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

ROGUN HYDROPOWER PROJECT – UPDATED ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Volume I – Environmental & Social Impact Assessment – Non-Technical Summary

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CONTENTS

1 INTRODUCTION

1.1.1. The Rogun Hydropower Project (HPP) is being developed on the Vakhsh river, approximately 100 km east of Dushanbe in Tajikistan. The Project will form part of a cascade of hydropower facilities on the river, with the Rogun HPP being the furthest upstream.

1.1.2. Once complete the project will consist of

- A dam which will have an overall height of 335 m (1300m above sea level);
- A reservoir with a full supply level (FSL) at 1290 m above sea level (asl), a total surface area of 170 km² and an overall length of approximately 70 km;
- A surface spillway, two mid-level and three high-level tunnels to protect the dam and allow safe passage of floodwaters up to the Probable Maximum Flood (PMF);
- An underground powerhouse (220 x 70 x 20 m) and transformer room (220 x 40 x 20 m) in excavated caverns. The powerhouse will contain six 630 MW turbines;
- A substation and 14.5 km of transmission lines to connect the Project to the national grid;
- Approximately 70km of underground roads and Two access roads, one on each bank, with one in the lower reservoir and one in the upper;
- Several underground tunnels to carry water to the powerhouse and back into the downstream river; and.
- Two construction camps for over 20 construction contractors

1.1.3. Construction of the Rogun HPP and filling in the reservoir will require the resettlement of over 50,000 people from 69 villages.

1.1.4. The Rogun Project Management Group (PMG) for Energy Facilities Construction under the President of the Republic of Tajikistan is managing the Project and serving as liaison with international Lenders. PMG is coordinating the work of Rogun Open Joint Stock Company (JSC Rogun), which is constructing the HPP and will continue to operate it, and the Directorate of the Rogun HPP Flooding Zone (DFZ), which is responsible for the resettlement program.

1.1.5. An Environmental and Social Impact Assessment (ESIA) was completed in 2014. This update to the ESIA has been developed following a pause in the project. The ESIA describes the potential significant impacts which may arise from the project's construction and operation and sets out the measures to avoid or manage the project to reduce harmful effects or increase the benefits of the project.

1.1.6. The ESIA is required to check and align the Project with several Environmental and Social (E&S) standards and guidelines, including those administered by the Republic of Tajikistan and the international laws, policies and guidelines that apply to the Project, which will include but are not limited to the following:

- Republic of Tajikistan law, including international agreements to which Tajikistan is a party; and
- The World Bank (WB) Environmental and Social Framework (2018) including the ten E&S standards (ESS), the WB Group (WBG) General Environmental, Health, and Safety (EHS) Guidelines (2007) in specific industry sectors.

1.1.7. This document provides the Non-Technical Summary (NTS) of the ESIA

2 PROJECT OVERVIEW

The Rogun Hydropower Project includes a 335m high dam with a reservoir approximately 80km long and 4km wide and associated hydropower turbines, transmission lines and infrastructure. The Project is part of a series of hydropower facilities along the Vakhsh river known as the Vakhsh Cascade. The Hydropower plant is designed to produce 17,000 GWh per year with an expected lifespan of 115 years.

WHY DO WE NEED THE PROJECT?

Energy Supply

Current energy supply in Tajikistan is seasonal with a surplus in summer and shortages in winter. This affects communities in rural and remote areas the most (70% of the population). The Rogun HPP project will provide enough energy in winter to remove shortages

River Flows and Flooding

The Project will enable water to be stored and released downstream to reduce water shortages in dry years.

The Rogun dam is designed to hold the Probable Maximum Flood and will help to protect the cascade downstream under flood conditions.

Long Term Planning

The Project will effectively extend the life of the Nurek HPP and Vakhsh cascade by over 100 years.

WHY DO WE NEED AN ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)?

The Project requires funding from international financial institutions. The purpose of the ESIA is to identify the potential for significant environmental and social impacts as a result of constructing and operating the Project. It also identifies mitigation to avoid or reduce any harmful effects and highlights any benefits or enhancements the Project brings throughout its lifecycle.

An ESIA was completed in 2014, however, following a pause in the development and construction, as well as changes to design and environmental standards for loans, an update to the ESIA is required.

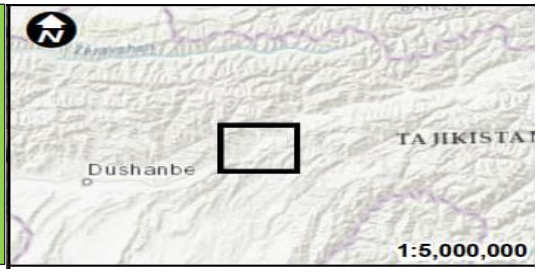
This document provides a non-technical summary (NTS) of the ESIA. It summarises the content and main findings of the ESIA process to assist non-technical stakeholders and the public in understanding the likely effects of the proposed development. The full ESIA report contains a more detailed description of the Project and documents the findings throughout the process.

WHO IS DEVELOPING THE PROJECT?

The government of Tajikistan established the Joint Stock Company (JSC) Rogun to own and operate the Project. Tajikistan also established the Project Management Group (PMG) for Energy Facilities Construction under the President of the Republic of Tajikistan to construct the Project.

WHERE IS THE PROJECT LOCATED?

The Rogun Dam is being developed approximately 100km east of Dushanbe in the Region of Republican Subordination in Tajikistan on the Vakhsh River. The river forms part of the Amu Darya Basin which drains into the Aral Sea.



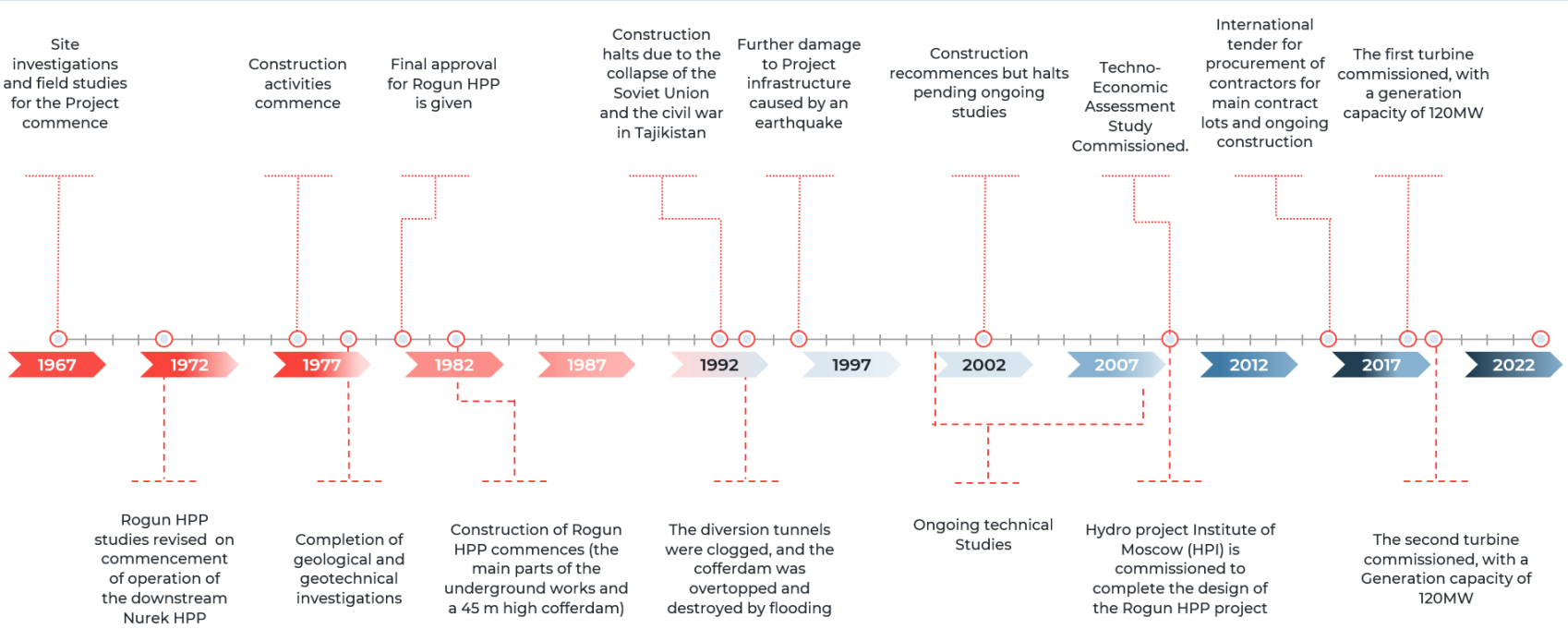
3 PROJECT HISTORY

The Project has been in development since the 1960's with several periods of construction between 1980 and today.

1.1.1. In 1978, a 335-meter dam with 6 power units (each 600 MW) in an underground power plant was proposed. The final construction decision was granted in 1980, and construction work began in 1982. Construction of the main components of the underground works and a 45-meter cofferdam was in-progress until 1990 but was paused with the independence of Tajikistan. In 1993, a major flood caused diversion tunnels to clog with sediment and the cofferdam was destroyed.

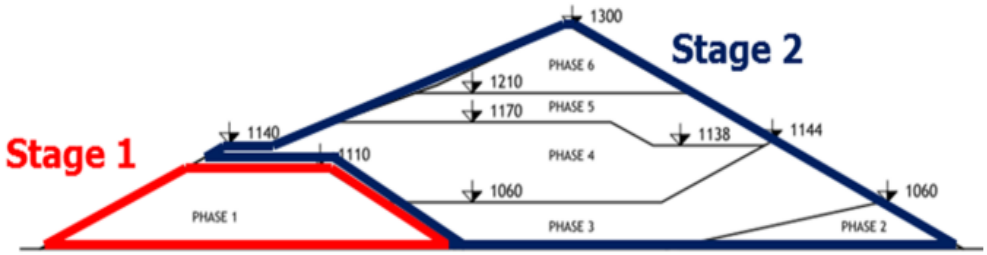
1.1.2. The Government of Tajikistan announced the construction would resume in May 2008. Limited construction and maintenance activities continued until 2011, when a Techno-Economic Study (TEAS) and ESIA were completed in 2014. The TEAS verified the design and operation of the Hydropower plant was feasible and the ESIA confirmed that project could be constructed and operated within the World Bank environmental and social standards that were in effect at the time. .

1.1.3. The Project is being constructed in two stages, Stage one was constructed between 2014 and 2018, with Stage 2 commencing in 2019. Construction will be complete in 2029 and the reservoir will be full by 2036.



4 PROJECT DESCRIPTION – DAM CONSTRUCTION

The construction of the dam commenced in 2014 and is being completed in two key stages.



The rock filled clay core dam is being constructed over a compacted concrete pad. The pad will form the base of the impervious clay core. Stage 1 of the dam has already been completed. The total volume of the Stage 1 Dam is approximately 16 million cubic meters.

Stage two involves progressively increasing the height of the dam by excavation and backfilling until the full height of the dam is reached. The rock material for the dam being provided by several borrow areas upstream of the dam in the area that will be flooded by the reservoir, with one area downstream of the dam also being used. The total volume of the dam is approximately 80 million cubic meters.

The construction of the dam also includes installation of hydraulic and grouting barriers to prevent the dam being affected by the natural salt wedge that crosses the Rogun site. Monitoring equipment is also being installed to identify changes over the lifetime of the dam to ensure it remains stable.

Terracing and other works to stabilise the slopes of the reservoir and prevent erosion and landslides is also being undertaken.

Construction Development & Timeline:

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.

Completed: 2016

Cofferdam
- An intermediate dam structure was then constructed using a geomembrane and a height of 1,050 m above sea level.

Completed: 2017

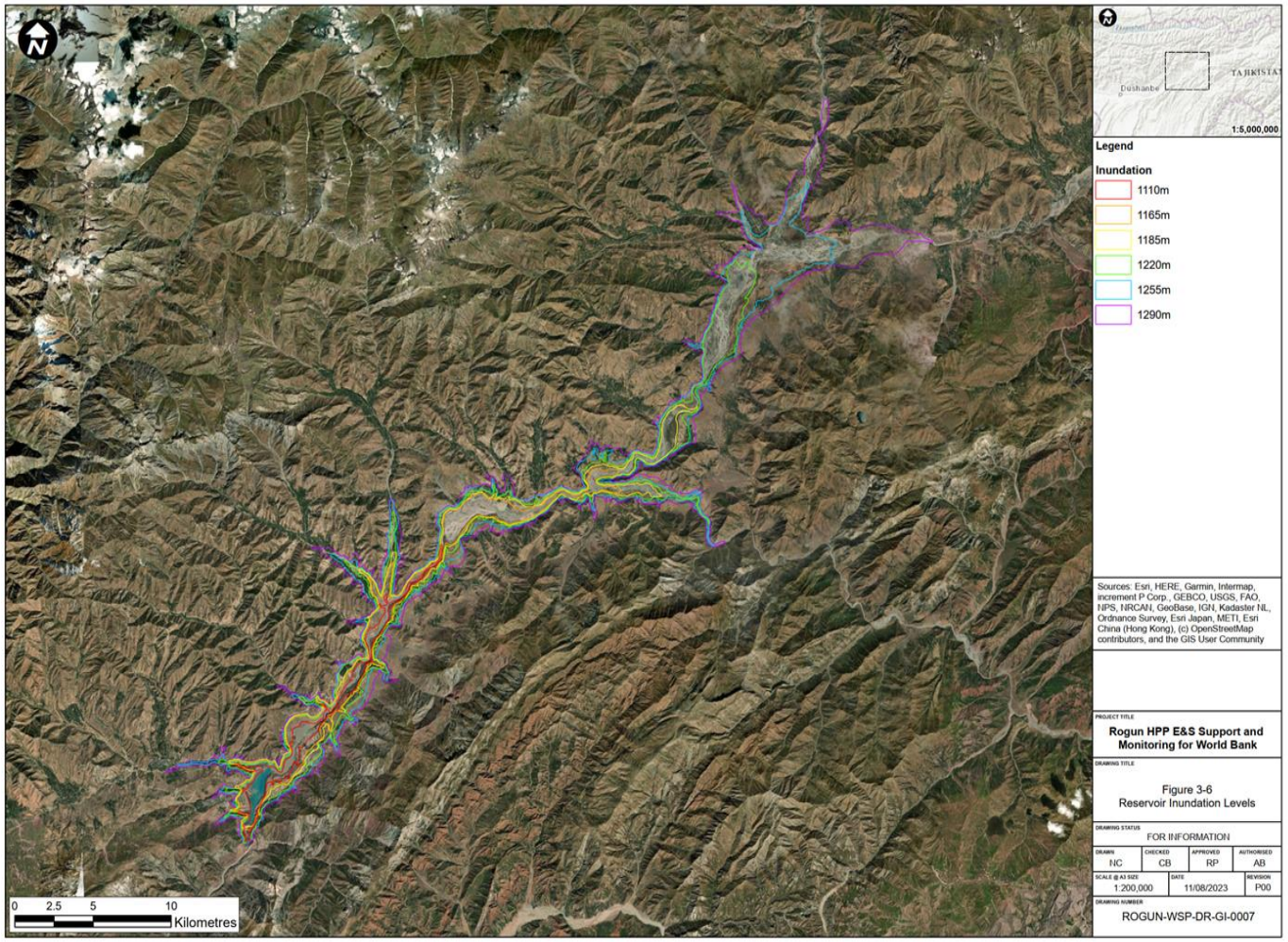
Stage 1 Dam
- An intermediate form of the dam at 1110m above sea level and 660m end-to-end was constructed to enable early electricity generation.

Completed: 2018

Stage 2: Full Height Dam
- The full height dam to 1300m above sea level and the reservoir level will be at 1290. Expected to be completed by 2029 with full reservoir filling by 2036.

Being constructed

PROJECT DESCRIPTION – RESERVOIR



Reservoir Key Facts:

Full supply level (FSL): 1290m above sea level (asl)

Total surface area:170 km²

Total land area:
Agricultural – 9,190 ha.
Irrigated - 1,970 ha.
Forests & bushes – 1,070 ha.
Others – 6,620 ha

Max. reservoir volume:13,238 hm^3

Year of Inundation:
1110 m asl - 2024
1165 m asl - 2026
1185 m asl - 2027
1220 m asl - 2029
1255 m asl - 2032
1290 m asl - 2036

PROJECT DESCRIPTION – OTHER KEY PROJECT AREAS

PROJECT COMPONENTS

POWERHOUSE & TURBINES 	▪ Total Installed Capacity: 3,780 MW—at present, 400MW. ▪ Number of Turbine Units: 6--at present, 2. ▪ Powerhouse Cavern: 220 x 20 x 70 meters. ▪ Transformer Cavern: 220 x 20 x 70 meters. ▪ By full operation the hydropower project is expected to generate an average of more than 17 billion kWh per year.	**POWER SUPPLY** 	▪ **Non-Grid/Back-up**: Prior to 2018, a direct power source from diesel generators and a direct power source from Nurek HPP was used. This now acts as the back-up power supply for the Project and will continue as the back-up for operation. ▪ **Self-Generated**: Following the completion of the Stage 1 Dam in 2018, the operation of the existing turbines allows direct power from Rogun HPP to be used.
TRANSPORTATION ROUTES  	▪ A single gate provides access to the Project site at Rogun City. ▪ **Sub-surface**: Around 80km of the Projects tunnels (required for operation of the reservoir) are being used as transport routes during construction. 70km of these will be blocked or flooded as the reservoir rises. 6km of underground roads will remain for operation. ▪ **Surface:** There are 26km of haul roads around the site, most of which are unpaved. Around 5-6km of these will remain during operation. Concrete and other supplies arrive from Dushanbe on public roads. ▪ Contractors transport workers who live in site accommodations to their workplaces. A twice-daily bus services transports around 300-400 workers living within 30km of Rogun city.	**TUNNELS** 	▪ Headrace Tunnels: Move water from reservoir to powerhouse and turbines for electricity production. The maximum discharge capacity is 1626 m3/s. ▪ Diversion Tunnels: 4 tunnels divert water during construction or repair of the hydropower complex. ▪ Spillways will release overflow water downstream as needed after the reservoir reaches full capacity. There are 3 High-Level Outlets (HLO) Spillways and 1 Remote Tunnel Spillway (RTS) on-site.

PROJECT COMPONENTS			
CONSTRUCTION COMPOUNDS	▪ Accommodation is provided on site in Construction Camp 1 for some of the existing workforce. The Lot 2 contractor has a purpose-built compound outside of the inundation area for worker accommodation. ▪ Other workers are accommodated outside of the site in Rogun City and surrounding villages. ▪ The construction camps also house concrete batching facilities, fuel storage areas, maintenance and equipment storage areas, site offices, medical facilities etc. ▪ Many of the facilities on Construction Camp 1 will be flooded as the reservoir rises. In future, new EPC contractors will develop their own facilities to good international standards.	**MATERIALS**	▪ Materials for the dam are sourced from stockpiles upstream and downstream of the dam. Materials suitable for use are extracted, processed and transported to the dam via conveyor. ▪ Reuse of material from tunnelling, where possible, is undertaken, with suitable materials used for dam construction. ▪ The area used for upstream stockpiles will be flooded by 2027. ▪ Before that occurs, approximately 12M tonnes of material to be used in future dam construction will be stored downstream of the dam, outside the reservoir footprint. ▪ Not all material at the required size, grade and type can be sourced from the existing materials. Aggregate materials from borrow areas downstream of the dam are sourced from Quarry 26, 2.5km downstream of the dam. Approximately 4M m^3 of aggregate will be excavated from this area.
WORKFORCE	▪ There are about 14,000 staff on-site. Peak employment will reach 15,000-20,000 between 2025-2028. ▪ Around 2,000 are office staff working 8am to 5pm, ▪ Around 5,000 staff work 12-hour day shifts in shops and other locations. ▪ Remaining staff work 12-hour day or night shifts on a 15 day on/off schedule. Therefore, only half of these staff are on site at any given day, and of those, half work the day and half work the night	**MEDICAL FACILITIES**	▪ Most major contractors provide medical facilities on-site. For the contractors that do not have their own medical facility, there are central Rogun Medical Centres that can be utilized by all workers. ▪ For any serious injuries or operations, workers are transported off-site to the closest medical center in Rogun City or to a hospital in Dushanbe. ▪ 13 medical facilities are provided by various contractors on-site. 8 emergency vehicles. ▪ 25 doctors, 44 healthcare professionals, 1 dentist, 13

	shifts. ▪ Each shift includes 1-hour for lunch.		paramedics, 5 nurses, 43 drivers, 4 janitors.
WASTE STORAGE AREAS 	**Hazardous waste** ▪ Facilities for waste storage areas within LOT2 construction are managed by the contractor WeBuild. ▪ The waste storage area is constructed of concrete cubicles, with waste is stored and labelled in open-top intermediate bulk containers (IBCs) ▪ Hazardous waste is stored in metal barrels inside larger containers or removed from site by a waste contractor for disposal at a certified waste disposal site. ▪ A licenced hauler takes away hazardous waste for recycling (e.g., batteries) or disposal. **Non-hazardous waste / construction debris** ▪ At present, most non-hazardous solid waste is taken to the Rogun municipal landfill, however, this landfill is over capacity. Rogun JSC is designing a new facility for construction wastes. Waste that has been improperly dumped on the construction site will be collected and disposed of in this new facility.		**Sewage Disposal (non-municipal)** ▪ Each contractor's sewage waste is currently managed in ponds / sumps. Liquid is generally infiltrated into the ground and solids are reportedly removed by a hauler for treatment in the Rogun town Wastewater Treatment Plant. ▪ A treatment system for sanitary water from Construction Camp 1 is being installed and came online in late 2023. It will be relocated before flooding in 2026. ▪ The HPP also has a small treatment plant that has will be functional throughout operation. ▪ Sanitary wastewater at resettlement villages is managed in treatment plants or in septic systems designed to Tajikistan National Standards. **Medical waste** ▪ All medical wastes from the construction area are taken for incineration at the Rogun Hospital. ▪ Since early 2023, the Rogun hospital has benefitted from a new UNICEF-financed facility for medical wastes constructed to international standards. ▪ Medical wastes from the new resettlement area at New Nurobod will be taken for incineration at the Rogun Hospital incinerator.

5 WHAT ALTERNATIVES WERE CONSIDERED?

The Analysis of Alternatives is an important part of an Impact Assessment. It enables Environmental and Social Risks to be identified early in the process and ensures the most cost effective and sustainable option is chosen.

Several Alternatives were considered for the project covering the need for the Project through to siting of resettlement locations.

- **Without Project Scenario**
- **Alternative locations for the Project**
- **Alternative Dam Structures**
- **Alternative Dam Heights**
- **Alternative sites for Resettlement Areas.**

Without the Project

The alternatives to the Rogun HPP include the continued and increased use of fossil fuels (Coal) to meet Tajikistan's Power needs. This will result in a continued rise in Carbon emissions contributing to Global Climate Change. The cost of energy has also increased, and alternative forms of renewable energy (Wind and Solar) cannot make up for the shortages in Winter.

Rogun HPP once constructed will allow the Cascade of dams downstream to be protected from the Probable Maximum Flood, protecting Downstream and neighbouring countries in case of a breach at Nurek. The project will also all better regulation of flows downstream to manage drought flows into the Amu Darya basin and improve cooperation between neighbouring countries.

6 STAKEHOLDER ENGAGEMENT

6.1.1. Stakeholder engagement will be implemented throughout the lifetime of the Project, in line with the Project's Stakeholder Engagement Plan (SEP). The stakeholder engagement process aims to establish effective communication channels and collaborative participation with a range of interested groups on key issues and opportunities.

6.1.2. Extensive stakeholder engagement was carried out for the 2014 ESIA and engagement with Rogun town and the resettlement villages has continued since that time.

6.1.3. The current SEP for the ESIA defines in detail the risks and impacts on all parties that may be affected by the Project. It outlines the commitments of the PMG relating to stakeholder engagement, consultation, and disclosure for the entire Project, throughout construction, operation and resettlement activities.

6.1.4. Through a thorough review of Project plans, objectives, and potential impacts, stakeholders have been categorized based on direct and indirect effects, considering both environmental and social aspects. Project stakeholders have been categorized into two main groups:

- Project's Affected Parties – Individuals and groups, including local communities, who may be affected by the Project due to actual impacts or potential risks to their physical environment, health, safety, cultural practices, well-being or livelihoods.
- Other Interested Parties – Persons, groups or organizations with an interest in the Project, which may arise from the location of the Project, its characteristics, impacts, or issues of public interest.

6.1.5. Based on the World Bank definition, no Indigenous Peoples have been identified as potentially affected stakeholders in relation to the Project.

6.1.6. Between 2008-2011, the Resettlement Unit managed the resettlement program of the Project and led a series of community consultations as part of the process, and it is clear the Project was well-known to people throughout Tajikistan due to its strategic importance and scale.

6.1.7. Since its official formation in 2011 and up to the present, DFZ has undertaken a series of consultation meetings with communities affected by resettlement and other impacts. In addition, PMG convened a meeting of the riparian governments in November 2023 in Kazakhstan to discuss the updated draft ESIA; NGO and CSO representatives also participated in this meeting.

6.1.8. Additional stakeholder engagement sessions were held in 2023 and 2024 with potentially affected communities within the Project region to obtain their concerns and views about the Project. Key issues and themes identified across the process are:

- Level of engagement with communities not affected by the resettlement program.
- Impacts of the resettlement program.
- Land allocation and compensation.
- Infrastructure, utilities and services.
- Livelihood restoration.

6.1.9. In addition to the previous stakeholder consultation and engagement undertaken for the Project (as summarized in Section 6.7), PMG and DFZ will disclose relevant information about the Project during the disclosure period, and then in an ongoing manner as the Project evolves.

7 BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

AREA OF INFLUENCE

7.1.1. The full extent of the Project (including the inundation zone and associated components), and an area surrounding or, 'buffering', these elements, has been used to define the spatial influence of the Project. This extent potentially impacted by the Project is known as the Area of Influence [AoI].

For most topics the maximum AoI corresponds to the project boundary at full inundation of the reservoir, with the possibility of some buffering up to 1km outside of this boundary, taking into account environmental, social and geographic receptors.

TRANSBOUNDARY CONSIDERATIONS

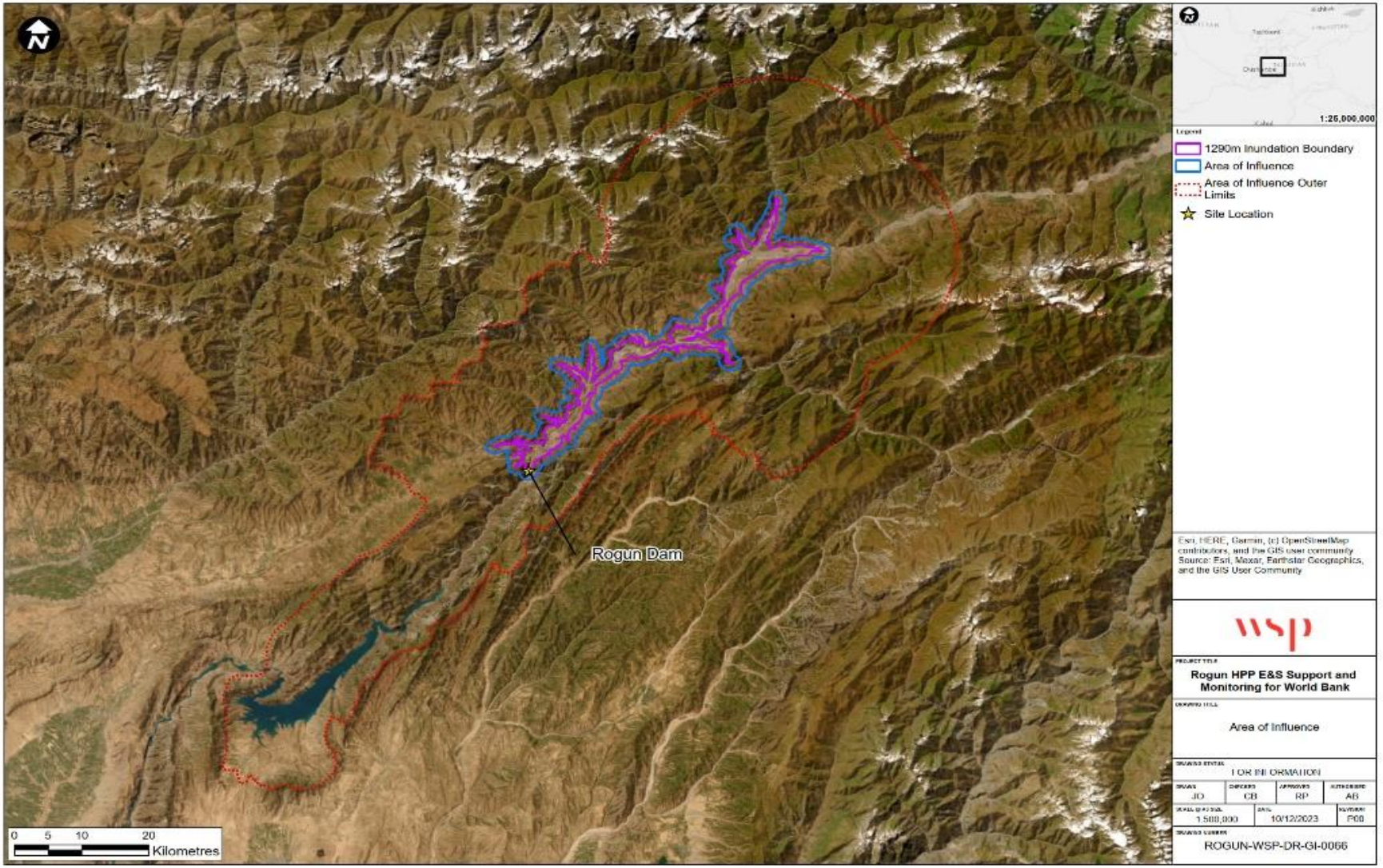
7.1.2. Transboundary effects (beyond Tajikistan) have also been identified. The key topic for Transboundary Effects is water for those areas of the Project which may be affected by flows in the Amu Darya River, of which the Vakhsh River is a tributary, through the construction of the reservoir, and in relation to the emergency response in case of a failure of the Rogun Dam.

7.1.3. Agreements between countries affected by the dam have been in place since the 1980's. The Almaty Agreement was signed in 1992 to maintain and adhere to the sharing of the transboundary water resources. Seasonal allocations of water have been developed in line with the annual agreements.

7.1.4. Tajikistan will not allow the reservoir to be filled immediately when construction is complete in 2029, as this could potentially affect the water quantity for downstream users during the summer, when there is the most need. Instead, the reservoir will be filled progressively more each year until it reaches its full supply level in 2036. This will allow Tajikistan to stay within the allocation of water agreed by neighboring countries under the agreements.

7.1.5. Formal agreements between Tajikistan and Uzbekistan are in place that manage expectations and/or obligations of both countries in the management of issues of mutual concern.

7.1.6. A Memorandum (2022) between the government of the Republic of Tajikistan and the government of the Republic of Uzbekistan sets out both governments' intention for long-term export/import of energy from Rogun HPP within summer months from Tajikistan to Uzbekistan under mutually beneficial terms.


Rogun Dam
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Legend
1290m Inundation Boundary
Area of Influence
Area of Influence Outer Limits
Site Location
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Rogun HPP E&S Support and Monitoring for World Bank
Area of Influence
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ENVIRONMENTAL BASELINE

7.1.7. The Project area is a brownfield that has already been subjected to construction activities over numerous decades. Consequently, the project site is heavily disturbed and this is reflected in the baseline data. for the site.

7.1.8. Tajikistan is a temperate country with a variable climate typical of Central Asia. The country is prone to natural disasters. Climate change impacts have been seen with around 2.5% of glacial ice lost during the 20th Century. Climate change predictions suggest an increase in average temperatures, and a rise in extreme high temperatures. The region is also predicted to have an increase in annual rainfall.

7.1.9. Tajikistan has one of the lowest greenhouse gases (GHG) emissions in Central Asia. Of the country's 13.9 Gigatons (Gt) of GHG emissions, agriculture (45%) and energy (42%) accounted for nearly 90% of the total emissions. Industrial processes and product use (10%) and waste (3%) accounted for the remaining emissions.

7.1.10. Visible air pollution is mainly related to dust (particulate matter) along the Project haulage routes. Small particulate matter ($PM_{2.5}$) within a 20 km buffer zone surrounding the Project footprint suggests this is above the World Health Organisation's (WHO) guidelines but within the range for the WHO interim targets designed to allow countries to work towards the standard.

7.1.11. Within the underground haul routes in the tunnels, the presence of small particulate matter is much more visible.

7.1.12. Current noise conditions are typical of construction activities. There are some exceedances during the day of permitted levels in areas around the crushing plant and conveyors, with other areas falling above night-time permissible levels especially for workers housed on-site around Construction camp 1. Noise levels are also above standards in some underground work areas.

7.1.13. The site geology is typical of the region, alternating between sandstone and siltstone, with soils typical of the area showing some local deposits suitable for arable farming, and the majority suitable for grazing. Soils in the construction area have been removed.

7.1.14. Some localised soil pollution has been observed especially, in areas where fuels have been used and kept and in relation to the historical use of Polychlorinated Biphenyls (PCBs) and Asbestos Containing Materials (ACMs). Other areas around the historic concrete batching plant and septic tanks also show levels of contamination and discharge.

7.1.15. The Rogun HPP is located in the Amu Darya River basin, on the upper reaches of the Vakhsh River. The basin extends across several countries, from its headwaters in the Pamir Mountain range to where it discharges into the inland Aral Sea. The river carries high sediment loads, driven by intense erosion processes upstream.

7.1.16. There is approximately 17km of river between Rogun dam and Nurek dam. The Rogun dam will block the movement of coarse bed loads downstream and will act as the control for flows downstream to Nurek.

7.1.17. The riverbanks (and artificial road embankments) are prone to erosion and partial collapse during the impounding phase before full submersion.

7.1.18. A study to define the Minimum Environmental Flows downstream of the Rogun Dam has also been undertaken. The current operating regime for Rogun allows for 10m^3/s of residual flow to be released downstream. A few small tributaries also contribute to the flows downstream of the dam.

7.1.19. Studies have been undertaken to identify whether the minimum flows in place are appropriate for the operation of the hydropower dam and protect downstream environments and users. These studies have identified a more variable flow would be more appropriate with flow regimes for typical years and drought years identified.

7.1.20. Given the legacy of human influence across the Area of Influence (AoI) and the disruption throughout the AOI, biodiversity has been greatly reduced. No Critical Habitat has been identified; however, both the upstream floodplain habitat and juniper woodland are considered to be Natural Habitats.

7.1.21. Of the mammal species recorded during the desktop studies, 12 are considered to be of increased interest/conservation status. Eight common/widespread species were recorded during field surveys, with one (the least weasel *Mustela nivalis*) being included within the Red Book of Tajikistan.

7.1.22. The desktop study identified two amphibian species within the Vakhsh River valley: green toad *Bufo viridis*; and lake frog *Rana ridibunda*. Both of these species were recorded during the 2023 fields surveys and are common and widespread. Nine species of reptile were also observed also considered common and widespread. Four species are listed in the Red Book of Tajikistan and/or are of increased conservation interest/status.

7.1.23. Most bird species recorded are considered to be common and widespread, which reflects the amount of habitat modification that has occurred in the AoI; although 16 species are listed on the Red Book of Tajikistan and/or are of increased conservation interest/status.

7.1.24. Within the Vakhsh River valley, including the lakes of the Tigrovaya Balka Nature Reserve, 36 fish species are known to be present, with the upper reaches of the Vakhsh River having much lower species composition than the lower parts of the river due to interruption of movement by the Nurek and other HPPs downstream of Rogun. Baseline conditions in the of the Tigrovaya Balka Nature Reserve have been affected by operation of the the Nurek HPP dam but has not been and will not be affected by construction and operation of the Rogun HPP.

7.1.25. Ecosystem services describe aspects of the natural environment that are important to the wellbeing of communities within the AoI. Aspects identified include plants gathered for traditional and medicinal uses; cultural trees (shrines); protected areas used for ecotourism and recreation; orchards and farmland; natural habitats; floodplains; streams and species biodiversity.

7.1.26. The current main access to the Project site is from the Dushanbe to Obi Garm road (M41). Stretches of existing roads that will be submerged during operation are currently being replaced. Two major new roads are also planned for the area surrounding the reservoir.

SOCIAL BASELINE

7.1.27. Approximately 26.3% of the Tajikistan population was living below the poverty line in 2019, which is an improvement from the proportion measured in 2013. Remittances, provided to households from members who are working as a migrant abroad, play an important role in reducing poverty and providing an income to an estimated 30-50% Tajikistan households.

7.1.28. The main source of income for residents in the Project region comes from remittances (33.1%), followed by pension (19.6%), public sector work (11.9%), agriculture (6.9%), self-employment (6.1%) and seasonal work (5.3%). Employment in the Project is only stated as being the main source of income by 5% of the households surveyed.

7.1.29. It is estimated that at its peak there will be a total construction workforce of between 15-20,000 workers. Currently there are approximately 14,735 people working on the Project with 23% sourced from within 50km of the Project.

7.1.30. Labor influx is associated with the migration of overseas workers into the Project area. Currently, the majority of Project workers are from Tajikistan, with expatriates, predominantly from India, Iran and Italy, comprising approximately 5.1% of the workforce.

7.1.31. Labor Management Procedures have been adopted by PMG which set out the measures around working conditions, terms and conditions of employment, conduct, grievance mechanism and other measures to improve working conditions. Some individual contractors also have their own Human Resource systems and policies.

7.1.32. Women currently comprise 5.2% of the workforce for the Project, primarily undertaking domestic types of work such as cleaning, preparing food for workers and washing dishes. There are also a small number who work as nurses, engineers, or in administrative roles.

7.1.33. The availability of community facilities, such as schools, religious meeting places and healthcare services vary greatly across the affected administrative areas.

7.1.34. According to the household surveys, the highest level of formal education among family members of households is secondary education, including vocational education degrees (more than 30%).

7.1.35. Access to healthcare services is limited in Tajikistan, and health spending in Tajikistan is the lowest in the WHO European Region.

7.1.36. Many of the Project worker accommodation camps have their own medical facilities with basic medicines and equipment, staffed by nurses and/or doctors. The closest medical center for Project workers who do not have access to on-site facilities is the Rogun Medical Centre.

7.1.37. All community assets and infrastructure within the Flooding Zone will be lost as the reservoir is filled. Currently, facilities such as schools and religious meeting places provide opportunities for communities to gather and socialize and contribute to the social fabric of the existing settlements.

7.1.38. While the majority of the population in Tajikistan has access to electricity, many experience blackout during winter due to the current power system being unable to meet demand. From 1990, production and consumption of electricity declined due to an aging power infrastructure which was poorly maintained and not replaced.

7.1.39. Access to clean drinking water continues to be a problem in Tajikistan, particularly in rural areas. Access, for the general population, to improved water sources has improved from over 75% in 2012 to over 84% in 2020, however Tajikistan has the lowest share of population (55%) with access to safely managed water supply sources.

7.1.40. Tajikistan is a relatively young country, with nearly 50% of the population under the age of 25 years old. Family planning services are limited in Tajikistan, and in 2017 it was estimated that 21% of women were using contraceptives.

7.1.41. Traffic accidents have been decreasing in Tajikistan in recent years, however, focus groups discussions with people affected by the Project highlighted road safety concerns of communities, and the poor road conditions due to ongoing construction and use of heavy trucks.

7.1.42. According to WHO data, infectious disease was responsible for 578 deaths in 2017, the most recent year for which data is available. Of these, 278 deaths were from tuberculosis, and a further 149 were from diarrheal diseases.

7.1.43. Social protection and assistance systems are going through modernization in Tajikistan in order to capture more vulnerable people in need. However, the country still faces challenges in ensuring the inclusion and protecting the rights of all members of society.

7.1.44. Certain individuals and groups, such as those based on age, gender, ethnicity, religion, disability, social exclusion, or economic disadvantage, may be more vulnerable to negative impacts from the Project. They are likely to face the risk of social exclusion and not equally benefit from the Project.

Identified vulnerable groups include:

- Disabled people, e.g., those with physical or mental disabilities or chronic illnesses, who will require physical assistance if the village is to be relocated.
- Female-headed households who may require additional assistance in building their new houses.
- Elderly people with no younger family members within their household, who may also require additional assistance in building their new houses.
- Young people (aged 24 or under) who may require additional assistance in finding a job in their new location.

7.1.45. In Tajikistan, discrimination based on gender is illegal, and equal work for equal renumeration is required. However, family-related factors and social institutions mean that gender inequality remains high.

7.1.46. Only 14 % of the Project affected women surveyed reported as having a source of income. Of these women, about 17% are engaged in public sector work (mainly as teachers, medical staff, civil servants) earning regular income. Household farming is often undertaken in the affected communities for subsistence, however only 7% of women are recorded as farmers. This could imply that women are undertaking unpaid agricultural work within their households.

7.1.47. The participation of women in the local labor force is low, with over half of working age females not in paid employment Women in rural areas are often faced with limited access to education, early marriages, family and cultural restrictions, restricted access to financial resources, and restricted rights to land ownership.

7.1.48. Unemployment, particularly in rural areas, has led to a high proportion of Tajik migrant workers who seek employment and better opportunities elsewhere (particularly Russia). It is estimated that about 30% of the wives left behind by their migrant husbands have been abandoned, adding to the family's financial burden on

their shoulders along with traditional responsibilities as carers and dealing with domestic work.

7.1.49. Cultural heritage resources have been recorded across the AoI. The archaeological potential of the flood plain and lower terraces of the inundation zone is limited, with the majority of sites located on the upper terraces, and the immediate perimeter of reservoir. These include several fortress sites, broadly dated to the 16th – 19th centuries, with high research potential, particularly in informing the archaeological record on the lower Karategin route of the Silk Roads and the Surkhob-Vakhsh river valley.

7.1.50. Identified cultural and sacred resources, important to communities within the resettlement villages, included (ancient) cemeteries, shrines and springs. Evidence of unique intangible cultural heritage was also recorded, associated with traditional crafts and activities, rituals / ceremonies and oral history and legend.

LABOR AND WORKING CONDITIONS

7.1.51. In general, workers at Rogun HPP are paid higher than the national minimum wage and are considered above average in the current Tajikistan labor market.

7.1.52. The majority of the contractors have a collective bargaining agreement in place. Project workers are free to join the Rogun Trade Union.

7.1.53. No one under the age of 18 is engaged in the construction works of the Project. All Project workers are required to verify their age by using legally recognized documents to prove their right to work, such as a copy of passports, birth certificates etc.

7.1.54. Local women are employed on site typically for domestic types of work, such as cleaning, preparing food for workers and washing dishes. There are a few women nurses working on site and a few women who work in administrative roles at the different contractor organizations. The international workers include a few women in technical roles (e.g. engineers).

7.1.55. The majority of contractors conduct mandatory health screening for workers once a year, which is paid for by the companies and includes general checks on worker's vision, hearing, heart, blood pressure, etc.

7.1.56. Standards of the worker accommodation provided for workers involved in the Rogun HPP construction activities varies significantly across the different contractors.

7.1.57. Improvements to various aspects have been identified and are in the process of being implemented on site.

- Drinking water provisions;
- Worker payments;
- Occupational health and safety (OHS) procedures;
- Information within employment contracts;
- Overtime work;
- Supply chain;
- Worker transport system;
- Worker accommodation facilities; and
- Provisions of certain personal protective equipment (PPE).

8 KEY ISSUES - RESETTLEMENT

The Rogun HPP is expected to affect 50,267 persons (6,788 households) in 69 villages of Rogun City, Nurobod and Rasht districts through physical and economic displacement. The final number of project-affected persons could be around 60,000.

The resettlement program of Rogun HPP is managed by the State Enterprise, Directorate of Flooding Zone of Rogun HPP (DFZ). The resettlement program follows a phased approach and aligns with the reservoir flooding that is scheduled to reach its full supply level by 2036. Resettlement is scheduled to be completed by 2032. Resettlement is underway.

- Phase 1 resettlement covered eight villages and 2,697 project-affected people between 2008-2017 and was declared complete in a resettlement completion audit (2018) approved and disclosed by the World Bank.
- The next phases of resettlement cover the remaining 69 villages and will be managed through multiple resettlement and livelihood restoration plans. Currently, the second phase of resettlement covers the resettlement of 16 villages between 2017-2025. A Resettlement Action Plan 2 and Livelihood Restoration Plan 2 are being prepared to align with the updated requirements of the international lenders.

DFZ provides communication on resettlement-related matters. Contact details of the grievance channels were disclosed and shared with communities prior to formal consultations in November 2023.

An updated Resettlement and Livelihood Restoration Framework in line with World Bank guidance has been consulted upon and publicly disclosed. The framework outlines a comprehensive strategy for the management of the Rogun HPP Resettlement Program. Resettlement is being undertaken on a phased approach. The DFZ has committed to preparing five Resettlement Action Plans (RAPs) to complete the program. The governance of the entire resettlement program requires seamless coordination among other government agencies that work with DFZ

RAP PLANNING resettlement completed by 2032 and full inundation (1290m) by 2036)

Inundation levels based on lowest point of villages (m asl)	Proposed years to complete resettlement	RAP period	No. of villages covered in each RAP	No. of households covered in each RAP	No. of PAPs covered in each RAP	RAP Status
1092-1220	2014-2017	2014-2017 RAP 1	8	326	2,697	Completed
1110-1290	2017-2025 (likely to be extended until 2026)	2017-2025 RAP 2	16	1,710	16,919	In progress
1185-1270	2026-2028	2026-2028 RAP 3	16	1,328	9,206	RAP 3 ready by 2025
1271-1295	2028-2030	2028-2030 RAP 4	17	2,215	12,547	RAP 4 ready by 2027
1296-1414	2030-2032	2030-2032 RAP 5	12	1,209	8,898	RAP 5 ready by 2029
TOTAL AFFECTED POPULATION			69	6,788	50,267	

RESETTLEMENT IMPACTS AND ENTITLEMENTS

8.1.1. The project commits to compensate or replace, where possible, all these losses in line with the best international practice and standards and to reverse the adverse impacts into positive outcomes.

8.1.2. Each RAP will contain an eligibility matrix which states the entitlements of all impact groups which are affected by physical and/or economic displacement. These include vulnerable groups. These entitlements will also be summarized in easy-to-read community information brochures.

8.1.3. To date all 2,697 Project Affected people under RAP 1 have been resettled. The second phase of resettlement is ongoing.

RAP 2 Progress	Villages	Number of people	Total
Completely Resettled	Sicharogh Sari Pul Furudgoh (Airport) Saidon Makhallai poyon Chanor	380 1149 370 182 806 1795	4,682
In Process	Roghuni poyon Obiboriki poyon Obiboriki bolo Mehrobod (formerly Komsomolobod	266 330 412 6016	7,024
Still to be resettled	Lughuri poyon Bedikho Aligalaboni bolo Khakimii poyon Khakimii bolo Khumrog (formerly Kumok)	362 588 1645 1000 863 755	5,213

8.1.4. Resettlement under RAPs 3 to 5 will commence in 2025 and be completed by 2032.

8.1.5. All Affected Peoples will know their eligibility for the Project's entitlements and this information will be disseminated through media channels, local DFZ representatives and publicly displayed in common facilities in the villages.

8.1.6. Affected Peoples are categorized into three main groups:

- People who have formal legal land rights recognized by the Land Code of Tajikistan.
- People who do not have formal legal land rights at the time of the cut-off date but have a claim to land or assets recognized under the national laws or that can become recognized through a process identified in the RAP. It is DFZ's responsibility to assist such people to formalize their land rights prior to receiving compensation.
- People who have no recognizable legal right or claim to the land they occupy.

8.1.7. All three groups of people affected by resettlement activities of the Project are entitled to compensation for loss of assets other than land, lost income, and livelihood restoration measures.

8.1.8. Under this Project, the cut-off date for eligibility for entitlements will be disclosed in each RAP and is either the start date of the census surveys or asset inventories of the affected population.

8.1.9. The construction of fixed structures in the dam and reservoir area was prohibited in 2009 when the first batch of technical passports of households was prepared.

8.1.10. People whose livelihoods are adversely affected, due to the resettlement activities of the Rogun HPP are entitled to livelihood restoration measures provided by Ministry of Labor, Migration and Employment of the Population (MoLMEP) and Ministry of Agriculture.

8.1.11. The Government of Tajikistan and Rogun HPP have adopted and will continue to implement the following policy commitments:

- Carry out meaningful consultations with all stakeholders and in particular resettled and host communities including vulnerable groups.
- Ensure that all private and public assets and services are fully restored to at least their previous levels and conditions;
- Provide fair and adequate replacements and/or compensation for lost land, assets and income to all eligible people;
- Provide transitional income support to re-settlers whose livelihood has been negatively impacted, until such time as their income-earning capacity has been restored to at least its previous level;
- Provide transitional support, including transport to the new location and income support;
- Comprehensively monitor all elements of the resettlement process until it is considered that living standards have been restored to at least pre-resettlement levels;
    - Pay particular attention to the needs and perspectives of women and vulnerable groups, and provide additional support as necessary to enable their equal participation;
    - Living standards and livelihoods of people and communities affected by the Project will be restored to at least the same level as before the Project, and improved where possible;
    - Pay particular attention to the needs of women and vulnerable groups, such as those who were unemployed at their previous location, who will be provided with additional support and interventions as required;
    - All physically and economically displaced PAPs will be eligible for livelihood restoration support and will be included within LRP, unless they clearly indicate that they do not wish to receive such support, or all reasonable efforts to contact them have failed;
    - The effectiveness of livelihood restoration measures will be assessed by regular monitoring and adjustment; and
    - The resettlement process will not be considered complete until livelihoods and living standards have been restored to at least their pre-resettlement levels.

8.1.12. Specific attention to gender aspects in resettlement planning is made that aligns with best practices and updated Lenders' standards.

8.1.13. A Gender Action Plan has been prepared for the Project to support women's participation in resettlement planning and improve socio-economic opportunities for both women and men.

KEY ISSUES – WATER

The Rogun HPP is being constructed at the upstream end of a cascade of hydropower dams on the Vakhsh River. The Vakhsh River drains into the Amu Darya basin and into the Aral sea and is transboundary. Filling and operation of the Rogun HPP is subject to agreements made with neghbouring countries on the fair use of water.

Reservoir Filling and Operation

- During the filling of the Rogan Dam reservoir Tajikistan will only use their average annual unused water allocation under Protocol 566 to fill the Rogun reservoir.
- Managing the filling of the Rogun Dam so as not to adversely affect downstream water users especially during dry years will use existing water resource management systems and processes.

Providing Minimum Flows

- Studies to identify the required minimum environmental flows for the operation of reservoir have been undertaken.
- A more naturalised regime important for maintaining Good Ecological Potential. These have been identified for drought years as well as average years.

Protecting the Cascade

The existing Nurek Dam is not designed to withstand the Probable Maximum Flood. This leaves the cascade vulnerable to breach in extreme events.

The Rogun dam has been designed to store and convey the Probable Maximum Flood helping protect the downstream environmental from a breach.

A detailed Emergency Response Plan has been developed to ensure downstream users and neighbouring countries can be warned and emergency response implemented in good time in case of any breach in the cascade.

Other Water Impacts

- The damming of the Vakhsh River to form a reservoir with a total surface area of 170 km², an overall length of approximately 70 km, will result in an extensive and permanent modification to the existing fluvial environment. To mitigate this impact, it will be necessary to identify opportunities to improve the ecological and water quality status upstream of the Rogun reservoir impoundment, or on the downstream river channel and hydropower cascade.
- Filling of the Rogan Dam reservoir will raise ground water levels over an extensive area. Ground water modelling and monitoring will be necessary to establish any effects on the local population and mitigation identified.
- During construction borrow pits will contribute to the temporary sediment load in the river channel downstream of the Rogun Dam. This will have a negligible impact on the sediment load in the Nurek reservoir given that the Rogun Dam will block sediment from the upstream catchment

m^3/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

KEY ISSUES – SUMMARY OF OTHER TOPICS

Air Quality.

Air quality impacts mainly relate to the generation of dust and particulate matter emissions due to construction phase activities, and exhaust emissions from diesel-fuelled trucks, excavators, and generators both above and underground.

Impacts from dust emissions during construction are associated with areas close to the existing and potential construction camps where workers are accommodated. Strict implementation of the Air Quality Management plan will reduce this risk.

Impacts from air quality including NOx in the tunnels impacts the workforce. Installation of adequate ventilation will be undertaken to minimise this risk.

Climate Change

The installation and operation of the Rogun HPP will not significantly contribute to global climate change. Compared to the without project alternatives the Project aims to reduce reliance on fossil fuels in the winter and will therefore contribute to lower increases in Tajikistan's carbon outputs.

There will be some Greenhouse Gas emissions especially in relation to potential methane from the reservoir, however, the depth and limitations on vertical mixing of the water will reduce these emissions. A Reduction plan will be developed to ensure energy efficient measures are implemented throughout the lifetime of the project.

Biodiversity and Ecosystem Services

Key impacts on biodiversity are associated with the loss of Natural habitats including Juniper woodland, River and Floodplain habitats.

Some areas for spawning fish will be lost through the creation of the reservoir, and upstream where the reservoir backs up into the rivers and streams feeding into it.

A no net loss plan is being developed to identify locations for replanting and improving the juniper woodland, and for enhancing any floodplain areas for fish and amphibians.

The Project may also have positive effects on mammals and in particular birds once construction has finished and the reservoir inundates and stabilizes. It is likely that otters, osprey, egrets and herons with some migrating duck species may benefit from the reservoir.

Impacts associate with the beneficial services derived from the environment (Plants, water etc) are associated with the loss of wood and local vegetation/arable land, impacts (temporary) to fishing, and land clearance in general.

With the offsetting/no net loss plan, lost habitats will be replaced which once mature will enable these services to continue. New settlements are providing land and access to these services and effects will be reduced.

Soils and Geology

Soils impacts mainly relate to the loss of arable soils especially in the reservoir area, compaction of the soils, and soil erosion especially during operation in the drawdown area.

Preventing soil erosion is key to extending the lifetime of the HPP.

Implementing soils conservation measures through stockpiling and reuse and implementing the watershed management plan to limit erosion will reduce these risks.

Contamination

There are several areas on the current Rogun construction site that may be contaminated by asbestos or past spills of fuel or other hazardous materials. These include workshops, asphalt and Concrete batching plants, fuel storage areas, waste areas and effluent storage areas.

All areas of existing contamination will be identified flooding and measures implemented to ensure that hazardous substances do not affect the reservoir or other areas.

A site wide asbestos survey and production of the asbestos register together with management procedures will reduce exposure of the workforce to asbestos fibres.

Traffic and Transport

Impacts from additional traffic and transport occur mainly from shift changes and the transport of the workforce as well as goods and materials along the existing roads.

A site-wide guideline for Traffic Management Plan has been developed to ensure haul roads are maintained and pedestrians are segregated. This will reduce the number of vehicle incidents on site.

Upgrading of transport routes is also occurring and during operation this is expected to bring a Benefit to the communities the creation of high-quality infrastructure.

Noise and Vibration

Noise impacts mainly relate to the use of crushing plant, vehicles, main and secondary conveyors in the stockpiles, earthworks and the asphalt plant.

Noise monitoring results indicate a potential high noise exposure for some workers, especially at nighttime.

Implementation of the Noise Management plan and monitoring of Worker exposure as well as enforcement of use of PPE will reduce significant effects to acceptable levels.

Resettlement areas will be at least 500m from any existing settlement. Construction of resettlement areas is considered unlikely to exceed the noise thresholds.

KEY ISSUES –SOCIAL

Local Economy, Employment & Benefit Sharing

During construction there will be an increase of spending in the local economy from the increased workforce at the Rogun HPP. During Operation, the construction workforce will reduce. However, a benefit sharing program is being designed as a complement to the Rogun HPP which will focus on longer term development challenges in the country and project area. The benefit sharing program will utilize a portion of the revenue from the sale of electricity to invest in addressing priority development issues. Separate consultations regarding the design of the benefit sharing program will be conducted as a part of the overall consultations for Rogun HPP. The Rogun HPP will bring positive long-term benefits for the local area.

Landscape and Visual Amenity.

Key issues associated with Landscape and visual relate to the changes on landscape character from braided river to lake, loss of viewpoints and native vegetation.

A detailed Landscape and Planting plan will be developed during project implementation. This plan will identify opportunities for reinstating viewpoints across the new landscape, screening project infrastructure, minimising lighting, and reinstating vegetation.

Community Assets and Infrastructure.

New settlements will provide improved infrastructure with new schools, healthcare facilities, sports and recreational facilities. The Project will also provide more reliable electricity throughout the year.

Both household survey and focus group discussion (FGD) outcomes show that people are positive about the post-resettlement improvements, as they will benefit from better community assets and infrastructure.

Labor and working conditions.

Key risks associated with Labor include influx where the increase in construction workers from outside the local area bring potential for increased pressure on services, increase in disease (including sexually transmitted), decreases in community cohesion and potential conflict.

The project is well known and has been under construction for many years. Existing communication routes with local communities are well established and many measures to reduce the impacts of labor influx have been implemented successfully, with very few incidents reported.

There is evidence that some working conditions (e.g., accommodation) require improvement to meet Good International Practice. These include provision of drinking water, medical facilities for all workers and sanitary facilities. New accommodation facilities will be developed which will comply with IFC/EBRD standards, and substandard accommodation demolished. These will be in place by end 2024 with the new contracting mechanism.

A Labor Management Plan has been developed which sets out the measures around working patterns, conduct and other measures to improve working conditions.

A grievance mechanism is available to all project workers.

Inclusion, Vulnerability and Gender.

Socio-economic conditions of women vary depending on their location and access to services. 14% of the women often supplement their income with the informal sale of agricultural surplus. Having access to land such as this is important in the future for females especially those being resettled. The updated resettlement plans will take into consideration vulnerability and gender for compensation.

Few women are employed on the Project due to distance, working patterns, and the male dominated environment. Whilst Tajik legislation prohibits women from working in heavy, underground, and hazardous works, collective agreements may allow for women to work in professions, and some exceptions have been granted. Sexual harassment in the workplace is prohibited by law. Training on gender-based harassment, and strict enforcement of code of conduct will reduce risks although this still remains relatively high.

Community Health Safety and Security.

Most impacts to the residential areas close to the construction compounds for the Project, and roads used to access these compounds. Impacts include increased noise and reduced air quality impacts on the health or residents; reduced safety and security of local families, women, and children from labor influx; reduced safety from increased road traffic, including construction vehicles, and increased risk of road accidents and any adverse risks due to security measures at the dam.

Outcomes from FGDs and household surveys highlight poor road conditions that put community safety at risk, and potential restricted access to services and facilities from vulnerable groups (Severance).

A community grievance mechanism is to be fully implemented and community liaison officers employed to ensure issues can be raised and mitigated. Better roads and services from the project will be developed to improve safe conditions for the communities.

Cultural Heritage.

The project will affect several historic assets including fortresses historic settlements, and fossil remains both directly and through affecting their setting. There are known to be 32 cultural and sacred resources affected during construction including cemeteries, tombs mosques and sacred springs. Intangible heritage such as traditional music, dance crafts etc, is distinct to the region, and anecdotal evidence from engagement suggests that older generations feel more “attachment” to their villages and heritage.

A detailed Cultural Heritage Management Plan has been developed to minimise impacts on both known and unknown heritage assets. This includes:

- Implementing exclusion zones around known assets
- Detailed Cemetery relocation guidelines
- Ongoing engagement to ensure safe access to sacred areas
- Recording and identification through investigations of known assets
- Chance Finds Procedure

KEY ISSUES – OTHER

Major Hazards and Disasters

Key risks associated with Major Accidents and Disasters include earthquakes leading to the damage or failure of the dam, overtopping or dam breach due to excessive water, landslides into the reservoir, cracks in the dam wall leading to the loss of water storage capacity or tunnels collapse preventing the diversion of water away.

These risks may have impacts on:

- Members of the public and local communities with loss of life/injury or livelihoods.
- Infrastructure and the built environment;
- The natural environment, including ecosystems, land and soil quality, air quality, surface and groundwater resources and landscape;
- The historic environment, including archaeology and built heritage.

To avoid or eliminate risk of the Major Hazards and Disasters, a number of processes including monitoring, risk assessments and Health & Safety Plans will be implemented. These include:

- Seismic Hazard Assessments – to identify seismically active zones that could cause landslides / ground collapses.
- Emergency Response Plan – measures to respond and ensure neighbouring communities and nations are notified of any emergency incident.
- Planned inspection and maintenance assessment of tunnels
- Construction Phase Health and Safety Plan

Reservoir Slope Instability

Slope instability around reservoirs has historically resulted in property and infrastructure damage and multiple fatalities. Slope instability can affect areas immediately surrounding the reservoir and large landslides could reach some distance from the reservoir edge, including landslides occurring throughout the reservoir catchment.

Landslide impact waves are a significant hazard during reservoir filling and operation because they can flood above reservoir level and potentially overtop the dam.

To avoid or eliminate risk of Reservoir Slope Instability, the management of reservoir slope instability requires detailed understanding of the potential landslide mechanisms that could affect the slopes around the reservoir, therefore; the following measures will be implemented:

- A monitoring program will be informed by the landslide investigations and include a risk assessment of the various potential landslide scenarios that could affect the reservoir.
- A reservoir landslide management plan will incorporate the results of the landslide investigations, risk assessments, monitoring and emergency management planning.
- Emergency Response Plan - developed to ensure downstream users and neighbouring countries can be warned and emergency response implemented in good time in case of any breach in the cascade.

Cumulative Impacts

Cumulative impacts are those that arise due to an impact from the Project interacting with an impact from another activity, to create an additional impact. Projects with a potential cumulative impact with Rogun HPP include:

- Nurek Hydropower Rehabilitation Project, due to an overlapping construction programme alongside Rogun HPP.
- International Highway (Vakhdat – Jirgital) due to the proximity of the development to Rogun HPP. Due to the general poor quality of roads, increased construction traffic may impact some host communities, however; the development of new infrastructure will be considered beneficial during the operational phases of both projects with a minor impact in the short-term.
- Central Asia–China gas pipeline, Line D. due to the proximity of the development to Rogun HPP. There could be potential air pollution and noise impacts to local people and construction workers, with dust generated from the construction works. Considering the distance of the Rogun HPP to the closest potential location of the gas pipeline (approx. 30 km), there will be very limited potential for cumulative impacts.
- Shurob is a proposed 850MW run-of-river HPP that would be located at the upper end of Nurek reservoir and with the reservoir extending nearly to the top of Rogun dam. It would occupy the Vakhsh River reach that would be affected by releases from Rogun HPP. If Shurob is indeed constructed, construction would not begin until Rogun construction is complete.

No additional mitigation is proposed as there is limited cumulative impacts. Community Liaison Officers will be available for stakeholders to contact should they feel they are impacted by potential cumulative effects from Rogun HPP and other project(s).

9 ENVIRONMENTAL AND SOCIAL MANAGEMENT

9.1.1. The Environmental and Social Management Plan sets out the management, mitigation, and monitoring measures to be taken during construction and operation of the Project to manage key potential environmental and social impacts identified in the ESIA.

9.1.2. The ESMP:

- Describes the Policies and Procedures that will be developed to implement the requirements of the ESMP and to meet regulatory requirements; and
- Sets out the key impacts and mitigations defined in the ESIA and allocates responsibilities for implementation and performance monitoring.

9.1.3. Project procedures and policies will draw on the elements of the established business management process, in implementing a Plan-Do-Check-Act (PDCA) cycle. This provides a methodological approach to managing E&S risks and impacts in a structured way on an ongoing basis.

9.1.4. The aim of the Project-specific E&S policies and procedures, the Environmental and Social Management Plan (ESMP) and supporting plans is for them to be live documents and tools against which E&S performance can be monitored. Continual improvement of these tools will be achieved through the continual assessment of E&S management performance against the relevant policies, objectives, and specific targets to identify areas for improvement.

9.1.5. The commitments, mitigations and management controls set out in the ESMP will be used to develop detailed sub plans to manage the key E&S risks on the project.

9.1.6. Additional site-wide guidelines and/or management plans are being finalized and will be completed before the Effective Date of the project.

10 PROJECT FEEDBACK

We welcome your views on the Project. Interested parties are welcome to contact PMG to ask questions or provide comments. Communications can be directed to us through any of the methods highlighted below.

Online at: http://www.energyprojects.tj

By email at esia.rogun.hpp@gmail.com

By telephone at **+992 37 235 74 16** or **+992 37 235 74 17**

By post at **ESIA COMMENTS, Project Management Group for Energy Facilities Construction. 5/1 Shamsi str., 6th floor, 734064, Dushanbe, Tajikistan**

In person through our Community Liaison Officer: **Mr. Bahrom Sirojev**