor customers as well as exports, which would represent about 62 percent of the total energy generated in 2022-2040. The indicative structure of a financing package under this scenario is the following, and the total financing requirement is US$5.1 billion inclusive of financing costs.

Table 4: Financing Sources of the Project under Scenario 2 of the Study

Sources	Amount
Project's operating cash flows	US$380 million
Government equity/state budget financing	US$2.2 billion
Grants from development partners	US$660 million
Concessional loans from development partners	US$1.3 billion
Export Credit Agencies (ECA) and commercial debt	US$600 million
Total	US$5.1 billion[18]

Source: Rogun Financing Options Study, World Bank, Nov. 2021.

Current Discussions on Financing of the Project Completion

36. **Development partners expressed their interest in the project during a high-level roundtable organized by the Government on December 7, 2021**. The Government and the Bank team presented the findings from the Study. The outcomes and conclusions were endorsed by the potential financiers including the list of issues that need to be addressed to increase the likelihood of the project to secure financing. There was a general consensus that the project: (a) remains economically viable as an export-oriented project with 62 percent of energy generated by 2040 to be exported; (b) holds significant potential for contributing to decarbonization of power systems of Central Asia countries given the cost-competitiveness of electricity it would generate and significant reliance on gas and coal in those systems; (c) should be completed in a macroeconomically sustainable manner without creating further macro-fiscal risks; and (d) should ensure that environmental and social performance is consistent with international good practice.

37. **The development partners highlighted the importance of having a coordination mechanism** and a common approach to conduct a joint assessment of the project to understand its technical, environmental and commercial aspects. This would enable an agreement on further steps and actions needed to finalize the required assessments so that each development partner can process its financing package. The Government proposed that the Bank take the lead in coordination of the activities aimed at addressing the identified challenges outlined in the Financing Options Study, and this proposal was supported by the development partners. The Rogun Coordination Group has been

[17] Typically, debt with grant element of at least 35 percent is considered to be concessional.
[18] The total financing requirement/financial cost is different from capital cost because of the financing costs. US$5.1 billion includes US$4.9 billion of capital costs + US$0.2 billion of financing costs.

successfully functioning to jointly agree with development partners on the scope of activities that would be required to address the identified challenges, review important outputs produced by Rogun PMG and its consultants, and agree on key policy, reform, and other steps that need to be implemented by the Government in order to secure the financing for Rogun HPP completion.

Outcomes of the First Stage of Review of Procurement of Main Contracts under Rogun HPP

38. **Following the high-level roundtable, the Bank carried out the first stage of review of the main contracts under the project.** The objective was to determine to what extent they align with international competitive procurement best practices and could potentially be considered acceptable for financing by various public and private financiers. The Bank, in discussion with Rogun PMG – the project implementation group - agreed to conduct the review in two stages. The first stage encompassed a high-level review to determine: (a) consistency of the overall procurement process with World Bank's core procurement principles; (b) eligibility and qualifications of firms to which the contracts were awarded; and (c) reasonableness of contract prices. The second stage would include a detailed contract-level review on value for money considerations, performance of the contracts and completeness of contracts to include environmental and social safeguards, fraud and corruption provisions, dispute resolution, payment terms, and other aspects which may need retrofitting to mitigate various contractual risks. The findings from the first stage of review suggested that some of the Bank's core procurement principles (e.g., efficiency, transparency, and acceptable governance requirements when conducting procurement) may not have been fully observed. The findings of the review were presented to the Government and development partners in April 2022. The key conclusions are summarized hereunder.

a. **Lot 1 contract with Voith Hydro (Austria)**: (a) the contractor was eligible at the time of award and remains eligible now; (b) the contractor is most likely qualified to carry out the scope of the work at required quality and within specified time; and (c) the contract appears to be reasonably priced.

b. **Lot 2 contract with Salini Impregilo (Italy)**: (a) the contractor was eligible at the time of award and remains eligible now; (b) the contractor is most likely qualified to carry out the scope of the work at required quality and within specified time; and (c) the contract appears to be reasonably priced.

c. **Lot 3 contract with TGEM (Tajikistan)**: (a) the contractor was eligible at the time award and remains eligible now; and (b) the contractor does not appear to comply with the qualification requirements set in the original bidding documents (issued in 2015).

Strengthening of Development Impacts

39. **The development impact of Rogun HPP could be maximized through the introduction of a benefit sharing program**. The Government should consider allocating a portion of the project's revenues to a benefit sharing program and explore the option of leveraging those with other centralized resources considering the best practices in comparator countries, which would help alleviate poverty and enhance development opportunities for local communities. This has been demonstrated in a number of projects supported by the World Bank Group and other development partners, including but not limited to Nam Theun 2 HPP Project in Laos, Lake Turkana Wind Power Project in Kenya, and Khimti I Hydropower Project in Nepal.

40. **Benefit sharing is especially important in basins with large rural populations where hydropower will affect their resources**. For hydropower development, benefit sharing could apply to communities living in the project impact zone, as identified in, for example, project environmental and social impact assessments (ESIAs) including individuals, households, entrepreneurs, and local businesses based in the project area. The intention is to go beyond the resettlement community to recognize others in the reservoir area, upstream and downstream who may also be affected by Rogun HPP Project. For example, a portion of revenues could be channeled to:

- ***Public service and infrastructure*** given significant local infrastructure needs and demand for improved public services.
- ***Local skills and livelihoods:*** Improved skills and livelihoods would most likely be among top priorities of communities given considerable scope for local employment under Rogun HPP Project. This may also include: (i) support for alternative skills development and income generation, such as microcredit for Small and Medium Enterprise development and skills audits, and (ii) establishment of and/or capacity building for community-based organizations or public institution.
- ***Environmental stewardship:*** The large-scale hydro and RE projects also have an opportunity to combine proactive environmental stewardship with local benefit sharing through mechanisms to improve the local environment, in addition to impact mitigation measures required for the project. Examples include wildlife habitat creation, environmental education, conservation programs, and sustainable tourism.

41. **Rogun JSC would also benefit from further improvement of transparency on its financial situation and strengthening of its capacity in financial reporting**. The Government, with support from the Bank, has made some progress with: (a) capacity building of SOEs in implementation of IFRS, and (b) improvement of oversight, performance monitoring, and management functions of MOF over large SOEs. The new activities under the Additional Financing for Public Finance Management Modernization Project 3 (P172924) will further support improvement of the quality of financial reporting and auditing standards, assist with improving SOE's accountability, and strengthen the oversight functions of MOF. Moreover, under the IDA Sustainable Development Finance Policy, Tajikistan's FY22 Performance and Policy Actions supported the publication of audited annual financial statements by SOEs and, as part of the proposed FY2023 Performance and Policy Actions , the Government will approve and publish (by December 31, 2022) a new SOE Fiscal Risks Management Strategy for 2022-2026 aiming to strengthen the SOE ownership function of the government, in line with recommendations provided by the IMF and the Bank.[19] There is also a need to improve Rogun JSC's transparency about the existing contracts under Rogun HPP Project.

C. Relevance to Higher Level Objectives

42. **The proposed TA Project is fully aligned with World Bank Group's Country Partnership Framework (CPF) for Tajikistan for FY2019-23 (Report No. 135875-TJ)**. Specifically, the Project will contribute directly to the achievement of objectives under the following CPF Focus Areas:

- *Focus Area I (Human Capital and Resilience)*. Reliable electricity supply is an essential prerequisite for enhanced educational, social and healthcare services. It is not possible to ensure quality delivery of educational, social and healthcare service if there are frequent electricity outages and supply interruptions. This creates not only significant additional costs for public and social facilities, but also significantly impacts the quality of the services.
- *Focus Area III (Enabling Private-Sector Growth and Creating Markets).* Reliable electricity supply is an important precondition for improved economic opportunities and, thus, private sector led economic growth. The Project would also contribute to the expansion of electricity export opportunities.

43. **The proposed TA Project is consistent with the World Bank Group's Climate Change Action Plan 2021-2025 (CCAP)**. Specifically, the CCAP recognizes the role of hydropower as a clean source of electricity and an enabler to integrate more solar PV and wind generation capacity. Thus, the World Bank will be supporting countries in developing sustainable and resilient hydropower, while not damaging the ecosystems, and the associated water storage needed,

[19] Proposed FY23 Performance and Policy Actions currently under review and subject to final approvals.

including through regional cooperation to advance complementary investments across countries. The ongoing ADB-financed project for reconnecting Tajikistan to CAPS would enable larger electricity trade within Central Asia and therefore exports of Rogun electricity. The Bank has also started an ongoing dialogue with Central Asian countries to gradually introduce an electricity market, which would also promote trade through use of standardized contracts among market's participants.

44. **The proposed TA Project is consistent with the principle of Maximizing Finance for Development**. In particular, preparation and adoption of the project financing plan, which needs to be macroeconomically sustainable, would allow to maximize utilization of public financing by raising resources from development partners in the short to medium-term as well as leverage commercial financing once the macro-fiscal situation allows.

45. **The proposed TA Project is also aligned with the World Bank Group's Energy Sector Directions Paper and the Sustainable Development Goal No. 7** - ensuring access to affordable, reliable, sustainable, and modern energy for all. Provision of TA would also contribute to the World Bank's twin goals of reducing the extreme poverty and increasing shared prosperity.

46. **The proposed TA Project is aligned with the World Bank Group's Global Crisis Response Framework**. The TA Project will ensure that commercial framework of Rogun HPP takes into account climate risks and their availability for water resources. Moreover, it will help to ensure that the financing package for completion of Rogun HPP is macro-fiscally sustainable. Therefore, it contributes to Pillar 3 on Strengthening of Resilience. Moreover, the TA Project: (a) contributes to further greening of electricity sector in Tajikistan and the broader Central Asia region by supplying low-cost firm renewable energy, and (b) strengthens the institutional capacity of Rogun JSC in operation and management of large hydropower projects and dams. Thus, it contributes to Pillar 4 on Strengthening Policies, Institutions, and Investments for Rebuilding Better.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

47. The project development objectives are to strengthen Rogun HPP Project's financial and commercial frameworks, enhance its environmental and social sustainability, improve the transparency, and support establishment of Rogun HPP Project's benefit sharing program.

PDO Level Indicators

48. The key PDO-level outcome indicators include:

- **Indicator One (Custom)**: The Government adopts a macroeconomically sustainable and financially viable plan for completing construction of Rogun HPP Project (Yes/No). This indicator will measure the progress towards development and adoption of a macroeconomically sustainable financing plan. The macroeconomic sustainability means that the financing plan would not create risks of debt distress for the country taking into account the proposed annual capital expenditures and financing terms for those expenditures. The plan may be updated from time to time as the macroeconomic situation changes.
- **Indicator Two (Custom)**: PPAs are signed for sale of Rogun HPP Project's electricity in the amount to make the financing plan viable (Yes/No).
- **Indicator Three (Custom)**: Rogun HPP Project has functioning dam safety as well as environmental and social POEs (Yes/No).

- **Indicator Four (Custom)**: The environmental and social instruments of Rogun HPP Project comply with the requirements of the World Bank's Environmental and Social Framework (Yes/No).
- **Indicator Five (Custom)**: The summary information on existing and future contracts and financing plan for completion of construction of Rogun HPP Project are publicly disclosed (Yes/No).
- **Indicator Six (Custom)**: Rogun HPP Project's community benefit sharing program is launched (Yes/No).

B. Project Components

49. This TA Project will help with the following: (a) development of a financing plan and a commercial framework; (b) improvement of dam safety; (c) strengthening of E&S aspects, and (d) strengthening the institutional capacity of Rogun JSC and Rogun PMG, which is the implementing entity of the proposed TA Project. The TA Project would be implemented during the period from March 6, 2022[20] to December 31, 2026. The implementation timeline is driven by the need to ensure that all key E&S assessments and studies are completed, including preparation of the Resettlement Action Plans for Phase 2 and Phase 3 of resettlement. Those are expected to be time-intensive given the number of project-affected people (around 40,000). The TA Project will have the following key components.

50. **Component 1: Development of a macroeconomically sustainable financing plan and a commercial framework for Rogun HPP Project (estimated cost of about US$4.8 million to be financed with IDA grant of US$3.6 million and AIIB grant of US$1.2 million)**. This component will finance:

a. Revision of the Rogun HPP Project construction completion schedule taking into account the existing and projected macro-fiscal framework of the country.

b. Preparation of the Rogun HPP Project financing plan taking into account the updated construction completion schedule.

c. Transaction advisory services to help the Government draft, negotiate, and sign long-term PPAs for sale of Rogun HPP electricity.

d. Update of the economic analysis of Rogun HPP Project.

e. Preparation of additional economic and financial assessments and studies that may be required for the needs of the Rogun HPP Project.

f. Development of tariff reform program for electricity sector.

g. Implementation of energy efficiency audit(s) of large state-owned industrial consumers and development of energy efficiency program for such state-owned enterprise consumers with the objective of reducing the energy consumption without material impact on competitiveness.

51. **Component 2: Improvement of the dam safety (estimated cost of about US$4 million to be financed with IDA grant of US$3.2 million and AIIB grant of US$0.8 million)**. This component will finance:

a. Dam safety POE.[21] The dam safety POE will carry out due diligence of existing design and project solutions, provide high level and professional independent advice and guidance to support objectivity and credibility in the development and implementation of designs and in the construction of the Rogun HPP Project, and share

[20] Taking into account the retroactive financing (estimated at about US$1 million) requested by the Ministry of Finance for some key consulting services such as update of E&S documents of the project, engagement of the Dam Safety POE, and hiring of the financial and legal advisor to help draft and negotiate long-term PPAs for sale of Rogun electricity.
[21] The Government committed to finance the dam safety POE cost after the completion date of the proposed TA Project.

technical expertise and knowledge and so contribute to dialogue amongst the various stakeholders.

b. Review of existing contracts and preparation of procurement documents.

c. Additional technical and engineering studies and consultancy services that may be required for various technical aspects of the Rogun HPP Project and preparation of procurement documents. The scope of those studies will be developed after dam safety POE completes its due diligence on existing designs and project solutions.

52. **Component 3: Strengthening of E&S framework and benefit sharing aspects of Rogun HPP Project (estimated cost of about US$7 million to be financed with IDA grant of US$4.2 million and AIIB grant of US$2.8 million)**. This component will finance:

a. Update of E&S instruments for Rogun HPP to align them with the requirements of the World Bank's ESF.

b. Assistance to Rogun PMG in developing a Contractor Management Plan that will include the details of how Rogun PMG will supervise the E&S performance of its contractors; and development of recommendations on ensuring compliance of contracts with E&S standards and requirements.

c. E&S POE[22] with a mandate to provide professional advice and guidance on E&S aspects of the Rogun HPP.

d. Design of a benefit sharing program that would contribute to equitable development and sustainable socio-economic growth at the local and national levels, which would allow to use part of the Rogun HPP revenues from electricity sale for various economic and social activities and initiatives.

e. Administration of the benefit sharing program and other E&S studies and assessments that may be required for Rogun HPP.

53. **Component 4: Strengthening of institutional capacity of Rogun PMG and Rogun JSC (estimated cost of about US$4.2 million to be financed with IDA grant of US$4 million and AIIB grant of US$0.2 million)**. This component will finance:

a. Corporate governance review of energy SOEs, including Rogun JSC, and development of recommendations to align those with best international practices.

b. Capacity building, including trainings, for the Rogun PMG and Rogun JSC staff in dam safety, operation and management of hydro facilities, and project management.

c. Public communication support to the Government, Rogun PMG and Rogun JSC.

d. Purchase of information and communication technologies and office equipment for Rogun PMG and Rogun JSC.

e. Project financial audits and incremental operating costs of Rogun PMG and.

Project Financing

54. The total Project cost is US$20 million. It will be financed with a US$15 million IDA grant and US$5 million AIIB grant.

[22] The Government committed to finance the E&S POE cost after the completion date of the proposed TA Project.

Table 5: Financing sources

Project Components	Project cost (US$ million)	IDA Financing (US$ million)	AIIB Financing (US$ million)	IDA Financing as % of Total
Component 1: Development of a macroeconomically sustainable financing plan and a commercial framework for Rogun HPP Project	4.8	3.6	1.2	75%
Component 2: Improvement of dam safety	4.0	3.2	0.8	80%
Component 3: Strengthening of E&S framework and benefits sharing	7.0	4.2	2.8	60%
Component 4: Strengthening of institutional capacity of Rogun PMG and Rogun JSC	4.2	4.0	0.2	95%
Total Project Costs	**20.0**	**15.0**	**5.0**	**75%**
Total Financing Required	**20.0**	**15.0**	**5.0**	-

C. Project Beneficiaries

55. The beneficiaries of the Project are the following.

56. *Rogun JSC*: Hiring of the dam safety and E&S POEs as well as the update of the E&S instruments of the Rogun HPP would reduce the technical and E&S risks of the project and therefore improve the likelihood of securing financing for the Rogun Project.

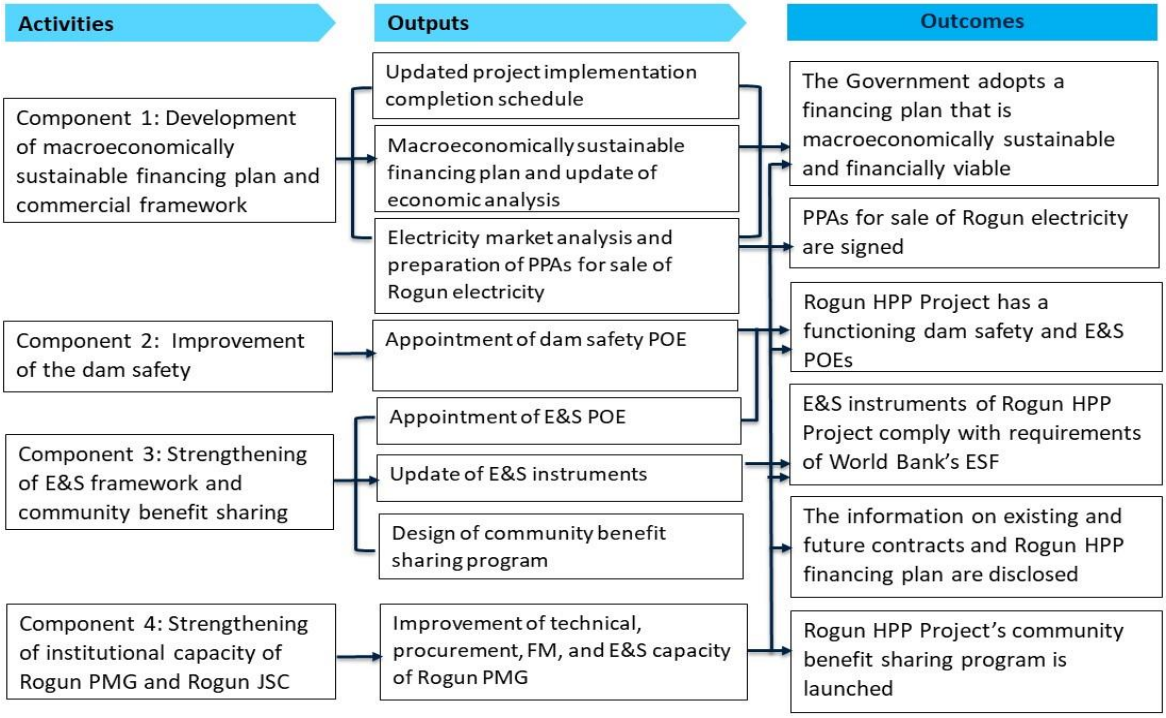
57. *Entire population of Tajikistan*: The proposed TA would contribute to the ongoing efforts of the Government in ensuring adequate and reliable electricity supply. Upon commissioning, it will help to meet the projected electricity demand in the country. Moreover, a macroeconomically sustainable financing plan may reduce the pressure on the state budget to channel an increasing share of fiscal revenues for the construction of the Rogun HPP. Therefore, more resources could be allocated for healthcare, social needs, and education.

58. *Electricity consumers in export markets for Rogun's electricity*. The proposed TA activities would improve the likelihood of the Rogun HPP Project securing the required financing and therefore allow for completion of construction. Thus, it will be able to supply clean energy and provide other services (e.g. reserves and balancing) to the broader CAPS at competitive prices thus enabling to maintain affordable electricity tariffs for consumers.

D. Results Chain

59. The challenges that the Project intends to address, Project components, outputs, intermediary and long-term outcomes are summarized in the project's theory of change below.

Figure 3: Results Chain



Source: World Bank team.

E. Rationale for Bank Involvement and Role of Partners

60. **Rogun HPP Project could generate significant economic and social benefits**. Those can be secured only once a macroeconomically sustainable and a financially viable plan to complete the construction is developed, a commercial framework for the project is designed, and the environmental and social sustainability of the project is improved. Therefore, considering the comprehensive Tajikistan energy sector engagement and overall global experience in hydropower, the Bank is well positioned to help the client address the issues related to improving the readiness of the Rogun HPP Project for financing.

- ***Advice on technical issues by building upon the detailed knowledge of the project gained during TEAS***. The experienced dam safety panel in combination with the thorough knowledge of the Rogun HPP Project due to Bank's engagement during TEAS should help to ensure that the existing detailed design solutions are carefully reviewed, and solutions are proposed to address any potential issues that may be identified. This would help to improve the level of confidence about the project's technical solutions among the potential financiers.
- ***Support to align the E&S performance of the Rogun HPP Project with the requirements of the Bank's ESF***. This would improve the sustainability of the project and increase the likelihood of securing the financing for completion of construction given the well-known rigor of the Bank's environmental and social policies and the Bank's expertise in this field.
- ***Comprehensive electricity sector policy and lending engagement as the foundation for providing advice on the commercial framework for the Rogun HPP Project***. The Bank can leverage its comprehensive policy reform and lending engagement in the electricity sector in Tajikistan as well as global experience in advising the clients on transparent and predictable contractual frameworks for sale of electricity and financial

structuring of large infrastructure projects. Furthermore, the Bank can leverage its ongoing engagement in Central Asian countries to further the agenda for the regional electricity market that would also benefit the Project. The Bank would also build on the comprehensive policy and project-level engagement in Tajikistan, including electricity sector financial recovery dialogue and PforR operation (Power Utility Financial Recovery PforR, P168211), to continue advising on electricity sector policy and regulatory issues that have implications for Rogun HPP Project (e.g. PPAs for domestic electricity supply).

- ***Helping the Government to anchor Rogun HPP financing on sustainable macro-fiscal framework***. The Bank together with IMF are advising the Government on debt sustainability issues including the maximum level of annual capital expenditures that would not jeopardize macro-fiscal stability of the country. The financing plan for completion of the construction should not create public debt distress and the Bank is well-positioned to advise on that given engagement on economic policy and analytical level including but not limited to debt sustainability analysis which is carried out each year.

61. **The Bank is considering a gradual approach to engagement into Rogun HPP**. The first phase would focus on improving the financing and commercial frameworks as well as environmental and social sustainability of the project. The decision on the second phase of engagement, which may include potential financing of the construction, would be made after satisfactory progress is made in implementation of the activities under the first phase.

62. Provision of an IDA grant is justified because those TA activities cannot be financed through commercial financing by Rogun JSC given that the company has limited financial resources because the revenues from early generation from Rogun are quite limited and the substantial share of expenses related to above-mentioned areas needs to be incurred within the next 2-3 years. The Government resources are also very limited considering the current macro-fiscal situation in the country.

63. The implementation of the proposed TA Project would be carried out in close cooperation with the Rogun Coordination Group, which is led by the Bank. The scope of the proposed Project is fully supported by all development partners included in the Rogun Coordination Group. The main outputs from various components of the TA Project would be jointly reviewed by development partners and will also be used for the purposes of their respective due diligence on the Rogun HPP Project when deciding on financing of investments.

64. The decision about future Bank financing of the Rogun HPP construction will depend on the successful implementation of key activities supported under this TA Project. If satisfactory progress is not made on the key issues discussed in Section I, B, then the Bank may decide not to be involved in the financing of Rogun HPP construction.

F. Lessons Learned and Reflected in the Project Design

65. The proposed TA Project drew upon the global experience and lessons learned by the Bank in supporting large hydropower projects.

a. ***High-level strategic support of similar complex and high-risk hydropower project is crucial***. The lessons learned from implementation of high-risk transformative hydro projects in developing countries suggest that very senior level government commitment to agreed-upon development approach is secured and there is direct communication channel with decision-makers (e.g., lessons from World Bank's Inga-3 and Mid-size Hydropower Development TA in Democratic Republic of Congo (DRC)[23]). In the case of Rogun HPP, the project implementing entity – Rogun PMG – directly reports to the President of Tajikistan, which also allows to reach resolution on pending issues without major risk of slow-down due to bureaucracy. Moreover, the results of the Financing Options Study (prepared by the Bank) with summary of requirements for any development

[23] DRC Inga 3 and Mid-size Hydropower Development TA, Implementation and Results Completion Report, World Bank, Feb. 5, 2018.

partner engagement were presented to the President and other senior government officials and endorsed by them.

b. ***Solid technical project preparatory work is critical***. It is essential to ensure that the required technical, geological, and geotechnical studies are completed and very robust without any information and data gaps that may stop or delay the Project during implementation. The Government, with the support from the Bank, carried out TEAS (2011-204) that was reviewed and found by the Bank and other parties to be of excellent quality. Therefore, the Bank will be engaging in a Project that has undergone critical review of the construction works carried out prior to the Bank's engagement in 2011 and has been implemented based on the recommendations from TEAS.

c. ***Macroeconomically sustainable project financing plan is essential***. Experience has shown that any infrastructure project, including hydropower, with large capital costs should have a financing plan for the entire project prior to commencement of construction (e.g., the Dasu project in Pakistan). In cases when such plans were not developed in advance and financing has not been secured, the projects were subjected to significant delays and technical risks (e.g., temporary civil work structures being washed away by floods because they were not designed for such long construction periods). In some other cases, those projects have also become a source of public debt or overall macroeconomic distress. Rogun HPP did not have a financing plan for the entire project prior to commencement of construction. Therefore, the proposed TA would be financing preparation of a macroeconomically sustainable construction schedule and update of the financing plan, which should be financially viable, given that Rogun's estimated capital cost of completion at US$4.8 billion is about 60 percent of its 2020 GDP (in current US$).

d. ***Solid contractual and commercial framework is a must***. The global experience with hydropower projects has demonstrated that it is essential to put in place an adequate commercial framework for sale of electricity in early stages of hydro development (e.g., Nam Theun 2 in Laos). Specifically, the contracts for sale of electricity (PPAs) in domestic market and for exports need to ensure predictability of revenues of projects in order to help raise the required financing. Otherwise, the projects run into difficulties with securing the financing, and then construction becomes significantly delayed.

e. ***Benefit sharing program***. Benefit sharing is especially important in basins with large rural populations where hydropower will affect their resources. For hydropower development, local benefit sharing should apply to communities living in the project impact zone, as identified in, for example, project environmental and social impact assessments including individuals, households, entrepreneurs and local businesses based in the project area. The intention is to go beyond the resettlement community to recognize others in the reservoir area, upstream and downstream who may also be affected by the project. Therefore, the proposed project would be supporting design of such benefit sharing program for Rogun by drawing upon the experience of Nam Theun 2 Project in Laos, Khimti I HPP Project in Nepal, Lake Turkana Wind Project in Kenya, and other.[24]

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

66. Rogun PMG will be responsible for the implementation of the Project. PMG staff consists of 34 persons. In its procurement activities, it is guided by the Public Procurement Law of the Republic of Tajikistan, and the Rules for

[24] Nam Theun 2 Social and Environment Project, Implementation Completion and Results Report, World Bank, Dec. 28, 2018; 10 Insights about Local Benefit Sharing in Hydropower Projects, IFC, Feb. 2021; and Local Benefit Sharing in Large-Scale Wind and Solar Projects, CommDev and IFC, Mar. 2020.

International Tender for Construction of Rogun Project. Rogun PMG has experience in implementing projects funded by the state budget including preparation of bidding documents for works and goods contracts, evaluation of bids, contract negotiations, and contract management.

67. Rogun JSC team and the Resettlement Unit will be involved in reviewing the relevant documents, reports, and outputs to be produced by the consultants to be hired by Rogun PMG. They would be involved in reviewing and approving the contractual, technical, environmental, and social recommendations and advice to be provided by the consultants that would be hired by Rogun PMG. In addition to its primary function, Rogun PMG is also responsible for coordination of the activities with various ministries, departments and international financial organizations in the implementation of the state policy of the Republic of Tajikistan with regards to issues related to the construction of energy facilities and their upgrade in accordance with the programs of socio-economic development of the Republic of Tajikistan.

68. However, Rogun PMG does not have experience in implementation of projects financed by IFIs including the Bank. Therefore, Rogun PMG would need to strengthen its implementation capacity by hiring the following specialists: TA project manager/coordinator, senior procurement specialist, procurement specialist, financial management specialist, senior environmental and social advisor with international experience, local environmental and social specialist, monitoring and evaluation specialist, and a translator. Those specialists will need to be hired under terms of reference satisfactory to the Bank with duration of contracts to be determined based on needs.

69. It should be noted that the Recipient, in its Letter No. 5/5-19/201, dated March 16, 2022, requested retroactive financing for the Project for the following activities that are on the critical path: (a) update of environmental and social documents of the Project; (b) engagement of the dam safety POE, which among other responsibilities, would also carry out the required technical audit of the Project; and (c) hiring of the financial and legal advisor to help us with negotiation and signing of power purchase agreements for sale of Rogun electricity in domestic market and for exports. The Bank has reviewed the PPSD of the Project and agreed to the procurement plan (see Annex 7) including the above activities that have commenced.

B. Results Monitoring and Evaluation Arrangements

70. Rogun PMG will be responsible for monitoring and evaluating the PDO Level and Intermediate Results Indicators during implementation and submitting semi-annual implementation progress reports to the Bank. Rogun PMG will rely on outputs from the consultancy services because all PDO indicators and Intermediate Result Indicators are to be measured based on the outputs and outcomes from the consultancy services. The baseline values for the results indicators were provided by Rogun PMG. The target values were discussed and agreed with Rogun PMG.

C. Sustainability

71. Sustainability of the Project will be secured through addressing key technical, E&S, commercial, and financing issues of the Rogun HPP project.

a. ***Professional advice from experienced dam safety POE would ensure robust technical solutions and implementation***. The dam safety POE would provide just-in-time advice to Rogun PMG on geotechnical, geological, hydraulics, electro-mechanical and other construction related matters. This would ensure robust technical solutions during implementation of the Project. The Government committed to financing the dam safety POE after the closing date of the proposed Project.

b. ***Professional advice from experienced E&S POE would ensure sound technical advice during update of E&S documents and implementation of the project***. The E&S POE would ensure that the updated E&S documents are robust and compliant with specified requirements. Moreover, the E&S POE would provide the required

advice to Rogun on various issues related to contractors' compliance with E&S requirements, resolution of issues, resettlement, and other relevant matters. The Government committed to financing the E&S POE after the closing date of the proposed Project.

c. ***Robust commercial framework is key for raising of required financing and sustainable operation of the power plant***. The proposed Project would support preparation and negotiation of the long-term PPAs for sale of Rogun electricity and therefore ensure predictable cash flows for the Project. This is critical for securing the financing to complete the construction and therefore minimize the technical risks from the delays and ensure adequate financing for operation and maintenance once the Project is operational.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

Technical

72. The components of the proposed Project have been based on an overall analysis of the current status of the Rogun HPP Project, the measures required to identify any deficiencies that would need to be addressed to both, facilitate financing of the Rogun HPP Project and ensure its successful implementation and monitoring of the subsequent implementation of the Rogun HPP Project over the life of the Project.

73. An assessment of the current status of the Rogun HPP Project, and various financing options towards its completion, was undertaken by the Bank as part of the Rogun Financing Options Study, which was conducted at the request of the Government of Tajikistan. The Study identified the following likely requirements for the potential engagement of development partners and, to a certain extent, commercial lenders:

- Carry out a technical audit of the Rogun HPP Project to validate the detailed design of the key project components to ensure solutions are technically robust and safe and the quality of completed civil works and the equipment supplied.
- Review the three main contracts already awarded (Lots 1, 2 and 3) for consistency with key applicable procurement principles.
- Adoption of a credible project schedule and financing plan, which is based on a realistic construction and reservoir impoundment schedule and is macroeconomically sustainable.
- Address specific E&S aspects, including the establishment of dam safety and E&S POEs and a series of other measures including updating of existing E&S documents, etc.
- Initiate activities to secure PPAs with large domestic customers and for exports.

74. The technical audit of the Rogun HPP Project will be carried out by the dam safety POE that will be financed under Component 2 of the proposed Project. It is a specific task in their TORs. POE will identify any deficiencies that would need to be addressed as well as any design or construction issues that require additional verification, and will recommend the measures required to satisfactorily address these issues. Any additional costs required for this verification, including potential engagement of an engineering firm for various technical review tasks, will be covered by the proposed Project.

75. As agreed with the Government and development partners, the Bank carried out a first stage review of the three main contracts under the Rogun HPP Project and shared its findings with the Government and development partners.

The detailed second stage review of each contract is expected to be conducted by the Bank and the development partners that are considering provision of financing for the specific contract.

76. Nothing in this document should be construed as a recommendation or suggestion concerning the alteration of any existing contracts or the execution of future contracts. To the extent that different scenarios offered might require changes to existing agreements, the Bank defers to the judgment of the Government of Tajikistan in its consultations and negotiations with the relevant parties, taking into consideration the economic costs of, and any other relevant factors related to, such amendments.

77. Components 1 and 3 of the proposed Project will finance the activities necessary for adoption of a credible project schedule and a financing plan, for transaction advisory services to help the Government draft, negotiate, and sign long-term PPAs for sale of Rogun HPP electricity, and for addressing important E&S aspects.

78. The continuation of the dam safety and E&S POEs for the duration of the proposed Project will ensure provision of high level and professional independent advice and guidance that will be an essential component in the monitoring of the implementation of the Rogun HPP Project.

Economic Analysis

79. The proposed TA Project does not lend itself to economic evaluation. However, the proposed activities under the Project would contribute to completion of the Rogun HPP project and therefore create significant indirect benefits by helping to finish construction of this hydropower plant. Rogun HPP was estimated to be an economically viable project that would generate significant benefits for Tajikistan and globally by reducing the CO2 emissions.

80. **Economic costs of Rogun completion.** The economic costs of Rogun completion include: (a) the estimated capital cost for completion of the project; (b) the cost of Project Management Consultant (PMC); (c) cost of land acquisition and implementation of ESMP; (d) capital cost of other projects that may be required to meet the domestic demand and export commitments; (e) fuel costs; (f) the incremental fixed and variable O&M costs; and (g) the social cost of carbon.

81. **Economic benefits of Rogun completion**. The main economic benefits of the project completion include:

a. ***Avoided costs of the Project decommissioning.*** Those costs are estimated to be at least US$500 million based on the TEAS assessments. It is to be noted that a 140 m-high dam now exists at the Rogun site and the cost of ensuring dam safety after decommissioning will be substantial; this could not be estimated given that it would require a detailed assessment.

b. ***Avoided capital costs of new generation projects to replace supply from the Project***. The country would have to incur capital cost of US$2.9 billion during 2022-2040 to construct alternative electricity generation capacity that would be required for the domestic market. Grid integration study has not been carried out to determine what additional costs would be required to safely integrate such large intermittent installed capacity from solar PV and wind into the domestic power system.

c. ***Increased export volumes and revenues***. The project would enable Tajikistan to fully meet the existing export commitments and enable further expansion of exports to the Central Asia region and beyond.

d. ***Protection of Vakhsh cascade against the Probable Maximum Flood (PMF)***. The construction of the Project would also provide flood protection against the PMF to the entire downstream Vakhsh cascade, which is designed for a lower extreme flood scenario. Therefore, to ensure meaningful comparison, it is necessary to include the costs of providing similar flood protection benefits in the “Without Rogun Completion” scenario. For Nurek HPP, this would require construction of an additional spillway at an estimated cost of US$318

million.[25] It is to be noted that a spillway at Nurek would only provide additional flood protection at Nurek and would not protect the rest of the Vakhsh cascade downstream of Nurek.

e. ***Reduction in fuel costs***. The fuel costs would be lower given that no new thermal power projects would be required if the Project is completed.

f. ***Reduction of CO2 emission due to reduction in the share of fossil fuel generation in the total electricity supply mix in Tajikistan and main export markets***. The reduction in CO2 emissions is estimated at 22 million tCO2e over 2022-2040. The total global benefit from reduction of those emissions, valued at shadow cost of carbon, is estimated at US$2.6 billion. Those are comprised of reduction of fossil fuel generation in countries that are expected to import electricity from the Project (Central Asian countries, Pakistan, and Afghanistan) and avoided emissions from the domestic power system.

82. **The project remains economically viable under the base case**. The updated economic analysis of the Project yielded the following results for the base case: economic NPV of US$656 million and EIRR of 11 percent.

B. Fiduciary

(i) Financial Management

83. The Financial Management (FM) arrangements at the Rogun PMG meet the minimum requirements of the World Bank's Policy and Directive on Investment Project Financing, subject to capacity building actions listed in table below. The Rogun PMG has no prior experience in implementation of Bank-funded projects in the past. To strengthen FM performance and build needed capacity for Project implementation the following FM capacity-building actions are recommended for the Rogun PMG:

Table 6: Financial Management Improvement Action Plan

Proposed Action	Timeline
1. The FM manual is developed and adopted (or a separate chapter on FM procedures and controls as part of the POM) to guide staff in daily project FM operations.	February 1, 2023
2. An accounting software satisfactory to the WB is installed and maintained for Project accounting, budgeting, and reporting by the Rogun PMG; the accounting system has to contain inbuilt controls to ensure data security, integrity, and reliability and the functionality of automatic generation of unaudited interim financial reports (IFRs) and statement of expenditures. Delivery of the accounting software should include on-job training for FM staff.	February 1, 2023
3. An FM Specialist to be hired as part of the Project to provide daily support to the Chief Accountant of the Rogun PMG. The terms of reference (TOR) for the FM specialist should be approved by the WB, he/she will be responsible for all financial aspects of the Project.	Completed
4. Accounting staff of the Rogun PMG and new FM staff to be hired under the Project shall be trained as part of fiduciary trainings, periodically organized by the WB, at the first opportunity.	As soon as training becomes available

84. The overall FM residual risk for the Project is assessed as Moderate after the mitigation measures are implemented. The inherent FM risk is rated as Substantial since the Rogun PMG has not been directly involved in implementation of the WB-financed projects so far, there is no experience to keep records using an accounting software, and there is no document to formalize internal control procedures, including policies and procedures to

[25] "Techno-Economic Assessment Study for Rogun Hydroelectric Construction Project," Barqi Tojik, Mar. 2014. The Government estimates those costs to be US$945 million.

clearly define conflict of interest and related party transactions (real and apparent) and provide safeguards to protect the organization from them. As part of Project implementation support and supervision mission, the WB will conduct a risk-based financial management implementation support and supervision within six months from the Project effectiveness to assess the status of proposed mitigation measures and FM arrangements in place.

85. Regarding the FM covenants to be included in the Disbursement and Financial Information Letter (DFIL), the following should be noted: (i) ***Financial Reports***. The Recipient shall prepare and furnish to the WB/Association not later than forty-five (45) days after the end of each calendar quarter, interim unaudited financial reports ("IFR") for the Project covering the quarter, in form and substance satisfactory to the WB/Association. (ii) ***Audits***. Each audit of the Financial Statements shall cover the period of one fiscal year of the Recipient, commencing with the fiscal year in which the first withdrawal was made. The audited Financial Statements for each such period shall be furnished to the WB/Association not later than six (6) months after the end of such period and made publicly available in a timely fashion and in a manner acceptable to the WB/Association.

86. The Project will receive disbursements from the World Bank through direct payment, reimbursement, special commitments and Advance to a Designated Account, once this method is allowed in Tajikistan; advancing of Grant proceeds into a Designated Account is not a Disbursement Method currently available under this Grant. In application of section 5.2 of the Disbursement Guidelines for Investment Project Financing, the use of a Designated Account is not permitted under this new operation due to the recipient's failure to refund undocumented advances to Designated Accounts within two months after the disbursement deadline date under three recently closed projects. The detailed disbursement arrangements will be provided in the DFIL. The payments project expenditures below the thresholds for direct payments stipulated in the DFIL will be made by the Rogun PMG directly from their accounts, respectively using its alternative available funds, which could be then reimbursed to the grant designated accounts once the advance method is allowed under the Project; payments will be made directly from the Project Designated Account (after the 'lapsed loan' is resolved).

(ii) Procurement

87. Procurement under the project will be governed by the World Bank's Procurement Regulations for IPF Borrowers (November 2020) (Procurement Regulations) and will also be subject to the World Bank's Anti-Corruption Guidelines (dated July 2016). The Project Procurement Strategy for Development (PPSD), developed by Rogun PMG, has been reviewed and agreed with the Bank. Preliminary market analysis suggests that a certain level of interest from specialized consulting firms and experts to the proposed assignments will be secured. Default selection method to apply is open international competitive process. Two Direct Selections for update of the project implementation completion schedule and update of the project economic analysis was proposed by the Recipient, given related ongoing contract with a firm and previous similar experience with another recommended firm. Rogun PMG has already initiated procurement of several consultants and signed all contracts with the dam safety POE members and E&S POE members. Following confirmation from the Bank, retroactive financing will apply to the TA Project for expenditures that were incurred within contracts under the agreed-upon procurement plan starting from September 1, 2022 in the amount not exceeding 20 percent of the IDA grant amount. The PPSD is currently being updated and will be included into the negotiations package.

88. Given that AIIB will be co-financing several of the TA Project activities with the Bank, the following was agreed with AIIB: (a) use of Bank's Procurement Regulations for co-financed TA activities; and (b) AIIB to rely on the Bank's assessments of compliance of procurement of co-financed TA activities with those regulations. This arrangement will also be reflected in the co-financing legal document to be signed between the Bank and AIIB.

C. Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	Yes
Projects in Disputed Areas OP 7.60	No

89. **Projects on International Waterways**. OP 7.50 is applicable to the project since the Rogun dam is located on the Vakhsh River, one of the main tributaries of the Amu Darya River shared by Afghanistan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan, and which is considered an "international waterway" for purposes of the Policy. Following the request from the Government (Letter No. 22/6-41 from June 17, 2022), the Bank sent notification letters to all riparian countries. Turkmenistan responded with two letters dated June 26 and July 28, 2022 respectively. Turkmenistan did not raise an objection to this Project, however, it raised number of issues related to potential impacts of Rogun HPP and made suggestions on addressing these. The Bank responded on November 15, 2022, confirming that the TA Project will not cause appreciable harm to riparian countries and that, as applicable, the terms of reference for TA activities will include an examination of any riparian issues."

D. Environmental and Social

90. The environmental and social risk ratings are both High making the overall ESF risk rating High as well. ESS's 1, 2, 3, 4, 5, 6, 8, and 10 are considered relevant and will be applied to identify mitigation measures required for the overall Rogun HPP. Appraisal-stage ESCP and SEP have been prepared. The Labor Management Plan (LMP) will be finalized no later than 30 days after the Project is effective.

91. The Environmental and Social Management Plan (ESMP) and first phase of the Resettlement Action Plan (RAP) have provided some lessons learned for the project. Key challenges included lack of E&S requirements in construction contracts; insufficient staffing for E&S supervision; lack of supervision of labor management practices; inadequate management of solid, liquid, and hazardous waste; inadequate reporting on E&S performance, including Occupational Health and Safety (OHS); a lack of surveys of natural habitats, which could require a biodiversity offset plan; and a lack of surveys on tangible and intangible cultural heritage impacts. Social management challenges included uneven supervision of working conditions, delays in finalizing the security fence at the site and a RAP with initially missing or minimal details on the process, procedures, timetable, census (including cutoff dates), grievance management, socioeconomic baseline and livelihood restoration of the project-affected population. All of these lessons are being taken into consideration by the Rogun PMG in their current implementation activities and are reflected in the scope of work for environmental and social assessments and plans.

92. While this TA Project only involves support for institutional capacity building to strengthen the implementation of the Rogun HPP, the HPP itself does involve a series of potentially adverse, significant, and long term environmental and social risks and impacts due to the construction of the dam which will cause permanent inundation and creation of a reservoir, headrace tunnel, powerhouse and required transmission line and ancillary facilities such as access roads and workers camps. Social risks and adverse impacts would include land acquisition, resettlement, labor influx, occupational and community health and safety, gender, sexual exploitation and abuse/gender-based violence. Environmental risks and adverse impacts will involve permanent inundation of the reservoir area and permanent changes in landscapes, impacts on river flows, quality and morphology; terrestrial and aquatic ecosystems, ecosystem services and biodiversity; pollution and waste disposal during construction, vibration impacts from blasting and heavy equipment, changes in hydrology of the Vakhsh River, potential cumulative environmental and social impacts, etc. The assessment of cumulative impacts in the updated ESIA will include impacts to both upstream and downstream project affected peoples (PAPs), environmental flows, sediment transport and management, ecosystem services, and the potential need for biodiversity offsets (and, if needed, a biodiversity offset strategy). The E&S instruments will also

take into account in particular the impacts on vulnerable groups (e.g. women-headed households, elderly, disabled, very poor, etc.) and include measures to mitigate harm and provide benefits to them from the Rogun HPP.

93. The Component 2 of the TA Project will finance:

a. An update or, where necessary, the preparation of new environmental and social instruments for the Rogun HPP Project to align the project with the requirements of the World Bank's Environmental and Social Framework (ESF). These instruments will include, but not be limited to, the update of the 2014 ESIA/ESMP (including, as required, plans to deal with dam safety, waste and pollution management, resource efficiency, community health and safety, security, site rehabilitation, etc.); the preparation of Labor Management Procedures; the preparation of a Resettlement Policy Framework (RPF); the update of the 2014 RAP and related documents, such as a livelihood restoration plan and/or skills development plan; the preparation of a Biodiversity Management Plan (BMP) to be included in the ESIA; and the preparation of the Stakeholder Engagement Plan (SEP). The updates to the ESIA/ESMP and RAP will include action plans for addressing any legacy issues, as well as updated cost estimates for implementation of all environmental and social mitigation measures (including OHS) related to the Rogun HPP, including any further preparatory work, as well as the construction, operational, and decommissioning phases.

b. Assistance to Rogun PMG in developing a Contractor Management Plan that will include the details of how Rogun PMG will supervise the environmental and social compliance and performance of its contractors.

c. Recommendations on modification of existing contracts, to include relevant ESF requirements to comply with the relevant ESS and other requirements.

d. Independent environmental and social panel of experts, which will include, at a minimum, a Senior Environmental Specialist, a Senior Social Specialist, and a Senior hydrology expert (the latter would also be a member of the dam safety panel).

e. Design of community benefit-sharing program that would contribute to equitable development and sustainable socio-economic growth at the local and national levels.

94. The TOR for the Update of Environmental and Social Instruments of Rogun Project and Support to Rogun PMG was reviewed and cleared by the Bank and disclosed.

E. Corporate

95. **Climate Change Context of Tajikistan.** Tajikistan is at risk of hydrometeorological hazards and natural disasters. Frequent natural disasters include landslides, floods, flash-flooding, mudflows, droughts, avalanches, heavy winds and storms. These risks are in part due to the country's complex mountainous terrain but are expected to be exacerbated and heightened through expected climate changes. The projected impacts from climate change make Tajikistan increasingly vulnerable to heavy precipitation, landslides, earthquakes, and floods. Climate change is also expected to increase risks and severity of natural disasters. In recent years, the number of natural disasters has increased nearly three times and, in many cases, have been considered as catastrophic, causing fatalities and leading to significant economic losses.

96. The proposed Project has no physical infrastructure investments and supports soft components only, therefore, the likelihood of the operation being impacted by climate risks is very unlikely. However, the exposure of Rogun HPP to climate risks was considered.

97. **Adaptation to Climate Change**. **Adaptation to Climate Change**. The update of ESIA under this Project would include update of the climate risk and vulnerability assessment. The analysis of the compiled available information on climate change projection scenarios for the area of study would allow to make a conclusion on the potential effects of temperature/rainfall/snowfall and storm intensity variations – from both present variability and with the

anticipated effects of climate change – on Rogun HPP inflows, electricity generation, and reservoir operation decisions. It should also be noted that several adaptation measures are under implementation to mitigate the impacts of climate change on the Rogun HPP. These include:

a. ***Design solutions considering flood attenuation***. Rogun HPP is designed to attenuate extreme floods up to PMF and the water discharge structures (e.g., surface spillways and flood-discharge tunnels) are designed taking this into account. Those issues were carefully evaluated during TEAS and were incorporated into the detailed design. Therefore, extreme hydrological events would not impact the safety of Rogun HPP. In fact, Rogun HPP would also provide increased flood protection for the entire Vakhsh cascade that is designed for 10,000-years return period floods, which is lower than the PMF for Rogun.

b. ***Introduction of an advanced flood forecasting/warning system and preparation of optimized reservoir operating rules to enhance the flood-handling capacity of the project.*** A flood forecasting software has been developed for the Rogun HPP utilizing data on snow cover, forecasts of summer temperatures and precipitation, etc. This software is being calibrated comparing predicted flood flows with actual flood flows and will be periodically refined and improved. Based on this flood forecasting system, reservoir operating rules will be reviewed for both Rogun and Nurek reservoirs.

98. **Gender**. The gender gap in labor force participation in Tajikistan is significant. The International Labor Organization estimates that only 33 percent of women aged 15-64 years old participated in the labor force in 2020, compared to 55 percent of men in the same age range who did so. The gap is even wider in the electricity and gas supply sector where the share of women employed was only 4 percent in 2016, according to the World Bank's Country Gender Assessment of Tajikistan (2021). This report also notes that the estimated income earned by females is 4.5 times lower compared to income earned by males. Technical jobs in the energy sector tend to offer higher wages and are thus of interest for providing more and better job opportunities for women.

99. The Component 4 of this TA Project will include activities to address the gender gap in women's employment in the energy sector, complementing the activities envisaged under other ongoing operations in Tajikistan, namely the Rural Electrification Project (P170132), the Nurek Hydropower Rehabilitation Project Phase 2 (P173804), and the Additional Financing to Power Utility Financial Recovery Project (P177563). To do so, the proposed Project will provide technical and/or leadership trainings for female employees of the Rogun PMG to strengthen their opportunities to progress in their careers. Other actions will be added based on the findings of a baseline assessment of women's employment in the energy sector in four Central Asian countries that is planned to take place between the summer and early fall of 2022.[26] Actions may include strengthening existing internship programs (if available) in collaboration with relevant academic institutions to attract more female engineers, providing trainings for managerial and technical staff at Rogun PMG on gender inclusion, providing childcare services and/or facilities to reduce possible barriers to women's retention at the companies, etc. To monitor progress of the gender actions toward narrowing the gender gap in employment in the energy sector, the Program will include the following intermediate result indicators: "*Increase in the number of women taking on permanent jobs at Rogun PMG at technical and managerial levels (baseline: 5, target: 10)*."

100. **Citizen Engagement**. The engagement of the local population and other civil society stakeholders (civil society, media, mahallas, community-based organizations, and the general public) is essential to the success of the Project – to ensure smooth collaboration between project staff and local community and to enhance project outcomes. Rogun PMG will continue and expand its engagement with local communities in order to maintain an effective interface with

[26] This assessment, financed by an ESMAP grant, will provide a baseline on women's employment in technical and managerial jobs in the energy sector, including women's experience in pursuing engineering studies, and in entering and advancing their careers in the energy sector.

target communities. This will be followed by several citizen engagement activities implemented regularly throughout the Project. The following specific activities will be implemented by Rogun PMG.

- ***Series of community consultations***, considering post-COVID circumstances and prevailing regulations, will inform communities and obtain feedback on the power plant construction issues and implementation process. Consultations will be held at least once per year and provide the opportunity for all citizens to provide feedback on the interventions and the effectiveness of the consultation process.
- ***Open information and feedback desks utilizing online complaints and response platforms,*** which will also serve as a feedback and grievance redress mechanism. This would allow creating an immediately accessible venue for citizens to obtain information on the project, provide feedback, raise concerns and to explain adapted processes due to the COVID-19 context. The GRM will be open to feedback on any project-related issues, the appropriate responsibilities of community liaison officers, contractors, supervision consultants, and respective departments of both Rogun PMG and Rogun OJSC that will be assigned to record, process, and provide meaningful responses and/or resolution to feedback received.

101. The effectiveness of the citizen engagement activities would be measured through the following intermediate results indicator under the project: "*Percentage of citizens who believe that the Project has established effective engagement processes*." The data will be collected through mini-surveys during/after each community consultation.

V. GRIEVANCE REDRESS SERVICES

102. ***Grievance Redress.*** Communities and individuals who believe that they are adversely affected by a project supported by the World Bank may submit complaints to existing project-level grievance mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address complaints through dispute resolution. Complaints may be submitted to the AM at any time after concerns have been brought directly to the attention of Bank Management and after Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), please visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank's Accountability Mechanism, please visit https://accountability.worldbank.org.

VI. KEY RISKS

103. Overall risk to achievement of the Project development outcomes is rated as Substantial. The below section presents the assessment and discussion of main residual risks.[27]

104. **Political and Governance Risk is Substantial**. The political decision has been made since late 2000s on the priority of Rogun HPP project and the authorities have demonstrated full commitment. The project is supported across the entire political spectrum and is consistent with the development strategy of the country. There are limited residual

[27] Evaluation of the risks under the proposed Project, except for E&S risks, was limited only to the impacts of those risks on the completion of technical assistance activities consistent with the corporate guidelines – Systematic Operations Risk Rating Tool (July 15, 2021). Evaluation of E&S risks, as per guidance of the OESRC Advisory Note on Technical Assistance and the ESF, was done considering potential downstream E&S implications of the Rogun HPP Project that may arise when, and if the TA, leads to future investments, despite the fact that the proposed operation finances only TA.

corruption or transparency risks to the TA activities because those would be carried out according to World Bank procurement rules, the Government has demonstrated ability to implement large investment projects (e.g. Nurek HPP Rehabilitation Project) according to Bank's procurement rules, and the activities are comprised primarily of individual and firm consultancy contracts with the largest estimated at US$4 million. The implementation of recommendations from the TA Project will also depend on the efficiency of the governance of Rogun JSC. This will be assessed during implementation of the TA and appropriate improvements will be proposed. The following will help to mitigate the governance risk: (a) prior review of some procurement activities by the Bank, (b) design of SOE performance improvement program of four energy SOEs, including Rogun JSC, that the Government committed to; and (c) further capacity building for Rogun PMG on procurement and management of contracts.

105. **Macroeconomic Risk is Substantial**. COVID-19 and the international situation negatively impacted the macroeconomic situation in the country. The deterioration of the macroeconomic situation will not impact the work related to development of a macroeconomically financing plan for Rogun HPP and other TA activities, which are all analytical pieces. However, the Government may deviate from implementation of recommendations, primarily the macroeconomically viable financing plan, considering its desire to complete the construction of the project as soon as possible and therefore create risks of public debt distress. The following will help to mitigate this risk: (a) clear signal from all potential financiers that they will not support the project if the financing plan is macroeconomically not sustainable; (b) the ongoing policy dialogue with the IMF and the Bank including prospects of budget support operations; and (c) regular monitoring of macroeconomic developments and updates to the debt sustainability analysis to determine whether the financing plan to be developed would require update(s).

106. **Sector Strategies and Policy Risk is Substantial**. The proposed intervention is consistent with the country's development strategy and objectives as specified in the Tajikistan National Development Strategy 2030 and other strategic documents. However, this risk at Project level is Substantial given that slow progress with implementation of key measures aimed at improving the electricity sector financial performance, such as tariff increases, further restructuring of debts, implementation of escrow account mechanism, may jeopardize the robustness of the commercial framework for Rogun HPP Project and impact collection of revenues for electricity sales by the project. There may also be delays with signing of PPAs and those PPAs may divert from core principles (e.g. off-taker, payment support mechanisms, dispute settlement, etc.) of bankable PPAs for sale of Rogun electricity. This risk will be mitigated through: (a) clear requirement by the Bank and other development partners to at least progress with signing of MOUs for exports of Rogun electricity; (b) demonstrate progress with negotiations of PPAs; and (c) core DLIs under the Power Utility Financial Recovery PforR and its Additional Financing (P168211) to achieve targets related to tariff adjustments, debt restructuring, improved investment planning, implementation of cost-saving measures, progress with introduction of good-practice governance including consistent implementation of the escrow account mechanism.

107. **Technical Design Risk is Substantial**. The technical risk is Substantial given the complexity of the Rogun HPP design, the scope of dam construction, and other civil works contract. It should however be noted that the proposed TA Project is financing only consulting services. The risk would be mitigated through technical audit on existing detailed design solutions, identification of measures to address the shortcomings that may be identified, and ongoing engagement of the dam safety POE to advise on various technical aspects of the Rogun HPP construction.

108. **Institutional Capacity for Implementation Risk is Substantial**. The implementing entity has experience in carrying out energy sector projects financed from the state budget. It has overall adequate technical expertise on general issues related to hydropower, however, it does not have the required in-house capacity on: (a) geology, hydrology, and other specialized aspects of hydropower; (b) procurement and financial management; and (c) monitoring and ensuring environmental compliance of the project. The risk would be mitigated by hiring additional experts at Rogun PMG to strengthen their implementation capacity and trainings on technical aspects of hydropower, procurement, contract management, FM, and E&S.

109. **Fiduciary Risk is Substantial**. The current procurement risk under the project is Substantial. Such a risk rating reflects the existing procurement and technical capacity limitations in the PMG and overall high public procurement risk environment. Specifically, the identified key issues and risks concerning procurement include: (i) lack of procurement experience under applicable procurement regulations; (ii) procurement and implementation delays due to insufficient existing capacity to develop technical parts of procurement documents and provide quality reviews and procurement decisions; (iii) limited contract management skills; (iv) overall high public procurement risk environment. The following mitigation measures are proposed to address these risks: (a) strengthening implementation capacity and hiring additional procurement and technical specialists meeting the requirements defined in the terms of reference satisfactory to the Bank; (b) involvement of technical experts to provide technical inputs to procurement documents; (c) start-up and intensive procurement training for PMG's staff and Tender Committee members; organization of procurement workshop before project effectiveness; (d) Bank's review of key project procurement activities as well as selection of key implementation support personnel; (e) preparing operations manuals with detailed section on procurement and contract management processes, and (f) enforcing public disclosure of contract notifications, awards and implementation progress information. The Financial Management (FM) risk for the Project is Substantial. Rogun PMG has no prior experience in implementation of Bank-funded projects in the past. The Bank team agreed with Rogun PMG on a set of FM actions that need to be implemented to strengthen the capacity.

110. **Environmental Risk is High**. The primary environmental impacts and risks during the 10-year construction period will be landslides and slope stability in the future reservoir area, erosion into the river and rising reservoir and consequent water quality impacts, loss of natural habitat, tunneling spoil management, management of wastes and wastewater from the workforce of about 12,000, dust control, and contamination at the tank farm. During operation, the primary risks would be landslides into the reservoir, management of waste and wastewater from the few hundred workers, maintenance of fisheries, and maintenance of sufficient downstream flows to support biodiversity. The management of environmental risks will be addressed in the updated E&S instruments, which will include the ESIA, a construction site operation plan, and a series of management plans. During construction, plans would include Traffic Management Plan, Waste Management Plan, Wastewater Management Plan, Hazardous Materials Management Plan, Air Quality Management Plan, Site Rehabilitation Plan, Erosion Control Plan, Watershed Management Plan, Floodplain Biodiversity Survey Plan, Biodiversity Offset Plan, Landslide Monitoring Program, etc. During operation, these would include a Reservoir Operating Plan, Bathymetric Monitoring and Sediment Characterization Program, and a series of day-to-day management plans, which would include plans for Site Maintenance and Housekeeping, Waste Management, Hazardous Materials Management, Wastewater Management, Landslide Management and Monitoring, Pollutant Spoil Prevention, Minimum Flow Release Management.

111. **Social Risk is High**. The Project will finance the updating and preparation of environmental and social instruments for the Rogun HPP. Given the complexity of the social risks and impacts to be assessed, the social risk rating is High. Key challenges include: (a) stakeholder and citizen engagement in a project that will have profound socio-economic impacts on project-affected people – including vulnerable groups – due to economic and physical displacement, worker retrenchment, establishment of new communities, restoration of livelihoods (e.g. agriculture, fisheries, light manufacturing, service occupations, etc.) and opportunities for benefit-sharing; (b) large resettlement (some 42,000 people); (c) establishment of an effective grievance mechanism for handling a potentially large volume of complaints; (d) labor management challenges, including working terms and conditions, OHS, and the establishment of safe and effective work camps; and (e) community health and safety issues, including labor influx, with attendant risks related to social conflict, gender-based violence, sexual exploitation and abuse/sexual harassment, transmission of disease and security issues. The management of social risks and impacts will be addressed in the updated environmental and social instruments, namely the ESIA, Phase 1 RAP audit, Phase 2 RAP (including a livelihood restoration plan), Child Care Plan, Skills Development Plan and Retrenchment Plan, as well as the newly prepared Labor Management

Procedures (LMP), Stakeholder Engagement Plan (SEP), a Cultural Heritage survey Plan and other plans and studies, as necessary.

112. **Stakeholder Risk is Substantial**. The project objectives are well understood, and all key stakeholders, comprised of local residents near Rogun HPP, the electricity consumers, and key local and central government bodies, support the project. However, there is a risk that the potential project affected people (those to be resettled) may not provide the required cooperation with consultants that would prepare the RAPs. The neighboring countries may also raise concerns related to the project related to water availability. The risk would be mitigated through: (a) appropriate public communication program to be developed under this Project as well as the development of local community benefit sharing program, which would send a strong signal about the Rogun HPP Project's focus on improvement of livelihoods of local communities; (b) ensuring that filling of the reservoir takes into account the existing water sharing agreements; and (c) consultations with neighboring countries on water related issues.

113. **Other Risk is Substantial**. The shortfall in concessional financing and re-emergence of objections from riparian countries may jeopardize ability of the TA Project to achieve its objectives related to establishment of credible financing and commercial frameworks for the Rogun HPP as well as jeopardize the construction due to disagreements around water use. This risk of financing shortfall will be managed through preparation and required adjustments to the project construction schedule taking into account availability of resources while not jeopardizing the technical safety of the project. The risk of riparian concerns will be managed through adherence to water-sharing agreements, sharing of information related to the relevant aspects of the project, as well as timely and comprehensive engagement and coordination with riparians.

114. It should also be noted that the delay in completion of CASA-1000 Project may also exert some negative impacts on Rogun HPP Project given that BT's existing hydropower generation surplus will disappear by around 2029 and Rogun HPP Project would therefore fill in this gap and therefore generate revenues for Rogun JSC. However, the revenue loss from CASA may potentially be compensated by increased exports to Central Asian countries, which the Government is actively pursuing with support from development partners.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework
COUNTRY: Tajikistan
Technical Assistance for Financing Framework for Rogun Hydropower Project

Project Development Objectives(s)

The project development objectives are to strengthen Rogun HPP Project's financial and commercial frameworks, enhance its environmental and social sustainability, improve the transparency, and support establishment of Rogun HPP Project's benefit sharing program

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Development of a sustainable financing plan and a commercial framework			
The Government adopts a macroeconomically sustainable and financially viable plan for completing construction of Rogun HPP Project (Yes/No)		No	Yes
PPAs are signed for sale of Rogun HPP Project's electricity in the amount to make the financing plan viable (Yes/No)		No	Yes
Improvement of environmental and social framework and benefit sharing aspects of Rogun HPP Project			
Rogun HPP Project has functioning dam safety as well as environmental and social POEs (Yes/No)		No	Yes
The environmental and social instruments of Rogun HPP Project comply with the requirements of the World Bank's Environmental and Social Framework (Yes/No)		No	Yes
Improvement of transparency of Rogun JSC and strengthening of capacity of the Rogun PMG			

Indicator Name	PBC	Baseline	End Target
The summary information on existing and future contracts and financing plan for completion of construction of Rogun HPP Project are publicly disclosed (Yes/No)		No	Yes
Rogun HPP Project's community benefit sharing program is launched (Yes/No)		No	Yes

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	End Target
Development of macroeconomically sustainable financing plan and a commercial framework for Rogun HPP			
Update of Rogun HPP Project implementation schedule is completed (Yes/No)		No	Yes
Electricity market analysis is completed and the PPAs for sale of Rogun electricity are drafted (Yes/No)		No	Yes
Improvement of the dam safety			
Dam safety POE, with composition and qualifications acceptable to the Bank, is hired (Yes/No)		No	Yes
Strengthening of E&S framework and benefit sharing aspects of Rogun HPP Project			
E&S POE, with composition and qualifications acceptable to the Bank, is hired and retained (Yes/No)		No	Yes
Update of E&S instruments of Rogun HPP Project is completed (Yes/No)		No	Yes
Preparation of Rogun HPP Project community benefit sharing program is completed (Yes/No)		No	Yes
Strengthening of institutional capacity of Rogun PMG and Rogun JSC			

Indicator Name	PBC	Baseline	End Target
Rogun PMG is strengthened with project management, procurement, FM, and E&S experts (Yes/No)		No	Yes
Increase in the number of women taking on permanent jobs at Rogun PMG at technical and managerial levels (Number)		5.00	10.00
Percentage of citizens who believe that the Project has established effective engagement processes (Text)		To be established during 2022 survey	At least 65 percent

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
The Government adopts a macroeconomically sustainable and financially viable plan for completing construction of Rogun HPP Project	This indicator will measure the progress with development and adoption of a macroeconomically sustainable financing plan. The macroeconomic sustainability means that the financing plan would not create risks of debt distress for the country taking into account the proposed annual capital expenditures and financing terms for those expenditures	Annual. The compliance with this indicator will need to be ensured on continuous basis given that macroeconomic situation may change	(a) Joint World Bank and IMF debt sustainability analysis; and (b) Rogun HPP Project financial model underpinning the financing plan	Outputs from debt sustainability analysis prepared by World Bank and IMF on regular basis. The required annual capital expenditures from the financing plan would be used as inputs into the debt sustainability analysis. The financing plan will be considered financially viable if the project cash flows:	Rogun PMG

				(a) cover the required debt service costs for all public and commercial debt (if any), (b) the required return on equity for private investors (if any); and (c) ensure positive internal rate of return (IRR) for the Government's equity	
PPAs are signed for sale of Rogun HPP Project's electricity in the amount to make the financing plan viable	This indicator will measure the progress with establishment of adequate commercial framework for Rogun HPP Project	Semi-annual	Electricity market analysis to be carried out by consultants to PPAs and the related contractual documents	Rogun PMG	Rogun PMG
Rogun HPP Project has functioning dam safety as well as environmental and social POEs	This indicator will measure the progress with ensuring functional dam safety and E&S POEs	Semi-annual	Rogun PMG	Signed contracts with dam safety and E&S POE members	Rogun PMG
The environmental and social instruments of Rogun HPP Project comply with the requirements of the World Bank's Environmental and Social Framework	This indicator will measure progress with ensuring that updated E&S instruments of the Rogun HPP Project are	Semi-annual	Review of updated E&S instruments by the World	E&S documents prepared by the consultants to be hired by Rogun PMG	Rogun PMG

	in compliance with the Environmental and Social Framework of the World Bank		Bank		
The summary information on existing and future contracts and financing plan for completion of construction of Rogun HPP Project are publicly disclosed	This indicator will measure the progress with improvement of financing and procurement transparency of the project	Semi-annual	Rogun JSC website	Data published by Rogun JSC on its website	Rogun PMG
Rogun HPP Project's community benefit sharing program is launched	This indicator will measure the progress with development and introduction of community benefit sharing program	Semi-annual	Rogun PMG semi-annual reports	Rogun PMG semi-annual reports	Rogun PMG

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Update of Rogun HPP Project implementation schedule is completed	This indicator will measure the progress with revision of the Rogun HPP Project implementation schedule to ensure that annual financing requirements are not exceeding the thresholds of annual financing that can be allocated without creating public debt distress.	Annual.	Outputs from the Consultants that would carry out the update of the Rogun HPP Project implementation schedule.	Rogun PMG.	Rogun PMG.

Electricity market analysis is completed and the PPAs for sale of Rogun electricity are drafted	This indicator will measure the progress with preparation of long-term contracts for sale of Rogun electricity. Those contracts will then be negotiated by the Government and Rogun JSC with main buyers in export and domestic markets	Semi-annual	Transaction advisor's reports	Transaction advisor's reports	Rogun PMG
Dam safety POE, with composition and qualifications acceptable to the Bank, is hired	This indicator will ensure that the Recipient hires and maintain a functioning dam safety POE	Semi-annual	Copies of contracts of dam safety POE members and outputs/deliverables of dam safety POE	Rogun PMG	Rogun PMG
E&S POE, with composition and qualifications acceptable to the Bank, is hired and retained	This indicator will ensure that the Recipient hires and maintain a functioning E&S POE	Semi-annual	Copies of contracts of dam safety POE members and outputs/deliverables of E&S POE	Rogun PMG	Rogun PMG

Update of E&S instruments of Rogun HPP Project is completed	This indicator will measure the progress with update of E&S documents required for Rogun HPP Project to make it compliant with the requirements of the World Bank's ESF	Semi-annual	Reports prepared by the Consultant to be hired by Rogun PMG	Reports of the E&S Consultant to be hired by Rogun PMG	Rogun PMG
Preparation of Rogun HPP Project community benefit sharing program is completed	This indicator will measure the progress with preparation of the community benefit sharing program	Semi-annual	Rogun PMG semi-annual reports	Rogun PMG semi-annual reports	Rogun PMG
Rogun PMG is strengthened with project management, procurement, FM, and E&S experts	This indicator will measure the progress with strengthening of Project implementation capacity of Rogun PMG	Semi-annual	CVs and excerpts from contracts of relevant experts hired by Rogun PMG	Rogun PMG	Rogun PMG
Increase in the number of women taking on permanent jobs at Rogun PMG at technical and managerial levels	This indicator will measures the progress with efficiency of gender activities under the Project.	Semi-annual	Report from Rogun PMG on total number of staff and gender break-down by technical and managerial	Rogun PMG	Rogun PMG

			jobs		
Percentage of citizens who believe that the Project has established effective engagement processes	This indicator will measure the progress with improvement of citizen engagement	Annual	Mini-surveys to be commissioned by Rogun PMG	Outputs from surveys based on questions to be asked to respondents	Consulting company to be hired by Rogun PMG

ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY: Tajikistan
Technical Assistance for Financing Framework for Rogun Hydropower Project

1. The implementation support strategy was developed considering the risks identified in the SORT and targets provision of flexible and efficient implementation support to the client.

- Technical: The Bank team will provide just-in-time implementation support to BT on: (i) technical aspects of power plant equipment rehabilitation and dam safety measures, including review of the technical specifications for bidding documents; and (ii) resolving issues that may arise during installation of the power plant equipment, replacement of autotransformers, and implementation of dam safety measures.
- Procurement**:** The procurement related implementation support will include: (i) timely advice on various procurement related issues and guidance on the Bank's Procurement Framework to be applicable to the project financed activities; (ii) technical support in reviewing the bidding documents, Request for Proposals, amendments, evaluation reports and other procurement-related documents; (iii) monitoring of procurement progress against the procurement plan; and (iv) post review of contracts.
- Financial management: As part of its project implementation support and supervision missions, the Bank will conduct risk-based financial management implementation support and supervisions within a year from the Project effectiveness, and then at appropriate intervals. During the Project implementation, the Bank will supervise the Project's financial management arrangements in the following ways: (a) review the Project's semi-annual IFRs as well as the entities' and the Project's annual audited financial statements and auditor's management letters and remedial actions recommended in the auditor's management letters; and (b) during the Bank's on-site missions, review the following key areas (i) project accounting and internal control systems; (ii) budgeting and financial planning arrangements; (iii) disbursement arrangements and financial flows, including counterpart funds, as applicable; and (iv) any incidences of corrupt practices involving project resources. As required, a Bank-accredited Financial Management Specialist will participate in the implementation support and supervision process.
- Public communication: The Bank's communication specialist will provide support to the implementing entity on matters related to public disclosure of information related to various project aspects, including the progress, details on GRM and how the cases were resolved, communication with non-government organizations, and other.
- Environmental and social safeguards: The Bank's environmental and social specialists will provide regular support to BT in ensuring compliance with ESMP and RAPs under the project, timely resolution of safeguards issues, timely response and clarifications on safeguards related questions and issues, and implementation of SEP.

Annex 1: Table 1: Implementation Support Skill Mix and Time Input

Time	Focus	Skills Needed	Resource Estimate (staff weeks (SW)
First twelve months	Task management	Energy economist and Energy Specialist	5 SWs
	Technical review of the electro-mechanical aspects of bidding documents; support with review of detailed designs; and supervision of rehabilitation of target infrastructure; and construction of new infrastructure	Electro-mechanical Engineer	4 SWs
	Technical review of hydropower-specific and dam safety related aspects of bidding documents; support with review of detailed designs; and supervision of rehabilitation of target infrastructure	Hydropower Specialist	5 SWs
	Procurement review of the bidding documents	Procurement Specialist	4 SWs
	Financial management	Financial Management Specialist	2 SWs
	Progress with implementation of key measures to improve financial standing of BT	Financial Specialist	3 SWs
	Support with review of detailed designs; and supervision of rehabilitation of target infrastructure; and construction of new infrastructure	Power Engineer	4 SWs
	Environmental safeguards supervision	Environmental Specialist	2 SWs
	Stakeholder engagement plan	Social Specialist	2 SWs
	Public communication	Public Communication Specialist	2 SWs
13-48 months	Task management	Energy Economist and Energy Specialist	25 SWs
	Review of procurement documents, and procurement guidance	Procurement Specialist	10 SWs
	Financial management and	Financial Management	10 SWs

Time	Focus	Skills Needed	Resource Estimate (staff weeks (SW)
	disbursements	Specialist	
	Progress with implementation of key measures to improve financial standing of BT	Financial Specialist	12 SWs
	Guidance and implementation support on power engineering issues	Electro-mechanical Engineer	12 SWs
	Guidance on hydropower-specific technical issues	Hydropower Consultant	25 SWs
	Environmental supervision	Environmental Specialist	5 SWs
	Stakeholder engagement plan	Social Development Specialist	4 SWs
	Public communication	Public Communication Specialist	6 SWs

2. The staff skill mix and focus in terms of implementation support is summarized in the tables below.

Annex 1: Table 2: Summary of Skill Mix and Time Input Required

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Task team leader	30	Field trips as required	HQ-based
Hydropower specialist	30	Field trips as required	Field-based
Procurement specialist	14	Field trips as required	Country office based
Financial management specialist	12	Field trips as required	County office based
Electro-mechanical engineer	17	6-8	Field-based
Environmental specialist	7	7	Field-based
Social specialist	6	6	HQ-based, Field-based, Country office based
Public communication specialist	8	5	HQ-based

ANNEX 2: Rogun HPP Project Overview

COUNTRY: Tajikistan
Technical Assistance for Financing Framework for Rogun Hydropower Project

1. **The Project is located on the Vakhsh River upstream of the Nurek HPP**. It is a Project with a large reservoir capable of providing seasonal regulation.

Map: Vakhsh Cascade of HPPs

Source: World Bank.

2. **The key characteristics of the project are the following:**

- Location: Vakhsh River, first project in the cascade upstream of the 3,000 MW Nurek HPP
- Dam: rock-filled dam with a central impervious core
- Dam crest: El. 1,300 masl
- Full supply level: El. 1290 masl
- Foundation level: ~ 965 masl
- Dam height: 335 m
- Installed capacity: 3,780 MW (6 x 630 MW)
- A staged construction has been planned in order to generate energy during the construction phase. A smaller dam embedded in the main one allows raising the reservoir level before dam completion. This is the Stage 1 dam which has a crest elevation of 1,120 masl.
- Expected annual average generation (at fully supply level): 14,400 GWh

- Surface Spillway: 7,800 m^3/sec (PMF)
- Maximum operating head: 320 m
- Total reservoir capacity: 13.3 km^3
- Reservoir active storage: 10.3 km^3
- Reservoir area: 110 km^2
- Reservoir operating lifespan: 115 years (based on the estimated sediment inflow)
- Projection completion cost (updated estimate): US$4.9 billion[28]
- Project start: 1976; stopped during early 1990s, resumed in 2007
- Project owner and implementing entity: Rogun JSC
- Ownership structure of Rogun JSC: 97 percent Republic of Tajikistan; 3 percent - various domestic legal entities and individuals.

[28] Assuming revised schedule and excluding financing costs.

ANNEX 3: Results of Rogun Financing Options Study

COUNTRY: Tajikistan
Technical Assistance for Financing Framework for Rogun Hydropower Project

1. This annex summarizes the results of the analysis of the options to finance completion of the Rogun HPP project. The analysis was carried out during 2021 and parts of the analysis would require an update. The Government will be updating the construction schedule and the financing plan for the Project under the proposed Project.

2. **The evaluation of the financing options for the Project was carried out considering the following main constraints**. Those constraints include macro-fiscal, limited Project revenues in the short to medium term, and long construction period.

- ***Limited government budget and external borrowing capacity***. The size of Tajikistan's economy is modest at GDP of US$8.1 billion in 2019. The country is currently estimated to have high debt distress risk. Therefore, without firm PPA commitment for energy sales or improvement of debt sustainability, the Government will most likely not be able to exceed the following spending limits on the Project: (a) state budget financing of about US$338 million in 2022 and not exceeding US$200 million/year in 2023-2029; and (b) external concessional borrowing of US$87 million in 2022 and not exceeding US$175 million in 2023-2029 as shown on the table below.

Annex 3: Table 1: Financing Requirement under Revised Schedule and Potential Financing Sources (MUS$)

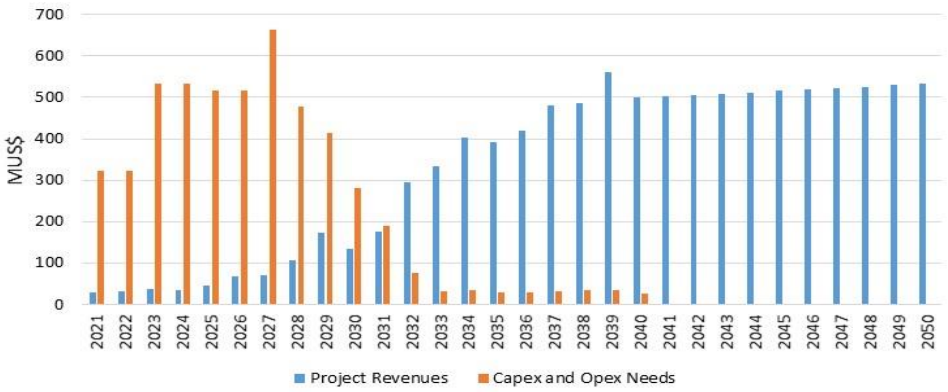
Sources	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Annual required financing	**322**[29]	**322**	**532**	**532**	**514**	**515**	**662**	**476**	**409**	**278**	**179**	**60**
State budget	200	338	205	203	200	200	200	200	200	200	200	200
Potential external concessional borrowing (without debt distress)	175	87	170	172	175	175	175	175	175	175	175	75
Financing required from other sources to close the gap (without debt distress)	-	-	157	157	139	140	287	101	34	-	-	-

Source: World Bank team estimation.

- ***Annual financing needs in 2022-2028 significantly exceed the Project revenues.*** As per the revised schedule, the Project construction is expected to be completed in 2032, with disbursement of 95 percent of the capital costs. The Project will be able to gradually increase electricity generation as the construction progresses and new generating units are commissioned; however, the Project revenues are quite limited until 2026. Therefore, there is a significant time lag between Project funding (primarily concentrated between 2022-2028) and realization of the Project revenues to service the financing. Furthermore, based on the Project's cashflow projections, it will take Rogun 20 years (by end 2050) to fully pay-back its capital investments. Therefore, the Project would require very "patient" capital as funding sources. The following figure shows annual CAPEX and OPEX requirements and project revenues.

[29] This year it is financed entirely from the state budget.

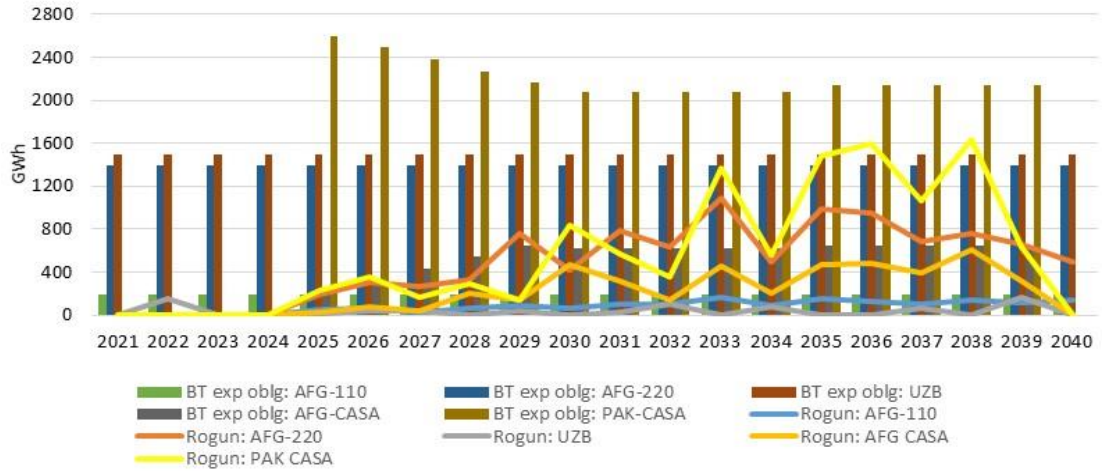
Annex 3: Figure 1: Annual CAPEX and OPEX Requirements and Project Revenues



Source: World Bank team estimate.

3. **The Project revenues are limited in short and medium term given the modest early generation from the Project and an undeveloped export market**. The electricity demand from the Project is particularly limited until 2026, when domestic and export supply obligations can still be met with existing power plants (primarily Nurek HPP) and IPPs from which BT is buying electricity under long-term PPAs. Those IPPs are the 670 MW Sangtuda-1 HPP and 220 MW Sangtuda-2 HPP. **Error! Reference source not found.**The following figure presents BT's estimated need for Rogun energy for the purposes of exports under existing PPA commitments including CASA-1000.

Annex 3: Figure 2: BT's Need for Rogun Energy to Meet Export Obligations



Source: World Bank team estimate.

4. **It is important to avoid double-booking of export revenues from CASA or any other PPAs**. This requires taking into account all other commitments that the Government has assumed under various programs or projects. Specifically, the Government Program of BT Financial Recovery for 2019-2025[30] assumes that BT would be the recipient of export revenues from CASA-1000 (which is an accurate assumption considering CASA PPAs) and those revenues would be contributing to elimination of cash deficit of BT and its return to adequate financial footing. Those

[30] The Program is currently being updated and considering the COVID-19 impacts and depreciation of the local currency, it is expected that the Program would need to be extended until 2029 with additional sources of cash injection required.

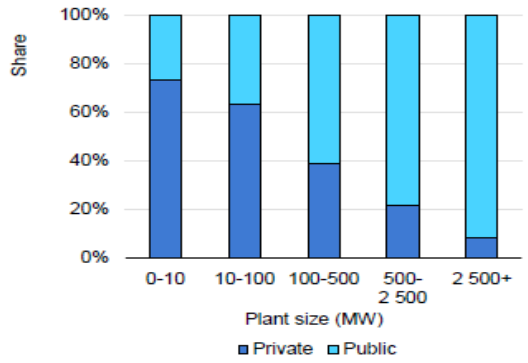
revenues play a critical role in financial recovery of BT and thus its ability to repay the outstanding stock of payables, short- and long-term debt service costs, and other liabilities. If BT does not receive those revenues, then its financial viability would be jeopardized with significant negative consequences on Rogun and the entire power sector.

Limited role of the private sector in the current stage of the Project

5. **There is no track record of private ownership in developing greenfield hydro of this scale in low-income countries**. While the private sector is playing an increasingly important role in developing and financing hydro power, their focus is on the small to medium size (<500 MW) hydro with moderate technical and country risks. Indeed, hydro plants developed[31] in 2000-2020 were dominated by the public sector when the installed capacity reaches 500 MW (see chart below). For projects over 2,500 MW, less than 10 percent greenfield hydro globally were developed through private ownership. Among these, only four projects were developed in the emerging market. All of them are in mid-income developing countries (one in China and three in Brazil)[32]. The lack of precedent in low-income countries are explained by a combination of limited number of projects and insurmountable challenges for the private sector investment.

6. **The Project shares common characteristics of large hydro projects that include high technical and E&S risks**, which could lead to construction delays and cost over-runs. The high risks were not necessarily compensated by high returns. In the base case scenario, the Project will generate an equity IRR below 7 percent based on 40-year cash flow. On a risk adjusted basis, the project is unlikely to meet screening criteria of most private sector developers

Annex 3: Figure 3: Greenfield Hydro Ownership



Source: IEA.

7. **The Project's financing challenge is further compounded by the lack of commercial financing capacity.** The four large hydro plants developed by the private sector mentioned above were all financed by large state-owned banks in China and Brazil who have the risk appetite to take long term project risks. For Rogun, the balance sheet and risk management capacity required from banks are simply not developed in Tajikistan or in Central Asian market. Without local and regional banks' support, any private developers have to rely on international financing. However, the risk appetite of international lenders is expected to be severely constrained due to availability of long-term country limits for Tajikistan and for the Project. In addition, the Project's status as a partially operating asset under construction, further complicated the financing prospect. Because of legacy design and construction, most private investors will be reluctant to assume risks of work performed prior to the investment.

[31] Hydropower Special Market Report, Analysis and forecast to 2030; https://www.iea.org/reports/hydropower-special-market-report
[32] Jin'anqiao Hydroelectric Power Plant, Santo Antonio Power Plant, Jirau Power Plant and Belo Monte Hydro Power Plant *https://ppi.worldbank.org/en/snapshots/sector/electricity*

8. **Limited International financing can be mobilized if the government offers sovereign guarantees**. However, financing backed by sovereign guarantee is also constraint due to the limited fiscal space (sovereign guarantees counted as government liability on the same basis as loans in Tajikistan). The limited sovereign guarantee should only be used on a selective basis for certain contracts, but it will only provide a fraction of the total financing.

9. **Limited equity contribution from a strategic investor might be possible.** However, any strategic investor would apply a heavy discount at this stage on the value of the project, taking into considerations of significant uncertainties and risks relating to project completion and financing. As a result, the Government is unlikely to receive an attractive valuation for the equity sale of the project. Even if the equity sale takes place, it will only provide a small portion of the total financing.

10. **Direct borrowing by the Government or Rogun JSC would be the realistic scenario of the Project financing vs. limited recourse project financing structure**. The Study evaluated the possible use of limited recourse project financing structure to complete the construction of the Project. Under the project finance structure, private investor(s) could take ownership in Rogun JSC, raise financing without sovereign guarantees, and operate the project under certain PPP model. This way it could minimize the direct impact on the public debt and government liability. However, the analysis and preliminary market sounding indicated that such schemes will be extremely difficult to structure and implement for the following reasons:

- ***The Project is currently under construction and is in a partial state of operation***. It would be extremely difficult for private investor(s) to take over ownership of the Project and seek to implement traditional limited recourse project financing structure. The Government is also unlikely to receive an attractive valuation for the sale of the Project given significant uncertainties and risks relating to Project completion and financing.
- ***Most of the Project financing will need to be raised from international financing sources given the relatively under-developed state of capital markets in Tajikistan***. However, the risk appetite of international lenders is expected to be quite constrained, especially in terms of availability of long-term country limits for Tajikistan and for the Project.
- Typical limited recourse project finance structure will require, among other things, that:
  - ***All contracts related to the Project construction are concluded on day one on a fixed price, date-certain, lump-sum turnkey EPC basis in order to mitigate delay and cost overrun risk***s. This would be impossible to achieve given that contracts have been signed at various time periods and not all of them may be turnkey EPC.[33] Moreover, Rogun JSC, due to lack of financing, occasionally engaged smaller contractors for some urgent small-scale civil works that should have ideally been done as part of the larger civil works contracts.
  - ***All offtake contracts, i.e. PPAs, are finalized and signed covering the entire generation capacity of the Project on a take-or-pay basis***. This would not be possible as new cross- border power sales agreement will take significant time (18-24 months) to materialize.
  - ***The project financiers will also require that the <u>entire</u> financing required to fund the project costs, including IDC, and other financing costs is irrevocably committed at Financial Close***. This is considered extremely difficult to achieve given the substantial capex financing requirement (around US$4.9 billion) of the Project and limited financing capacity of international commercial financing sources, in particular for long-tenor debt financing.

[33] The World Bank did not review the contracts and relies on information provided by Rogun JSC.

11. Overall, the stringent requirements of project finance lenders including those related to due diligence, documentation, and covenants, limited recourse project financing - even if considered possible - can be an expensive, time-consuming and risky proposition for the Project, and may lead to increased uncertainties and higher cost of electricity.

12. **This Study examined three indicative financing scenarios ranging from largely budget and concessional sources (Scenario 1) to predominantly private and commercial sources (Scenario 3).** The Project would most likely be implemented as a mix of Financing Scenarios 1 and 2 described below. It is expected that in the early years, the financing would most likely proceed as Scenario 1 and may be comprised of state budget financing and concessional resources from development partners given the current public debt situation. Once the public debt situation improves, the Government may consider raising commercial financing, which would resemble Scenario 2. It should be reiterated that PPAs would need to be signed irrespective of the financing sources and scenarios to ensure there are reliable long-term sources of Project revenues. Therefore, the scenarios need to be viewed as illustrative highlighting the implications of amalgamation of different financing sources, but the actual scenario will likely progress in a dynamic manner considering the evolving macro-economic situation and other factors.

Financing Scenario 1: Public financing from the state budget combined with potential grants and concessional loans

13. This scenario assumes that the Project would continue to be financed largely with reliance on state budget with potential additional grants and concessional loans from development partners. The Government may continue spending about US$200 million/year from the state budget and seek to raise additional US$175 million/year of concessional resources from development partners. This would enable Tajikistan to complete the Project construction by the end of 2035. However, the construction schedule under this scenario would critically depend on the availability of concessional resources from development partners. If development partners do not provide the required financing, then, with reliance on state budget financing only, the Government would only be able to complete the Project construction by 2043. It should be noted that the financing requirements under this scenario are not linked to the Project construction schedule and important milestones. This is based on the simplified assumption that all key Project construction milestones can be shifted by the same number of years. Moreover, this scenario does not take into account the potential technical and safety risks that may arise if the Project construction is delayed for extended period of time, e.g. the flooding risk.

Financing Scenario 2: Sequenced public and private financing, consisting of combination of state budget spending, grants, concessional loans, and commercial debt

14. The financing plan under this scenario would include state budget financing, grants from development partners, concessional loans from development partners, and ECA/commercial loans to Rogun JSC, but would require a lead development partner for the Project. This financing plan is a result of optimization under the conditions of: (i) meeting the domestic spending and external borrowing constraints; (ii) minimizing the interest payment during construction; and (iii) ensuring that the debt repayment schedule matches the project revenue stream. Such optimization yields the following financing from different sources. All five sources of financing would be needed to complete the Project. The capital expenditures are primarily disbursed during the period of 2021-2030. Therefore, more than 95 percent of this financing package would be required during this time period. The table below shows the financing plan under Scenario 2.

Annex 3: Table 2: Scenario 2: Financing Sources of the Project

Sources	Amount
Project's operating cash flows	US$380 million
Government equity/state budget financing	US$2.2 billion
Grants from development partners	US$660 million
Concessional loans from development partners	US$1.3 billion
ECA and commercial debt	US$600 million
Total	US$5.1 billion[34]

Source: World Bank team estimate.

15. **Under Scenario 2, the financial cost to complete the Project is estimated at US$5.1 billion inclusive of financing costs**. The order of financing sources reflects the principle of prioritizing the government's budget contribution over external borrowing, and cheaper and long-term debt (e.g. loans from development partners) over more expensive financing in form of ECA loans and commercial debt. Therefore, the Project will first utilize the equity and grant financing and then only start drawing down the other more expensive sources. However, relying on equity and grants will only meet about 60 percent of the funding requirement. Then, the loans from development partners are drawn each year to the maximum extent required and allowable under external concessional borrowing constraints for each year. The remaining funding gap will have to be filled with ECA and commercial debt.

16. **The state budget spending and concessional loan amounts under this scenario are consistent with the annual caps that the Government committed to observe as part of their commitments to IMF and the Bank**.[35] As can be seen from the table below, the annual state budget financing and concessional borrowing are within the specified limits. The estimated annual concessional borrowing amounts passed the concessionality test with the grant element of the concessional portion of financing at 56 percent.[36]

Annex 3: Table 3: Comparison of Financing Plan Against Existing Constraints (MUS$)

	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gov equity	297	205	203	200	200	200	200	200	200
Gov equity limit	338	205	203	200	200	200	200	200	200
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Total grants	-	127	142	143	143	143	146	115	148
Total concessional loans	-	170	172	175	174	175	169	76	174
Concessional borrowing limit	87	170	172	175	175	175	175	175	175
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: World Bank team estimate.

17. **Both concessional and commercial debt may be secured when there are PPAs for exports of Rogun energy. Moreover, the commercial financing would be possible when public debt is sustainable**. Predictable and adequate revenue streams are required for the Project to be able to service both concessional and commercial debt. The debt may be secured using export or domestic sale PPAs with customers with good credit quality. There may be a need for payment guarantees to make the PPAs bankable, however, those should be considered only when the macro-fiscal

[34] Including financing costs.
[35] Under the Government's Letter of Intent as part IMF's Rapid Credit Facility discussions and the Performance Action 2 under World Bank's Sustainable Development Finance Policy Recommendation (SDFP) of FY22.
[36] The grant element of a debt is the difference between the net present value (NPV) of debt and its nominal value, expressed as a percentage of the nominal value of the debt. The NPV of debt at the time of its signing date of an underlying loan agreement is calculated by discounting the future stream of payments of debt service due on this debt. The discount rate used for this purpose is 5 percent.

situation allows for such additional liabilities for the Government. The success of private financing will also depend on the market appetite, quality of PPAs and Tajikistan's overall macro-fiscal situation.

18. **The financing Scenario 2 would help to meet the annual financing requirements of the Project and generate net positive cash flows for the Project**. This means that the Project financing package provides adequate resources to finance the remaining construction works and other expenses of the Project. Moreover, this financing scenario will generate a return of 6.4 percent and NPV of US$690 million (40-year cash flow; counting grants as equity) for the Government's equity in the Project.[37]

Annex 3: Table 4: Matching of Financing Needs and Financing Sources

Year	Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Project Costs ('000 US$)											
Lot 1: Electro-Mechanical Equipment	466,007	3,717	3,773	48,608	48,751	62,296	62,357	53,011	78,934	81,648	22,912
Lot 2: Main Dam	1,623,414	107,159	107,159	117,945	117,945	121,425	121,425	219,993	209,414	140,870	360,079
Lot 3: Right Bank Structures	1,852,919	119,181	119,181	236,220	236,220	231,594	231,594	324,990	124,616	124,436	104,886
Lot 4: Left Bank Structures	596,334	63,024	63,024	103,946	103,946	77,879	77,879	36,141	35,432	35,061	-
Pre-Contract Works & maintenance of civil works	54,998	10,423	10,423	10,423	10,423	6,653	6,653	-	-	-	-
Design works for left and right bank structures	10,371	3,623	3,623	781	781	781	781	-	-	-	-
Owner's engineer (Intl.)	13,585	1,870	1,870	921	921	902	902	1,669	1,589	1,507	1,435
Owner's engineer (Local)	1,999	341	321	149	142	132	127	225	205	187	171
ESMP and RAP Implementation	234,754	12,993	12,993	12,993	12,993	12,993	12,993	25,985	25,985	25,985	78,844
Initial liquidity buffer	10,000	10,000	-	-	-	-	-	-	-	-	-
Upfront Fees	14,349	-	-	14,349	-	-	-	-	-	-	-
Commitment Fees	32,899	-	-	7,954	6,899	5,959	5,198	3,201	1,762	1,465	462
Interest During Construction	207,882	-	-	4,515	10,175	15,017	19,099	30,774	39,417	41,267	47,618
Total Project Costs	**5,119,512**	**332,332**	**322,367**	**558,804**	**549,196**	**535,630**	**539,007**	**695,989**	**517,355**	**452,426**	**616,407**
Project Funding ('000 US$)											
Equity (Government)	2,213,715	308,812	296,902	205,000	203,000	200,000	200,000	200,000	200,000	200,000	200,000
Private Sector/Off-taker Govt. Investment	-	-	-	-	-	-	-	-	-	-	-
Grant source 1	439,800	-	-	40,000	55,000	55,000	55,000	55,000	60,000	59,800	60,000
Grant sources 2 & 3	240,000	-	-	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000
Concessional loan tranche 1	428,394	-	-	56,667	57,333	58,333	57,900	58,333	56,374	25,472	57,981
Concessional loan tranche 2	428,394	-	-	56,667	57,333	58,333	57,900	58,333	56,374	25,472	57,981
Concessional loan tranche 3	428,394	-	-	56,667	57,333	58,333	57,900	58,333	56,374	25,472	57,981
ECA/Commercial Loan Tranche 1	556,788	-	-	84,130	60,497	39,317	35,321	223,277	18,558	-	95,688
Operating Cashflows used for Construction	384,029	23,519	25,465	29,674	28,699	36,313	44,987	12,713	39,674	86,210	56,774
Total Project Funding	**5,119,512**	**332,332**	**322,367**	**558,804**	**549,196**	**535,630**	**539,007**	**695,989**	**517,355**	**452,426**	**616,407**

Source: World Bank team estimate.

19. **The indicative terms of financing are based on preliminary market analysis**. These are purely indicative and will need to be refined through further discussions with prospective financiers closer to the time of an actual fund-raising exercise. At this stage, the terms of concessional loans are based on funding from similar projects financed by

[37] This is different from the EIRR in the economic analysis. This relates to financial analysis of the Project and includes only the return on government equity.

development partners in Tajikistan, the publicly available sources, and clarifications provided by development partners. The terms of ECA/commercial loans are based on analysis of available similar transactions and additional data received from Rogun JSC. The table below shows indicative financing terms.

Annex 3: Table 5: Indicative Financing Terms

Financiers	Order of funding	Upfront fee	Commitment fee	Margin over Libor/Euribor	Grace period	Repayment period
Equity (government)	1	n/a	n/a	n/a	n/a	n/a
Grant source 1	2	n/a	n/a	n/a	n/a	n/a
Grant sources 2 & 3	3	n/a	n/a	n/a	n/a	n/a
Concessional loan tranche 1	4	0.25%	0.25%	0.73%	96	180
Concessional loan tranche 2	5	0.25%	0.25%	0.90%	96	180
Concessional loan tranche 3	6	0.25%	0.25%	0.73%	96	180
ECA loans /commercial debt	7	2.00%	1.00%	6.00%	42	144

Source: World Bank team estimate.

20. **Implementation of Scenario 2 hinges upon a number of important actions, to be implemented by the Government in the short and medium term, including creation of a strong commercial framework for the Project**. Those actions encompass a wide range of issues and include the following.

a. ***Adoption of a credible financing plan for the Project***. The lack of a full financing plan makes it impossible to assess the financing and project completion risks. Therefore, in order to allow development partners' and commercial banks' participation in financing, it is imperative to prepare a comprehensive financing plan consistent with an updated construction schedule including clarity on all sources and uses of funds. Additionally, the financing plan needs to be macroeconomically sustainable and consistent with the country's public debt management plan.

b. ***Identification of a lead development partner in the Project***. The presence of a lead development partner to assist the Government in the financing and implementation of the Project is a condition for many potential financiers. Early commitment from a development partner would signal to the market about the project's feasibility and bankability.

c. ***Securing a large amount of grants and concessional resources***. In 2023-2030, the Government would require a total of US$660 million grants and US$175 million in concessional loans. This translates into an average annual grant requirement of US$80 million and a concessional loan requirement of US$1.3 billion. As mentioned earlier, when designing this financing plan, concessional borrowing was capped at US$175/year to avoid an unsustainable trajectory of public debt.

d. ***Timely completion of CAPS reconnection/resynchronization project***. The project, financed by ADB, is financing strengthening of the relay protection, installation of SCADA system for high-voltage equipment, and emergency control systems, and is scheduled to be completed by 2023. Upon completion, Tajikistan would be able to synchronize its power system with CAPS. This would allow Tajikistan to expand export opportunities to CA using the existing transmission interconnections with Uzbekistan.

e. ***Continuation of reforms aimed at improvement of financial standing and governance of the power sector***. The Government has been making good progress with implementation of the Program for Financial Recovery of BT/Power Sector for 2019-2025, which is also supported by ongoing projects of various development partners, including the World Bank. As part of that program, the Government: (i) carried out increases of tariffs with the objective of gradually reaching the cost-recovery levels; (b) introduced and started implementation of a new conceptually robust tariff methodology; (c) unbundled the vertically integrated BT

into BT generation, transmission (SIB), and distribution (STB) companies, and will be involving the private sector in operation of the electricity distribution through hiring a management contractor; and (d) initiated measures to improve the transparency and governance of BT, including improvement of investment planning, strengthening of internal audit, and introduction of elements of good corporate governance (e.g. creation of supervisory boards and specialized committees). It would be important to continue implementation of the Government Program for Financial Recovery of BT/Power Sector to ensure the power sector returns to an adequate financial footing, which would be an important prerequisite for enhancing the bankability of the PPA between the Project and the domestic power supplier (the power distribution company).

f. ***Long-term direct PPAs for domestic sales and exports of Rogun energy to be entered into by Rogun JSC***. As a matter of priority, PPAs for about 13,000 GWh of sales to domestic market and about 14,000 GWh for exports would need to be secured for the period of 2022-2030,[38] as the basis for about US$600 million in commercial financing, possibly without sovereign guarantees (PPAs might be secured by a guarantee from development partners). The feasibility of such a scheme will need to be further tested with ECAs and commercial banks. It is highly likely that the ECAs/commercial banks would confirm the needs to seek additional credit enhancement in the form of: (i) offshore escrow of export receivables under PPAs, (ii) sovereign payment guarantees from off-taker governments in support of their respective payment obligations under the PPAs, and (iii) Development Partners' Payment or Loan Guarantees (discussed later). Moreover, additional contracts would need to be secured for sales of energy available in 2031-2040: about 39,000 GWh to domestic market and 76,000 GWh for exports.

21. **The work to secure PPAs with domestic anchor customers and for exports should commence immediately**. The estimated domestic sales and exports of the Project, to make it financially viable under the current financing scenario, are presented on Figure 9.7. Those PPAs would preferably need to be signed with large customers with adequate credit quality to enable commercial lending against those PPAs. Legislative changes would be required to enable such direct PPAs given that under current legislation BT is the single buyer of electricity in the country. Those legal and regulatory changes would be required in any case given the ongoing power sector unbundling process. We recommend the Government to consider the following:

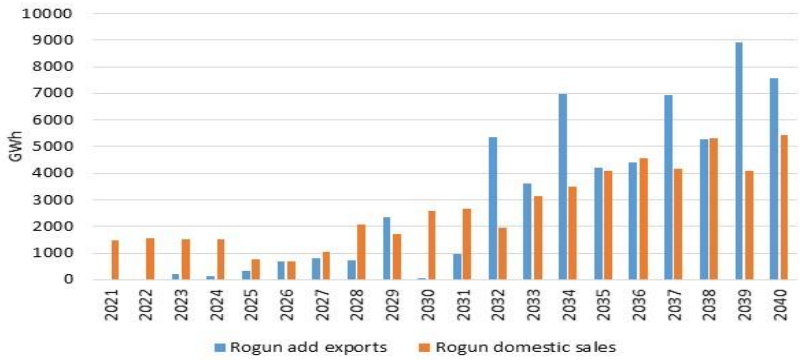
- **PPAs with large domestic customer - TALCO - and, potentially, some other industrial enterprises**. TALCO could provide a reliable revenue stream for the Project considering that it is a very large client, which consumed about 2,100 GWh of electricity in 2020 or 15 percent of total 2020 domestic consumption. The smelter is currently implementing a multi-stage project to expand aluminum production capacity with annual consumption expected to increase from 2,100 GWh in 2020 to 4,680 GWh in 2023 (Stage 1), and reaching 6,480 GWh in 2026 (Stage 3). The implementation of the Stage 1 is underway. The decision on implementation of subsequent stages would be made by the Government in 2022 and the financing for those stages has not yet been secured. Rogun HPP would not be able to meet the entire energy requirement of TALCO until 2031, however, it would be able to supply substantial share of TALCO's demand. The added benefit of this solution is that TALCO would continue buying from BT until 2030 when it is estimated to reach the cost recovery level and eliminate the cash deficit. Therefore, the financial viability of BT would not be jeopardized. Legal and regulatory changes would be required to allow Rogun JSC to sell directly to large domestic anchor customers and for exports. In addition to disclosure of annual financial statements, it would

[38] The share of exports in total generation can be different for various time periods, but the total share is 62 percent during 2022-2040. This is due to the fact that the surplus summer generation increases significantly after 2030. The focus here is on the period from 2022 to 2030 because 20-year PPAs for power trade are rare.

be important to further improve the transparency of TALCO's finances and overall operations, which would allow potential lenders to Rogun Project to more reliably estimate the creditworthiness of TALCO as a potential off-taker of the Project electricity under a PPA. The key details requiring increased transparency relate to ownership structure, tolling arrangement, investment program and the role of Government as well as financing sources.

- **PPAs for exports.** Rogun energy is estimated to be a competitive supplier in the broader CA region and beyond. The potential markets may include, but not be limited to CA countries, including Uzbekistan and Kazakhstan, which are large power systems with aggregate demand of more than 62,000 GWh and 110,000 GWh respectively in 2020 and are expected to grow. Moreover, several CA countries are planning to significantly expand their solar PV and wind capacity, which would increase the demand for balancing services, which large hydropower plants with reservoirs are well-suited to provide. The figure below shows projects domestic sales and additional exports required under financing Scenario 2.

Annex 3: Figure 4: Projects Domestic Sales and Additional Exports[39] Required under Financing Scenario 1



Source: World Bank team estimate.

22. **The Government should also work in parallel to secure additional energy sale contracts for the Project with a focus on other export markets (e.g. Middle East, Europe) and the production of green hydrogen.** MEWR should evaluate the economic viability of exports to the Middle East and other regions. There may be potential for new infrastructure to interconnect with the Middle East and then with the South Caucasus and Europe that may be interconnected through the Georgia-Romania Undersea Cable Project (under consideration). There are number of regional interconnection projects at various stages of development, which may potentially create benefits for Rogun. Specifically, if Tajikistan manages to access the Middle Eastern power market, where some countries experience electricity deficits (e.g. Iraq), then, in addition to sales to this region, it may export to the South Caucasus and even Europe utilizing the existing infrastructure and the projects under development (e.g. Georgia-Armenia-Iran corridor with infrastructure under construction) and Georgia-Romania Undersea Power and Digital Interconnection Project (the feasibility study is underway).

23. **Promotion of green hydrogen.** MEWR should also consider carrying out a detailed technical-economic evaluation of the potential for green hydrogen exports. The recently completed World Bank Study on High-Level Potential for Green Hydrogen Development in CA suggested that Tajikistan has a competitive advantage in the production of green hydrogen. Specifically, the 2020 cost was estimated at US$1.8/kg, which is substantially lower than the current global costs of US$3-6/kg. This is due to significant surplus of green energy during summer months. Therefore, production and export opportunities should be explored in greater detail especially considering that some of the infrastructure

[39] In addition to amounts that the Project can supply to BT to fill in the supply gap of BT under existing contracts.

required for transportation (gas pipelines) already exists and China is estimated to be a US$130 billion green hydrogen market by 2030.

24. **Phasing out of domestic tax benefits.** The phasing-out of domestic tax benefits, which are estimated at about 10 percent of 2018 GDP, may create additional fiscal space to finance the Project.

25. **Development partners may play an important role in mobilizing private capital to complement the grant as part of the financing package**. This will be realized by the catalytic effect of development partners' participation in the Project as well as targeted direct private capital mobilization through the guarantee instrument.

- **A development partner's payment guarantee may offer credit enhancement for** potential energy off-takers from the Project (Uzbekistan, Kazakhstan, Afghanistan, and Pakistan). This may be required by ECAs and commercial banks. It may be noted that similar design is envisioned under the CASA-1000 guarantee. The payment guarantees under PPAs, depending on the overall public debt situation and outlook, may be classified as contingent liabilities and therefore would not add to existing public debt stock of the country.
- **A development partner's loan guarantee may be deployed in later years when the public debt situation allows**. These would be primarily relevant for commercial banks (since ECAs may not be eligible to benefit from development partner guarantee support). Given the nature of the Project - the weak credit profile and substantial construction, financing and offtake risks - the guarantee coverage provided under the loan guarantee might need to be well above the usual 40-60 percent typical coverage. It is however noted that the development partner loan guarantee requires a counter guarantee from the Government, which might not be feasible in the short to medium term until the public debt is at a more sustainable level.

26. **Scenario 2 is very sensitive to even small changes in the size of concessional financing leading to negative Project cash flows and thus rendering the entire financing package unviable.** A sensitivity case was developed to illustrate the importance of the grant component of the financing plan. In this scenario, the grants from sources 2 and 3 are reduced by 50 percent reaching US$15 million instead of US$30 million. This leads to a need of an additional US$720 million (compared to US$556 million in Base Case) from ECAs and commercial sources. This in turn results in:

- Increase in total financing costs by US$51 million, i.e. from US$255 million in the Base Case to US$306 million.
- Negative cash balance in some periods. The minimum cash balance goes down from US$4 million (Base Case) to negative US$38 million, meaning that the Government /Rogun JSC must borrow additional funds to pay for debt service during the construction period, which would not be possible due to macro-fiscal constraints.

27. The Project would most likely be implemented as a mix of Financing Scenarios 1 and 2 depending on the macro-fiscal situation in the country. Specifically, in early years, the financing would most likely proceed as Financing Scenario 1 and may be comprised of state budget financing and concessional resources from development partners given the current public debt situation. Once the public debt situation improves, the Government may consider raising commercial financing, which would resemble the Financing Scenario 2. It should be reiterated that PPAs would need to be signed irrespective of the financing sources and scenarios to ensure there are reliable, preferably long-term sources, of additional Project revenues.

Financing Scenario 3: Combination of state budget spending and commercial financing

28. **This scenario will increase the Project completion cost to US$5.9 billion due to a larger need for commercial financing.** This scenario may not be feasible due to the following:

- The ECA loan tranche will be limited to the size of the contract for Lot 1: Supply and installation of electro-mechanical equipment (US$370 million equivalent).

- The commercial loans – with their relatively short tenors – will put enormous burden on the Project cashflows. This could result in negative cash flows from operations on a year-on-year basis, and an estimated cumulative negative cash flow of US$1.5 billion to be funded through additional state budget or borrowing, which is not possible.
- The higher loan repayment during construction, higher cost of commercial loan financing, and absence of grants would lead to an increase in the Project funding requirements by almost US$1 billion compared to the base case.
- Due to the absence of development partner grants and loans and thus a very high level of commercial financing, the financing package would lead to debt distress.
- Lack of a lead development partner may become a major obstacle for crowding in investments form the private sector.

29. **It would also be warranted to explore the option of attracting a strategic partner/stakeholder into the Project.** The presence of a strategic partner/stakeholder may be conducive to attracting commercial financing into the Project. There can also be benefits in the form of knowledge-sharing and best practices on operation and maintenance, improving corporate governance, and overall implementation efficiency of the Project.

30. **The Government should consider introducing a revenue sharing mechanism for the Project**. For example, under Scenario 2, in 2022-2027, the Government could allocate a total of US$10 million or 3 percent of total revenue for local communities' development initiatives. As the cash revenues of the Project increase, the allocation can increase to 5 percent and that would generate additional US$223 million for benefit-sharing programs over the period of 2028-2040. The Government should consider increasing the allocation to benefit-sharing program taking into account the best practices in comparator countries, which would alleviate poverty and enhance local area development. For example, portion of the Project's revenues could be channeled to:

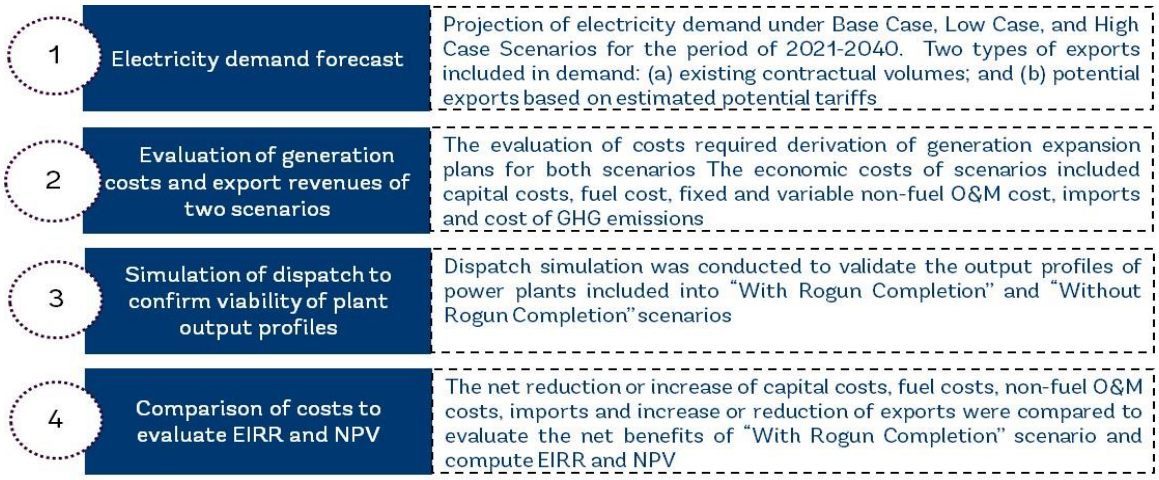
- **Public service and infrastructure** given significant local infrastructure needs and demand for improved public services.
- **Local skills and livelihoods:** Improved skills and livelihoods would most likely be among top priorities of communities given considerable scope for local employment. This may also include: (i) support for alternative skills development and income generation, such as microcredit for SME development and skills audits, and (ii) establishment of and/or capacity building for community-based organizations or public institution.
- **Environmental stewardship:** The large-scale hydro and RE projects also have an opportunity to combine proactive environmental stewardship with local benefit sharing through mechanisms to improve the local environment, in addition to impact mitigation measures required for the project. Examples include wildlife habitat creation such as environmental education, conservation programs, and sustainable tourism.

ANNEX 4: Summary of Updated Economic Analysis of Rogun Hydropower Project

COUNTRY: Tajikistan
Technical Assistance for Financing Framework for Rogun Hydropower Project

31. **Overview of conceptual approach.** The update of the Project economic viability assessment was conducted by comparing the streams of economic costs and benefits under "With Rogun Completion" and "Without Rogun Completion" scenarios for the period of 2021-2040. This is a conservative approach because the useful lifetime of the Project's dam is about 115 years, the useful life of electro-mechanical equipment – 35 years, and therefore the benefits would be larger considering that replacement projects under "Without Rogun Completion" scenario have shorter economic lifetimes and would need to be replaced, which would increase the capital cost of the "Without Rogun Completion" scenario.

Annex 5: Figure 1: Analytical Approach to Evaluation of Supply Scenarios



Source: World Bank team.

32. The generation planning was done using the OptGen model of PSR (Brazil).[40] The modelling of generation from Rogun and other power plants and simulation of exports was done using the Stochastic Dual Dynamic Programing (SDDP) model of PSR, which has a track record of global use and is well suited for modelling hydro-dominated systems, including optimization of reservoir operations. The power system serviced by BT is comprised of South and North zones with 500 kV OHL connecting the two and the analysis was done considering projected demand in both zones and the interconnection capacity constraint. The economic analysis was carried out using 2020 US$ denominated economic costs and prices and includes physical contingencies, but excludes the financing costs, taxes, subsidies (e.g. below cost-recovery price of electricity), and price contingencies.

a. **Under the Base Case Scenario, the aggregate domestic electricity demand was projected to increase by an average annual rate of 2.9 percent**. The domestic hourly load was projected for 2020-2040 using the 2020 actual hourly load curve for South and North Zones of BT service area as the starting point. The annual growth rates of net electricity demand (at end-user level) were projected based on a long-term forecast of real GDP growth and changes in real price of electricity. Then, the forecast level of electricity losses and power plants' own consumption were added to net demand to evaluate the electricity demand at generation level.

[40] https://www.psr-inc.com/en/

b. **Hourly electricity demand projection was used for modelling of generation from the Project and the entire power system**. The estimated growth rate of demand at generation level was used to forecast the hourly load for entire evaluation period with the assumption that the load profile remains constant throughout the entire evaluation period.

c. **Economic discount rate of 8 percent was used**. The economic discount rate (social opportunity cost of capital) was estimated at 8 percent.[41]

d. ***Exports were estimated following principles of economic efficiency and considering contractual quantities.*** Exports were modelled as variable demand with supply taking place only when: (i) surplus was available after domestic demand was fully met; and (ii) the marginal cost of electricity generation at each hour was lower than defined export tariffs. The export quantities were capped at contractual quantities specified in the respective PPAs with Afghanistan under 220 and 110 kV transmission lines, Uzbekistan as well as Afghanistan and Pakistan under CASA-1000 Project. For potential new exports, those were limited by transmission interconnection capacity. The Project does not anticipate material exports of electricity to Afghanistan. Nevertheless, the financial sustainability of the state-owned distribution company, which will be one of the buyers of the energy from the Project, may be jeopardized if payments from Afghanistan cannot be secured. Therefore, this may create risks for the financial viability of the Project. The team would clarify that the Study is recommending diversifying the export markets for the Project's energy to reduce the risks

e. ***Imports were capped at 10 percent of aggregate demand.*** This was done considering: (i) the existing constraints for import of electricity given that Tajikistan is not yet synchronized with CAPS; and (ii) energy security considerations.

f. ***Hydrology***. The planning and simulation of dispatch of HPPs was assumed to be deterministic[42] with the same historical pattern repeating during the evaluation period. Specifically, the 2000-2019 historical hydrology pattern was assumed to repeat during 2021-2040.

g. ***Generation profiles of solar PV and wind***. The generation of solar PV and wind was modelled based on estimated hourly capacity factors of such projects. Specifically, solar PV and wind projects were assumed to be constructed in the regions with average and above-average resource potential based on resource potential data from Geographical Information Systems (GIS). The average annual capacity factors for solar PV were about 21 percent in the South and 20 percent in the North. For wind, those were 27 percent in the South and 48 percent in the North.

h. ***Social cost of GHG emissions.*** The World Bank's[43] high-range shadow price of carbon was included as a variable cost in development of the least-cost generation expansion plans and in simulation of power system electricity generation/dispatch.

i. ***Transmission investments.*** The transmission investments to connect to the network the replacement projects under "Without Rogun Completion" scenario were not quantified given that this would have required more detailed analysis. However, if included, those would only improve the viability of the "With Rogun Completion" scenario.

[41] Estimated following the World Bank Guidance on Discounting Costs and Benefits in Economic Analysis of World Bank Projects (May 9, 2016).
[42] It is advisable to also carry out stochastic simulation to determine potential impacts of variable hydrology on Rogun generation and sales in order to evaluate the cash reserve that would be required for the Project to service its debt in years with unfavorable hydrology.
[43] Based on World Bank Guidance Note on Shadow Cost of Carbon in Economic Analyses (Nov. 12, 2017). The shadow carbon price projections were adjusted to make 2020 as the base year.

33. **Economic costs of "With Rogun Completion" scenario.** The economic costs include: (a) the estimated cost for completion of the Project; (b) the cost of PMC; (c) cost of land acquisition and implementation of ESMP; (d) capital cost of new projects that may be required to meet the domestic demand and export commitments; (e) fuel costs; (f) the incremental fixed and variable O&M costs; and (g) the social cost of carbon.

34. **Economic costs of "Without Rogun Completion" scenario.** The economic costs include: (a) decommissioning of the Project; (b) additional spillway at Nurek HPP to improve protection against extreme floods; (c) construction of new projects that may be required to meet the domestic demand and export commitments; (d) fuel costs; (e) the incremental fixed and variable O&M; and (f) the social cost of carbon.

35. **Economic benefits of the Project completion**. The main economic benefits of the Project completion include:

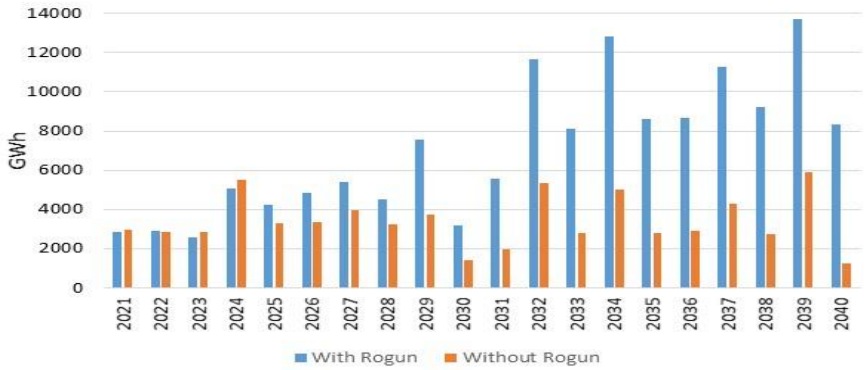
a. ***Avoided costs of the Project decommissioning.*** Those costs are estimated to be at least US$500 million based on the TEAS assessments. It is to be noted that a 100 m-high dam now exists at the Rogun site and the cost of ensuring dam safety after decommissioning will be substantial; this could not be estimated given that it would require a detailed assessment.

b. ***Avoided capital costs of new generation projects to replace supply from the Project***. The country would have to incur capital cost of US$2.9 billion during 2022-2040 to construct a new 250 MW gas-fired thermal combined cycle gas turbine plant (CCGT), 2,900 MW of solar PV, and 600 MW of wind projects to replace electricity generation from the Project that would be required for domestic market. Grid integration study has not been carried out to determine what additional costs would be required to safely integrate such large intermittent installed capacity from solar PV and wind into the domestic power system.

c. ***Increased export volumes and revenues***. The Project would enable Tajikistan to fully meet the existing export commitments and enable further expansion of exports to the CA region and beyond. The following figure demonstrates the contribution of the Rogun Project to exports. **Error! Reference source not found.** shows total estimated electricity exports under "with Rogun Completion" and "without Rogun Completion" scenarios. The difference amounts to US$2.9 billion of potential additional export revenues in 2022-2040. It would be important to ensure further diversification of exports, as assumed under this Study, to avoid material dependence of the Project's financial viability on a single market that may create risks for the Project's bankability in case of shocks.

Annex 5: Figure 2: Total Estimated Electricity Exports under "With Rogun Completion" and "Without Rogun Completion" Scenarios[44]

[44] Exports under "Without Rogun Completion" scenario are higher until 2025 because Rogun is assumed to generate as run-of-river project maximizing electricity generation whenever water is available. Under this scenario, Rogun reservoir cannot be operated due to Project safety considerations.



Source: World Bank team estimate.

d. ***Protection of Vakhsh cascade against the Probable Maximum Flood (PMF)***. The construction of the Project would also provide flood protection against the PMF to the entire downstream Vakhsh cascade. Therefore, to ensure meaningful comparison, it is necessary to include the costs of providing similar flood protection benefits in the "Without Rogun Completion" scenario. For Nurek HPP, this would require construction of an additional spillway at an estimated cost of US$318 million.[45] It is to be noted that a spillway at Nurek would only provide additional flood protection at Nurek and would not protect the rest of the Vakhsh cascade downstream of Nurek.

e. ***Reduction in fuel costs***. The fuel costs would be lower given that no new thermal power projects would be required if the Project is completed.

f. ***Reduction of CO2 emission due to reduction in the share of fossil fuel generation in the total electricity supply mix in Tajikistan and main export markets***. The reduction in CO2 emissions is estimated at 22 million tCO2e over 2022-2040. The total global benefit from reduction of those emissions, valued at shadow cost of carbon, is estimated at US$2.6 billion. Those are comprised of reduction of fossil fuel generation in countries that are expected to import electricity from the Project (Central Asian countries, Pakistan, and Afghanistan) and avoided emissions from domestic power system.

36. **The Project remains economically viable under the base case**. The updated economic analysis of the Project yielded the following results for the base case: economic NPV of US$656 million and EIRR of 11 percent.

37. **Switching value analysis of the Project**. Switching value analysis was conducted to assess the changes in the key evaluation variables at which the EIRR of the project equals the social discount rate of 8 percent and NPV equals zero.

a. 22 percent increase of the Project construction cost (in addition to 8 percent physical contingencies already included) with base case values for all other variables.

b. 27 percent lower export revenues compared with base case values for all other variables

c. 11 percent economic discount rate (vs. 8 percent in base case) with base case values for all other variables.

38. The results of the switching value analysis suggest that substantial variation of main variables would be required to make the Project economically non-viable. The Project's economic viability is most sensitive to changes in the volume of exports.

[45] "Techno-Economic Assessment Study for Rogun Hydroelectric Construction Project," Barqi Tojik, Mar. 2014. The Government estimates those costs to be US$945 million.