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Report No: PAD3973

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED GRANT

IN THE AMOUNT OF SDR36.5 MILLION
(US$50 MILLION EQUIVALENT)

TO THE

REPUBLIC OF TAJIKISTAN

FOR A

NUREK HYDROPOWER REHABILITATION PROJECT, PHASE 2

June 4, 2020

Energy & Extractives Global Practice
Europe And Central Asia Region

CURRENCY EQUIVALENTS

Exchange Rate Effective May 31, 2020

Currency Unit =	Tajik Somoni (TJS)
TJS10.24 =	US$1
US$1.37 =	SDR 1

FISCAL YEAR
January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

ACF	Average Capacity Factor
ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
AMC	Anti-Monopoly Commission
a.s.l	Above sea level
BT	Barqi Tojik
CAPS	Central Asia Power System
CASA	Central Asia South Asia
CCGT	Combined Cycle Gas Turbine
CHP	Combined Heat and Power
CPF	Country Partnership Framework
CRI	Corporate Results Indicators
CSO	Civil Society Organization
DA	Designated Account
DC	Direct Contracting
DCC	Development Coordination Council
EBRD	European Bank for Reconstruction and Development
EBITDA	Earnings before Interest, Taxes, Depreciation, and Amortization
ECA	Europe and Central Asia
EaDB	Eurasian Development Bank
EC	European Commission
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
EPC	Engineering, Procurement, and Construction
EPP	Emergency Preparedness Plan
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
EU	European Union
FIRR	Financial Internal Rate of Return
FM	Financial Management
FMM	Financial Management Manual
GBAO	Gorno-Badakhshan Autonomous Oblast
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
GRS	Grievance Redress Service
GWh	Gigawatt-hour
HAP	Hydropower Advancement Project
HPP	Hydropower plant
ICB	International Competitive Bidding
IDC	Interest During Construction
IFAC	International Federation of Accountants
IFI	International Financial Institution
IFR	Intermediate un-audited Financial Report
IMF	International Monetary Fund
IPP	Independent Power Producer
ISA	International Standards on Auditing
KfW	Kreditanstalt fur Wiederaufbau
kV	Kilovolt
kWh	Kilowatt-hour
MEWR	Ministry of Energy and Water Resources
MIV	Main Inlet Valve
mmBtu	Million British Thermal Units
MOEDT	Ministry of Economic Development and Trade
MOF	Ministry of Finance
MOJ	Ministry of Justice
NGO	Non-Government Organization
NPV	Net Present Value
O&M	Operation and Maintenance
OP	Operational Policy
PMC	Project Management Consultant
PMF	Probable Maximum Flood
PMT	Proxy Means Testing
POE	Panel of Experts
POM	Project Operational Manual
PPA	Power Purchase Agreement
PPSD	Project Procurement Strategy Document
PRG	Project Realization Group
QCBS	Quality and Cost Based Selection
RFB	Request for Bids
SCADA	Supervisory Control and Data Acquisition
SEP	Social Engagement Plan
SOE	State-owned Enterprise
SSS	Single-Source Selection
TA	Technical Assistance
TALCO	Tajik Aluminum Company
TPP	Thermal Power Plant
TSA	Targeted Social Assistance
UN	United Nations
USAID	United States Agency for International Development
VECs	Valued Environmental and Social Components

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DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Tajikistan	Nurek Hydropower Rehabilitation Project Phase 2	
Project ID	**Financing Instrument**	**Environmental and Social Risk Classification**
P173804	Investment Project Financing	Substantial

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[X] 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)	

Expected Approval Date	Expected Closing Date
29-Jun-2020	31-Dec-2030

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The objective of the Project is to rehabilitate and increase the generating capacity of six power generating units of Nurek HPP and improve their efficiency.

Components

Component Name	Cost (US$, millions)

Component 1: Rehabilitation of six generating units and related penstocks, and strengthening of Nurek HPP capacity to operate and maintain the power plant	46.60
Component 2: Technical assistance	3.40

Organizations

Borrower:	Republic of Tajikistan
Implementing Agency:	Barqi Tojik

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	191.90
Total Financing	50.00
of which IBRD/IDA	50.00
Financing Gap	141.90

DETAILS

World Bank Group Financing

International Development Association (IDA)	50.00
IDA Grant	50.00

IDA Resources (in US$, Millions)

	Credit Amount	Grant Amount	Guarantee Amount	Total Amount
Tajikistan	0.00	50.00	0.00	50.00
National PBA	0.00	50.00	0.00	50.00
Total	**0.00**	**50.00**	**0.00**	**50.00**

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Annual	0.00	1.24	2.93	3.95	5.08	5.88	6.60	6.27	6.35	6.31

Cumulative	0.00	1.24	4.17	8.12	13.20	19.08	25.69	31.95	38.31	44.62

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	Moderate
2. Macroeconomic	Low
3. Sector Strategies and Policies	Low
4. Technical Design of Project or Program	Low
5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	Substantial
7. Environment and Social	Substantial
8. Stakeholders	Low
9. Other	Moderate
10. Overall	Moderate

COMPLIANCE

Policy

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

[ ] Yes [X] No

Does the project require any waivers of Bank policies?

[ ] Yes [X] 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	Not Currently Relevant
Biodiversity Conservation and Sustainable Management of Living Natural Resources	Not Currently Relevant
Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	Not Currently Relevant
Cultural Heritage	Not Currently 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 gradually increase the average electricity tariff during the Project implementation period in a manner consistent with the Electricity Tariff Paper to reach cost recovery tariff level by December 31, 2027.

Sections and Description

The Recipient shall cause the Project Implementing Entity to, except as the Association shall otherwise agree, not incur any long-term debt unless a reasonable forecast of its revenues and expenditures shows that its estimated net revenues for each fiscal year during the term of the debt to be incurred shall be equal to at least the estimated long-term debt service requirements in such year on all debt of the Project Implementing Entity, including the debt to be incurred.

Sections and Description
The Recipient shall cause the Project Implementing Entity to reach ninety five percent (95%) average collection rate for billed electricity sold domestically by December 31, 2026 and not to reduce such rate until the Project Closing Date.

Sections and Description
The Recipient shall cause the Project Implementing Entity to carry out the Project in accordance with the Project Operational Manual and not amend, suspend, repeal or waive any of the provisions of the Project Operational Manual without the Association's prior written agreement.

Sections and Description
The Recipient shall cause the Project Implementing Entity to maintain, during the entire period of Project implementation, unless otherwise agreed with the Association, the Project Management Consultant, with the experience, competence and terms of reference satisfactory to the Association, to assist with the detailed design of the rehabilitation and dam safety works, the tendering processes, and the supervision of the works.

Sections and Description
The Recipient shall maintain, during the entire period of Project implementation, the Project Realization Group with functions, terms of reference and resources satisfactory to the Association for the purposes of day-to-day Project management, monitoring and evaluation.

Conditions

Effectiveness
The Subsidiary Agreement has been executed on behalf of the Recipient and the Project Implementing Entity.

I. STRATEGIC CONTEXT

A. Country Context

1. **Tajikistan is a landlocked country located in southeast Central Asia. It has a population of 8.5 million and a Gross National Income per capita of US$1,010 (2018)**.[1] In 2016-2019, Tajikistan's real Gross Domestic Product (GDP) exhibited healthy growth rates. According to official statistics, GDP growth was 6.9 percent in 2016 and accelerated to 7.5 percent in 2019, supported by robust year-on-year growth in industry, agriculture, and retail trade. On the demand side, consumption and net exports drove growth. Growth was largely supported by heightened public investment in infrastructure projects.

2. **The current account deficit narrowed in 2019 due to larger growth in exports and slow increase of imports**. A jump in exports and a recovery in remittances helped narrow the current account deficit to an estimated 4.3 percent of GDP in 2019. Merchandise imports increased by 6.3 percent in U.S. dollar terms. Export earnings rose by 9.4 percent in 2019, supported by higher shipments abroad of precious metals and electricity.

3. **The fiscal stance remained cautious in 2019**. The fiscal deficit of 2.7 percent of GDP was little unchanged from 2018. Cuts in non-energy capital spending accompanied with lower-than-projected revenue collection helped to contain the deficit. Spending on the Rogun Hydropower Plant (HPP) comprised the largest share of public investment in 2019, facilitating the launch of the second of the six generating units in 2019.

4. **The authorities made progress in addressing the banking sector crisis**. The financial sector continued its recovery from the 2016 banking crisis, showing an improvement in the quality of the credit portfolio. The share of nonperforming loans (NPL) stood at 26 percent at the end of 2019 (down from 48 percent in 2016), and the capital adequacy ratio rose to 21.4 percent (from 17 percent in 2016). Banking sector profitability also continued to improve, and the level of dollarization declined to 55 percent at the end of 2019 (from a peak of 65.6 percent in 2015).

5. **Poverty rate reduced**. The poverty rate - using Tajikistan's official poverty line - fell to 27.4 percent in 2018, reflecting acceleration of economic growth and recovery in inflows of remittance. The rural poverty rate declined markedly from 36.1 percent in 2014 to 30.2 in 2018, reflecting rising household consumption.

6. **COVID-19 poses significant economic and social challenges for 2020-2022**. The outbreak of the COVID-19 disease may deteriorate the macro-fiscal framework of the country, reflecting the implications of the COVID-19 outbreak and the slowdown in Russia and China. These implications include the sharp decline of trade and lower commodity prices, a likely large drop in remittances, and worsened prospects for transport and tourism industries.

7. **The overall economic slow-down may negatively impact the macroeconomic fundamentals.** The fiscal situation may deteriorate due to lower revenues and increased spending on health and social transfers. The revenue shortfall will mirror the high share of value added tax (VAT) and trade taxes in total tax revenue and considering the share of imports. The expected increase in public spending in 2020 is likely to reflect social support to mitigate the loss of household incomes.

8. **The Government has undertaken several steps to address the structural issues in the economy and mitigate the social impacts from COVID-19**. Specifically, the Government initiated: (a) implementation of the Program for Financial Recovery of BT for 2019-2025 aimed at improving financial viability of BT and increasing reliability of

[1] In current US$, Atlas Method, World Development Indicators, The World Bank. Source: *https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?locations=TJ*

electricity supply, and (b) further roll-out of the Targeted Social Assistance (TSA) Program to cover the entire country; from COVID-19.

B. Sectoral and Institutional Context

9. **The power sector is comprised of the vertically integrated energy company, BT, three independent power producers (IPPs), and a concession in Gorno-Badakhshan Autonomous Oblast (GBAO) combining power generation and distribution**. BT is a state-owned company. It owns and operates most of the electricity generating plants and is also responsible for electricity transmission, dispatch, and distribution services to around 9 million people in all regions of the country except for GBAO. Two of the IPPs – Sangtuda-1 and Sangtuda-2 hydropower plants (HPPs) – were constructed with investments from Russian and Iranian state-owned companies and supply electricity to BT under 20-year Power Purchase Agreements (PPAs). The third IPP – Rogun HPP – is under construction and supplies electricity to BT under a PPA. Pamir Energy Company (PEC) generates and supplies electricity to around 245,000 people in GBAO under a 25-year concession agreement.

10. **The Government has initiated optimization of the organizational structure of BT and its unbundling into separate electricity generation, transmission, and distribution companies**. The main objective of unbundling is to improve operational and financial performance by clearly defining the technical boundaries of assets along the value chain and improving the financial discipline, including involvement of a management contractor for electricity distribution. Therefore, as a first step, in June 2019,[2] the Government established, under BT, 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. The new companies are legally separate, but not independent. BT would remain state-owned and will operate all state-owned electricity generation plants except for Rogun HPP. Currently, the Government does not have any plans to privatize BT, SIB, or STB.

11. The restructuring was also driven by the need to: (i) optimize the structure of BT by combining several regional electricity distribution and some other service provider companies owned by BT into a single electricity distribution company and one electricity transmission company, and (ii) divest non-core business related assets (e.g. kindergartens, guest houses). The newly-established companies are expected to become operational by the end of 2020 given that the following important activities are still ongoing: (a) transfer of assets and liabilities; (b) appointment of staff; (c) selection of the supervisory board members; (d) appointment of management; etc.

12. **Electricity supply mix is dominated by hydropower**. The total installed generation capacity of Tajikistan is 6,058 MW and HPPs account for 88 percent. The 3,000 MW Nurek HPP, with a seasonal reservoir, is the largest generating plant. It generates 50 percent of the total annual energy requirements and is also the balancing plant in the system. It should be noted that available operational capacity is lower considering that several HPPs and some of the CHPs, such as Dushanbe-1 and Yavan, have technical issues.

[2] The Government Decision No. 330, dated June 22, 2019.

Table 1: Generation Capacity and Rehabilitation Status of Main HPPs.

Plant	Current Installed Capacity (MW)	Commissioning	Major rehabilitation or upgrade
Nurek	3,000	1972-1979	Yes (some refurbishment done for Units 8 and 9 using BT resources; the Phase 1 of the rehabilitation Project ongoing)
Rogun	400[3]	2018-2019	See Footnote
Sangtuda-1	670	2008-2009	Not required
Baipaza	600	1985-1986	No
Golovnaya	240	1962-1963	Yes (under ongoing project supported by ADB)
Sangtuda-2	220	2011-2014	Not required
Qairokkum	126	1956	Yes (under ongoing projected supported by multiple financiers)

Source: Barqi Tojik.

13. 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 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. BT also operates about 50 MW of capacity, from 200 MW, at Dushanbe-1 CHP, which is fueled by natural gas imported from Uzbekistan. The utilization rate is low because the power plant has very low fuel efficiency and hence a high variable cost of electricity and/or heat.

14. **Electricity demand increased by 10 percent in 2016-2019 and winter[4] electricity shortages were eliminated.** Total annual net domestic electricity demand in BT service area was 14,112 GWh in 2019, which is an increase of 10 percent over 2016 due to rebound of economic activity and robust GDP growth rates. Electricity demand is seasonal, with a winter peak driven by reliance on electricity-based heating. BT has historically been struggling to fully meet winter electricity demand given reliance on hydro and unfavorable hydrology conditions in winter, which was leading to electricity outages. On the contrary, there has been significant electricity surplus in the summer given the abundant hydropower resource. The winter electricity shortages have substantially reduced after: (a) 400 MW Dushanbe-2 CHP commenced operations and, in addition to electricity, started supplying district heating (DH) to some parts of the capital city of Dushanbe. The DH company also initiated gradual rehabilitation of DH network; and (b) early generation from Rogun HPP starting from 2018. Nevertheless, the results of preliminary generation expansion plan indicate that Tajikistan will need to construct more firm capacity to be able to meet the increase in winter demand in 2024-2040 because the available capacity of HPPs without seasonal storage is lower in winter.

15. **Electricity exports have been increasing, and regional connectivity is improving.** Electricity exports increased from 1,350 GWh to almost 3,000 GWh in 2019 due to resumption of exports to Uzbekistan. The electricity exports are expected to increase further after: (a) synchronization of Tajik electricity network with Central Asian Power System (CAPS) in 2022, which would allow to supply electricity to all countries of Central Asia without network management and other operational challenges, and (b) commissioning of 1,300 MW Central Asia South Asia (CASA-1000) Interconnection in 2023.

[3] This is the capacity for early generation during construction with temporary runners and lower head. The final capacity upon completion will be 3,600 MW.

[4] For the purposes of analysis, winter season is assumed to include the months of November-March when hydrology conditions are least favorable.

Pressing Challenges in the Power Sector

16. The power system is currently facing the key challenges below, which need to be addressed to ensure adequate and reliable electricity supply, and financially sustainable power sector.

17. **Challenge #1: Financial distress of BT**. BT has been in financial distress due to: (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$. This has led to significant deterioration of financial standing of BT. Specifically, BT has a sizeable cash deficit because tariffs are below cost recovery levels and there are operational inefficiencies. The significant increase in cash costs, which were not fully passed through to end-user tariffs, coupled with operational inefficiencies, resulted in a significant cash deficit[5], which is estimated at TJS11.7 billion (US$1.2 billion) as of 2018. This cash deficit can only be eliminated in case the Government implements gradual tariff increases coupled with financial measures and operational efficiency improvements by BT.

18. The financial distress of BT is also caused by a lack of planning of investments and expenditures and gaps in accounting and financial reporting of BT related to revenue recognition due to issues linked to commercial losses of electricity. Additionally, BT needs to introduce proper planning of investments and expenditure into generation, transmission, and distribution. Currently, there is no generation expansion plan, which is prepared consistent with the principles of least economic cost planning. BT does not have a T&D investment program that draws upon the planned generation investments and takes into account the need for replacement of ageing and unreliable assets. Moreover, BT does not disclose the key operational[6] and financial[7] data and information related to its activities, which is important for building consumers' support for ongoing and planned investments and building the trust and credibility with potential lenders and investors.

19. **Challenge #2: Reduction of electricity supply reliability due to dilapidation of electricity generation, transmission and distribution (T&D) assets.** The financial distress of BT 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. The need for rehabilitation was established based on the technical assessment of the condition of the generating units and other infrastructural components of the power plant. The poor technical condition of the plant is due to obsolescence of equipment and lack of major capital repairs since its commissioning. The same major issues are relevant for the 600 MW Baipaza HPP, which requires rehabilitation.

20. It should be noted that dilapidation of Nurek HPP is due to lack of upgrade and rehabilitation. The feasibility study confirmed that Nurek HPP staff maintained the equipment and other infrastructural components in good condition taking into account financing constraints. Planned electricity tariff increases to gradually reach cost-recovery levels by 2026 will allow generating additional financial resources for increased spending on O&M after rehabilitation of the power plant.

21. BT has 450 T&D substations several of which also require urgent rehabilitation of key equipment. Most of those substations were constructed in the 1960-70s and have not undergone any major capital upgrade. This has resulted in increased number of outages, which, often times, resulted in black-outs for consumers. BT was able to finance only

[5] Difference between cash sales and accrual-based costs related to core business activities: cost of electricity from IPPs; O&M; liabilities related to repayment of outstanding principal amounts of debt; interest costs; accumulated payables to IPPs, and taxes.
[6] Quarterly generation, transmission, exports, imports and domestic consumption data.
[7] Quarterly un-audited financial statements.

the most urgent rehabilitation and replacement of assets where deferral of spending was not feasible due to significant technical risks and severe consequences in terms of end-user supply reliability. Specifically, the number of equipment failures in T&D networks increased from 2,237 in 2014 to 2,417 in 2017.

22. **Challenge #3. 43,126 people (0.5 percent of population) in GBAO and Khatlon regions do not have access to electricity service**. In parts of Khatlon, bordering Afghanistan, there are 74 settlements with total population of 31,460 without access to electricity. Those settlements could not be connected to the grid due to severe financial difficulties of BT. In GBAO, 61 settlements with total population of 11,666 are not connected to electricity service. Those settlements are in remote mountainous areas in the region, which is also the service area of PEC, where access has historically been a challenge. Most of the settlements are scattered over a vast territory in the eastern part of GBAO, while a few of the settlements are in the western part, close to existing PEC grid. Before Tajikistan's independence, those areas were primarily supplied with diesel-based portable generator sets. This approach became prohibitively expensive given the increase in unit costs of diesel-based electricity generation once the generous fuel subsidies provided under the Soviet Union disappeared.

Measures Undertaken by the Government to Address the Power Sector Challenges

23. **The US$1.5 billion Government Program for Financial Recovery of BT for 2019-2025[8] (the Program) aims at improving the financial viability of BT and contribute to electricity supply reliability**. The Program includes policy, financial, and operational measures aimed at improving financial viability of BT and increasing reliability of electricity supply. The Program will be financed from: (a) BT's additional cash flows and cost savings due to implementation of operational and financial efficiency improvements; (b) Asian Development Bank (ADB) and European Bank for Reconstruction and Development (EBRD) support for scale-up of advance metering and billing systems in eight large cities, which combined account for 50 percent of total of electricity consumption in the country: (c) ADB support to competitively procure a management contractor for the newly-created power distribution company; and (d) the Bank-financed Power Utility Financial Recovery Project, which supports several important measures under the Government Program.

24. The main measures include: (a) gradual increase of tariffs, to be computed as per recently-approved new tariff methodology, to achieve cost-recovery by 2026; (b) strengthening of the capacity of Anti-Monopoly Committee (AMC) to review the tariff requests to be submitted by power companies; (c) revision of Subsidiary Agreements between MOF and BT under various donor-financed projects, supported by international or bilateral financial institutions, to align the terms with original terms of financing as made available to the Republic of Tajikistan; (d) conversion into equity of BT's fines and penalties for overdue principal repayments and interest on funds received from MOF under Subsidiary Agreements; (e) timely rehabilitation and upgrade of key electricity T&D assets; (f) use of technically, economically, and financially sound principles for investment decision-making in generation, transmission, and distribution; (g) implementation of good-practice corporate governance principles at BT and newly-established companies; and (h) improved operational and financial transparency of BT through disclosure of key operational and financial information.

25. **Construction of Rogun HPP and ongoing projects to rehabilitate the largest state-owned HPPs will improve the reliability of electricity supply.** The 3,600 MW Rogun HPP, when completed and with the reservoir reaching the full supply level, is expected to provide up to 3,000 GWh and 11,400 GWh of winter and summer supply respectively. Therefore, it would play an important role in meeting the domestic electricity demand and supplying electricity for exports. Additionally, BT is currently implementing:

[8] Adopted on April 15, 2019.

a. ***US$325.7 million Nurek Hydropower Rehabilitation Project, Phase 1***. The project has the following financing structure: US$225.7 million of IDA grants and credits, US$60 million from Asian Infrastructure Investment Bank (AIIB), and US$40 million from Eurasian Development Bank (EaDB).[9] The Phase 1 supports rehabilitation of three of the nine generating units, the key infrastructural components of the plant, replacement of autotransformers, and enhancement of dam safety.

b. ***US$196 million Qairokkum Hydropower Rehabilitation Project*.** The project is financed by EBRD, European Investment Bank (EIB), Green Climate Fund and Climate Investment Funds. It supports rehabilitation of generating units, repair of the damaged concrete surfaces, installation of additional safety surveillance equipment, balance of plant and control system and power transformers, together with implementation of improved operational procedures to promote resilience to climatic variability and climate change. The project will also increase the generation capacity from 126 MW to 174 MW and improve the operational efficiency.

c. ***US$136 million Golovnaya Hydropower Plant Rehabilitation Project***. The project is financed by ADB and supports refurbishment of electric and mechanical equipment at the power plant. The project will also increase the generation capacity from 240 MW to 270 MW and improve the operational efficiency.

26. **The ongoing Rural Electrification Program of the Government would provide electricity access to settlements in Khatlon and GBAO region**. Several development partners – Kreditanstalt für Wiederaufbau (KfW), European Union (EU), Swiss State Secretariat for Economic Affairs (SECO), United States Agency for International Development (USAID), and the Bank – have structured their projects and programs to help the Government address the identified challenges. Specifically, a financing envelope of about US$85.8 million was designed, including US$31.7 million Bank-financed Rural Electrification Project, to bring electricity supply to 31,460 people in Khatlon region and 11,666 people in GBAO. The electrification program includes support for: (a) connection of target settlements to the distribution networks of BT and PEC; (b) construction of 11 MW Sebzor HPP in GBAO; (c) construction of solar PV, wind, micro hydro, and battery energy storage systems based micro-grids in GBAO; (d) construction of Sebzor HPP – Khorog substation 18 km overhead power transmission lines (OHLs) to connect Sebzor HPP to the network and 60 km 110 kV Khorog-Qozideh OHL to improve reliability of supply to domestic consumers in GBAO and increase electricity exports to Afghanistan.

Summary of Progress with Implementation of Phase 1 of the Project

27. The Project is the scale-up of the ongoing Phase 1 of the Nurek Hydropower Rehabilitation Project, which is financing rehabilitation of three power generating units and improvement of the safety of Nurek dam. The details with implementation progress of Phase 1 are presented hereunder.

28. **Progress Towards Achievement of PDO and Overall Implementation Progress is Satisfactory**. The progress towards achievement of the PDO is Satisfactory and there are currently no material factors that may delay achievement of the PDO by the project closing date. The overall implementation progress is Satisfactory. Specifically, the Project is currently substantially on schedule as per the Project Master Schedule (Revision D), dated May 29, 2019. To date, there has not been a significant impact of COVID-19 on the implementation progress and this aspect is being monitored. The progress on implementation is being monitored by BT, the Nurek HPP PIU, and Stucky – the project management consultant (PMC).

29. **Component 1: Rehabilitation of the three generating units, the key infrastructural components of the plant, and replacement of autotransformers.** The progress with main sub-components and activates is presented hereunder.

[9] Parallel financing for autotransformers only.

30. **Sub-component 1.1: Replacement and refurbishment of mechanical, electrical, and electro-mechanical equipment**. This sub-component includes the following:

31. ***Rehabilitation of the electromechanical equipment - three generating units and the balance of the plant.*** This package covers the Phase 1 of the rehabilitation of the electromechanical equipment of the Nurek powerhouse. The main items include rehabilitation of three of the nine generating units, electromechanical balance of plant, and inspection of the penstocks. After a competitive procurement process, the contract for this package was awarded to Andritz Hydro (a joint venture of Andritz Hydro GmbH Germany, Andritz Hydro GmbH Austria and Andritz JV Corp. USA). The contract became effective on January 1, 2019. The progress on implementation is being monitored by BT, the Nurek PIU and PMC (Stucky). Implementation issues are discussed hereunder. The implementation of this contract is currently substantially on schedule.

32. ***Rehabilitation of the hydromechanical equipment at Nurek HPP***. This package covers the rehabilitation of the hydromechanical equipment at Nurek HPP, including the rehabilitation of the spillway gates and of the power intake gates. The bid evaluation report was cleared by the Bank, with the proposed contract award recommendation to Sinohydro Corporation (China) with total contract price of US$19.95 million. The contract is expected to be awarded in June 2020.

33. **Sub-component 1.2: Replacement of six autotransformers**. This package covers replacement of the autotransformers in the switchyard. The contract is fully financed by EaDB and the US$19.43 million contract was signed on April 14, 2020 with the consortium of Tojikgidroeletromontaj JSC (TGEM) and Togliatti Transformers JSC.

34. **Component 2: Enhancement of Dam Safety.** This component finances activities to improve the safety of the operation of the Nurek HPP. A Panel of Experts (POE) is reviewing the dam safety activities.

35. ***Dam monitoring instrumentation, geodetic instrumentation & geotechnical investigations***. The contract with TGEM JSC for US$2.91 million was signed and the geotechnical investigations on the left bank are expected to commence in July 2020.

36. ***Miscellaneous civil works for improvement of dam safety***. These will include rehabilitation of the spillway tunnels, improving the water-tightness at the interfaces of the top gallery with the core and the abutments, rehabilitation of the spillway outlet works (if planned analyses show these to be required), remedial measures for improving slope stability of the Left Bank (if investigations show these to be required), and clearing the tailrace channel to lower tailwater levels. The scope of work to be undertaken under this package will depend on the results of the investigations to be carried out under the previous contract, and is expected to be finalized by the end of 2020.

37. ***Introduction of an advanced flood forecasting/warning system and preparation of optimized reservoir operating rules to enhance the flood-handling capacity of the dam.*** A flood forecasting software has been developed utilizing data on snow cover and forecast of summer temperatures. This software is being calibrated comparing predicted flood flows with actual flood flows. Based on this calibration, reservoir operating rules will be reviewed. The design flood for the Nurek dam is the 10,000-year flood of 5,400 m^3/sec. Improving the water-tightness at the interfaces of the top gallery with the core and the abutments will increase the flood-handling capacity at Nurek. The construction of Rogun Dam will add to the safety of the entire cascade as it is designed to withstand a Probable Maximum Flood (PMF), with releases downstream limited to a maximum of 5,400 m^3/sec.

38. ***Update of the Nurek HPP Emergency Preparedness Plan (EPP), Dam Operation and Maintenance Plan, and the Instrumentation Plan***. BT, with support of the Project Management Consultant (Stucky), is undertaking the preparation of these plans. The analytical work required for preparation of all these studies is underway and the EPP will cover the entire Vakhsh cascade of HPPs.

Climate and Disaster Risk Screening

39. The Project has been screened for climate and disaster risks using the Bank's online screening tool at *https://climatescreeningtools.worldbank.org*. Major climate risks and natural hazards that are likely to affect the country's sustainability include extreme weather events (including high temperatures, dust storms, avalanches, heavy rainfall, hail), negative effects for freshwater resources through changes in precipitation frequency and melting of glaciers, negative changes to natural resources, which include changes to climatic patterns, increased drought and changes in habitat as well as an increase in earthquakes. A major part of Tajikistan is vulnerable to floods and mudflow hazards, which occur frequently across the country. National actions on climate change are reflected in the "National Action Plan for Climate Change Mitigation", Tajikistan's Second National Communication to the United Nations Framework Convention on Climate Change and recent study conducted by GERES[10] on "Climate Vulnerability and Capacity Assessment." The Project interventions under both phases take into account the likelihood of extreme weather events. The increased frequency of larger floods necessitate improvement of dam safety measures, including installation of improved flood forecasting system, rehabilitation of spillways and other measures supported under Phase 1 of the Project. The increased frequency of mudflows may block the access road to the Nurek dam. Therefore, the Phase 2 of the Project is procuring specialized machinery to help Nurek HPP staff to expeditiously unblock the road to ensure unhindered operation and maintenance. The rehabilitation design for Nurek bridge, supported under Phase 2 of the Project, would take into account the river flows when designing the civil works.

C. Relevance to Higher Level Objectives

40. **The proposed 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 Objective 4 *(Improved Financial Viability of Public Electricity and Water Utilities)* under the CPF Focus Area II *(Public Institutions and Sustainability).* It will not possible to ensure financial viability of power sector without maintaining supply of low-cost electricity from Nurek HPP. Additionally, without Nurek HPP, which currently accounts for 50% of total electricity supply in the country, there can be no sustainable institutional and economic development. Indirectly, the project will also contribute to the two other CPF Focus Areas:

- *Focus Area I (Human Capital and Resilience)*. Reliable electricity supply is an essential prerequisite for enhanced educational, social and health 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.

41. **The 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.

42. **By rehabilitating the Nurek HPP, the project contributes to the World Bank's twin goals of reducing the extreme poverty and increasing shared prosperity.** Specifically, the project will:

a. *Avoid an increase in poverty due to substantial increase of electricity tariffs, which would have been needed to replace generation from Nurek HPP.* The inability of Nurek HPP to maintain the current levels of generation would lead to an increase in the cost of electricity supply for all consumers because it would need to be replaced by a new thermal power plant with higher electricity costs. Coupled with increases required to bring tariffs to cost-recovery levels, this

[10] Groupe Energies Renouvelables, Environnement et Solidarités.

would have had significant poverty impacts. Therefore, rehabilitation of Nurek HPP contributes to having lower tariff increase compared to a scenario where such rehabilitation is not done and Nurek HPP is replaced by substitute plants. The cost of generation from Nurek HPP is low given that no fuel or other large expenses are needed and the project will need to recover only the capital cost of rehabilitation. In case of loss of generation from Nurek, the end-user tariff would need to increase. Assuming no changes in other factors impacting poverty, such an increase, if it were to materialize, would result in significant increase of poverty. It should be noted that currently households spend up to 16 percent of their disposable income on energy. That proportion is 25 percent for the poorest quintile in rural areas. Thus, the proposed operation would help preclude an increase in poverty due to a substantial hike of electricity tariffs, which would happen if the proposed operation does not support rehabilitation of Nurek HPP.

b. *Increase of electricity exports with positive welfare impacts on entire population*. Rehabilitation of Nurek HPP will ensure that Tajikistan is capable of expanding its electricity exports. The export revenues will generate more taxes and require smaller financial injections from the Government into BT, thus, freeing up resources that can be used for social or other programs and increasing shared prosperity.

43. **The proposed project addresses the binding constraints for attracting private financing in the sector and is consistent with the "Maximizing Finance for Development" approach.** The Project contributes to achievement of financial sustainability of BT considering that Nurek HPP accounts for 50 percent of total generation and has very low cost of generation considering that it is fully depreciated plant and there are no fuel costs. Therefore, sales of Nurek electricity into domestic market and for exports would substantially contribute to improvement of financial viability of BT. This, in turn, should help to improve the creditworthiness of BT and establish a track record of sustainable operation, thus helping to unlock much-needed commercial financing from local and international capital markets, as well as public financing from different development finance institutions. Improvement of the financial standing of BT could also facilitate engagement of the IFC and the Multilateral Investment Guarantee Agency (MIGA) in the power sector.

44. **By addressing the reliability of supply, the proposed project supports key priorities of Tajikistan's Nationally Determined Contribution (NDC) to mitigate greenhouse gas (GHG) emissions.** In particular, the NDC for Tajikistan specifies a flexible target, not exceeding 80-90 percent of the 1990 level by 2030, which amounts to 1.7-2.2 tons of CO2 equivalent (tCO2e) per capita, as the country's contribution to anthropogenic GHG emission reductions. The Project addresses one of the country's priority sectors for climate change mitigation, namely energy. Based on the climate and disaster risk screening conducted for the project, the following hazards are classified as High Risk for regions of Tajikistan targeted by the Project: (i) extreme weather conditions, including floods; and (ii) a potentially damaging earthquake with a 20 percent probability to occur in the next 50 years.

45. The Project will help to partially mitigate the risks of extreme weather conditions by maintaining the green source of electricity from Nurek HPP and therefore avoid increased reliance on alternative energy sources, which would need to be constructed to replace supply from Nurek HPP if it is not rehabilitated. Specifically, the Phase 2 of the Project would help to avoid 59 million tCO2e of emissions. Additionally, the Phase 2 of the Project would generate climate adaptation co-benefits by allowing the country to design the civil works to be financed (e.g. rehabilitation of Nurek bridge) considering the increased probability of high-intensity floods and proposing specific design and construction solutions to that end.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

46. The development objective of the Project is to rehabilitate and increase the generating capacity of six power generating units of Nurek hydropower plant and improve their efficiency.

PDO Level Indicators

47. The key outcome indicators include:

- Indicator One (CRI): Generation capacity of energy constructed or rehabilitated under the project (MW). This indicator measures the capacity of hydropower constructed or rehabilitated under the project.
- Indicator Two (Custom): Estimated total annual electricity generation of six units included in the scope of the project (GWh). This indicator measures the amount of electricity supplied by the six units of Nurek HPP, which were rehabilitated under the project, to the power transmission network. The Project Phase 1 Indicator was: "Estimated increase of winter electricity generation of rehabilitated units due to efficiency," which was revised considering that now Nurek HPP can also generate more in summer due to substantial expansion of exports due to various factors.
- Indicator Three (Custom): Estimated increase of total annual electricity generation of six rehabilitated units due to efficiency improvements (GWh). This indicator measures the increase in total generation of rehabilitated units due to average efficiency increase of 2.74 percent based on the specifications in the signed contract.
- Indicator Four (CRI): People provided with new or improved electricity service (Number). The indicator measures the number of people that have received improved electricity service due to the project.

B. Project Components

48. **Component 1: Rehabilitation of six generating units and related penstocks, and strengthening of Nurek HPP capacity to operate and maintain the power plant (US$188.5 million, including US$46.6 million from IDA and US$141.9 million financing gap).** This component will consist of two sub-components.

49. ***Sub-component 1.1: Rehabilitation of six generating units (US$177.8 million, including US$35.9 million from IDA and US$141.9 million financing gap)***. This sub-component will finance: (a) rehabilitation of six power generating units, including generators, turbines, main inlet valves, and transformers, and supply of spare parts to ensure sustainable operation of rehabilitated units; and (b) rehabilitation of penstocks related to six units to be rehabilitated.

50. The scope of rehabilitation works for penstocks will be informed by the inspection of the first penstock to be carried out during Phase 1 as well as supplemented by information from recently performed rehabilitation works and a review of the O&M history of the plant. The recently performed rehabilitation works included replacement of three runners and rehabilitation of two Turbine Inlet Valves. The scope was further reviewed by the PMC, who prepared the bidding documents used in Phase 1.

51. The sub-component will also finance the incremental costs that may be required under the contract for rehabilitation of the generating units to ensure its compliance with the requirements of the Bank's new Environmental and Social Framework (ESF) because the contract was signed under Phase 1 when Bank's previous E&S applied. The contract for both phases will be made compliant with the requirements of ESF.

52. The procurement of the contractor for rehabilitation of electromechanically equipment was done for both phases during the Phase 1 of the project. The phased approach was used because: (a) the entire financing for rehabilitation

of all generating units was not available at Phase 1 of the Project; and (b) avoid issues with compatibility of equipment if different suppliers and manufacturers of equipment were used for two phases. Therefore, decision was made to use phased approach and start with three units and then expand the contract to include the remaining six units under Phase 2 when financing becomes available. The bid of the existing contractor for Phase 2 is valid until June 30, 2021, which means the amendment to the existing contract would need to be signed by then.

53. ***Sub-component 1.2*: *Rehabilitation of Nurek bridge, the powerhouse, and other building and strengthening of Nurek HPP capacity to operate and maintain the power plant (US$10.7 million, which will be fully financed by IDA)***. This sub-component will finance: (a) rehabilitation of Nurek bridge; (b) rehabilitation of the powerhouse and some other buildings/structures at Nurek HPP that may require rehabilitation; and (c) purchase of machinery, including excavators, forklift trucks, truck cranes, required for maintenance of the power plant.

54. The bridge was partially destroyed during the civil war in Tajikistan and complete refurbishment is a priority in order to provide sustainable and safe access for the plant staff and to the communities located on the left bank of the Vakhsh river downstream the Nurek HPP. The need for rehabilitation of the Nurek bridge was established by a detailed feasibility study carried out by BT's consultant. The proposed rehabilitation design is consistent with Eurocodes and includes: (a) replacement and rehabilitation of abutments and piers; (b) repair of reinforced concrete end span; (c) slope protection of embankments; (e) replacement of concrete deck and superstructure; and (f) replacement of the entire steel substructure.

55. The rehabilitation of powerhouse is also considered an urgent need considering that it has not undergone any major renovation since construction in 1972 and there are areas subject to leakages. There may be other buildings/structures to be rehabilitated, which are currently being assessed. The rehabilitation of Nurek bridge and those other buildings and structures was not included into Phase 1 to avoid funding shortage for main contracts for rehabilitation of Nurek. The contract prices for main rehabilitation works were lower than estimated at feasibility study stage, thus, inclusion of those additional civil works into the scope of Phase 2 of the project is justified.

56. The rehabilitation of Nurek bridge, the powerhouse and other buildings/structures at Nurek HPP would also contribute to mitigation of COVID-19 impacts on the local economy by boosting capital spending and creating local jobs. The share of local components in such civil works is quite high because most of the construction materials are locally produced and local labor force would be employed. The preliminary estimates suggest that only rehabilitation of Nurek bridge can generate about 1,000 person-month of construction related jobs.

57. ***Adaptation climate co-benefits*.** To address the possible adverse impacts of the climate and disaster risks on the project, the detailed technical designs for project infrastructure will account for risks and include relevant mitigation and prevention measures in the design and operations and maintenance of the infrastructure. In particular, the adaptation measures through the Project would include due consideration of increased flood and earthquake risks when designing the civil works under the Phase 2 of the Project (e.g. Nurek bridge rehabilitation). The incremental cost of introducing such adaptation measures is estimated at US$0.3 million.

58. ***Mitigation climate co-benefits***: The Phase 2 of the Project will generate environmental benefits in form of net reduction of CO2 emissions. The assessment of net CO2 emission reductions from Phase 2 of the project was conducted during the economic analysis, which shows that the Phase 2 of the project will lead to 45 million tCO2e reduction in emissions versus the baseline during economic life of the project. Moreover, the project would allow increased integration of Solar PV capacity, which, as per indicative generation expansion plan, would be part of the generation mix to meet the forecast electricity demand in the country in 2020-2050. The hydropower projects with large storage reservoirs are well-suited for regulation purposes in case the power network has intermittent renewable generation capacity such as Solar PV. The increased penetration of Solar PV would help to reduce the reliance on thermal generation capacity fueled by coal. The project includes the following intermediate results indicator on

climate indicator related to mitigation co-benefits: "Avoided CO2 emissions during the project lifetime." The incremental cost of mitigation measures is US$188.5 million.

59. **Component 2: Technical assistance (US$3.4 million, which will be fully financed by IDA).** This component will support implementation of the project and strengthen the institutional capacity of BT by supporting the following.

a. Additional PMC costs that may be required to assist BT with the review of designs, bidding, quality control and construction supervision of the project. BT has already signed the US$5.2 million equivalent contract with PMC under Phase 1 of the Project.

b. Technical, economic, financial, and other studies, which may be required during Project implementation, including, but not limited to hydrologic risk study for the Tajik hydro-dominated energy sector to quantify the financial impact of the dry years and other climate shocks and design financial mitigation tools to reduce vulnerability and introduce climate resilience in the sector.

c. Consultant services to support BT with citizen engagement, carrying out of gender-informed consultative processes during project implementation, and promotion of larger participation of women in the workforce of BT.

d. Capacity building for Nurek HPP, MEWR, and BT staff in dam safety, operation and management of hydro facilities, project management, procurement, financial management, and good practices of ensuring compliance and managing the E&S aspects of the Project.

e. Project and entity audits.

f. Incremental operating costs of the project implementing entity.

60. ***Adaptation climate co-benefits.*** Moreover, the Phase 2 of the project would be supporting a hydrological risk study to estimate the impact of changes in hydrological conditions on the financial standing of BT. Climate change driven extreme weather conditions may cause pronounced fluctuation in water flows from year to year and therefore impact the availability of electricity for exports under the Government's existing contracts. This would, in turn, lead to financial losses. The study would also recommend development of mechanisms to mitigate the impacts of such low hydrology years. The incremental cost of designing adaptation mechanisms is estimated at US$0.2 million.

Project Cost and Financing

61. The total cost of Phase 2 is US$191.9 million inclusive of the total physical and price contingency of 15 percent.[11] Currently, the financing for the Phase 2 includes only new US$50 million IDA grant. Thus, the Phase 2 has a financing gap of US$141.9 million. The Government is currently exploring the options for closing the financing gap with the objective of having the entire financing required for the Phase 2 by June 30, 2021. The following options are currently pursued by the Government:

a. *Ongoing discussions with the Bank and Asian Infrastructure Investment Bank (AIIB) to utilize about US$58.7 million of savings[12] under Phase 1 to finance activities under Phase 2*. The savings accrued due to lower actual contract price for the largest contract (with Andritz Hydro) for rehabilitation of the nine generating units. The price was lower, compared to the feasibility study, due to solid competition for large contractors specializing in hydropower plant rehabilitation and relative decline in prices of main inputs after the feasibility study. Currently, the split of savings between the Bank's and AIIB financing is not known considering that AIIB financing is covering only installation works related to the contract for rehabilitation of three units under

[11] All estimated costs for Phase 2 include a contingency of 15 percent over the base case cost estimate.
[12] From US$225.7 million of IDA financing and US$60 million AIIB loan under Phase 1.

Phase 2 and 50 percent of the cost of dam safety works. The Government is in advanced stage of discussions with the Bank and AIIB to request restructuring of the Phase 1 in order to utilize the savings for Phase 2.

b. *Ongoing discussions with EaDB to relocate to Phase 2 about US$15 million of savings under the parallel financing for autotransformers under Phase 1*. The procurement process of the contractor resulted in savings due to solid competition with 7 bids received. The Government is in advanced discussions with EaDB to allow to utilize those savings for Phase 2 of the project as a co-financing with the Bank.

c. *Secure the remaining US$68.2 million from other sources*. The Government is in advanced discussions with other development partners to secure the required additional resources by June 30, 2021. The Government will undertake all required measures to fill in the residual financing gap of the project considering that it is of strategic importance for the country.

Table 2: Financing Sources.

Project Components	Project cost (US$ million)	IDA Financing (US$ million)	IDA Financing as % of Total	Financing Gap (US$ million)
Component 1. Rehabilitation of six generating units and penstocks, and strengthening of Nurek HPP capacity to maintain the power plant	188.5	46.6	24.7%	141.9
Component 2. Technical assistance	3.4	3.4	100%	-
Total Project Costs	**191.9**	**50.0**	**26%**	-
Total Financing Required	**191.9**	**-**	**-**	-

C. Project Beneficiaries

62. The beneficiaries of the Project are all electricity consumers in the country and BT.

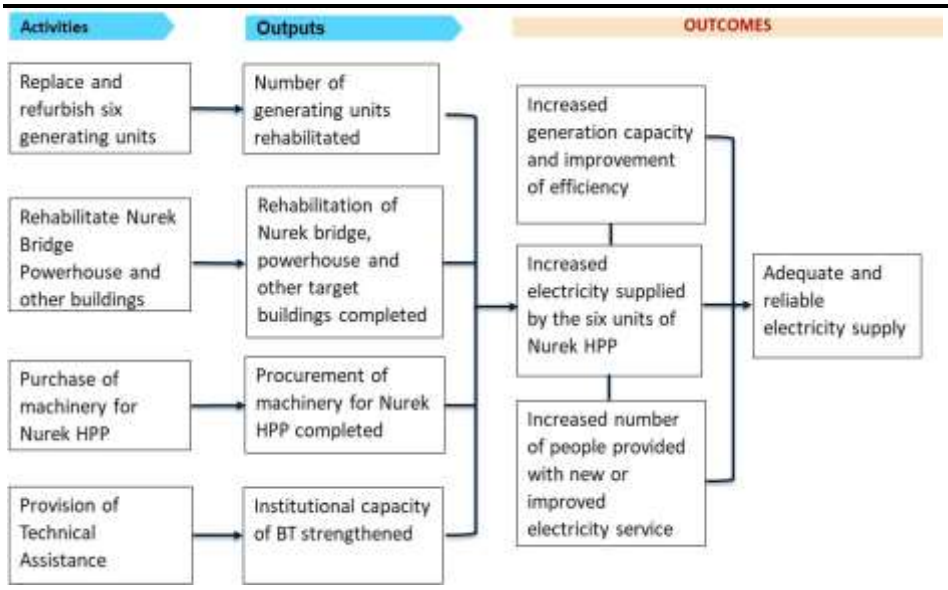
63. *Electricity consumers*: The Project will contribute to the ongoing efforts of the Government in ensuring adequate and reliable electricity supply. In particular, the project will preclude loss of electricity supply from Nurek HPP, which accounts for 50 percent of total annual electricity generation. Thus, about 8.3 million people in the service area of BT, including 4.1 million females, would benefit from the Project. Moreover, 53,680 legal entities connected to the electricity network will also benefit because the project will help to meet their demand in a reliable manner.

64. *BT*: Rehabilitation of Nurek will allow BT to reduce revenue loss due to equipment failures caused by dilapidation and obsolescence. Those equipment failures lead to electricity under-supply from the power plant, which creates financial loss for BT. In case of disconnection of Nurek HPP from the power supply network due to failure of equipment or infrastructural components, the power plant does not supply electricity until the technical issues are fixed.

D. Results Chain

65. The challenges that the project intends to address, project components, outputs, intermediary and long-term outcomes are summarized on the Figure 1.

Figure 1: Results Chain.



Source: World Bank team.

E. Rationale for Bank Involvement and Role of Partners

66. The Bank's involvement is justified for the following main reason. As stated earlier, Phase 1 of the Nurek HPP rehabilitation is being financed by the Bank together with AIIB and the EaDB, and includes rehabilitation of three out of nine generating units, key auxiliary systems and associated Balance of Plant. The Phase 2 of the project needs to be processed now despite the COVID-19 because the delay with expanding the contract with existing contractor would create price increase and major technical issues.

67. Specifically, BT needs to sign the contract with Andritz Hydro for Phase 2 to include the rehabilitation of the remaining six units, which are not covered by Phase 1, by June 30, 2021. In order to avoid having different manufacturers for the Phase 1 and Phase 2 equipment, it had been decided to invite bids during Phase 1 for all nine generating units, award the initial contract for the Phase 1 scope, and amend the contract subsequently to include the Phase 2 scope. Otherwise, the financial offer from Andritz Hydro will not be valid and would need to be renegotiated. This is very likely to result in a significant increase in the overall cost of the project. Procurement of a new contractor for Phase 2 was not considered to be a viable option due to interface and other technical issues.

68. The Government would not be able to secure the required US$191.9 million financing required for Phase 2 of the project without the Bank's financing in the form of an IDA grant, especially considering the current macro-fiscal situation. Moreover, the Bank's involvement would help the Government to leverage the required financing from other development partners considering the successful track record of cooperation with other financiers for Phase 1 with significant value assigned to the in-depth technical knowledge and expertise contributed by the Bank.

F. Lessons Learned and Reflected in the Project Design

69. ***Comprehensive feasibility study is essential for cost-effective rehabilitation***. The experience suggests that detailed feasibility studies, which do not include adequate assessment of the condition of the equipment, viable rehabilitation options, seismic risks, bathometric surveys, sedimentation studies, and other important elements result in: (a) high bids due to uncertainties faced by potential bidders due to lack of clarity on the detailed scope of work and condition of equipment and civil works to be rehabilitated; and (b) cost over-runs due to major resulting gaps in the

knowledge about condition of equipment and civil works until the contractors commence the works. Cost over-runs also result from unclear or deficient specifications in the bidding documents in case the feasibility study was not comprehensive.

70. ***Seeking feedback from potential bidders early in the process and flexibility in contracting***. The rehabilitation and refurbishment of HPP projects of this scale, cost, and complexity requires meticulously prepared procurement package and, if necessary, non-traditional contract packaging solutions. The experience has shown that it pays off to carry out adequate market assessment and organize a pre-tender conference to seek views from potential bidders on early draft technical and economic qualification criteria (without disclosing too many details) and other issues and concerns that they may have with such large-scale projects. It is not always possible for countries to secure upfront the entire amount of financing for the rehabilitation project due to various constraints related to public debt and other impediments. Therefore, flexibility in procurement documents to allow bids for multiple phases of the project with the specific timelines or milestones for expansion of signed contracts to add more volume enables to start the project while ensuring that the same contractor is retained until completion. This helps to avoid or minimize interface, equipment compatibility, and other issues.

71. ***Multi-agency technical Working Group helps to resolve issues in timely manner***. Implementation of large HPP rehabilitation projects are always accompanied by various technical, schedule, and contractual issues. Several of those issues require fast resolution to avoid project delays or power system-wide issues considering the size of the project and require more active involvement of the line ministry responsible for the project. Therefore, based on the experience of the Phase 1, the project benefited from establishment and effective functioning of a Working Group comprised of representatives of the contractors, BT, Nurek HPP, and MEWR.

72. ***Strong PMC is essential***. For situations, when the implementing entity does not have the required experience in effectively supervising implementation of such complex projects, it is important to have a qualified PMC that would provide necessary support with review of detailed designs, technical issues, contractual matters, and supervision of E&S compliance of the contractors.

III. IMPLEMENTATION ARRANGEMENTS

A. Institutional and Implementation Arrangements

73. BT will be responsible for implementation of the Phase 2 of the Project. The proposed Project's implementation arrangements were developed considering the experience of BT with implementation of IFI-financed projects, including the Energy Emergency Recovery Project and its Additional Financing (World Bank), the Energy Loss Reduction Project and its Additional Financing (World Bank), ongoing Project on Reduction of Electricity Losses in Sughd Region (EBRD) as well as the ongoing Qairokkum Hydropower Rehabilitation Project financed (EBRD). The implementation arrangements are reflected in the Project Operational Manual (POM), prepared during Phase 1, which will also be used for implementation of Phase 2.

74. The Supervisory Board of BT will be responsible for overall project oversight. The Supervisory Board is chaired by the Prime Minister and includes the Minister of Energy and Water Resources, Minister of Finance, Minister of Economic Development and Trade, Minister of Justice, Chairman of the State Committee on Investments and State Property Management, and the Chairman of BT.

75. **Project Task Force**. For Phase 1 of the Project, BT was relying on the Working Group for coordination of various important tasks related to the Project and resolution of pending issues. However, the responsiveness of the Working Group has not always been consistent with the urgency of various technical issues considering the relatively large number of people on the Working Group, including from different government agencies. Therefore, in order to resolve

the issues without any delay, considering the strategic importance of the Project, MEWR established the Project Task Force, which is chaired by the Deputy Minister of Energy and Natural Resources and includes representatives of MEWR, BT, the Contractors, Nurek HPP staff, and PMC. The Task Force meets each week and discuss project implementation, existing progress and problems and assists in resolving of issues which requires political support.

76. **Technical Council of BT**. The Technical Council will be responsible for review and approval of the technical specifications of the bidding documents for all main contracts under the Project. The Technical Council includes the heads of all technical departments of BT.

77. PoE and PMC will provide technical advice and implementation support to both Technical Council and the Working Group. Specifically, PoE will provide independent review and expert advice on dam safety issues, including review of all technical reports and specifications in the bidding documents for implementation of activities related to enhancement of the dam safety. BT completed the selection of a PoE, which includes an experienced dam safety specialist, geologist, and an electro-mechanical expert.

78. The support of PMC with respect to Phase 2 of the Project would include: (a) preparation of the design and bidding documents for rehabilitation of the Nurek bridge, the powerhouse and other buildings at Nurek HPP site, and technical specifications for machinery to be procured for maintenance of Nurek HPP; (b) preparation of a detailed cost estimate for each of those packages in accordance with standard methods of measurement; (c) support to BT with evaluation of bids under the Phase 2, including advice on all technical and commercial matters related to the bid; (d) review of the implementation schedules for rehabilitation of six units and other civil works covered by Phase 2; (e) supervision of the construction works; (f) monitoring of the contractors' compliance with the provisions of ESMP and relevant national legislation; (g) issuing of instructions to the contractors; (h) inspection and testing of works; and (i) advising BT on approval of payment certificates. The PMC will continue to support the Phase 2 implementation under their existing contract.

79. **Project Realization Group (PRG) of BT**. PRG at BT will be responsible for procurement, contract administration, and financial management under the project. PRG has experience in implementation of IFI financed projects, including the recently completed World Bank financed Energy Loss Reduction Project and its Additional Financing. Overall, the PRG is adequately staffed with procurement and FM staff with qualifications acceptable to the Bank.

80. In particular, the Central Accountancy of BT and Financial Management department of PRG will be responsible for overall implementation of the financial management (FM) function of the Project including, monitoring the flow and accountability of funds, budgeting, accounting, reporting, internal controls and external auditing. BT PRG has hired individual Finance Consultant, which is supporting BT PRG finance unit.

81. During Phase 1 of the Project, BT PRG established its project management office at Nurek HPP. It is staffed with technical, procurement, and contract management specialists that provide daily guidance to Nurek HPP staff on various technical and contractual issues. BT PRG has also hired an individual environmental and social consultant, which is supporting with supervision of environmental and social compliance of the rehabilitation activities under various works contracts.

82. **Project implementation timeline**. The Project implementation schedule foresees completion by December 31, 2029, but the closing date of the Phase 2 is proposed to be set at December 31, 2030 considering that such large-scale and complex hydro rehabilitation projects are prone to delays. The rehabilitation of the first of the additional six units financed under Phase 2 is expected to commence in 2023 considering that only one unit can be out of service each year and the time required to complete the rehabilitation of three units under Phase 1. The detailed review of the schedule by BT and its PMC suggests that, as of now, COVID-19 is not expected to impact implementation schedule of the Phase 2.

B. Results Monitoring and Evaluation Arrangements

83. BT will be responsible for monitoring and evaluating the PDO Level and Intermediate Results Indicators during implementation. BT will collect the required data from progress reports submitted by PMC, Reports of the UN Population Division, and Nurek HPP. The baseline and target values for the results indicators were agreed with the relevant stakeholders, including BT. BT, on behalf of the Recipient, will also prepare and submit project semi-annual progress reports to the World Bank no later than 45 days after the end of the period covered by such report. Those reports will also provide data on relevant gender, citizen engagement, and climate change indicators. The technical data will be collected by BT with inputs from PMC.

84. The Results Framework (RF) and Monitoring section includes annual intermediate targets for Project indicators. The Bank will conduct implementation support reviews at least on a semi-annual basis during implementation to assess the project's performance. In addition, an Implementation Completion and Results Report evaluating the overall performance of the project will be prepared and submitted by the Recipient and the Bank no later than six months after project closing.

C. Sustainability

85. The sustainability of the investments will be secured through improved financial viability of BT, which, among other things, will require inclusion of the project debt service costs and adequate level of O&M costs in the electricity tariff. Specifically, the Program for Financial Recovery of BT for 2019-2025 (the Government Program) envisages implementation of several operational, financial, and other measures to ensure financial viability of BT. The COVID-19 is expected to have material impact on the financial standing of BT and may necessitate update of the Government Program to renew the assessment on financial standing of BT, reassess the sources of savings and explore new sources of cash injection. The ongoing CASA-1000 project would also contribute to sustainability of the Project by allowing increased exports to Afghanistan and Pakistan and therefore improving the financial standing of BT.

86. The project's TA component will also strengthen the capacity of Nurek HPP staff in technical matters related to O&M of the plant, including training on any recent advances in operational and maintenance practices of such plants. In addition, Nurek HPP staff will benefit from training and knowledge transfer of PMC. Additionally, the existing contractor for rehabilitation of electrotechnical equipment has been providing training and other capacity building support to relevant staff of Nurek HPP. This will include: (i) transfer of expertise through the work on site with engineers of BT working with the constrictor's experts; (ii) transfer of expertise by means of training sessions or lectures conducted in Tajikistan by the contractor's engineers on site that would ensure active participation of Nurek HPP's engineers throughout the duration of the project assignment; and (iii) hands-on training/lectures at Andritz's head offices. The above activities will contribute to sustainability of the project.

87. The contract for rehabilitation of electromechanical equipment also envisages supply of spare parts required for the generating units and other infrastructural components of the project. This will contribute to sustainability of the operation of the project after rehabilitation works are completed.

IV. PROJECT APPRAISAL SUMMARY

A. Technical, Economic and Financial Analysis

88. **Technical analysis**. The proposed approach to rehabilitation of the power plant and the dam safety measures are based on comprehensive and robust technical and economic assessments, including detailed cost estimate, which was carried out during Phase 1 of the project and the following recaps the options considered and the option ultimately selected. The feasibility study proposed three options for rehabilitation of Nurek HPP.

- Option 1: Rehabilitation measures urgently required to maintain the power plant's generation capacity and the safety of the power complex. This option covered only the generation units, electrical balance of plant, parts of the mechanical balance of plant, and the Supervisory Control and Data Acquisition (SCADA) system.
- Option 2: All activities under Option 1 plus additional measures to replace and refurbish the obsolete equipment such as the hydro-mechanical equipment at the power intake and some mechanical auxiliary systems; and
- Option 3: All activities under Option 2 pus all additional measures to ensure complete rehabilitation of the power plant.

89. The project will support complete rehabilitation of the power plant proposed under Option 3. This approach is justified because several of other infrastructural components of the power plant, which would have been left out of Options 1 and 2, are also close to the end of their useful economic life and would require rehabilitation within 5-7 years from now if not rehabilitated under the proposed project.

90. **Update of the economic analysis of the entire project**. The economic analysis of the entire project (nine units with total operational capacity of 2,660 MW) was updated considering the signed main contracts for rehabilitation of the electromechanical equipment and the balance of plant, rehabilitation of the hydromechanical equipment, replacement of autotransformers and the PMC costs. The dam safety capital costs were excluded from the update since this would be required even if the rehabilitation was not undertaken. The corresponding benefits of strengthening the dam safety of the Project were also excluded.

91. ***Economic costs of the entire project***. The base case values for updated economic costs include: (a) the contract price for rehabilitation of all nine units and the balance of plant inclusive, including the approved changer orders under Phase 1 and the agreed-upon change orders in Phase 2; (b) the capital cost of rehabilitation of buildings at Nurek HPP site;[13] (c) the cost of machinery; (d) the contract price of six autotransformers; (e) the contract price of PMC; and (f) the incremental O&M costs associated with maintenance of the new equipment. The costs are disbursed according to the years in which they are expected to be incurred during the project construction period.[14]

92. ***Economic benefits of the entire project***. The update of the main economic benefits was necessary considering the changes in the power sector of Tajikistan since approval of Phase 1. Specifically, now the project is expected to generate not only benefits in the form of increased winter supply (main benefit during appraisal of the Phase 1), but also summer supply due to increased exports to Afghanistan (from 1,100 GWh in 2016 to 1,500 in 2019) and commencement of exports to Uzbekistan (about 2,000 GWh in 2019) with potential expansion by another 1,000 GWh starting from 2022. Therefore, the main economic benefit of the Project is the avoided increase in the cost of meeting the projected electricity demand inclusive of exports. This benefit was estimated as the difference between the total cost of electricity supply to meet the projected demand[15] under "without Project" and "with Project" scenarios. The analysis confirmed that there will be a need for significant new capital expenditures to construct substitute generation capacity[16] to meet the projected electricity demand if Nurek HPP is not rehabilitated.

93. ***Results***: The updated economic analysis of the entire project yielded the following base case results: (a) economic Net Present Value (NPV) of US$2,083 million[17] and Economic Internal Rate of Return (EIRR) of 40 percent exclusive of

[13] Capital cost of bridge rehabilitation was excluded because it would need to be done irrespective of the project.
[14] Project construction costs are not levelized over the operating life of the project.
[15] At generation level.
[16] The high-level generation expansion planning analysis suggests that replacement capacity would be comprised of gas-fired generation (combined cycle gas turbines, gas turbines, and reciprocal internal combustion engines), coal CHPs, and Solar PV capacity.
[17] The updated economic discount rate/social opportunity cost of capital was estimated at 4.37 percent and computed consistent with

the social cost of carbon; and (b) economic NPV of US$3,859 and EIRR of 44 percent. In comparison, during appraisal of Phase 1, the entire Project was estimated to have: (a) economic NPV of US$1,615 million and EIRR of 36 percent exclusive of the social cost of carbon; and (b) economic NPV of US$2,077 million and EIRR of 40 percent inclusive of the social cost of carbon. The clarifications on causes of the improvement of economic viability of the project are presented in Annex 2.

Table 3: Summary of Results: Updated Economic Analysis of Entire Project.

	Economic Viability Exclusive of Social Cost of Carbon	Economic Viability Inclusive of Social Cost of Carbon
Economic NPV (million US$)	2,083	3,859
Economic IRR (%)	40	44

Source: BT.

94. ***GHG reduction benefits of the entire project***. The entire project will generate global environmental benefits in form of net reduction of CO2 emissions. Specifically, the Phase 2 will lead to 69 million tCO2e net reduction in emissions vs. the baseline during economic life of the project.[18] Therefore, the Project will generate climate mitigation co-benefits.

95. **Economic analysis of Phase 2**. The differences between the economic analysis of the Phase 2 and the entire project are the following: (a) lower economic cost due to rehabilitation of six generating units (out of nine), and (b) smaller avoided increase in the cost of meeting projected electricity demand in case six units (out of nine) are not rehabilitated under Phase 2. The remaining three units are assumed to be rehabilitated because Phase 1 is already under implementation.

96. ***Results***. The economic analysis of the Phase 2 yielded: (a) an economic NPV of US$660 million and EIRR of 20 percent exclusive of the social cost of carbon; and (b) economic NPV of US$1,774 million and EIRR of 27 percent inclusive of the social cost of carbon.

Table 4: Summary of Results: Economic Analysis of Phase 2 of the Project.

	Economic Viability Exclusive of Social Cost of Carbon	Economic Viability Inclusive of Social Cost of Carbon
Economic NPV (million US$)	660	1,774
Economic IRR (%)	20	27

Source: BT.

97. ***GHG reduction benefits for the Phase 2 of the project***. The Phase 2 will generate global environmental benefits in form of net reduction of CO2 emissions. Specifically, the Phase 2 will lead to 45 million tCO2e net reduction in emissions vs. the baseline during economic life of the project.[19] Therefore, the Project will generate climate mitigation co-benefits.

98. ***Sensitivity analysis***. Sensitivity analysis was conducted to assess the robustness of the estimated economic returns of the entire project and Phase 2 to changes in the main evaluation variables. The results of the sensitivity analysis suggest that the economic returns of the entire project remain economically viable even in case of substantial variation of main variables that affect its viability. For Phase 2, the net project returns become negative under some scenarios. See Annex 2 for details.

the World Bank Guidance on Discounting Costs and Benefits in Economic Analysis of World Bank Projects, May 9, 2016.

[18] Assumed to be 35 years.

[19] Assumed to be 35 years.

99. **Update of the financial analysis of the entire project**. The financial analysis of the entire project was updated considering the signed main contracts for rehabilitation of the electromechanical equipment and the balance of plant, rehabilitation of the hydromechanical equipment, improvement of dam safety, replacement of autotransformers and the PMC costs. The dam safety capital costs were included in the update of the financial analysis because those are direct cash costs for BT.

100. ***Financial costs of the entire project***. The financial costs of the entire project include: (a) all economic costs inclusive of indirect taxes and both the physical and price contingencies; (b) the cost of dam safety measures; (c) the incremental financial cost of electricity supply; and (d) the incremental O&M costs of the Project. The costs are projected according to the years in which they are expected to be incurred during the project construction period.

101. ***Financial benefits of the entire project***. The financial benefits of the entire project were estimated as the avoided reduction in cash revenues from domestic electricity sales and exports due to gradual loss of generation capacity of Nurek HPP. The estimates of avoided revenue reduction took into account electricity losses in the power system, including expected reduction trajectory, and the estimated billing and collection rates for electricity.

102. ***Results***. The updated financial analysis of the entire project yielded a financial NPV of US$4,060 million[20] and Financial Internal Rate of Return (FIRR) of 33 percent. This result suggest that the project will have significant impact on precluding significant deterioration of financial viability of BT. Without the project, BT's revenues will significantly reduce exacerbating the financial difficulties of the company.

103. **Financial analysis of Phase 2**. The differences between the financial analysis of the Phase 2 and the entire project are the following: (a) lower capital and electricity supply cost due to rehabilitation of six generating units (out of nine), and (b) smaller avoided reduction in the cash revenues the cash revenues attributed to six units (out of nine) rehabilitated under Phase 2 are taken into account. The remaining three units are assumed to be rehabilitated because Phase 1 is already under implementation.

104. ***Results***. The updated financial analysis of the entire project yielded a financial NPV of US$1,634 million[21] and FIRR of 19 percent. This result suggest that the project will have significant impact on precluding significant deterioration of financial viability of BT. Without the project, BT's revenues will significantly reduce exacerbating the financial difficulties of the company.

105. ***Sensitivity analysis***. Sensitivity analysis was conducted to assess the robustness of the estimated financial returns (both the entire project and Phase 2) to changes in the main evaluation variables. The results of the sensitivity analysis suggest that both the entire project and the Phase 2 remain financially viable even in case of substantial variation of main variables that affect its viability. See Annex 2 for details.

106. **Assessment of current financial performance of BT**. The financial condition of BT steadily deteriorated during the analyzed period of 2013-2019 due to: (a) unsustainable and increasing debt levels, (b) local currency depreciation, (c) low cash collections, and (d) below cost-recovery end-user electricity tariffs.

107. By the end of 2019, the financial debt[22] of BT reached $2 billion, which is slightly more than the company's assets. It comprised of borrowings from international financial institutions (71.5 percent), local bank (11.4 percent), and interest payable (17.2 percent). The absence of corresponding debt service allowance in the tariffs and under-

[20] The financial discount rate of 0.59 percent was estimated based on the expected cost of the capital for the Project considering the financing structure.
[21] The financial discount rate of 0.32 percent was estimated based on the expected cost of the capital for the Phase 2 considering the expected financing structure.
[22] Financial debt includes interest-bearing financial liabilities and interest payable.

collection of receivables caused the company to fail to make full and timely principal and interest payments on its debt. Ensuing penalties on overdue borrowings amounted to TJS 3.3 billion (US$339 million).

108. The situation with trade payables, which account for about 14 percent of its total liabilities, also deteriorated. BT struggles to make payments to IPPs, Sangtuda-1 and Sangtuda-2 HPPs, in timely manner because the cost of electricity from those IPPs is higher than the end-user electricity tariff and those IPPs primarily supply electricity during the months of April-October (surplus energy season) when the other lower cost HPPs, owned by BT, can generated at significantly lower cost and spill water given low summer demand and lack of export opportunities.

109. The devaluation of Tajik somoni, which lost about half of its value against the US dollar during the period of 2013-2019, and the lack of currency diversification of revenue sources and liabilities magnified the financial difficulties of BT. Revenues in dollar terms has been stagnant since 2013 and started to improve in 2018 supported by growth of dollar-priced exports, deceleration of the currency devaluation rate, and the annual tariff increases of 15 percent. Nevertheless, BT still holds an uncovered foreign currency position[23] of more than TJS22 billion. The Bank is currently helping the Government to develop solutions to hedge the FX exposure of BT.

Figure 2: Dynamics of BT's Debt & Revenues

Source: Corporate Financial Model of BT.

110. End-user electricity tariffs remain below the cost-recovery levels, which do not allow the company to finance even the required recurrent expenditures. The expected average end-user tariff for 2020 is estimated at 50 percent of cost-recovery level. The cost-recovery tariff was assessed following the cash needs approach. This was done through assessment of the amount of cash revenue that BT requires to fully finance the recognized recurrent expenses (accrual-based items in the financial statements), which include the O&M costs, administrative costs, capital repairs from own funds, pension liabilities, debt service, and taxes. It should be noted that concept of cash-based cost of service is different from the concept of economically efficient cost of supply and does not take into account the return on invested capital and investments required to meet the long-run forecast electricity demand.

111. **Projection of financial performance of BT**. Financial performance of BT was forecast based on the targets in the Government Program for Financial Recovery of BT for 2019-2025,[24] with adjustments due to COVID-19 impacts, including increase of end-user average tariff to cash-based cost recovery level, improvement and maintaining the collection rate for billed electricity in domestic sale at 95 percent, and other efficiency improvements.

112. Increase of end-user tariffs, gradual improvement of collection rates, more efficient working capital management and reduction of technical losses will help BT generate more cash from operations and BT will eliminate the cash

[23] Measured by the gap between foreign currency denominated financial assets and foreign currency denominated financial liabilities.
[24] Adopted in April 6, 2019. The Program will be updated considering the COVID19 impacts.

deficit by the end of 2027. The earnings before interest, tax and depreciation (EBITDA) margin will increase to 45 percent by 2030, and the liquidity will improve. Revision of on-lending term of the Ministry of Finance will reduce the debt service costs of the BT and free up additional cash for repayment of its overdue liabilities. Commencement of electricity exports under CASA-1000 project will also significantly contribute to improvement of financial standing of BT starting from 2023. BT will gradually repay its current and overdue financial liabilities using incremental operating cash flows from financial recovery measures. It is estimated that by 2028 BT will have fully repaid its overdue debt (principal plus interest) to Ministry of Finance, overdue payables to Sangtuda-1 and Sangtuda-2 and the outstanding commercial debt. As a result, by the end of 2030 the debt-to-assets ratio will have come down to 0.63, net debt (i.e. total financial debt net of cash balance) will stand at 2 time the EBITDA,[25] and operating cash flow will be more than 5 times its debt service requirements (DSCR). See Annex 2 for details.

Table 5: Projected Financial Ratios under Financial Recovery Scenario.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross margin	28%	38%	35%	52%	52%	52%	51%	51%	50%	49%	49%
EBITDA margin	24%	34%	31%	49%	49%	49%	48%	47%	46%	45%	45%
Current ratio	0.17x	0.18x	0.21x	0.23x	0.25x	0.27x	0.35x	0.55x	1.13x	1.87x	2.62x
Debt-to-assets	1.28x	1.28x	1.29x	1.23x	1.17x	1.09x	1.01x	0.90x	0.79x	0.71x	0.63x
DSCR	0.00x	0.14x	0.13x	0.27x	0.32x	0.39x	0.49x	0.79x	1.87x	5.11x	5.26x

Source: Corporate Financial Model of BT.

113. **Financial covenants in the Financing Agreement**. The financial analysis of BT and projection of its financial performance informed inclusion of the following covenants into the Financing Agreement for the Project.

- ***Tariff increase***. The Recipient shall gradually increase the average electricity tariff during the Project implementation period in a manner consistent with the Electricity Tariff Paper[26] to reach cost recovery tariff level by December 31, 2027.
- ***Long-term DSCR***. The Recipient shall cause the Project Implementing Entity to, except as the Association shall otherwise agree, not incur any long-term debt unless a reasonable forecast of its revenues and expenditures shows that its estimated net revenues for each fiscal year during the term of the debt to be incurred shall be equal to at least the estimated long-term debt service requirements in such year on all debt of the Project Implementing Entity, including the debt to be incurred.
- ***Collection rate for billed electricity sales to domestic market*** The Recipient shall cause the Project Implementing Entity to reach ninety five percent (95%) average collection rate for billed electricity sold domestically by December 31, 2026 and not to reduce such rate until the Project Closing Date.

B. Fiduciary

Financial Management

114. The FM arrangements in place at BT PRG have been reviewed in May 2020, in accordance with the Financial Management Manual for World Bank Investment Project Financing Operations that became effective on March 1, 2010 but was revised on February 10, 2017. Currently, BT PRG has been successfully implementing a large number of

[25] A proxy for operating cash flow.
[26] Electricity Tariff Paper would be the official tariff policy document of the Government containing the computation of the level of cost-recovery electricity tariffs and the trajectory of planned electricity tariff increases for a given time period, and is planned to be adopted by December 31, 2020, in form and substance satisfactory to the Bank, and which the Government shall not, amend, abrogate, waive or fail to enforce without prior agreement from the Bank.

the Bank[27] and other donor financed projects, including Nurek Hydropower Rehabilitation project – Phase 1 (P150816) as well as EBRD/EIB/Green Climate Fund financed Qairokkum Hydropower Rehabilitation project.

115. The Project FM assessment confirmed that: (i) BT PRG FM staff has significant experience in implementing Bank-financed projects; (ii) there is overall adequate accounting software utilized by BT PRG; (iii) the audits of the Bank-financed projects implemented by BT PRG revealed no critical issues, and (iv) the IFRs on the projects implemented by BT PRG were received in general on time and overall found to be acceptable to the Bank with some exceptions. Overall FM arrangements at BT PRG are adequate to implement the Project and meet the minimum requirements of the Bank's Policy and Directive on Investment Project Financing.

116. Project management-oriented Interim Un-audited Financial Reports (IFRs) will be used for the Project monitoring and supervision. The format of the IFRs will include: (i) Project Sources and Uses of Funds, (ii) Uses of Funds by Project Activity, (iii) Designated Account Statements, (iv) A Statement of the Financial Position, and (v) SOE Withdrawal Schedule. BT PRG will be producing IFRs every calendar quarter throughout the life of the project. These financial reports will be submitted to the Bank within 45 days of the end of each calendar quarter. The first IFRs will be submitted after the end of the first full quarter following the initial disbursement.

117. The Project audit arrangements will rely on the existing arrangements in place at BT PRG for the ongoing Bank-financed projects, which are overall adequate. There are no pending audits under the Bank-financed projects implemented by BT PRG. The auditor issued unmodified (clean) opinions on the financial statements of the projects implemented by BT PRG, with no critical recommendations in the management letters. The audit of the Project and the Entity (BT) annual financial statements will be conducted (i) by independent private auditors acceptable to the Bank, on terms of reference (TOR) acceptable to the Bank, and (ii) according to the International Standards on Auditing (ISA) issued by the International Auditing and Assurance Standards Board (IAASB) of the International Federation of Accountants (IFAC). The annual audits of the Project and Entity financial statements will be provided to the Bank within six months since the end of each fiscal year, also at the Project closing. The cost of the Project and Entity audit will be financed from the proceeds of the Project.

118. The Recipient has agreed to disclose the audit reports for the Project and Entity within one month of their receipt from the auditors and acceptance by the Bank by posting the reports on the web-site of BT or other official websites of the Recipient. Following the Bank's formal receipt of these reports from the Recipient, the Bank will make them publicly available according to World Bank Policy on Access to Information.

119. The overall FM risk for the Project is assessed as Moderate, with the Inherent Risk Substantial and Control Risk assessed as Moderate.

120. The World Bank procedures require that during the project preparation the World Bank FM team assesses to what degree the project could rely on the country-specific Public Financial Management (PFM) systems. The latest Public Expenditure Financial Assessment report (conducted in 2017) found that several critical PFM elements including internal controls, external audit (Supreme Audit Institution - SAI), and financial reporting remain weak. While some elements of the country PFM, such as the country's budget system, will be used for the Project, for other PFM elements (accounting, financial reporting, internal controls, funds flow under the Project), the project specific system at BT PRG will be used.

121. Disbursement: The FM/accounting staff of BT PRG is well aware of the Bank's disbursement procedures. The Project's Designated Account (DA), in US$, will be opened and maintained in a commercial bank(s) acceptable for the Bank. Considering the distressed situation in the country's banking sector, the Bank will monitor the performance of

[27] Barqi Tojik will also implement Tajikistan Power Utility Financial Recovery Program for Results (P168211), which was approved by the Bank, but not effective by the time of the Phase-2 assessment.

local commercial banks. Currently only a few commercial banks are considered acceptable to the Bank for holding the projects' DAs.

122. The SOE based disbursement method will be applied for the Project. The Project funds will flow from the Bank, either: (i) via the DA, which will be replenished on the basis of SOEs or full documentation; or (ii) on the basis of direct payment withdrawal applications and/or special commitments, received from the implementing entity. The following disbursement methods may be used under the Project: Reimbursement, Advance, Direct payment and Special Commitment. The DAs' ceilings for each DA as well as the detailed instructions on withdrawal of Project proceeds will be provided in the Disbursement and Financial Information Letter.

Procurement

123. The procurement assessment conducted for the Phase I of the Project is valid and the procurement arrangements would continue. The detailed assessment of the implementing entity, market assessment, agreed arrangements and risks are covered in the Project Procurement Strategy for Development (PPSD) prepared for Phase 1, it covers the large contract which have already been awarded. A new PPSD was prepared by BT to cover the new small contracts that are to be awarded under the Phase 2 of the Project.

124. The procurement of the main procurement packages, which include: (a) rehabilitation of all nine units and the balance of the plant; (b) rehabilitation of hydromechanical equipment; and (c) dam safety and monitoring instrumentation, has been completed. For the contract covering the rehabilitation of the units, three out of the nine units were funded under Phase I, and the works for the remaining six units are to be triggered by June 2021, under Phase 2 of the Project. Most of the Phase 2 financing (about US$35.9 million) would be allocated to the existing contract to cover the remaining six units to be rehabilitated. There is a substantial financing gap in this contract. Other allocations include small-scale civil works for rehabilitation of the Nurek bridge (US$1.7 million), renovation of some buildings/structures at Nurek HPP (overall cost is about US$5 million), some consultancy services (US$3.4 million), and procurement of machinery.

125. The procurement plan for the additional small contracts was prepared. The new civil works contracts are not expected to be prior review. It should be noted that the main contract, which would be expanded to include the remaining six units, was prior-reviewed in Phase 1 and the inclusion of the remaining six units would be an amendment, which would also be reviewed by the Bank.

126. The PMC will continue to provide implementation support to BT for procurement and contract management. The major consideration of procurement for Phase 2 is contract management aspects, especially of the large contracts. BT PRG will prepare contract management plans with Key Performance Indicators (KPIs). Despite the small size of the new contracts to be procured, the procurement risk has been rated as Substantial due to contract management risks associated with large contracts.

C. Legal Operational Policies

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

127. **Projects on International Waterways**. OP 7.50 is applicable to the project since the Nurek dam is located on the Vakhsh River in western Tajikistan. The Vakhsh River is one of the main tributaries of the Amu Darya River, which is

considered an “international waterway” for purposes of the Policy. The other riparian states to the Amu Darya are Afghanistan, Uzbekistan and Turkmenistan, all three being downstream riparians.

128. The policy applies, inter alia, to hydroelectric projects that involve the use or potential pollution of international waterways. Therefore, at the request of the Republic of Tajikistan, the Bank sent a notification letter (on April 29, 2020) to riparians informing about the ongoing Phase 1 of the Project, the planned Phase 2 of the Project and its components. No responses were received by the Bank from the concerned riparian states by the requested response deadline of May 29, 2020.

D. Environmental and Social

129. **Environmental and Social performance of Phase 1**. BT awarded the construction contract for rehabilitation of generating units to a reputable international firm. The contractor included dedicated HSE staff to implement contractual obligations. The contractor is already mobilized, including its subcontractors. Under the contractual obligations, the contractor prepared and submitted first draft of Construction Environmental, Health and Safety Plan (CEHSP) to PMC for approval. Since the works are an early stage of implementation therefore no serious compliance issues have so far been reported. BT PRG has a two-member environmental team to assist and provide oversight for the project environmental requirements. PMC, on the other hand, are without environmental expert in its team, but are in the process of hiring a local specialist soon. No issues were observed with compliance with social requirements under the Phase 1. The

130. **Project Phase 2**. An ESIA was prepared for the Phase 1 of the Project and cleared by the Bank. For the proposed Phase 2 of the Project, BT is updating the ESIA under the Bank's ESF. BT is also preparing an ESMP for the Nurek bridge, an activity that has been included in the project only as part of the Phase 2.

131. **Environmental impacts**. The main environmental impacts and risks as identified in the updated ESIA for Phase 2 of the project are: (a) asbestos in the equipment to be refurbished; (b) disposal of hazardous waste, (c) health and safety risks (electrocution) for the workers and personnel engaged in dismantling, installation and testing of equipment (e.g. turbines and auto-transformers) in a limited work space, and (d) water contamination due to potential leakage from construction material including waste. The environmental and social management and monitoring plan in the updated ESIA includes appropriate and adequate measures to mitigate the identified potential impacts and risks. The only impacts on reservoir or downstream water quality would be from spills of hazardous materials or the release of sanitary waste. The risk of such potential impacts is minor if hazardous materials and waste are managed properly and sanitary water is controlled and treated. The Environmental and Social Management Plan (ESMP) for Nurek bridge rehabilitation screened the environmental risks and impacts during the construction of bridge. These could include traffic disruption, excessive noise and dust levels, water contamination and road safety. The Phase 1 of the project is also supporting preparation of the EPP for Vakhsh cascade of HPPs. It will cover risk categorization, roles/responsibilities of key entities, notification/ warning procedures, etc.

132. **Social impacts.** The Project will have overall positive impacts with continued employment as well as low-cost electricity supplied to commercial, industrial, and residential consumers, which is a material positive impact considering that Nurek HPP accounts for about 50 percent of domestic electricity supply. The Phase 2 may have negative social impacts considering the scale of the Project and potential Occupational, Health, and Safety (OHS) risks, including use of heavy equipment/machines, work in confined areas/height, exposure to asbestos. The rehabilitation works within the power plant will be confined to existing structures while bridge rehabilitation, which is primarily used to access Nurek plant facilities, will be rehabilitated in a way that allows continued use.

133. The contractor selected under the Phase 1 for rehabilitation of the generating units has already developed procedures and included those in the OHS Plan (for construction) and the Nurek Safety and Health Plan (for

operations) to minimize the risks. If the Plan is properly implemented, risks would be reduced. Safety measures will be put in place to protect both workers and communities throughout Project implementation with additional measures to ensure safety during operation. Power plant rehabilitation works will be conducted within a confined area, which will have minimal or no impact on communities.

134. Traffic risk will be controlled by the contractor's preparation and implementation of a Traffic Management Plan. As noted, this will include requirements that routes through Nurek City be planned to avoid sensitive areas such as hospitals and schools, and that traffic avoid rush hours. With these controls, the potential impacts are considered to be moderate. The project will have a generally positive effect on the economy of Nurek City.

E. Gender

135. The Project will address gender gaps in employment within BT. The 2016 Country Gender Assessment for Tajikistan conducted by ADB identified strong occupational segregation and earnings gap. In terms of the energy sector, ILO data for 2009 indicates that 3 percent of women are employed in the sector related to electricity, gas, and steam supply as well as air conditioning (ISIC-Rev.4). The situation has improved since then due to improvement of the situation at BT considering that BT is the largest employer in the mentioned sector. As of April 30, 2019, BT employed 13,296 workers, of which 1,488 are women (11 percent). Women represent 55 percent of managerial staff and 11 percent of technical staff (engineers). Nevertheless, there is room for further improvement and specific measures will be carried out during the Project to increase participation of women in the labor force of BT.

136. Therefore, as part of Component 2 (Technical Assistance), the project will finance a first-of-its-kind gender diversity and inclusion assessment for BT to examine the role of women and gender disparities within BT. The assessment would look into: (1) the extent to which gender diversity and inclusion is a corporate priority, (2) workforce policies, such as recruitment, leave flexible work, and workplace safety, promotions, career development support, benefits, etc. to identify gender-related trends and any potential areas of bias or discrimination; (3) the organizational culture (i.e. do men and women perceive themselves to be equally included in the workplace, and (4) the challenges women face to remain and succeed in technical positions in the utility. Based on the findings of the assessment, the project will work with BT to develop a gender diversity plan that can include such activities as revising their hiring practices to minimize gender biases, conducting career and recruitment outreach to female students in engineering and STEM technical training programs, developing career development and leadership training programs for female employees of BT, among others. The Project includes an intermediate indicator under the Component 2 "Percentage of women employed by BT" with a baseline of 11 percent in 2019 and a target of 17 percent in 2030.

F. Citizen Engagement

137. 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. BT will continue and expand its engagement with local communities in order to maintain an effective interface with target communities. This will be followed by several citizen engagement activities implemented regularly throughout the Project, which were also carried out during Phase 1 of the project. The following specific activities will be implemented by BT to build upon and expand the citizen engagement (CE) mechanisms put in place for Phase 1.

- ***A series of digital (virtual, online) or traditional community consultations***, blended to adapt to post-COVID circumstances and prevailing regulations, will inform communities and obtain feedback on the power plant and bridge rehabilitation design and implementation process. Consultations will be held at least twice 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 expanding the arrangements under the Phase I. This would allow to provide citizens with an immediately accessible venue 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 BT that will be assigned to record, process, and provide meaningful responses and/or resolution to feedback received
- ***Capacity building for local CE facilitators of BT***. This would include training for project field staff in organization and facilitation of online and blended solutions for community consultations.

138. The effectiveness of the CE 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 and an online questionnaire at the feedback platform.

V. GRIEVANCE REDRESS SERVICES

139. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB'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 WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service. For information on how to submit complaints to the World Bank Inspection Panel, please visit www.inspectionpanel.org.

VI. KEY RISKS

140. The overall risk to achievement of the Project development outcomes is rated as Moderate. The below section presents the assessment and discussion of main residual risks.

141. **Political and Governance Risk is Moderate**. At the project level, the political decision on the priority of the Nurek HPP rehabilitation was made and the authorities demonstrated full commitment. The operation does not present any threat to political stability of the country and the Project is supported across the entire political spectrum and is consistent with the development strategy of the country. There are no residual corruption or transparency risks to the project because the main contract (with Andritz Hydro) for power plant rehabilitation has already been awarded and will be extended to also cover the Phase 2 of the Project based on the bid already submitted. The procurement of this contractor has been done in full compliance with the Bank's applicable procurement rules and was well organized and managed by BT. The new procurement under Phase 2 would include only civil works for rehabilitation of Nurek bridge, renovation of Nurek powerhouse and other buildings, as well as some consultancy contracts. Each of these civil works contracts is not expected to exceed US$2-3 million. Nevertheless, some risks with management of large contract with Andritz Hydro remain considering that BT has limited experience in administration of such large contracts. The following will help to mitigate the residual risk of this new procurement: (a) prior review of those packages by the Bank; (b) established track record of the implementing entity under Phase 1 in carrying out the

procurement consistent with the Bank's procurement regulations; and (c) further capacity building for BT on management of complex design, supply, and install contracts.

142. **Macroeconomic Risk is Low.** The deterioration of the macroeconomic situation in the country due to COVID-19 impacts is very likely, but the change in macroeconomic condition and the Government's macroeconomic policies will not impact development outcomes. First, under the base case scenario, the project financing gap of US$141.9 million is expected to be filled through concessional credit from development partners, including some grant financing. Therefore, despite the strained public debt situation, there should be no major impact on the long-term debt sustainability of the country. Moreover, the project is very high priority and, if needed, reprioritization of other capital projects will take place. Second, TJS depreciation and acceleration of local inflation will not be impacting the construction of the project because the main contracts are denominated in FX and the local currency denominated small-scale civil works will have price adjustment, which will help to partially capture the impact from TJS depreciation through adjustment of costs. Third, the possible deterioration of the banking sector stability carries limited residual risk because majority of payments would be made through Direct Payment method and the funds will not be transferred to the designated account of the project in a local commercial bank.

143. **Sector Strategies and Policy Risk is Low**. This risk at Project level is Low given that: (a) policies and strategies in the power sector are adequate for the purposes of the operation and consistent with the country's development strategy and objectives as specified in the Tajikistan National Development Strategy 2030; and (b) the newly-adapted Program for Financial Recovery of BT (2019-2025) is technically sound, supported by various development partners with conditional financing against achievement of specific targets and results, and is likely to allow to gradually revert BT to adequate financial standing without jeopardizing achievement of outcomes under the Nurek Phase 2 Project. Even if COVID-19 results in further deterioration of BT's financial standing against the baseline in the Program for Financial Recovery, this will not impact achievement of development outcomes because BT will continue generating enough resources to adequately operate Nurek HPP considering the relatively small size of those costs in the total cost structure of BT.

144. **Technical Design Risk is Low.** The Project design was based on robust technical and economic assessments, including physical examination of technical condition of some of the key equipment, the balance of the plant, and the dam. The rehabilitation works, including the new equipment such as large generating units, have been successfully operated globally in other large hydropower projects. The Project's economic benefits depend on factors that are largely under BT's control and the cost estimates and assumptions are realistic. Most of the major equipment is being replaced by new equipment, and thus there will not be significant increases in rehabilitation scope. The only major equipment to be rehabilitated are the main inlet valves – their rehabilitation scope may change when these are dismantled. If extra works are needed for these valves, then BT would make a case-by-case decision, with advice of its experienced PMC, to make technically sound decisions with limited implications expected on the overall cost of the project.

145. **Institutional Capacity for Implementation Risk is Moderate**. The Project involves one implementing entity - BT Project Realization Group (PRG) - which has overall adequate capacity to implement the project with assistance from PMC on technical, contract management, and E&S issues. The PMC is an experience and competent consulting firm with good track record of performance under Phase 2. The monitoring and evaluation arrangements are largely adequate with some delays observed in submission of monthly progress reports. The Project is located in a single geographical area. Operational rules, processes and systems are comprehensive and generally enforced, but occasional delays occur on decision-making related to important technical and contractual issues, e.g. review of change order submitted by the contractors. Therefore, in order to ensure timely resolution of pending issues, the Government established Nurek Project Task Force comprised of representatives of BT and MEWR and chaired by the Deputy Minister of Energy and Water Resources. The Task Force conducts weekly meetings to resolve pending issues.

146. **Fiduciary Risk is Substantial.** The procurement of the largest procurement packages, which include: (a) replacement of all nine units and rehabilitation of the balance of plant; (b) rehabilitation of hydromechanical equipment; and (c) dam safety and monitoring instrumentation, has been completed. The packages to be supported under the Phase 2 would include the existing contract with Andritz Hydro to add the remaining six units, small-scale civil works for rehabilitation of the Nurek bridge (US$1.7 million), renovation of some buildings/structures at Nurek HPP (overall cost is about US$5 million), some consultancy services (US$3.4 million), and procurement of some machinery. The following measures will help to mitigate the fiduciary risks. PMC, hired under Phase 1 of the project, will continue provide implementation support to BT for procurement and contract management. Overall these procurements are simpler, however, the risk rating has been determined initially based on the contract management considerations of the large International Competitive Bidding (ICB) packages. Moreover, the Task Force established for the project would provide timely guidance to BT on addressing the important contractual issues on technical level. BT's relevant staff as well as procurement staff will be provided trainings on contract management and will be required to prepare and monitor contract management plans and Key Performance Indicators. Additionally, BT may not be able to fully address the recurring issue of policies and procedures for recognition of revenues and receivables for electricity sales. The issue is caused by inadequate metering and billing infrastructure. The current size of the AMI program would allow to cover additional large eight cities, including Dushanbe, which combined would account for 60 percent of total sales.

147. **Environmental Risk is Substantial.** The environmental risks associated with the Nurek HPP Project are Substantial. Considering the project scope, which includes mainly rehabilitation works, potential risks and impacts are predictable, are of short duration and reversible with good mitigation measures. Major rehabilitation works are within the powerhouse (replacement of generators, turbines, transformers, etc.), the switchyard (autotransformers) and on the existing civil structures. The workers could also be exposed to asbestos and other hazardous waste present in the existing infrastructure including equipment. This risk will be mitigated through decontamination works to be carried out by the contractor prior to commencement of rehabilitation activities in any of the locations which have asbestos-containing materials. Industrial waste leakage from the material present at the works sites could enter into reservoir or river water and contaminate it. Exposure to extended Electromagnetic Field (EMF), chances of electrocution, excessive noise levels, traffic disruption and road safety are perceived risks during the construction/rehabilitation works. Appropriate mitigation measures are specified and will be enforced. The only impacts on reservoir or downstream water quality would be from spills of hazardous materials or the release of sanitary wastes. The risk of such potential impacts is considered to be minor if hazardous materials and wastes are managed properly and sanitary water is controlled and treated.

148. **Social Risk is Substantial.** This risk is Substantial considering the scale of the Project and potential OHS risks, including use of heavy equipment/machines, work in confined areas/height, exposure to asbestos. The rehabilitation works within the power plant will be confined to existing structures while bridge rehabilitation, which is primarily used to access Nurek plant facilities, will be rehabilitated in a way that allows continued use of the bridge. The Project is predominately rehabilitation of existing equipment. The works will be conducted within a confined area, which will have minimal or no impact on communities. The risks from various tasks will be evaluated by the contractor for rehabilitation of units and procedures will be developed and included in the OSH Plan and the Nurek Safety and Health Plan (for operations) to minimize the risks. If the Plan is properly implemented, the risks would be manageable. Traffic risk will be controlled by the contractor's preparation and implementation of a Traffic Management Plan. As noted, this will include requirements that routes through Nurek City be planned to avoid sensitive areas such as hospitals and schools, and that traffic avoid rush hours. It should be noted that the Project is also expected to generate positive impacts on the economy of Nurek City and Tajikistan including: (a) increased employment opportunities for local workers - both skilled and unskilled; (b) development of economic opportunities, such as restaurants and food

suppliers, fuel suppliers, and providers of other goods needed for everyday life; (c) reliable long-term electricity generation to ensure sufficient domestic supply and revenues from exports.

149. **Stakeholder Risk is Low.** The project objectives are well understood, and all key stakeholders support the project. BT conducted public consultations on the project and the Environmental and Social Impact Assessment (ESIA) during preparation of Phase 1 (Report SFG2926),[28] and regularly engaged with stakeholders during implementation of the Phase 1 to share information on the status and collect feedback. This practice will continue as part of the Phase 2 consistent with the updated Stakeholder Engagement Plan (SEP).

150. **Financing Risk is Moderate.** The deterioration of macroeconomic situation may complicate timely mobilization of the required financing to fill the gap. However, it should be noted that the project is of strategic importance for the country and the Government considers it to be very high priority. Therefore, the probability that sufficient resources would not be secured to close the financing gap is low considering that several financiers have indicated their willingness to participate in the Project. The only constraint may be the cost of borrowing in case public debt and fiscal situation of the Government deteriorates to secure the required resource. The risk will be mitigated through reprioritization of other energy sector investments to channel the required funds to Nurek HPP.[29]

151. **Climate Change Related Disaster Risk is Low** given that the impact of climate change on the hydrology of the Vakhsh river have been studied. Furthermore, the Project will utilize the advanced flood forecasting model that is being developed and calibrated under Phase 1. The construction of Rogun dam upstream with a large reservoir will mitigate the impacts on Nurek and the rest of the Vakhsh cascade.

152. **Risk of COVID-19 Impact on the Project Schedule is Low**. As of end-April 2020, the COVID-19 impacts were limited to mobilization delays of some new contractors. The major contract for rehabilitation of three units has been progressing as per original schedule. If the situation in Tajikistan improves by September 2021, then Phase 1 and Phase 2 are not expected be materially impacted.

[28] Disclosure date of Jan. 29, 2017.
[29] The other high priority is Rogun HPP.

VII. RESULTS FRAMEWORK AND MONITORING

Results Framework

COUNTRY: Tajikistan

Nurek Hydropower Rehabilitation Project Phase 2

Project Development Objectives(s)

The objective of the Project is to rehabilitate and increase the generating capacity of six power generating units of Nurek HPP and improve their efficiency.

Project Development Objective Indicators

Indicator Name	PBC	Baseline	End Target
Rehabilitation of six units at Nurek HPP			
Generation capacity of energy constructed or rehabilitated (CRI, Megawatt)		0.00	2,010.00
Hydropower generation capacity rehabilitated under the project (CRI, Megawatt)		0.00	2,010.00
Estimated total annual electricity generation of six units included in the scope of the project (Gigawatt-hour (GWh))		7,500.00	9,623.00
Estimated increase of total annual electricity generation of rehabilitated units due to efficiency improvements (Gigawatt-hour (GWh))		0.00	198.00
People provided with new or improved electricity service (CRI, Number)		0.00	8,260,000.00
People provided with new or improved electricity service - Female (CRI, Number)		0.00	4,072,000.00

Intermediate Results Indicators by Components

Indicator Name	PBC	Baseline	End Target
Component 1: Rehabilitation of six generating units and purchase of machinery for Nurek HPP			
Cumulative number of generating units rehabilitated (Number)		0.00	6.00
Rehabilitation of Nurek bridge completed (Yes/No)		No	Yes
Procurement of machinery for Nurek HPP completed (Yes/No)		No	Yes
Avoided CO2 emissions during the project lifetime (Metric ton)		0	45
Component 2: Technical assistance			
Percentage of women employed by BT (Percentage)		11	17
Percentage of citizens who believe that the Project has established effective engagement processes (Text)		To be defined by the end of 2021	At least 75 percent

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Generation capacity of energy constructed or rehabilitated	This indicator measures the progress with rehabiltiation of generating units	Annual	Project implementation progress reports from PMC.	Review of implementation progress for rehabilitation of units	BT
Hydropower generation capacity rehabilitated under the project	This indicator measures the progress with rehabiltiation of generating units	Annual	Project implementation progress reports from PMC	Review of implementation progress for rehabilitation based on monthly reports from the Contractor	BT

Estimated total annual electricity generation of six units included in the scope of the project	This indicator measures the amount of electricity supplied by the six units of Nurek HPP, which were rehabilitated under the project, to the power transmission network	Annual	BT	Meter readings at Nurek HPP substation	BT
Estimated increase of total annual electricity generation of rehabilitated units due to efficiency improvements	This indicator measures the increase in total generation of rehabilitated units due to average efficiency increase of 2.74 percent	Annual	Actual efficiency of new units	BT	BT
People provided with new or improved electricity service	The indicator measures the number of people that have received improved electricity service due to Phase I of the project	Annual	UN Population Survey and Statistical Agency under the President of the Republic of Tajikistan	Regular reports on estimated total population of BT service area	BT
People provided with new or improved electricity service - Female	The indicator measures the number of females that have received improved electricity service due to Phase I of the project	Annual	UN Population Survey and Statistical Agency under the President of the Republic of Tajikistan.	Regular reports on estimated total population of BT service area.	BT

Monitoring & Evaluation Plan: Intermediate Results Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collecti	Responsibility for Data Collection
Cumulative number of generating units rehabilitated	This indicator measures the progress with rehabilitation of generating units under the project	Semi-annual	Project implementation progress reports from PMC	Review of implementation progress for rehabilitation based on monthly reports from the Contractor	BT

Rehabilitation of Nurek bridge completed	This indicator measures the progress with rehabilitation of the Nurek bridge	Semi-annual	Project implementation progress reports from PMC	Review of implementation progress for rehabilitation based on monthly reports from the Contractor	BT
Procurement of machinery for Nurek HPP completed	This indicator measures the progress with procurement of key machinery required for maintenance of Nurek HPP	Semi-annual	BT progress reports	BT progress reports	BT
Avoided CO2 emissions during the project lifetime	This indicator measures the CO2 emissions avoided during the useful lifetime of Nurek HPP given that substantial share of electricity from this project would have been replaced by coal and gas-fired generation if the project was not rehabilitated	Annual	The estimated emissions from replacing the annual electricity supply from Nurek HPP by specified combination of coal and gas-fired generation as per supply mix simulations under "without project" scenario in the economic analysis	The annual Nurek HPP generation number to be provided by BT	BT will carry out the computation
Percentage of women employed by BT	This indicator will measure the progress with closing gender gap in employment by BT	Annual	BT HR records	Internal database of employees	BT
Percentage of citizens who believe that the Project has established effective engagement processes	This indicator will monitor progress with citizen engagement activities	Annual	Survey	Survey	BT

ANNEX 1: Implementation Arrangements and Support Plan

COUNTRY: Tajikistan
Nurek Hydropower Rehabilitation Project Phase II

Strategy and Approach for Implementation Support

1. This Implementation Support Plan (ISP) for the Project describes how the Bank will assist the client in achieving the PDO of the project. In particular, the ISP places emphasis on accomplishing the following objectives: (a) providing necessary technical advice to the client and bringing international experience and good practices to promote successful implementation; (b) ensuring that project investments meet the Bank's technical standards; (c) oversight and capacity building support for BT and Nurek HPP staff; and (d) ensuring that the required fiduciary, social, and environmental safeguards are put in place and implemented according to the financing agreement and other project documents.

2. **Technical implementation support**. The Bank team will provide just-in-time implementation support to BT to address technical issues that may arise during the rehabilitation of the six generating units financed under the project, rehabilitation of the Nurek bridge, and rehabilitation of buildings at Nurek HPP site. The implementation support would include technical advice from hydropower specialist, hydro-mechanical specialist, power engineer, civil engineer, and road/bridge engineer. Technical implementation support missions will be carried out two times a year. The project team will also carry out site visits to Nurek HPP site.

3. **FM implementation support.** 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 quarterly IFRs as well as 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; 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.

4. **Procurement implementation support**. Implementation support activities are proposed based on the project procurement risks identified and include: providing procurement trainings for staff of implementing entity; prior/post review of procurement documents and providing timely feedback to BT; and providing detailed guidance on the Procurement Regulations; and monitoring procurement and contract management processes through STEP.

5. **Environmental and social**. The Bank's environmental and social specialists will provide regular support to BT in ensuring compliance with ESIA/ESMP for Nurek HPP, Nurek bridge rehabilitation EMP, checklist EMP documents for rehabilitation of buildings at Nurek HPP site, LMP, and SEP under the project. The Bank team will also provide guidance on resolution of safeguards issues and timely response and clarifications on safeguards related questions and issues.

Implementation Support Plan and Resource Requirements

6. The proposed implementation support requirements are described in Tables 1.1 and 1.2.

Table 1: Annex 1: Implementation Support Requirements.

Time	Focus	Skills Needed	Resource Estimate
From pre-effectiveness until completion of implementation (120 months)	• Coordination of the support and guidance to BT on technical, contract management, project implementation, E&S, FM and procurement issues. • Advice on technical issues related to rehabilitation of generating units and monitoring of rehabilitation works; • Advice on technical issues related to rehabilitation and refurbishment of the balance of the plant and monitoring of rehabilitation works; • Review of the technical specifications of the bidding documents for rehabilitation of the Nurek bridge and other buildings on the territory of Nurek HPP; • Advice on technical matters and monitoring of implementation of the rehabilitation works for the Nurek bridge and buildings at Nurek HPP site; • Review of the E&S requirements in procurement documents and overall implementation of E&S requirements; • Advise on procurement, financial management, and disbursement related matters; • Monitoring of implementation of E&S instruments under the project; • Guidance on implementation of citizen engagement and gender related activities. • Review of the compliance with financial covenants under the legal agreements.	• Project management; • Hydropower expert; • Hydro-mechanical expert; • Power engineer; • Road/transport engineer; • Civil engineer; • Procurement specialist; • Financial management specialist; • Financial officer/disbursements; • Environmental specialist; • Social specialist; • Gender specialist; • Financial analyst.	US$1,800,000

Table 2: Annex 1: Skills Mix Required.

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Team leader	140	30	Headquarter (HQ) based
Hydropower expert	100	20	International consultant
Hydro-mechanical expert	80	20	International consultant
Power engineer	40	10	HQ based
Road/transport engineer	20	4	International consultant
Civil engineer	10	2	International consultant
Procurement specialist	20	10	Region based
Financial management specialist	20	-	Country office based
Disbursement specialist	10	-	Region based
Environmental specialist	10	8	HQ based
Social specialist	15	8	HQ based
Gender specialist	10	4	HQ based
Financial analyst	20	8	Region based

ANNEX 2: Economic and Financial Analyses

COUNTRY: Tajikistan
Nurek Hydropower Rehabilitation Project Phase II

1. **Update of the economic analysis of the entire project**. The economic analysis of the entire project was updated considering the signed main contracts for rehabilitation of the electromechanical equipment and the balance of plant, rehabilitation of the hydromechanical equipment, replacement of autotransformers and the PMC costs. The dam safety capital costs were excluded from the update since this would be required even if the rehabilitation was not undertaken. The corresponding benefits of strengthening the dam safety of the Project were also excluded.

2. ***Economic costs of the entire project***. The base case values for updated economic costs include: (a) the contract price for rehabilitation of all nine units and the balance of plant inclusive, including the approved changer orders under Phase 1 and the agreed-upon change orders in Phase 2; (b) the capital cost of rehabilitation of buildings at Nurek HPP site; (c) the cost of machinery; (d) the contract price of six autotransformers; (e) the contract price of PMC; and (f) the incremental O&M costs associated with maintenance of the new equipment. The costs are disbursed according to the years in which they are expected to be incurred during the project construction period.[30]

3. ***Economic benefits of the entire project***. The update of the main economic benefits was necessary considering the changes in the power sector of Tajikistan since approval of Phase 1. Specifically, now the project is expected to generate not only benefits primarily in the form of increased winter supply (main benefit during appraisal of the Phase 1), but also summer supply due to increased exports to Afghanistan (from 1,100 GWh in 2016 to 1,500 in 2019) and commencement of exports to Uzbekistan (about 2,000 GWh in 2019) with potential expansion by another 1,000 GWh starting from 2022. Therefore, the main economic benefit of the Project was estimated as the avoided increase of meeting the projected electricity demand, inclusive of exports, under "without Project" and "with Project" scenarios. There will be a need for significant new capital expenditures to construct substitute generation capacity[31] to meet the projected electricity demand if Nurek HPP is not rehabilitated.

4. ***Results***: The updated economic analysis of the entire project yielded the following base case results: (a) economic NPV of US$2,083 million[32] and EIRR of 40 percent exclusive of the social cost of carbon; and (b) economic NPV of US$3,859 and EIRR of 44 percent inclusive of the social cost of carbon. In comparison, during appraisal of Phase 1, the entire Project was estimated to have: (a) economic NPV of US$1,615 million and EIRR of 36 percent exclusive of the social cost of carbon; and (b) economic NPV of US$2,077 million and EIRR of 40 percent inclusive of the social cost of carbon.

5. The improvement of the overall project economics for the base case exclusive of GHG reduction benefits was due to: (i) 40 percent lower base case estimated capital cost, based on the value of signed contracts,

[30] Project construction costs are not levelized over the operating life of the project.
[31] The high-level generation expansion planning analysis suggests that replacement capacity would be comprised of gas-fired generation (combined cycle gas turbines, gas turbines, and reciprocal internal combustion engines), coal CHPs, and Solar PV capacity.
[32] The updated economic discount rate/social opportunity cost of capital was estimated at 4.37 percent and computed consistent with the World Bank Guidance on Discounting Costs and Benefits in Economic Analysis of World Bank Projects, May 9, 2016.

compared to the estimates in the feasibility study; the actual cost was lower due to strong competition during procurement process and reduction of prices of some main commodity inputs (metals) used in the feasibility study estimates; (ii) larger avoided increase in the cost of meeting projected electricity demand due to revised base case assumptions for increase in exports compared to the values assumed during appraisal of Phase 1; the exports increased by 2,500 GWh between now and appraisal of Phase 1 and are expected to increase by another 1,000 GWh;[33] and (iii) lower discount rate (4.6 percent vs. 10 percent during appraisal of Phase 1) considering the long-term base case growth rate of real GDP and population.

6. ***GHG reduction benefits of the entire project***. The entire project will generate global environmental benefits in form of net reduction of CO2 emissions, which are estimated at 69 million tCO2e net reduction in emissions vs. the baseline during economic life of the project.[34]

7. ***Sensitivity analysis***. Sensitivity analysis was conducted to assess the robustness of the estimated economic returns of entire project to changes in the main evaluation variables. Sensitivity analysis covers the following cases that in turn stress test the economic returns to the project. The results of the sensitivity analysis suggest that the project remains economically viable even in case of substantial variation of main variables that affect its viability. Therefore, the sensitivity analysis was done only for results exclusive of benefits from social cost of carbon because the base case economic NPV and EIRR are even higher and the project would not become unviable under the stress-tested scenarios.

Annex 2: Table 1: Sensitivity Analysis for Economic Evaluation of Entire Project.

Exclusive of avoided CO2 emissions	NPV (million US$)	EIRR (%)
Base-case	**2,083**	**40**
a. Loss of generation capacity of each unrehabilitated unit delayed by 3 years and base case values for other variables[35]	886	12
b. 20 percent higher project construction cost and base case values for other variables	2,010	36
c. 10 percent lower-than-projected price of natural gas and coal under "without project" scenario and base case values for other variables	1,540	33
d. Simultaneous occurrence of a, b, and c	341	8

8. **Economic analysis of Phase 2**. The differences between the economic analysis of the Phase 2 and the entire project are the following: (a) lower economic cost due to rehabilitation of six generating units (out of nine), and (b) smaller avoided increase in the cost of meeting projected electricity demand in case six units are not rehabilitated under Phase 2. The remaining three units are assumed to be rehabilitated because Phase 1 is already under implementation.

9. ***Results***. The economic analysis of the Phase 2 yielded: (a) an economic NPV of US$660 million and EIRR of 20 percent exclusive of the social cost of carbon; and (b) economic NPV of US$1,774 million and EIRR of 27 percent inclusive of the social cost of carbon.

10. ***GHG reduction benefits for the Phase 2 of the project***. The Phase 2 will generate global environmental benefits in form of net reduction of CO2 emissions. Specifically, the Phase 2 will lead to 45 million tCO2e net reduction in emissions vs. the baseline during economic life of the project.

[33] Excludes planned CASA-1000 exports, which are unchanged.
[34] Assumed to be 35 years.
[35] Total loss of generation by 2033 instead of 2030 under base-case.

11. ***Sensitivity analysis***. Sensitivity analysis was conducted to assess the robustness of the estimated economic returns of entire project to changes in the main evaluation variables. Sensitivity analysis covers the following cases that in turn stress test the economic returns to the project. The results of the sensitivity analysis suggest that the project remains economically viable except for delayed loss of generation capacity and the low likelihood scenario when all variables simultaneously change as per sensitivity scenario (d). The delayed loss of generation capacity impacts viability because under that scenario the benefits in the form of avoided increase in electricity supply cost would start accruing in later years, which reduced the present value of such benefits. It should be noted that this is an unlikely scenario because the units have not been rehabilitated for almost 40 years and can fail at any time.

Annex 2: Table 2: Sensitivity Analysis for Economic Evaluation of Phase 2.

Exclusive of avoided CO2 emissions	NPV (million US$)	EIRR (%)
Base-case	**660**	**20**
a. Loss of generation capacity of each unrehabilitated unit delayed by 3 years and base case values for other variables	349	(3)
b. 20 percent higher project construction cost and base case values for other variables	628	18
c. 10 percent lower-than-projected price of natural gas and coal under "without project" scenario and base case values for other variables	366	-[36]
d. Simultaneous occurrence of a, b, and c	(701)	-[37]

12. **Update of the financial analysis of entire project**. The financial analysis of the entire project was updated considering the signed main contracts for rehabilitation of the electromechanical equipment and the balance of plant, rehabilitation of the hydromechanical equipment, replacement of autotransformers and the PMC costs. The dam safety capital costs were included in the update of the financial analysis because those are direct cash costs for BT.

13. ***Financial costs of the entire project***. The financial costs of the entire project include: (a) all economic costs inclusive of indirect taxes and both the physical and price contingencies; (b) the cost of dam safety measures; (c) the incremental financial cost of electricity supply; and (d) the incremental O&M costs of the project. The costs are projected according to the years in which they are expected to be incurred during the project construction period.

14. ***Financial benefits of the entire project***. The financial benefits of the entire project were estimated as the avoided reduction in cash revenues from domestic electricity sales and exports due to gradual loss of generation capacity of Nurek HPP. The estimates of avoided revenue reduction took into account electricity losses in the power system, including expected reduction trajectory, and the estimated billing and collection rates for electricity.

15. The avoided reduction of revenues from domestic sales was computed as the product of reduction in supply from Nurek HPP and projected average end-user electricity tariff adjusted for projected collection rates. The main changes in assumptions from Phase 1 include: (a) updated trajectory of domestic electricity tariff increases until 2026 consistent with the targets under the Program for Financial recovery of BT for 2019-2026; (b) increased exports to Afghanistan and Uzbekistan; and (c) revised targets for improvement of collection rates considering the updated progress and committed projects aimed at roll-out of AMI in eight

[36] EIRR was not computable because the stream of benefits was positive from the first year.
[37] Negative annual stream of economic benefits. Thus, computation of EIRR not possible.

large cities in Tajikistan. The avoided reduction of revenues from summer exports was computed as the product of reduction in supply from Nurek and forecast tariffs under Power Purchase Agreements (PPA), including those signed under CASA-1000.

16. ***Results***. The updated financial analysis of the entire project yielded a financial NPV of US$4,060 million[38] and FIRR of 33 percent. In comparison, during appraisal of Phase 1, the entire Project was estimated to have a financial NPV of US$25,156 million and FIRR of 23 percent. This result suggest that the project will have significant impact on precluding significant deterioration of financial viability of BT. Without the project, BT's revenues will significantly reduce exacerbating the financial difficulties of the company.

17. The estimated financial viability of the overall project improved due to: (a) expected tariff increases to reach full cost-recovery by 2026 and subsequent annual inflation-based adjustment of tariffs as per new tariff methodology allowing for cost recovery; and (b) projected larger exports to Afghanistan and Uzbekistan consistent with observed increase in exports in 2017-2019.

18. ***Sensitivity analysis***. Sensitivity analysis was conducted to assess the robustness of the estimated financial returns of entire project to changes in the main evaluation variables. Sensitivity analysis covers the following cases that in turn stress test the financial returns to the project. The results of the sensitivity analysis suggest that the project remains financially viable even in case of substantial variation of main variables that affect its viability.

Annex 2: Table 3: Sensitivity Analysis for Financial Evaluation of Entire Project.

	NPV (million US$)	FIRR (%)
Base-case	**4,060**	**33**
a. 20 percent higher project construction cost and base case values for other variables	3,940	28
a. 3 percent lower annual tariff increased compared to targets in the Program for Financial Recovery of BT (2019-2025) and base case values for other variables	2,379	33
b. Loss of generation capacity of each unrehabilitated unit delayed by three years and base case values for other variables	3,009	13
c. Simultaneous occurrence of a, b, and c	1,211	9

19. **Financial analysis of Phase 2**. The differences between the financial analysis of the Phase 2 and the entire project are the following: (a) lower capital and electricity supply cost due to rehabilitation of six generating units (out of nine), and (b) smaller avoided reduction in the cash revenues the cash revenues attributed to six units (out of nine) rehabilitated under Phase 2 are taken into account. The remaining three units are assumed to be rehabilitated because Phase 1 is already under implementation.

20. ***Results***. The financial analysis of the Phase 2 of the Project yielded a financial NPV of US$1,634 million[39] and an FIRR of 19 percent. This result suggest that the project will have significant impact on precluding significant deterioration of financial viability of BT. Without the project, BT's revenues will significantly reduce exacerbating the financial difficulties of the company

[38] The financial discount rate of 0.59 percent was estimated based on the expected cost of the capital for the Project considering the financing structure.
[39] The financial discount rate of 0.32 percent was estimated based on the expected cost of the capital for the Phase 2 considering the expected financing structure.

21. ***Sensitivity analysis***. Sensitivity analysis was conducted to assess the robustness of the estimated financial returns of Phase 2 to changes in the main evaluation variables. Sensitivity analysis covers the following cases that in turn stress test the financial returns to the project. The results of the sensitivity analysis suggest that the project is financially robust even in case of substantial variation of main variables that affect its viability.

Annex 2: Table 4: Sensitivity Analysis for Financial Evaluation of Phase 2.

	NPV (million US$)	FIRR (%)
Base-case	**1,634**	**19**
a. 20 percent higher project construction cost and base case values for other variables	1,582	17
b. 3 percent lower annual tariff increased compared to targets in the Program for Financial Recovery of BT (2019-2025) and base case values for other variables	713	17
c. Loss of generation capacity of each unrehabilitated unit delayed by three years and base case values for other variables	680	5
d. Simultaneous occurrence of a, b, and c	449	4

22. **Assessment of current financial performance of BT**. The financial condition of BT steadily deteriorated during the analyzed period of 2013-2019 due to: (a) unsustainable and increasing debt levels, (b) local currency depreciation, (c) low cash collections, and (d) below cost-recovery end-user electricity tariffs.

23. By the end of 2019, the financial debt[40] of BT reached US$2 billion, slightly more than the company's assets. It comprised of borrowings from international financial institutions (71.5 percent), Orienbank (11.4 percent), and interest payable (17.2 percent). The absence of corresponding debt service allowance in the tariffs and under-collection of receivables caused the company to fail to make full and timely principal and interest payments on its debt. Ensuing penalties on overdue borrowings amounted to TJS3,286 million (US$339 million).

24. The situation with trade payables, which account for about 14 percent of its total liabilities, also deteriorated. BT struggles to make payments to IPPs, Sangtuda-1 and Sangtuda-2 HPPs, in timely manner because the cost of electricity from those IPPs is higher than the end-user electricity tariff and those IPPs primarily supply electricity during the months of April-October (surplus energy season) when the other lower cost HPPs, owned by BT, can generated at significantly lower cost and spill water given low summer demand and lack of export opportunities.

25. As of Dec 31, 2019, current assets were 13 percent of TJS17,484 million (US$1,804 million) current liabilities. This is a significant reduction in the liquidity, as measured by the ratio of current assets to current liabilities, which was at 0.39 in 2013.

26. The devaluation of Tajik somoni, which lost about half of its value against the US dollar during the period of 2013-2019, and the lack of currency diversification of revenue sources and liabilities magnified the financial difficulties of BT. Revenues in dollar terms has been stagnant since 2013 and started to improve in 2018 supported by growth of dollar-priced exports, deceleration of the currency devaluation rate, and the annual tariff increases of 15 percent. In addition to Afghanistan and Kyrgyz Republic, the geography of electricity exports expanded to also include Uzbekistan doubling the export volume to 2,936 million kWh between 2017

[40] Financial debt includes interest-bearing financial liabilities and interest payable.

and 2019. Nevertheless, the Company still holds an uncovered foreign currency position[41] of more than TJS 22 billion.

Annex 2: Figure 1: Dynamics of BT's Debt & Revenues

Source: Corporate Financial Model of BT.

27. As of the end-2019, the collection rate for billed electricity was still below the industry average, at around 83.3 percent. The Company had 99 days receivables outstanding. The aluminum producer, TALCO, is the largest debtor to BT.

Annex 2: Table 52: Bill Collection Rates by Customer Categories in 2019.

Customer category	Bill collection rate
Industry	96.0%
TALCO	100.3%
Budgetary organizations, housing and communal enterprises and electric transport	82.0%
Pumps and pumping stations	38.0%
Residential consumers	78.7%
Average	**83.3%**

Source: Barqi Tojik.

28. End-user electricity tariffs remain below the cost-recovery levels, which do not allow the company to finance even the required recurrent expenditures. The expected average end-user tariff for 2020 is estimated at 50 percent of cost-recovery level. The cost-recovery tariff was assessed following the cash needs approach. This was done through assessment of the amount of cash revenue that BT requires to fully finance the recognized recurrent expenses (accrual-based items in the financial statements), which include the O&M costs, administrative costs, capital repairs from own funds, pension liabilities, debt service, and taxes. It also assumes gradual repayment of accrued liabilities (i.e. interest payables, overdue loans and payables to Sangtuda-1 and Sangtuda-2 HPPs for purchased electricity) over a ten-year period starting 2020. It should be noted that concept of cash-based cost of service is different from the concept of economically efficient cost of supply and does not take into account the return on invested capital and investments required to meet the long-run forecast electricity demand.

[41] Measured by the gap between foreign currency denominated financial assets and foreign currency denominated financial liabilities

Annex 2: Table 6: Cost-recovery Tariff Projections.

In TJS million	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Cash cost of sales	**2,140**	**2,359**	**2,527**	**2,817**	**3,038**	**3,279**	**3,540**	**3,823**	**4,126**	**4,459**	**4,821**
Cost of purchased electricity	1,485	1,610	1,745	1,895	2,057	2,233	2,426	2,636	2,865	3,115	3,387
Materials	357	437	454	577	620	665	714	766	817	877	941
Salary and related expenses	116	123	131	139	147	156	165	175	185	197	208
Taxes	51	51	51	51	51	51	51	51	51	51	51
Other	130	138	146	155	164	174	185	196	208	220	233
Cash selling expenses	**398**	**419**	**442**	**466**	**492**	**520**	**549**	**580**	**613**	**649**	**686**
Cash admin expenses	**89**	**91**	**92**	**94**	**96**	**98**	**100**	**102**	**104**	**107**	**109**
Finance costs	**2,422**	**2,462**	**2,951**	**3,050**	**3,344**	**3,587**	**1,884**	**1,586**	**1,220**	**1,203**	**1,232**
Current interest on MOF loans	350	231	258	281	294	281	243	201	166	153	151
Current interest on commercial loans	462	403	337	264	184	96	-	-	-	-	-
Current period principal repayment on MOF loans	586	593	621	694	725	759	831	538	601	576	585
Current period principal repayment on commercial loans	385	403	421	440	461	482	-	-	-	-	-
Repayment of overdue interest on MOF loans	317	331	346	362	379	396	414	433	453	474	496
Retirement of delinquent MOF loan principal	303	317	331	346	362	379	396	414	-	-	-
Retirement of overdue payables to Sangtuda-1,2	20	185	637	663	939	1,194	-	-	-	-	-
Profit	-	-	-	-	-	-	-	-	-	-	-
Required revenue	**5,049**	**5,331**	**6,012**	**6,427**	**6,971**	**7,484**	**6,073**	**6,092**	**6,063**	**6,417**	**6,847**
Cost recovery end-user tariff (diram/kWh)	*46.54*	*44.22*	*49.38*	*52.27*	*56.13*	*59.66*	*47.94*	*47.61*	*46.92*	*49.16*	*51.94*

Source: Corporate Financial Model of BT.

29. **Forecast of Financial Performance of BT**. Financial performance of BT was forecast based on the agreed-upon targets to be achieved by BT as reflected in the Action Plan for Financial Recovery, including increase of end-user average tariff, improvements in collection rates, and other efficiency improvements. The key assumptions for each of the forecast scenarios are presented below.

Projected Financial Performance of BT: Financial Recovery Scenario

30. Under this scenario, the projections of financial performance of BT were made on assumptions that:

(a) Bill collection rate will remain at 83 percent in 2020 and start increasing to reach 95 percent by 2026.

(b) Technical losses will reduce by 0.50 percentage point annually.

(c) Overdue receivables will be recovered.

(d) All grants on-lent by the Ministry of Finance to BT on credit terms will be converted to grants in 2020.

(e) In 2020, half of subsidiary agreements of BT with MOF will be revised to mirror the terms of borrowing by MOF from IFI, and the other half will be revised in 2021.

(f) Domestic supply of electricity will drop by 10% in 2020 due to depressed demand caused by COVID-19, recover to pre-COVID level in 2021, and increase by 1 percent thereafter.

(g) Exports to Afghanistan and Pakistan are forecast to increase by 2,800 GWh starting from 2023, when cross-border transmission facilities with Afghanistan and Pakistan under CASA-1000 project become operational.

(h) Electricity will be sold to Afghanistan and Pakistan at marginal prices of USc5.11/kWh and USc5.16/kWh respectively.

(i) The following volumes and tariffs for exports to Uzbekistan:

Annex 2: Table 7: Cost-recovery Tariff Projections.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Volume (GWh)	2,000	2,500	3,000	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200
Tariff (USc/kWh)	0.025	0.026	0.027	0.028	0.028	0.028	0.028	0.028	0.028	0.028	0.028

(j) BT will purchase 2,600 GWh of electricity from Sangtuda-1 and Sangtuda-2.

(k) Prices of electricity purchased from Sangtuda-1 and Sangtuda-2 will growth at annual rate of 4 percent and 5 percent respectively.

(l) BT will purchase up to 2,000 GWh of electricity from Rogun HPP at US$ 0.0246/kWh.

(m) The exchange rate of Tajik somoni against US dollar will change by the differential between Tajik and US inflation rate in accordance with PPP approach.

(n) The BT will not accumulate new penalties on overdue loans.

31. Increase of end-user tariffs, gradual improvement of collection rates, more efficient working capital management and reduction of technical losses will help BT generate more cash from operations. EBITDA margin will increase to 45 percent by 2030, and the liquidity will improve. Revision of on-lending term of the Ministry of Finance will reduce the debt service costs of the BT and free up additional cash for repayment of its overdue liabilities. Commencement of electricity exports under CASA-1000 project will also significantly contribute to improvement of financial standing of BT starting from 2023. The exports will increase from current level of 2,936 GWh to more than 5,900 GWh per year, including the existing exports to Afghanistan, Pakistan, and Uzbekistan. BT will gradually repay its current and overdue financial liabilities using incremental operating cash flows from financial recovery measures. It is estimated that by 2028 BT will have fully repaid its overdue debt (principal plus interest) to Ministry of Finance, overdue payables to Sangtuda-1 and Sangtuda-2 and the commercial debt. As a result, by the end of 2030 the debt-to-assets ratio will have come down to 0.63, net debt (i.e. total financial debt net of cash balance) will stand at 2 time EBITDA[42], and operating cash flow will be more than 5 times its debt service requirements (DSCR).

[42] A proxy for operating cash flow.

Annex 2: Table 8: Projected Impact of Financial Recovery Measures.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1. Tariff increase	15%	15%	8%	8%	8%	8%	6%	6%	6%	6%	6%
Additional cash flow, TJS million	**325.6**	**674.2**	**889.2**	**1,086.5**	**1,302.9**	**1,540.1**	**1,751.3**	**1,965.9**	**2,196.5**	**2,444.4**	**2,710.7**
2. Collection improvement	83%	85%	87%	89%	91%	93%	95%	95%	95%	95%	95%
Additional cash flow, TJS million	**-**	**74.3**	**162.1**	**265.2**	**385.8**	**526.0**	**675.8**	**723.5**	**774.5**	**829.2**	**887.8**
3. Reduction of receivables for supplied electricity	155	164	173	125	103	74	70	70	71	71	71
Additional cash flow, TJS million	**97.7**	**192.3**	**406.0**	**602.6**	**774.5**	**912.4**	**356.6**	**274.7**	**294.1**	**314.9**	**337.1**
4. Reduction of technical losses by 0.5p.p. per annum	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%	0.50%
Additional cash flow, TJS million	**2.5**	**5.3**	**8.0**	**11.3**	**15.0**	**19.1**	**23.8**	**29.1**	**35.1**	**41.8**	**49.2**
5. Additional cash flow from revision of interest rates on sub-loans from MOF, TJS million	**96.0**	**330.5**	**349.6**	**367.7**	**389.7**	**421.7**	**419.4**	**349.0**	**278.9**	**216.7**	**125.3**
6. Additional cash flow from conversion of MOF loans to grants, TJS million	**220.9**	**159.0**	**184.1**	**192.5**	**201.6**	**211.2**	**229.4**	**258.1**	**267.6**	**255.1**	**251.6**
Total cash flow, TJS million	**742.8**	**1,435.7**	**1,999.1**	**2,526.0**	**3,069.4**	**3,630.5**	**3,456.2**	**3,600.3**	**3,846.7**	**4,102.1**	**4,361.7**
Cumulative cash flow, TJS million	**742.8**	**2,178.5**	**4,177.7**	**6,703.7**	**9,773.1**	**13,403.6**	**16,859.9**	**20,460.1**	**24,306.9**	**28,408.9**	**32,770.7**

Source: Corporate Financial Model of BT.

Annex 2: Table 9: Project Repayment Schedule for Payables and Debts under Financial Recovery Scenario.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Current payables to Sangtudas-1 and 2	817	1,299	1,419	1,554	1,700	1,861	2,036	2,228	2,438	2,669	2,921
Overdue payables to Sangtudas-1 and 2	22	199	689	730	1,022	1,294	-	-	-	-	-
Interest on commercial loans	462	193	-	-	-	-	-	-	-	-	-
Retirement of commercial loans	1,386	966	-	-	-	-	-	-	-	-	-
Current interest on MOF debt	-	189	543	429	294	281	243	201	166	153	151
Repayment of overdue interest on MOF debt	-	-	-	2,120	1,949	-	-	-	-	-	-
Repayment of MOF debt principal due	-	-	-	-	444	2,521	3,395	1,175	601	576	585
Retirement of overdue MOF debt	-	-	-	-	-	-	-	2,150	1,217	-	-
Total payments, TJS million	**2,687**	**2,846**	**2,651**	**4,833**	**5,410**	**5,957**	**5,674**	**5,754**	**4,422**	**3,397**	**3,656**

Source: Corporate Financial Model of BT.

Annex 2: Table 10: Projected Financial Ratios under Financial Recovery Scenario.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Gross margin	28%	38%	35%	52%	52%	52%	51%	51%	50%	49%	49%
EBITDA margin	24%	34%	31%	49%	49%	49%	48%	47%	46%	45%	45%
Current ratio	0.17x	0.18x	0.21x	0.23x	0.25x	0.27x	0.35x	0.55x	1.13x	1.87x	2.62x
Debt-to-assets	1.28x	1.28x	1.29x	1.23x	1.17x	1.09x	1.01x	0.90x	0.79x	0.71x	0.63x
DSCR	0.00x	0.14x	0.13x	0.27x	0.32x	0.39x	0.49x	0.79x	1.87x	5.11x	5.26x

Source: Corporate Financial Model of BT.

Annex 2: Table 11: Projected Balance Sheet of BT.

In TJS thousand	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
ASSETS											
Non-current assets											
PP&E	15,558,610	16,018,803	16,477,002	16,234,001	16,127,633	16,049,750	15,868,715	15,715,339	15,589,480	14,978,128	14,390,750
Intangible assets	11,323	11,323	11,323	11,323	11,323	11,323	11,323	11,323	11,323	11,323	11,323
Non-current advances paid	1,397,215	1,397,215	1,397,215	1,397,215	1,397,215	1,397,215	1,397,215	1,397,215	1,397,215	1,397,215	1,397,215
Non-current investments	182,400	182,400	182,400	182,400	182,400	182,400	182,400	182,400	182,400	182,400	182,400
Deferred tax assets	-	-	-	-	-	-	-	-	-	-	-
Other non-current assets	122	122	122	122	122	122	122	122	122	122	122
Total non-current assets	**17,149,670**	**17,609,862**	**18,068,062**	**17,825,061**	**17,718,693**	**17,640,810**	**17,459,775**	**17,306,399**	**17,180,540**	**16,569,188**	**15,981,810**
Current assets											
Inventory	712,350	778,030	829,066	912,266	974,274	1,042,216	1,115,713	1,195,275	1,280,482	1,372,951	1,472,007
Trade and other accounts receivable	1,469,993	1,967,689	2,109,423	2,273,377	2,005,822	1,540,488	1,537,152	1,640,153	1,738,887	1,855,598	1,980,079
Advances paid	12,581	12,581	12,581	12,581	12,581	12,581	12,581	12,581	12,581	12,581	12,581
Tax prepayments	-	-	-	-	-	-	-	-	-	-	-
Cash and cash equivalents	453,019	291,531	554,160	349,365	343,467	320,333	170,051	155,650	1,766,276	4,766,451	7,902,626
Total current assets	**2,647,942**	**3,049,831**	**3,505,230**	**3,547,588**	**3,336,144**	**2,915,617**	**2,835,497**	**3,003,659**	**4,798,226**	**8,007,580**	**11,367,293**
TOTAL ASSETS	**19,797,612**	**20,659,693**	**21,573,292**	**21,372,649**	**21,054,836**	**20,556,426**	**20,295,272**	**20,310,058**	**21,978,766**	**24,576,768**	**27,349,103**
LIABILITIES AND EQUITY											
Equity											
Share capital	751,751	751,751	751,751	751,751	751,751	751,751	751,751	751,751	751,751	751,751	751,751
Foreign exchange difference from translation of foreign subsidiaries	-	-	-	-	-	-	-	-	-	-	-
PP&E revaluation reserve	3,745,360	3,745,360	3,745,360	3,745,360	3,745,360	3,745,360	3,745,360	3,745,360	3,745,360	3,745,360	3,745,360
Reserve capital	24,302	24,302	24,302	24,302	24,302	24,302	24,302	24,302	24,302	24,302	24,302
Accumulated deficit	(9,996,134)	(10,330,696)	(10,679,507)	(9,461,548)	(8,013,098)	(6,307,768)	(4,632,781)	(2,415,290)	7,376	2,642,144	5,462,376
TOTAL EQUITY	**(5,474,721)**	**(5,809,283)**	**(6,158,094)**	**(4,940,135)**	**(3,491,685)**	**(1,786,356)**	**(111,368)**	**2,106,123**	**4,528,789**	**7,163,557**	**9,983,789**
Non-current liabilities											
Non-current borrowed funds	7,972,379	7,867,460	8,682,177	8,801,718	9,025,831	9,226,866	9,913,553	10,280,016	10,709,459	10,642,584	10,546,642
Deferred income non-current portion	1,629,734	1,961,605	2,105,505	2,242,375	2,366,851	2,480,761	2,480,761	2,480,761	2,480,761	2,480,761	2,480,761

In TJS thousand	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Deferred tax liability											
Non-current trade and other payables	-	-	-	-	-	-	-	-	-	-	-
Total non-current liabilities	**9,602,113**	**9,829,065**	**10,787,682**	**11,044,093**	**11,392,681**	**11,707,627**	**12,394,314**	**12,760,776**	**13,190,220**	**13,123,345**	**13,027,402**
Current liabilities											
Trade and other accounts payable	4,630,821	4,553,537	4,022,262	3,452,962	2,589,793	1,440,989	1,459,008	1,477,853	1,497,562	1,518,175	1,539,733
Advances received	1,044,046	1,044,046	1,044,046	1,044,046	1,044,046	1,044,046	1,044,046	1,044,046	1,044,046	1,044,046	1,044,046
Taxes payable	1,113,459	1,112,741	1,111,990	1,111,205	1,110,385	1,108,026	1,066,511	1,065,572	1,064,590	1,063,563	1,062,489
Income tax payable	10,522	10,522	10,522	10,522	10,522	10,522	10,522	10,522	10,522	10,522	10,522
Current borrowed funds	8,818,886	9,866,580	10,702,398	9,597,470	8,346,609	6,979,085	4,379,752	1,792,679	590,551	601,074	628,636
Deferred income current portion	-	-	-	-	-	-	-	-	-	-	-
Other payables and accrued expenses	52,486	52,486	52,486	52,486	52,486	52,486	52,486	52,486	52,486	52,486	52,486
Total current liabilities	**15,670,219**	**16,639,911**	**16,943,704**	**15,268,691**	**13,153,840**	**10,635,155**	**8,012,326**	**5,443,158**	**4,259,757**	**4,289,866**	**4,337,912**
TOTAL LIABILITES	**25,272,333**	**26,468,976**	**27,731,386**	**26,312,784**	**24,546,522**	**22,342,782**	**20,406,639**	**18,203,935**	**17,449,977**	**17,413,211**	**17,365,314**
TOTAL EQUITY AND LIABILITIES	**19,797,612**	**20,659,693**	**21,573,292**	**21,372,649**	**21,054,836**	**20,556,426**	**20,295,272**	**20,310,058**	**21,978,766**	**24,576,768**	**27,349,103**

Annex 2: Table 12: Projected Income Statement of BT.

In TJS thousand	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Revenue											
Domestic	2,530,848	3,233,862	3,527,497	3,847,793	4,197,173	4,578,276	4,901,502	5,247,549	5,618,025	6,014,658	6,439,293
Export	934,084	1,140,354	918,987	2,766,042	2,892,212	3,024,137	3,162,067	3,306,301	3,367,125	3,521,520	3,682,995
Total revenue	**3,464,933**	**4,374,215**	**4,446,484**	**6,613,835**	**7,089,385**	**7,602,414**	**8,063,569**	**8,553,849**	**8,985,150**	**9,536,178**	**10,122,288**
Cost of sales											
Depreciation of fixed assets	(360,362)	(371,833)	(382,647)	(385,181)	(381,068)	(378,898)	(375,849)	(371,911)	(368,623)	(359,942)	(345,827)
Cost of purchased electricity	(1,485,233)	(1,610,222)	(1,744,976)	(1,894,897)	(2,056,800)	(2,233,419)	(2,425,967)	(2,635,922)	(2,864,903)	(3,114,681)	(3,387,194)
Materials	(357,249)	(436,513)	(454,385)	(577,314)	(619,538)	(664,864)	(713,523)	(765,759)	(816,874)	(876,734)	(941,002)
Salary and related expenses	(116,333)	(123,313)	(130,712)	(138,555)	(146,868)	(155,680)	(165,021)	(174,922)	(185,417)	(196,542)	(208,335)
Taxes	(50,717)	(50,717)	(50,717)	(50,717)	(50,717)	(50,717)	(50,717)	(50,717)	(50,717)	(50,717)	(50,717)
Other	(130,288)	(138,105)	(146,392)	(155,175)	(164,486)	(174,355)	(184,816)	(195,905)	(207,660)	(220,119)	(233,326)
Total cost of sales	**(2,500,182)**	**(2,730,704)**	**(2,909,829)**	**(3,201,839)**	**(3,419,475)**	**(3,657,933)**	**(3,915,892)**	**(4,195,136)**	**(4,494,194)**	**(4,818,736)**	**(5,166,401)**
Gross margin	**964,750**	**1,643,512**	**1,536,654**	**3,411,996**	**3,669,910**	**3,944,481**	**4,147,677**	**4,358,713**	**4,490,957**	**4,717,443**	**4,955,887**
Selling expenses											
Depreciation of fixed assets	(242,243)	(249,953)	(257,223)	(258,926)	(256,161)	(254,703)	(252,653)	(250,006)	(247,796)	(241,960)	(232,472)
Salary and related expenses	(208,774)	(221,300)	(234,578)	(248,653)	(263,572)	(279,387)	(296,150)	(313,919)	(332,754)	(352,719)	(373,882)
Allowance for doubtful AR	-	-	-	-	-	-	-	-	-	-	-
Inventories	(91,996)	(98,367)	(105,180)	(112,465)	(120,254)	(128,583)	(137,489)	(147,011)	(157,193)	(168,080)	(179,722)
Allowance for doubtful advances	-	-	-	-	-	-	-	-	-	-	-
Service expenses	(44,936)	(47,632)	(50,490)	(53,520)	(56,731)	(60,135)	(63,743)	(67,567)	(71,621)	(75,919)	(80,474)
Other	(51,797)	(51,797)	(51,797)	(51,797)	(51,797)	(51,797)	(51,797)	(51,797)	(51,797)	(51,797)	(51,797)
Total selling expense	**(639,745)**	**(669,050)**	**(699,269)**	**(725,361)**	**(748,515)**	**(774,604)**	**(801,831)**	**(830,300)**	**(861,161)**	**(890,475)**	**(918,346)**
G&A expenses											
Fines and penalties on taxes	-	-	-	-	-	-	-	-	-	-	-
Taxes other than income tax	(44,519)	(44,519)	(44,519)	(44,519)	(44,519)	(44,519)	(44,519)	(44,519)	(44,519)	(44,519)	(44,519)
Salary and related expenses	(22,499)	(23,849)	(25,280)	(26,797)	(28,404)	(30,109)	(31,915)	(33,830)	(35,860)	(38,012)	(40,292)
Professional expenses	(3,066)	(3,250)	(3,445)	(3,652)	(3,871)	(4,103)	(4,350)	(4,611)	(4,887)	(5,180)	(5,491)
Depreciation of fixed assets	(9,461)	(9,762)	(10,046)	(10,112)	(10,004)	(9,947)	(9,867)	(9,764)	(9,677)	(9,450)	(9,079)

In TJS thousand	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Commission of the bank	(198)	(198)	(198)	(198)	(198)	(198)	(198)	(198)	(198)	(198)	(198)
Other	(18,909)	(18,909)	(18,909)	(18,909)	(18,909)	(18,909)	(18,909)	(18,909)	(18,909)	(18,909)	(18,909)
Total G&A expense	**(98,652)**	**(100,487)**	**(102,397)**	**(104,187)**	**(105,906)**	**(107,785)**	**(109,758)**	**(111,830)**	**(114,051)**	**(116,268)**	**(118,488)**
Operating margin	**226,353**	**873,974**	**734,989**	**2,582,448**	**2,815,489**	**3,062,092**	**3,236,087**	**3,416,582**	**3,515,745**	**3,710,700**	**3,919,053**
Net loss on foreign exchange operations	**(1,156,323)**	**(773,526)**	**(816,502)**	**(891,921)**	**(846,460)**	**(799,091)**	**(745,300)**	**(657,281)**	**(555,126)**	**(519,349)**	**(516,403)**
Finance income											
Amortization of discount on loans	-	-	-	-	-	-	-	-	-	-	-
Write-off/grant conversion of MOF loan	8,168,886	(5,520)	(5,773)	(6,038)	(6,315)	(18,141)	(319,346)	(7,224)	(7,555)	(7,901)	(8,264)
Finance expenses											
Interest expense	(822,852)	(429,491)	(261,525)	(284,536)	(297,829)	(284,711)	(246,169)	(203,237)	(168,390)	(154,980)	(152,740)
Penalties on loans	-	-	-	-	-	-	-	-	-	-	-
Amortization of front-end fee commission	-	-	-	-	-	-	-	-	-	-	-
Amortization of discount on borrowed funds	-	-	-	-	-	-	-	-	-	-	-
Total financial expenses	**(822,852)**	**(429,491)**	**(261,525)**	**(284,536)**	**(297,829)**	**(284,711)**	**(246,169)**	**(203,237)**	**(168,390)**	**(154,980)**	**(152,740)**
Profit before tax	**6,416,064**	**(334,562)**	**(348,811)**	**1,399,953**	**1,664,885**	**1,960,149**	**1,925,273**	**2,548,840**	**2,784,673**	**3,028,469**	**3,241,646**
Tax expense	**(834,088)**	**-**	**-**	**(181,994)**	**(216,435)**	**(254,819)**	**(250,286)**	**(331,349)**	**(362,008)**	**(393,701)**	**(421,414)**
Net income	**5,581,976**	**(334,562)**	**(348,811)**	**1,217,959**	**1,448,450**	**1,705,330**	**1,674,988**	**2,217,491**	**2,422,666**	**2,634,768**	**2,820,232**

Annex 2: Table 13: Projected Cash Flow Statement of BT.

In TJS thousand	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Cash flow from operating activities											
Net income	5,581,976	(334,562)	(348,811)	1,217,959	1,448,450	1,705,330	1,674,988	2,217,491	2,422,666	2,634,768	2,820,232
Adjustments to net income:											
Depreciation	612,066	631,548	649,916	654,220	647,233	643,548	638,369	631,681	626,096	611,352	587,378
Net loss from change in FX rate	1,156,323	773,526	816,502	891,921	846,460	799,091	745,300	657,281	555,126	519,349	516,403
Write-off/grant conversion of MOF loan	(8,168,886)	5,520	5,773	6,038	6,315	18,141	319,346	7,224	7,555	7,901	8,264
Interest expense	822,852	429,491	261,525	284,536	297,829	284,711	246,169	203,237	168,390	154,980	152,740
Change in working capital:											
(Increase)/Decrease in receivables	(385,706)	(497,696)	(141,734)	(163,954)	267,555	465,334	3,336	(103,001)	(98,734)	(116,711)	(124,480)
(Increase)/Decrease in taxes payable	1,061,955	(718)	(751)	(785)	(821)	(2,358)	(41,515)	(939)	(982)	(1,027)	(1,074)
(Increase)/Decrease in inventory	249,806	(65,680)	(51,036)	(83,199)	(62,009)	(67,941)	(73,498)	(79,562)	(85,207)	(92,468)	(99,057)
Increase/(Decrease) in payables	493,378	(77,284)	(531,274)	(569,301)	(863,169)	(1,148,804)	18,019	18,845	19,709	20,613	21,558
Cash flow from operating activities	**1,423,764**	**864,145**	**660,110**	**2,237,436**	**2,587,843**	**2,697,051**	**3,530,513**	**3,552,257**	**3,614,620**	**3,738,757**	**3,881,963**
Cash flow from investing activities											
Purchase of PP&E and intangible assets	(1,126,000)	(1,091,741)	(1,108,115)	(411,220)	(540,864)	(565,665)	(457,335)	(478,305)	(500,237)	-	-
Cash flow from investing activities	**(1,126,000)**	**(1,091,741)**	**(1,108,115)**	**(411,220)**	**(540,864)**	**(565,665)**	**(457,335)**	**(478,305)**	**(500,237)**	**-**	**-**
Cash flow from financing activities											
MOF loans received	1,135,551	1,100,572	1,116,898	415,179	546,498	571,557	463,497	484,750	506,978	-	-
MOF loans repaid	-	-	-	-	(450,318)	(2,555,277)	(3,440,789)	(3,369,866)	(1,842,344)	(583,602)	(593,048)
Repayment of overdue interest on MOF loans	-	-	-	(2,148,745)	(1,975,704)	-	-	-	-	-	-
Repayment of current interest on MOF loans	-	(191,745)	(550,163)	(434,317)	(297,829)	(284,711)	(246,169)	(203,237)	(168,390)	(154,980)	(152,740)
Commercial loans received	-	-	-	-	-	-	-	-	-	-	-

In TJS thousand	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Commercial loans repaid	(1,404,983)	(978,825)	-	-	-	-	-	-	-	-	-
Repayment of current interest on commercial loans	(468,179)	(195,765)	-	-	-	-	-	-	-	-	-
Grants received under P4R	622,677	331,871	143,900	136,870	124,475	113,910	-	-	-	-	-
Cash flow from financing activities	**(114,933)**	**66,109**	**710,635**	**(2,031,012)**	**(2,052,877)**	**(2,154,520)**	**(3,223,461)**	**(3,088,352)**	**(1,503,756)**	**(738,582)**	**(745,788)**
Net cash flow	**182,831**	**(161,487)**	**262,629**	**(204,796)**	**(5,898)**	**(23,134)**	**(150,282)**	**(14,401)**	**1,610,626**	**3,000,175**	**3,136,175**
Cash balance in the beginning of the period	270,188	453,019	291,531	554,160	349,365	343,467	320,333	170,051	155,650	1,766,276	4,766,451
Cash balance at the end of the period	**453,019**	**291,531**	**554,160**	**349,365**	**343,467**	**320,333**	**170,051**	**155,650**	**1,766,276**	**4,766,451**	**7,902,626**