Report on

Information-Sharing and Consultation Meeting of Riparian Governments on the Updated Environmental and Social Impact Assessment of the Rogun Hydropower Project

November 2023

Prepared by

Project Management Group for Energy Facilities Construction
Under the President of the Republic of Tajikistan

WSP UK Limited

Contents

Acronyms

AIIB	Asian Infrastructure Investment Bank
CHMP	Cultural Heritage Management Plan
CIA	Cumulative Impact Assessment
CSO	Civil Social Organization
DFZ	Directorate of Flooding Zone of Rogun HPP
DSPoE	Dam Safety Panel of Experts
E&S	Environmental & Social

EDS	Engineering and Dam Safety
ESF	Environmental Social Framework
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESPoE	Environmental and Social Panel of Experts
ESS	Environmental and Social Standards
FSL	Full Supply Level
GIIP	Good International Industry Practice
GRM	Grievance Redress Mechanism
GBV	Gender Based Violence
HPP	Hydropower Project
JSC	Joint Stock Company
LRP	Livelihood Restoration Plan
MW	Megawatt
PMC	Project Management Consultant
PMF	Probable Maximum Flood
PMG	Project Management Group for Energy Facilities Construction under the President of the Republic of Tajikistan
PPA	Power Purchase Agreements
RA	Resettlement Audit
RAP	Resettlement Action Plan
SCI ICWC	Scientific Information Center of the Interstate Commission for Water Coordination
RPF	Resettlement Policy Framework
TEAS	Techno-Economic Assessment Study
ToR	Terms of Reference
UN	United Nations
UNRCCA	UN Regional Centre for Preventive Diplomacy for Central Asia
USD	United States Dollar
WB	World Bank

1. Introduction

On November 8, 2023, the World Bank initiated a Sixth Information-Sharing and Consultation Meeting with the Riparian Governments to seek riparian input on the concluding 2023 Updated Environmental and Social Impact Assessment (ESIA) prepared by WSP UK Limited.

The Rogun Hydropower Project (HPP) has a long history, a summary of project milestones until 2014:

- **1967**: A series of site investigations and field studies were conducted for the commencement of the Project.
- **1972**: Rogun HPP site investigations and field studies were revised on the commencement of the operation of downstream Nurek HPP.
- **1977**: Construction activities commenced at the Rogun HPP site.
- **1977**: Completion of geological and geotechnical investigations.
- **1980**: Final approval for Rogun HPP is given.
- **1982**: Construction of Rogun HPP commences with the main parts of the underground works and a 45-metre-high cofferdam.
- **1992**: Construction halts due to the collapse of the Soviet Union and a civil war in Tajikistan.
- **1993**: The diversion tunnels clogged, and the cofferdam overtopped and destroyed by flooding.
- **1995**: Further damage to the Project infrastructure caused by an earthquake
- **2002**: Construction commences, but halts again in 2009 pending the finalization of the technical, economic, and environmental and social studies (TEAS).
- **2009**: Hydro project Institute of Moscow (HPI) is commissioned to complete design of HPP.
- **2014**: International tender for procurement of contractors for main contract lots and ongoing construction of the Project
- **2014**: ESIA and TEAS 2014 studies completed.

2. 2014 Technical, Economic, and Environmental Assessment Studies

From 2011 To 2014, the WB provided financing to assess the technical, environmental, and social aspects of the Project. In 2014, an ESIA, an Environmental and Social Management Plan (ESMP), a Resettlement Policy Framework (RPF), a Phase 1 Resettlement Action Plan (RAP 1), and a Livelihood Restoration Plan (LRP) were prepared by Pöyry Energy Limited.

In August 2014, the WB Environmental & Social Panel of Experts (E&S PoE) prepared their final report to conclude the work undertaken since 2011. In the stated period, the E&S PoE visited the site, prepared ten reports, made presentations during regional consultations in 2011, 2013 and 2014, and interacted closely with the Government of Tajikistan, the WB, the ESIA and TEAS Consultants and the Engineering and Dam Safety (DSPoE). In their final report, the E&S PoE concluded that the final draft ESIA '*is of acceptable international standard, and subject to some comments on key issues raised in the present report the Panel agrees with the overall conclusion and recommendations made in the ESIA'*.

3. 2014 Consultations on Assessment Studies

Over the course of four years, five consultation periods were held to review interim findings of the Assessment Studies. The riparian government and civil society representatives raised questions and provided comments on a wide range of issues.

The Fifth Information Sharing and Consultation meetings were held on June 16, 2014, to July 29, 2014, and attended by all six riparian countries (Afghanistan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan), with 67 government officials participating.

Similarly, CSO discussions connected 46 civil society representatives in-person and video-conference, and 96 members of the donor and diplomatic community registered to be briefed on the main conclusions. The meetings also welcomed two formal observers: the Scientific Information Center of the Interstate Commission for Water Coordination (SIC ICWC) and the UN Regional Centre for Preventive Diplomacy for Central Asia (UNRCCA).

Several issues were discussed in previous consultations and are detailed in previous consultation reports (available online). A summary of comments from the 2014 Consultations can be found in **Table 1**, with full detailed comments and responses presented within the *Report on 5th Riparian Information-Sharing and Consultation Process on the Assessment Studies of a Proposed Rogun Hydropower Project* found in **Annex 1**.

Table 1 – Summary of comments from 5th Riparian Information-Sharing and Consultation Meetings

Comments	Responses
Seismicity	
Participants raised concerns regarding whether the proposed dam has been assessed against the possibility of a major earthquake.	The consultants confirmed that the assessment has used the Maximum Credible Earthquake metric as the design criterion.
Sedimentation and Mud Flows	
Participants raised two possible management measures regarding dam safety risk: watershed management to reduce sediment inflows and measures to prevent the impact of Obishur mudflows.	It was noted that although there have been some successes internationally in mitigating sediment inflows into reservoirs (through actions such as reforestation and improved agricultural practices) such watershed management is not a viable solution in the Vakhsh basin to materially reduce the large volume of sediment inflow.
Flood Management	
Participants noted the change in design criteria to meet the Probable Maximum Flood (PMF) standard common in modern international dam design	The consultation discussion noted that the design approach adopted for the Rogun project is to manage the PMF to limit downstream releases to the flood-handling capacity of the downstream cascade. The two higher Rogun alternatives (1290 FSL and 1255 FSL) have sufficient reservoir storage capacity to achieve this. For the 1220 FSL Rogun alternative and for the No-Rogun scenario, measures to protect the downstream cascade against the PMF would need to be provided.
Downstream Water Flows	
Participants raised concerns regarding the implication for downstream water flows, particularly regarding the transfer of water from summer to winter. Downstream riparian nations highlighted the dependence of economies and livelihoods on adequate summer flows for agriculture and	For the operational phase of the Rogun project, the Government of Tajikistan has stated its commitment to abide by existing agreements and practices related to water allocations, and thus limit the transfer of water from the vegetative season inflows at Rogun to the non-vegetative season releases downstream of Nurek to 4.2 km³. This is the quantity currently transferred by the annual operation regime of the Nurek reservoir, and this operational regime is in line with the decisions of the Interstate

Comments	Responses
managed winter flows to prevent flooding.	Commission on Water Coordination (ICWC). Several stakeholders identified the need to develop rules for operating the cascades that are agreed by all riparian nations. The riparian countries could initiate discussions on an appropriate institutional arrangement for monitoring reservoir operation to ensure compliance with the prescribed operating regime.
Economic Feasibility	
Participants also raised several questions regarding the economic feasibility of the proposed project and inquired as to the range of alternative sources of energy that were considered.	The least-cost study considered all possible generation options for Tajikistan, including storage and run-of-river hydro projects, generation based on domestic coal, import of electricity, import of gas for gas-fired generation and urban space heating, etc.
Resettlement	
Participants raised concerns about the extensive potential resettlement of up to 42,000 people	The consultants and World Bank team described the World Bank Operational Policy 4.12, which is based on international standards, and was used for this study. The Policy is based on a number of key principles: (i) that resettlement should be avoided or minimized to the degree possible taking into consideration alternative project designs; (ii) where it is not feasible to avoid resettlement, resettlement activities should be conceived as sustainable development programs and (iii) displaced persons should be assisted in their efforts to improve their livelihoods or at least to restore them to predisplacement levels. Although resettlement can have negative impacts if not implemented properly, resettlement is sometimes necessary to accommodate development projects that can help meet poverty reduction goals. The preparation of a resettlement audit (RA), resettlement action plan (RAP), and resettlement policy framework (RPF) -- the core documents for resettlement in the ESIA -- provide the planning and implementation documents consistent with international standards. The RAP, RPF, and RA outline good international practice and specific remedial actions for previously affected communities, including some retroactive actions for people who have already been resettled. This includes grievance measures and monitoring to ensure people have an appropriate mechanism for raising concerns. The Government of Tajikistan has expressed its commitment to meet international good practice for Rogun resettlement should the project proceed.

Annex 1. Report on 5th Riparian Information-Sharing and Consultation Process on the Assessment Studies of a Proposed Rogun Hydropower Project - June 16 – July 29, 2014

4. Project Development Since 2014

Current Works

Since the 2014 ESIA and TEAS studies were completed, construction of Rogun HPP commenced. **Table 2** shows the schedule and status of construction activities undertaken since 2014.

Construction Stage	Description	Scheduled Duration From 2014	Status
Pre-cofferdam	Start of the river diversion to allow construction to proceed, improving the access road and internal roads, and finalising diversion tunnel No. 3.	Approximately 28 months	Complete
Cofferdam	Construction of cofferdam to crest at 1050 m asl.	Approximately 36 months to complete (inclusive of the eight months for the pre-cofferdam)	Complete
Stage 1 Dam	Construction of dam to crest at 1110 m asl. This is an intermediate stage to allow early electricity generation.	Estimated to be completed in 58 months, inclusive of previous stages	Complete
Stage 2 Dam	Construction of dam to crest at 1300 m asl and the reservoir level will be at 1290 m asl filling over a 16-year period (approx. 2036).	Scheduled completion in 163 months from the start of construction, in about 2029.	On-going

Operations

The installation and commissioning of the turbines is being completed incrementally. Since late 2019, turbines unit No. 5 and No.6 have operated at limited capacity. To date, the operational turbine units No.5 and No.6 have generated approximately 6.8 billion kilowatt hours (KWh) of electricity. Upon completion of the project, it is expected to generate in excess of 17 billion kWh per year. It is expected 70% of the generated electricity from Rogun HPP will be exported throughout Central Asia.

Reservoir

The reservoir is expected to inundate an area of 170 km² and 51 km² at the minimum operating level, the reservoir will reach FSL 1290m above sea level (asl) by 2036. **Table 3** presents the Reservoir Inundation Levels by Year.

Table 3 – Reservoir Inundation Levels by Year

Year	Maximum Reservoir Elevation (asl)	Maximum Reservoir Volume (hm^3)
2024	1,100 m	470
2025	1,150 m	1,526
2026	1,175 m	2,467
2027	1,186 m	3,033
2028	1,207 m	4,268

2029	1,223 m	5,468
2030	1,237 m	6,668
2031	1,249 m	7,868
2032	1,259 m	9,068
2033	1,269 m	10,268
2034	1,278 m	11,468
2035	1,286 m	12,668
2036	1,290 m	13,238

Overview of Previous Environmental and Social Studies and Key Findings

In August of 2014, the WB E&S Panel of Experts (hereafter referred to as 'the ESPoE'), prepared their final report to conclude the work undertaken since 2011. In the stated period, the ESPoE visited the site, prepared ten reports, made presentations during regional consultations in 2011, 2013 and 2014, and interacted closely with the Government of Tajikistan, the WB, the ESIA and Technical and Engineering (TEAS) Consultants and the Engineering and Dam Safety Panel of Experts (DSPoE). In their final report, the ESPoE concluded that the final draft ESIA '*is of acceptable international standard, and subject to some comments on key issues raised in the present report the Panel agrees with the overall conclusion and recommendations made in the ESIA'*.

In 2021, the World Bank reviewed the ongoing construction to:

i) evaluate the adequacy and performance of the mitigation and management measures in the Environmental and Social Management Plan (ESMP);
ii) appreciate whether the E&S impacts were being managed to acceptable levels; and
iii) evaluate the extent to which Rogun JSC and its contractors were implementing the requirements of the ESMP.

In 2022, the WB approved a Technical Assistance grant to support PMG in updating the 2014 ESIA and other E&S instruments and undertaking other studies needed to ensure the Project's technical and E&S planning and execution are in accordance the 2018 ESF and Good International Industry Practice (GIIP). In 2023, newly constituted ESPoE, whose role is to provide independent advice regarding the measures to enhance the overall environmental and social outcomes of the Project, has produced two reports, appraising the Project against each of the applicable ESS as per the WB ESF. The ESPoE reports highlighted several key issues, recommendations on organizational arrangements and ES capacity building measures that would require consideration within the scope of the ESIA, Resettlement Policy Framework (RPF), Stakeholder Engagement Plan (SEP) as well as additional E&S studies.

5. Summary of Draft 2023 Environmental and Social Impact Assessment (ESIA)

Representatives from WSP UK Limited (referred as 'WSP') presented the findings from the Draft Updated ESIA in Almaty, Kazakhstan on November 8, 2023. The presentation on the Draft Updated ESIA findings can be found in **Annex 5.**

The purpose of the Updated ESIA for the Rogun Hydropower Project is to verify and update the previous findings and conclusions regarding the environmental and social impacts of the Project and the most effective way to avoid or minimize impacts. In conjunction with the 2014 Techno-Economic Assessment Study (TEAS) and findings of the Dam Safety Panel of Experts (DSPoE) and the Environmental and Social Panel of Experts (ESPoE), this updated ESIA will serve to inform further decision making and further dialogue among riparian countries and with other stakeholders, development partners, and potential financiers.

In line with the agreed Terms of Reference (ToR) for an Update of Environmental and Social Instruments of Rogun Project, WSP has prepared a Draft ESIA, in line with the new 2018 requirements of the World Bank Environmental and Social Framework (ESF), to analyze the environmental and social impacts and propose mitigation measures for the Project. This includes incorporating new information and new analyses since the 2014 ESIA was published.

The ESIA report is divided into three interrelated volumes, as follows:

- Volume I: Environmental and Social Impact Assessment.
- Volume II: Technical Annexes.
- Volume III: Environmental and Social Management Plans.

Volume I: Environmental and Social Impact Assessment is intrinsically supported by *Volume II: Technical Annexes* within which the detailed E&S assessments are contained for the varying technical aspects, including air quality, noise, water, biodiversity etc. The resulting Environmental and Social Management Plan (ESMP) and other supporting or outline management plans are contained within *Volume III*, describing the mitigation and management measures explicitly tailored to the annexes as necessary and where relevant to do so.

Assessment of Alternatives

An assessment of alternatives was undertaken as part of Volume I of the ESIA. This investigated the TEAS studies recommendations and findings on the alternatives for the Project, from alternative locations, dam heights, dam structures and a No Project Scenario.

Cumulative Impact Assessment

A Cumulative Impact Assessment (CIA) was undertaken as part of Volume I of the ESIA. This investigated any cumulative effects from nearby projects or developments. The Qosh Tepa Canal in Afghanistan was scoped in the assessment due to potential transboundary impacts on water on the Amu Darya River. The Central Asia–China gas pipeline, Line D was scoped in with potential air pollution and noise impacts to local people and construction workers due to the potential location of the pipeline route. However, it was considered to have very limited potential for cumulative impacts to human health from dust generation during Rogun HPP construction activities.

Impact Assessment

A summary of the ESIA findings and mitigation measures can be found in **Table 4**.

Water and Minimum Environmental Flows

Studies to determine minimum environmental flow were completed. Minimum flow rates will be maintained in Vakhsh River from Rogun dam to Nurek reservoir – 17km when Nurek reservoir is full Flows will not be "steady-state" but will mimic natural variation: they allow for seasonality and protection of the river during drought years. Rogun HPP has confirmed that maintaining these minimum flows is feasible. There will be no effect downstream of Nurek. Reservoir will be allowed to fill over years, reaching full supply level of 1290masl in 2036. Tajikistan has a long-term average allocation of 9.5km3 under Protocol 566 – average BVO annual allocations average from 1992 and 2010 was 8.845 km3. Rogun HPP will start to regulate Vakhsh River flows about 2027 and gradually take over from Nurek. Tajikistan will use the previously unused share of water allocated to it by ICWC, while remaining within the framework of the Nukus Declaration, Protocol 566, and average limits set by ICWC. Water used for filling the reservoir will be in accordance with current agreements and practices and will be no more than 1.2 km3/year.

Table 4 – Summary of ESIA Findings & Mitigation Measures

Aspect	Findings	Mitigation Measures
Air Quality	• Off-site: emissions of dust from vehicle movement and dumping • On-site: significant risk to underground workers in tunnels, powerhouse, transformer cavern from dust and diesel emissions	• Develop and implement site-wide and contractor-specific Air Quality Management Plans, which will require: ○ increased dust suppression ○ Improved and additional ventilation
Noise	• Off-site: limited or no potential due to isolation of site • On-site: significant risk to workers from construction activities (e.g., crushing plant, vehicles, conveyors, earthworks, ventilation fans, etc.), also to workers in site accommodations	• Develop and implement site-wide and contractor-specific Noise Management Plans • Monitor worker noise exposure, improve noise control
Traffic & Transport	• Off-site: minimal, primarily transport of goods to site from Dushanbe and worker transport to local accommodations • On-site: significant risk to workers and Project construction due to 100s of trucks and other vehicles • Reservoir will flood some major roads.	• Improvement and enforcement of site-wide Traffic Management Plan, including rules for on-site and –off-site traffic and vehicles. • Improved use of vehicle checklists • Realignment of flooded roads to be undertaken under separate ESIAs to required international standards.
Soils & Geology	• Soil loss in and around the flooding zone and in infrastructure areas. • Loss of use of soils in reservoir footprint • Increased landslide risk due to reservoir fluctuation	• Develop and implement a Watershed Management Plan: vegetation planting, slope stabilization, etc. • Improved spoil management to reduce erosion into the reservoir.

Aspect	Findings	Mitigation Measures
	• Risks from Ionakhsh fault and salt wedge	• Designed to withstand seismic events, grouting to isolate salt wedge
Waste	• Increased pressure on existing disposal and recycling facilities from the increased construction waste • Contamination of soil and groundwater from improper waste management	• Develop and implement side-wide and contractor-specific Waste Management and Water Management Plan: monitoring of haulers, review of off-site facilities, etc. • Complete design and initiate use of dedicated for construction debris--currently under design. • Implement a Waste Strategy with to identify strategic options for minimizing waste and options for waste disposal taking into consideration both resource efficiency and disposal.
Biodiversity	• No critical habitat (as defined by World Bank. • Loss of small amounts of natural habitats: floodplain habitats and juniper woodlands. • 70km river habitat changed to reservoir habitat. • Change in flow rates of 17km from Rogun dam to Nurek reservoir. • Entrainment and carrying of fish into turbines. • Loss of river tributaries and short-range fish migration • Pollution of reservoir and river through spills or releases of harmful or hazardous substances	• Implement Biodiversity management Plan and Fisheries Management Plan. • Implement Offset Management Strategy
Cultural Heritage	• Loss of physical cultural heritage resources due to construction. • Loss of access to physical cultural heritage in flooding zone. • Loss of or damage to cultural heritage due to resettlement construction ground disturbance • Loss of intangible cultural heritage practices or cultural norms due to resettlement.	• Resettlement Action Framework and Plans allow resettled villages to remain together if desired, maintaining any intangible cultural heritage practices and cultural norms within communities. • Implement Cultural Heritage Management Plan (CHMP) and chance finds procedure, with awareness and training programme for specialist on-site staff, archaeological and paleontological minimization to record and analyze any receptors within the area of influence and consult with regional stakeholders to determine their significance.
Resettlement	• Physical displacement of over 46 000 people in 69 villages • Loss of structures, land and associated livelihoods, crop lands, public infrastructure, and impacts on business activities.	• Update 2014 Livelihood and Resettlement Policy Framework to ensure ongoing and future resettlement meet World Bank standards. • Update and implement (partly retroactive) of 2018-2025 Resettlement

Aspect	Findings	Mitigation Measures
	• Loss of community assets and infrastructure	Action Plan (RAP), develop and implementation of 2018-2025 Livelihood Restoration Plan (LRP) • Develop and implement future RAPs and LRPs through 2032 and beyond. • Implement Stakeholder Engagement Plan (SEP)
Labor and Working Conditions	• Inadequate safeguards to protect workers from unfair or illegal labor management – this is a risk of all projects this has not been experienced at Rogun. • Inadequate safeguards to protect workers from adverse working conditions, including occupational health and safety and accommodations—again, this is a risk that has not been a major problem at Rogun	• Implement Labor Management and Monitoring Plan which includes requirements for employment contracts, working conditions, accommodations, and other aspects. • Develop and implement improved site-wide Occupational Health and Safety Plan and site-wide Accommodations Management Plan.

Annex 5. Presentation on Draft Updated ESIA

6. Summary of 2023 Consultations

The World Bank initiated a Sixth Information-Sharing and Consultation Meeting with the Riparian Governments and CSOs to seek riparian input on the concluding 2023 Updated Environmental and Social Impact Assessment (ESIA) prepared by WSP UK Limited.

On November 08, 2023, the Sixth Information-Sharing and Consultation Meeting was held in-person in Almaty, Kazakhstan (and video conference) with representatives invited from all six riparian countries (Afghanistan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan). CSOs attended on November 09, 2023.

A full list of participants who attended both in-person and via video conference can be found in **Annex 2**. The agenda for the Information-Sharing and Consultation Meeting on November 8, 2023, is presented in **Annex 3**.

The purpose of the 2023 consultations was:

- To disclose the findings and recommendations of the Updated Rogun HPP ESIA.
- To gather feedback from the invited transboundary governments from the Republic of Tajikistan, Republic of Kazakhstan, Republic of Uzbekistan, Kyrgyz Republic, Turkmenistan, and Afghanistan on the draft ESIA and on the Rogun HPP project.

A matrix of comments received, and responses can be found in **Annex 4**.

It was confirmed to all participants the draft ESIA was available online at the Project Management Group for Energy Facilities Construction under the President of the Republic of Tajikistan (PMG) website. The Draft ESIA in English was available from late October 2023, followed by translated copy in Russian available in early November 2023, prior to the consultation meetings.

Participants in the sixth consultation process raised concerns regarding the any potential loss of downstream water flows, highlighting the importance for economies and livelihoods on adequate summer flows for agriculture and managed winter flows to prevent flooding. The Government of Tajikistan has stated its commitment to the existing Protocol 566 agreements and ICWC water allocations for the Amu Darya.

Participants also raised concerns on the water quality due to Rogun HPP operations. WSP confirmed water quality will not be affected during operation, and all areas of contamination will be addressed prior to inundation of the reservoir. Participants noted water quality monitoring will be undertaken as per the supporting plans in Volume III of the ESIA.

Participants commented on the plans for a cascade failure emergency warning system. It was noted this will be provided by an EPC contractor on Nurek / Rogun HPPs, along with a future plan after completion of Rogun HPP for a whole basin / cascade system to address any transboundary concerns.

During the CSO consultations, comments were raised on the ESIA focusing on the gender action plans and the Grievance Redress Mechanism (GRM). It was noted Gender based violence (GBV) was addressed within the Gender Action Plan. It also included a plan to encourage women in management positions and the encouragement of employment. It was confirmed both women and men on site are trained on behavioral aspects and GRM. In addition to, GBV and cultural awareness on sensitive issues with extensive training to management. There are open discussions on what is appropriate between employers and employees. A Code of Conduct is implemented to all workers on site.

Annex 2. Agenda for Information-Sharing and Consultation Meeting on November 8, 2023
Annex 3. Participants in Information-Sharing and Consultation Meeting on November 8, 2023
Annex 4. Matrix of Comments Received and Responses

7. Next Steps

Following the Sixth Information-Sharing and Consultation Meeting held in Almaty, Kazakhstan, it was noted by participants to send any written comments to the Project Management Group for Energy Facilities Construction under the President of the Republic of Tajikistan. WSP would respond and amend the draft ESIA accordingly. It was confirmed in late November 2023, comments were received by the riparian countries on the draft ESIA prepared for the consultation meetings. There is opportunity for riparian countries or interested parties to raise comment until the end of 2023.

There will be continued communications and cooperation with the riparian countries to address any concerns surrounding the updated ESIA and other E&S instruments. This may require additional riparian consultation in Tajikistan for further comment from riparian countries or CSOs for later drafts or a final disclosed ESIA.

It is expected the World Bank will disclose the Updated ESIA and other E&S instruments in April 2024.

Annex 1

Report on 5th Riparian Information-Sharing and Consultation Process on the Assessment Studies of a Proposed Rogun Hydropower Project -- June 16 – July 29, 2014

Report on

5th Riparian Information-Sharing and Consultation Process on the Assessment Studies of a Proposed Rogun Hydropower Project

June 16 – July 29, 2014

Prepared by
Europe and Central Asia Region
World Bank

In partnership with the Independent Engineering and Dam Safety and Environment/Social Panels of Experts for the Rogun Assessment Studies

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Acronyms

bcm	billion cubic meter
CSO	Civil Social Organization
DSHA	Deterministic Seismic Hazard Assessment
DT	Diversion Tunnel
EDS	Engineering and Dam Safety
EDS-PoE	Engineering and Dam Safety Panel of Experts
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ES-PoE	Environmental and Social Panel of Experts
FSL	Full Supply Level
GoT	Government of Tajikistan
GWh	Gigawatt hour
HPI	Hydro Project Institute
HPP	Hydro Power Plant
ICOLD	International Commission on Large Dams
ICWC	Interstate Commission for Water Coordination
IDA	International Development Association
MCE	Maximum Credible Earthquake
MW	Megawatt
NPV	Net Present Value
OBE	Operating Base Earthquake
PGA	Peak Ground Acceleration
PMF	Probable Maximum Flood
PoE	Panel of Experts
RA	Resettlement Audit
RAP	Resettlement Action Plan
RoR	Run-of-River
RPF	Resettlement Policy Framework
RTS	Reservoir Triggered Seismicity
SIC ICWC	Scientific Information Center of the Interstate Commission for Water Coordination
TEAS	Techno-Economic Assessment Study
ToRs	Terms of Reference
UNRCCA	UN Regional Centre for Preventive Diplomacy for Central Asia

I. Introduction and Background

Two studies were conducted to assess the potential benefits and risks, and evaluate the viability, of the proposed Rogun Hydropower Project (HPP) in Tajikistan: a *Techno-Economic Assessment Study* (TEAS) and an *Environmental and Social Impact Assessment* (ESIA). The studies cover technical, economic, social, and environmental factors, within the context of a least-cost electricity generation expansion plan to meet Tajikistan's energy demand. These Assessment Studies have been conducted by international consultant firms contracted by the Government of Tajikistan and financed through a World Bank IDA grant. The studies were contracted to two international firms through an international competitive procurement process, closely monitored by the World Bank. A consortium led by Coyne & Bellier undertook the TEAS (contract signed on February 8, 2011) while Poyry Energy Ltd. carried out the ESIA (contract signed on March 25, 2011).

Assessment of the potential benefits and risks of the proposed Rogun HPP and its technical, economic, social, and environmental viability was based on international standards and practices and in accordance with the World Bank's policies and procedures. The Terms of Reference for the studies were broadly consulted on as part of the process. The Studies provide the Government of Tajikistan, the other Central Asian countries and the international community, including the World Bank, with information about key elements of the proposed Rogun HPP, such as the project's technical soundness and safety, economic viability, and compliance with relevant environmental and social safeguards.

These Assessment Studies will not determine whether a proposed Rogun HPP will be built, nor will they determine the final design if the project does proceed. The Assessment Studies serve as an input to decision-making.

The World Bank supported the studies and the accompanying consultation process to: 1) ensure the application of international standards for safety, quality, objectivity and transparency in the assessment process, including compliance with World Bank's policies and procedures; and 2) facilitate good practice in information-sharing and constructive dialogue. Support for the Assessment Studies does not imply that the Bank will finance the proposed project in the future.

As part of its engagement, the World Bank has coordinated two independent Panels of Experts (PoEs): an Engineering and Dam Safety PoE and an Environmental and Social PoE. The PoEs each consist of five experts with internationally-recognized expertise in their respective fields; they are funded and managed bythe World Bank. The mandate of the PoEs has been to provide technical oversight, scrutinizing the analytical quality of the Assessment Studies, enhancing objectivity and participating in riparian consultations. The PoEs issued final reports at the end of the consultation process; the Executive Summaries are included in Section IV of this report.

In order to share intermediate and final findings and ensure that the diverse perspectives of the potentially affected stakeholders in the riparian countries are heard and understood, the Bank also supported a riparian consultation and information-sharing process. The Fifth Riparian Information Exchange and Consultation Process was the final in a series held around key

milestones during the assessment process (Figure 1). The consultative process began with meetings on the draft Terms of Reference held in 2008/2009,followed by four riparian information-sharing and consultations held in May 2011 on the consultants' inception reports; November 2012 on the Environment and Social Assessment (ESIA) screening report and interim reports of the Techno-Economic Assessment Study (TEAS); February 2013 to discuss the findings of the Environmental and Social Screening Reports and preliminary investigations on hydrology, design criteria, and geology; and October 2013 on the outputs of Phases 0 and 1 of the TEAS.

The consultation process provided an opportunity for riparian governments and civil society representatives to interact with the two international firms / consortia conducting the TEAS and the ESIA, with members of two independent Bank-funded PoEs, as well as World Bank experts facilitating the process. The participation by stakeholders in previous rounds of discussions benefited the assessment process and the comments and suggestions received have been considered by the PoEs who have shared recommendations with the Government of Tajikistan and the consultants.

Figure 1: Timeline of Rogun Riparian Information-Sharing and Consultation (2008-2014)

II. Fifth Riparian Information-Sharing and Consultation Process

On June 17, 2014, the World Bank initiated the Fifth (and final) Riparian Information-Sharing and Consultation Process to seek riparian input on the two concluding deliverables of the assessment process: the TEAS Phase II Summary and the ESIA.

The 6-week Information Sharing and Consultation process for the two reports included:

- Disclosure: Documents for discussion during the consultations -- the draft TEAS summary and draft ESIA -- were disclosed on June 17, 2014, four weeks before the consultation meetings. In addition, a World Bank note on *Key Issues for Consideration on the Proposed Rogun HPP* was shared in order to bring together the key findings of the Assessment Studies and identify additional issues for consideration;
- Consultation meetings: The World Bank hosted meetings with riparians and other stakeholders, on July 14-18, 2014 at its regional offices in Almaty, Kazakhstan (see Annex A for the Agenda of these meetings);
- Open comment: From June 17 to July 29, 2014 stakeholders were encouraged to provide comments in writing to a World Bank office in their country, or via a World Bank dedicated email address (rogunconsult@worldbank.org), as well as the Project Management Group for Energy Facilities Construction (PMG EFC) website at www.energyprojects.tj;
- Review of riparian comments: The PoEs, in consultation with the World Bank, prepared recommendations to the Government of Tajikistan and consultants based on the full period of their engagement and integrating comments from the riparian consultations; and
- Final disclosure: The final TEAS Phase II Summary Report and Environmental and Social Impact Assessment (Volumes 1, 2, and 3) were disclosed after the fifth round of riparian consultations was completed and comments from government and civil society stakeholders were carefully considered. As part of the ESIA process, a draft Resettlement Policy Framework and draft Stage 1 Resettlement Action Plan were developed to guide ongoing and future relocation and livelihood restoration of affected people. These documents will be publicly disclosed in September for consultation, discussed with project-affected people, and then finalized.

The final disclosure marks the end of formal consultations and the Assessment Studies. Additional work noted in the Assessment Studies, including advanced design and other considerations, will be taken into account in determining the next phase of project preparation, should a decision to proceed be made by the Government of Tajikistan.

The World Bank thanks all participants, and technical and logistical teams required to manage these consultation meetings. Over four years, the information sharing and consultation process has provided extensive access and input to the studies at key points in the process through the disclosure of 17documents, 32 presentations on the studies,14 meetings and direct (face to face) engagement of representatives from government and civil societies of Afghanistan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan, the international development and diplomatic communities, as well as numerous written submissions. The World Bank also thanks the Government of Tajikistan for supporting the process and its active engagement in the

dialogue.

III. Summary of Fifth Riparian Discussion

The Fifth Information Sharing and Consultation meetings were attended by all six riparian countries (Afghanistan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan), with 67 government officials participating. Similarly, CSO discussions connected 46 civil society representatives in-person and video-conference, and 96 members of the donor and diplomatic community registered to be briefed on the main conclusions. The meetings also welcomed two formal observers: the Scientific Information Center of the Interstate Commission for Water Coordination (SIC ICWC) and the UN Regional Centre for Preventive Diplomacy for Central Asia (UNRCCA).

Over the course of four years, five consultation periods were held to review interim findings of the Assessment Studies. The riparian government and civil society representatives raised questions and provided comments on a wide range of issues that can be broadly grouped under the following headings:

- Design Criteria
- Condition of Existing Works
- Geology (including the salt wedge)
- Seismicity
- Sediment Management
- Management of Floods
- Reservoir Filling & Operation
- Alternatives to Rogun
- Economic Analysis
- Risk Management
- Implementation Issues
- Climate Change Impacts
- Resettlement Issues
- Environmental Impacts (including downstream impacts)

Several of these issues were discussed in previous consultations and are detailed in previous consultation reports (available online). Several of the riparian issues discussed in-detail during the fifth consultation period through to July 29, 2014, are highlighted in this report below. A detailed account of all of the specific questions and comments received during the fifth consultation period and the corresponding responses are given in Appendix C for TEAS-related questions and in Appendix D for ESIA-related questions.

Regarding seismicity, participants in the fifth consultation process raised concerns regarding whether the proposed dam has been assessed against the possibility of a major earthquake. The consultants confirmed that the assessment has used the Maximum Credible Earthquake metric as the design criterion.

Regarding sedimentation and mud flows, participants raised two possible management measures regarding this dam safety risk: watershed management to reduce sediment inflows and measures to prevent the impact of Obishur mudflows. It was noted that although there have been some successes internationally in mitigating sediment inflows into reservoirs (through actions such as reforestation and improved agricultural practices) such watershed management is not a viable solution in the Vakhsh basin to materially reduce the large volume of sediment inflow. Appendix C lists the complete response on this topic and others.

Regarding flood management, participants noted the change in design criteria to meet the Probable Maximum Flood (PMF) standard common in modern international dam design. The consultation discussion noted that the design approach adopted for the Rogun project is to manage the PMF so as to limit downstream releases to the flood-handling capacity of the downstream cascade. The two higher Rogun alternatives (1290 FSL and 1255 FSL) have sufficient reservoir storage capacity to achieve this. For the 1220 FSL Rogun alternative and for the No-Rogun scenario, measures to protect the downstream cascade against the PMF would need to be provided.

Some participants raised concerns regarding the implications for downstream water flows, particularly regarding transfer of water from summer to winter. Downstream riparians highlighted the dependence of economies and livelihoods on adequate summer flows for agriculture and managed winter flows to prevent flooding. For the operational phase of the Rogun project, the Government of Tajikistan has stated its commitment to abide by existing agreements and practices related to water allocations, and thus limit the transfer of water from the vegetative season inflows at Rogun to the non-vegetative season releases downstream of Nurek to 4.2 km^3. This is the quantity currently transferred by the annual operation regime of the Nurek reservoir, and this operational regime is in line with the decisions of the Interstate Commission on Water Coordination. Several stakeholders identified the need to develop rules for operating the cascade that are agreed by all riparians. The riparian countries could initiate discussions on an appropriate institutional arrangement for monitoring reservoir operation to ensure compliance with the prescribed operating regime.

Annexes C and D provides the detailed comments and questions that were raised during the consultation and the specific responses related to hydrology and downstream flows.

Participants also raised a number of questions regarding the economic feasibility of the proposed project and inquired as to the range of alternative sources of energy that were considered. As noted in more detail in both Annex C and D, the least-cost study considered all possible generation options for Tajikistan, including storage and run-of-river hydro projects, generation based on domestic coal, import of electricity, import of gas for gas-fired generation and urban space heating, etc.

During the consultations, comments and questions raised on the ESIA focused on two main topics: resettlement and downstream water management. Comments on downstream water management are consolidated with those on the TEAS and summarized above. Detailed

comments and associated responses related to the ESIA, including on both resettlement and downstream water management are provided in Annex D.

Although not a riparian issue per se, the extensive potential resettlement of up to 42,000 people stimulated a number of comments and suggestions. The consultants and World Bank team described the World Bank Operational Policy 4.12, which is based on international standards, and was used for this study. The Policy is based on a number of key principles: (i) that resettlement should be avoided or minimized to the degree possible taking into consideration alternative project designs; (ii) where it is not feasible to avoid resettlement, resettlement activities should be conceived as sustainable development programs and (iii) displaced persons should be assisted in their efforts to improve their livelihoods or at least to restore them to pre-displacement levels. Although resettlement can have negative impacts if not implemented properly, resettlement is sometimes necessary to accommodate development projects that can help meet poverty reduction goals.

The preparation of a resettlement audit (RA), resettlement action plan (RAP), and resettlement policy framework (RPF) -- the core documents for resettlement in the ESIA -- provide the planning and implementation documents consistent with international standards. The RAP, RPF, and RA outline good international practice and also specific remedial actions for previously affected communities, including some retroactive actions for people who have already been resettled. This includes grievance measures and monitoring to ensure people have an appropriate mechanism for raising concerns. The Government of Tajikistan has expressed its commitment to meet international good practice for Rogun resettlement should the project proceed. This commitment was reiterated during the fifth consultation.

Participants in the consultation process noted that the process of international expert assessment and consultations will need to be continued in subsequent project stages. Consistent with the Terms of Reference, the assessment study has developed feasibility-level designs and established the feasibility of the project. For implementation, detailed designs will need to be developed and these will be reflected initially in tender documents and subsequently in greater detail in the construction drawings. The Consultants made detailed recommendations on (i) specific aspects that will need to be taken into account in the detailed design stage, and (ii) the steps that would need to be taken to ensure implementation follows international good practice. The Panel of Experts has also recommended expert oversight during the detailed design and construction stages - this is a standard process for such an important project.

IV. Panels of Experts' Recommendations to Government of Tajikistan

Members of the Engineering and Dam Safety Panel of Experts and the Environmental and Social Panel of Experts participated in the fifth Riparian Consultations and Information-Sharing meetings, offering insight from their independent expertise on these issues and interacting with participants on a range of topics. Members of the Panels have participated in previous consultation processes and also made recommendations to the Government of Tajikistan at each milestone during the Assessment Studies based on their own expert knowledge, site observations, and in response to issues raised by riparian stakeholders.

The final reports of the two PoEs are publicly available. The reports reflect on the entire TEAS and ESIA process and place specific emphasis on the findings and conclusions of the TEAS Phase II and ESIA reports. Their final reports can be found on the World Bank's Rogun website[1] and the website of the Project Management Group for Energy Facilities Construction under the President of the Republic of Tajikistan[2], and the Executive Summaries are reproduced here.

Executive Summary of the Engineering and Dam Safety Panel of Experts' Final Report

This report presents the stance of the Engineering and Dam Safety Panel of Experts (EDS PoE or PoE) with respect to recommendations of the Techno-Economic Assessment Studies (TEAS) for the Rogun Hydropower Project (HPP) and highlights the distinctive issues from the PoE's perspective. It should be read in conjunction with the Phase 0, Phase 1, and Phase II summary reports prepared by the TEAS Consultant.

The primary outcome requested of the PoE's work is to ensure international standards of design, risk evaluation and impact assessment are met. The PoE has a strong team with capabilities covering geology, hydrology, seismology, dam safety, sedimentation, electro-mechanical elements, economics and hydropower policy. Over the period from April 2011 until July 2014 the PoE has been involved in field missions, independent site investigations, design review meetings and desk studies, and has participated in riparian consultations.
The creation of a clear set of design criteria, based on international standards and guidelines, to guide all phases of the TEAS work was a key early recommendation of the PoE in May 2011.

The studies have been comprehensive, rigorous and subject to intense scrutiny from both the PoE and the World Bank team.

The PoE believes the studies have resulted in a robust understanding of the site geology and geotechnics and considers the geological conditions of the dam site are appropriate for an earthfill dam. As well, suitable construction materials are available at the site in sufficient quantities for the largest proposed earthfill dam.

The PoE accepts the TEAS Consultant's analysis of the leaching and rising of the salt wedge in the Ionakhsh fault that crosses the footprint of the dam. The measures proposed to mitigate leaching and cavity formation are supported, as they have been designed with a high geotechnical factor of safety. However, a robust monitoring system must be fully operational during the lifetime of the dam to enable the measures proposed for remedial action to be implemented if necessary.

The PoE considers that the seismic risks are adequately addressed at this feasibility stage. A Deterministic Seismic Hazard Assessment (DSHA) has predicted that a Maximum Credible Earthquake (MCE) occurring along the Vakhsh Fault with a magnitude Mw of 6.9 (maximum historical magnitude plus 0.5) is likely to produce the most severe peak ground acceleration (PGA) at the Rogun dam site. This PGA has been estimated to be

[1] www.worldbank.org/eca/rogun

[2] www.energyprojects.tj

0.71g. The Ionakhsh fault is likely to generate seismic displacements in the order of 1.3m to 2m.

Reservoir triggered seismicity (RTS) and its impact on the project are suitably addressed at this feasibility stage. The DSHA study demonstrates that the RTS is likely to produce earthquake magnitudes smaller than the historically observed maximum magnitude earthquake.

The PoE recognises the validity of the hydrologic data used and the results obtained in terms of the 1:10,000 years flood and PMF, which are conservative and substantially larger than previous estimates.

The PoE endorses the results of the assessment of Rogun operating performances, which show that a substantial increase of electrical power production can be met on the assumption of no changes from the current downstream flow release pattern, thus honouring regional water sharing agreements. Moreover, the PoE supports strengthening the current institutional framework for water sharing among the Central Asian States, including a water monitoring system, and greater transparency.

The PoE recognises that ensuring the project can safely accommodate an end of life scenario with a sediment filled reservoir is an appropriate and significant change from previous designs. However, more work is required to define the sediment management regime during the operating life of the project and this is a priority task for the detailed design stage.

Significant work has already been undertaken to excavate tunnels as well as the power house cavern. However, the PoE notes that:

- substantial remedial works are needed to upgrade the two existing diversion tunnels (DT1 and DT2);
- remedial work is necessary to satisfactorily stabilise the power house cavern and the "pillar" zone between the power house cavern and the transformer hall.
- it is essential that the proposed modifications to the HPI design of DT3 are implemented before DT3 is completed and commissioned.

The PoE considers that the stability of the caverns could feasibly be secured with the implementation of stabilisation works. However, the PoE recommends to:

- continue with the monitoring of the cavern's displacements;
- undertake in-situ testing of proposed rock anchors prior to detailed design.

The PoE agrees with the selection of an impervious core embankment dam type and the improvements to the cross section recommended by the TEAS Consultant.

The PoE endorses the proposed approach to management of construction floods, noting that construction should proceed continuously once the river is diverted to limit the project's exposure to embankment overtopping risk.

Due to the very challenging nature of the project and its tight scheduling, the TEAS Consultant has recommended that all efforts are made to carefully select, through

international tender, experienced and highly qualified contractors for the Main Contract of Works. This international tendering approach is strongly supported by the PoE.

The EDS PoE considers that the TEAS program for the Rogun HPP over the past three years has:

- addressed all the feasibility level issues of the project with a sufficient degree of technical due diligence;
- proposed dam alternatives where international quality standards have been incorporated into the feasibility-level designs;
- undertaken a comprehensive assessment of the economic viability of the various dam height alternatives using a regional power market model for a fully interconnected Central Asian Power System;
- considered the technical risks of the project and recommended a suitable suite of mitigating actions to effectively address them.

Notwithstanding the above, the EDS PoE notes that there are still matters to be addressed at the detailed design stage of the project, most notably to:

- determine the optimum installed capacity configuration;
- establish effective arrangements for sediment management during the operation stage of the project;
- confirm the stabilisation measures for the powerhouse cavern;

It is the POE's view that the outcome of these detailed assessments will not affect the feasibility of the project.

The PoE reiterates the importance, from a dam safety perspective, of making all endeavours to ensure that the dam construction can be completed in a continuous process once the river diversion has commenced. In particular, the PoE recommends that full financing of that aspect of the works be secured prior to commencing river diversion.

From a techno-economic perspective the EDS PoE endorses the TEAS Consultant's recommendation for the further detailed consideration of the FSL 1290 masl dam alternative since:

- key dam safety issues can be acceptably addressed;
- from a sedimentation perspective it provides the longest project life;
- it addresses the exposure of Nurek to sediment build up in the medium term;
- it improves the extreme flood safety of the Vakhsh cascade as a whole enabling it to withstand the PMF;
- it is the most economic option by a clear margin and its positive economic performance is robust to a wide range of scenarios.

We also reiterate that the level of installed capacity is yet to be confirmed.

This endorsement is made with the requirement that ALL the recommendations made by the TEAS Consultant during the assessment process need to be followed during the next stages of the project.

In addition, the EDS PoE notes that a decision to proceed with a particular development alternative does not rest solely on techno-economic considerations. The recommendations of the Environmental and Social Impact Assessment need to be considered in conjunction with the technical considerations to ensure that, as a minimum, international good practice is adopted for all aspects of a proposed Rogun development.

Executive Summary of the Environmental and Social Panel of Experts' Final Report

This is the Final Report of the Environmental and Social Panel of Experts (the "E&S PoE" or "Panel") on the Rogun Hydropower Project in Tajikistan. It is the conclusion of work undertaken since May 2011 during which the Panel has interacted closely with the Government of Tajikistan (GoT), the World Bank, the Environmental and Social (ESIA) and Technical and Engineering (TEAS) consultants and the Engineering and Dam Safety (EDS) Panel of Experts. In this period the Panel has visited the site, produced 10 reports and made presentations during regional consultations in 2011, 2013 and 2014, most recently in Almaty in July 2014 at which the Final Draft of the Environmental and Social Assessment Report was presented and discussed.

The overall role of the Panel has been to ensure that the ESIA of the Rogun Hydropower Project has been conducted in accordance with good international practice and World Bank guidelines.

As reported below the Panel finds that the Final Draft ESIA (the "ESIA") is of acceptable international standard, and subject to some comments on key issues raised in the present report the Panel agrees with the overall conclusions and recommendation made in the ESIA.

The Panel has followed the TEAS studies closely and has from an environmental and social perspective no reason to doubt the international standard and conclusions of these studies that form the basis for the ESIA.

This implies that the Panel agrees with the overall conclusion of the studies that construction of a high dam (from 300 m to 335 m high, full supply levels 1255 and 1290 m) at Rogun, located upstream of the 300 m high Nurek dam in a cascade on the Vakhsh River (tributary to the Amu Darya River), is feasible, and that the environmental and social impacts of such a dam can be satisfactorily mitigated. The Panel further agrees that the Vakhsh cascade can be operated in such a manner that no change in the current downstream flow pattern will occur. However, both potential negative and positive impacts need to be considered, i.e. negative in terms of possible reductions in downstream summer flows, and positive in terms of improved flood protection and possible low flow augmentation in dry years.

This conclusion is subject to implementation of further studies and measures recommended by the TEAS and ESIA Consultants and the EDS Panel, including a strengthened legal and institutional framework on water sharing in the Amu Darya Basin.

The Panel finds that the advice and guidance provided to the ESIA Consultant has been largely heeded and that most chapters in ESIA presented in Almaty require no further work. However, the Panel still has concerns on three key points: (1) possible

downstream impacts in the Amu Darya Basin, (2) resettlement of up to 42,000 people in the area to be affected by the future Rogun reservoir, and (3) the final selection of dam height.

On the downstream impacts in Amu Darya Basin the Panel notes that although the current mechanisms and practices for water allocation appear functional and satisfactory to all parties in the present situation, they suffer from lack of clarity and transparency and may not be sustainable in the long run with emerging pressures and trends in water availability and demand. It is the view of the Panel that the necessity for future harmony and avoidance of misunderstandings or differences in interpretation, calls for Central Asian countries, including Afghanistan, to come to a revised agreement, and a strengthened legal and institutional framework, on water sharing in the Amu Darya. Such an agreement should include clear, understandable, transparent, monitored, and enforceable rules to ensure equitable water sharing, especially under dry conditions.

Further, the Panel strongly recommends that a formalised and appropriately monitored management agreement of the Vakhsh reservoirs for normal, wet and dry years be developed. This agreement would have to include a river monitoring and flood forecasting/warning system to be used as support for transparent monitoring of Vakhsh cascade water use and management.

On the resettlement issue the Panel notes that the World Bank Operational Policy 4.12, other international requirements and good industry practice proposals require that resettlement should as far as possible be avoided, hence the proposed focus on dam height optimization, and that the livelihoods of involuntarily resettled persons must be improved or at a minimum restored, hence the Panel's recommendations pertaining to livelihood restoration.

The Panel finds that the resettlement documentation has been significantly improved in the course of the Panel's involvement, and is now generally adequate, but that two important comments expressed on the last iteration of these documents remain: (1) while livelihood restoration is the key issue of this resettlement, livelihood restoration planning remains weak in the final Resettlement Action Plan (RAP) , and (2) the RAP does not convey a clear commitment from the GoT to implement it, regardless of the source of funding of the Project. The Panel therefore reiterates its recommendation that the GoT should commit unequivocally to implementing the agreed Resettlement Policy Framework (RPF) and RAP, regardless of final arrangements for the funding of Rogun Hydropower Project.

On the final selection of dam height the Panel observes that the difference in economic parameters between the two feasible high dams is not large. This increases the importance of non-monetary parameters, which, at this point, have not featured prominently, if at all, in the comparative analysis. Such non-monetary parameters include, amongst others: (1) the cumulative effect of displacing, resettling, and rehabilitating 42,000 people: while the direct cost of resettlement is more or less proportional to the number of the people displaced, the difficulty of finding suitable agricultural land and/or jobs for a larger number of people and the related impoverishment risks will increase more than proportionally; (2) the potential for exacerbated riparian sensitivity in relation the highest dam; and (3) the incremental debt burden for the population of Tajikistan.

All trade-offs should therefore be carefully assessed and the Panel is of the opinion that giving further detailed consideration to only the highest dam alternative is not sufficient. The recommended way forward for such an assessment would be to take advantage of the forthcoming project optimisation phase to apply a multi-criteria decision approach, or similar, with stakeholder participation, to arrive at an optimized dam height based on both technical and social considerations.

Annex A: Agenda from the Civil Society Meetings

JULY 14-15, 2014 (10:00am – 6:00pm)
Almaty time, for other participating cities, please note time difference with Almaty

World Bank Central Asia Regional Office
41A Kazybek bi St., 3rd floor, Almaty, Kazakhstan; tel. +7 (727) 377-82-20

Purpose: To share the draft Summary Report of the Techno-Economic Assessment Study (TEAS) Phase 2 and the draft Environmental and Social Impact Assessment (ESIA) on the proposed Rogun Hydropower project with civil society representatives from riparian countries for comment and information sharing.

Chair: Ms. Anna Bjerde, Director, Strategy and Operations, Europe and Central Asia, World Bank
Co-Chair: Mr. Saroj Kumar Jha, Regional Director, Central Asia, World Bank
Facilitator: Ms. Jamila Assanova, Director, Association for the Civil Society Development

Monday July 14, 2014: Techno-Economic Assessment Study			
1000-1045	Opening Session	Welcome and statements Update on studies and consultations Review of agenda	**Moderator:** Anna Bjerde, World Bank **Speakers:** Saroj Jha, World Bank Daryl Fields, Senior Water and Energy Specialist, World Bank Imtiaz Hizkil, Senior Power Engineer, World Bank Jamila Assanova, Facilitator
1045-1330	Technical Assessment of Alternatives	Dam safety: design criteria, geology, floods, seismicity, dam stability *Break* Water management & reservoir operations: hydrology, reservoir filling, cascade operation, sedimentation, climate change Discussion	**Moderator:** Ranjit Lamech, Practice Manager, World Bank **Speakers:** Ascensio Lara and Louis Bouzat, Coyne & Bellier Roger Gill, Ljiljana Spasic-Gril, Ezio Todini, Engineering and Dam Safety Panel All participants
Lunch			
1430-1545	Economic Assessment of Alternatives	Demand projections Least cost generation expansion analysis Cost/Benefit & financial analysis	**Moderator:** Ranjit Lamech, World Bank **Speakers:** Nikhil Venkateswaran, Vincent

		Discussion	Libaud, Ascensio Lara, Coyne & Bellier Roger Gill, Engineering and Dam Safety Panel All participants
Break			
1600-1800	TEAS Wrap-Up	Implementation Risk analysis Conclusions & Recommendations Discussion	**Moderator:** Ranjit Lamech, World Bank **Speakers:** Nikhil Venkateswaran, Vincent Libaud, Ascensio Lara, Coyne & Bellier Roger Gill, Engineering and Dam Safety Panel All participants
Tuesday July 15, 2014: Environmental and Social Impact Assessment			
1000-1015	Opening Session	Day 1 Wrap Up Review of agenda	**Moderator:** Anna Bjerde, World Bank **Speaker**: Jamila Assanova, Facilitator
1015-1330	Environmental and Social Impacts	Environmental impacts Resettlement and social impacts Discussion *Break* Impact on riparian countries Discussion	**Moderator:** Agi Kiss, Regional Environmental and Safeguards Advisor, World Bank **Speakers:** Robert Zwahlen, Martin Bieri, Poyry Torkil Clausen, Frederic Giovannetti, ESIA Panel of Experts All participants
Lunch			
1430-1600	Analysis of alternatives	Alternatives to Rogun Dam alternatives Discussion	**Moderator:** Agi Kiss, World Bank **Speakers:** Robert Zwahlen, Martin Bieri, Poyry Richard Fuggle, ESIA Panel of Experts All participants
1600-1630	ESIA Wrap Up	Next Steps	
Break			
1645-1730	World Bank Note		**Moderator:** Daryl Fields, World Bank
1730-1800	Closing session	Next Steps Closing statements	**Moderator:** Anna Bjerde, World Bank **Speakers:** Daryl Fields, World Bank

Annex B: List of July 2014 Information Sharing and Consultation Materials

All materials and information related to the Fifth Information-Sharing and Consultation Meeting on the Assessment Studies of the Proposed Rogun HPP (July 14-18, 2014) can be found on the Bank's dedicated page via this shortened link: http://bit.ly/1sVz82N

Reports

- Draft Techno-Economic Assessment Study (TEAS), Phase II : Executive Summary (Coyne et Bellier)
- Draft Techno-Economic Assessment Study (TEAS), Phase II : Summary (Coyne et Bellier)
- Draft Environmental and Social Impact Assessment (ESIA), Volume I: Text (Poyry)
- Draft Environmental and Social Impact Assessment (ESIA), Volume II: Annexes (Poyry)
- Draft Environmental and Social Impact Assessment (ESIA), Volume III: Preliminary (Poyry)
- Environmental and Social Management Plan (Poyry)
- Key Issues for Consideration on the Proposed Rogun Hydropower Project (World Bank)

Presentations

- Riparian Issues: Rogun Hydropower Project Assessment Studies Riparian Information-Sharing and Consultation Process (World Bank)
- Overview: Rogun Hydropower Project Assessment Studies (World Bank)
- Dam Safety Part 1: Basic Data and Dam Design (Coyne Et Bellier)
- Dam Safety Part 2: Hydrology and Flood Control (Coyne Et Bellier)
- Water Management and Reservoir Operations (Coyne Et Bellier)
- Introduction, Dam Safety, Water Resources and Flood Risk Management (Engineering and Dam Safety Panel of Experts)
- Rogun Hydroelectric Techno-Economic Assessment Study: Economic and Financial Analysis (IPA Energy + Water Economics)
- Implementation Studies (Coyne Et Bellier)
- Risk Analysis (Coyne Et Bellier)
- Conclusion and Recommendations (Coyne Et Bellier)
- Environmental and Social Impact Assessment for Rogun Hydro Power Plant (Poyry)
- Environmental and Social Impact Assessment: Report by Environmental and Social Panel of Experts (Environmental and Social Panel of Experts)
- Environmental and Social Impact Assessment: Analysis of Alternatives (Poyry)
- Next Steps (World Bank)

Annex C: Matrix of TEAS Comments Received and Responses

Comments	Response
I. Dam Safety	
Seismicity	
1. Were physical models used to assess the seismic response of the proposed Dam? *Comment expressed by stakeholder from Uzbekistan.*	According to current international practice, numerical models are now considered to be the most effective way to assess the seismic response of structures. Modeling has been done using a two-dimensional (2D) analysis, and it has been recommended that a three-dimensional (3D) analysis be carried out during the detailed design stage. The proposed dam design performs well using the 2D analysis. The performance is expected to improve in the 3D model due to the S-shape of the valley and the narrow gorge, which will limit the displacements of the dam.
2. Were earthquakes that have occurred in the region more generally as well as far away locations used to assess the seismic hazard? *Comment expressed by stakeholder from Uzbekistan.*	All relevant information on earthquakes and regional tectonics has been included in the assessment of the seismic hazard for the Rogun dam site. The information used and the assessment carried out have been reviewed in detail by the Panel of Experts.
3. Were national experts used in the assessment process? *Comment expressed by stakeholder from Turkmenistan.*	National experts have been extensively consulted to seek data on the project. The seismic assessment has been carried out, and reviewed, by international experts.
4. Has the earthquake risk been assessed that can result in dam failure or massive damage? *Comment expressed by stakeholder from the Kyrgyz Republic.*	The Maximum Credible Earthquake (MCE) that can occur at the Rogun Site has been assessed in line with current international practice, and the dam has been designed to safely withstand the MCE.
5. Nurek will be safer during a seismic even if the reservoir level is lowered. Has this been considered? *Comment expressed by stakeholder from Uzbekistan.*	Safety assessment of Nurek was outside of the scope for these assessment studies. However, safety assessment of Nurek was undertaken a few years ago under a different study and Nurek was found to be seismically safe.
6. Why was the spectral analysis carried out based on the records of distant deep earthquakes of North Afghanistan, where the epicenter is more than 200 km from Rogun? The mechanism of deep Afghan earthquakes considerably differs from its internal earthquakes around the Hissor Ridge, where there had been catastrophic earthquakes, such as Karatag, 1907 (M = 7.3 and M = 7.4) and Hait 1949, M = 7.4. Confined to this zone, are also such devastating, grade 8-9 earthquakes as Garm, 1941, M = 6.4 and Faizabad, 1943, M = 6.0. The response of a high dam to long-period fluctuations of deep distant earthquakes is considerably different from the response to close fault-shear earthquakes generated by its own active zone. To address the issues of earthquake prediction and correct assessment of	The mentioned near-field earthquakes (Karatag, 1907 etc.) have been considered for the determination of the reference earthquakes. Following the determination of the reference earthquakes, the associated spectra were developed on the basis of the three Ground Motion Prediction Equations (GMPEs), whose application has been selected and justified using the state-of-the-art approach proposed by Bommer et al. (2010). The spectra are not based on the records of particular earthquakes: the GMPE approach leads to a statistically more relevant solution than the use of single records.

Comments	Response
seismic risk in the calculation of response spectra, it would be more logical to use the record of earthquakes whose epicenters were within 100km. This would include earthquake of January 9, 2002, grade 5.0, magnitude 6-7. [Editor's note, revised for clarity] *Comment expressed by stakeholder from Uzbekistan.*	
7. There is no Regional Zoning Map, prepared on the basis of macro-seismic data and evaluation of the parameters of probable earthquakes (source mechanisms). *Comment expressed by stakeholder from Uzbekistan.*	Considering the seismotectonic context, the deterministic hazard assessment performed in this study did not require a regional zoning map, as it was a site specific hazard assessment: near-field faults are the most penalizing earthquake sources given the combination of the high magnitudes that can be associated to them and the focal distance from the Rogun site. Far-field sources have also been examined but their attenuation would lead to lower accelerations than those of near-field sources for the whole frequency range. The separate probabilistic seismic hazard assessment has considered all the earthquakes in the region, both near and far field. No regional maps per se were required as this is a site-specific analysis that has taken into account all the earthquakes in the region.
8. Have 3D models been constructed for different scenarios of near-, medium- and long-distance earthquakes from different focal areas of the region, with different depths and mechanisms of earthquakes for sampling the design spectra of (grade 7, 8, 9) earthquake responses? *Comment expressed by stakeholder from Uzbekistan.*	The following earthquake data was used in the assessment: • Historic earthquakes with M>5.0 occurring in Tajikistan from 250 BC to 1999 AD (Rautian and Leith, 2002) • Report: "Seismic Conditions on the Territory of Tajikistan" Babaev et al. (2005); the report provides data onStrong earthquakes (intensity six or higher on the MSK-64 scale) in the territory of Tajikistan (1892—1999) • CASRI earthquake catalogue (1895-2005), provided by the Institute of Earthquake Engineering and Seismology of Dushanbe. Each earthquake was analyzed and was represented in the models by an epicentral distance (x and y coordinates) from Rogun Dam and a focal depth (z coordinates). Therefore, each earthquake was represented spacially in 3D.
9. Regarding TEAS Chapter 4 technical assessment of underground facilities where the methodology of calculation of seismic load is estimated as inadmissible: given the random nature of seismic loads depending on many factors, including the amplitude, spectral composition, direction, and duration of exposure, the calculations of structures for seismic loads involve a high degree of uncertainty. Therefore, to ensure the safety of buildings designed in seismically dangerous areas, it is logical to change from calculations by the limit state method to calculations based on the maximum permissible risk. The monitoring program should be drawn up in accordance with the recommendations of the EC2 and the	In the final design, the structures shall be designed in accordance with international standards such as ACI318 or EC2. This implies a structural verification in Ultimate Limit State and Serviceability Limit State (maximum deformation acceptable, control of crack openings, etc.). Moreover, a monitoring program will need to be drawn up in accordance with international standards and practices.

Comments	Response
World Commission on Dams. *Comment expressed by stakeholder from Uzbekistan.*	
Sediments/Mudflows	
10. Has watershed management been considered as a mean of reducing the sediment inflows to the reservoir? *Comment expressed by stakeholder from Afghanistan.*	The sediment transported down the Vakhsh river is estimated at 100 hm^3 per year and is the result of erosion in a geologically relatively young environment. While there have been some successes internationally in mitigating sediment inflows into reservoirs, through actions such as reforestation and improved agricultural practices, such watershed management is not a viable solution in the Vakhsh basin to materially reduce the large volume of sediment inflow.
11. Measures to prevent the impact of the Obishur mudflows have not been described. *Comment expressed by stakeholder from Uzbekistan.*	A series of check dams are to be built on the Obishur to prevent mudflows from interfering with the Vakhsh flows downstream of the dam.
Geology	
12. Geology: there are many landslides in the area; some will affect the main road to Rogun and the water supply system. It appears that these were not studied. *Comment expressed by stakeholder from Uzbekistan.*	The landslides that will affect the safety of the dam have been studied extensively and were discussed in detail in previous consultations.
13. Geology: information provided on erosion is not sufficient. *Comment expressed by stakeholder from Uzbekistan.*	This aspect was studied in sufficient detail for an assessment study. The report on Geology was previously disclosed, consulted on with riparian representatives and civil society groups, and is available online.
Salt Wedge	
14. Salt wedge: it was expected that the Consultant would bring some new, international views & recommendations for this problem; however it appears that the original methodology for the salt dissolution and mitigation measures were adopted. Even more, it is proposed to omit the brine curtain. Also, if something goes wrong, how would the mitigation measures be implemented? *Comment expressed by stakeholder from Uzbekistan.*	For the salt wedge, the Consultants carried out a detailed review of previous investigations and analyses, as well as recommended mitigation measures. Additional site investigations were carried out and new analytical models were developed to study all pertinent aspects. The mitigation measures proposed (grouting of the wedge cap and provision of a drainage curtain) are similar to those recommended previously, as these are the appropriate mitigation measures. The brine curtain is not considered necessary. A comprehensive monitoring plan will be implemented to ensure that the efficiency of the mitigation measures is maintained throughout the project life. The design incorporates feasible measures that will permit remedial works to be undertaken, if and when required, to restore the efficiency of the mitigation measures. Information on the Phase 0 studies was provided in a Summary Report, which was publicly disclosed prior to the October 2013 consultations.
15. The reliability of mathematical model to forecast possible scenarios of leaching	A large number of geological data and logs are available from the original design.

Comments	Response
process at the salt wedge is based on the physical and mechanical properties of rocks derived from the core material. However, cores provide incomplete information on the cut due to the small radius of coring and loss of original physical and mechanical properties of samples from the time of their selection to the time of laboratory testing. From the results of core analysis, it is also difficult to determine the inclination of rock layers and presence of fractures. To solve the problem of determining the physical and mechanical properties of rocks, it would be more effective to carry out log measurements (spectrometric gamma ray logging, sonic scanning side logging and neutron-lifetime GR). Then, from the results of interpretation of the above complex, it would be possible to calculate a three-dimensional lithological model based on the composition of clay, physical and mechanical properties of rocks, formation of layers and the identified elements of fracture of materials. The uncertainty of mathematical model to determine the risks of excessive leaching of salt depends on the database components, therefore, the final report should include in tabular form the data on the design parameters included in the blocks of original parameters of sub-models. *Comment expressed by stakeholder from Uzbekistan.*	This data has been reviewed and confirmed by the Consultant with the help of additional in-situ investigations. They provide sufficient information of the nature and extent of the salt wedge and its surroundings. A 2D-mathematical modeling of the water seepage has been built based on the most critical cross-section. This level of detail is enough to assess how critical the leaching process can be for the project feasibility. The study of the leaching process through mathematical modeling has shown that the main parameters governing this phenomenon are: the rock mass hydraulic conductivity and effective porosity, the rate of rise of the salt wedge and the clay cover thickness. Within the additional investigations conducted in the assessment studies, the large-scale hydraulic conductivity and effective porosity have been measured by conducting in-situ pumping tests. Then sensitivity analyses have been conducted on the rate of rise of the salt dome and on the clay cover thickness, covering a broad range of variation of the parameters. Based on the results of the model, it was concluded that with the implementation of a grouting barrier and a hydraulic barrier, and considering significant safety factors, the leaching process would not lead to the creation of cavities in the dam foundation that would endanger the dam and appurtenant works. The Consultant has recommended additional investigations for refining the model in the detailed design stage of the project (in particular the measure of the actual salt dome rising rate) and designed an instrumentation system dedicated to monitoring the leaching process during construction and operation. The development of a 3D-mathematical model could assist in interpreting these monitoring results.
Powerhouse/Transformer Hall	
16. Powerhouse cavern convergence: the proposed stabilization measures were not discussed in detail. *Comment expressed by stakeholder from Uzbekistan.*	This aspect was part of the Phase I studies, and is covered in the Summary Report that was publicly disclosed prior to the October 2013 consultations.
Probable Maximum Flood (PMF)	
17. Why does the hydrograph for the PMF last one year - Surely this is too long? *Comment expressed by stakeholder from Afghanistan.*	The PMF does not extend over a year – the hydrograph shows the flows over the whole year but the PMF peak lasts for a relatively short duration, as is evident from the hydrograph.
18. The cascade has been designed to accommodate the 1 in 10,000 flood. Rogun has been designed now to accommodate the PMF. Would all the dams in the cascade need to be	The two higher Rogun dam alternatives have been designed to manage the PMF so as to limit the downstream discharge to the current flood-handling capacity of the

Comments	Response
modified to accommodate the PMF? *Comment expressed by stakeholder from Uzbekistan.*	downstream cascade. If the recommended alternative is implemented, no additional facilities for augmenting the flood-handling capacity of the cascade will be needed for several decades. Eventually, when Rogun reservoir is sedimented to an extent that it can no longer attenuate the PMF sufficiently, the PMF will be discharged via the surface spillway. At this future date, additional facilities will be required to increase the flood-handling capacity of the downstream cascade.
19. Rogun has now been designed to cope with the Probable Maximum Flood (PMF); however the downstream cascade will not be able to cope with the PMF. Measures to protect the cascade against the PMF should be provided and their cost should be included in the cost of the project. *Comment expressed by stakeholder from Uzbekistan.*	The design approach adopted for the Rogun project is to manage the PMF so as to limit downstream releases to the flood-handling capacity of the downstream cascade. The two higher Rogun alternatives (1290 FSL and 1255 FSL) have sufficient reservoir storage capacity to achieve this. For the 1220 FSL Rogun alternative and for the No-Rogun scenario, measures to protect the downstream cascade against the PMF would need to be provided. However, this cost is not attributable to the project but would be a benefit provided by the two higher dam alternatives.
Design Criteria and Construction	
20. Are the design criteria in line with international practice? Is the design 'state *of the art*'? *Comment expressed by stakeholder from Tajikistan.*	A comprehensive set of technical design criteria were established for Rogun, at the outset of the assessment process, in line with international practice for high dams and hydropower projects. The design criteria adopted for the assessment study comply with the applicable state of the art approach.
21. Designing of surface and subsurface structures of Rogun HPP is carried out under the scenarios of resuscitation of obsolete Soviet project and ignoring modern standard safety requirements. The data of hydrological observations for a period of at least 3-4 years are necessary to establish the basic parameters of waterworks. *Comment expressed by stakeholder from Uzbekistan.*	The overall design of surface and subsurface structures has been carefully reviewed and modified as necessary by the Consultant. As an example, the system of flood discharge structures has been significantly upgraded, introducing in particular a surface spillway and staged stilling basins as a security in addition to the less reliable vortex evacuation tunnels and as a necessary measure for the end-of-life of the project. The design of surface and subsurface structures developed in the assessment studies is in accordance with international standards and practices. As regards hydrology, protection against floods and dam operation, the studies have been based on 76 years of hydrological records.
22. Local construction materials: these have not been described sufficiently. *Comment expressed by stakeholder from Uzbekistan.*	This aspect was part of the Phase I studies, and is covered in the Summary Report that was publicly disclosed prior to the October 2013 consultations. Relevant information is also provided in the Phase II Summary Report that was publicly disclosed prior to the July 2014 consultations.
23. Section 2.3 of the TEAS summary report shows that concrete works are carried out with violation of the requirements to the organization and production of works for the	The importance of the quality of concrete for the long and safe life of the project is fully recognized. It is also recognized that the required quality can be achieved using

Comments	Response
construction of hydraulic structures. Quality of concrete is the basis of the safety of hydraulic installation and must conform to the requirements to tensile and compressive strength, water resistance, frost resistance, resistance against aggressive water, strain and compression characteristics. In accordance with the operating rules, the concrete mix must be prepared at the central automated concrete plant or a factory machine with numerical program control with mixers of not less than 1000 l capacity. The preparation of concrete mix at several plants is allowed only if it is substantiated by technical and economic calculations [SNiP III-16-80]. It is necessary to provide information on the number of cement grades used, cement delivery system, condition of the premises for concrete plant and utilities for feeding concrete aggregates, how much they are isolated from the effects of low and high air temperatures, insolation and the availability of heating, cooling and dust collecting devices. *Comment expressed by stakeholder from Uzbekistan.*	modern and up to date standards and specifications. These standards and technical specifications for the concrete as well as concrete production and placing equipment will be developed in a subsequent stage of the project as part of the technical specifications for the Contractor(s).
24. Exploitation of obsolete and physically worn-out equipment during concrete production affects its quality. Therefore, one cannot but agree with the recommendation that equipment should by upgraded. The question arises about the quality of concrete works already carried out. In view of the high risks and threats, it is recommended to expand this section in the final report by adding more detailed information on how the formwork, reinforcement and concrete works are carried out in reality, ways of their preparation and transportation of concrete mix, and their conformity to the requirements of SNiP and international safety standards. *Comment expressed by stakeholder from Uzbekistan.*	The cost estimate has assumed that appropriate equipment will be used for concrete production. The quality of the concrete in the existing works has been checked by core drilling and laboratory testing. The appropriate specifications for concrete production and placement will be developed in a subsequent stage of the project as part of the technical specifications for the Contractor(s).
25. There were no design studies of elastic and plastic nonlinear behavior of material using cycle model with specification of displacements and excess pore pressure appearing in the core during an earthquake. *Comment expressed by stakeholder from Uzbekistan.*	The stability analyses conducted in the assessment studies are deemed sufficient for verifying the technical feasibility of the project. More detailed stability calculations are foreseen in the detailed design stage of the project.
26. No justification was provided for application of non-soil materials for construction of a waterproof dam element at the first stage. Otherwise, acceptable structural alternatives should be developed. *Comment expressed by stakeholder from Uzbekistan.*	The watertightness of the Stage 1 dam is foreseen to be accomplished through a bituminous curtain. Such technology has already been used successfully on higher dams with a longer lifetime and under more critical climatic conditions during construction.
27. Sufficient justification should be also provided for the necessity and possibility of two observation tunnels drifting in the dam core at elevations of 1120 and 1240, without violation of the normal operation conditions. *Comment expressed by stakeholder from Uzbekistan.*	The two observation adits in the core of the dam are a provision of the initial design. The Consultant has recommended to not implement those adits.

Comments	Response
II. Economics	
28. It seems that the economic analysis does not take into account the impact on the social aspects and the significant loss of irrigation benefits downstream? Have the consultants looked at Dukhovny & Sorokin's paper? *Comment expressed by stakeholder from Uzbekistan.*	In the assessment studies, the operational modeling of the Vakhsh cascade assumes there is no change to the seasonal operating pattern for flows downstream of Nurek compared with the situation that would exist in the No-Rogun case. As such, based on the maintenance of the stipulated operating pattern, operation of Rogun would not result in impacts downstream.The paper referred to assumes a different operating regime and is thus not relevant to the economic analysis carried out in the assessment studies.
29. Why was Rogun not considered as a small dam Run-of-River (RoR) scheme or a diversion type RoR scheme? *Comment expressed by stakeholder from Uzbekistan.*	A critical issue for development on the Vakhsh river is the management of the very large amount of sediment transported by the river. Low height dams upstream of Nurek would have limited storage capacity in relation to the annual sediment inflow. Such dams would thus have short useful lives and are therefore not suitable options for hydropower development without a significant reservoir volume created upstream of them. This is relevant for any dam development on high sediment laden rivers in the region. The Nurek reservoir is already partly filled with sediment and one of the benefits of the Rogun project is that it would delay further sediment build-up in Nurek for several decades.
30. Has a coal plant been considered? *Comment expressed by stakeholder from Uzbekistan.*	Based on available domestic coal resources, about 1300 MW of coal-fired power is assumed to be available in the least cost generation planning assessment.
31. Can Rogun be replaced by re-establishment of the Central Asian Transmission grid? *Comment expressed by stakeholder from Uzbekistan.*	One of the primary reasons for using an interregional model to prepare a least cost generation plan for the region was to ensure that the benefits of power exchange between countries could be assessed, notably the exchange of hydro generation in summer and thermal generation in winter. The assessment was done with various interconnection assumptions, including well-developed interconnection between all countries. The outcome shows that Rogun is part of the least cost solution in all cases.
32. 15% less water will be discharged during impoundment. What is the impact of this on the economic analysis? *Comment expressed by stakeholder from the Kyrgyz Republic.*	The calculation of the energy generated from the cascade during the filling phase has taken into account the volume of water to be stored in the reservoir. The volume stored annually during the filling stage will be up to 1.2 bcm, which is about 6% of the average annual Vakhsh flow.
33. How is the impact of social risks in Afghanistan and Pakistan taken into account in the economic analysis bearing in mind that it could have an impact on disruption of the transmission lines? *Comment expressed by stakeholder from the Kyrgyz Republic.*	Experience to date has been that infrastructure (including transmission lines) has not been targeted either in Afghanistan or Pakistan, and a number of transmission lines are functioning without interruption. Furthermore, any disruption due to damages to individual towers could be overcome by rapid repairs/replacements and such a disruption would not last for more than a week or so. The economic impact would be

Comments	Response
	negligible. A more serious scenario would be a long-term interruption from any cause whatsoever. In the economic analysis, this scenario was assessed and it was determined that the NPV would become negative only if there is no export revenue from Pakistan and Afghanistan for more than 12 years. If such a situation were to develop, Tajikistan could explore other potential export markets during this period.
34. What is the firm output of Rogun? *Comment expressed by stakeholder from the Kyrgyz Republic.*	The firm energy is defined as the minimum energy available 95% of the time. For the Rogun 1290 alternative, the firm energy increase from the Vakhsh cascade is estimated to be 9,832 GWh compared to the scenario without Rogun. The average annual energy increase is 15,357 GWh.
35. If Tajikistan also uses the share of water allocated to downstream countries to generate electricity, how will the downstream countries be reimbursed? *Comment expressed by stakeholder from Uzbekistan.*	The Government of Tajikistan has committed: • To use only the Tajik allocation of water, as fixed by the ICWC in accordance with the existing agreements and practices on Amu Darya Basin water allocation, each year for the initial filling of the Rogun reservoir. • To maintain summer water transfer at the same level as is currently being transferred at Nurek (i.e. 4.2 bcm). Thus, neither the initial filling nor the operation of Rogun would entail the use of the water allocated to downstream countries to generate electricity.
36. Was consideration given to the case where Pakistan might not buy power from Rogun? *Comment expressed by stakeholder from Uzbekistan.*	Such a scenario was analyzed in the economic analysis and it was determined that the NPV would become negative only if there were no exports to Pakistan (and Afghanistan) for more than 12 years. If such a situation were to develop, Tajikistan could explore other potential export markets during this period.
37. Will the turbine and generator equipment purchased in the past for the Rogun project, for early generation, be used in the proposed Rogun development? *Comment expressed by stakeholder from Tajikistan.*	There are components of two generation units (Units 5 & 6) that were purchased prior to the current assessment studies. The existing equipment will be used to the maximum extent possible even if it requires some modification.
38. In the assessment of a least cost generation expansion plan, several new Run-of-River (RoR) hydropower plants were assumed to be built along with imports from Kyrgyz Republic. What RoR plants are needed and how much electricity imports are required from Kyrgyz Republic in the years beyond 2030? *Comment expressed by stakeholder from the Kyrgyz Republic.*	There are 90 different least-cost generation expansion plans analyzed for the ten different alternatives covered by the assessment studies (nine Rogun alternatives and a No-Rogun alternative). The number and timing of new Run-of-River (RoR) hydropower plants to be built, along with imports from Kyrgyz Republic, varies for each expansion plan. In all expansion plans, at least one large storage HPP is included as the main addition to the Tajik power system. This large storage HPP is Rogun for the nine Rogun alternatives and Dashtijum for the No-Rogun scenario.

Comments	Response
	Net imports from (or through) the Kyrgyz Republic to meet Tajik domestic winter demand are required until Rogun is at full production in 2026; subsequently net winter imports in any significant amount are not required until 2033. The quantity of imports depends on the Rogun alternative being considered. For the highest dam alternative, the model shows imports of around 1650 GWh in the base case from 2036, growing to around 4300 GWh in 2045. There are also summer imports from the Kyrgyz Republic that are wheeled through to Pakistan and Afghanistan.
39. A recent international study suggests that large hydropower projects are not economically justified. Also, large dams in the USA are being dismantled. How can Rogun be justified? *Comment expressed by stakeholder from Uzbekistan.*	A recent paper from the Saïd Business School and Department of Statistics, Oxford University, UK (titled "Should we build more large dams? The actual cost of hydropower megaproject development", 2013) criticized systematic cost and schedule overruns of large hydropower projects. This paper has a number of deficiencies, which have been pointed out in various responses. The Consultants have prepared the cost estimates using a detailed methodology, and these have been reviewed by an independent expert. The cost estimates include a suitable contingency allowance that varies for each element of the work. One of the main factors contributing to cost overruns in large dam projects is the impact of unanticipated unfavorable geological conditions. In the Rogun case, the existing work on site has substantially removed the risk of geological uncertainty. Furthermore, the economic analysis has analyzed a very large number of sensitivity scenarios, including cost overruns. It has been assessed that, for the highest dam alternative, the actual cost would need to increase by 31% above the cost estimate for the NPV to reduce to zero using a 10% discount rate.
40. Could the consultants release the methodologies and results that their team used in preparing the Economic Assessment component of the TEAS Phase 2 report? *Comment expressed by stakeholder from Finland.*	The methodology, assumptions and results of the Economic Assessment are given in Chapter 5.1 of the TEAS Phase 2 Summary report, which was publicly disclosed in June 2014.
III. Alternatives to Rogun (least cost expansion plan)	
41. The economic assessment suggested lower CO_2 emissions without Rogun. Is this the result of more run of river projects? *Comment expressed by stakeholder from Uzbekistan.*	Yes. In the No-Rogun case, the very large amount of new RoR hydro required to meet demand growth in the last years of the forecast results in larger surplus summer energy production, the export of which would result in regional CO_2 emission savings being higher. Prior to this, the emission reductions vary over time with the respective build of Rogun and Dashtijum (the latter in the No-Rogun case).
42. Did we consider lowering the height of the dam significantly and instead building a cascade of smaller dams? *Comment expressed by stakeholder from the Kyrgyz Republic.*	A critical issue for development on the Vakhsh river is the management of the very large amount of sediment transported by the river. Low height dams upstream of Nurek would have limited storage capacity in relation to the annual sediment inflow. Such dams would thus have short useful lives and are therefore not suitable options for hydropower development without a significant reservoir volume created

Comments	Response
	upstream. This is relevant for any dam development on high sediment laden rivers in the region. The Nurek reservoir is already partly filled with sediment and one of the benefits of the Rogun project is that it would delay further sediment build-up in Nurek for several decades.
IV. Water Management	
Hydrology	
43. What is the amount of evaporation? How was this taken into account? *Comment expressed by stakeholder from Uzbekistan.*	The expected amount of evaporation is not significant and does not impact the economic analysis.
44. How is the impact of the climate change taken into account? *Comment expressed by stakeholders from Tajikistan and Uzbekistan.*	The assessment of the potential impacts of climate change indicates that the most likely scenario is a gradual decrease in flood peak volumes because of earlier and longer melt seasons linked to increased temperature and glacier retreat. A change in the annual distribution of discharge could also lead to an increase in the value of the average annual discharge. For the assessment study, the possible reduction in the flood peaks and increase in average annual discharge have not been considered. This is a conservative approach.
45. As a result of climate change what is the expected increase in annual inflow. What temperature rises are foreseeable over the project lifetime? *Comment expressed by stakeholder from the Kyrgyz Republic.*	The assessment of the potential impacts of climate change indicates that the most likely scenario is a gradual decrease in flood peak volumes because of earlier and longer melt seasons linked to increased temperature and glacier retreat. A rise in average temperature could also lead to a temporary increase in the value of the average annual discharge linked to the release of the water stored in the glaciers. The best indication of climate change implications are those prepared by the IPCC, which in the latest 2014 report anticipate for Central Asia no practical change in precipitation and an increase up to 2-2.5 °C towards the end of the 21st century. For the assessment study, the possible reduction in the flood peaks and increase in average annual discharge have not been considered. This is a conservative approach.
46. What hydrometeorological stations were used for the hydrological assessments? Was up to date data used? *Comment expressed by stakeholder from the Kyrgyz Republic.*	Inflows at Rogun Dam site are taken from the following sources: • From 1932 to 1972, discharges recorded at Tutkaul gauging station are used. • From 1973 to 1988, discharges at Tutkaul are reconstituted based on observations made at Komsomolabad. Correlations between the two stations are based on period of common recording (1949-1957 and 1963-1972). • From 1988 to 2003: discharges are calculated based on data on Nurek inflows issued by the Nurek Maintenance Service.

Comments	Response
47. Hydrological data from 1992-2010 has been used in the cascade modeling. This is not satisfactory. Also, the impact of sedimentation on the regulation capacity of Rogun has not been modeled properly. *Comment expressed by stakeholder from Uzbekistan.*	The inflow data used by the cascade model consists of monthly discharges from April 1932 to March 2008. A detailed analysis has been carried out to assess the impact of sedimentation on the regulation capacity of Rogun, conservatively assuming an annual sediment inflow of 100 hm3. As sediment builds in the Rogun reservoir in the longer term, the regulation role of Rogun will be shared with the available live storage in Nurek to ensure that the operating assumption can be maintained.
48. Have the hydrological data from other countries been utilized? *Comment expressed by stakeholder from Turkmenistan.*	This aspect is covered in detail in the report on Hydrology, which was previously disclosed, consulted on with riparian representatives and civil society groups, and is available online.
49. Hydrogeology: no detailed information on the hydrogeological conditions in the Ionakhsh fault has been provided. *Comment expressed by stakeholder from Uzbekistan.*	Please refer to the report on Geology and the Phase 0 Summary, both of which were previously disclosed, consulted on with riparian representatives and civil society groups, and made publicly available online.
50. The Consultants of the assessments should have found out that the historical regime of Vakhsh is a different figure. The historical period should be not from 1991 to 2014, but from 1973 to 1990 when winter discharges, ensured by summer flows, were 2.615 km3 a year. According to hydrological calculations, this regime will cause a 10% decrease in water availability in only 30 out of 100 years, 20% in 14 years, 30% in 28 years, 40% in 12 years, and 50 or more percent in 16 years! Here we should remember 2000 and 2001, when, for two years in a row, the average supply of water in the Amu Darya basin was only 75% of the standard rate. In these years Tajikistan met its demand for water for 87%, while downstream regions met it for only 50%. This caused the withdrawal of 190,000 ha of land from irrigation, affecting over 100,000 people. In 2001, Uzbekistan's overall damage amounted to hundreds of millions of US dollars, which is written in Rogun operation scenarios published in 2007. If these damages were included in cost effectiveness calculations of the proposed HPP, the final results (which still remain secret) would possibly disappoint the Consultants, as this happened with Lahmeyer's project. *Comment expressed by stakeholder from Uzbekistan.*	As stated in the various reports, the assessment is based on the summer to winter transfers resulting from the operation of the Vakhsh cascade over the past twenty-plus years. The figures for this period are in accordance with the limits established each year by the ICWC, consistent with the provisions of the Almaty Agreement of 1992. An annual transfer from summer flows to winter flows of 4.2 bcm is consistent with the current transfer using the regulating capacity of the Nurek reservoir in line with the ICWC decisions, and thus safeguards the interests of the downstream riparians. The figures given in the second and third paragraphs are not applicable to the intended operating pattern for the Rogun project. The stipulated operating pattern for the project will not result in any change in summer Vakhsh releases downstream of the cascade compared to the No-Rogun scenario.
Flow regime – filling	
51. The presentation suggested that the Tajik full share of water is 1.5 bcm per annum whereas only 1.2 bcm per annum is being used for reservoir filling. Does that mean that Tajikistan has not used its full share to fill the reservoir? *Comment expressed by stakeholder from Tajikistan.*	Tajikistan's average unused allocation of water in the Amu Darya basin is 1.57 bcm, of which the average unutilized allocation of water on the Vakhsh river is 1.2 bcm. The Government of Tajikistan intends to fully utilize its allocation in future, including using it for the initial filling of the Rogun reservoir.

Comments	Response
Flow regime – operations	
52. The TEAS presentation on Water Management showed that Nurek reservoir level is to be held at around its FSL all year. What is the justification of this? It was also indicated that Rogun will be emptied each year and this will be a major change in the dynamic of water use in the region. *Comment expressed by stakeholder from Uzbekistan.*	From an energy generation perspective, retaining Nurek near FSL while regulating the flows with Rogun maximizes the energy production of the cascade. The combined operation of the two reservoirs is to be optimized in the detailed design stage and also periodically during the operating life of the project. Rogun reservoir will not be emptied each year. It will be lowered on average by around 30m (for the highest dam alternative) by the end of winter with an inherent transfer of 4.2 bcm of water stored in summer through to winter. This will use less than one-third of the available combined live storage of the Rogun and Nurek reservoirs. This is the same water storage transfer regime that currently applies with the operation of the Nurek reservoir.
53. The model assumes that 4.2 bcm will be transferred from summer to winter. It is more likely that this transfer will be 6.2 bcm. A guarantee is needed that this transfer will be limited to 4.2 bcm. *Comment expressed by stakeholder from Uzbekistan.*	There is no analytical basis for stating that the more likely transfer will be 6.2 bcm. This is an arbitrary number. The assessment study has been based on the stated intent of the Government of Tajikistan to maintain summer water transfer at the same level as is currently being transferred at Nurek (i.e. 4.2 bcm). Thus operation of the Rogun reservoir will not entail any changes in downstream seasonal flow pattern. The Riparian Countries could initiate discussions on an appropriate institutional arrangement for monitoring reservoir operation to ensure compliance with the prescribed operating regime.
54. Current operational regime of the cascade is not acceptable for Turkmenistan and Uzbekistan. *Comment expressed by stakeholder from Uzbekistan.*	The current operational regime of the cascade is based on the allocations made by the ICWC. According to Article 11 of the Almaty Agreement of 1992, the decisions taken by the ICWC are binding. The assessment studies have assumed that the future operational regime of the Vakhsh cascade will be based on the current system of water allocations carried out under the Interstate Commission for Water Coordination (ICWC).
55. Summer water transfer to the winter could cause several problems to downstream countries: shortage of water in the summer and large floods in the winter. *Comment expressed by stakeholder from Turkmenistan.*	The Government of the Republic of Tajikistan has stated its intention to maintain the summer water transfer at the same level as is currently being transferred at Nurek (i.e. 4.2 bcm). Operation of the Rogun reservoir will thus not entail any changes in downstream seasonal flow pattern.
56. Would the summer power production have impact on the flora and fauna? *Comment expressed by stakeholder from Turkmenistan.*	No as operation of the Rogun reservoir will not entail any changes in downstream seasonal flow pattern.
57. The expected Amu Darya flow when Rogun HPP is commissioned and its socioeconomic effects: The International Law and the Water Conventions, as well as the World Bank's Operational Policies prescribe to consider interests of the downstream countries. We see no evaluation of the multiyear supposed operational regime apart from the	The assessment studies simulated operation using the entire 78 years of available hydrological record, with annual transfers from summer flows to winter flows limited to 4.2 bcm. This limitation is consistent with ICWC decisions and the current transfer using the regulating capacity of the Nurek reservoir, and thus safeguards the

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indicators of the three typical hydrological years, which fail to give any clear signs on how the Vakhsh Cascade will take the proposed natural fluctuations of the runoff, and increased changes of the climate. Interests of the neighboring countries are obviously disregarded at all. Subject to its experience and rules, the World Bank would have to understand that there is a historical regime – not the regime of 1991-2014, but the regime of 1930-90. In the second place, the World Bank would have to make the contractors to simulate the whole multi-year regime, and also to assess, whether it is possible to fix the multi-year regulation subject to the release parameters fixed in the project, and select an option, which is more suitable for all countries and approve it under the guarantee of the World Bank, as it was done for the Indus River 54 years ago. The World Bank seems to have demonstrated more responsibility for observance of all countries releases at that time. *Comment expressed by stakeholder from Uzbekistan.*	interests of the downstream riparians. The Government of the Republic of Tajikistan has stated its intention to follow this annual operational regime. There is no difficulty in abiding by this limitation whatever the runoff fluctuation and this does not require a multiyear operational pattern. The Riparian Countries could initiate discussions on an appropriate institutional arrangement for monitoring reservoir operation to ensure compliance with the prescribed operating regime. In case the Riparian Countries are interested in using the additional storage capacity provided by the Rogun reservoir, they could discuss and agree on a modified operating pattern that could provide additional benefits to be shared between the Countries, and a multiyear operational pattern could then be studied in this context.
58. Given that the purpose of Rogun operation is, at best, to ensure that the discharge of the Nurek remains unchanged, compared to current figures where Uzbekistan and Turkmenistan lose 4.2 km3 of water annually, the Consultants of the assessments acknowledge the significant damages caused to these two economies (however, without providing specific calculations). It should be noted that the Consultants disregard that, if more water is shifted to the winter period, this will cause further deterioration in water supply in Tajikistan itself. We believe that the flow of the Amu Darya should be the key determinant in making the decision whether to launch construction of Rogun HPP and this issue will require additional and deeper assessment and approvals. *Comment expressed by stakeholder from Uzbekistan.*	The summer to winter transfer of flows of 4.2 bcmis the agreed operational regime consistent with the ICWC framework, and the release of this flow in winter is included in the ICWC allocation to Uzbekistan and Turkmenistan. The scenario of "maximization of winter energy generation" is a risk scenario and is not the stipulated operational regime. The assessment studies demonstrate that the project is feasible if it is operated so as to limit summer to winter transfers of Vakhsh flows to 4.2 bcm, as has been the practice for the past twenty-plus years. The Government of Tajikistan has committed to follow this stipulated operational regime in accordance with the existing agreements and water management practices during operation of Rogun HPP and the whole Vakhsh cascade. The Riparian Countries could initiate discussions on an appropriate institutional arrangement for monitoring reservoir operation to ensure compliance with the prescribed operating regime.
59. It is not clear what modeling tools were used by the Consultants to analyze the discharge regime. In-depth forecasts analysis shows that according to the multi-year series compliance with the operating energy requirements of the Rogun HPP to the discharge regime causes increase of the disastrous years below 60% of the water supply up to 25 years of 100. It is required to consider conduct of the hydropower sites owners reasoned with their commercial interests to understand that all irrigated agriculture of the Amu Darya basin will depend on the interests and political preferences of the Tajikistan ruling elite. That is why, it is very important to comprehensively assess such key aspect as the discharge regime of Amu Darya using a reliable and generally proven tool, which was, unfortunately, not used in all assessments conducted so far. The appraisals can be accepted as reliable ones	The simulation model developed for the assessment studies is based on water volume balances. Operation constraints are imposed based on a "required water release", which comprises a monthly discharge that has to be released downstream of the reservoir. The model is not meant to predict what will be the future water releases but is meant to calculate the maximum energy than can be produced by the whole cascade without changing the present operation principle for the Vakhsh cascade other than the change due to the full use of Tajik water allocation. There appears to be a misunderstanding regarding the period used for calibration of the model and the period used for the simulation of the reservoir operation. The calibration period used is the longest common period between the inflows series

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only subject to the additional work in this direction. *Comment expressed by stakeholder from Uzbekistan.*	from 1932 to 2008 and the Nurek operation data from 1991 to 2010, i.e. 1991-2008. The simulation period used is the longest inflow series available: 1932-2008.
60. Rogun HPP operation procedures and rules: Another issue which, in our opinion, remained unanswered is how to prevent the "hydrological pressure" of the purely power generation regime, which makes cooperation impossible. Attempts to devise (with assistance from the Asian Development Bank) in 2005-2009 procedures and rules for the operation of the cascade in the Syr Darya and then the Amu Darya were objected and obstructed by upstream energy producers (Kyrgyz Republic and Tajikistan). These countries benefit from the possibility to vary river flows in order to maximize electricity generation, without taking into account the interests of downstream water consumers. To devise acceptable solutions with respect to construction of Rogun HPP, which would make it possible to avoid conflicts, the Consultants of assessments should have modeled the multi-year flow in its various combinations (medium, dry and wet years) and projected (if possible) multi-year controls for discharges that determine Rogun HPP operation scenarios. The rules for the Vakhsh Cascade operation, which would be acceptable to all countries and approved by them in a respective agreement, could form a basis for sustainable water use in the Amu Darya, under the World Bank's guarantee, as this was arranged with respect to the Indus between India and Pakistan 54 years ago. Consequently, the assessments should recommend mutually acceptable procedures, rules and parameters for Rogun HPP operation. They should be based on the model tools, which were not made available to us during or after consultations despite the promises to provide them to local specialists from design documents. *Comment expressed by stakeholder from Uzbekistan.*	The intended operation of the Rogun project is based on an annual pattern and does not require consideration of a multiyear operational pattern. The joint operation of Rogun and Nurek reservoirs analyzed in the assessment studies is based on maintaining the same annual summer-to-winter flow transfer experienced during the last twenty-plus years. However, if the Riparian Countries are interested in using the additional storage capacity provided by the Rogun reservoir, they could discuss and agree on a modified operating pattern that could provide additional benefits to be shared between the Countries, and a multiyear operational pattern could then be studied in this context. The Riparian Countries could initiate discussions on an appropriate institutional arrangement for monitoring reservoir operation to ensure compliance with the prescribed operating regime.
61. The existing international legislative framework should form the basis for assessment and search for a consensus as to how to mitigate possible adverse impacts of the Rogun HPP. Consultants of the assessments are wrong in their interpretation of the existing legislative framework governing the relationships between Central Asian countries with respect to the management and use of water resources. In particular, the Agreement on Cooperation in the Joint Management of the Use and Protection of Water Resources of International Water Courses (Almaty, 1992) obliges the states "to ensure strict compliance with the approved procedure and established rules for the use and protection of water resources," which means the maintenance of the procedure established before independence. In post-independence practice this procedure and the discharge regime are not observed. However, as we already noted, despite these provisions, the historical discharge was	The Consultants have carried out the assessment based on the water allocation practice being followed in the region since 1992. The existing water allocation system in the Amu Darya basin is based on the Almaty Agreement of 1992. By this Agreement, the Inter-state Commission for Water Management (ICWC) was established. The ICWC was assigned the responsibility to develop and approve the limits annually for each of the Republics and the region as a whole, as well as the corresponding schedules of the operation modes of reservoirs - and to adjust these according to the updated forecasts on water availability. Article 11 of the Agreement states that "The decisions made by the Inter-state Commission for Water Management (ICWC) on issues of compliance with the established limits of water withdrawals, rational use and protection of water resources are binding for all water consumers and water users".

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calculated using post-independence data while the possible discharge was not carefully studied. Yet, one of the key conclusions state that, "The proposed options for the Rogun Dam will not affect the seasonal flow downstream the Nurek and […] operation [will be] in strict compliance with the existing agreements and water distribution practices." For an unbiased assessment to be possible, Tajikistan's disrespect for its obligation to ensure stable water supply to downstream countries and ecosystems should not be veiled. It should be carefully studied and ways to eliminate such practices in the future should be found so that downstream countries obtain convincing guarantees that Tajikistan will perform its obligations in the future despite the fact that Tajik power producers will have a practically unrestricted opportunity to control the flow with the Rogun HPP if it is constructed. In this connection, what concerns us are the proposals by some Consultants of the assessments, which were stated during the fifth information-sharing and consultation meeting on the Rogun HPP on July 17-18 in Almaty: "Construction of Rogun is feasible while its operation regimes can be agreed later as work proceeds." In addition, in accordance with the Tajik laws, the proposed activities with possible transboundary impacts must be assessed in accordance with the Convention on Environmental Impact Assessment in a Transboundary Context, which states that, "transboundary impact" includes, inter alia, effects on cultural heritage or socioeconomic conditions resulting from alterations to those factors in other countries (Articles 1(vii) and 1(viii)). However, as we already stated, the assessment reports do not elaborate, in a proper manner, on the potential socioeconomic effects of construction of Rogun HPP in downstream countries. To help the riparian countries ensure a fair and reasonable use of water resources and properly protect the ecosystems of the Amu Darya (being an international water course in accordance with international law), all issues need to be examined in a more careful and comprehensive manner and an effective mechanism, which would guarantee unconditional compliance with international law and the cascade operation regime agreed by all riparian countries, needs to be developed. *Comment expressed by stakeholder from Uzbekistan.*	It is reiterated that: - The stipulated operation of the Rogun reservoir would maintain the same seasonal downstream flow pattern as would exist in the No-Rogun scenario. - The Riparian Countries could initiate discussions on an appropriate institutional arrangement for monitoring reservoir operation to ensure compliance with the prescribed operating regime.
62. Protection of water ecosystems: The assessments do not pay due attention to compliance with international law governing the protection of watercourses. In particular, they do not provide reasonably substantiated and convincing calculations of the guaranteed (not recommended) minimum flow in the river, which is today an obligatory requirement of international common law. The ESIA report (Chapter 8) recommends that a minimum flow from Rogun HPP be maintained at not less than 10 m^3/s. However, the downstream flow in the Vakhsh is controlled at Nurek, not Rogun. This is insufficient, because at this level of discharge from	The minimum flows will be in winter and these can be maintained unchanged downstream of Nurek. The 10 m^3/s minimum flow recommended in the ESIA is a minimum flow requirement for the reach between Rogun and Nurek based on environmental considerations. Actual flows will almost always be far greater. It has been assumed that artificial floods to restore the natural dynamics would be made within the water allocation practice currently in place and in combination with appropriate flood control measures.

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Rogun and transit discharges through the Nurek reservoir (and this situation can be modeled because the level of water in the Nurek reservoir is taken as constant) the discharge downstream the Vakhsh Cascade can be below the minimum set by operational requirements. Certain environmental discharges should be foreseen for the Vakhsh where it approaches the Nurek reservoir and downstream the reservoir. These discharges can be calculated based on standard sanitary discharge rates and water intake for irrigation: through the Dangara tunnel from the Nurek reservoir (100 m3/s), the Yavan tunnel (75 m3/s), and the Vakhsh main canal (230 m3/s). Rogun's minimal discharges can be adjusted to these environmental discharges. The ESIA report (Chapter 12.5.4.2) considers the possibility of making artificial floods "to restore some of the natural dynamics" of the Vakhsh. These floods, which are planned for early summer in extremely wet years, will increase water losses in the basin, which could be avoided if excess water in wet years is used to fill water reservoirs and, thus, ensure the maximum effect from the multi-year flow control. Artificial floods to restore the natural dynamics should only be made when they do not contradict the multi-year control principles and in combination with flood control. *Comment expressed by stakeholder from Uzbekistan.*	
V. Implementation and Risk Management	
Schedule	
63. Duration of construction has been taken to be 13 years. Is it not more likely that it would be 20-25 years? *Comment expressed by stakeholder from Uzbekistan.*	A detailed construction schedule has been developed with the help of construction experts having experience of constructing large dams. The construction schedule is based on achieving the best rate of progress with a practical level of availability of construction equipment and productivity rates. The estimated period of 13 years for constructing the highest alternative is reasonable.
64. There appears to be a break in the construction program of around 2.5 years. Why is this? *Comment expressed by stakeholder from Tajikistan.*	There is no planned break in the construction effort once dam fill placement commences. Fill is placed upstream initially to quickly reach the crest of the Stage 1 dam (El. 1150 for the highest dam alternative) so that early generation can commence. Work then proceeds on placing material in the downstream dam section and thus there is no increase in the dam level until the downstream fill also reaches the crest level of the Stage1 dam.
65. Why isn't the schedule based on a regular annual expenditure level? It appears that investment will be around USD $350 million per annum – is this realistic? *Comment expressed by stakeholder from Tajikistan.*	The construction schedule is based on achieving the best rate of progress with a practical level of availability of construction equipment and productivity rates. The implementation schedule defines the annual financing requirements. These are not excessive for a project of this size.
Risks	
66. There are six risks that remain defined as "moderate" even after mitigation has been	The risk assessment ratings are appropriate at this assessment stage and serve to

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applied. Why is this, since these are serious risks and should be reduced to no risk what so ever? *Comment expressed by stakeholder from Uzbekistan.*	highlight the importance of effective implementation of the proposed mitigation actions. Provided that the mitigation measures are appropriately implemented in the detailed design, construction and implementation phases, the risk rating could be progressively reduced.
67. If a dam failure occurs there will need to be a guarantor to rectify serious damage. How will this be done? *Comment expressed by stakeholder from Uzbekistan.*	As would be the case for any large dam, adequate measures would need to be taken in the design, construction and operation of the project to comply with international safety norms.
68. What is the construction cost and is it under-estimated? *Comment expressed by stakeholder from Uzbekistan.*	The estimated construction cost value is not available for public release as it is commercially confidential information prior to construction tendering. The Consultants have prepared detailed cost estimates and an independent expert has reviewed these. The cost estimates include a suitable contingency allowance that varies for each element of the work. One of the main factors contributing to cost overruns in large dam projects is the impact of unanticipated unfavorable geological conditions. In the Rogun case, the existing work on site has substantially removed the risk of geological uncertainty. Furthermore, the economic analysis has analyzed a very large number of sensitivity scenarios, including cost overruns. It has been assessed that for the highest dam alternative the actual cost would need to increase by 31% above the cost estimate for the NPV to reduce to zero using a 10% discount rate.
69. Has reservoir-triggered seismicity been correctly recognized and accounted for? *Comment expressed by stakeholder from Uzbekistan.*	The reservoir-triggered seismicity (RTS) has been studied in detail including data collected on RTS at Nurek. The earthquake that could be generated by RTS at the Rogun site would have a much lower magnitude than the Maximum Credible Earthquake (MCE) that was selected as the design earthquake for the dam.
70. The TEAS report only poorly mentions that landslides, rock falls, and ground movements in general can be triggered by earthquake and dam impounding triggered seismicity. These phenomena, in Tajikistan, are historically known with result of river damming and pool or lake creation. This argument is only partially quoted by the Institute of Geology, Earthquake Engineering and Seismology of the Academy of Sciences of the Republic of Tajikistan. *Comment expressed by stakeholder from Italy.*	A thorough survey of the potential instabilities and landslides in the reservoir area had been carried out in the original studies. This has been reviewed by the Consultant and found to be sufficient for the assessment studies. As part of the recommendations of the Consultant for the next stages of the project, it is foreseen to design specific measures (reshaping of banks, anchoring systems, drainage and monitoring) so as to ensure their stability against seismic loads and raising of the water level during impoundment. The issue of possible creation of natural dams is not a critical factor for the feasibility of the Rogun project.
71. Residual risks for the salt wedge and the powerhouse cavern have been classified as "moderate". This is unacceptable bearing in mind that considerable mitigation measures are	Risks related to the salt wedge and the powerhouse cavern have been classified as moderate because satisfactory mitigation measures have been defined.

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yet to be implemented. *Comment expressed by stakeholder from Uzbekistan.*	
72. Security of the Rogun HPP: We would also like to point out that the issues of earthquake resistance and salt erosion of soil in the basement of the dam are not given due regard, while these are catastrophic risks that can cause the destruction of the Rogun hydro facilities and the entire Vakhsh Cascade. TEAS includes the results of survey conducted in 2012. The work scope is extremely small. Probably, this resulted from financing problems and schedule. The main work content is a mere description of well-known information. The problems appeared during construction and its suspension, were basically not solved. The most important problem remained also unsolved (What should be done with a turbine hall and transformers bay? How should they be fixed? Is it possible to fix them at all?). No specific recommendations were provided regarding the mudflow danger of Obishur river. It is not clear, what mud dam is constructed, if recommendations on further river mudflow potential studies are provided. The main and essential impression from the TEAS: the work does not summarize all accumulated factual materials; does not cover the whole spectrum of the existing problems; and does not define their solutions. PMF technique is widely used for the regions of Southeast Asia and other countries, where the maximum water flow rates are created exclusively by rains. For rivers in Central Asia, in particular Vakhsh, the maximum water flow rates are created by melting snowfields and glaciers. Under Vakhsh river basin conditions the PMF should be based on the marginal maximization of air temperature with other key parameters (rainfall, snow cover, sunshine duration, cloudiness, etc.). In PMF calculations the author of the report used mainly temperature characteristics (degree-day factor), which is somewhat simplified model of the snow and ice melting process. The PMF calculations included only meteorological data for a short 40-year period (till 1980) and only for two meteorological stations (available for Vakhsh river basin, or representative). Linear correlations between daily water consumption and degree-day factor were defined, as the report says, with a significant correlation coefficient R2, but without specifying its value. It is possible to clarify and confirm the calculated maximum water flow rate measured by the PMF method (8160 m3/s) providing the availability of a technique and corresponding software, and involving additional parameters in the design scheme and a larger volume of hydrological and meteorological data (till 2012 inclusively). Throughput capacity of the Vakhsh cascade existing structures on Vakhsh river is designed	Substantial analytical work has been undertaken to define the mitigation measures required to provide adequate safety against the risk of increased dissolution of the salt wedge. The large volume of data available from previous studies was carefully studied and additional investigation were carried out. New mathematical models were developed and used to analyze a number of potential scenarios. These aspects are covered in the Summary of the Phase 0 Report, which was previously disclosed and is available on the Web. Detailed deterministic and probabilistic seismic hazard assessments have been carried out to determine the appropriate design parameters, including the Safe Shutdown Earthquake. The studies have established that the proposed Rogun dam would be able to appropriately withstand these design earthquakes. The relevant information is provided in the Summary of the Phase II Report, which has been disclosed and is available on the Web. The remedial measures to be undertaken for the caverns of the turbine hall and transformer bay are covered in the Phase I Summary Report that was publicly disclosed prior to the October 2013 consultations. Both of these caverns can be used after implementation of the rehabilitation measures. A series of check dams are to be built on the Obishur to prevent mudflows from interfering with the Vakhsh flows downstream of the dam. The assessment of the PMF adopted a methodology appropriate for the Vakhsh catchment, and the results obtained were consistent with those obtained from other recent studies. The daily peak for the assessed PMF is 7,770 m3/sec. The two higher Rogun dam alternatives (1290 FSL and 1255 FSL) have been designed to manage the PMF so as to limit the downstream discharge to the current flood-handling capacity of the downstream cascade. If either of these alternatives is implemented, no additional facilities for augmenting the flood-handling capacity of the cascade will be needed for several decades. Eventually, when Rogun reservoir is sedimented to an extent that it can no longer attenuate the PMF sufficiently, the PMF will be discharged via the surface spillway. At this stage, additional facilities will be required at Nurek and possibly at other downstream projects to increase the flood-handling capacity of the downstream cascade. Regarding the issues listed under the heading “Conclusions on the Dam”, it is to be noted that: The type of dam, the location of the dam axis and the use of local construction

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for maximum water flow rate of 0.01% of exceedance probability, which is equal to 5400-5760 m3/s. Taking into account the results of new studies completed in 2014, discharge of the maximum water flow rate determined by PMF method (8160 m3/s) will require construction of additional discharge structures over the whole HPPs cascade. The issue of evaluating and updating of the maximum Vakhsh flow rate at the Rogun HPP site is still relevant. Conclusion on the Dam: Type of dam (rockfill dam with a soil core), the location of the dam axis, local construction materials and basic design solutions on the dam structure are fully consistent with the provisions of the initial technical design of high dam with crest elevation of 1300 m at NWL 1290 m, 1978 - 1981. There were no design studies of the dam in three-dimensional model taking into account the S-shape of the valley and high-dipping slopes, with specification of displacements and excess pore pressure appearing in the core during an earthquake. There were no design studies of elastic and plastic nonlinear behavior of material using cycle model with specification of displacements and excess pore pressure appearing in the core during an earthquake. No justification was provided for application of non-soil materials for construction of a waterproof dam element at the first stage. Otherwise, acceptable structural alternatives should be developed. Sufficient justification should be also provided for the necessity and possibility of two inspection galleries drifting in the dam core at elevations of 1120 and 1240, without violation of the normal operation conditions. In terms of tectonically active faults, it is necessary to consider the issue of creeping and coseismic displacements, which can reach 1 m in Ionakhsh fault. For Ionakhsh inclined planes these estimates show large uncertainties. Based on current knowledge, one should not ignore the fact that part of the displacements appear due to creeping and/or secondary faulting. This view should be carefully considered during the next phase of design. Possible internal block deformation between Ionakhsh and Gulizindan faults should be taken into account, as this block forms the foundation of the dam and dam-associated structures. As an alternative option to the construction of Rogun HPP, one should thoroughly consider the development of the energy resources of mid-, and small-scale hydraulic power industry in Tajikistan.	materials are largely consistent with the earlier design of the dam. However, a number of significant changes have been incorporated in the design (e.g. the fine content of the impervious core, the width of the filters, the nature of the fill material in the upstream portion of the dam, the processing requirements for the construction materials, etc.). Furthermore, very major changes have been made in the design of the flood management structures (both for construction floods and extreme floods) and in the sediment management approach. Both the design parameters used to ensure safety against extreme seismic events and extreme floods are significantly greater than that adopted in the original Soviet-era design. Thus the current feasibility-level design developed for the assessment studies is an appreciably safer design and meets current international standards. The assessment studies have recommended that a three-dimensional analysis be performed during the detailed design stage. The proposed dam design performs well using a two-dimensional analysis. The performance is expected to improve in the 3D model due to the S-shape of the valley and the narrow gorge that will limit the displacements of the dam. Analyses using non-linear properties of materials are not carried out for an assessment study. These are appropriately part of the analyses to be carried out in the detailed design stage. The recommendation for a bituminous core for the Stage I dam was based on a consideration of a number of alternative solutions. This aspect can be further optimized in the detailed design stage and has no impact on the viability of the project. There are no inspection galleries crossing the impervious core in the design developed by the Consultants for the assessment studies. The reference to the galleries given in Section 3.1.2.1 of the Phase II Summary refers to a provision in the previous design that is considered undesirable. As stated in the Phase II Summary, both creeping and coseismic displacements have been considered. For example, in order to withstand the effects of creeping and/or possible large displacements resulting from seismic events, a thick highly reinforced concrete lining divided into short stretches (rings) along the reach of the shear zone will be implemented for Diversion Tunnel 3 at both fault crossings (Ionakhsh Fault and Fault 35). Localized impacts of the various faults, including such aspects as possible internal block deformation between the Ionakhsh and Gulizindan Faults, will be studied in the detailed design stage. The sediment load carried by the various rivers is so great that run-of-river projects

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Based on the TEAS materials, it can be concluded that, to date there is a project with the main structural and layout solutions. However, the guidelines included in each section and related to the necessity for additional research, studies and detailed design work at the next stages, show that the consultants and the World Bank provided experts' review not for a full-scale project, but for the project idea with many uncertain parameters. In this regard, the consultant should have provided detailed recommendations on procedure of the next design stages development based on international experience, but not an opinion on feasibility of the Rogun HPP project. Full-scale review of the project can be implemented only after additional research, studies and detailed design work required according to the consultants' opinion, as well as specification of all key project parameters. What guarantees can the consultant or the World Bank provide for the fact that the contract will include additional research, studies and detailed design work? Who can guarantee that the results of additional research, studies and detailed design work will be presented for international experts' review? *Comment expressed by stakeholder from Uzbekistan.*	would have limited life spans unless there is a large reservoir upstream to trap the sediment. Furthermore, implementation of run-of-river projects, which would produce limited winter energy and significant summer energy, would result in enhancing the mismatch between the peak winter electricity demand and the peak summer generation. The assessment study has developed feasibility-level designs and established the feasibility of the project. For implementation, detailed designs will need to be developed and these will be reflected initially in tender documents and subsequently in construction drawings. The Consultants have made detailed recommendation on (i) specific aspects that will need to be taken into account in the detailed design stage, and (ii) the steps that would need to be taken to ensure implementation follows international good practice.
Phase 3 (further work based on recommendations)	
73. Understanding the existing gaps in assessments, the Consultants state, in practically each section of the TEAS and ESIA, that additional research, studies and detailed design work need to be implemented at subsequent project stages. As a result, they recommend devising a detailed project at the next stage, which should incorporate additional research, studies and detailed design work. This means that the process of international expert assessment and consultations needs to be continued. In addition, we need to request the Consultants to provide detailed recommendations as to how subsequent project stages should be developed. *Comment expressed by stakeholder from Uzbekistan.*	The assessment study has developed feasibility-level designs and established the feasibility of the project. For implementation, detailed designs will need to be developed and these will be reflected initially in tender documents and subsequently in greater detail in the construction drawings. The Consultants have made detailed recommendation on (i) specific aspects that will need to be taken into account in the detailed design stage, and (ii) the steps that would need to be taken to ensure implementation follows international good practice. The Panel of Experts has recommended expert oversight during the detailed design and construction stages - this is a standard process for such an important project.
74. Materials of the TEAS allow to conclude that of some design study with the mainly approved structural and layout decisions has been currently completed, but it is not clear, why each section then instructs on the additional surveys, studies and detailed design work to be fulfilled at the next design stages. The consultant is then to give detailed recommendations on the procedure applicable to drawing up the next design stages based on the world experience. It follows from the consultant's instructions that it is required to draw up the detailed design study to include the additional surveys, studies and the detailed design work, which is also to pass the international expertise. *Comment expressed by stakeholder from Uzbekistan.*	The assessment study has developed feasibility-level designs and established the feasibility of the project. For implementation, detailed designs will need to be developed and these will be reflected initially in tender documents and subsequently in construction drawings. The Consultants have made detailed recommendation on (i) specific aspects that will need to be taken into account in the detailed design stage, and (ii) the steps that would need to be taken to ensure implementation follows international good practice.
VI. Other Issues	

Comments	Response
75. Why is it suggested that Pyanj projects require regional co-operation while those on the Vakhsh do not? *Comment expressed by stakeholder from Uzbekistan.*	The Study reports do not state this. For the Vakhsh, the principal issues of regional interest are related to downstream seasonal releases and safety aspects. These are addressed extensively in the reports. The Pyanj is a shared river between Tajikistan and Afghanistan. Thus, in addition to the above issues of a regional nature, there would be implementation issues to be agreed between the two Countries.
76. Did the experts visit the site? *Comment expressed by stakeholder from Uzbekistan.*	There have been numerous site visits by all of the parties involved in the assessment studies (Consultants, Panels of Experts, Bank Team). Staff of the Consultants supervised the additional site investigations carried out.
77. Changed purpose of construction of Rogun HPP: The assessment reports state that the primary purpose of the Rogun HPP is to generate electricity to help Tajikistan overcome critical shortages of electricity in winter and meet future demand. This differs completely from the original purpose of this project. In particular, the reports totally ignore the interests of downstream countries in ensuring sustainable water supply in the context of the variable hydrological regime, which is aggravated by climate change, since the purpose of the Vakhsh flow control is to change the natural flow, with its highs in summer months, to an anti-natural pattern with higher winter flows. In addition, possible fluctuations in flow parameters are not addressed, which means that water supply in the middle and lower course of the river will be determined by uncertainties in commercial power generation. This fundamental change contradicts the existing commitments and needs to be additionally agreed with all stakeholders in the Amu Darya basin. *Comment expressed by stakeholder from Uzbekistan.*	The assessment studies have shown that the project is feasible even with the conservative assumptions that there would be no additional transfer of Vakhsh flows from summer to winter. This assumption takes into account the interests of downstream countries and is in accordance with the current water allocation practice being followed in the region. The studies do not preclude some form of mutually-beneficial cooperative operation that would be agreed between the stakeholders.

Annex D: Matrix of ESIA Comments Received and Responses

Comments	Response
I. Resettlement	
1. How does resettling 42 000 people achieve the World Bank's goals, including poverty reduction? Resettlement so far has had problems, with many people no longer having cattle and so it is not possible for them to continue animal husbandry, and some do not have vegetable gardens. *Comment expressed by stakeholder from Uzbekistan.*	The World Bank Operational Policy 4.12 is based on a number of key principles: (i) that resettlement should be avoided or minimized to the degree possible taking into consideration alternative project designs; (ii) where it is not feasible to avoid resettlement, resettlement activities should be conceived as sustainable development programs; and (iii) displaced persons should be assisted in their efforts to improve their livelihoods or at least to restore them to pre-displacement levels. Although resettlement can have negative impacts if not implemented properly, sometimes resettlement is necessary to accommodate for development projects with their own poverty reduction goals. The Government of Tajikistan has expressed its commitment to meet international good practice for Rogun resettlement should the project proceed.
2. The Government of Tajikistan noted that the resettlement program is dealing with people who live in difficult conditions in very remote canyons. People who have been resettled already have better hospitals, infrastructure, etc., and this is consistent with Tajikistan's domestic policy of improving conditions for people to give them basic services. In some ways, it is more efficient to achieve this policy by resettling people rather than trying to improve conditions in such remote locations. A video is available that illustrates highlights of the resettlement program. *Comment expressed by stakeholder from Tajikistan.*	This comment is acknowledged and does not require a response.
3. Situations more complex than Rogun – involving radioactivity, for example – have shown how complex and difficult resettlement can be. Even people moved away from radioactive sites have not been happy. For this reason, the goal for resettlement (and other issues) must be to meet international standards, and to ensure there are neutral observers and organizations to verify the results meet the goals. *Comment expressed by stakeholder from Kazakhstan.*	People generally do not want to have their lives disrupted and, as mentioned in the previous comment, successful resettlement can be very difficult. The RAP and RPF prepared for the Rogun project are being designed to meet international standards. The Government of Tajikistan has expressed its commitment to meet international good practice for Rogun resettlement should the project proceed.
4. Jergetal District is populated mainly by Kyrgyz people and interethnic conflicts can arise in the event of resettlement. *Comment expressed by stakeholder from the Kyrgyz Republic.*	The Jergetal district lies outside of the project affected area for resettlement.
5. The ESIA describes a somewhat different resettlement process than was discovered during 156 interviews conducted in 2013. Although Tajikistan has taken	An early evaluation/audit of the Resettlement Unit's work to date shows the work is generally good but that there are some areas where improvements are needed to meet

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important steps to improve, there are still serious gaps. *Comment expressed by stakeholder from Uzbekistan.*	the standard of international good practice. The RAP, RPF, and RA outline good international practice and also specific remedial actions for previously affected communities, including some retroactive actions for people who have already been resettled. This includes grievance measures and monitoring to ensure people have an appropriate mechanism for raising concerns.
6. It is recommended that the ESIA analyze legislation that will guide resettlement and that the program guarantee that all who will lose land will receive replacement land unless they decline, and that there will be no short- or long-term losses. *Comment expressed by stakeholder from Uzbekistan.*	The ESIA, the RAP, and the RPF evaluate the applicable legal framework in Tajikistan. In some cases, instead of direct land-for-land entitlements the RAP provides for other forms of compensation and livelihood support.
7. The resettlement process should be fully transparent, with NGOs being provided unfettered access to areas where people are resettled. *Comment expressed by stakeholder from Uzbekistan.*	The RAP and RPF are being developed in a consultative manner based on interactions with project affected people. The entitlements and mitigation measures including provision for ongoing consultations, monitoring, information disclosure and grievance redress mechanisms are included in the resettlement documents. All resettlement documents will be publically disclosed and available to interested stakeholders. The RAP and RPF provide for the inclusion of an independent Witness NGO as one of the measures to ensure transparency.
8. 1500 people have been relocated. What are the actual conditions? *Comment expressed by stakeholder from Uzbekistan.*	Chapters 13 and 19 of the ESIA provide an overview of current conditions of the resettled people. A resettlement audit conducted in 2011 provides additional documentation on the resettlement processes carried out to date.
9. We support the idea of a coordination council that includes representatives of multilateral NGOs in order to monitor resettlement. *Comment expressed by stakeholder from Uzbekistan.*	The ESIA notes that a Witness NGO will monitor the resettlement process.
10. The ESIA refers to villages above FSL1290 that may require relocation. How many such villages may be affected? *Comment expressed by stakeholder from Tajikistan.*	Currently, there are 12 villages above FSL 1290 m a.s.l. affected by the project and likely to be relocated. The exact number of the villages will be specified by the end of the construction.
11. Is there a plan of action for the social protection of the population, with specific figures of payments and jobs to be provided, with health care options for women of childbearing age in Nurobod (47 villages), Rasht (21 villages) and Rogun (9 villages) areas? *Comment expressed by stakeholder from Uzbekistan.*	There is a Resettlement Action Plan (RAP) for Stage 1 resettlement covers seven villages to be affected by the first phase of dam construction. Plans for Stage 2 resettlement will be prepared in advance of actual resettlement over the years of reservoir filling in accordance with the RPF. The resettlement documents provide for social services, health services, and a livelihoods support plan that is being developed.

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12. Were Public hearings with the population of above villages carried out? If so, where are the Minutes of the meetings in the Report? *Comment expressed by stakeholder from Uzbekistan.*	A number of meetings were held in Stage 1 villages in 2011 for the purposes of collecting information and preparing the Resettlement Action Plan. Summaries of these meetings are in ESIA Volume 2, Annex A, section A1.2. Consultations on RAP and RPF with affected communities are planned and the resettlement documents provide for a process of continuous engagement with affected communities throughout the life of the project. See transcripts in English and Russian of such meetings in ESIA Vol. II, Section A13.4.3.and mainly in RAP Stage 1, Vol. II, A/П 5, CONSULTATIONS AND PARTICIPATION / КОНСУЛЬТАЦИИ И УЧАСТИЕ
13. What are the issues and concerns raised by residents of the village to be flooded? Are there Minutes of the Public hearing and, if so, have the experts conducted an analysis of the issues to avoid in the future not standard situations? *Comment expressed by stakeholder from Uzbekistan.*	A summary of the issues raised are in ESIA Volume 2, Annex A. Project affected people have raised issues with respect to clarity on entitlements, concerns over the delays in implementing the resettlement programs, support for housing construction, and options for livelihood support among other issues. See transcripts of meetings mentioned above.
14. Was there a discussion with the population on the resettlement plan strategy and a package of measures to address economic and social issues? *Comment expressed by stakeholder from Uzbekistan.*	A number of meetings were held in Stage 1 villages in 2011 for the purposes of collecting information and preparing the Resettlement Action Plan. Summaries of these meetings are in ESIA Volume 2, Annex A, section A1.2 and in the Annex to the RAP (see above). The resettlement documents provide for social services, health services, and a livelihoods support plan that is being developed.
15. Is there a plan of action for the social protection of the population of the villages Kishrog, Mirog, Tagi Agba, Talkhakchashma, Tagi Qamar and Sech, Chorsada, which will be flooded at the 1st stage of reservoir filling? *Comment expressed by stakeholder from Uzbekistan.*	Yes, there is a Resettlement Action Plan for Stage 1 resettlement of these seven villages.
16. Procedure for payment of compensations? Timing of payment of compensation to settlers - will it be a lump sum or stretched to 10-15 years that will naturally lead to impoverishment of the local population? *Comment expressed by stakeholder from Uzbekistan.*	Payments are not spread over many years, but are paid as needed, in accordance with Tajikistan law and the Resettlement Action Plan.
17. Is there a program of measures for the adequate provision of health services to women, children and seniors? *Comment expressed by stakeholder from Uzbekistan.*	Yes. As described in Chapters 13 and 19 of the ESIA, clinics and health care facilities in resettlement villages are superior to what was available in the past. Also as described there, Resettlement Action Plans will include special provisions and care for vulnerable people.
18. Does the population agree with the displacement of cemeteries? What is the total	Cemeteries will be moved in accordance with the population's wishes and legal

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number of cemeteries to be displaced and by what means? *Comment expressed by stakeholder from Uzbekistan.*	requirements. Tajikistan has a well defined procedure for relocating graves, which includes the population, the administration and religious authorities. The exact numbers are not known at present; that will be determined as detailed plans are prepared and in consultation with affected communities. For the 7 Stage 1 villages, 230 graves have to be relocated.
19. What is included in the notion of certain procedure of moving cemeteries and to what extent does it conform to the generally accepted national traditions? *Comment expressed by stakeholder from Uzbekistan.*	Tajikistan has a clearly defined procedure for relocating graves, which includes the affected population, the local administration and religious authorities. This procedure is part of the resettlement plan and will be followed.
20. Was there a discussion with the population about a possible influx of foreign nationals who will be engaged in the construction of hydroelectric power plant? *Comment expressed by stakeholder from Uzbekistan.*	Population influx is still uncertain, including the number of foreign nationals who may be involved in construction. The management of construction workers and construction camps will be guided by a specific work camp management plan included in the Environmental Management Plan. Resettlement Action Plans will call for and ensure that local populations are consulted and informed throughout the construction process.
21. It is recommended that the ESIA be modified to include analysis of Tajikistan's human rights obligations under national and international law and articulate these obligations as key standards to guide the Resettlement Policy Framework. The World Bank, its consultants, and its economic and social panel of experts should be guided by international human rights standards in addition to World Bank policies. *Comment expressed by stakeholder from the United States.*	Good international practice for resettlement includes provisions for addressing people's needs and protecting their rights.
22. It is recommended that the ESIA (and the Draft Key Issues paper) document be modified to: stress the importance of mitigating the risk of human rights abuses in future resettlements and of remedying any past violations in a timely manner. *Comment expressed by stakeholder from the United States.*	The RPF and RAP include provisions for addressing people's needs and protecting their rights.
23. The ESIA should recommend necessary measures to ensure that compensation awards reflect the full replacement cost of lost homes, including materials and qualified laborers and address this in the RPF and RAPs. *Comment expressed by stakeholder from the United States.*	The RPF and RAP include provisions to ensure full replacement cost and the RA process will be used to address gaps.
24. Provided that the Resettlement Audit includes a full account of past awards and an accurate assessment of the full replacement cost of homes, the ESIA should recommend that the government provide additional compensation and other remedies, as appropriate, to those families who received less than the full replacement cost of their homes. If the audit does not achieve this, it is recommended that a full, independent audit of past awards be completed and that additional compensation be provided as	A process is in place to prepare a full RA. At this stage it has detailed general issues. A more detailed assessment will be done to identify additional compensation required.

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necessary. *Comment expressed by stakeholder from the United States.*	
25. The ESIA should recommend the creation of a low/no interest lending option or other appropriate measures to allow families to build additional houses. *Comment expressed by stakeholder from the United States.*	In compliance with the law of the Republic of Tajikistan on mortgage, PAPs will be eligible for allocation of credit for mortgage by GoT; also for improving the living conditions the Government provides other benefits such as: • House plot allocation without charge; • Preferential loan from TJS 3000 to 15000 for improving living conditions; • Providing infrastructure (roads, schools, medical centers, kindergartens etc.); • Free of charge transportation of goods; • Full payment of house and outbuildings cost • construction materials from the liquidation of outbuildings and houses are provided at no cost for the displaced people
26. It is recommended that the ESIA highlight the absence of available farm land in certain communities and the lack of adequate communication about the availability of farm and pasture land and how to apply for such land throughout the resettlement process. *Comment expressed by stakeholder from the United States.*	The ESIA mentions the lack of suitable land in some resettlement communities. The audit determined that people needed to be better informed about the land available, and provisions for this have been made part of the RAP.
27. The ESIA should recommend that all resettled people who have lost farms or pastures receive replacement lands within a reasonable distance of their new homes unless they decline to receive them, reflect this in the RPF and RAPs, and work to remedy this for people who have already been located or are in the process of relocating through the Resettlement Audit. *Comment expressed by stakeholder from the United States.*	To the extent possible, people are offered relocation in areas with adequate available land. In some cases, instead of direct land-for-land entitlements the RAP provides for other forms of compensation and livelihood support. The audit identified some shortcomings in resettlement and land replacement to date, and specified remedial actions to be taken.
28. It is recommended that the ESIA include discussions of short-term reductions in people's ability to maintain livelihoods while construction is ongoing and the impact of incurring additional traveling expenses. *Comment expressed by stakeholder from the United States.*	The RAP and RPF include provisions for this in the form of payment of minimum wage.
29. Consistent with the UN Basic Principles and Guidelines on Development-Based Evictions and Displacement, the ESIA should recommend that the government takes the necessary measures to ensure that resettled individuals do not experience either short or long-term reductions in their standards of living as a result of government action and include such measures in the RPF and RAPs. *Comment expressed by stakeholders from Uzbekistan and the United States.*	These are included in the RPF and RAP.
30. It is recommended that the Resettlement Audit be utilized to measure any	A process is in place to prepare a full RA. At this stage it has detailed general issues. A

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decline in resettled people's standard of living and that the ESIA recommend that the government provide remedies to all resettled people who have experienced such a decline as a result of resettlement. *Comment expressed by stakeholder from the United States.*	more detailed assessment will be done to identify additional compensation required.
31. It is recommended that the ESIA include discussion of the gaps in government assistance for marginalized groups to move or construct new homes in resettled areas and problems experienced by pre-resettlement households that are affected by the Rogun HPP construction, particularly households in which a person with a disability resides. *Comment expressed by stakeholder from the United States.*	This issue is discussed in sections 19.4.4 and 19.4.5 of the current draft ESIA. These gaps and other identified in the preliminary Resettlement Audit are addressed in the RPF and RAP.
32. The ESIA should recommend that the government guarantee that housing or assistance with building housing and essential services are provided to marginalized persons, including persons with disabilities, widows, and divorced women throughout the resettlement process, reflect this in the RPF and RAPs, and through the Resettlement Audit identify marginalized persons, analyze difficulties they have faced through resettlement, and provide additional information and assistance. *Comment expressed by stakeholder from the United States.*	The resettlement documents identify vulnerable groups and provisions are recommended. This is discussed in the ESIA (section 19.4.5).
33. The ESIA should recommend that the government ensure that all consultation and information sharing sessions be accessible to persons with disabilities and other marginalized groups and that specific measures be taken to communicate that such meetings are upcoming and will be accessible and reflect this in the RPF and RAPs. *Comment expressed by stakeholder from the United States.*	This recommendation is accepted and will be included in the RPF and RAP and reflected in the appropriate sections of the ESIA.
34. It is recommended that the ESIA highlight instances in which access to basic services including water and education is diminished in resettlement sites as compared to the pre-resettlement areas and recommend that these shortcomings be urgently addressed. *Comment expressed by stakeholder from the United States.*	Any such instances will be identified in the detailed Resettlement Audit and will be addressed as soon as possible as part of the required remedial measures.
35. The ESIA should recommend that all infrastructure, including water, electricity, and schools in resettlement sites is in place and fully functional before the sites are populated and include this as a key issue to be addressed in the RPF and RAPs. *Comment expressed by stakeholder from the United States.*	This provision is part of the RPF and RAP and the detailed RA will identify situations where remedial actions are needed.
36. The ESIA should recommend that the Tajikistan government strictly prohibit forced child labor and hazardous child labor, including in cotton farming, and holds accountable school authorities and others who engage in forcing children to perform	ESIA includes the requirement to implement all the applicable laws. In Tajikistan children are not allowed to work at difficult and hazardous working conditions. (Labor Code of the Republic of Tajikistan; Article 174). Tajikistan has also signed the ILO

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forced and hazardous labor. *Comment expressed by stakeholders from Uzbekistan and the United States.*	Convention No.182 (On the worst types of child labour, signed on June 8, 2005) and No.138 (Convention on minimum age, signed on June 26, 1993, indicating the minimum age of 16). In case of complaints from the public regarding these facts, materials will be transferred to the appropriate authorities.
37. The ESIA should recommend increased monitoring by an independent third party in resettled communities with a view to identifying and addressing adverse human rights impacts. *Comment expressed by stakeholder from the United States.*	Section 19.8.5 of the ESIA includes a recommendation for a Witness NGO to monitor the entire resettlement (and livelihood restoration) process to verify satisfactory implementation of the RAP.
38. The ESIA should recommend that the government regularly provides information and assistance to resettled individuals about the specific aspects of resettlement mentioned previously and that this be addressed in the RPF and RAPs. *Comment expressed by stakeholder from the United States.*	Consultations on RAP and RPF with affected communities are planned and the resettlement documents provide for a process of continuous engagement with affected communities throughout the life of the project.
39. The ESIA should recommend that an independent third party regularly meet with individuals at all stages of resettlement to share information, hear complaints, and provide assistance and reflect this in the RPF. There should also be increased monitoring in resettled areas to ensure that human rights and other international standards are being upheld and outline the measures to achieve this in the RPF. *Comment expressed by stakeholder from the United States.*	These would be among the functions of the Witness NGO described in section 19.8.5 of the ESIA and included in the RAP and RPF.
40. The ESIA should recommend that the Tajikistan government publicly commits to protect individuals subject to resettlement from reprisals for raising issues during the consultation process, making complaints, or otherwise pursuing grievances. *Comment expressed by stakeholder from the United States.*	Ensuring open, safe consultations is the responsibility of the Government of Tajikistan and monitoring this would be among the functions of the Witness NGO described in section 19.8.5 of the ESIA and included in the RAP and RPF.
41. The ESIA should recommend that the government, including through local authorities, provides information and additional support to residents about how to file and pursue grievances through multiple strategies, including public notices. *Comment expressed by stakeholder from the United States.*	The RAP and RPF have specific provisions for grievance mechanisms. With formal adoption of the RAP, there will be additional communications regarding the grievance redress process.
42. The ESIA should recommend that the government or donors engage civil society organizations to assist residents, including but not limited to members of marginalized groups, in filing and pursuing grievances. *Comment expressed by stakeholder from the United States.*	This would be among the functions of the Witness NGO described in section 19.8.5 of the ESIA and included in the RAP and RPF.
43. The ESIA should recommend the resettlement process be transparent and that the government provides the witness NGO, civil society, and journalists unfettered	All resettlement documents will be publically disclosed and available to interested stakeholders. The RAP and RPF provide for the inclusion of an independent Witness

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access to areas from which people will be resettled and resettlement sites. Further, the ESIA should recommend that the Tajikistan government publicly commit to protect NGO members and journalists from reprisals for monitoring the resettlement process and acting on behalf of resettled people. *Comment expressed by stakeholder from the United States.*	NGO as one of the measures to ensure transparency. Ensuring open, safe consultations is the responsibility of the Government of Tajikistan and monitoring this would be among the functions of the Witness NGO described in section 19.8.5 of the ESIA and included in the RAP and RPF.
44. Recommend that NGO oversight extend to: ▪ Monitoring and reporting conditions in villages in the construction zone, including but not limited to the effects of blasting, through both scheduled and unscheduled visits. ▪ Monitoring and reporting conditions in resettled sites, through both scheduled and unscheduled visits. ▪ Independently meeting with residents at all stages of resettlement and without government officials present to determine whether human rights violations exist. ▪ Monitoring the local authorities' actions in resettled and yet to be resettled areas through scheduled and unscheduled visits and interviews with government and local authorities. *Comment expressed by stakeholder from the United States.*	These recommendations will be taken into consideration when designing the Terms of Reference and scope of responsibilities for the Witness NGO.
45. The Tajikistan government and the World Bank should publish online and in accessible public places in resettlement communities and communities to be resettled the draft Resettlement Audit and Resettlement Action Plans for a reasonable comment period in Tajik, English, and Russian. *Comment expressed by stakeholder from the United States.*	This disclosure and consultation process is ongoing.
46. The Tajikistan government and the World Bank should consult broadly with all affected communities on the basis of these drafts, taking special measures to ensure that consultations are known to and accessible for marginalized individuals. *Comment expressed by stakeholder from the United States.*	This disclosure and consultation process is ongoing.
47. The Tajikistan government and the World Bank should publish the estimated cost of the resettlement in the Draft Resettlement Action Plan, the Techno-Economic Assessment Study, and in the Key Issues document in order to facilitate better understanding of its place in total project costing. *Comment expressed by stakeholder from the United States.*	Cost estimates are provided in the draft RAP and will be updated in the final RPF and RAP. The economic analysis in the TEAS considered the estimated costs of resettlement.

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II. Alternatives	
48. Was a cascade of small hydropower plants on the Vakhsh considered as an alternative? If it was considered, what were the impacts? *Comment expressed by stakeholder from Uzbekistan.*	This was not one of the alternatives considered in the ESIA but it was considered in earlier technical studies. Those studies concluded that low-head hydropower and/or a cascade upstream of Nurek would not be practical because of the short lifespan possible before storage capacity would be lost to sediment accumulation.
49. The development of the energy resources of mid-, and small-scale hydraulic power industry in Tajikistan should be considered. *Comment expressed by stakeholder from Uzbekistan.*	These are being considered, but full development could not provide the winter generation and other benefits that Rogun could bring, as demonstrated in the least-cost energy study.
50. The Tajik government and neighboring countries are considering a gas pipeline and a railroad to China through the proposed region and then through the Alay Valley. Are these projects taken into account in Rogun plans? *Comment expressed by stakeholder from the Kyrgyz Republic.*	Although these transport projects are under consideration, they are in no way related to Rogun. The least-cost energy study did consider various gas pipelines, but not the one from China.
51. We disagree with the presentation's statement that there no significant differences between the FSL 1255 and 1290 alternatives. FSL 1290 has an extended life, there is additional power generation capacity, which is important given current shortages, there is 14% better economic performance, the additional storage volume would provide more water for dry year release, and there other positive differences. In addition, the investment for development or resettlement will be necessary regardless of Rogun, especially since local investment has been prevented for over 30 years. *Comment expressed by stakeholder from Tajikistan.*	The language regarding the lack of significant difference was specific to downstream impacts, which would be no different for these two alternatives. However, the ESIA concluded there were points in favor of FSL 1255 and points in favor of FSL 1290. However, the positive impacts have to be balanced against the negative impacts, which include the need for FSL 1290 to resettle significantly more people than for FSL1255. The POE expressed its opinion that international good practice would include an evaluation of intangible impacts such as cultural, psychological, attachment to land, etc.
52. If other possibilities are available, why is Rogun considered as the first/primary option for generation? *Comment expressed by stakeholder from Uzbekistan.*	The least-cost generation expansion analysis examined different demand scenarios and a number of different options for meeting demand, and determined that Rogun was part of the least-cost solution under all scenarios.
53. Rogun FSL 1290 alternative would extend the lifespan of the entire Vakhsh cascade, which provides 90% of Tajikistan's power generation, by at least 115 years, and also would allow construction of the Shurob HPP. *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response.
54. The report states that the larger volume of the FSL1290 reservoir would allow transfer of more water from summer to winter. We recommend consideration of other possible small and medium hydro projects, and diversion projects, which would not present the risk of more seasonal transfers of water due to winter energy generation, and which would also take maximum advantage of differences in elevation and bring power generation closer to its point of use. Up to 30 billion kWh could be generated by such	The ESIA concludes that the larger reservoir presents the largest potential for storage, and thus for seasonal shifting. This is not the proposed operating pattern, however. The least-cost study considered all possible generation options for Tajikistan, including storage and run-of-river hydro projects, generation based on domestic coal, import of electricity, import of gas for gas-fired generation and urban space heating, etc.

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projects. *Comment expressed by stakeholder from Uzbekistan.*	A model was used to evaluate more than ninety different generation expansion scenarios, and Rogun was always part of the least-cost option, with a significant benefit over the next lowest option.
55. The selection of the alternative must be made with great caution weighing all pros and cons and widely discussing the issue. *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response. The ESIA presents a summary of the analysis of alternatives.
56. Table 22-3 compares in a detailed and clear manner a wide spectrum of "Without Rogun" environmental and social impact alternative, as well as the alternatives of FSL1290, 1255, and 1220. The column of "Conclusions" in the Table reveals no evident (from the socio-environmental point of view) advantage of a high dam. *Comment expressed by stakeholder from Tajikistan.*	As noted in the ESIA, "…from an environmental and social point of view, there are strong arguments for and against each of these two alternatives, and important trade-offs have to be considered." The ESIA then recommends FSL1290 after taking into consideration the longer life span, the higher electricity production, and the ability to mitigate the additional adverse effects of FSL1290, which are primarily related to resettlement.
III. Amu Darya agreements and practices	
57. The studies' interpretation of the existing agreements and practices is incorrect. It is incorrect to say, as the ESIA does, that "[t]he proposed options for the Rogun Dam will not affect the seasonal flow downstream of Nurek and … operation [will be] in strict compliance with the existing agreements and water distribution practices." This is because the agreements are based on pre-independence conditions and flows, not post-independence as is used in the modeling and the ESIA. *Comment expressed by stakeholder from Uzbekistan.*	The ESIA is based on information and assumptions provided by the TEAS studies. Please see TEAS response matrix for details. The current practice followed by BVO and ICWC since independence was taken as a basis for modelling the cascade operation. The ESIA concluded that Rogun and the cascade could be operated as proposed under existing agreements. The ESIA and POE both recommend that the existing agreements be modified to allow for improved management of the Vakhsh cascade and the Amu Darya Basin to optimize benefits for all countries of the region.
58. It is recommended that an international council assist or lead water management decision-making for the Amu Darya, including the Vakhsh river, including provisions for dry, normal, and wet years. *Comment expressed by stakeholder from Uzbekistan.*	The ESIA concluded that Rogun and the cascade could be operated as proposed under existing agreements. The ESIA and POE both recommend that the existing agreements be modified to allow for improved management of the Vakhsh cascade and the Amu Darya Basin to optimize benefits for all countries of the region.
59. Afghanistan should be included in decision-making for the Amu Darya. *Comment expressed by stakeholders from Uzbekistan and Afghanistan.*	The ESIA includes the recommendation that Afghanistan become part of water allocation discussions and decisions, including modification of agreements in the future. This is also a strong recommendation of the POE.
60. There is no guarantee that Tajikistan will continue to supply water since the current agreement is outdated by Rogun. The fact that Tajikistan is not part of all trans-boundary water agreements does not give confidence. *Comment expressed by stakeholder from Uzbekistan.*	The ESIA concluded that Rogun and the cascade could be operated as proposed under existing agreements. Both ESIA and POE also recommend that the existing agreements be modified to allow for improved management of the Vakhsh cascade and the Amu Darya Basin to optimize benefits for all countries of the region. As mentioned in ESIA Section 8.5.2, Protocol 566 included the construction of 2 new

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	reservoirs, Zeid (in Turkmenistan) and Rogun; Zeid was built in the meantime.
61. It was mentioned that Rogun would be able to provide more water in dry years. Nurek could do the same thing now, but it is not operated this way. What kind of institutional framework can ensure we can feel the benefits from additional water? *Comment expressed by stakeholder from Uzbekistan.*	The ESIA concluded that Rogun and the cascade could be operated as proposed under existing agreements. The ESIA and POE also agree that the existing institutional framework could be modified so that it includes the possibility of providing more water in dry years. During the consultations in Almaty, the World Bank gave examples of various trans-boundary water management agreements that have been effective in balancing the interests of multiple parties.
62. We have no doubts about the expert evaluation in the reports, but we and everyone else are concerned that Tajikistan honor all terms and conditions of water agreements. We recommend that conditions of operation be transparent, including a website to allow water monitoring.). *Comment expressed by stakeholder from Kazakhstan.*	The Government of Tajikistan has expressed its commitment to continue to abide by existing agreements and practices. The ESIA and the POE both recommend a rigorous monitoring program, including online availability of real-time hydrologic and operating data.
63. The chairperson of the Environmental and Social Panel of Experts has reported he has no confidence that Rogun and the Vakhsh cascade can be operated optimally unless an agreement is reached among riparian states. *Comment expressed by stakeholder from Uzbekistan.*	PoE is of the view that this statement was not made by the PoE. The ESIA concluded that Rogun and the cascade could be operated as proposed under existing agreements. The ESIA and POE both recommend that the existing agreements be modified to allow for improved management of the Vakhsh cascade and the Amu Darya Basin to optimize benefits for all countries of the region.
64. There is no agreement. Before an agreement can be reached, there must be a guarantee the regime will work, however long that takes. *Comment expressed by stakeholder from Uzbekistan.*	The best assurance that the operating regime will work is through mutual agreement among the parties, as recommended by the ESIA and POE. The ESIA concluded that Rogun and the cascade could be operated as proposed under existing agreements. The ESIA and POE both recommend that the existing agreements be modified to allow for improved management of the Vakhsh cascade and the Amu Darya Basin to optimize benefits for all countries of the region.
65. The rules for the Vakhsh Cascade operation, which would be acceptable to all countries and approved by them in an agreement, could form a basis for sustainable water use in the Amu Darya, under the World Bank's guarantee, as this was arranged with respect to the Indus between India and Pakistan 54 years ago. Any agreement must be based on modeling multi-year flows in various combinations and projected multi-year controls to determine Rogun operation scenarios. *Comment expressed by stakeholder from Uzbekistan.*	The ESIA concluded that Rogun and the cascade could be operated as proposed under existing agreements. The ESIA and POE both recommend that the existing agreements be modified to allow for improved management of the Vakhsh cascade and the Amu Darya Basin to optimize benefits for all countries of the region. Any possibility for the World Bank to be engaged with the GoT and partners in the region to explore options for cooperative management of the water of the Amu Darya Basin would need to be discussed. Although the World Bank played a major role in facilitating the process leading to Indus Treaty between India and Pakistan, it should be noted that the Bank was not a

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	guarantor under the treaty.
66. The studies involved an extensive analysis of the institutional and legal framework for Amu Darya water management. Although the ESIA and POE recommend new or modified water management agreements, it is Tajikistan's view that the studies have concluded that agreements and instruments for water allocations are sufficient and adequate, and the mode of operation of Rogun will be part of that framework. If some additional safeguards are needed for the operating regime for Rogun, this could be done in the context of existing agreements, but no "new" agreement is needed. *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response.
67. Tajikistan would agree to modify existing agreements to integrate Afghanistan into the water management process. However, Tajikistan also believes that all such changes to the agreements need to be undertaken in a process independent of the Rogun project. *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response.
68. Water managers and power managers naturally have somewhat antagonistic approaches, and this is the cause of the trans-boundary issues here. A stringent mechanism for complying with the desired water management regime is needed, and both interests have to be involved. Good analysis and modeling will not always be enough due to human factors and changing conditions. However, tradeoffs/compromises have to be found among reasonable people. *Comment expressed by stakeholder from Kazakhstan.*	The ESIA and POE both recommend the operating regime should be agreed upon in the context of a trans-boundary agreement.
69. We appreciate the significant work that has been done for these Rogun studies. As we follow the proceedings, it appears that water management matters have very much been taken into consideration. We agree in principal regarding the matter of Afghanistan's participation in Central Asia trans-boundary water agreements. However, it is important that Central Asian countries are aware that Afghanistan has not fully used its water resources. From the 1960s, war imposed on Afghanistan has prevented completion of projects to use its water resources for energy and irrigation. *Comment expressed by stakeholder from Afghanistan.*	The ESIA noted the reduction in recent water usage by Afghanistan, and made certain assumptions about future increases.
70. Regarding the discussion of Protocol 566 in ESIA section 8.5.2, the guaranteed water resources of Amu Darya was 61.8 km^3 with 90 % of availability (90 years in 100). Taking into account the Rogun operation, it will increase up to 68.8km^3 per year.	Protocol 566 does not mention the 61.8 km^3, but it does mention that actual diversion at that time (1987) exceeded the guaranteed water availability.

Comments	Response
Comment expressed by stakeholder from Tajikistan.	
71. Regarding the statement in section 8.5.2 that Protocol 566 does not give any information on the way these water allocations shall be split in time (during the year) or in space (by sub-basin): the allocated quota for water resources use (related to consumptive water use for irrigation) is applied for the vegetation period. The flow return is accounted downstream as Amu-Darya resources. The quota distribution by sub-basins (Pyandzh, Vakhsh, Kafirnigan, Surkhandarya) is the exclusive right of the Government of Tajikistan. *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response.
IV. Rogun and cascade operation	
72. We are concerned with the statement made on July 17-18 in Almaty that ""Rogun can be constructed while its operation regimes can be agreed later as work proceeds." This is of concern. *Comment expressed by stakeholder from Uzbekistan.*	The GoT has committed to operating the dam in a manner that maintains the existing flow regime in the Amu Darya River at the border. The detailed operating plans and protocols to achieve this remain to be developed and set out in an operational manual.
73. It is clear to everyone that the ESIA needed to examine impacts of Rogun on the entire basin. Therefore, why does the ESIA TOR not mention the basin or cover impacts downstream. Riparians have a stake in activities on the Vakhsh river, not only the Amu Darya. [Note: this also included an unclear comment about the Helsinki UNECE agreement/ convention.] *Comment expressed by stakeholder from Uzbekistan.*	The ESIA and the presentations have emphasized that the Vakhsh is part of the Aral Sea and Amu Darya basin, and the ESIA covered basin-wide issues, including downstream effects to the extent possible based on available data, and in the presentations during the consultations. The ESIA section entitled "Vakhsh as an International River" clearly makes the point that the Vakhsh should be subject to many or all of the same trans-boundary considerations as rivers that actually cross international borders. It was also noted that Tajikistan is not a party to the UNECE Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes, and that has not prevented adherence to existing agreements and practices for the Amu Darya.
74. This is a complex project with regard to its potential impacts. The actual impacts that will be experienced will depend on how closely mitigation is implemented, and this in turn depends on how seriously is the commitment. *Comment expressed by stakeholder from Kazakhstan.*	The ESIA identifies many actions that must be taken to avoid or mitigate potential impacts, and to monitor how well these actions are implemented.
75. We acknowledge, support, and recognize the fact that Tajikistan has the right to use the water as proposed. At the same time, Rogun must not affect Afghanistan's ability to use its own share of Amu Darya water. *Comment expressed by stakeholder from Afghanistan.*	The comment is acknowledged and does not require a response.
76. The project seems vulnerable since it depends on regional entities that affect	The importance of using and strengthening existing regional institutional structures for

Comments	Response
other countries, specifically, the ICWC. An option that is recommended is for a public council composed of riparian representative to monitor the process of implementation and enable better avoidance of impacts. The countries here have experience with trans-boundary issues, including Kyrgyzstan. The success of the project will all depend on how work is organized. *Comment expressed by stakeholder from the Kyrgyz Republic.*	water management is acknowledged. The ESIA concluded that Rogun and the cascade could be operated as proposed under existing agreements. The ESIA and POE both recommend that the existing agreements be modified to allow for improved management of the Vakhsh cascade and the Amu Darya Basin to optimize benefits for all countries of the region.
77. The ESIA does not describe the situation sufficiently. The reduction in water caused by reservoir filling in summer will cause negative effects on irrigation and biodiversity and will take billions to mitigate given challenging conditions. *Comment expressed by stakeholder from Uzbekistan.*	As described in the ESIA, Tajikistan intends to operate Rogun so there is no further transfer of water from summer to winter beyond what is already transferred by Nurek (The transfer is limited to the current capacity). Thus, there will be no further negative effects. The ESIA demonstrates that Rogun will provide the potential to reduce the negative effects on irrigation due to drought in dry years, and also the potential to adjust flows so as to benefit downstream Tugai ecosystems.
78. The primary objective of Rogun has changed since it was originally conceived, from irrigation to power generation. This change will affect downstream countries, and the possibility of further changes in downstream flows will be a lever for influence. More analysis is needed to estimate environmental and social, and economic, damages that could occur downstream in case the project is not operated as described. We are concerned this presents a significant risk to downstream riparians, and this risk was not analyzed in the ESIA. The assessment needs to properly evaluate effects on downstream countries as required by the Convention on Environmental Impact Assessment in a Trans-boundary Context (the Espoo Convention). *Comment expressed by stakeholder from Uzbekistan.*	The ESIA describes the change in purpose since Rogun was initially conceived. The ESIA's review of downstream impacts analyzed the impacts if Rogun and Nurek would be operated for extreme winter energy production, and also examined downstream flow regulation in dry years and during floods. As noted above, this is not the proposed operational regime, but the analysis was included as part of the project risk assessment. The analysis concluded there would be significant effects on downstream countries if Rogun was operated to maximize winter energy, including an estimate of the potential reduction in irrigation that would result. A more detailed assessment would need to be based on primary data that would need to be provided by downstream affected parties. The ESIA, including this analysis, has been shared with downstream countries in keeping with the Espoo Convention.
79. Because additional research, studies and detailed design work will need to be implemented at subsequent project stages and the process of international expert assessment and consultations will need to be continued, it is requested that the authors develop detailed recommendations as to how subsequent project stages should be developed. *Comment expressed by stakeholder from Uzbekistan.*	The environmental, technical, and economic studies were financed by the World Bank to assess the feasibility of Rogun construction and operation. That phase of the project has now ended. Each of the studies presents clear recommendations as to next steps in terms of additional studies and plans.
80. The studies disregard that, if more water is shifted to the winter period, this will cause further deterioration in water supply in Tajikistan itself. *Comment expressed by stakeholder from Uzbekistan.*	The ESIA risk analysis section addressed this issue, in analyzing the impacts of the hypothetical scenario of operating the cascade to maximize winter energy generation. One of the major reasons Tajikistan has decided to maintain current flow patterns is that any such transfer would cause adverse impacts to water supply in all downstream

Comments	Response
	countries, not only Tajikistan
81. The flow of the Amu Darya should be the key determinant in making the decision whether to launch Rogun construction and this issue will require additional and deeper assessment and approvals. *Comment expressed by stakeholder from Uzbekistan.*	This is one important factor among others that has been considered in the ESIA. As planned, the construction and operation of Rogun would not affect the flow of the Amu Darya except during the filling period. The impact on flow during the filling period is analyzed in detail in the ESIA.
82. The ESIA says that operation will continue as at present, with the summer-to-winter transfer of water remaining at 4.2bcm. Based on the analysis in CASA-1000 studies, the electricity shortage in Tajikistan will continue to grow and so more generation will be necessary, to the extent that the transfer will need to be increased to 6bcm or more to meet increased demand of 3-4b KwH by 2030. *Comment expressed by stakeholder from Uzbekistan.*	As indicated in the ESIA and TEAS reports, the conclusion of numerous studies on this issue is that operating Nurek, Rogun and the overall Vakhsh cascade so as to maintain the current summer-to-winter transfer of 4.2bcm will be sufficient to meet winter energy demand until about 2032. After that the growth in demand will require additional sources of production.
83. The possibility of exporting electricity in winter cannot be dismissed. *Comment expressed by stakeholder from Uzbekistan.*	Tajikistan currently has a significant electricity shortage in winter and the assessment studies have shown that, even with various measures to manage winter demand, a future scenario with significant winter surplus is unlikely. Even if some winter surplus is available, it should be possible to export it without any adverse implications.
84. There will be a high probability of idle discharge in summer due to flood in that season, and to avoid this the water could be used in winter. This would lead to more summer to winter transfers of water in the Vakhsh. *Comment expressed by stakeholder from Uzbekistan.*	Rogun will provide additional storage capacity that could reduce downstream flood risk. The potential for "idle" discharges in summer is very low, since Tajikistan intends to sell excess summer electricity. While it is theoretically possible to increase summer to winter transfers, as described and evaluated in the ESIA, this is not the way Tajikistan intends to operate the cascade.
85. The completion of the technical, economic, and environmental studies has been long and complex since Tajikistan first approached the World Bank in 2007. One major concern was to avoid negative impacts on downstream riparian countries, and so one of the prerequisites of the major analyses was that there be no change on downstream flows. It was determined that maximizing winter energy was not the most efficient approach, even for Tajikistan itself. *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response.
86. It is not clear what model tools and methods were used to analyze discharge when the Rogun HPP is put into operation. Amu Darya flow must be comprehensively assessed using a reliable and recognized tool, which the current assessments lack. Without additional work in this area it will be impossible to accept the assessments as reliable. Our own analyses show that the number of years when water supply will be lower than 60% of the average rate will increase to 25 out of 100 years. *Comment expressed by stakeholder from Uzbekistan.*	The analysis of Amu Darya's historical and average flows in relation to the proposed Rogun HPP discharge is presented in detail in the TEAS report, including details of the data, methods and the water balance and allocation model used. In addition, the ESIA analyzed the potential impact of climate change on the river flow over the coming decades, based on the best and most up to date climate change predictions that are available.
87. There is no evaluation of multiyear operational regimes apart from the indicators	The purpose of the modeling was to determine whether various operating schemes were

Comments	Response
of the three typical hydrological years, which fail to give any clear signs on how the Vakhsh Cascade will account for the natural fluctuations of the runoff, and changes due to climate change. Interests of the neighboring countries are obviously disregarded. *Comment expressed by stakeholder from Uzbekistan.*	feasible technically and economically. Detailed operating management rules should be developed when an agreement will be reached among riparian states. In addition, the ESIA examined the proposed operating regime and compared it to a scenario of maximizing winter energy production. It is in response to the interests of neighboring countries that the GoT has committed to operating the Vahksh cascade in a way that does not change current downstream flows.
88. Cascade simulation should be based on historical data from 1973-1990, not 1991-2014, and multi-year regulation should be based on what is more suitable for all countries. This regulation should be under the guarantee of the World Bank as done for the Indus River. *Comment expressed by stakeholder from Uzbekistan.*	The purpose of the ESIA is to assess the potential environmental and social impacts of Rogun and alternatives, including potential impacts on downstream riparian countries. In keeping with internationally accepted practices for impact assessment, the evaluation was based on current baseline conditions, not on conditions that may have existed at some time in the past. The TEAS has used inflow data from 1932 to 2008. It should be noted that the World Bank was not a guarantor in the case of the Indus River treaty. However, the World Bank facilitated the dialogue between the two countries towards execution of the treaty.
89. The minimum flow from Rogun of 10m^3/s is not sufficient downstream of Nurek. Minimum flow should be based on standard sanitary discharge rates and water intake for irrigation. *Comment expressed by stakeholder from Uzbekistan.*	The minimum flow was proposed only for the river reach between Rogun and Nurek reservoir, not downstream of Nurek dam. The ESIA has been reviewed to ensure that it is clear that the recommended residual flow is for the river upstream of Nurek.
90. The residual flow (of 10m^3/s) has been determined without taking into consideration that the Vakhsh accounts for 29% of the Amu Darya flow (without factoring in river losses) and the requirement to "strictly observe and ensure sanitary discharge through Taxiatosh throughout a year of a least 100 m3/s." *Comment expressed by stakeholder from Uzbekistan.*	The minimum flow was proposed only for the river reach between Rogun and Nurek reservoir, not downstream of Nurek dam, where flows will follow the same pattern as at present. The ESIA was reviewed to make it clear that this recommended residual flow is for the river upstream of Nurek.
91. There are conflicting and ungrounded statements concerning flow rates: section 21.2.3 states that summer flow would be reduced by 7.4km^3, while 21.1 says Rogun will not reduce water availability for irrigation by downstream riparians. *Comment expressed by stakeholder from Uzbekistan.*	Section 21.2.3 describes one possible operating regime that was evaluated, i.e., the scenario of maximizing winter energy production. However, this is not how Tajikistan intends to operate Rogun, The statement in section 21.1 summarizes the implications of the actual operating regime Tajikistan intends to use.
92. The ESIA does not describe the rules of Vakhsh and Amu Darya flood control. It only considers the control principles – creation of additional capacity (4.2 km^3) in Rogun reservoir for flood protection by April, and possible preliminary drawdown of Nurek reservoir. Emptying both reservoirs by the beginning of vegetation period involves high risk for irrigation water supply, which should be thoroughly studied and mitigated.	Detailed modeling of potential flood management scenarios was not necessary at this stage of project planning, but would be part of future studies at the detailed design stage. The hypothetical scenario of maximizing winter energy production by drawing down both reservoirs was evaluated as part of the risk analysis even though this is not how GoT intends to operate the dams.

Comments	Response
Comment expressed by stakeholder from Uzbekistan.	
93. Because of increased evaporation caused by the Rogun reservoir, which is part of the water allocated to Tajikistan by ICWC, the actual reduction in downstream flows during the 16 years of will be a bit more than 0.83km^3 per year. *Comment expressed by stakeholder from Tajikistan.*	The impact of evaporation was analyzed in the TEAS report and found to be insignificant. In response to the comment, the final ESIA has been modified so it now describes Rogun and Nurek evaporation in more detail.
94. GOT expressed its commitment to adhere to the conditions spelled out in the report. *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response.
V. Nurek HPP	
95. The proposed operating regime may change the stable stratification process of Nurek reservoir and increase the area of the reservoir, and, consequently, water evaporation volume. *Comment expressed by stakeholder from Tajikistan.*	Thermal stratification of Nurek will not be changed by keeping its level stable. As Figure 8-39 shows, the (colder, sediment loaded and therefore denser) water of Vakhsh river "dives" rapidly when reaching the reservoir, the warmer water remains at the surface. The combined operation of the two reservoirs is to be optimized in the detailed design stage and also periodically during the operating life of the project. This subsequent study will take into account all pertinent factors including potential flood inflows downstream of Rogun, available discharge capacity, impact on evaporation from both reservoirs, etc. PoE would like to point out that an increase in evaporation is a percentage of the annual evaporation from the lake, which is already negligible with respect to the water volumes involved.
96. Section 6.5.1 of the ESIA notes the problem of mudflow from the Obishur valley, and the recommendation for mudflow studies. This all emphasizes the need for additional studies of Nurek stability under the proposed operating regime, in particular to analyze risks to the dam and on the Dongarinsk irrigation tunnel. *Comment expressed by stakeholder from Tajikistan.*	Section 6.5.1 calls for assessment and implementation of measures to handle mudflows from the Obishur. This was not a recommendation of the ESIA, but of the 2009 HPI study. In the meantime, a sediment checkdam is being built, with construction nearing completion. When this checkdam is filled with mud flows, another checkdam will be put into operation upstream of the first checkdam. Section 6.5.1 was changed to make this clear.
97. The ESIA and other studies repeatedly state that Rogun will not change the current 4.2km^3 summer-to-winter water transfer. Sediment accumulation has reduced the storage capacity of Nurek reservoir by 25%. Since the original design net volume of Nurek was 4.5km^3, the actual summer-to-winter transfer would be about 3.37 km^3, not 4.2. *Comment expressed by stakeholder from Tajikistan.*	Present active storage was calculated based on recent data on inflow and outflow (1991-2011) and was found to be 4.2 km³.

Comments	Response
VI. Climate Change	
98. Will there be changes in the microclimate of the upstream valley? Evaporation from the Rogun reservoir would lead to higher precipitation in upstream valleys. As a result, upstream hydrologic monitoring and weather stations in Kyrgyzstan will need to be updated and maintained. *Comment expressed by stakeholder from the Kyrgyz Republic.*	Although this would be a large lake, the ESIA concludes it would not be large enough to cause any significant change in local humidity or temperature, although there could be a few more frost-free days in the immediate surroundings of the reservoir. Thus, there is no major concern about microclimate change due to the project. Notably, there is already one major reservoir in this area, Nurek, and no adverse impacts have been noted. A similar scenario is expected for the Rogun reservoir. The ESIA concluded that the modest size of the Rogun lake (in the context of evapotranspiration as compared to the Vakhsh catchment upstream of Rogun) would preclude any impacts on local microclimate, including the amount or distribution of precipitation. Regardless of Rogun, there need to be a comprehensive hydrologic and meteorologic monitoring program to allow proper adaptation measures to be implemented in response to climate change.
99. To what extent has the study assessed the role of Rogun in mitigating climate change impacts such as flood, drought, GHG emissions, etc.? Was mentioned in presentation, but wanted to ask about ESIA extent. *Comment expressed by stakeholder from Tajikistan.*	All were addressed comprehensively in the ESIA. The analysis of climate change reported the results and trends shown in relevant climate change models. One key trend is for more variability in the distribution of precipitation, although not in the total amount. This suggests more dry years and more wet years, as well as changes in seasonal runoff. As indicated in the ESIA, there is significant potential for Rogun to be used to reduce downstream flooding by retaining peak flows, including early-year flows, as well as to release more water in dry years to help mitigate drought impacts. However, this would require agreement among riparian countries to modify current water sharing agreements.
100. Because the operating regime is strongly based on seasonal flow control (depending on winter severity and energy requirements), Rogun will not be able to align annual flows over a long-term period. Thus, Rogun cannot help in mitigating the effect of irregular annual precipitation resulting from climatic impact. *Comment expressed by stakeholder from Uzbekistan.*	It is agreed that Rogun cannot align annual flows over a long-term period, for the reasons given. However, the additional storage capacity provided by Rogun could be used to moderate the impacts of increased variability in seasonal and annual precipitation and seasonal changes in run-off and flow caused by climate change. With appropriate agreements, this additional storage capacity could be used to the benefit of all countries.
101. The ESIA's hydrologic projections up to 2100 are unrealistic. *Comment expressed by stakeholder from Uzbekistan.*	The only projections the ESIA makes for the period to up to 2100 are those on climate change. These are based on the latest available results from climate change models, which for the time being is the most reliable information on this subject..
VII. Aral Sea	
102. The Amu Darya and the Aral Sea must be seen as a single system, and mitigation measures should be developed in this context. Future agreements may be	The ESIA considered the entire system, including the Vakhsh river, the Amu Darya, and the Aral Sea. The ESIA includes a detailed description of the Aral Sea situation and concludes that Rogun would not have an important impact, either positive or

Comments	Response
able to realize some benefits to the system. *Comment expressed by stakeholder from Kazakhstan.*	negative. The only effect at all would be that over a 16-year period, an average of 0.8bcm per year would be used to fill the Rogun reservoir; Tajikistan reports it will use this water with or without Rogun. It is agreed that future agreements will be needed if there is to be any improvement in the Aral Sea.
103. During impoundment, inflows to the Aral Sea will be reduced by 15%, which will result in further desertification to be faced. *Comment expressed by stakeholder from Uzbekistan.*	During filling there would be a potential reduction in current annual flows to the Aral Sea by about 15 percent of present inflow, which is less than 1.5% of the original natural inflow. As discussed in the ESIA, Rogun would have no significant effect, positive or negative, on the situation of the Aral Sea given the highly reduced flows which already exist.
104. Nurek transfers water from summer to winter and this will be made worse by Rogun. *Comment expressed by stakeholder from Uzbekistan.*	The proposed Nurek-Rogun operating regime would not increase this summer-to-winter transfer. The only change in flow patterns would be during the 16-year filling period, during which up to 1.2bcm per year would be used to fill the Rogun reservoir; Tajikistan indicates that this falls within its regular annual allocation under current agreements and reports it intends to use this allocated water with or without Rogun.
105. Aral Sea is a water user. Why is water not allowed to reach Aral Sea so this water user can receive its proper share of water? *Comment expressed by stakeholder from Uzbekistan.*	The ESIA included a thorough explanation of the condition of the Aral Sea, and the causes of that condition. The ESIA concluded that Rogun will have little or no effect on water flows to the Aral Sea, and could have no significant positive or negative effect there. Significant improvement of flows to Aral Sea would require broad commitments from all riparians.
VIII. Construction and Filling	
106. It is reported that construction and filling will take 16 years, which is not long enough. Normally it takes 20-25 years for construct such a dam. Evaporation has not been taken into account, so will take more than 16 years. Proper calculation need to factor in the 27-33% evaporation attributed to reservoir. *Comment expressed by stakeholder from Uzbekistan.*	Filling of the reservoir would begin as soon as the inital (first stage) dam is completed, which is expected to be 10-13 years. With filling proceeding in parallel with construction of the second phase, it is estimated that filling would be completed in about 3-4 years additional years. Actual evaporation loss due to the reservoir will be only about 0.5%, in part due to the fact that climatic conditions result in many months with no evaporation. This will not significantly impact the time required to fill the reservoir.
107. The ESIA's evaluation of impacts of construction is very local, with no analysis of possible aftermath for whole river. *Comment expressed by stakeholder from Uzbekistan.*	The impacts of construction will indeed be very local. The only important off-site impact could be erosion into the river, which would cause downstream turbidity. This will be controlled through good construction practices, but in any case any additional sediment would largely be captured by the downstream Nurek reservoir, resulting in little or no downstream impacts due to construction.
IX. Dam Safety	
108. Civil society has no issue with whether Rogun is built or not, but we want to	Technical studies concluded the dam can be designed and constructed to withstand the

Comments	Response
make sure dam safety is considered and dealt with. *Comment expressed by stakeholder from Uzbekistan.*	Probable Maximum Earthquake and to handle the Probable Maximum Flood. The TEAS report provided specific recommendations for design and construction to ensure safety of the dam, as well as recommendations for some further studies to inform final designs (such as dam break analysis).
109. Have you considered downstream effects from dam cracks or any other breakdown of dam structure? *Comment expressed by stakeholder from Afghanistan.*	Dam failure of this type would be expected to result in significant wave impacts in the case of any large dam. Rogun would actually reduce the current risk of wave impacts by providing the capacity to manage the Probable Maximum Flood, which is currently lacking in the Vakhsh cascade. No matter how safely a dam is designed, international practices require that possible failure be accounted for, including ensuring appropriate emergency preparedness planning. That is properly done at the appropriate time, which is at the time of final design. That will take place for this project if and when it is decided to implement it.
110. Neither the ESIA nor TEAS studies evaluated possible impacts of maintaining Nurek at constant FSL. Side inflows can amount to $1km^3$ over several hours, and this may pose a hazard to Nurek dam safety. This is complicated by aging of the reservoir and inoperability of the bottom discharge. *Comment expressed by stakeholder from Tajikistan.*	From an energy generation perspective, retaining Nurek near FSL while regulating the flows with Rogun maximizes the energy production of the cascade. The combined operation of the two reservoirs is to be optimized in the detailed design stage and also periodically during the operating life of the project. This subsequent study will take into account all pertinent factors including potential flood inflows downstream of Rogun, available discharge capacity, impact on evaporation from both reservoirs, etc.
X. ESIA Evaluation of other impacts	
111. It is not clear why some significant social risks are not considered in the ESIA, such as risks of increasing social instability in some countries, and threats to the security of transmission lines or the dam itself due to the potential emergence of terrorist groups to destroy. Are there plans to make such analysis? *Comment expressed by stakeholder from Uzbekistan.*	At present, there is no definitive plan for export to electricity outside Tajikistan and thus no analysis can be undertaken at this time. Rockfill dams are generally resistant to terror attack. For example, the Rogun dam would be over 1.5km wide, and thus it would be very difficult to affect its stability or integrity.
112. The threat of instability and terrorism that is present for many countries, not only Tajikistan, should not stop these countries from development. *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response.
113. ESIA does not assess the impact on regional food security by loss of the flooded area. It will not be possible to replace the fruit trees due to climatic differences between current settlements and new ones. The loss of grazing lands in Rogun and Darband districts will affect southern communities and lead to mass slaughter of animals. *Comment expressed by stakeholder from Tajikistan.*	The reservoir area is not a major contributor to the food / agriculture production. The resettlers will be assisted to adopt agricultural and other livelihoods activities suitable to new locations. Livelihood support program called for in the RAP will assist in dealing with this potential problem. The reservoir area which will be submerged is barely able to produce enough food for the population which is going to be relocated. People from these villages also use land (mainly pasture land) above the FSL.

Comments	Response
	Relocating them to other sites will therefore reduce pressure on remaining pasture land. Those resettlers who decide to go into agriculture in the new sites, especially in Dangara and Tursunzade, will find by far better conditions for agricultural production. Lost fruit trees are being replaced by planting new fruit trees at the new locations.
114. In the 1990s, the World Bank developed a project to improve conditions in Muhnak district, with a system of dams to rehabilitate lakes and feed wetlands. The total volume of water in these reconstructed lakes is approximately equivalent to the 1.2km^3 that would be used for filling the Rogun reservoir. With Rogun there will be no water for this good project for 16 years. *Comment expressed by stakeholder from Uzbekistan.*	Throughout Amu Darya basin, more efforts are needed for irrigation efficiency and productivity. The volume of water that would be used to fill the reservoir has been allocated to Tajikistan by ICWC in past years but not used. Even without Rogun, Tajikistan has stated its intent to use its full allocated share in the future.
115. The ESIA does not discuss the relationship of Rogun with CASA1000 and the issues associated with power export. *Comment expressed by stakeholder from Uzbekistan.*	Whatever the sources of domestic generation utilized to meet domestic demand, surplus electricity will be generated in summer and this will require significant transmission export capacity. The transmission export capacity required will be significantly greater than that planned for the CASA project. The studies have shown that the least cost solution also foresees winter electricity imports. Thus regional electricity trade will be an important future objective for the Tajikistan power sector. These aspects are covered in the Technoeconomic Assessment Studies. Regional electricity trade is not expected to result in significant environmental and social impacts. Separate ESIAs will be prepared for the transmission interconnections prior to their implementation.
116. Were the possible impacts of the garbage dumps and animal burial sites used by resettled villages considered, and how will the issue be handled? The ESIA lacks data on this. *Comment expressed by stakeholder from the Kyrgyz Republic.*	The ESIA calls for a waste management plan as part of the ESMP, to identify and remove any possible contaminants, especially in the construction site. These contaminants would be analyzed in detail and, if necessary, removed before flooding.
117. What are the positive impacts of the Rogun HPP? *Comment expressed by stakeholder from Tajikistan.*	Although the ESIA focuses on potential negative impacts and on mitigation, it describes significant positive impacts. These include: ▪ Improved electricity supply for the country and resulting indirect environmental positive benefits (reduced fuel-wood use, for example) and improvement of quality of life ▪ Economic benefit for the country due to more stable supply and potential for export sales/trade ▪ Water regulation potential that could help mitigate downstream low flows in drought years ▪ Protection of Nurek and the cascade against PMF, and potential to operate so as to reduce flows and protect downstream resources and people from lesser floods.

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	▪ Significant local economic benefit from over 13,000 jobs for up to 16 years. ▪ Potential to improve Tugai ecosystems in Tigrovaya Balka ▪ Potential for development of fishery in Nurek, which will be managed at a constant level.
XI. Geology and Seismicity	
118. Seismicity can affect not only the dam and reservoir but also many other "components" like construction area, quarries, borrow pits and dumping areas. *Comment expressed by stakeholder from Italy.*	Although not expressed in the ESIA, this is true, and will be added to Table 1 of the ESMP and Table 16-1 of Volume I of the ESIA as a potential impact. It is believed no further mitigation is needed to protect these areas, which except for some tunnels will be used for only short periods, against seismic events.
119. If as stated in Table 1 of the ESMP [and Table 16-1 of ESIA Volume I] "reservoir triggered seismicity cannot be of a higher magnitude than a potential spontaneous earthquake would be" and "Estimate of the Maximum Credible Earthquake (MCE) is from Guissar Fault Mw=7.4/7,9 " also if "RTS at the Rogun site is likely to be less than 5" but "Maximum observed magnitude clearly related with a dam is 6.3"we can assume that the valuation of importance "small negative" is underestimate and only after the proper mitigation measures' foreseen can become small negative. *Comment expressed by stakeholder from Italy.*	It is important to note that 6.3 is the maximum observed induced seismic event anywhere in the world, and that Rogun is not expected to experience induced events of that magnitude, in part due to the slow reservoir filling.
120. The statement in the ESIA (Table 16-1) and ESMP (Table 1) that "The installation of a micro-seismic monitoring network is proposed" is not correct because "…this is not a mitigation measure but a proper and scientific method to establish a "seismicity baseline" and a monitoring system for [the] coming period." *Comment expressed by stakeholder from Italy.*	The clarification is noted and ESIA and ESMP will address this comment. A micro-seismic network can also be used as a mitigating measure as if such activity will be recorded it has to be assessed how reservoir impounding can proceed. The results will also show which faults are activated and if they have an impact on e.g. reservoir slope stability. Then mitigating measures would have to be studied for such slopes.
121. Table 1 of the ESMP [and Table 16-1 of ESIA Volume I] does not mention impacts on people that can occur due to reservoir-induced earthquake and landslide. If new areas are subject to earthquake, Instruments of Disaster Risk Reduction Mitigation measures should be added to the table as mitigation measures for resettlement impacts. In addition, seismic design of new buildings should be a mitigation in such areas. *Comment expressed by stakeholder from Italy.*	In general, resettlement areas are not subject to higher seismic risks than the old settlements, except the minor risk of induced earthquakes near the reservoir, which could be expected to be small. As a risk reducing measure the buildings, structures and infrastructures in the resettlement areas must be able to withstand the ground motion of the largest expected RTS events and new structures shall be designed for such ground motions. Existing structures may have to be strengthened if they have not been designed against earthquakes.
122. There is insufficient consideration of earthquakes *Comment expressed by stakeholder from Uzbekistan.*	The ESIA considered regional seismicity as well as reservoir-triggered seismicity. The ESIA also noted that the dam will be designed to withstand Maximum Credible Earthquake, and that the extended filling period will reduce risks from induced

Comments	Response
	earthquakes.
123. Earthquake resistance and salt erosion are not given due regard. *Comment expressed by stakeholder from Uzbekistan.*	The dam will be able to withstand the Maximum Credible Earthquake, and there are proposed mitigation measures for preventing damaging dissolution of salt as covered in Phase 0 study under the TEAS.
124. It is necessary to consider the issue of creeping and co-seismic displacements, which can reach 1 m in Yonakhsh fault. For Yonakhsh inclined planes these estimates show large uncertainties. Based on current knowledge, one should not ignore the fact that part of the displacements appear due to creeping and/or secondary faulting. This view should be carefully considered during the next phase of design. Possible internal block deformation between Yonakhsh and Gulizindan faults should be taken into account, as this block forms the foundation of the dam and dam-associated structures. *Comment expressed by stakeholder from Uzbekistan.*	This comment relates to TEAS study. Comment Wieland: The dam will be designed for limited fault movements, therefore, creep deformations are not considered as critical as there would be adequate time for taking action (e.g. lowering of the reservoir level) if such movements have been observed and if they have a negative impact on dam safety. Much more critical are the fault movements occurring during a strong earthquake as they develop almost instantaneously, which is more critical than slowly developing creep movements.
XII. Other Comments and Requests	
125. Because additional research, studies and detailed design work will need to be implemented at subsequent project stages and the process of international expert assessment and consultations will need to be continued, it is requested that the authors develop detailed recommendations as to how subsequent project stages should be developed. *Comment expressed by stakeholder from Uzbekistan.*	TEAS and ESIA reports address feasibility stage. Both identify specific works to be done for subsequent project phases.
126. What guarantees can be provided that the additional research, studies and detailed design work will be completed? Who can guarantee that the results of additional research, studies and detailed design work will [p]resented for international experts' review? *Comment expressed by stakeholder from Uzbekistan.*	GOT has made a commitment that all additional studies and designs will be completed, and will be submitted for review by international experts.
127. The ESIA proposes artificial floods "to restore some of the natural dynamics" of the Vakhsh. To prevent any increase in water losses in the basin, artificial floods to restore the natural dynamics should only be made when they do not contradict the multi-year control principles and in combination with flood control. *Comment expressed by stakeholder from Uzbekistan.*	The comment is acknowledged and does not require a response. The ESIA mentions the possibility of such artificial floods to improve the situation especially in Tigrovaya Balka, but it also mentions that this has to be planned very carefully in order not to cause any damage to settlements or agriculture.
128. An NGO should be involved to provide objective monitoring as an observer. We are open to cooperation. *Comment expressed by stakeholder from the Kyrgyz Republic.*	The comment is acknowledged and does not require a response.

Comments	Response
129. Two authorized specialists from each downstream state should be allowed to visit the site at the beginning of HPP construction and then at least twice a year to monitor the ESMP. This would definitely increase the mutual confidence level. This should be added to ESIA Volume 3 EMP, section 3.3.3.2 External Experts. *Comment expressed by stakeholder from Tajikistan.*	GOT has indicated it will consider the recommendation for observers.
130. The measures proposed in Chapter 16 to mitigate negative impacts and the associated monitoring measures are of good quality, and they are stated in an accessible and understandable matter. *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response.
131. ESIA Volume 3 ESMP, Section 2.2, Table 1. This table on impacts and mitigation contains a systemized, wide range of effects as well as mitigation and monitoring measures. It would be reasonable to indicate the responsible party in a new column of Table 1. *Comment expressed by stakeholder from Tajikistan.*	Figure 2 of the ESMP shows the various monitoring and management plans, and indicates whether they will be prepared by the project Owner or contractor. Details of responsibility will be further developed as project planning proceeds.
132. Regarding section 3.2 of ESIA Volume 3, ESMP: it was previously recommended to create separate managerial structure with autonomous funding, independent of OSHC Barki Tojik and Rogun HPP OJSC, for certain aspects of the project. These include preparation of the Water Storage bed, sanitation of the relocated living settlements and other activities. Regardless, it is necessary to release the Resettlement Unit from the duties on preparation of the water storage bed. *Comment expressed by stakeholder from Tajikistan.*	The project authorities will periodically review institutional arrangements.
133. The ESIA emphasizes the need to involve the maximum number of local workers to help mitigate resettlement impacts. However, this is not required by the ESMP (in particular, it is not in paragraph 3.2.6, paragraph 5.1 Contractor's Labor Force Management Program, or paragraph 4.1 Owner's Labor Force Management Plan). *Comment expressed by stakeholder from Tajikistan.*	The comment is noted and the ESMP will be revised to ensure that the project Owner will have a Contractor Management Plan. One of the provisions will be to encourage contractors to make maximum use of local workers, and to provide data on where workers are from in periodic reports.
134. Since employment will be reduced from 13 000 to 800 when construction is complete, there needs to be a plan to reduce impacts when this occurs. *Comment expressed by stakeholder from Tajikistan.*	The requirement to prepare and implement a retrenchment plan will be made part of the final ESMP.
135. ESIA Volume 3 ESMP, section 5 states that per capita water demand was not available for Tajikistan. The Civil Norms and Rules regulating the daily water	Relevant norms and rules will be used in preparing the water management plan for the project and is included in the ESMP.

Comments	Response
consumption norms per one person including the streets watering norms apply in Tajikistan. The rules on use of the public water systems in Tajikistan also contain the water consumption norms. *Comment expressed by stakeholder from Tajikistan.*	
136. ESIA Volume 2 ESMP, section 5.3.3 refers to Table 4.3, which is not presented. Table 6, which was presented, shows water quality standards that long out of date, and have been updated in Tajikistan in 2007. *Comment expressed by stakeholder from Tajikistan.*	The correct water quality standards are presented in the final ESMP and the water quality management plan.
137. I fully support the development of the online hydrologic monitoring system (ESMP section n 7.1) and the emergency preparedness plan (ESMP section 7.3). *Comment expressed by stakeholder from Tajikistan.*	The comment is acknowledged and does not require a response.
XIII. Technical Issues	
138. The TEAS work does not summarize all accumulated factual materials; does not cover the whole spectrum of the existing problems; and does not define their solutions. *Comment expressed by stakeholder from Uzbekistan.*	TEAS was intended to evaluate project technical feasibility and to focus on the key technical issues that could affect project feasibility.
139. It will be difficult to remediate underground structures, and so they may need to be plugged and re-done. *Comment expressed by stakeholder from Uzbekistan.*	TEAS studies concluded that proposed remedial measures would be able to restore the underground structures.
140. The most important problems that appeared during construction have not been solved, including turbine hall and transformer cavern stability. *Comment expressed by stakeholder from Uzbekistan.*	TEAS studies have confirmed there are technical solutions to stabilize existing excavations.
141. No specific recommendations were provided regarding the mudflow danger of Obishur river. It is not clear, what mud dam is constructed if recommendations on further river mudflow potential studies are provided. *Comment expressed by stakeholder from Uzbekistan.*	A dam is being constructed to intercept mudflow from the Obishur river.
142. There is no mention of any structure going through the riverbed. Concrete, steel, etc., could withstand pressure higher than weight of dam. *Comment expressed by stakeholder from Uzbekistan.*	Such aspects are not feasibility-level issues and are to be considered in the detailed design stage.
143. Although the studies call for additional grouting to stabilize the powerhouse, this will not be sufficient to ensure the stability of the powerhouse given the characteristics	TEAS studies concluded that the powerhouse could be repaired and restored with grouting, so it could safely meet its intended purpose.

Comments	Response
of the rock, including its hardness. *Comment expressed by stakeholder from Uzbekistan.*	
144. In 1993 -1994, a survey of Nurek dam showed it did not meet modern requirements, in particular requirements related to seismicity. One common measure to reduce such risk is to lower the water level in reservoir, It is recommended that Nurek stability should be studied in next phase. *Comment expressed by stakeholder from Uzbekistan.*	In 1993-1994 there was no survey of Nurek due to the civil war in the country. The survey was carried out in 2007- 2008 by the French company "EDF" on the Project of "Monitoring of Dam Safety at Nurek HPP – Power Rehabilitation Project" (ADB Loan 1817-TAJ). The survey showed that for the operation period the dam deformation and filtration corresponded to the design parameters and from the seismicity perspective the Nurek HPP dam was stable. In 2010 Nurek HPP has been issued a certificate of quality and the dam of the hydro power station was rated "As the best feat of engineering" by ICOLD. Baki Tajik has signed a contract for studies on rehabilitation and dam safety works for Nurek HPP.
145. What is the capacity of spillways of the Vakhsh cascade? Is Rogun's capacity to be 8000 or 5000 cubic meters per second? Is downstream capacity adequate? *Comment expressed by stakeholder from Uzbekistan.*	The daily peak for the Rogun PMF is 7,770 m3/sec, whereas Nurek and the downstream cascade has been designed for a maximum flood of about 5,400 m3/s (the 1 in 10,000 flood). The two higher Rogun dam alternatives (1290 FSL and 1255 FSL) have been designed to manage the PMF so as to limit the downstream discharge to the current flood-handling capacity of the downstream cascade. If either of these alternatives is implemented, no additional facilities for augmenting the flood-handling capacity of the cascade will be needed for several decades. Eventually, when Rogun reservoir is sedimented to an extent that it can no longer attenuate the PMF sufficiently, the PMF will be discharged via the surface spillway. At this stage, additional facilities will be required at Nurek and possibly at other downstream projects to increase the flood-handling capacity of the downstream cascade. For the 1220 FSL Rogun alternative, measures to protect the downstream cascade against the PMF would need to be provided straight away.
146. We strongly disagree that the salt dome should be considered only "moderate" risk. Work conducted in the past concluded that protection of the salt dome is a priority for the project, since the fate of the project depends on these protection measures. There is a need to assess work already performed against modern design. We also disagree that other risks, including those of tunnel integrity and powerhouse convergence, are only considered "moderate." *Comment expressed by stakeholder from Uzbekistan.*	This topic was covered in more detail in the technical sessions, but in summary, it is appropriate to consider the salt dome, as well as the tunnels and powerhouse, as presenting moderate risk. ▪ Salt wedge. TEAS phases 0 and 1, and the corresponding reports, evaluated the salt dome and mitigation measures in detail, and the results were discussed in previous consultations. Best engineering judgment concluded the risk could be managed, but the risk was left as "moderate" to ensure the issue will be kept in mind for final

Comments	Response
	assessment. ▪ Tunnels. Again, a thorough engineering analysis was performed in TEAS phase 1, and it was concluded that appropriate solutions were readily available for implementation. ▪ Powerhouse. 1/3 in sandstone, so no problem there. Contingency of convergence was analyzed and solutions developed after evaluating performance of institutes' engineering solutions. These issues were also of significant concern for the technical POE, which concluded the issues were evaluated thoroughly and appropriately. There is a substantial body of information that is available for public review.
147. Our own calculations show that Rogun would provide only 50-60 years of flow control due to sedimentation, and this could be shorter due to glacier melt and increase in flow glacial deposits into the river. *Comment expressed by stakeholder from Uzbekistan.*	The estimate of 115 years was the approximate (minimum) length of time that the life of Nurek would be extended (that is, the time before Rogun could hold no more sediment), not the time that Rogun would maintain full flow control.
148. The Vakhsh river water is somewhat corrosive due to high concentrations of carbonate, sulfate, and chlorine. This can damage concrete structures, so special hydrochemical studies will need to be implemented in the future. *Comment expressed by stakeholder from Tajikistan.*	The importance of the quality of concrete for the long and safe life of the project is fully recognized. It is also recognized that the required quality can be achieved using modern standards and specifications that take into account the specific site conditions. These standards and technical specifications for the concrete will be developed in a subsequent stage of the project as part of the technical specifications for the Contractor(s).
XIV. Consultations	
149. It would be useful to compile NGO comments from today and from the previous consultations, with an emphasis on conducting further economic studies by way of justification. *Comment expressed by stakeholder from Uzbekistan.*	All comments provided during consultation meetings and submitted in writing will be acknowledged and responded to in detail.

Annex 2

List of Participants: Information-Sharing and Consultation Meeting on November 8, 2023, and November 9, 2023, of Riparian Governments and CSOs on Updated ESIA for Rogun Hydropower Project

List of Participants – November 08, 2023

##	*Name*	*Organization*	*Position*
1	Usmonali Usmonzoda	Government of the Republic of Tajikistan	Deputy Prime Minister, Head of delegation
2	Shahnoza Nodiri	Ministry of Labor, Migration and Employment of the Republic of Tajikistan	Deputy Minister
3	Manuchehr Safarzoda	Ministry of Energy and Water Resources of the Republic of Tajikistan	Deputy Minister
4	Abdukodir Mavlodod	Committee for Environmental Protection under the Government of the Republic of Tajikistan	Deputy Chair
5	S. Kurbonzoda	Executive Office of the President of the Republic of Tajikistan	Head of Infrastructure Development Department
6	Pulod Muhyiddinyon	PMG for energy facilities construction under the President of the Republic of Tajikistan	Director
7	Manuchehr Jamilzoda	Directorate for the flood zone of the Rogun HPP	Director
8	Manuel Berlengero	World Bank	Lead Energy Specialist and co-TTL for Rogun HPP
9	Gaurav D. Joshi	World Bank	Senior Environmental Specialist
10	Harjot Kaur	World Bank	Senior Social Development Specialist
11	Maqsud Safarov	World Bank	Energy Specialist
12	Emil Zalinyan	AIIB	Infrastructure Sector Economist
13	Gulru Azimova	AIIB	Senior Social Development Specialist
14	Christoph Meindl	ADB	Senior Energy Specialist
15	Ibrahim Shukri	Islamic Development Bank, Regional Center in Kazakhstan	Head of RC Almaty
16	Ali Khan	Islamic Development Bank, Regional Center in Kazakhstan	Regional Operations Manager
17	Edzwan Anwar	Islamic Development Bank, Regional Center in Kazakhstan	Head of Task Force-EI
18	Rustam Eshonkhujaev	Islamic Development Bank, Regional Center in Kazakhstan	Country Economist
19	Erlan Aliaskarov	Eurasian Fund for Stabilization and Development	Senior Project Manager
20	Nurym Ayazbaev	Eurasian Development Bank	Director of the Energy Directorate
21	Nozim Khasanov	International Institute of Central Asia	Head of Water and Environmental Research Department
22	Ljiljana Spasic-Grill	DSPoE	Chairman

23	Afshan Khawaja	ESPoE	Chairman
24	Ioannis Karavokiris	ESPoE	Member
25	Anvar Rakhmonov	JSC "Rogun HPP"	Production Director
26	Murod Sadulloev	JSC "Rogun HPP"	a.i. Technical Director
27	Mehriddin Tohirzoda	JSC "Rogun HPP"	CEO's councelor
28	F. Mirzoev	JSC "Rogun HPP"	Press service operator
29	Manuchehr Azizov	JSC "Rogun HPP"	Chief Accountant
30	Rustam Saidzoda	Directorate for the flood zone of the Rogun hydroelectric power station	Deputy Director for Environmental and Social Affairs
31	Ayub Faizullozoda	Directorate for the flood zone of the Rogun hydroelectric power station	Chief specialist of the production department
32	Parviz Atoev	Technical assistance for financing the Rogun HPP project	Project coordinator
33	Bakhtiyor Begmuradov	Technical assistance for financing the Rogun HPP project	Environmental and Social Specialist
34	Jack Mozingo	Technical assistance for financing the Rogun HPP project	Senior Advisor for Environmental and Social Affairs
35	Angela Boitsidis	WSP UK	ESIA Lead / Technical Director
36	Matt Goodwin	WSP UK	ESIA Expert
37	Daler Karimov	PMG for energy facilities construction under the President of the Republic of Tajikistan	Construction Department Specialist
38	Mehrubon Asoev	PMG for energy facilities construction under the President of the Republic of Tajikistan	Office Manager
39	Zaza Grigolia	Employer Representative	HSE Manager
40	Umed Kosimov	Employer Representative	Translator
41	Sh. Khamraev	Government of the Republic of Uzbekistan	Minister of Water Resources, head of delegation
42	Zhumandarov A.	Ministry of Energy of the Republic of Uzbekistan	Deputy Minister
43	Zh. Kazbekov	Ministry of Ecology and Environmental Traces	Deputy Minister
44	F. Sattarov	Ministry of Ecology and Environmental Traces	Head of Environmental Policy Department
45	V. Akhmadjonov	JSC " Uzbekhydroenergo "	Deputy Chairman of the Board
46	E. Irgashev	JSC "Hydroproject"	Deputy Director
47	V. Shi- syan	State Institution "Center for Environmental Expertise"	Deputy Director General
48	S. Nizamov	Ministry of Agriculture	Head of Climate Change Adaptation Department
49	M. Turaev	Ministry of Foreign Affairs of the Republic of Uzbekistan	First Secretary of the Department of Cooperation with Central Asian Countries

50	Zhandos Demesinovich Nurmaganbetov	Ministry of Energy of the Republic of Kazakhstan	Vice-Minister, Head of delegation
51	Nurlan Zhanuzakovich Aldamzharov	Ministry of Water Resources and Irrigation of the Republic of Kazakhstan	Vice-Minister
52	Zhomart Shiyapovich Aliev	Committee for Environmental Regulation and Control of the MENR of the Republic of Kazakhstan	Chairman
53	Akzhelen Serikovna Kosayeva	Committee for Environmental Regulation and Control of the MENR of the Republic of Kazakhstan	Chief Expert
54	Zhaslan Serikovich Kasenov	Ministry of Energy of the Republic of Kazakhstan	Department Director
55	Gulzhan Kalizhanovna Nalibaeva	LLP “RFC for support of renewable energy sources” Republic of Kazakhstan	Director General
56	Dauren Tulegenovich Shakenov	JSC KEGOC, Republic of Kazakhstan	Deputy Chief Dispatcher of NDC SO
57	Nazgul Zhorobekovna Usenova	Ministry of Energy of the Kyrgyz Republic	Deputy Minister, Head of delegation
58	Ernst Kydykbaevich Kaldybaev	Ministry of Finance of the Kyrgyz Republic	Deputy Minister
59	Bakyt Berenov	Ministry of Natural Resources, Ecology and Technical Supervision of the Kyrgyz Republic	Head of the Land Resources Department of the Department of Water and Land Resources
60	Azizbek Sagynbekovich Karagulov	Ministry of Energy, Kyrgyz Republic	Leading specialist of the Department of External Relations and Project Promotion
61	Kumyushai Akhmatbekovna Suyumbaeva	Ministry of Foreign Affairs of the Kyrgyz Republic	Advisor to the Water and Environmental Diplomacy Sector of the Department of Foreign Policy Analysis and Planning
62	Shakirzhan Puletovich Saidov	JSC Directorate of Power Plants under Construction	Deputy General Director
63	Atamurat Muradov	Ministry of Environmental Protection of Turkmenistan	Deputy Minister, Head of delegation
64	Yanov Pashshiev	State Committee for Water Resources of Turkmenistan	Delegation Member
65	non-titled	State Committee for Water Resources of Turkmenistan	Delegation Member

List of Participants – November 09, 2023

##	*Name*	*Organization*	*Position*
1	Usmonali Usmonzoda	Government of the Republic of Tajikistan	Deputy Prime Minister, Head of delegation
2	Shahnoza Nodiri	Ministry of Labor, Migration and Employment of the Republic of Tajikistan	Deputy Minister
3	Manuchehr Safarzoda	Ministry of Energy and Water Resources of the Republic of Tajikistan	Deputy Minister
4	Abdukodir Mavlodod	Committee for Environmental Protection under the Government of the Republic of Tajikistan	Deputy Chair
5	S. Kurbonzoda	Executive Office of the President of the Republic of Tajikistan	Head of Infrastructure Development Department
6	Pulod Muhyiddinyon	PMG for energy facilities construction under the President of the Republic of Tajikistan	Director
7	Manuchehr Jamilzoda	Directorate for the flood zone of the Rogun HPP	Director
8	Gaurav D. Joshi	World Bank	Senior Environmental Specialist
9	Nozim Khasanov	International Institute of Central Asia	Head of Water and Environmental Research Department
10	Ljiljana Spasic-Grill	DSPoE	Chairman
11	Afshan Khawaja	ESPoE	Chairman
12	Ioannis Karavokiris	ESPoE	Member
13	Anvar Rakhmonov	JSC "Rogun HPP"	Production Director
14	Murod Sadulloev	JSC "Rogun HPP"	a.i. Technical Director
15	Mehriddin Tohirzoda	JSC "Rogun HPP"	CEO's councelor
16	F. Mirzoev	JSC "Rogun HPP"	Press service operator
17	Manuchehr Azizov	JSC "Rogun HPP"	Chief Accountant
18	Rustam Saidzoda	Directorate for the flood zone of the Rogun hydroelectric power station	Deputy Director for Environmental and Social Affairs
19	Ayub Faizullozoda	Directorate for the flood zone of the Rogun hydroelectric power station	Chief specialist of the production department
20	Parviz Atoev	Technical assistance for financing the Rogun HPP project	Project coordinator
21	Bakhtiyor Begmuradov	Technical assistance for financing the Rogun HPP project	Environmental and Social Specialist
22	Jack Mozingo	Technical assistance for financing the Rogun HPP project	Senior Advisor for Environmental and Social Affairs
23	Angela Boitsidis	WSP UK	ESIA Lead / Technical Director
24	Matt Goodwin	WSP UK	ESIA Expert

25	Daler Karimov	PMG for energy facilities construction under the President of the Republic of Tajikistan	Construction Department Specialist
26	Mehrubon Asoev	PMG for energy facilities construction under the President of the Republic of Tajikistan	Office Manager
27	Zaza Grigolia	Employer Representative	HSE Manager
28	Umed Kosimov	Employer Representative	Translator
29	Sh. Khamraev	Government of the Republic of Uzbekistan	Minister of Water Resources, head of delegation
30	Zhumandarov A.	Ministry of Energy of the Republic of Uzbekistan	Deputy Minister
31	Zh. Kazbekov	Ministry of Ecology and Environmental Traces	Deputy Minister
32	F. Sattarov	Ministry of Ecology and Environmental Traces	Head of Environmental Policy Department
33	V. Akhmadjonov	JSC " Uzbekhydroenergo "	Deputy Chairman of the Board
34	E. Irgashev	JSC "Hydroproject"	Deputy Director
35	V. Shi- syan	State Institution "Center for Environmental Expertise"	Deputy Director General
36	S. Nizamov	Ministry of Agriculture	Head of Climate Change Adaptation Department
37	M. Turaev	Ministry of Foreign Affairs of the Republic of Uzbekistan	First Secretary of the Department of Cooperation with Central Asian Countries
38	Akkenjenov E.K.	Ministry of Energy of the Republic of Kazakhstan	Vice-Minister
39	Nurlan Zhanuzakovich Aldamzharov	Ministry of Water Resources and Irrigation of the Republic of Kazakhstan	Vice-Minister
40	Akzhelen Serikovna Kosayeva	Committee for Environmental Regulation and Control of the MENR of the Republic of Kazakhstan	Chief Expert
41	Dauren Tulegenovich Shakenov	JSC KEGOC, Republic of Kazakhstan	Deputy Chief Dispatcher of NDC SO
42	Harjot Kaur	World Bank	Senior Social Development Specialist
43	Nuriya Bikineeva	NGO Echo	Communication specialist
44	Jamila Asanova	NGO Argo	Director
45	Galina Artyukhina	Kazakhstan Association of Nature Users for Sustainable Development (KAPUR)	Director
46	Saodat Tursunbaeva	NGO "Sharq Ayoli"	Director
47	Non-titled	NGO «For ecology clean of Ferghana»	
48	Indira Jakypova	NGO “Ecois Bishkek”	Director

49	Rafika Musaeva	Association of Energy Workers of Tajikistan	Chairman
50	Sobirjon Usmanov	Association of Energy Workers of Tajikistan	Member of the Board
51	Abdukarim Abdurakhmanov	Association of Energy Workers of Tajikistan	Member
52	Jura Boboev	Association of Energy Workers of Tajikistan	Member
53	Sabit Negmatullaev	NGO PMP International	Director
54	Muhammadrahim Yusufi	Environmental Commission of the Majlisi Oli of the Republic of Tajikistan	Chairman
55	Hamijon Arifov	National Commission of Tajikistan on Large Dams	Secretary
56	Mavlon Hokimalizoda	EC IFAS	Representative of Tajikistan
57	Anvar Kamolitdinov	Tajik Institute of Hydraulic Engineering and Land Reclamation	Senior Researcher
58	Akmal Akhmedov	Association of Geologists of Tajikistan	Member
59	Markhabo Abdullaeva	National Association of Insurance Organizations of Tajikistan	Director
60	Khisrav Sadykov	Tajik Technical University	Professor
61	Galia Rabieva	League of Women Lawyers of Tajikistan	Director
62	Shakhlo Abdunabizoda	NGO Jahon	Director
63	Oistamo Gulberdieva	Jumhuriyat newspaper	Chief specialist of the economic department
64	Vitaly Khinenzon	LLC "Trunk"	Director
65	Yuri Skochilov	“Climate Network of NGOs”, NGO Youth Ecocenter	Coordinator Director
66	Umed Ulugov	NGO " Peshsaf "	Director
67	Gulru Azimova	AIIB	Senior Social Development Specialist
68	Yanov Pashshiev	State Committee for Water Resources of Turkmenistan	Delegation Member
69	non-titled	State Committee for Water Resources of Turkmenistan	Delegation Member

Annex 3

Agendas for Information-Sharing and Consultation Meetings for Riparian Governments and CSOs on Updated ESIA for Rogun Hydropower Project

Consultations with representatives of Central Asian Governments on the updated ESIA for Rogun HPP project (November 8, 2023. Almaty, Kazakhstan)

Time	***Topic***	***Speaker***
09:30 – 09:50	Opening speech on behalf of the Government of the Republic of Tajikistan	U. Usmonzoda, Deputy Prime Minister of Tajikistan
09:50 – 10:20	Welcome speeches on behalf of Central Asian Governments	Heads of delegations of riparian countries
10:20 – 10:50	Rogun Hydropower Project: video and description	PMG, JSC Rogun HPP and State Institution DFZ
10:50 – 11:30	PowerPoint presentation: Updating the social and environmental instruments of the Rogun HPP project. Key E&S issues related to the riparians.	PMG - Jack Mozingo, Senior E&S Advisor; WSP representatives
11:30 – 11:50	Coffee break	
11:50 – 12:30	Questions and Answers on presentation	All
12:30 – 12:45	WB's brief information on status of the project	Harjot Kaur; Gaurav Joshi
12:45 – 13:00	AIIB's brief information on status of the project	Emil Zalinyan
13:00 – 14:00	Lunch *(Intercontinental Hotel)*	
14:00 – 14:15	Presentation by the Chair of the DSPoE	Ljiljana Spasic Grill
14:15 – 14:30	Presentation by the Chair of the ESPoE	Afshan Khawaja
14:30 – 15:00	Questions and Answers on PoEs presentations	All
15:00 – 16:00	ESIA: Comments, opinions, and discussions	All
16:00 – 16:20	Coffee break	
16:20 – 17:00	Speeches by riparian countries Heads of delegations	Participating countries
17:00 – 17:20	Wrap up and closure	U. Usmonzoda, Deputy Prime Minister of Tajikistan
19:00	Official reception on behalf of the Government of the Republic of Tajikistan	All

Consultations with representatives of Central Asian CSOs on the updated ESIA for Rogun HPP project (November 9, 2023. Almaty, Kazakhstan)

Time	***Topic***	***Speaker***
09:30 – 09:50	Opening speech on behalf of the Government of the Republic of Tajikistan	U. Usmonzoda, Deputy Prime Minister of Tajikistan
09:50 – 10:20	Rogun Hydropower Project: video and description	PMG, JSC Rogun HPP and State Institution DFZ
10:20 – 11:20	PowerPoint presentation: Updating the social and environmental instruments of the Rogun HPP project. Key E&S issues related to the riparians.	PMG - Jack Mozingo, Senior E&S Advisor; WSP representatives
11:20 – 11:40	Coffee break	
11:40 – 12:00	Questions and answers on presentation	All
12:00 – 12:15	WB's brief information on status of updated ESIA documents	Harjot Kaur; Gaurav Joshi
12:15 – 12:30	AIIB's brief information on status of updated ESIA documents	Emil Zalinyan
12:30 – 12:45	Presentation by the Chair of the DSPoE	Ljiljana Spasic Grill
12:45 – 13:00	Presentation by the Chair of the ESPoE	Afshan Khawaja
13:00 – 14:00	Lunch *(Intercontinental Hotel)*	
14:00 – 14:30	Questions and Answers on PoEs presentations	All
14:30 – 15:30	ESIA: Comments, opinions, and discussions	All
15:30 – 15:50	Coffee break	
15:50 – 17:00	ESIA: Comments, opinions, and discussions	All
17:00 – 17:20	Wrap up and closure	U. Usmonzoda, Deputy Prime Minister of Tajikistan

Annex 4

2023 Comments Matrix from Information-Sharing and Consultation Meetings with Riparian Governments and CSOs

2023 Comments Matrix from Information-Sharing and Consultation Meetings with Riparian Governments and CSOs

Comment / Question	Response / Action
Environmental and Social Impact Assessment	
"Is the ESIA disclosed, we have not received a copy. Could you please clarify?" *Comment by stakeholder from Turkmenistan*	The Updated ESIA was disclosed in English in late October 2023, followed by Russian in early November 2023. It is available online at the website for the Project Management Group (PMG) for Energy Facilities Construction under the President of the Republic of Tajikistan. (http://energyprojects.tj/index.php/en/rogun-hpp/eko-sots-instrument) *Response from WSP*
Project	
"What is the latest cost of this Project, or a project of this scale?" *Comment by stakeholder from Kyrgyz Republic*	A total cost of the Project since 1980s is estimated to be $10 billion USD. To date, it has cost approximately $6 billion USD, including construction and resettlement program. It will cost $296 million USD to resettle over 46,000 people. Funding and grants are available through financial institutions and governments. Rogun HPP is currently funded by 15 financial institutions such as the World Bank (WB) and European Investment Bank (EIB). *Response from the Government of Tajikistan*
"Details on energy trading for Rogun HPP and welcome any experience from the Project you would like to share." *Comment by stakeholder from Kyrgyz Republic*	Trade agreements are due to be signed on the export of energy through Power Purchase Agreement (PPA) from Rogun HPP. It is expected 215 – 240 megawatts (MW) are available for export in 2024 to 2026 during May-September. *Response from the Government of Tajikistan*
"Who is doing the post-project monitoring and notifying the transboundary countries of any concerns?" *Comment by stakeholder from Kazakhstan*	There will be a 10-year monitoring period will be overseen by the Panel of Experts. A quarterly report will be produced by the Panel of Experts, with ongoing issues published for all transboundary countries to view. In addition to post-mission guidance, all with WB

Comment / Question	Response / Action
	IFC Guidelines and GIIP standards for solutions. There will be ongoing meetings to discuss any concerns. The monitoring plans will have reviews implemented regularly. A new Project Management Consultant (PMC) will be appointed for 8-10 years at a cost of $100 million USD providing interim/yearly monitoring reports to ensure the project is meeting the WB ESF standards in all construction lots. *Response by ESPoE / DSPoE*
Water / Environmental Flows	
"We have listened to the presentation, and would like more data on the downstream flows, the cascades are bigger than the capacities, what is the future for flows downstream of Rogun HPP?" *Comment by stakeholder from Turkmenistan*	There will be limited or no changes to downstream flows. The Republic of Tajikistan will respect the Protocol 566 agreements and ICWC water allocations for the Amu Darya. *Response from WSP / Jack Mozingo*
"The lower downstream habitats are not considered within the ESIA, I request you consider the whole Vakhsh river downstream as an ecosystem." *Comment by stakeholder from Uzbekistan*	In the ESIA, we have considered the Area of Influence and biodiversity buffer zones within the assessment. There will be no significant changes downstream. *Response from WSP*
"The Republic of Kazakhstan has bad experiences with ecological impacts *from hydropower projects upstream,* could you please provide some water availability modelling on impacts and a year-by-year breakdown of reservoir inundation." *Comment by stakeholder from Kazakhstan*	There will be limited or no changes to flows. The Republic of Tajikistan will respect the Protocol 566 agreements and ICWC water allocations for the Amu Darya. Nurek HPP will continue to control the flows on the river, and by 2028, Rogun HPP will control the flows permanently. *Response from WSP / Jack Mozingo*
"Please provide the statistics on high and low flows and climate change modelling?"	There are plans to update feasibility studies for Climate Change in 2024. Operational and Maintenance plans will be prepared.

Comment / Question	Response / Action
Comment by stakeholder from Uzbekistan	*Response from WSP / ESPoE*
"In 2008 and 2011, there was regional shortage of potable water and for irrigation, what are the low water years and recommended discharges from Rogun HPP, if required?" *Comment by stakeholder from Uzbekistan*	There will be funding available to model these low water years and recommended discharges from Rogun HPP, these will be considered and adapted. Results will be provided to interested parties. *Response from ESPoE / DSPoE*
"Have glaciers meltwater been considered on the impact of water volumes"? *Comment by stakeholder from Uzbekistan*	This will be included with the ToR of the 2024 Climate Change studies. *Response from ESPoE / DSPoE*
"What about the quality of the water – will this impacted?" *Comment by stakeholder from Turkmenistan*	Water quality will not be affected during operation. All areas of contamination will be addressed prior to inundation of the reservoir. *Response from WSP*
"We fully support implementing the E&S concerns presented on this Project, how will you control the safety in low / high water, will there be any compensation in low water years for downstream nations?" *Comment by stakeholder from Kyrgyz Republic*	Rogun was designed to incorporated flexibility when it comes to climate change concerns, as it is not predictable. There are ongoing studies for 2024 to provide further evidence for climate change adaption. It is important we understand the ESIA is a dynamic and flexible document, any new impacts that arise will have effective ongoing monitoring and new mitigation measures to address those impacts. *Response from ESPoE / DSPoE*
"How will water quality be monitored before and after construction, and how will public health concerns be addressed?" *Comment by stakeholder from AIIB*	The supporting plans in Volume III of the ESIA provide the measures to protect water quality. The ORP will look any public health concerns and undertake any public health monitoring. *Response from ESPoE / DSPoE / WSP*
"What are the potential impacts of any loss of water downstream?" *Comment by stakeholder from Turkmenistan*	The operational design for the Rogun Dam only uses the water share from Protocol 566 and ICWC. No changes are proposed, and the outflow will remain the same. Rogun will regulate the flow with measures to protect the river systems in the ESIA.

Comment / Question	Response / Action
	Response from WSP
"Could you please clarify how you can guarantee sizeable flows downstream?" *Comment by stakeholder from Turkmenistan*	The Republic of Tajikistan has under-collected water as part of the ICWC agreements. No more than 1.2 million m3 of water will be collected and the Republic of Tajikistan will not exceed this with Rogun. Rogun will be able to provide water in dry periods to 3 million hectares of irrigated land to Uzbekistan and Turkmenistan. Rogun HPP will conform to international agreements. *Response from ESPoE*
"There can be no fixed flows that are the same on an annual basis, this is set up by the Central Asian nations, you cannot fix to 1.2 million m3 as the water will be gone after a year. Please reconsider this, and run modelling of Rogun/Nurek HPPs, and consider how they will work in parallel." *Comment by a stakeholder from Uzbekistan*	Minimum environmental flows do not relate to water resources. This is designed to be flexible and not fixed. *Response from ESPoE*
Dam Safety / Cascade Failure	
"A suggestion for a cascade failure emergency warning system, for example an online monitoring system" *Comment by a stakeholder from Uzbekistan*	This will be provided by an EPC contractor on Nurek / Rogun HPPs, along with future plans after completion of Rogun HPP for a whole basin / cascade system to address any transboundary concerns. *Response from the Government of Tajikistan*
"Is there an Early Warning System, so nations are made notified?" *Comment by a stakeholder from Uzbekistan*	This will be made available. Risk maps, evacuation routes, safe havens will be developed. *Response from the Government of Tajikistan*
"What is the extent of locations / regions included in the Emergency Preparedness Plans?" *Comment by a stakeholder from Uzbekistan*	Plans are prepared for each stage of inundation, and once the maximum flood level is reached, it will include the whole cascade on the river. Additional consultation will be

Comment / Question	Response / Action
	undertaken. There is a plan for this cover further downstream/upstream and from a transboundary perspective. *Response from ESPoE / DSPoE*
"Do you have any plans to upgrade the Dam to improve safety?" *Comment by stakeholder from AIIB*	It is the role of the DSPoE to constantly monitor and address any safety concerns. *Response from ESPoE / DSPoE*
"To what extent is supervision undertaken in the construction phase and processes?" *Comment by stakeholder from CSO*	Under the structures of the construction lots, there is supervision on a daily basis by the Employers Representatives, in live with international agreements and quality of works. *Response from ESPoE / DSPoE*
Environmental & Social	
"Will the environmental and social (E&S) plans be modified if any change happens within the region?" *Comment by stakeholder from CSO*	Yes, there is procedures for the management of change with annual reviews. An ORP will also be developed. It is important there is dynamic, live documents aligned with the WB ESF requirements. Stakeholder engagement will be key to any GRS to address complaints and feed into any community identified risks. *Response from WB / ESPoE*
"In 2014, my NGOs reached out to PMG on questions about the CASA 1000 project dust concerns, we were supported by international organizations and can now see it is well supported with the appropriate management plans. When drafting the environmental plans, did you focus and consider any transboundary impacts with any air quality dust risks?" *Comment by a stakeholder from Uzbekistan*	Ensuring the Air Quality Management Plan are implemented and noted the experienced dust emissions during the CASA 1000 Project, we are aware dust can be high during construction on site. Many factors across multiple plans will contribute to reducing dust emissions. We have looked at transboundary water issues and considered these across the ESIA. CASA 1000 project forms part of the Cumulative Impact Assessment in Volume I, Chapter 11 of the ESIA, and identifies any potential impacts and risks. *Response by WSP*
"What do the gender action plans include, and what are the key issues?" *Comment by stakeholder from Kazakhstan*	Consultations and engagements were undertaken with the needs of women. It showed many women wanted to work but did not have the appropriate childcare arrangements.

Comment / Question	Response / Action
	Therefore, actions for childcare in new resettlement areas will allow women access to new skills training and employment for women. There is little use of the GRM by women and there are new actions to address this. Gender based violence (GBV) was addressed within the Gender Action Plan. It also includes plan to encourage women in management positions and the encouragement of employment. *Response from WB / ESPoE*
"Do you have any training for women on their rights and the Grievance Redress Mechanism (GRM) for raising awareness?" *Comment by stakeholder from CSO*	Both women and men on site are trained on behavioral aspects and GRM. Training to GBV on cultural awareness on sensitive issues with extensive training to management. There are open discussions on what is appropriate. A Code of Conduct is implemented to all workers on site. Communities will be engaged on the ESIA outcomes as it forms part of the stakeholder engagement and GRM for the Project. *Response from WB / ESPoE / WSP / Jack Mozingo*
"Are there any concerns for Human Rights, Gender and/or Working Conditions? – we are happy to hear there is mitigation and management plans." *Comment by stakeholder from CSO*	There are significant effects, but these can be managed effectively, these will need to be implemented properly through the management plans. *Response from WSP*
Resettlement	
"Resettlement for vulnerable groups is noted within the ESIA, can I suggest the addition of orphans are added as its own category?" *Comment by a stakeholder from the CSOs*	The first phase of resettlement was undertaken under a previous Resettlement Policy Framework (RPF), the new improved standards will be implemented going forward. Orphans are included as part of the marginalized / vulnerable groups. We will certainly look to better define those vulnerable group, *Response by WSP / WB*

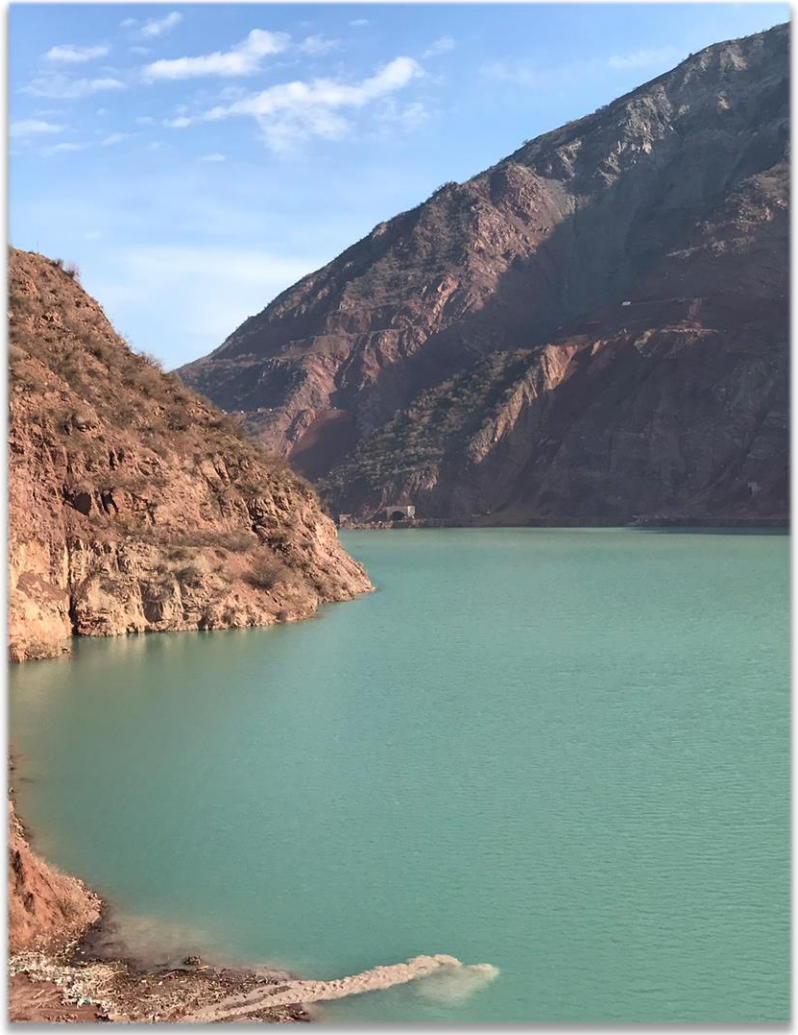
Comment / Question	Response / Action
"CSOs have travelled to resettled communities and are impressed with the positivity among those resettled, the new infrastructure built and improved access to services – can you please tell us how many are resettled to date, new settlements built and any further details you can provide?" *Comment by a stakeholder from the CSOs*	To date, approximately 14,600 project affected people (PAPs) are resettled. We expect an estimated 46,000 (PAPs) in total, across multiple phases of resettlement and to be completed by 2032 and note the full supply level of the reservoir will be inundated by 2036. Resettlement Action Plan 1 (RAP 1) resettled 7k – 10k PAPs. The 2014 RPF was used to resettle these PAPs. A new 2023 RPF is being developed by the consultant WSP, and this 2023 RPF will be implemented for RAP 2 and any future RAPs. Previous PAPs under RAP1 will be compensated under the new 2023 RPF. It is expected 2-3 additional RAPs will be completed by 2032/ Each RAP will address stages of inundation by DFZ. RAP 1 has lessons learnt and these will be brought forward for the new 2023 RPF and future RAPs looking at how resettlement can be improved. Including improved livelihoods to be outlined. The 2023 ESIA provides all resettlement details in the RPF/RAPs. A figure was produced and full list of villages to be built and those within the inundation zone for to be/already resettled. *Response from WB / ESPoE / Jack Mozingo / WSP*

Annex 5

Presentation on Draft Updated ESIA

UPDATED ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR ROGUN HPP

OCTOBER 2023



Project Management Group for Energy Facilities Construction
Under the President of the Republic of Tajikistan

Almaty, Kazakhstan
November 8-9, 2023

This Discussion Will Cover:

1. Introduction
2. Purpose of this Meeting
3. Project Overview
4. Objectives
5. Key Elements of the Project
6. Project Phasing
7. Scope of the ESIA
8. Project Alternatives
9. Impact Assessment
10. Managing Impacts
11. Conclusions
12. Questions, Comments, Discussion

1. INTRODUCTION AND BACKGROUND

- Rogun HPP was conceived in the 1960s, designed in the 1970s, and construction began in the 1980s
- The World Bank provided financing for two studies completed in 2014: the Techno-Economic Assessment Study (TEAS) and Environmental and Social Impact Assessment (ESIA)
- During the studies, there were four meetings with riparian Governments
- After the studies were completed, a final meeting was held in Almaty in August 2014 on the findings and conclusions

1. INTRODUCTION AND BACKGROUND

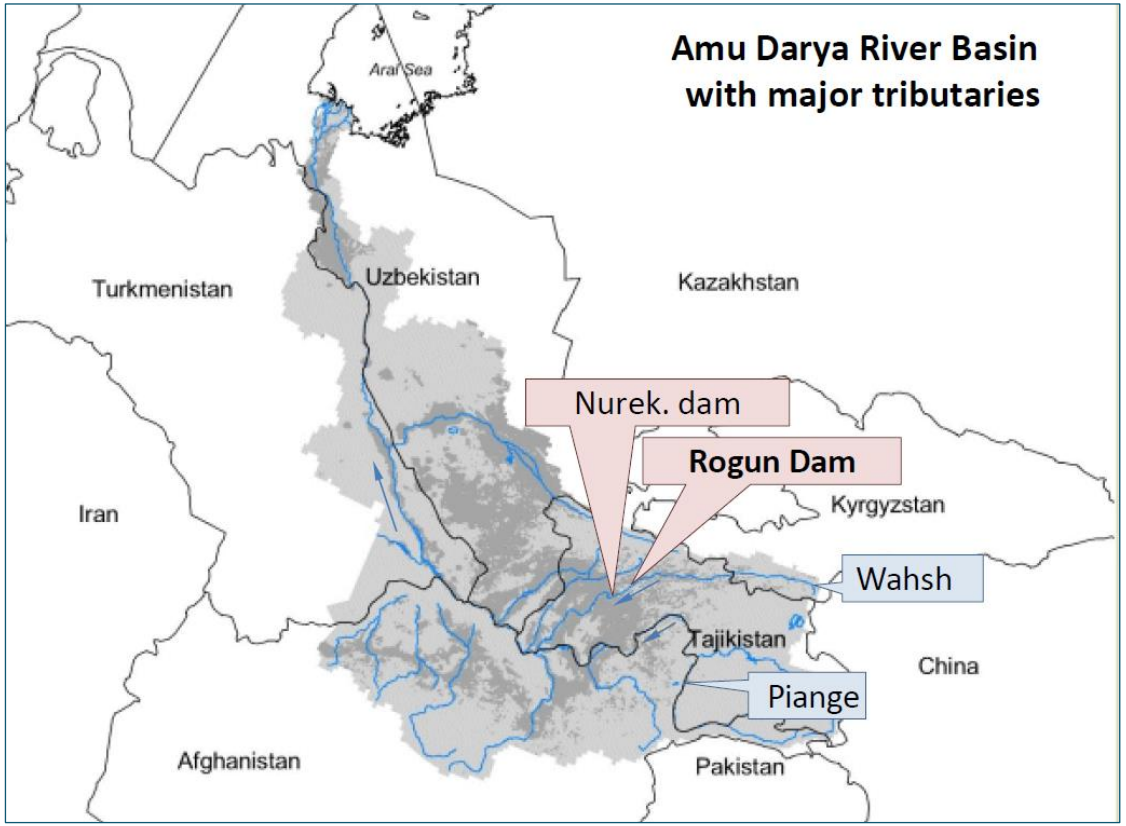
- The 2014 ESIA was prepared to meet the World Bank's environmental and social safeguard policies in effect at the time, including Operational Policy 4.01
- The World Bank adopted a new Environmental and Social Framework in 2018
- The World Bank and the Asian Infrastructure Investment Bank (AIIB) have now provided financing for an updated ESIA
- The updated draft ESIA meets the requirements of the new Framework and of other international financial institutions
- The updated draft ESIA takes into consideration development of the Project since 2014
- The updated draft ESIA has been disclosed for your review

2. PURPOSE OF THIS MEETING

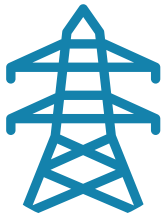
- To disclose the findings and recommendations of the updated Rogun HPP ESIA
- To gather feedback from transboundary governments on the draft ESIA and on the Rogun HPP Project
- Invited Transboundary Stakeholders:
  - Republic of Tajikistan
  - Republic of Kazakhstan
  - Republic of Uzbekistan
  - Kyrgyz Republic
  - Turkmenistan
  - Afghanistan

3. PROJECT OVERVIEW

- Project is approximately 110 km east of Dushanbe on the Vakhsh River, 70 kilometers of upstream of Nurek HPP
- Part of the Vakhsh Cascade that now includes Nurek, Baipaza, Sangtuda 1 & 2, and Golovnaya
- Vakhsh (Wahsh) flows into the Amu Darya River
- Will be largest dam in Central Asia: at 335 meters high and 3,600 megawatts (MW) generation capacity
- Developer: Project Management Group for Energy Facilities Construction under the President of Tajikistan(PMG)



4. PROJECT OBJECTIVES



The Project will provide 30% of the current energy, eliminate critical winter shortages and allow sale of power to neighbouring countries.

The Project will enable water to be stored and released downstream to reduce water shortages in dry years. The dam is designed to hold the Probable Maximum Flood and will help to protect the cascade downstream under flood conditions.

The Project's sediment retention will significantly prolong the lifespan of the Vakhsh River cascade, including the Nurek HPP by 100 years.

The Project will contribute to Tajikistan's greenhouse gas reduction goals by reducing its reliance on fossil fuels

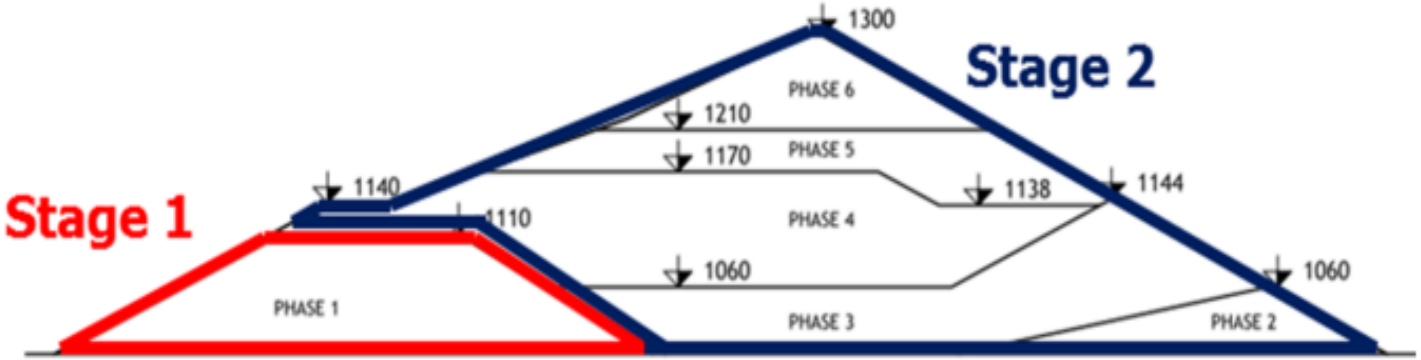
5. KEY ELEMENTS

- Designed to withstand the Probable Maximum Flood (PMF)
- Dam crest 1 300 meters above sea level
- Reservoir at full supply level: 1 290masl, 170km^2 maximum of four kilometers wide
- Underground powerhouse and transformer room with 6 x 600 MW turbines
- Other underground works: diversion tunnels, intake and tailrace tunnels, transport routes
- Substation and six 500kv transmission lines to carry power to the national grid and other countries
- Current workforce: ≈ 12 000 workers, 95 percent Tajik citizens

- Generation capacity:
  - Currently: two turbines, 400MW
  - Future: six turbines, 3 600MW
- Lifetime: ≈ 115 years, depending on sedimentation

6. PROJECT PHASING

- Phase 1 constructed between 2014 and 2018
- Phase 2 from 2019 though completion in ≈ 2029.
- Current dam height 1 110 masl



- Final dam height 1,300 masl (≈ 2029)
- All turbines to be installed and commissioned by 2029
- Staged reservoir filling, to reach FSL by ≈2036

7. SCOPE OF THE ESIA UPDATE

- High level scoping to identify key risks for the Updated ESIA
- Fieldwork to fill key gaps: biodiversity, water quality, air, noise, contaminated land, waste, cultural heritage
- Update to Resettlement Policy Framework and 2017-2025 Resettlement Action Plan
- ESIA update uses previous and new/current information
- Transboundary and cumulative effects considered
- Updated Environmental and Social Management Plan (ESMP) defines actions to avoid or reduce risks and impacts

8-1. PROJECT ALTERNATIVES

'No Project' Scenario

- **Energy Security**: Tajikistan currently experiences seasonal energy generational volatility. The Project will eliminate winter shortages.
- **Fossil fuel use**: would be needed to provide power and stabilise the national grid without Rogun
- **Cost of electricity**: Cost analysis showed that economic benefits of the project exceeded other feasible HPPs and thermal power plants
- **Flood protection**: investment needed to upgrade the existing flood protection of the Vakhsh river cascade would exceed USD 1 billion. Constructing the Project would increase the lifespan of the cascade.
- A **cost-benefit analysis** of the different alternatives would reduce net imports of fossil fuels and natural gas and increase exports of electricity

No longer feasible since the Project is already under construction and generating power

8-2. PROJECT ALTERNATIVES

Alternative Location

Alternative locations for the Project were investigated, but the current site was chosen for the following key reasons:

- **Topography**: the chosen site has a narrow valley which makes the dam easier to construct and with a minimum quantity of filling material
- **Seismicity**: the active Ionakhsh fault line along the river upstream of the Project site means the dam could not be constructed further upstream due to higher risk of instability.

Alternative Dam Height

Three different dam heights were considered, taking into account Full Supply Level (FSL), installed power capacity, and the E&S impacts of each. It was concluded the highest crest of 1,290masl was optimal for the following reasons:

- **Energy production** – maximised annual energy production
- **Lifespan** – Increased sediment retention from the increased height prolongs lifespan of the dam and those downstream in the Vakhsh cascade
- **Flood risk** – the larger reservoir increases water retention and improves flood management

Alternative Dam Structures

- The chosen design was selected based on the site topography, access arrangements, available construction materials, and presence of the Ionakhsh fault which means the dam will need regular impoundment during construction. Other dam types were considered less suitable.

Cost of Project Alternatives

A cost-benefit analysis of the different alternatives concluded there will be considerable savings can by reducing the need for coal or import natural gas, saving on net imports.

9. IMPACT ASSESSMENT

Updated ESIA assesses potential environmental and social risks and impacts to:

- Air quality
- Noise
- Traffic and Transport
- Soils and geology
- Waste
- Biodiversity
- Cultural Heritage
- Communities
- Labor and Working Conditions (Workers)
- Physical and Economic Displacement (Resettlement)
- Water: Flow Rates in Vakhsh and downstream of Nurek

9. IMPACT ASSESSMENT

Traffic & Transport

Risks:

- Off-site: minimal, primarily transport of goods to site from Dushanbe and worker transport to local accommodations
- On-site: significant risk to workers and Project construction due to 100s of trucks and other vehicles
- Reservoir will flood some major roads

Mitigation:

- Improvement and enforcement of site-wide **Traffic Management Plan,** including rules for on-site and –off-site traffic and vehicles
- Improved use of vehicle checklists
- Realignment of flooded roads, with separate ESIAs

Soils & Geology

Risks:

- Soil loss in and around the flooding zone and in infrastructure areas.
- Loss of use of soils in reservoir footprint
- Increased landslide risk due to reservoir fluctuation
- Risks from Ionakhsh fault and salt wedge

Mitigation:

- Develop and implement a **Watershed Management Plan**: vegetation planting, slope stabilization, etc.
- Improved spoil management to reduce erosion into the reservoir
- Designed to withstand seismic events, grouting to isolate salt wedge

9. IMPACT ASSESSMENT

Air Quality

Risks:

- Off-site: emissions of dust from vehicle movement and dumping
- On-site: significant risk to underground workers in tunnels, powerhouse, transformer cavern from dust and diesel emissions

Mitigation:

- Develop and implement site-wide and contractor-specific **Air Quality Management Plans,** which will require:
  - increased dust suppression
  - Improved and additional ventilation

Noise

Risks:

- Off-site: limited or no potential due to isolation of site
- On-site: significant risk to workers from construction activities (e.g., crushing plant, vehicles, conveyors, earthworks, ventilation fans, etc.), also to workers in site accommodations

Mitigation:

- Develop and implement site-wide and contractor-specific **Noise Management Plans**
- Monitor worker noise exposure, improve noise control

9. IMPACT ASSESSMENT

Waste

Risks:

- Increased pressure on existing disposal and recycling facilities from the increased construction waste
- Contamination of soil and groundwater from improper waste management

Mitigation:

- Develop and implement side-wide and contractor-specific **Waste Management** and **Water Management Plan**: monitoring of haulers, review of off-site facilities, etc.
- Complete design and initiate use of dedicated for construction debris--currently under design

Biodiversity

Risks:

- No critical habitat (as defined by World Bank
- Loss of small amounts of natural habitats: floodplain habitats and juniper woodlands
- 70km river habitat changed to reservoir habitat
- Change in flow rates of 17km from Rogun dam to Nurek reservoir
- Entrainment and carrying of fish into turbines
- Loss of river tributaries and short-range fish migration
- Pollution of reservoir and river through spills or releases of harmful or hazardous substances

Mitigation:

- Implement **Biodiversity management Plan** and **Fisheries Management Plan**
- Implement **Offset Management Strategy**

9. IMPACT ASSESSMENT

Cultural Heritage

Risks:

- Loss of physical cultural heritage resources due to construction
- Loss of access to physical cultural heritage in flooding zone
- Loss of or damage to cultural heritage due to resettlement construction ground disturbance
- Loss of intangible cultural heritage practices or cultural norms due to resettlement.

Mitigation:

- **Resettlement Action Framework and Plans** allow resettled villages to remain together if desired
- Implement **Cultural Heritage Management Plan** (CHMP)

Communities

Risks:

- Limited impact on communities other than resettlement
- Rogun HPP is primary employer in Rogun City, which was established for purpose of constructing the HPP
- Some limited risk from traffic, influx of mostly male workers—limited or no impact to date

Mitigation:

- Develop and implement **Air Quality Management Plan**, **Traffic Management Plan**, **Labor Management Plan** that will apply to all contractors
- Implement **Stakeholder Engagement Plan** (SEP)
- Establish goals for local employment
- Develop and implement a community benefit sharing program to support regional economic development.

9. IMPACT ASSESSMENT

Resettlement

Risks:

- Physical displacement of over 46 000 people in 69 villages
- Loss of structures, land and associated livelihoods, crop lands, public infrastructure, and impacts on business activities
- Loss of community assets and infrastructure

Mitigation:

- Update **2014 Livelihood and Resettlement Policy Framework** to ensure ongoing and future resettlement meet World Bank standards
- Update and implement (partly retroactive) of 2018-2025 **Resettlement Action Plan** (RAP), develop and implementation of 2018-2025 **Livelihood Restoration Plan** (LRP)
- Develop and implement future **RAPs** and **LRPs** through 2032 and beyond
- Implement **Stakeholder Engagement Plan** (SEP)

Labor and Working Conditions

Risks:

- Inadequate safeguards to protect workers from unfair or illegal labor management – this is a risk of all projects this has not been experienced at Rogun
- Inadequate safeguards to protect workers from adverse working conditions, including occupational health and safety and accommodations—again, this is a risk that has not been a major problem at Rogun

Mitigation:

- Implement **Labor Management and Monitoring Plan** which includes requirements for employment contracts, working conditions, accommodations, and other aspects
- Develop and implement improved site-wide **Occupational Health and Safety Plan** and site-wide **Accommodations Management Plan**

9. IMPACT ASSESSMENT: CLIMATE AND GREENHOUSE GAS EMISSIONS

- Over the last 30 years, temperature has increased 0.7 °C, precipitation by < 7%. Changes predicted to continue in same direction
- Prediction is for more rain than snow and for continued glacial melting — reduction by 20% by 2050s
- Climate risk vulnerability assessment: design and operating parameters reduce vulnerability to flooding, sedimentation and other risks due to climate change
- Updates to previous climate and hydrology studies to be completed in coming months
- Transition risks generally low under realistic scenarios
- Project GHG emissions estimate at 1,582 tCO_2e/year, considered a significant overestimate--GHG emission intensity predicted as 102 gCO2/kWh
- Major reduction in emissions from alternative energy sources: ↓ 87% from coal, ↓ 71% from gas

9. IMPACT ASSESSMENT: MAINTAINING MINIMUM FLOWS

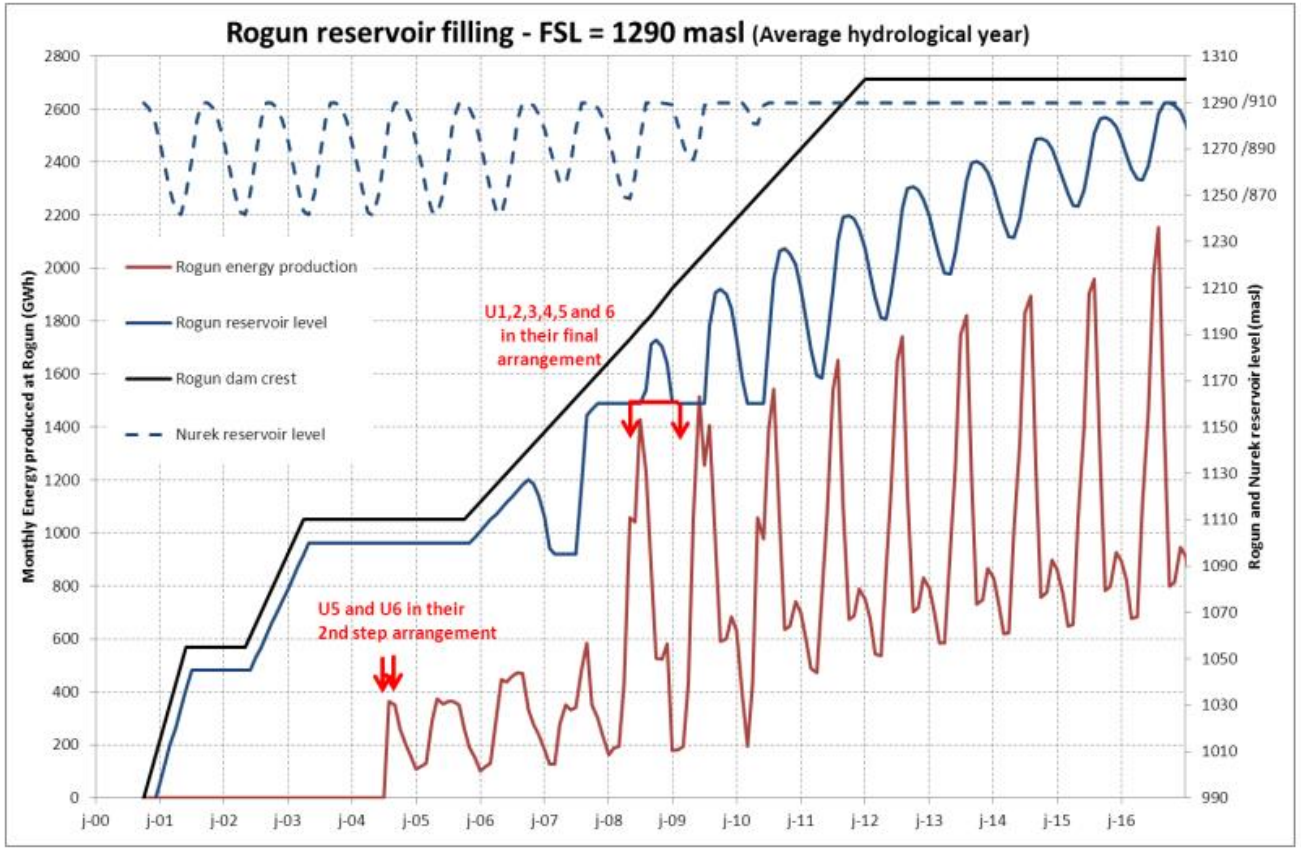
- Studies to determine minimum environmental flow were completed
- Minimum flow rates will be maintained in Vakhsh River from Rogun dam to Nurek reservoir – 17km when Nurek reservoir is full
- Flows will not be “steady-state” but will mimic natural variation: they allow for seasonality and protection of the river during drought years
- Rogun HPP has confirmed that maintaining these minimum flows is feasible
- No effect downstream of Nurek

Minimum Flow from Rogun to Nurek Reservoir m3/s

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Minimum flow in Drought Years	102	76	64	55	53	51	68	90	122	152	156	136
Minimum flow in Average Years.	141	107	89	78	75	73	95	125	168	207	213	187

9. IMPACT ASSESSMENT: RESERVOIR FILLING AND OPERATION (1)

- Dam will reach maximum height (1300masl) in 2029
- River flows are highest in spring, lowest in winter
- Reservoir will be allowed to fill over years, reaching full supply level of 1290masl in 2036
- Tajikistan has a long-term average allocation of 9.5km^3 under Protocol 566 – average BVO annual allocations average from 1992 and 2010 was 8.845 km^3

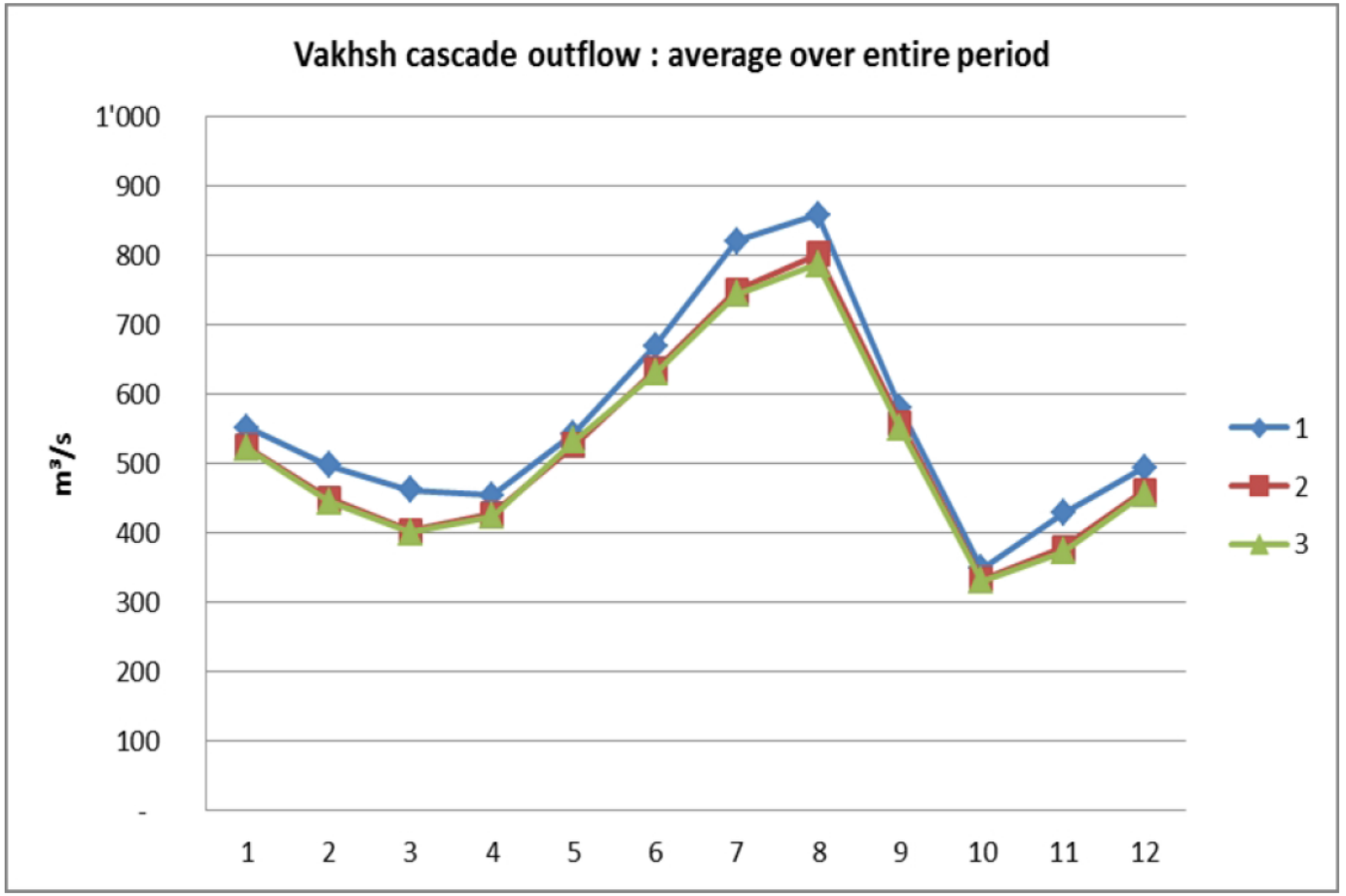


9. IMPACT ASSESSMENT: RESERVOIR FILLING AND OPERATION (2)

- Reservoir will reach the full supply level of 1290masl by 2036, about seven years after the dam is completed and all turbines are commissioned
- Rogun HPP will start to regulate Vakhsh River flows about 2027 and gradually take over from Nurek
- Tajikistan will use the previously unused share of water allocated to it by ICWC, while remaining within the framework of the Nukus Declaration, Protocol 566, and average limits set by ICWC
- Water used for filling the reservoir will be in accordance with current agreements and practices and will be no more than 1.2 km^3/year

9. IMPACT ASSESSMENT: DOWNSTREAM FLOWS

1. Without Rogun
2. Tajikistan using full share of water for irrigation, without Rogun
3. Tajikistan using full share of water for irrigation, with Rogun and planned operating mode



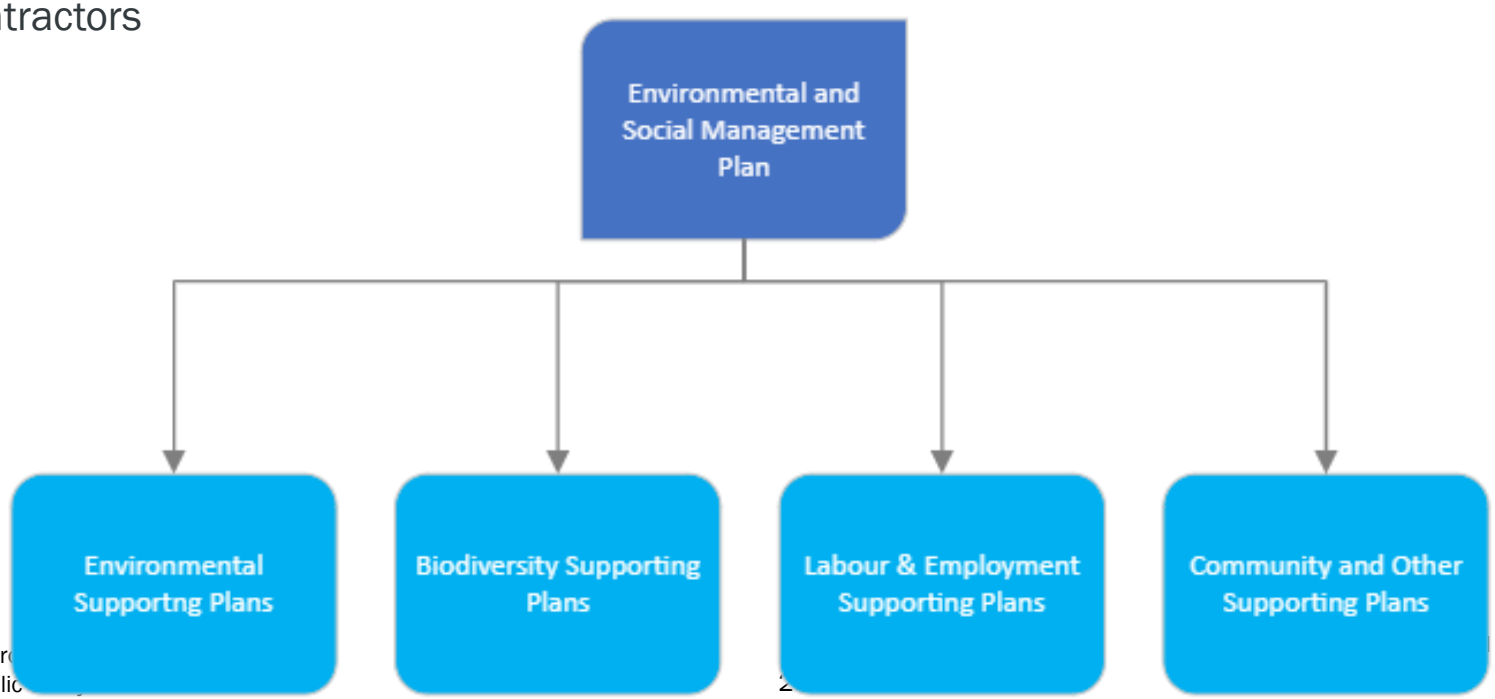
9. IMPACT ASSESSMENT: PROTECTING THE CASCADE – FLOOD CONTROL

Protecting the Cascade

- Nurek Dam is not designed to withstand the Probable Maximum Flood
  - Nurek and the cascade can be vulnerable to breach in extreme events
- Rogun dam is designed to store and convey the Probable Maximum Flood
  - This will help protect the downstream dams and communities from a breach
- Emergency Preparedness and Response Plan for the cascade will ensure downstream users and countries will be warned and emergency response implemented in case of breach
  - This will consider dam failure scenarios, including wave propagation impact studies

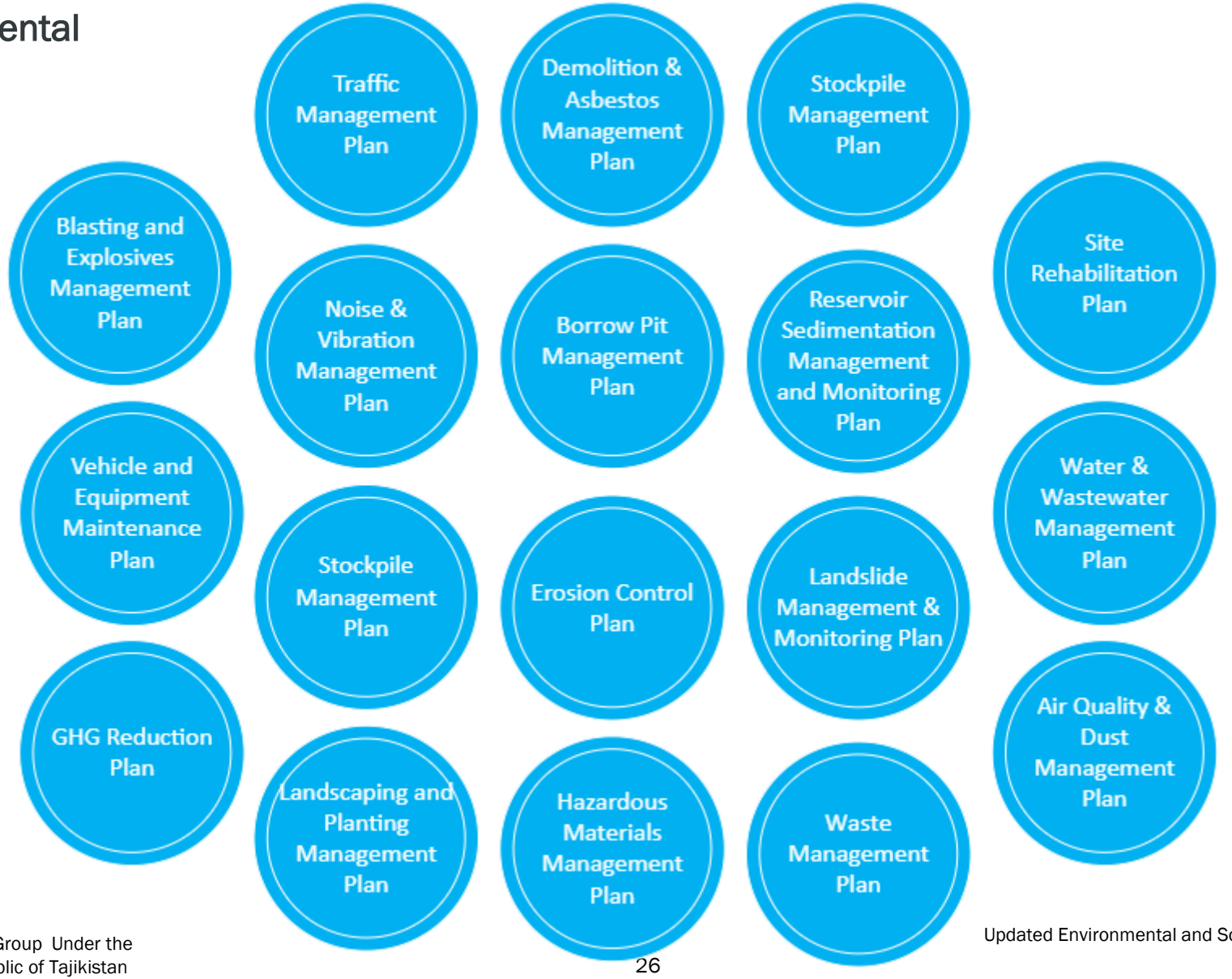
10. MANAGING IMPACTS: OVERVIEW

- An Environmental and Social Management Plan (ESMP) requires key mitigation and monitoring measures to manage risks and impacts
- PMG, JSC Rogun, and DFZ will have plans for risks and impacts under their areas of responsibility
  - PMG for stakeholder engagement, oversight of Rogun HPP and Directorate of the Flooding Zone
  - Rogun HPP: plans to manage risks and impacts under their control (biodiversity, operations, etc.) and site-wide guidelines for contractors (safety, waste, traffic, etc.)
  - Directorate of the Flooding Zone : plans to manage resettlement and livelihood restoration, and guidelines for construction contractors



10. MANAGING IMPACTS: SUPPORTING GUIDELINES AND PLANS

Example Environmental Supporting Plans



10. MANAGING IMPACTS: SUPPORTING PLANS

Community and Other Supporting Plans

10. MANAGING IMPACTS: SUPPORTING PLANS

Example Biodiversity Supporting Plans

Example Labor and Employment Supporting Plans

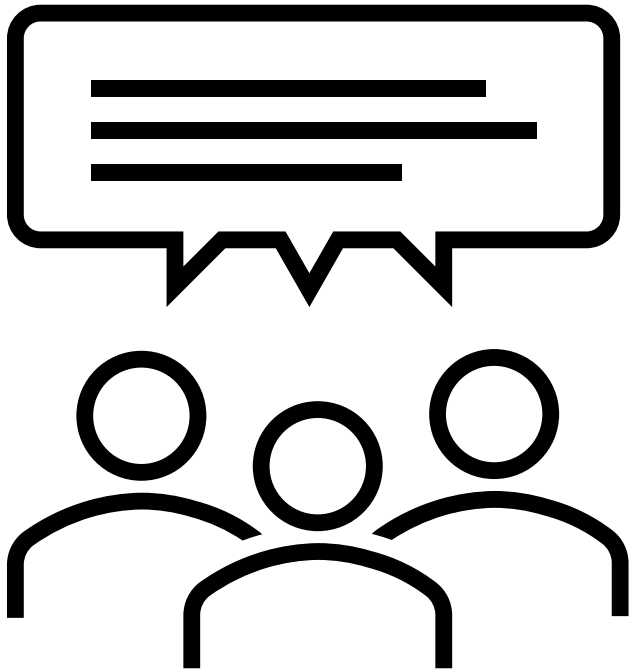
11. CONCLUSIONS

- Potentially adverse impacts of construction on people and the environment can be managed to meet ***international standards***
- Technical and environmental studies show that Rogun HPP can be operated so that the ***flow regime*** from the cascade will remain unchanged
- Construction and operation ***will not reduce the water shares*** allocated to the downstream riparian countries
- Rogun will provide ***major benefits*** to Tajikistan and to Central and South Asian countries
  - Resettled people will have improved infrastructure and opportunities
  - Economic benefits to Tajikistan through reduced imports, increased exports
  - Clean energy: Reduced imports and use of fossil fuels, reductions in greenhouse gas emissions
  - Major increase in reliable electricity supply for Tajikistan and for neighboring countries

12. QUESTIONS, COMMENTS, DISCUSSION

We want to hear from you—please tell us:

- Facts/Information
- Opinions
- Recommendations



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