



GOLD
Project: **Sebzor HPP**
Stage: **Preparation**
Date: **October 2023**

Assessment Report

Project Name: Sebzor Hydropower Project

Project Sponsor: Pamir Energy Co.

Report Author: Joerg Hartmann, Zaglul Khandkar,
Nur Khairin Binti Bujang, Mohd. Firdaus Bin Ibrahim

Report Date: October 10, 2023



Cover page photo: Overview of Shokhdara Valley in Roshtkala District, looking upstream, with future Sebzor powerhouse site located in Lower Chagev village in foreground (right bank), and Sebzor village on left bank (August 2021)

Published by:

Hydropower Sustainability Council
One Canada Square
Canary Wharf
London E14 5AA
United Kingdom
Email: sustainability@hydropower.org

First published in September 2021.
This edition published in May 2022.

Copyright
© 2022 Hydropower Sustainability Council

All rights reserved. No part of this publication may be reproduced, stored or transmitted without the prior permission of the publisher.

The findings in this report are based on an independent assessment conducted in compliance with the processes set out in the Hydropower Sustainability Assurance System.



A. Assessment Details

Project sponsor	Pamir Energy Co. (PEC), majority owned by the Aga Khan Fund for Economic Development (AKFED)
Assessors	Joerg Hartmann PhD, Accredited Lead Assessor, Sustainable Water & Energy LLC Zaglul Khandkar, Accredited Assessor, SMEC Nur Khairin Binti Bujang, Provisionally Accredited Assessor, Sarawak Energy Berhad (SEB) Mohd. Firdaus Bin Ibrahim, Provisionally Accredited Assessor, SEB
Observers	HSS certification assessment: - Alain Kilajian, Senior Sustainability Specialist, IHA - Daryllynn Chung, Provisionally Accredited Assessor, SEB - Dayang Zanariah Abang, Provisionally Accredited Assessor, SEB Validation of gap closures: - Alain Kilajian, Senior Sustainability Specialist, IHA
Assessment objective	Certification of the Sebzor Hydropower Project against the Hydropower Sustainability Standard
Assessment dates	On-site assessments: - August 9-18, 2021: HESG assessment - September 30 - October 5, 2022: HSS certification assessment - June 3-8, 2023: Validation of gap closures
Assessment report date	October 10, 2023
Prepared for	PEC
Limitations of the assessment	The 2023 exercise to validate the closure of some of the gaps identified in 2022, did not constitute a full re-assessment. In 2023, the assessors reviewed only evidence related to the gaps that had been resolved (documents listed at the end of Annex 2). All other information in this report is valid as of the time of the 2022 assessment. The project has since moved into the implementation stage.

B. Project Details

Project name	Sebzor Hydropower Project (HPP) Tajikistan
Country	Tajikistan
Location	Shokhdara River in the south-western part of Gorno-Badakhshan Autonomous Oblast (GBAO) region of Tajikistan, upstream of the regional capital Khorog, close to the Afghan border
Purpose	Increased supply and reliability for the existing regional grid operated by PEC, and extension of grid to additional communities in GBAO as well as in Badakhshan province in Afghanistan
Developer / Owner	Pamir Energy Co. (PEC)
Financer(s)	Direct financing for Sebzor HPP from EU and BMZ through KfW, embedded into a wider financing framework with contributions from the Aga Khan Fund for Economic Development (AKFED), World Bank Group, SECO, USAID and the Government of Tajikistan
Installed capacity (MW)	11 MW
Construction start date (planned or actual)	Financing approved and negotiations with contractor ongoing; preparatory works started in 2020
Commercial operations date (planned or actual)	Planned for end-2024
Annual average generation (GWh / year)	77.6 GWh/a
Associated infrastructure: road(s) (length)	No additional roads, as infrastructure is directly alongside the Khorog-Sebzor road; some road sections and bridges will be strengthened/replaced
Transmission lines and sub-stations (names, lengths and capacities)	18 km line between a 110/35/6.6kV substation next to the Sebzor HPP and a 110/35kV substation in the town of Khorog, next to the existing Khorog HPP
Total cost (USD m)	57.5 million (without transmission)
Annual operating costs (USD m)	Sweco estimate of 1 UScent/kWh, which would result in ~ USD 776,000/a for 77.6 GWh/a
Project development cost not including transmission (USD m)	USD 57.5 m (Fichtner June 2021, at current 2021 exchange rate)
Transmission costs for project development (USD m)	USD 9.5 m (SECO), including other project components
Specific investment cost (USD m / MW)	USD 5,192/kW (without transmission)
Levelised energy cost (USD / kWh)	Not calculated
Dam type	Concrete diversion weir
Dam height (m)	8.5 m (above lowest point in foundation)
Dam length at crest (m)	80 m
Units (number, type, MW)	3 x 3.9 MW Pelton units
Reservoir area at Full Supply Level (FSL) (km ²)	5 ha (~0.5 ha more than original water surface)
Average net head at FSL (m)	110.2 m
Average flow (m ³ / s)	27.2 m ³ /s

Design flow (m ³ / s)	12.0 m ³ /s
Load factor	80%
Number of physically displaced households	17 households due to HPP; none due to TL
Power density (W / m ²)	11 MW / 0.5 ha = 11,000,000 / 5,000 m ² = 2,200
Emissions intensity (gCO ₂ e / kWh)	Not relevant
Contacts / website	www.pamirenergy.com



Figure 1 – Administrative boundaries and major roads and rivers in Tajikistan and its neighbours. The eastern region of Tajikistan is the Gorno-Badakhshan Autonomous Oblast (GBO). The GBO has an area of 64,200 km² with approximately 230,000 inhabitants, resulting in a very low population density of 3.6/km². Khorog is the administrative center of GBO with approximately 30,000 inhabitants. The Pamir Highway as the only major road in GBO connects Tajikistan’s capital Dushanbe to Khorog, Murghab, and Osh in Kyrgyzstan. The Afghan province to the west of GBO is Badakhshan, with the capital of Fayzabad.



Figure 2 – Topography, natural features and protected areas of eastern Tajikistan and neighbouring countries, including glaciers (in blue). The map shows the confluence of the Shokhdara River with the Gund River in the town of Khorog. Pamir Energy’s two main existing HPPs are located on the Gund River (Khorog HPP within the town limits of Khorog, and Pamir-1 HPP upstream). The planned Sebzor HPP will be located on a tributary of the Gund, the Shokhdara River, between Khorog and the district center of Roshtkala. After passing through the town of Khorog, the Gund flows into the Panj River, which forms the border with Afghanistan for several hundred kilometers. The Panj and the Vakhsh rivers form the Amu Darya, the largest river in Central Asia and main source of the Aral Sea.

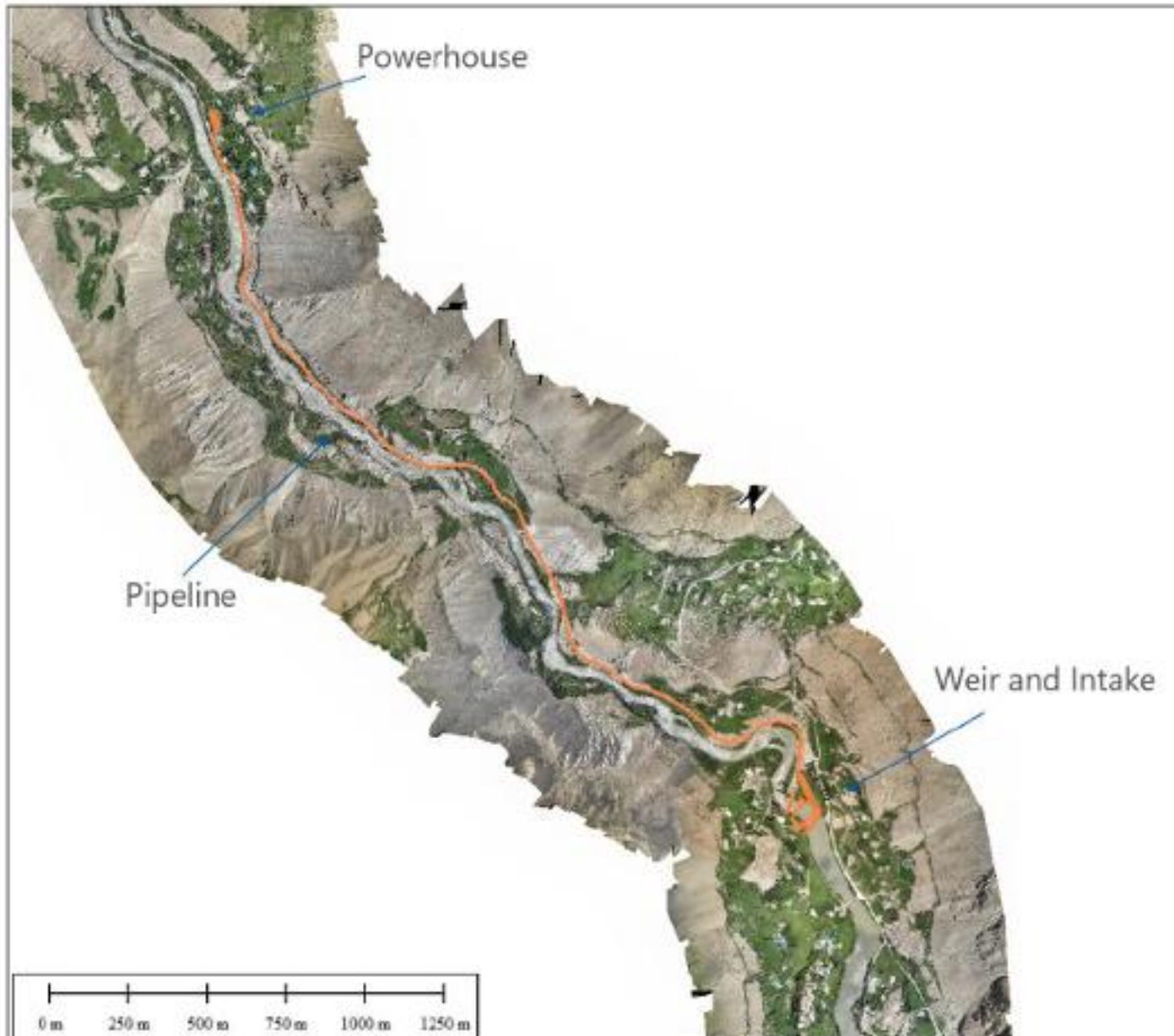
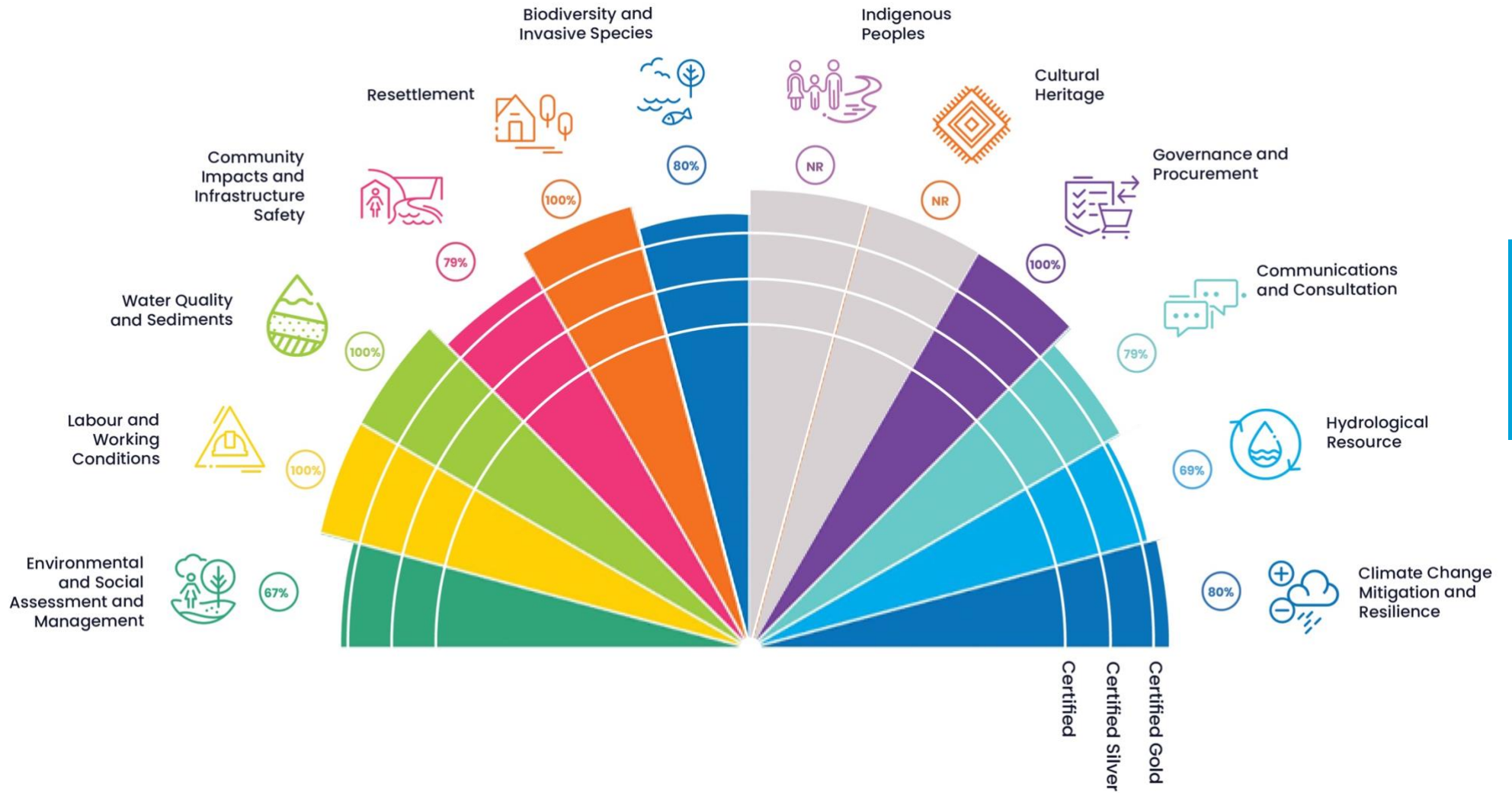


Figure 3 – Sebzor project layout according to updated draft feasibility study (Fichtner 2021). The 3 km pipeline between the intake and the powerhouse will be laid into the road on the right bank of the Shokhdara River. From the substation next to the powerhouse, an 18 km 110 kV transmission line will run to a new substation at Pamir Energy's main operational centre in Khorog, next to the Khorog HPP.

C. Minimum Requirements

There are no gaps against minimum requirements.

D. Results diagram



E. Advanced Requirements

	Sections											
	1. Environmental and Social Assessment and Management	2. Labour and Working Conditions	3. Water Quality and Sediments	4. Community Impacts and Infrastructure Safety	5. Resettlement	6. Biodiversity and Invasive Species	7. Indigenous Peoples	8. Cultural Heritage	9. Governance and Procurement	10. Communications and Consultation	11. Hydrological Resource	12. Climate Change Mitigation and Resilience
TOTAL NUMBER OF REQUIREMENTS	12	3	7	14	3	5	5	5	11	14 ¹	13	10
NUMBER OF REQUIREMENTS MET	8	3	7	11	3	4	n.r.	n.r.	11	11	9	8
PERCENTAGE OF REQUIREMENTS MET	67%	100%	100%	79%	100%	80%	n.r.	n.r.	100%	79%	69%	80%
PROPOSED CERTIFICATION LEVEL	Gold											

Note:

- A project must meet all Minimum Requirements on all relevant sections to achieve HS Certified label.
- To receive the HS Silver label, projects must meet at least 30% of the Advanced Requirements on each relevant section.
- To receive the HS Gold label, projects must meet at least 60% of the Advanced Requirements on each relevant section.

¹ Since one requirement is not relevant, the total number has been reduced from 15 to 14.

F. Environmental and Social Action Plan (ESAP)

(Gaps that have been resolved since the previous assessment were removed from the ESAP.)

Advanced Requirements							
Section	Requirement sought	Action(s)	Responsibility	Indicator of achievement	Timeframe		
					<12 months	12-24 months	>24 months
1	The E&S impact assessment lacks broader considerations, such as basin-wide water resource assessment and management; the cumulative impact of existing and potential projects in the basin; needs and alternatives; impacts resulting from the supply chain, and the role and capacity of third parties.	Since it is not effective to update the ESIA at this stage, this will be taken as a lesson learnt for PEC's next hydropower project.	PEC	ESIA for next HPP			x
1	The E&S impact assessment is not grounded in a thorough analysis of regional social and environmental needs, policies and plans.	Since it is not effective to update the ESIA at this stage, this will be taken as a lesson learnt for PEC's next hydropower project.	PEC	ESIA for next HPP			x
1	The E&S impact assessment did not cover issues related to sustainable river basin design and integrated water resources management.	Since it is not effective to update the ESIA at this stage, this will be taken as a lesson learnt for PEC's next hydropower project.	PEC	ESIA for next HPP			x
1	The lack of a documented analysis makes it impossible to confirm that siting and design are optimal from a sustainability perspective.	Since it is not effective to update the ESIA at this stage, this will be taken as a lesson learnt for PEC's next hydropower project.	PEC	ESIA for next HPP			x
4	There is a lack of a comprehensive analysis covering all upstream risks.	Work with AKAH to expand upstream geohazard analysis.	PEC	Upstream geohazard mapping	x		
4	There are limited baseline data for most local residents (those indirectly affected) and no clear methodologies in the ESMPs to monitor and track changes in social conditions.	Expand the data included in the Gap Resolution Report and produce a social baseline report with the same indicators that will be tracked through the monitoring program, and an explanation why these are expected to be influenced by the project. Consider also, for comparative purposes, to include an area	PEC	Social baseline report	x		

		where no project impacts are expected (e.g. a group of similar villages in a different valley). This would allow to clearly differentiate between changes due to the project and changes due to general developments in the area.					
4	There are no comprehensive safety plans, processes and equipment in place, for early warning, emergency preparedness and emergency response.	Work with AKAH to put in place a comprehensive safety system, as soon as possible.	PEC	Design of comprehensive safety system	x		
6	There has been no systematic assessment of potential positive biodiversity impacts and how these could be enhanced.	Contact local biodiversity stakeholders such as the Pamir Biological Institute and identify priorities for conservation that could be supported by PEC and the Sebzor project.	PEC	Report on options	x		
10	It cannot be determined whether the current reporting is addressing areas of high interest.	Conduct a survey among a representative sample of stakeholders about their interests, and design public reporting formats accordingly.	PEC	Survey results and re-designed reporting formats	x		
10	There is a lack of disclosure of a project-specific climate resilience assessment.	Conduct a project-level or broader PEC-level assessment (see below, based on an analysis of future hydrology) and publish results.	PEC	Climate resilience assessment	x		
10	Minor non-conformances have been identified where several grievances were not acknowledged within a specified timeline.	Ensure that the team dealing with grievances has enough resources to respond to grievances in a timely manner.	PEC	Grievance log with response times	x		
11	There is a lack of analysis of future hydrology.	Work with UAC to conduct analysis of future hydrology.	PEC	Future hydrology assessment	x		
11	There has been only limited analysis of hydrological variability and uncertainty.	See above. Analysis of future hydrology should explore variability and uncertainty.	PEC	Future hydrology assessment	x		

11	There has been no assessment of the impacts of broader long-term hydrological changes on generation.	See above. Analysis of future hydrology should estimate potential impacts on generation, preferably at the level of the entire PEC portfolio.	PEC	Future hydrology assessment	x		
11	The project's design as a run-of-river project with high load factor provides very limited flexibility for generation operations.	Explore other opportunities for PEC to ensure flexibility of generation operations, e.g. by adding BESS, more storage hydropower, or other resources to its generation portfolio.	PEC	Options report at the level of PEC's supply area	x		
12	The lack of a detailed hydrological model precludes the integration of climate models to undertake an analysis of sensitivity to climatic change.	See above. Analysis of future hydrology should explore the impacts of different climate scenarios.	PEC	Future hydrology assessment	x		
12	The project's climate resilience cannot be quantified with any degree of certainty.	See above. Analysis of future hydrology should be used to assess resilience, primarily in terms of generation and financial performance, power supply reliability, dam safety/geohazards, and environmental and social impacts.	PEC	Future hydrology and climate resilience assessment	x		

1. Environmental and Social Assessment and Management



Scope and Principle	
This section addresses the assessment and planning processes for environmental and social impacts associated with project implementation and operation throughout the area of impact of the project, the contribution of the project in meeting demonstrated needs for water and energy services, and the evaluation and determination of project siting and design options. The principle is that environmental and social impacts are identified and assessed, and that avoidance, minimisation and mitigation measures are designed and implemented.	

Background	
Identify the main environmental and social issues during implementation	Land acquisition and physical displacement of a small number of HH; temporary construction disturbances; local employment and procurement
Identify the main environmental and social issues during operation	Minor downstream flow changes; minor increases in traffic and direct employment; visual impacts; increased security of electricity supply and thereby, reduced consumption of firewood; affordability of tariffs (which have not been increased for 12 years - at USc 2.75/kWh for the regular residential tariff - and have protections for low-income customers, primarily during the winter heating months)
Identify the environmental regulator	Committee for Environmental Protection (CEP) and its regional and district-level offices
Identify other regulators (e.g. on land, water use, Indigenous Peoples)	Local and regional government agencies with responsibilities for various issues; the district environmental office for example issues permits for gravel extraction, cutting of trees, and use of water resources
Summarise the ESIA regulatory requirements	Small HPPs with a capacity of less than 30MW are in Category B (II); category B projects are planned activities that have a predictable impact on the environment. Required documentation includes an assessment of the various types of environmental impact, such as air emissions and discharges into water sources, the formation and disposal of solid and liquid wastes, noise, and other types of impacts. A number of other laws and regulations apply.
List the key license conditions/voluntary commitments	License conditions refer to general adherence to environmental regulations; solid waste collection and disposal; fish protection barriers at the intake; prevention of water pollution; environmental management plans; and payments of environmental fees.
Total environmental and social costs in project development, including resettlement costs	USD 2.72 m (Fichtner June 2021)
Description of the non-physical cultural heritage in the project area	Pamiris (the inhabitants of the Pamir Mountains in GBAO) are a minority in Tajikistan, with distinct linguistic and cultural traditions and mostly followers of Ismaili Shia Islam.
Other relevant information	E&S assessment and management of the Sebzor HPP and other PEC infrastructure is primarily guided by frameworks agreed with and supervised by financing institutions. There are a number of common documents for the components financed by World Bank, KfW/EU, and SECO.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
Assessment					
Assessments of project environmental and social impacts	✓	After preliminary reviews of impacts in the pre-feasibility and initial feasibility stages, full ESIA for the Sebzor HPP and the associated transmission line to Khorog were finalized during 2019. Additional studies and plans for sensitive issues such as resettlement, aquatic biodiversity and traffic management were subsequently prepared. ESMPs for both the Sebzor HPP and the Sebzor-Khorog transmission line were also prepared in June 2022, and for Sebzor updated in April 2023.	The assessment takes broad considerations into account, and both risks and opportunities	✗	The assessment of the project-related environmental and social impacts focuses on the immediate project footprint area with little consideration of the upstream and downstream areas. The assessment addresses the critical environmental and social risks, such as geohazards, resettlement, livelihood restoration, and traffic management. However, it lacks broader considerations, such as basin-wide water resource assessment and management; the cumulative impact of existing and potential projects in the basin; needs and alternatives; impacts resulting from the supply chain, and the role and capacity of third parties. This is a significant gap against advanced requirements.
Assessments address:					
• project implementation	✓	The ESIA address potential impacts and mitigation measures during the construction stage.			
• project operation	✓	The ESIA address potential impacts and mitigation measures during the operation stage.			
• associated facilities	✓	Separate ESIA have been prepared for the Sebzor-Khorog TL and for other PEC infrastructure.	The social impact assessment incorporates assessment of human rights	✓	Although no explicit human rights impact assessment has been prepared for the Sebzor project, the assessments cover issues such as the rights of people involuntarily displaced, and labour rights. The project must comply with the human rights obligations required by
• cumulative impacts	✓	The sections of the ESIA dealing with cumulative impacts are very short and only deal with cumulative impacts within the Shokhdara valley. The impacts of multiple HPPs on the			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		regional river network (e.g. potential fragmentation of both the Gund and Shokhdara rivers) and the combined impacts with other foreseeable changes in the region (e.g. infrastructure, demographic, economic and climate change) are not covered. Given the scale and scope of impacts, this is considered a non-significant gap at the level of minimum requirements.			government and donors. PEC's Labour Management Procedures establish principles such as non-discrimination and no child labour.
• role and capacity of third parties	✓	There is some description of legal responsibilities but no assessment of resources and experience of third parties such as regulators, contractors and consultants. The E&S Monitoring Plan foresees no monitoring by regulators. While this is a gap, it is considered non-significant because 1) contracts for contractors will include E&S requirements following the World Bank ESF, 2) there is regular reporting to and relatively close supervision by the banks/donor agencies, who will act as backstop.			
• impacts associated with primary suppliers	✓	There is no description of supplies and associated impacts in the ESIA's. This is considered a non-significant gap because 1) labour risks are required to be assessed, monitored and changes required if necessary, according to WB ESF, if client has			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		significant control, 2) the quarry is owned by PEC and if additional supplies of aggregates are required, they will come from authorized sources or the impact will be assessed and mitigated as required, 3) the quantities of major materials at worksites are monitored, among other things for calculating carbon emissions.			
Assessments have been prepared using appropriate expertise	✓	The expertise has been adequate given the scale and scope of impacts. The absence of specific expertise on some issues (e.g. public health, cultural heritage) is acceptable given the low level of impacts.			
A baseline has been established and well-documented for the pre-project condition against which post-project changes can be compared	✓	Baseline studies have been conducted. The 2021 HESG assessment identified a number of gaps (e.g. social data on indirectly affected people, training needs for local people to match them with employment opportunities, priority needs of local communities, mapping of cultural heritage sites); some of these were subsequently closed in 2022 prior to the certification assessment.	The assessment is based on dialogue with government planners, policy makers and key stakeholder groups	✓	As described in section 10, during the ESIA stage, PEC consulted key stakeholders, including project-affected communities and donor organisations. PEC also consulted government organisations at the local and national levels and obtained relevant permits to commence the construction works.
Assessment of needs for water and energy services	✓	While these needs have not been specifically assessed, there is sufficient context information to conclude that there is adequate	The assessment shows a strong emphasis on social and environmental needs, policies and plans, including the need	✗	Whilst the assessment meets applicable local and international requirements, it is not grounded in a thorough analysis of regional social

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	availability of water (in particular during the summer irrigation months), and hence no need for seasonal water storage as part of the HPP, as well as high energy needs both on the Tajik and the Afghan side of the border. However, there are limits to the ability to pay for power in the region.	for sustainable development of the river basin and integrated water resource management	and environmental needs, policies and plans. For example, local infrastructure development plans, the need to restore vegetation lost in recent years, the need to create income opportunities for the wider community in the Roshtkala valley, and other water uses along the Shokhdara River are only mentioned in passing. The broader Aga Khan Development Network (AKDN) is active across multiple sectors in GBAO, but the ESIA was not used as an opportunity to embed the project in these wider initiatives. This is seen as a significant gap against the advanced requirements.
Assessment of options to meet water and energy needs	✓ The Tajikistan power sector master plan shows significant demand growth in GBAO but no specific supply options. The project's design with a high capacity factor helps with baseload supply during winter, the most critical time with high power demand and low river flows. PEC has undertaken some informal comparisons of generation options, and the location of the Sebzor HPP in the Shokhdara valley provides some redundancy regarding the exposure to geohazards and diversification of supply. The project is also a part of the draft Tajikistan Midterm Development Program for 2021-2025. The ESIA contains only a superficial discussion of alternative options. The feasibility studies did not analyse power and water demand, but relied on client data. The comparison of options appears to have been based on narrow criteria (avoidance of		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		supply interruptions), and there is no other information to confirm that Sebzor is a preferred option with relatively low costs and low impacts. Because of the important role of geohazards for supply security, this is considered acceptable and not a significant gap. However, it is recommended that PEC undertake a systematic study to compare further expansion options.			
Assessment of national and regional policies and plans relevant to those needs	✓	See above. There is a high level of uncertainty over future policies and plans for Badakhshan province, including Badakhshan Energy's concession. The alternative, if there is a temporary supply surplus in GBAO, is supply to the main Tajikistan grid, as the interconnections are being strengthened.			
Social and environmental considerations, including regulatory considerations, have been analysed at an early stage in preliminary project designs and options	✓	According to partial data available, Roshtkala district has average poverty rates, but deficits in infrastructure which make it a high priority for investments. The Shokhdara valley may be less exposed to natural disasters than the Gund valley, where most of PEC's infrastructure is concentrated. Along the Shokhdara valley, there have been several comparisons of left and right bank options, which took E&S	Options take into consideration sustainable river basin design and integrated water resources management	✗	The assessment did not cover issues related to sustainable river basin design and integrated water resources management, which is a significant gap against the advanced requirements (see also section 11).

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		considerations (particularly land acquisition) into account.			
Management					
Environmental and social management plans and processes have been developed	✓	PEC has an E&S Policy based on AKFED and IFC requirements. PEC has company-wide processes for a number of issues, e.g. hazardous transformer oil is disposed of through a specialised firm in Dushanbe. The ESIA's contain chapters on planned mitigation measures, and three types of ESMPs, i.e. project-wide ESMP, site-specific ESMPs and construction ESMP, are prepared for the Sebzor HPP and the transmission line projects. A range of specific processes for the Sebzor project have also been developed e.g. for compensation payments, grievance mechanisms, and waste disposal.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	The ESMPs are comprehensive and include a number of monitoring mechanisms and methodologies (parameters, locations, frequency, reporting responsibilities etc) to ensure that the ESMPs' environmental and social objectives are achieved. A comprehensive monitoring program is under development to ensure that objectives are achieved, and that in case of non-conformances and non-compliances, appropriate remedial actions are adopted. An ESMP implementation budget is available. Geohazards are considered the most critical risks for the project. The Disaster Risk Reduction (DRR) unit of PEC has developed a comprehensive risk identification system to identify areas prone to various climatic and non-climatic natural phenomena such as avalanches, rockfalls and landslides. Ongoing programs are in place to collect remotely sensed data and on-site data that enable early identification of any threats to infrastructure, workers and communities, and take preventive
Plans address project implementation	✓	The current focus of the ESMPs and E&S processes is on the implementation stage. Local contractors see PEC's environmental, health and safety requirements as tough, significantly beyond typical requirements in government-funded infrastructure projects.			
Plans address project operation	✓	Some components of the ESMPs – such as environmental flows - also address the operations stage, some			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		can be continued from the implementation stage, and for others which are still missing, there is sufficient time until project commissioning.			measures to minimise damage to infrastructure and lives. Protection measures, such as fences and buffer zones, are being installed (for example, above the proposed powerhouse to offer enhanced resilience to rockfall). This is seen as the best available approach given that rockfall, landslides and avalanches are prevalent in GBAO, and there are limited opportunities for PEC to protect its infrastructure against these natural phenomena.
Plans have been prepared using appropriate expertise (internal and external)	✓	The expertise has been generally adequate given the scale and scope of impacts (see above under Assessment). Most of the ESIA/ESMP documents have been prepared by external consultants, but PEC's staff is well aware of the content, has worked with the external experts, and has experience with implementing similar plans in other projects.	Plans are embedded within an internationally recognised environmental management system which is third party verified, such as ISO 14001	✓	PEC's E&S policies commit to integrating AKFED's ESMS into PEC's processes. Additional commitments are made to integrate development partners' E&S requirements into PEC's processes. Because most of PEC's investment projects are donor-funded, with different requirements for each donor, there is a need to harmonize and consolidate processes into one E&S Management System, with clear responsibilities. PEC is developing such a corporate-level ESMS and was recently certified against ISO 14001:2015.
Plans address all key social and environmental issues	✓	Most identified social and environmental impacts have mitigation plans already developed, in draft form, or clearly identified as deliverables for contractors.			
Plans address construction-related waste, noise, air quality, land disturbance and rehabilitation	✓	These issues are addressed in the ESIA/ESMP and contractors are required to submit related plans and method statements before starting	Independent review mechanisms are utilised	✓	PEC contracts specialised organisations (e.g. Pamir Biological Institute of the Academy of Sciences) and individual specialists to provide

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	works. The district only has an informal dump site but solid waste disposal in Khorog town is being significantly improved with EBRD/SECO support. Construction waste from the preparatory works (administrative building building) was partially recycled and otherwise buried at a site indicated by local authorities, which is acceptable as it did not include hazardous waste. For the upcoming major contracts, contractors will develop and the client will approve and supervise waste management plans.		technical support. Additionally, there is detailed donor review of project documents including E&S issues.
Environmental and social impact assessment and key associated management plans are publicly disclosed	✓ Online disclosure through World Bank as well as hardcopies displayed in local communities. Specific plans such as the RAP and the Compensation Payment Mechanism have also been shared with directly affected people and members of implementation committees such as local government officials. The PEC website was not functional during the on-site assessment but will be restored and also used for disclosure. PEC could benefit from consolidated public reporting across all projects and operations, e.g. through an annual report including sustainability issues		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
An optimisation process has been undertaken to assess the project siting and design options	✓	The Sebzor project will be the first project on the Shokhdara river, which can provide some redundancy in case other operating/planned HPP on the Panj River are affected by geohazards. Siting and design of the main project components, including intake, weir, penstock and powerhouse, considered environmental and social aspects. For example, the right-bank option was preferred to minimise population displacement and minimise the construction footprint; the desander is designed to minimise frictional damage to turbines; flap gate and flush gates are provided to remove ice sludge and sediment from the weir; and the penstock is to follow the existing road alignment to minimise the construction footprint.			
Outcomes					
Environmental and social plans avoid, minimise and mitigate negative impacts	✓	The E&S impacts of the project are limited and generally well-managed, The more detailed action plans submitted by contractors to date are adequate, for the type of construction included in the preparatory or enabling works, if enforced consistently.	Environmental and social plans avoid, minimise, mitigate and compensate negative project impacts	✓	The ESMPs are comprehensive, and the updated project-level ESMP and the site-specific ESMP for the civil contractor TGEM have sufficient detail, including regarding continued monitoring and adaptative management.
The strategic fit of the project with needs for water and	✓	The Sebzor HPP fits well into PEC's strategic expansion plans, which aim	Plans provide for enhancements to pre-project	✓	Project preparation has generally focused on managing negative

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
energy services, and relevant policies and plans can be demonstrated		for a stepwise increase in both generation capacity and supply area.	environmental or social conditions or contribute to addressing issues beyond those impacts caused by the project		impacts, not on enhancing pre-existing conditions. However, the Community Development Plan (CDP, see section 4) includes some improvements of social infrastructure in affected villages.
The final project siting and design has responded to environmental and social considerations	✓	Alternative alignments of HPP and TL on both riverbanks have been compared and E&S considerations have influenced siting and design choices.	The project is one of the priority options to address demonstrated needs	✓	The Sebzor site was identified as a potential HPP site during Soviet times. Subsequently, it was compared against other possible sites and eventually selected as the preferred option based on several criteria, including power generation capacity with a relatively short penstock, less adverse climatic conditions, availability of land suitable for development, accessibility of the site, less prone to avalanches providing enhanced infrastructure resilience, and the proximity to potential consumers.
The project can pay for social and environmental plans and commitments	✓	The project budget as planned in the feasibility study has reserved approximately 5% for E&S social measures; and both PEC and donors would be likely to provide additional funds if needed. The World Bank 2019 appraisal report for the Rural Electrification Project contains historical and projected balance sheet and cash flows for PEC, which indicate a solid financial basis.	The final project siting and design is optimal with respect to sustainability considerations for siting and design	✗	While there are some plausible arguments for the siting and design of the Sebzor project, including from a sustainability perspective, these are not based on a systematic masterplan at the system level and comparison of alternatives at the project level. The lack of a documented analysis makes it impossible to confirm that siting and design are optimal, which is a

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			significant gap against advanced requirements.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	8

Summary of findings and other notable issues
The Sebzor HPP is part of PECs ongoing investment program funded by international donors, and ESIA and ESMPs have been developed and approved by government and donors. The environmental impacts are relatively minor due to the small footprint of the project (small reservoir, low diversion weir, and limited land disturbance as the pipeline is laid into the existing roadway) and limited biodiversity values. The main social impacts are related to physical and economic displacement of a small number of families, disruptions during construction, and positive socio-economic changes due to increased employment and power supply.

Relevant Evidence	
Interviews:	B4, B5, B6, B7, B10, B24, B28, B29
Documents:	1, 3-7, 15, 17-26, 34, 37, 38, 46, 47, 56, 57, 59, 64, 66, 69 -73, 76- 82, 91, 92, 103-110, 115
Photos:	1, 2, 8, 25, 26, 30, 35, 39, 67, 77, 80-90, 95, 96, 119

2 Labour and Working Conditions



Scope and Principle	
This section addresses labour and working conditions, including employee and contractor opportunity, equity, diversity, health and safety. The principle is that workers are treated fairly and protected.	

Background	
Labour requirements during implementation (full-time equivalent)	<p>For the hydropower project (HPP):</p> <ul style="list-style-type: none"> ● According to ESIA, 250-300 workers employed by contractors, with 150-200 local and 75-150 nonlocal workers ● According to PEC Labour Management Procedures, 475 workers employed by contractors (including road and bridge works), plus 5 PEC staff <p>For the transmission line (TL): ~40 workers employed by contractors, many or most local, plus 4 PEC staff</p>
Labour requirements during operation (full-time equivalent)	21 permanent PEC staff (including 8 female staff)
Applicable key human resources regulations	2016 Labour Code
Applicable key occupational health and safety (OH&S) regulations	Labour Code as well as 2009 Law on Occupational Safety
Identify the regulator for labour law and OH&S	Inspectorate for Industrial Safety
Other relevant information	<p>PEC has common Labour Management Procedures for all components currently financed by World Bank, KfW/EU and SECO, including the Sebzor HPP and the Sebzor-Khorog transmission line.</p> <p>There are very high rates of unemployment and underemployment in the project area, with many people migrating to work in Russia or Dushanbe. Out of the 13,453 people in working age in the Roshtkala district, 6,654 are reportedly work migrants and of the remaining, only ~3,000 are working in the formal sector (i.e. paying income taxes). The minimum salary is approximately USD 35/month and the average salary USD 60/month, while salaries for workers on the Sebzor HPP can be approximately USD 200/month, based on performance.</p>

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
Assessment			
Assessment of human resource and labour management requirements	✓ PEC currently has a total of 780 permanent full-time staff operating the power system in GBAO, and has significant experience with identifying labour-related issues through almost 20 years of the concession period and multiple investment projects. 146 staff are female, with efforts to review and increase female participation, including in non-traditional roles such as meter reading. A consultant is currently working with PEC to identify opportunities for improvement of HR policies. Most of the staff are Tajik, with only a small number of expatriates working as consultants. Most workers during project implementation will also be locals. Labour requirements for the project are addressed in the ESIA's and in PEC's Labour Management Procedures.	The assessment takes broad considerations into account, and both risks and opportunities	✓ PEC's management continually assessed human resources issues. PEC recruits skilled local staff both from GBAO and outside GBAO to meet their skill demand. When particular skills are not available, PEC hires expatriate consultants. The Sebzor leadership team includes a number of staff who are from GBAO and familiar with the cultural and political context of the region, which is advantageous for the project to address environmental and social issues. PEC is considered one of the region's major employers, and staff interviews indicate that PEC/project staff are satisfied with the working conditions. Staff performance is closely monitored, and remedial actions taken as and when necessary.
The assessment includes project occupational health and safety issues, risks, and management measures	✓ OH&S risks on the Sebzor HPP (which involves no high-risk components such as tunnels, surge shafts, or high dams) are primarily normal risks associated with smaller-scale civil works. The transmission line will involve some work in steep terrain. Geohazards have been assessed (see section 4). Risks related to the Covid-19 pandemic have been assessed and PEC has a company-wide Covid-19		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		management plan in place. The impact of Covid-19 have been limited as the preparatory works have included a limited number of workers, all of which were local; infection rates in the region appear relatively low; and basic precautions have been taken.			
Management					
Human resource and labour management policies, plans and processes have been developed for project implementation	✓	<p>PEC has HR Regulations and a well-developed program for OH&S in construction projects, led by the corporate HR and Health and Safety department. New staff are required to bring health certificates and undergo annual health checks. An internal, confidential grievance mechanism for PEC staff is under development.</p> <p>The Sebzor HPP E&S team also supervises health and safety on work sites. Specific Ministry of Energy safety rules must be followed. A safety officer and a trained nurse were on site, during the enabling works contract. Some minor inconsistencies (e.g. regarding use of PPE) were observed during the site visits. Detailed labour management procedures for the investment projects have been developed which include a review of applicable regulations, safety risks, processes and responsibilities. Tender documents,</p>	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	<p>Incident reporting systems and systematic grievance redressal mechanisms are also in place. No significant health and safety incidents have been reported since the commencement of the enabling and other construction activities (linked to the transmission line, the substation and the river diversion works). There are no reported incidents of discrimination or harassment, which indicates that existing policies are working well. A training program to create awareness regarding gender-based violence is in place.</p> <p>A code of conduct has been developed to protect workers' rights and ensure ESHS compliance. It is included in the tender documents (e.g. ESHS specifications in the electro-mechanical tender package) as well as in the recently developed ESMP. However, it is unclear what overarching mechanisms and</p>

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		<p>contracts, monitoring and reporting include labour issues.</p> <p>A Code of Conduct will be required for the workers of the main contractors, and a Covid-19 prevention plan will be put in place (not considered to be relevant for the local contractor for preparatory works). Workers are aware of and have used the project's grievance mechanism (e.g. in case a formal contract was delayed, or PPE was incomplete). They can also address these to the Ministry of Labour's Inspectorate, which may visit to check compliance. Government agencies also provide other supervision (e.g. social security and income tax payments by contractors for staff).</p>			<p>monitoring program PEC will put in place, to ensure the implementation of such a code of conduct.</p> <p>Adequate staff accommodation is available to the Sebzor project staff at the Sebzor administration building ('base camp'), and the construction of a permanent construction camp is ongoing.</p>
Human resource and labour management policies, plans and processes have been developed for project operation	✓	PEC will apply the same policies, plans and processes for the Sebzor HPP staff as for its existing workforce in other HPPs. These include, for example, special protections such as longer leave for workers employed in hazardous roles. PEC is one of the few companies in GBAO that provides health insurance to its employees.			
These plans cover all labour management planning components, including those of contractors, subcontractors and intermediaries	✓	The Labour Management Procedures cover PEC, contractor and sub-contractor workers; no use of intermediaries is planned. Where necessary PEC will intervene to			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
		enforce labour protection for contractor and subcontractor workers.			
Outcomes					
There are no identified inconsistencies of labour management policies, plans and practices with internationally recognised labour rights	✓	Tajikistan has ratified all fundamental ILO conventions, and these are reflected in the Labour Code, although implementation may be inconsistent. PEC maintains high labour standards and is considered an employer of choice in the region, with above-average salaries, benefits and retention rates. Its Labour Management Procedures establish principles such as non-discrimination and no child labour. Employees are organized in a labour union and have elected representatives. No significant accidents have occurred to date in the Sebzor HPP. The last major accident was in 2002, when 4 PEC staff died in an avalanche.	Labour management policies, plans and practices are demonstrated to be consistent with internationally recognised labour rights	✓	Overall, all labour issues associated with logistics, health, security and safety are managed satisfactorily. Labour management policies, plans and practices are consistent with the applicable internationally recognized labour rights.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	3

Summary of findings and other notable issues
The Sebzor HPP and transmission line will be implemented by a workforce of several hundred, mostly local workers. PEC has a large permanent workforce, significant experience with temporary workforces for investment projects, and well-developed processes for labour management and OH&S. PEC is one of the most important and attractive employers in the GBAO.

Relevant Evidence	
Interviews:	B4, B8, B9, B10, B11, B13, B25
Documents:	9, 10, 11, 16-19, 43, 45, 54, 78-82, 95, 103, 105, 106
Photos:	46-48, 82-86, 88-92, 97, 98, 102-106

3 Water Quality and Sediments



Scope and Principle	
This section addresses the management of water quality, erosion and sedimentation issues associated with the project. The principle is that water quality in the vicinity of the project is not adversely impacted by project activities, and that erosion and sedimentation caused by the project are managed responsibly and do not present problems with respect to other social, environmental and economic objectives.	

Background	
Water Quality	
Description of water quality	High turbidity, untreated water not suitable for domestic purposes
Key water quality issues	Significant bacterial pollution in the Shokhdara River, especially in warm weather, primarily from return flows from irrigation channels. Settlements primarily use springs/groundwater as source for domestic and irrigation purposes, and river water is used only in exceptional cases.
Main influences on water quality	Mountain river with human and animal waste as only significant sources of pollution. The reservoir will have a very short retention time and is unlikely to influence water quality.
Sedimentology	
Key sediment issues	Very steep topography in the catchment area, with gradual erosion as well as significant sediment contributions from rockfall, landslides, debris flows, avalanches, landslide dam outburst floods, GLOFs and similar events. Some of these geohazards can be triggered by earthquakes, climate change (e.g. melting of glaciers and permafrost), and human activities. Sand for construction purposes will be extracted from the Shokhdara River; probably from 3 km upstream of weir. Aggregates for concrete will be extracted from PEC's own quarry, downstream from the Sebzor HPP on the right bank.
Sediment load (tonnes/year)	No measurements; estimated at 445 t/km ² /a or 1.69 million t/a plus ~10% bedload
Catchment area at the dam	Mountainous catchment of 3,794 km ² between 2,100 masl and 4,500 masl
Other relevant information	The reservoir and the desander in front of the intake will trap sediments, and flushing gates in weir and desander will allow flushing of sediments. Flushing will be done primarily during high flows in summer, which is also the season with the highest sediment load.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
Assessment			
Water quality issues assessment	✓ A basic assessment was undertaken in the ESIA and the biodiversity surveys, with limited sampling (from the river on 7 occasions, with different parameters), review of government data on groundwater quality in Khorog (not dated), and biological water quality surveys. Data have not been analysed for seasonal variations and pollution sources. This is a gap against minimum requirement, however this is acceptable as 1) there are limited pollution sources in the Shokhdara valley, primarily settlements and livestock, 2) most water for domestic and irrigation purposes is not taken from the river, 3) the small HPP reservoir will not impact water quality, 4) the reduced flows in the bypass reach will not increase the concentration of pollutants as there are no identified sources of pollutants in that reach, and 5) the river has a significant self-cleaning capability.	✓ The assessment takes broad considerations into account, and both risks and opportunities	Initial high level assessments were conducted during preparation through limited river water quality sampling, and additional sampling and analysis will continue through the construction and operation phase, to identify potential risks such as quality variations due to changes in flow rates, and to be able to document if water quality issues are not caused by the project. The assessment of erosion and sedimentation issues meets advanced requirements.
Erosion and sedimentation issues assessment	✓ Several assessments and surveys on erosion, sediments and geohazards have been undertaken, based on the significant experience of PEC with these issues in its concession area. These have included modern remote sensing technologies. (Floods, debris		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		flows and other geohazards have caused significant damages to PEC's infrastructure and supply interruptions on several occasions).			
Identification of erosion and sedimentation impacts that may be caused by the project	✓	Compared to the natural erosion and sedimentation processes, only minor issues are likely to be caused by the project, primarily slightly increased erosion from work sites and slightly delayed and more concentrated sediment transport down the Shokhdara River. A risk of riverbank erosion downstream of the diversion weir was identified and considered in the design. The HPP components will not be built on steep slopes. While the transmission line will be built across steep terrain, no new access roads are required, and it is unlikely that foundation works will cause significant erosion or trigger landslides. (Other factors such as existing irrigation canals - which can make landslide-prone slopes more unstable - are considered to have a greater impact on geohazards.)			
Identification of erosion and sedimentation issues that may impact on the project	✓	The feasibility study determined hazard levels up to 'very high' levels for the headworks, waterway and powerhouse. The most recent detailed assessment of geohazards was undertaken by the Aga Khan Agency for Habitat (AKAH) in 2020,			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		which identified 7 active landslide areas in the project area. In some areas, landslides, debris flows, rockfall and avalanches could reach populated areas, or the Shokhdara River and its tributaries, potentially affecting project infrastructure or creating natural dams. Geohazards can also add significantly to the sediment load in the river system, requiring increased flushing operations.			
An understanding of the sediment load and dynamics for the affected river system	✓	A preliminary understanding has been achieved through limited measurements and empirical models. As the sediment load is likely to be quite variable and influenced by one-off events such as landslides, measurements might not be representative and hence, their absence is not considered a significant gap against minimum requirements. The feasibility study does not address likely patterns of sediment deposits in the reservoir. This is a gap, but it is also not considered significant, given that sediment can be flushed from the reservoir and the desander (and in cases of unexpected accumulation, mechanically removed). Additional measurements and monitoring of sediment accumulation during operations are advisable.			
Management					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Plans and processes to address identified water quality issues have been developed for project implementation	✓	Standard preventative measures are being implemented. The Sebzor HPP administrative building includes functional wastewater disposal facilities, and some resettlement homes will have septic tanks instead of the previous pit latrines. The approved contractor plans for the preparatory works include various measures to reduce potential pollution risks; contractor supervision includes checks for pollution hazards (spills, solid waste storage, etc.). This will apply equally to the main works.	Processes are in place to anticipate and respond to emerging risks and opportunities for water quality	✓	The scope of the water quality monitoring plan includes monitoring the drainage from worksites and sedimentation ponds, as well as river water upstream and downstream of the project, seasonal changes) which gives the project the information to anticipate and respond to any emerging risks and opportunities.
Plans and processes to address identified water quality issues have been developed for project operation	✓	Due to the design of the project, no specific pollution prevention measures are required other than standard preventative measures, such as adequate storage of chemicals in the powerhouse and the availability of spill kits.			
Plans and processes to address identified erosion and sedimentation issues have been developed for project implementation	✓	Sediment traps and other controls to reduce sediment run-off from work sites have been proposed in the ESIA. The approved contractor plans for the preparatory works include a Land Management and Erosion Control plan; and contractor supervision includes checks for erosion. This will equally apply to the main works. The excavated material is 1) limited in quantity, 2) some of it can be re-used (e.g. for the cofferdam), and 3) the	Processes are in place to anticipate and respond to emerging risks and opportunities for erosion and sedimentation	✓	According to the Erosion and Sedimentation Plan, monitoring stations are to be placed in 3 main areas; 1) upstream of the sand extraction point, 2) downstream of the tailrace outlet and 3) downstream of a point of potential project influence (to be determined). These stations will be designed to continuously register the sediment load of river water i.e. suspended solids), which will help PEC to

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		rest will be deposited in spoil dumps, with well-chosen locations and with proper stabilization measures planned. Some measures to reduce geohazards have already been identified and taken, such as ditches/terraces above the Upper Chagev resettlement village.			anticipate and respond to any emerging issues. PEC (through the DRR team) is working closely with AKAH to monitor and address geohazards in the upstream catchment. While this has not yet been defined through a specific plan (see also section 4), this is not seen as a gap since AKAH is the sister agency of PEC and has previously provided assistance to other HPPs owned by PEC.
Plans and processes to address identified erosion and sedimentation issues have been developed for project operation	✓	The desander in front of the intake will be periodically flushed, depending on actual accumulation of materials. Based on previous experiences PEC will monitor geohazards and take preventive measures and undertake repairs as necessary (such as after the 2015 Barsem debris flow, between the Pamir-I HPP and the Khorog HPP).			
Outcomes					
Plans avoid, minimise and mitigate negative water quality impacts arising from project activities	✓	The project design - with very short water retention time in the reservoir and adequate minimum flows in the bypass reach - minimizes potential water quality impacts	Plans avoid, minimise, mitigate and compensate negative water quality impacts	✓	Direct impacts from construction and operation (e.g. wastewater from camps, spills) are well managed, and negative impacts from the reservoir are unlikely due to the very short retention time. Monitoring makes it possible to track and measure the effectiveness of the plans.
			Plans provide for enhancements to pre-project water quality conditions or contribute to addressing water quality issues beyond	✓	The project makes a number of contributions to water quality through the improvements in sanitation for resettled households, and the CSR

Minimum Requirements		Advanced Requirements					
Requirement is met: yes (✓) or no (✗)		Findings and Observations		Requirement is met: yes (✓) or no (✗)		Findings and Observations	
				those impacts caused by the project			measures to improve water supply to villages (see section 4).
Plans avoid, minimise and mitigate erosion and sedimentation issues arising from project activities	✓	Given the small footprint of the project, standard measures to reduce erosion impacts during construction will be sufficient. Sediment transport through the bypass reach will be slightly delayed until accumulated sediments are flushed, and sediment concentration during flushing will be higher than under natural conditions, but this is unlikely to have significant impacts.		Plans avoid, minimise, mitigate and compensate erosion and sedimentation issues arising from project activities	✓		Aside from the impacts generated through construction activities identified earlier, no other issues require management for this project.
Plans avoid, minimise and mitigate erosion and sedimentation issues that may impact on the project	✓	Geohazards have been analysed through various studies and to some extent, have been taken into account in the design of the HPP and transmission line, although significant exposure to hazards remains (see section 4). There are some uncertainties around sediment accumulation in the reservoir, and the design of the HPP will require regular flushing of the headworks.		Plans provide for enhancements to pre-project erosion and sedimentation conditions or contribute to addressing erosion and sedimentation issues beyond those impacts caused by the project	✓		If the recommendations for identified landslide areas (as mentioned in AKAH's Sebzor Landslide Assessment Report) will be implemented (e.g water-proof irrigation canals on landslide-prone areas), this will help to address pre-project erosion and sedimentation conditions.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	7

Summary of findings and other notable issues
Sebzor HPP and transmission line negative impacts on erosion, sedimentation and water quality will be minor, and there will be some positive impacts on erosion and water quality. However, the project will be built in a valley with intensive natural erosion and sediment transport processes as well as geohazards. The design

Summary of findings and other notable issues	
of the project has aimed to minimize the exposure of the project to these issues. The understanding of water quality, sediment loads and geohazards will be improved over time.	

Relevant Evidence	
Interviews:	B1, B2, B4, B16, B28
Documents:	1, 2, 3, 5, 6, 7, 10, 14, 19, 28, 29, 38, 50, 79, 80, 81, 82, 83, 87, 107-110, 114, 115
Photos:	82, 85, 86, 87,93, 94, 124

4 Community Impacts and Infrastructure Safety



Scope and Principle
<p>This section addresses impacts of the project on project-affected communities, including economic displacement, impacts on livelihoods and living standards, public health impacts, and impacts to rights, risks and opportunities of those affected by the project. This section also addresses project benefits and infrastructure safety during project preparation, implementation and operation. The principle is that livelihoods and living standards impacted by the project are improved relative to pre-project conditions for project-affected communities, and that life, property and community assets and resources are protected from the consequences of dam failure and other infrastructure safety risks. This section does not address requirements that relate to physical displacement or to Indigenous Peoples, which are addressed in Section 5 and 7. Other interested parties and groups are addressed in Section 10.</p>

Background	
Community Impacts and Benefits	
<p>Description of project-affected communities and how they are affected (distinguish between directly affected vs economically displaced vs other affected communities and include number of people and households)</p>	<p>Tajikistan’s Human Development Index value for 2019 is 0.668, which ranks the country at 125 out of 189 countries and territories. The GBAO region is ranked lower than the national average on most socio-economic indicators. The project area is rural, with Khorog (a town of approximately 30,000 people and the seat of most regional institutions, including PEC) close by.</p> <p>Directly affected 74 physically and economically displaced households with a total of 553 individuals, according to the latest Progress Report (No. 4, April 2022 – June 2022)</p> <ul style="list-style-type: none"> ● 17 physically displaced (see section 5) ● 8 will lose businesses or structures other than dwellings ● 49 will lose land, crops, and/or trees ● 10 of these households are considered vulnerable ● Total land acquisition 18 ha ● 1 school in flood zone to be relocated to higher ground <p>Indirectly affected:</p> <ul style="list-style-type: none"> ● 60 houses within 100 m of project infrastructure ● Several villages (Dashtak, Barjingal, Chagev, Midensharv, Sebzor) near project area, with a total of 268 households and 1,517 individuals ● School near reservoir needs to be moved to higher ground ● 25 villages along the Shokhdara River between reservoir and Khorog, that could be affected by increased traffic ● 29 villages with a total of 9,943 individuals along the transmission line ● Households near the new substation in Khorog, adjacent to the existing Khorog HPP <p>Population planned to be served by electricity from Sebzor HPP:</p>

	<ul style="list-style-type: none"> • 227,000 people in Tajikistan • 468,000 people in Afghanistan
Agencies relevant to land acquisition	All land in Tajikistan is owned by the state. Land is assigned to individual families (for homes and gardens) while most agricultural land is assigned to ‘dehqan farms’ and divided between farmers in the area. Changes in assignments are processed by the land offices of the “Mirsaid Mirshakar” Jamoat (sub-district of Roshtkala District) and Roshtkala District; in cases of dispute land issues can be escalated to the Head of GBAO Government (governor). Land re-assignment to PEC has been approved through a Land Resolution by competent authorities, and the State Committee on Land Management and Geodesy will process the registration.
Agencies relevant to livelihood restoration and project benefits	Local, district and regional government departments. Districts typically have 5-year development plans, and the project is generally in alignment with local plans. PEC typically spends about one quarter of its profits on CSR activities.
Infrastructure Safety and Public Health	
Type of dam	Concrete diversion weir
Dam height (m)	8.5 m from lowest point of foundation
Probable maximum flood (m ³ /s)	Has not been calculated; the ‘safety check flood’ is 515 m ³ /s (1-in-1,000-years)
Design flood (expressed as estimated flood with return period)	400 m ³ /s (1-in-100-years)
Spillway capacity (m ³ /s)	The maximum flood that can be diverted over the spillway and through the flushing gates without freeboard is approx. 790 m ³ /s.
Spillway height (masl)	2,529
Headrace length (m)	Penstock length 3,110
Headrace width (m)	Penstock diameter 2.3
Headrace capacity (m ³ /s)	12
Seismicity	Significant earthquake risks as discussed in draft feasibility study (Fichtner June 2021), 475-year earthquake used in design of weir/spillway; further Seismic Risk Study proposed
Geology	In the Shokhdara valley, dominated by recent alluvial and glacial deposits
Dam safety regulatory authorities	The State Service for Supervision of Safety of Hydraulic Structures, under the Ministry of Energy and Water Resources is responsible for dam safety.
Local presence/capacity of emergency services	Contact with Fire Department established; no information on capacity
Potential safety risks in this context	Significant distance of project area from emergency services based in Khorog and Roshtkala
Degree of risk of dam failure and in what way	Significant level of geohazards in upstream area, but minimal dam breach consequences
Population at risk of dam break (locations, numbers)	Small volume of reservoir and limited exposure of people in the downstream area (houses are generally not directly on riverbank, and few people access the river); not quantified
Dam safety standards followed	Draft feasibility study indicates technical standards only for gates
Agencies relevant to dam safety	See above under regulatory authorities

Other infrastructure safety issues	Road safety, safety on and near water
Description of key public health issues	Demand on public health services, infectious diseases, noise, dust, EMF
Agencies relevant to public health	District and regional government

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
Assessment			
Community Impacts and Benefits			
An assessment of issues relating to project-affected communities	✓ Social issues in the ESIA for the Sebzor HPP and the transmission line have focused on land acquisition. Additional information on project-affected people was gathered through the preparation of the RAP and the survey of households affected by land acquisition. PEC staff are very familiar with local conditions, including down to the individual household level. Some additional potential socio-economic and socio-cultural impacts were mentioned but not explored in detail in the ESIA. This was rectified after the initial HESG assessment of the project in August 2021.	✓ The assessment takes broad considerations into account, and both risks and opportunities relating to project-affected communities and project benefits	✓ The key additional community impact assessed after the ESIA are traffic disruptions during the laying of the pipeline in the roadway and other construction works. These can cause delays for public and private transport including businesses, emergency services and pedestrians (e.g. schoolchildren) over an extended period of time. These disruptions are in addition to safety risks, dust, noise, road damage and other impacts from increased traffic during construction and to a lesser extent, during operation. Traffic along the only road linking Roshtkala and Khorog is key to livelihoods and the quality of life in the project area. Local people are generally not concerned about road closures (with short disruptions common on mountain roads) but may not fully appreciate the scale of disruptions yet. Following the 2021 HESG assessment, PEC conducted traffic surveys and
This assessment utilised local knowledge	✓ There has been a strong contribution of local knowledge.		
An assessment of opportunities to increase the development contribution of the project through additional benefits and/or benefit sharing strategies	✓ There has been no systematic opportunity assessment but this is acceptable given the multiple benefits for local communities (additional power supply, employment, better homes, replacement of 4 old schools with a total of ~400 students with 1		

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	<p>new school, PEC CSR program) and the Community Development Plan (CDP). The PEC CSR program is for the entire GBAO and was also going to be extended to Badakhshan Province in Afghanistan. For example, PEC helped to rebuild a house between Khorog and Sebzor destroyed by an avalanche in the winter 2021/2022.</p> <p>An analysis of community development priorities was done once the available budget for the CDP was known. The new school will be larger than the existing one, to also include a community centre and an early childhood development centre. For the CDP, one project was selected in a participatory manner for each of the three most directly affected villages (water supply for Barjingal, sports fields for Dashtag and Chagev).</p>		<p>focus groups to better understand the context of traffic disruptions.</p> <p>A number of other minor or indirect social impacts have not been assessed, as parts of the ESIA are relatively generic. For example, there is no discussion of land use restrictions within the transmission line corridor (as the old transmission line will be dismantled, there will only be a small net effect, but different households will be affected). This is not considered a significant gap.</p> <p>Benefit sharing opportunities have been assessed through a number of engagement mechanisms.</p>
The pre-project baseline against which delivery of benefits can be evaluated post-project is well-documented	✓		

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
		at the village, sub-district and district levels. during the preparation of the traffic management plan and the CDP.			
Infrastructure Safety and Public Health					
An assessment of dam and other infrastructure safety risks during project preparation, construction, and operation	✓	The feasibility study and ESIA contain a basic discussion of dam safety risks, including estimates of design floods and reservoir volume, stability analysis of headworks, and estimate of flows in case of failure of the weir. Some of these analyses were added after the 2021 HESG assessment. The weir receives a 'low' dam safety risk rating according to ICOLD criteria, based on dam height/reservoir volume and people at risk. Maps of geohazards in the project area have been prepared.	The assessment takes broad considerations into account, and both risks and opportunities relating to infrastructure safety	✗	There is limited discussion in the preparation documents of dam safety and road safety risks, and the contribution of geohazards to dam and road safety risks. For example, there is no analysis of the risk of landslides blocking the river upstream, which is a common phenomenon in the region. The value of a "more thorough study that includes slope movement (landslide, rock avalanche, Massive Rock Slope Failures, etc.) as well as glacial lakes" is acknowledged in the Feasibility Study.
This assessment was conducted using appropriate expertise	✓	The feasibility study, ESIA and geohazards consultants generally provided appropriate expertise. The disaster risk reduction (DRR) unit in and the Aga Khan Agency for Habitat (AKAH) have developed significant in-house expertise and have access to state-of-the-art hardware and software.			PEC's own disaster risk reduction (DRR) unit in collaboration with the Aga Khan Agency for Habitat (AKAH) have undertaken significant risk mapping of the areas around the project, and some analysis of the risk of failure of 2 lakes in the upstream catchment. Risk prevention has been taken into account e.g. in the siting of resettlement buildings. The lack of a more comprehensive analysis covering all upstream risks is

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
					a significant gap at the level of advanced requirements.
Public health issues assessment	✓	There was no separate health impacts assessment but a generic section in the ESIA, which does not cover some aspects such as Covid-19 or bacterial pollution of Shokhdara River. This is acceptable at the level of minimum requirements, given the low level of health risks.	The assessment takes broad considerations into account, and both risks and opportunities relating to public health	✓	The initial health impact assessment in the EIA was limited. However, the project has since initiated a comprehensive health monitoring and adaptive management program with the public health authorities, which will be able to detect any risks and opportunities.
This assessment includes public health system capacities and access to health services	✓	While these were not covered in the ESIA this is acceptable at the level of minimum requirements, as 1) project staff are well aware of the nearest health facilities (Roshtkala district hospital at ~20km and Tavdem rural clinic at ~5km), 2) most workers are local (so there is little additional use of these facilities), 3) the project has its own first aid facilities, and contractors have trained nurses on staff and have made arrangements with public facilities to cooperate and cover the costs of services.			
This assessment has considered health needs, issues and risks for different community groups	✓	Not assessed but this is acceptable at the level of minimum requirements, given the low level of health risks.			
Management					
Community Impacts and Benefits					
Management plans and processes for issues that	✓	PEC has a comprehensive E&S Policy and experience with the management	Processes are in place to anticipate and respond to	✗	There is good engagement of affected people and their representatives, and

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
affect project-affected communities have been developed	<p>of social impacts. A number of relevant plans and processes are already in place, including the RAP, CDP and grievance mechanism. Originally (according to the ESIA) contractors were expected to develop plans for Traffic Management and Community Health & Safety. Current plans are to develop frameworks for these plans by PEC in collaboration with the project implementation consultant, examples provided to contractors, and plans adapted and implemented by contractors. A first draft of the Traffic Management Plan has now been submitted by the contractor.</p> <p>There are also plans to further increase the number of E&S staff dedicated to the Sebzor project. A budget for E&S management is included in the overall project budget, with social spending covered under the budget for the RAP. Reporting by contractors to PEC and by PEC to donors has been established.</p> <p>The social management processes generally need to be robust enough to deal with all impacts, not just those related to the land acquisition. There are some contingency funds under the RAP budget, and there are also additional resources available from</p>	emerging risks and opportunities relating to project-affected communities and project benefits	<p>PEC staff and construction workers are embedded in local communities, thus allowing for informal monitoring and adaptive management.</p> <p>While baseline data have been collected for people directly affected by displacement, there are limited baseline data for most local residents (those indirectly affected) and no clear methodologies in the ESMPs to monitor and track changes in social conditions. The implication is that neither improvements in living standards can be easily demonstrated, nor a deterioration detected which might require mitigation measures. This lack of formal processes is a significant gap against advanced requirements.</p>

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		PEC and from the Ministry of Energy and Water Resources, which has taken on a supporting role for Roshtkala District.			
These plans and processes include monitoring procedures, utilising local expertise when available	✓	Monitoring is focused on contractor performance and interaction with communities, as well as the well-being of those households directly affected by land acquisition. Monitoring was adequate for the enabling works but needs to be expanded to all project components; implementation of plans also needs to be enforced through adequate sanctions (e.g. for speed limit violations, including for PEC's own vehicles).			
If there are formal agreements with project-affected communities, these are publicly disclosed	✓	Agreements on processes (such as the Compensation Payments Mechanism) as well as agreements on priorities for the CDP are public. There are also agreements with individual households (which all adult members have to agree to), but these are private.			
Project benefit plans and processes have been developed for project implementation that incorporate additional benefit or benefit sharing commitments	✓	There is a strong emphasis on local employment (with a particular focus on directly affected and vulnerable people), and improved housing for directly affected people; both benefits are being actively addressed. Employment prospects for local people are often good because contractors can save some costs (e.g.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		for accommodation) and many local people have relevant construction skills after working in Russia and/or graduating from local technical courses, offered e.g. by the district administration. A CDP has also been developed.			
Project benefit plans and processes have been developed for project operation that incorporate additional benefit or benefit sharing commitments	✓	There are no specific plans for continuing benefit sharing after construction, but PEC's approach in other projects suggests that communities around all HPPs will benefit from ongoing employment and procurement, as well as CSR and community development activities.			
Commitments to project benefits are publicly disclosed	✓	While most categories of benefits have been publicly discussed and disclosed (e.g. the employment approach, the CDP), there is currently no easy way for communities to access a summary of expected benefits, e.g. through a public community development agreement.			
Infrastructure Safety and Public Health					
Dam and other infrastructure safety management plans and processes have been developed for project implementation	✓	The dam design and construction processes have incorporated appropriate safety margins. Safety-relevant plans and processes are either under preparation or will be assigned to contractors.	Processes are in place to anticipate and respond to emerging infrastructure safety risks and opportunities	✗	At this stage there are no comprehensive safety plans, processes and equipment in place, for early warning, emergency preparedness and emergency response. Given the level of natural hazards in the area, the fact that these are not yet in place is a significant gap against advanced
Dam and other infrastructure safety management plans and processes have been	✓	The weir/spillway has been designed for a 1-in-1,000-year safety check flood with a safety margin of 1m			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
developed for project operation		freeboard (with a reference to GLOF risks, but without actual estimates of GLOF or other geohazard-related floods). There are also some partial references in the ESIA (e.g. fencing of weir and intake areas, warning of communities during commissioning testing).			requirements, related to the lack of comprehensive safety assessment (see above). The project implementation consultant is tasked with developing plans regarding early warning equipment (upstream and at dam), that would give operators a chance to lower the water level in the reservoir in anticipation of a flood event. AKAH will undertake a hazards study once the reservoir is in place. These plans will also need to be consistent with the Hazard and Vulnerability Risk Assessments and Disaster Management Plans, and the volunteer groups that the Aga Khan Agency for Habitat (AKAH) has developed and is coordinating for every village.
These plans have been developed in conjunction with relevant regulatory and local authorities	✓	Plans have not yet been developed in conjunction with relevant regulatory and local authorities. However, the State Service for Supervision of Safety of Hydraulic Structures will approve designs, supervise construction and approve commissioning, and the road authorities will be involved regarding road safety measures.	Plans provide for public safety measures to be widely communicated in a timely and accessible manner	✓	There are ongoing and planned measures for communication of public safety issues, including signage, alarms and training of emergency volunteers. According to the district administration, there is good coordination in place between the various emergency services, government departments, AKAH and PEC.
Plans provide for communication of public safety measures	✓	There are plans to publicly communicate some relevant elements of the plans (such as road safety measures).			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Emergency response plans include awareness and training programmes and emergency response simulations	✓	Emergency preparedness and response plans still have to be developed. PEC has in the past used awareness and training programs and emergency drills, at least for its own staff, on other projects. The security company RedLine which is also responsible for site emergencies, has been conducting weekly emergency response trainings.	Emergency response plans are independently reviewed	✓	PEC collaborates with its sister agency AKAH on emergency response plans, and will ask AKAH for review. Plans will also be shared with public emergency services and donors.
Dam safety is independently reviewed	✓	Design safety is being reviewed by KfW's technical department and by the State Service for Supervision of Safety of Hydraulic Structures, which is adequate given the low level of risks.			
Plans and processes to address identified public health issues have been developed for project implementation	✓	Several generic public health issues and management measures are identified in the ESIA. Community Health and Safety Plans will be required for major contracts.	Processes are in place to anticipate and respond to emerging public health risks and opportunities	✓	A dedicated process to monitor and manage public health (with a focus on infectious diseases such as HIV and Covid-19) has been created which includes a communication mechanism and 6-monthly roundtable meetings where action plans are updated. Opportunities to support health services under PEC's CSR program, from rehabilitation of facilities to donation of materials and financial support for individual medical emergencies, are identified separately.
Plans and processes to address identified public health issues have been developed for project operation	✓	Other than potential low-level noise and EMF impacts, no issues have been identified for the operations phase. These are mainly addressed through design solutions, e.g. the transmission line runs mostly at a distance from settlements.			
Outcomes					
Community Impacts and Benefits					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Plans provide for livelihoods and living standards impacted by the project to be improved	✓	The compensation and livelihood restoration measures for people affected by land acquisition are generally accepted as generous. PEC opted for a revised valuation approach through a private company, after the initial valuation results by a government agency were seen as too low. The construction activities are also injecting significant additional income into the project area, with its high unemployment rates. For example, the security company RedLine that has been contracted by PEC, is currently employing 28 mostly local people. PEC has worked with several local contractors over the years, gradually raising their performance..	Plans provide for livelihoods and living standards that are impacted by the project to be improved with the aim of self-sufficiency in the long-term	✓	The overall benefits of the project will likely outweigh the partially negative impacts, for almost all households, although this will be difficult to demonstrate given the gaps in baseline studies and monitoring mechanisms. The livelihood restoration programme aims to provide business and technical skills with a long-term livelihood perspective.
Plans provide for economic displacement to be fairly compensated, preferably through provision of comparable goods, property or services	✓	Compensation under the RAP is in kind where feasible but in most cases, in cash. While the main economic displacement impacts will be fairly and in fact, generously compensated, and a number of grievances related to economic displacement have already been resolved, there are no plans for compensation for some types of disruptions (e.g. some loss of productivity or income by traffic disruptions; restrictions on use of land under transmission lines). This is not considered a significant gap because	The project contributes to addressing issues for project-affected communities beyond impacts caused by the project itself	✓	The CDP will provide three small-scale community investments for the most directly affected villages.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		the disruptions are 1) limited (if an adequate Traffic Management Plan is adopted) and 2) are generally accepted by local communities; few grievances and requests for additional compensation have been raised to date, and these have generally been resolved favourably for affected people.			
Plans deliver benefits for communities affected by the project	✓	There will be significant short-term and long-term benefits for local communities. Roads, schools, sports fields, and other infrastructure such as water supply will be in a better condition than before the project. Increased power supply will also support local businesses, in some cases with additional support from other AKFED initiatives (such as micro-finance).	Plans deliver significant and sustained benefits for communities affected by the project	✓	The increased local economic activity and improved infrastructure will likely have a lasting beneficial effect for affected communities.
Infrastructure Safety and Public Health					
Plans avoid, minimise and mitigate safety risks	✓	Residual safety risks for communities should be acceptable, even though there are some uncertainties resulting from gaps in the assessment and management of safety risks.	Plans contribute to addressing safety issues beyond those risks caused by the project itself	✓	The geohazard assessments and safety-related plans (e.g. for an early warning system) will address some pre-existing safety risks for communities.
Plans avoid, minimise and mitigate negative public health impacts arising from project activities	✓	There are only minor negative impacts on public health, and these are either already addressed or there are plans to do so (e.g. with a Covid-19 prevention plan for the main works).	Plans avoid, minimise, mitigate and compensate negative public health impacts	✓	There are no specific concerns related to public health, and the joint monitoring and management process with the public health authorities should ensure that negative impacts are quickly identified and responded.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
		Plans provide for enhancements to pre-project public health conditions or contribute to addressing public health issues beyond those impacts caused by the project	✓ The improvement of water supply to Barjingal village, and improved hygiene in resettlement homes are expected to have a minor positive impact on public health.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	11

Summary of findings and other notable issues
The Sebzor HPP and the associated transmission line has significant social impacts in the project area, during construction and operation, including land acquisition impacts that was the focus during project preparation. There will be net benefits for almost all households, although a number of disruptions e.g. for traffic during construction still have to be managed. There is also potential to improve planning for public safety. Public health is well managed.

Relevant Evidence	
Interviews:	A3-12, A14, A16, A24-25, A31, A33-34, B3, B5-6, B11-12, B15-23, B25
Documents:	1, 5-8, 10-12, 15, 18, 19, 21-27, 32, 35, 39-41, 45, 5-51, 56-58, 60, 61, 66, 77, 78, 80-84, 86, 87, 91, 93, 97, 99, 103, 107-115
Photos:	1, 2, 7, 9, 12, 16-22, 34-38, 41-45, 49-55, 60-66, 73, 79, 81, 90-93, 95, 96, 99-101, 103-108, 111-114, 119-124

5 Resettlement



Scope and Principle
This section addresses physical displacement arising from the hydropower project development. The principle is that the dignity and human rights of those physically displaced are respected; that these matters are dealt with in a fair and equitable manner; and that livelihoods and standards of living for resettles and host communities are improved. This section does not address those that are only economically displaced, who are addressed in Section 4.

Background	
Does the project require or result in any physical displacement of people? Please state the evidence on which this determination is made.	
Yes, this section is relevant	Yes, as described in the ESIA and RAP
No, this section is not relevant	

Description of physically displaced communities and how they are displaced (distinguish between permanently vs temporarily and include number of people and households)	17 households with 118 individuals (according to the social database as of 2020), are permanently physically displaced due to the construction of Sebzor HPP. They have been allocated replacement plots (for house and 'courtyard'/garden) within the same villages. There have been no cases of tenants, farmworkers or other dependents that would be affected by physical displacement.
Name and number of settlements	Individual households in the villages of Barjingal, Chagev and Dashtak.
Agencies relevant to land acquisition	See section 4
Agencies relevant to livelihood restoration	University of Central Asia (School for Professional and Continuing Education) as partner organization for the implementation of LRP.
Other relevant information	The construction of the 18km 110kV overhead transmission line will not cause any physical displacement.

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
Assessment			
An assessment of the resettlement implications of the project has been undertaken early in the project preparation stage	✓	Resettlement implications arising due to the construction of Sebzor HPP have been well understood from the earliest project studies.	The assessment takes broad considerations into account, and both risks and opportunities
			✓
			Minimization of physical displacement has been an important consideration in the design of the project. Geohazard mapping was conducted to

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
This has established the socio-economic baseline for resettlement for potential resettles and host communities	✓	Census and detailed baseline surveys have been undertaken. Currently all displaced households are planning to move to new or existing homes within their own villages. However even if they decided to move to larger cities such as Khorog and Dushanbe, the issue of host communities is not relevant.			further ensure that the new sites selected by resettles are suitable. Acknowledging that some households can be at a risk of being disproportionately affected by resettlement, a set of criteria were pre-defined and used to screen potentially vulnerable households during the socio-economic survey.
This has included an economic assessment of required resettlement including ongoing costs for improvement in living standards	✓	The cost of the RAP has been estimated in detail. Key cost elements (listed by amount) are compensation for residential structures, the Barjingal school, compensation for crops and land, including livelihood restoration, connections for new residential plots (road, water, power), the Community Development Programme, implementation costs, and contingencies. The total budget appears sufficient.			
Management					
A Resettlement Action Plan and associated processes have been developed for project implementation	✓	A detailed RAP, compensation payment mechanism, and a grievance resolution mechanism with the involvement of local authorities are in place. Households receive close support for all resettlement-related activities (e.g., design and construction supervision for new homes and official ownership titles). Some temporary land acquisition may be needed during construction, however this will be	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	Resettled households also receive support through various other activities (e.g., protection of Upper Chagev village from rockfall/landslides after review of hazard by Aga Khan Agency for Habitat (AKAH), detailed survey of employment interest and skills for PEC and contractor jobs, support for financial management, legal support).

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		carried out based on voluntary rent agreements between construction contractors and affected persons.			<p>The eligibility matrix included special and additional entitlements for vulnerable households and for those who feel particularly challenged in performing resettlement-related tasks within deadlines.</p> <p>The members of the Resettlement Committee, which is comprised of representatives from PEC, responsible governmental institutions and the local community, are regularly engaged and updated on the progress of resettlement-related activities, and are responsible to assist PEC on any resettlement-related issues relevant to their field of jurisdiction.</p> <p>As a significant amount of compensation will be executed in cash and not in kind, training and awareness building on financial management are ongoing as parts of the LRP. In addition, to ensure that cash compensation is used for the intended purpose, those who choose to build a new house will be paid in four instalments in line with the progress of house construction. Monitoring of one household (currently living in Russia) who opted for the lumpsum payment still needs to be undertaken.</p>
A Resettlement Action Plan and associated processes have been developed for project operation	✓	Households in backwater zones with increased risks from flooding once the reservoir is filled have been included in the RAP.			
The RAP and associated processes have been developed in a timely manner	✓	The RAP has been developed in time for the enabling works, and resettlement has started, with most households already living in the newly built homes or acquiring new homes.			
The RAP or associated processes include:					
• up-to-date socio-economic baseline	✓	A detailed socio-economic survey has been conducted, completed in August 2020 and captured in a database.			
• compensation framework	✓	A detailed eligibility matrix is included in the RAP, and a Compensation Payment Mechanism is operational. Most of the compensation payments have been completed. In some cases, this is still underway in relation to the progress of new house construction.			
• grievance mechanisms	✓	The grievance mechanism is operational and at the time of the on-site assessment, the grievance log had 56 entries, several which are related to resettlement (typically concerns about financial ownership titles and about land allocated for replacement homes; almost all of which have been resolved).			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• monitoring procedures	✓	Resettled households are closely monitored, and progress is reported in PEC's monthly ESHS Compliance Monitoring Report.			
Formal agreements with resettles and host communities are publicly disclosed	✓	The Resettlement Policy Framework, the RAP, and the ESIA are publicly disclosed. The detailed RAP budget has not been disclosed, and the Compensation Agreements with individual resettled households are private.			
Outcomes					
Plans provide for resettlement to be treated in a fair and equitable manner	✓	After the first valuation results were considered too low, PEC hired a private valuation company (the same company that audits PEC's financial statements), whose results – based on full replacement cost – are generally considered as fair and equitable.			13 resettled households – who are expected to lose a significant share of their income and/or land – are entitled to a livelihood restoration programme which focuses on business creation and entrepreneurship. The programme was developed taking into account the situation and expressed needs of the beneficiaries. It is currently underway and will be implemented for a period of 24 months. With a primary aim to ensure that households' livelihoods are fully restored and improved in the long term, the implementation of this programme will be monitored, and outcomes will be assessed using selected indicators against relevant baseline data.
Resettles and host communities will experience a timely improvement in livelihoods and living standards	✓	The payment mechanism, where payments are made against progress in building or acquiring replacement homes, ensures that new homes will be available in time. Most families have opted to build new homes themselves and use the saved money for other purposes such as education or business investments. Resettled households also receive other support, e.g., compensation for loss of agriculture and business income; salvaging of building materials, crops, trees (even when they have been	Plans provide for resettles and host communities to experience a timely improvement in livelihoods and living standards with the aim of self-sufficiency in the long term	✓	

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
	compensated); a livelihood restoration package; and extra payments for vulnerable households. A number of affected households also benefit from preferential employment in the project.		

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	3

Summary of findings and other notable issues
Physical displacement has been minimised, and resettled households are well compensated and supported in other ways. They generally agree with the resettlement approach, have been able to make their own choices, and almost all grievances have been resolved. It is highly likely that their livelihoods and living standards will improve, especially with the implementation of the livelihood restoration programme.

Relevant Evidence	
Interviews:	B2, B3, B5, B12, B30, B31
Documents:	6-8, 10, 11, 20-27, 66, 83, 84, 86, 87, 92-94, 97
Photos:	23, 29, 34, 38, 41, 56, 58, 61-63, 68-73, 108-111, 115-118, 120-123

6 Biodiversity and Invasive Species



Scope and Principle	
<p>This section addresses ecosystem values, habitat and specific issues such as threatened species and fish passage in the catchment, reservoir and downstream areas, as well as potential impacts arising from pest and invasive species associated with the project. The principle is that there are healthy, functional and viable aquatic and terrestrial ecosystems in the project-affected area that are sustainable over the long-term, and that biodiversity impacts arising from project activities are managed responsibly.</p>	

Background	
Short description of the ecological region in the project area	The project area lies between 2,200 masl (Khorog) and 2,800 masl (Roshtkala) and has a strongly continental climate, with warm dry summers and very cold and somewhat wetter winters. It is located within the 280km long, isolated Shokhdara valley. Hillsides and mountains have sparse vegetation, while valley bottoms and irrigated areas have some trees and small agricultural plots. Valley-bottom habitats are strongly modified by human settlements.
Protected areas (national parks and reserves etc) and their distance from the project	Tajik National Park is a large (2.6 million ha) World Heritage Site in the Pamir Mountains, approx. 60km north-east of the project area. A lake approx. 40km upstream from the Sebzor site is considered an important bird area, and there are protected areas far downstream near the confluence of the Panj and Vaksh rivers. None of these are impacted by the project.
Critical habitats in the project area, including important bird areas, hotspots of endemism etc.	None
# threatened species in the directly affected area: terrestrial	Several near-threatened species thought to occur in general area but unlikely to be affected. Some of the River Otter's (<i>Lutra lutra</i>) habitat along the bypass reach and reservoir will be altered.
# threatened species: aquatic	No aquatic species of conservation concern. Fish populations were much reduced because of intensive fishing during the 1990's economic crisis, but have recovered.
Any other species of conservation importance	None
Migratory pathways	Two migratory fish species in Shokhdara River
Invasive species: terrestrial	Two known invasive plant species that colonize areas disturbed by constructions
Invasive species: aquatic	None
Key threats to biodiversity	Collection of firewood, shrubs and dung for winter heating
Agencies involved in biodiversity conservation	Committee for Environmental Protection, regional and district environmental offices

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
Assessment					
Assessment of terrestrial biodiversity	✓	Terrestrial biodiversity has been assessed through the ESIA's for the HPP and the transmission line, and additional surveys were conducted in autumn 2019 and spring 2020 by a specialised biodiversity consultancy in cooperation with Tajik experts, partly from the Pamir Biological Institute of the Academy of Sciences, based at the Botanical Garden in Khorog.	The assessment takes broad considerations into account, and both risks and opportunities	✗	The assessment of negative biodiversity impacts has been comprehensive. However, there has been no systematic assessment of potential positive biodiversity impacts and how these could be enhanced (e.g. through biodiversity offsets resulting in a net habitat gain, or support to protected areas). This is a significant gap against advanced requirements.
Assessment of aquatic biodiversity including passage of aquatic species and loss of connectivity to significant habitat	✓	The above-mentioned assessments and surveys also covered aquatic biodiversity. Additionally, hydraulic studies have been undertaken to determine river conditions (depth, velocity, geomorphology) and fish habitat under different minimum flow releases (see also section 11), and fish pass design considerations.			
Assessment of risks of invasive species	✓	There has been only a cursory assessment of invasive species risks, but this is acceptable given 1) the small footprint of the project and 2) the planned mitigation measures (revegetation with native species; monitoring and eradication of invasives).			
Management					
Plans and processes to address identified biodiversity	✓	Standard mitigation measures apply for biodiversity, primarily aimed at minimizing the footprint of the	Processes are in place to anticipate and respond to	✓	Qualified environmental specialists will be contracted during implementation, able to identify

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
issues have been developed for project implementation	<p>project (Land Clearing Control Plans). Measures will be taken to make the transmission line more visible for birds. Transmission towers that were originally going to be in sensitive locations, will be moved.</p> <p>One of the main determinants of habitat quality in the Shokhdara valley is the presence of trees (which also provide other ecosystem services including wood, fruits, shade, soil stabilization, carbon sequestration etc.). Owners of trees are being compensated and are encouraged to replant trees, and trees are planned to be replanted around project-impacted sites. However, plans are not consistent between different documents, depending on issues like tree ownership, species, conservation or production value etc. This is a gap as it makes implementation of replanting efforts unnecessarily complicated, but is not significant as the overall number of affected trees is so small that they can be logged individually, the value of trees is clearly understood, first efforts at replanting are already underway, and reforestation is a well-established part of PEC's CSR programme.</p>	emerging risks and opportunities	<p>biodiversity values (such as species of concern, natural habitats, nesting trees) and these values will either be avoided or replaced in appropriate quantities. This concerns, for example, one plant species of concern (Dwarf everlasting), hibernating bats, or nesting owls, bats, or raptors in mature trees.</p> <p>No direct monitoring of terrestrial species populations is planned but this is not considered a gap, given the low expected impact.</p> <p>There are plans to manage minimum flow releases adaptively, based on monitoring of fish populations and fish food species, and their response to reduced flows, once the project enters operations. Aquatic biodiversity experts who were involved in project preparation, will be available to assist in this process.</p>

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Plans and processes to address identified biodiversity issues have been developed for project operation	✓	The main biodiversity issues during operations are related to the effectiveness of the minimum flows and fish passage. Both of these issues are under active consideration during the design stage, will be monitored, and can be adapted if necessary. It is reasonable to further analyse the initially determined minimum flow of 3 m ³ /s (10% of average flow), as a smaller release might be sufficient for biodiversity and highly valuable for winter power generation.	Commitments in plans are public, formal and legally enforceable	✓	Commitments will be public through the ESIA/ESMPs and enforced through licensing conditions and supervision by donors.
Outcomes					
Plans avoid, minimise, mitigate and compensate negative biodiversity impacts arising from project activities with no significant gaps	✓	The overall impact on biodiversity will be limited and is being well managed. The plans for maintaining a certain minimum depth in the river for fish in winter appear sufficient, given that the four species of fish will mostly remain in deeper pools and can also move out of the reduced-flow reach. Fish adapted to this highly turbulent mountain river should have no issues using the fish passage as designed.	Plans avoid, minimise, mitigate and compensate negative biodiversity impacts arising from project activities with no identified gaps	✓	No gaps have been identified.
			Plans provide for enhancements to pre-project biodiversity conditions or contribute to addressing biodiversity issues beyond those impacts caused by the project	✓	The improvement of power supply in the service area of PEC will have significant indirect positive impacts from a reduction in firewood cutting and a recovery of vegetation in the wider area (as has already been shown, since the minimum vegetation level was reached in ~2005), as well as potentially a minor positive impact by enlarging the existing slow-flowing river section above the planned Sebzor weir, creating a deeper and larger habitat for some species, or improving some terrestrial habitats

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
			during site rehabilitation. However, these are side effects rather than specific, intentional biodiversity management measures.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	4

Summary of findings and other notable issues
The overall impact on biodiversity will be limited and is being well managed. Some disturbance is inevitable during construction, but the footprint of the project will be strictly limited, directly affected vegetation will be restored, and it is expected that increased power supply in the region will further reduce firewood extraction, thus improving some habitats. However, there are no measures to intentionally improve biodiversity values in the area.

Relevant Evidence	
Interviews:	A10, A13, A17, A20, A24, A30, A33, A34, B5-7, B10
Documents:	1, 5-7, 12, 15, 18, 28-31, 36, 38, 44, 47-49, 57 59, 72, 73, 78, 80-83
Photos:	1-3, 20, 25, 26, 30, 38, 49, 68, 69, 76, 87, 119, 124

7 Indigenous Peoples



Scope and Principle

This section addresses the rights at risk and opportunities of Indigenous Peoples with respect to the project, recognising that as social groups with identities distinct from dominant groups in national societies, they are often the most marginalised and vulnerable segments of the population. The principle is that the project respects the dignity, human rights, aspirations, culture, lands, knowledge, practices and natural resource-based livelihoods of Indigenous Peoples in an ongoing manner throughout the project life.

Background

Are any of the affected people Indigenous Peoples? Please state the evidence on which this determination is made.

Yes, this section is relevant

No, this section is not relevant

Not relevant. The Pamiri people do not meet international definitions of Indigenous Peoples, and there are no other ethnic minorities in the project area, where the main Pamiri language Shughni is spoken. The Pamiris are a minority in Tajikistan, with distinct ethnic origins, cultural traditions, language and religion, but they are clearly the dominant group within the GBAO region.

8 Cultural Heritage



Scope and Principle
This section addresses cultural heritage, with specific reference to physical cultural resources, at risk of damage or loss by the hydropower project and associated infrastructure impacts (e.g. new roads, transmission lines). The principle is that physical cultural resources are identified, their importance is understood, and measures are in place to address those identified to be of high importance. This section does not address non-physical cultural resources, which are addressed in Section 1 and/or in Sections 5 and 7 when relevant.

Background	
Does the project affect any physical cultural resources? Please state the evidence on which this determination is made.	
Yes, this section is relevant	
No, this section is not relevant	Not relevant. While a number of cultural heritage sites are named in the ESIA, they are at a distance from the project area, as confirmed by the Ministry of Culture, local people, and the district administration. There are some traditional homes and grave sites in closer vicinity to project components, but these will either not be affected or are not considered to have significant cultural heritage values. One traditional watermill is located on the bypass reach, but has not been used for a long time; the structure will not be affected. One grievance was raised that the allocated land for a resettlement house was close to a 'sacred site', and a new piece of land was found. PEC also has a chance find procedure to deal with unexpected discoveries.

9 Governance and Procurement



Scope and Principle	
<p>This section addresses corporate and external governance considerations for the project, and all project-related procurement including works, goods and services. The principle is that the developer has sound corporate business structures, policies and practices, and that procurement processes are equitable, transparent and accountable.</p>	

Background	
Key information on political context and public sector risks	Tajikistan is a presidential republic with a strong central executive. The GBAO regional as well as district and local governments, also have some degrees of administrative and political authority. The country is stable but scores poorly in an international comparison on a number of governance indicators (e.g. voice and accountability, regulatory quality). There are complex security and economic development challenges in the wider region, especially with Afghanistan.
Key information on corporate ownership and governance	PEC is a public-private partnership, jointly owned by the Aga Khan Fund for Economic Development (AKFED) through its subsidiary Industrial Promotion Services (IPS) and the International Finance Corporation (IFC), which is planning to exit as a shareholder now that PEC has reached maturity.
Details of the concession, if applicable	PEC holds a 25-year concession from 2002-2027 for operating the power generation, transmission, and distribution network in the GBAO. Assets remain in government ownership.
Key licensing or permitting requirements	See section 1
Key information on expected procurement strategy for this project (EPC, BOOT, etc)	<p>7 main packages:</p> <ol style="list-style-type: none"> 1) enabling works (already contracted with the local contractor LLC Madad, including the administrative building, road improvements and excavations - FIDIC Green Book) 2) engineering consultant (already contracted with the international consultant Fichtner, for the update of the feasibility study, detailed engineering and construction supervision - FIDIC White Book) 3) main civil and hydraulic steel works (pre-qualification completed, evaluation ongoing - FIDIC Red Book) 4) electro-mechanical equipment and installation (evaluation ongoing - FIDIC Yellow Book) 5) temporary bridge and diversion channel lining (already contracted with LLC "Stroymet", construction ongoing- FIDIC Red Book) 6) supply (already contracted with LLC "Pamirenergoservice") and construction (already contracted with LLC "Sajar" and "Badakhshon TADES" JV) of Sebzor-Khorog 110kV transmission line (construction nearing completion – FIDIC Yellow Book); and 7) supply (already contracted with Chinese supplier HNAC) and construction (already contracted with LLC "Madad") of Sebzor substation (construction nearing completion – FIDIC Yellow Book).

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
Assessment					
Assessments have been undertaken of the following through the project development cycle:					
<ul style="list-style-type: none"> political and public sector governance issues 	✓	As public-private partnerships with contractual relationships and frequent interactions with government, PEC and its sister companies in north-east Afghanistan and northern Pakistan are very aware of external governance issues and have managed to negotiate and maintain concession agreements in challenging governance contexts. Several donor agencies have also assessed the external governance situations over time.	There are no significant opportunities for improvement in the assessment of political and public sector governance issues	✓	The change of government in Afghanistan in 2021 creates uncertainties regarding the supply of electricity to the northern parts of Afghanistan. However, given the high electricity demand in GBAO, even if power transmission to Afghanistan does not eventuate, the electricity generated by the Sebzor HPP is likely to be utilised locally.
<ul style="list-style-type: none"> corporate governance requirements and issues 	✓	Corporate governance requirements are typical for a small utility and well understood, with significant interest and influence from donors. Arrangements have evolved over time, based on evaluations by shareholders (AKFED through ISP, and IFC) and other donors. PEC's annual financial statements are audited by a reputable accounting firm	There are no significant opportunities for improvement in the assessment of corporate governance requirements and issues	✓	No significant opportunities have been identified.
<ul style="list-style-type: none"> major supply needs, supply sources, relevant legislation and guidelines, supply chain risks and corruption risks 	✓	PEC is not subject to Tajikistan's public sector procurement guidelines, but has followed donor procurement processes, with support and supervision by donors. Supply needs are analysed in feasibility studies and in some cases, through the preparation of dedicated	The assessment includes opportunities for local suppliers and local capacity development.	✓	PEC engaged local contractors (LLC Madad and TGEM) for the enabling works (construction of the administrative building or 'base camp', road improvements and excavations) and river diversion works. In addition, local contractors were preferred and engaged in

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		<p>procurement plans. PEC is familiar with procurement issues for small hydropower plants.</p> <p>For the Sebzor project, supplies have been split up logically into a number of packages, on the basis of a good understanding of the market, objectives such as best value-for-money and promoting local companies, and an initial implementation schedule.</p>			<p>installing the operating rooms for the Sebzor and Khorog substations. Local content issues are included in PEC's internal skill development programs, e.g. FIDIC contract training, IHA training and automation and protection courses.</p>
Management					
Processes are in place to manage the following:					
<ul style="list-style-type: none"> • corporate, political and public sector risks 	✓	<p>Most of the donor-funded projects have involved updates to PEC corporate governance arrangements, e.g. for financial management with modernized accounting and additional staff, and arrangements with central government that limit political and public sector risks.</p> <p>PEC maintains good relations at all government levels. The former PEC General Director became Minister of Energy and Water Resources in 2020.</p>	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	<p>PEC management is aware of the major internal and external governance risks and challenges, e.g. the upcoming expiration of the concession agreement, transboundary issues with Afghanistan, power transmission arrangements, the need for power diversification, skill shortages etc. For example, PEC has identified a few scenarios concerning the concession agreement and commenced internal discussions. To deal with local skill shortage issues, PEC appointed two expatriate consultants, for E&S and H&S, to provide technical guidance to the PEC team. Also, PEC works closely with various donor agencies, who provide technical guidance and assistance to PEC projects.</p>

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• compliance	✓	Compliance with laws, regulations, the concession agreement, permits, contracts, financing agreements and safeguards requirements is supervised through the relevant corporate departments. IFC and World Bank have worked with PEC to strengthen corporate compliance processes.	Contractors are required to meet or have consistent policies as the developer	✓	Both PEC and its contractors are subject to local laws and regulations. In addition, both must meet donors' requirements for donor-funded components. For example, tender documents require submission of a technical proposal that includes ESHS methodology to meet applicable ESH requirements. Major contracts are prepared based on relevant FIDIC contract forms and reviewed and approved by respective donors before the execution of the contract. Contractors are required to submit detailed E&S plans for PEC's approval.
• social and environmental responsibility	✓	An E&S policy and a CSR program are in place. ESG declarations and evaluations are included in tender and contracting processes.			
• grievance mechanisms	✓	A grievance mechanism is in place, with an objective of acknowledging all grievances within 7 days and resolving them, if possible, within 30 days.			
• ethical business practices	✓	The E&S policy refers to ethical business practices, and codes of conduct and other mechanisms are used in HR and procurement processes.	Sustainability and anti-corruption criteria are specified in the pre-qualification screening	✓	Pre-qualification screening has included sustainability and anticorruption criteria to exclude bidders associated with sanctionable activities, e.g. criminal activities, child labour, human trafficking, money laundering, corruption and debarment by financial institutes. For example, Section V (Eligibility Criteria) of the civil work package tender refer to KfW policy for sanctionable practice-social and environmental responsibility.
• transparency	✓	Information on PEC's projects and performance is published through a variety of channels, including local governments and communities (also as non-technical summaries), the AKDN and World Bank websites and, once its functionality is restored, the PEC website. The audited financial reports will also be published on PEC's website.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Policies and processes are communicated internally and externally as appropriate	✓	Corporate staff is well aware of relevant policies and processes. A number of corporate policies (such as the E&S policy) and processes (such as the Compensation Payment Mechanism) are communicated externally. Tender evaluation processes are clearly communicated to bidders.			
Independent review mechanisms are utilised to address sustainability issues in cases of project capacity shortfalls, high sensitivity of particular issues, or the need for enhanced credibility	✓	Donors have reviewed a number of sustainability issues and provided capacity building support. KfW has also provided an independent tender agent for the Sebzor project tenders.			
Procurement plans and processes have been developed for project implementation	✓	PEC and their engineering consultants have developed formal procurement plans in some projects and in others, such as Sebzor, have divided the project into different tender packages during the detailed design stage, based on a good understanding of contractor capabilities. Major procurement has included a prequalification stage. PEC has developed some internal capabilities for some supplies and services, e.g. owns its own quarry.	Anti-corruption measures are strongly emphasised in procurement planning processes	✓	Anti-corruption measures are included in the bidding documents and the contracts with the contractors. The donor generally sets up these requirements. For example, the agreement with Madad for the enabling works refers to the KfW policy for sanctionable practice-social and environmental responsibility.
Procurement plans and processes have been developed for project operation	✓	There are no procurement needs for operations at this stage.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Conformance and Compliance					
The project has no major non-compliances relating to governance	✓	There are no indications for any major non-compliances.	There are no non-compliances	✓	There are no indications for any non-compliances.
Processes and objectives relating to procurement have been and are on track to be met with:					
• no major non-compliances	✓	There are no indications for any major non-compliances in procurement.	There are no non-conformances	✓	There are no indications for any non-conformances
• no major non-conformances	✓	There are no indications for any major non-conformances in procurement.			
Any procurement related commitments have been or are on track to be met	✓	There are no indications otherwise.			
Outcomes					
There are no significant unresolved corporate and external governance issues identified	✓	One corporate governance issue, related to the exit of IFC as a shareholder, is on track to being resolved.	There are no unresolved corporate and external governance issues identified	✓	No unresolved issues have been identified.
Procurement of works, goods and services across major project components is:					
• equitable	✓	From the review of procurement documentation as well as from interviews with the PEC procurement unit and contractor, there are no indications of any issues with procurement processes. Contracting and contractor performance is also supervised by donor agencies.			
• efficient	✓	See above			
• transparent	✓	See above		✓	

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• accountable	✓	See above			As mentioned in the Assessment section above, PEC deliberately spilt up the project into several lots, enabling local contractors to be engaged for civil works. A number of other local contractors are engaged, such as a security company. In addition, the project creates small-scale opportunities for local businesses, as demand for food and other supplies is growing as the project moves toward the construction phase. Employment of local skilled and unskilled labourers also provides opportunities to learn and practice the particular skills of choice.
• ethical	✓	See above			
• timely	✓	See above			
Contracts are progressing or have been concluded within budget or changes on contracts are clearly justifiable	✓	There are minor delays in the project schedule but these have been due to external circumstances (such as the harsh winter 2020/2021 and the Covid-19 pandemic). The enabling works contract remained within budget (excepting the additional scope with excavation). Contracts with non-performing contractors/consultants have been cancelled.			
			Opportunities for local suppliers including initiatives for local capacity development have been delivered or are on track to be delivered		

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	11

Summary of findings and other notable issues
While PEC is operating within a complex governance context with a number of challenges, the company has managed to establish good corporate governance processes and has over-achieved compared to expectations at the beginning of the concession period, regarding operational performance, coverage/rural electrification, and investments. PEC staff is now being seconded into the much larger national power utility Barki Tojik, to transfer some of the positive experiences (e.g. with loss reduction).

Relevant Evidence	
Interviews:	B4, B14, B24, B26, B29

Relevant Evidence	
Documents:	3, 4, 5, 12-18, 34, 42, 43, 49, 53, 64, 67, 68, 71-73, 78-82, 91, 92, 97, 98, 100-103, 105, 106
Photos:	4, 5, 12, 50, 79-86, 103-106, 111, 125, 126

10 Communications and Consultation



Scope and Principle
This section addresses the identification and engagement with project stakeholders, both within the company as well as between the company and external stakeholders (e.g. affected communities, governments, key institutions, partners, contractors, catchment residents, etc). The principle is that stakeholders are identified and engaged in the issues of interest to them, and communication and consultation processes establish a foundation for good stakeholder relations throughout the project life. Communications and consultation requirements unique to Indigenous Peoples are found in Section 7.

Background	
Directly affected community-level stakeholders	Local communities in the Sebzor project area, along the transmission line, and in the wider Shokhdara valley and beyond (supply area of PEC)
Directly affected institutional-level stakeholders	Local, district, regional and central government agencies; donor/financing agencies

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
Assessment					
Stakeholder mapping has been undertaken to identify and analyse stakeholders	✓	The ESIA and the Stakeholder Engagement Plan (SEP) provide good reviews of stakeholders.	The stakeholder mapping takes broad considerations into account	✓	For a project of this size, the mapping identifies a wide range of stakeholders who may have an interest in the project and those who are affected by the project (e.g., project affected communities, agencies, authorities, NGOS, institutes and universities at local, state and/or national level). The project should ensure that other water users along the Shokhdara river are comprehensively covered in future mapping updates (see section 11).
It establishes those that are directly affected	✓	A subset of directly affected stakeholders – those affected by land acquisition – have been surveyed in detail.			
It establishes communication requirements and priorities	✓	The SEP establishes the required engagement activities for different project phases. PEC's experience in GBAO has shown that direct person-to-person communication is most effective, while other channels (such as the website and reports) are less relevant.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
Management					
Communications and consultation plans and processes have been developed at an early stage	✓	Two separate SEPs were developed – one as early as 2016 as part of feasibility study, and another one in August 2019 for the construction and operation of the project. As the local power distribution utility, PEC has had close contacts with communities and other stakeholders for two decades and has communicated regularly about the planned Sebzor project.	Communication and consultation plans and processes show a high level of sensitivity to communication and consultation needs and approaches for various stakeholder groups and topics	✓	Planned stakeholder engagement activities will guide the project communications for preparation stage up to operation stage. The SEP describes engagement topics, methods to be used, frequency and location of each engagement for different groups of stakeholders, with responsibilities assigned for each activity.
They outline communication and consultation needs and approaches for various stakeholder groups and topics	✓	The SEP outlines various communication channels, tools and techniques to be applied for different stakeholder groups.		Vulnerable households have been defined and identified, and separate and individual engagements for this group are planned.	
They are applicable to project preparation, implementation and operation	✓	The SEP defines a program for stakeholder engagement, incl. public information disclosure and consultation, throughout the preparation, construction and operation of the Project. The activities, types and frequency are adapted to the three main project stages. Communications and consultation have been and will continue to be a permanent task for PEC staff.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	A well-structured grievance resolution process including a Grievance Redress Committee consisting of representatives from PEC, village organizations, district agencies and the Head of the Region (GBAO) allow the project to anticipate and respond to risks and opportunities raised from project stakeholders.
They include an appropriate grievance mechanism	✓	A Grievance Redress Mechanism (GRM) is in place and operational. It is accessible to all project stakeholders, including workers, affected people,			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		community members, civil society, media, and other interested parties.			
Stakeholder Engagement					
There has been engagement with the following groups, or on the following topics, or through the following processes, with directly affected stakeholders:					
• Project preparation, on topics of interest and relevance to directly affected stakeholders	✓	Local stakeholders have been engaged on issues such as siting and design, and employment and procurement opportunities.	Engagement with directly affected stakeholders has been inclusive and participatory	✓	As indicated by interviewees, engagements with resettlers and community representatives have been inclusive and participatory. Discussions at community and/or household-level during the development of the RAP, LRP, CDP and the traffic management plan gave affected communities the opportunity to provide input on their preferences regarding the project, as well as ideas to mitigate impacts that concern them. Some have been incorporated into the relevant plans. For example, a water supply system will be one the additional benefits to be realised by PEC, in response to the community's request.
• The business interacts with a range of directly affected stakeholders to understand issues of interest to them	✓	A significant number of consultations and meetings with various groups of stakeholders (e.g., community representatives, school, agencies, authorities, NGOs, institutes and universities at local, state and/or national level) have been held to identify stakeholders' needs and interests (among other objectives).			
• Environmental and social impact assessment and management planning	✓	Stakeholders were engaged during scoping consultations, and presentation of results.			
• Siting and design optimisation	✓	Some discussions have been held with local stakeholders about design and siting alternatives.			
• Project benefits	✓	The socio-economic surveys on households affected by land acquisition were also used to promote employment for affected people. More engagements regarding project benefits occurred during the development of the CDP to identify development priorities.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• Project-affected communities	✓	Interaction is ongoing, and most intensively with resettles. Those who will be affected by traffic and road closures have also been engaged for their input on the traffic management plan and measures.			
• Resettlees and host communities	✓	Communities affected by land acquisition are being engaged extensively and in on-going manner.			
• Assessment and planning for cultural heritage issues		Not relevant.			
• Assessment and planning for public health, including health officials	✓	Specific engagement on this issue is not apparent from the documentation, except for a scoping meeting with central Ministry of Health. This is acceptable given the low level of public health impacts.			
• Downstream flow regimes	✓	Specific engagement on this issue has been limited to biodiversity experts and environmental officials. This is acceptable given the small number of households along the bypass reach, and their lack of dependence on the river.			Individual consultations were held with resettled households to discuss new location options, asset valuation reports and draft contracts. The mechanism of compensation was agreed in advanced. The resettlees were given ample time to consider and provide agreement.
• Plans for the management of climate risks	✓	Specific engagement on this issue is not apparent from the documentation. This is acceptable as it is uncertain who the relevant stakeholders would be, beyond government officials. The need for engagement of public authorities on public safety risks is discussed in section 4.	Negotiations are undertaken in good faith	✓	Ideas from the affected people on the proposed mitigation measures (e.g., for traffic management) and development initiatives were explored, considered and/or incorporated.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Engagement with directly affected stakeholders has been appropriately timed:					
• Project preparation, on topics of interest and relevance to them	✓	There are no indications for any delayed engagement activities.			
• Environmental and social impact assessment and management planning	✓	See above.			
• Siting and design optimisation	✓	See above.			
• Project benefits	✓	See above.			
• Project-affected communities	✓	Engagement on possible measures with people affected by traffic disruption started relatively late considering that disruptions have already occurred, with additional traffic during project preparation and early works, compared to baseline levels. This is a gap but is considered as not significant as 1) the traffic management plan that is being developed in consultation with communities, will be in place before the main construction activities commence, and 2) the current level of disruptions has not caused any frictions between the communities and the project.			
• Resettles and host communities	✓	There are no indications for any delayed engagement activities.			
• Assessment and planning for cultural heritage issues		Not relevant.			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• Assessment and planning for public health	✓	See above.	Feedback on how issues raised have been taken into consideration has been thorough and timely	✓	Comments and queries from stakeholders are mainly addressed and responded through regular meetings and the grievance redress mechanism (GRM). Although some of the feedback and concerns raised (especially on complex issues e.g., on certificates and documentation on lands) did not follow strictly the timeline specified per GRM, interviews with affected people and a local authority suggest that PEC has provided feedback in a thorough and timely manner, and some feedback was considered by PEC.
• Downstream flow regimes	✓	See above.			
Engagement with directly affected stakeholders has often been two-way:					
• Project preparation, on topics of interest and relevance to them	✓	There are no indications for any one-sided engagements. PEC has been described as open and accessible.			
• Environmental and social impact assessment and management planning	✓	See above.			
• Siting and design optimisation	✓	See above.			
• Project benefits	✓	See above.			
• Project-affected communities	✓	See above.			
• Resettlees and host communities	✓	See above.			
• Assessment and planning for cultural heritage issues		Not relevant.			
• Assessment and planning for public health	✓	See above.	The business makes significant project reports publicly available	✓	See under minimum requirements. Key project reports to date (i.e., ESIA, SEP, Resettlement Policy Framework, ESMP, etc.) are publicly available either through donor websites or accessible at various locations (e.g., Sebzor HPP base camp, local school and local administration office).
• Downstream flow regimes	✓	See above.			
Engagement is undertaken in good faith	✓	There are no indications for any engagement not undertaken in good faith.			
Ongoing processes are in place for stakeholders to raise issues and get feedback	✓	Various channels are provided for stakeholders to submit their comments or raise issues (e.g., comment boxes which are situated at some accessible places, through their respective leaders, by email,			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		telephone, etc.). Issues can be raised formally via the GRM. Stakeholders confirmed that it is easy to reach PEC representatives and that they are responsive.			
Ongoing processes are in place for:					
• Environmental and social impact assessment and management planning	✓	See above and section 1.			
• Siting and design optimisation	✓	See above and section 1.			
• Project benefits	✓	See above and section 4.			
• Project-affected communities	✓	See above and section 4.			
• Resettlees and host communities	✓	See above and section 5.			
• Employees and contractors on human resources and labour management issues	✓	See above and section 2.			
• Assessment and planning for cultural heritage issues		Not relevant.			
• Assessment and planning for public health	✓	See above and section 4.			
• Downstream flow regimes	✓	See above and section 11.			
Engagement with resettlees has been culturally appropriate	✓	There has been close engagement with affected households. PEC is culturally well integrated into the local communities, with many project staff originating and/or living in the same or neighbouring villages.	Engagement with resettlees and host communities has been inclusive and participatory	✓	As indicated by interviewees, engagement with resettlees have been inclusive and participatory. Extensive consultations at community and/or household-level during the development of the RAP and LRP gave
			The business publicly reports on project performance in sustainability areas of high interest to its stakeholders	✗	While stakeholders have been surveyed about their interests (as captured in the SEP), this information has not been further used to develop a materiality matrix and design public reporting mechanisms on the progress of the project and on its environmental and social performance. Therefore, it cannot be determined whether the current reporting is addressing areas of high interest, which is a significant gap against advanced requirements.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Resettlees and host communities have been involved in the decision-making around relevant options and issues	✓	Resettlees are involved in choosing resettlement sites, whether to build or buy a new house (or apartment in Khorog/Dushanbe), house design, and the focus of the livelihood restoration programme.			affected communities the opportunity to provide input on their preferences as well as ideas for their livelihood restoration activities.
Public disclosure:					
• the business makes significant project reports publicly available	✓	Some significant project reports have been made publicly available or are planned to be made available.			
• the business publicly reports on project performance, in some sustainability areas	✓	<p>PEC reports on the project progress monthly and/or quarterly to the donors and the Government, however such reports are not made public. Most of the publicly available materials and contents (i.e., those available, published, and/or broadcasted through donors' website, television, newspapers, etc.) address plans and key events. Coverage on the actual implementation progress or project performance is either very limited or is not easily accessible by the public at large. This is adequate at the level of minimum requirements but could be enhanced by increasing disclosure through additional materials (e.g., annual or sustainability reports) and channels (e.g., restoring PEC website functionality).</p> <p>At the time of the assessment, the company website is out of order.</p>	The assessment of project resilience has been publicly disclosed	✗	The lack of disclosure of a project-specific assessment is a significant gap against advanced requirements (see section 12).

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		However, a commitment to update the website regularly (at least on a quarterly basis) with key project updates and reports on the project's performance is sighted and documented.			
• results of the assessment of strategic fit are publicly disclosed	✓	There has been no formal assessment of the strategic fit of the project, i.e., its contribution to national and regional plans, but there are some references to needs & alternatives in the ESIA and other documents.			
• power density calculations, estimated GHG emissions, and / or the results of a site-specific assessment have been publicly disclosed	✓	Not calculated and disclosed, but this is not a gap due to very high power density and low emissions (see section 12).			
Stakeholder Support					
Affected communities generally support or have no major ongoing opposition to the plans for the issues that specifically affect their community	✓	Communities generally have positive views of PEC and understand that PEC is acting as a professional and responsible commercial company (with profits re-invested in service improvements and a permanent commitment to the community). So far, communities have supported the specific plans for the Sebzor project.	Formal agreements with nearly all the directly affected communities have been reached for the mitigation, management and compensation measures relating to their communities	✓	Household-level agreements on compensation measures has been signed for each of the household affected by land acquisition. The RAP, LRP and CDP were developed in agreement with the affected people. The same approach is being taken for the development of the traffic management plan.
Resettlees and host communities generally support or have no major on-going opposition to the Resettlement Action Plan	✓	There are no indications for any opposition. Widespread acceptance of projects supported by the Aga Khan Development Network is typical in the region, and people appear to support the rapid development of the project	There is consent with legally binding agreements by the resettlees and host communities for the Resettlement Action Plan	✓	All households have accepted the valuation reports for their homes and land, and have voluntarily signed the Compensation Agreements.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		and to consider compensation as quite adequate.			
Directly affected stakeholder groups generally support or have no major ongoing opposition to the cultural heritage assessment, planning or implementation measures		Not relevant.	Formal agreements with the directly affected stakeholder groups have been reached for cultural heritage management measures		Not relevant.
Conformance and Compliance					
Processes and objectives relating to communications and consultation have been and are on track to be met with:			There are no non-compliances	✓	No non-compliances have been identified regarding communications and consultation.
• no major non-compliances	✓	The required consultations for the ESIA have been conducted.			
• no major non-conformances	✓	PEC's own plans as laid out in the Stakeholder Engagement Plan have generally been followed.	There are no non-conformances	✗	Minor non-conformances have been identified against the GRM procedure where several grievances were not acknowledged within a specified timeline. This is a significant gap against advanced requirements. Nonetheless, they were resolved, and based on the record, complainants were satisfied with the resolution.
Any communications related commitments have been or are on track to be met	✓	There have been no complaints from stakeholders over any communications commitments that were not met.			
List of significant gaps against Minimum Requirements			Number of Advanced Requirements met		
None			11		

Summary of findings and other notable issues

There is generally good engagement of stakeholders, including opportunities for directly affected stakeholders to influence project decisions, broad support from stakeholders, and few non-conformances. Although some project documentations and information have been made publicly available, disclosure on project sustainability performance and resilience is limited and could be enhanced.

Relevant Evidence

Interviews:	B3-B5, B11, B12, B14, B30
Documents:	5-8, 10, 16, 20, 56, 60, 85, 86, 90, 92-94
Photos:	91, 98, 103-106, 122, 123

11 Hydrological Resource



Scope and Principle

This section addresses the hydrological resource availability and reliability to the project, reservoir planning and downstream flow regimes in relation to environmental, social and economic impacts and benefits. The principle is that the project's planned power generation takes into account hydrological resource availability and reliability in the short- and long-term, and that the reservoir and downstream flow regimes are planned and managed with an awareness of environmental, social and economic objectives.

Background

Hydrology and flows

Average flow at dam (m ³ /s)	27.2 m ³ /s
Minimum monthly average flow (m ³ /s)	9.8 m ³ /s (February)
Maximum monthly average flow (m ³ /s)	75.0 m ³ /s (July)
Lowest observed flow (m ³ /s)	7.4 m ³ /s
Highest observed flow (m ³ /s)	298.5 m ³ /s
Design flow (m ³ /s)	12 m ³ /s
Affected river reaches (start/end and how affected)	Bypass reach between intake and tailrace, under the assumption that Sebzor HPP will be operated as a pure run-of-river plant with no active use of reservoir storage, and there is no impact downstream of the tailrace.
Proposed downstream flow regimes for environmental or social objectives	Fish habitat. Sufficient flows for fish are assumed to also cover flow requirements for other purposes such as habitat for other species, dilution of pollution, and aesthetics of the river. There is no need to provide higher flows for other purposes. People do not use the bypass reach for kayaking/rafting (after a fatal accident in 2007), irrigation, water supply, or milling (an existing water mill has long been defunct), particularly not during winter, under low flow conditions. The bypass reach is used only occasionally for fishing. Sediment transport occurs mainly during high flow conditions, which are not significantly reduced.

Reservoir

Reservoir length (km)	700 m with increased water level, compared to natural conditions
Minimum operating level MOL (masl)	Water level only lowered from normal operating level when flushing gates opened
Normal operating level (masl)	Overflow spillway crest at 2,529.0 masl
Full supply level FSL (masl)	Maximum water level under flood conditions at 2,531.0 masl
Reservoir area at FSL (km ²)	5 ha
Reservoir area at MOL (km ²)	No information provided
Volume at FSL (m ³)	210,000 m ³
Volume at MOL (m ³)	No information provided
Average retention time in days	Not provided in the document, but based on known volume, it is equivalent to ~128 minutes of average inflows.

Number of days for filling	Not provided in documentation, but see above rough estimate
----------------------------	-------------------------------------------------------------

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
Assessment					
Assessment of hydrological resource availability	✓	Although historical data have significant gaps, the analysis was adequate and the design is conservative, with a high load factor and spilling approximately half of the time.	Issues that may impact on water availability or reliability have been comprehensively identified	✗	<p>There has been limited analysis of potential future hydrological conditions, with estimates currently based on statistical review of historical data.</p> <p>PEC is collaborating with the University of Central Asia (UCA) to conduct a study on water availability projections and variability within the next 50 years, based on probable scenarios of precipitation and temperature (see section 12). At the time of this assessment, the Terms of Reference are still under preparation by UCA. Since this study is only in the inception stage, its findings will not be part of design considerations. The lack of analysis of future hydrology is seen as a significant gap against advanced requirements.</p>
Hydrological resource assessment has been undertaken utilising:					
• available data	✓	Downstream data from Khabost gauging station, operated intermittently since Soviet times			
• field measurements	✓	Data from PEC's own gauging station established in 2015 near intake			
• appropriate statistical indicators	✓	A range of statistical parameters have been calculated and tests performed.			
• a hydrological model	✓	No hydrological model to estimate flows from the catchment was developed. This is a gap but is not considered significant at the level of minimum requirements, in this particular context because 1) in this high mountain environment where most of the precipitation falls as snow and most of the runoff comes from snow- and glacial melt, and few meteorological data are available, building an accurate model would be highly demanding, 2) hydrological and meteorological input data are likely to be inaccurate, within a margin that			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		may be larger than trends to be detected, and thus the usefulness of a model is further limited, 3) the HPP is already designed with a high capacity factor where river flows are likely to be higher than intake capacity for much of the time, 4) the HPP does not have active storage capacity so that inflow forecasts would not be useful for operational optimization.			
Issues which may impact on water availability or reliability have been identified and factored into the modelling	✓	A number of potential issues have been considered. There is relatively little water abstraction in the upper valley and no reason to assume that this will increase substantially.			Generation was modelled using 38 years of daily discharge data, and ranges between 89.9 GWh/a in wet years and 67.8 GWh/a in dry years. Beyond this calculation, there has been only limited analysis of variability and uncertainty. This is a significant gap against advanced requirements.
Hydrological resource assessment includes evaluation of scenarios, uncertainties and risks	✓	Hydrological studies have focused on historical measurements, complemented by more recent data, to understand typical patterns and estimate flood flows for the design of project components. There may be changes in timing of snowmelt, precipitation and evaporation as a result of climate change (see section 12) but given the conservative and robust design of the HPP, such changes are more likely to be positive, by lengthening the season during which excess flows are available. Melting glaciers in the headwaters are also expected to increase flows temporarily (over a	Hydrological uncertainties and risks have been extensively evaluated over the short- and long-term	✗	It would be advisable to process data from the new PEC gauge station, correlate them with data from the Khabost gauge, and update all hydrological analyses with information obtained from UCA's study to provide further understanding on potential uncertainties and risks.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		scale of decades), beyond the historical averages, perhaps by ~10%. However, most additional glacial melt will occur in summer months when there is already excess flow, thus not contributing to generation.			
Assessment of important considerations prior to and during reservoir filling	✓	The assessment has focused on the raising of the water level by approximately 3 meters, the direct effects on riparian residents, and the backwater effects during flood events.	The reservoir assessment is based on dialogue with local community representatives	✓	There has been no formal assessment conducted with the communities, however this is acceptable due to their lack of dependence on the river and their ability to address any issues with PEC (see sections 4, 11).
Assessment of important considerations during reservoir operations	✓	There has been no formal assessment because 1) the reservoir water level will be maintained at the full supply level, as the reservoir is not intended for peaking (other PEC HPPs will provide load following) and 2) there are no other uses of the reservoir.			
Assessment of flow regimes downstream of project infrastructure	✓	Flow needs and hydraulic conditions in the bypass reach have been assessed and a minimum flow of 3 m ³ /s has been established.	The reservoir and flow regimes assessments take broad considerations, risks and opportunities into account	✓	Based on the outcome of the biodiversity study, there may be an opportunity to adjust the ecological flow, to provide extra flow for energy generation during the winter season. However, it has been agreed with KfW that the reassessment will only take place during operation stage, as an adaptive management measure.
Flow regimes assessment includes all potentially affected river reaches	✓	The assessment only covers the bypass reach of approximately 3km. No assessment of the reach below the tailrace is required if the project is not used for peaking.			
Flow regimes assessment includes identification of the flow ranges and variability to achieve different	✓	The assessment was focused on minimum flows to maintain minimum depths for fish habitat in the low-flow winter months. Other potential objectives were not formally analysed	The flows regimes assessment is based on field studies	✓	Bathymetry has been established with representative cross-sections, and hydraulic conditions have been modelled.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
environmental, social and economic objectives		but this is adequate as 1) no important social river uses have been identified in the bypass reach, besides some recreational fishing and the aesthetic value of the flowing river, 2) fish are clearly the most affected taxonomic group, 3) while there is significant bacteriological pollution in the river, only a very small portion of that originates in the bypass reach (and could therefore become more concentrated), 4) flows in the summer months, which are the most important for fish, dilution of pollution, aesthetics and other purposes, will remain abundant, and 5) variability is maintained for most of the time.			2 aquatic biodiversity field surveys were conducted in autumn 2019 (Sept-October) and spring 2020 (April). The studies confirmed that the ecological flow is likely sufficient to provide adequate depth for fish habitat and migration. Estimated water depths and presence of fish will be verified through field studies once the project is operational, for potential adjustments of ecological releases.
Flow regimes assessment is based on relevant scientific and other information	✓	Habitat requirements of fish have been estimated based on experience with different rivers and different species, but appear plausible.			
Management					
Plans and processes for generation operations have been developed to ensure efficiency of water use	✓	The operational concept is very simple, with a stable reservoir water level (which maximises the available head) and constant minimum flow.			
Plans and processes for generation operations are based on:			Generation operations planning has a long-term perspective	✗	There is no long term generation operations planning for this project, as the project is designed conservatively, with high capacity factor and small storage. However, there has been no assessment of There has been no assessment of the impacts of broader long-term

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
					hydrological changes on generation, which is a significant gap against advanced requirements.
• analysis of the hydrological resource availability	✓	The power plant will operate at full capacity for about half of the time, and based on water availability for the other half of the time.	Generation operations planning takes into consideration multiple uses and integrated water resources management	✓	There is no other use of the water resources identified aside from energy generation and fish habitat, thus operational rules focus on meeting the needs for those two uses.
• a range of technical considerations	✓	Keeping the reservoir at a stable level reduces the technical complexity of operations.			
• an understanding of power system opportunities and constraints	✓	Because much electricity is actually consumed for heating in winter, power demand is relatively stable. PEC is also promoting the use of heaters which store heat during off-peak hours. PEC has other peaking plants available to follow variable demand in the regional system, and is therefore planning to operate Sebzor HPP as a pure run-of-river plant.	Generation operations planning fully optimises and maximises efficiency of water use	✓	Given that there are no other, competing uses of water resources, the operating priorities will be to maximise energy supply during the high-flow season in summer, and provide reliable energy supply during the low-flow season in winter while always meeting the required environmental flow.
• social and environmental considerations including downstream flow regimes	✓	The increased depth and width of the river in the reservoir area is expected to provide improved habitat conditions for some aquatic species and their predators, such as fish otters. A stable reservoir level will maintain a significant degree of variability of downstream flows.			
Plans and processes to manage reservoir preparation and filling have been developed	✓	There is no need for specific plans and processes for preparation and filling of this reservoir, except for the small area along the riverbanks that will be inundated additionally and	Generation operations planning has the flexibility to anticipate and adapt to future changes	✗	The project has been pursued as a stand-alone investment, and its design as a run-of-river project with high load factor provides very limited flexibility. The feasibility of

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		where some land is being acquired, banks may have to be stabilised, and trees felled. The first filling will be conducted under supervision.			integrating the project with battery energy storage and solar PV systems is being explored, to reliably meet the increasing demand, however it is uncertain whether this option will be pursued. The limited flexibility is a significant gap against advanced requirements.
Plans and processes to manage reservoir operations have been developed	✓	Under the chosen operational concept, there is no need for specific plans and processes to manage reservoir operations. Use of the flushing gates under flood conditions is addressed in section 3.			
Plans and processes for delivery of downstream flow regimes have been developed	✓	The minimum flow will be released through a dedicated gate in the weir and the fishpass. There will be additional flows in the bypass reach from seepage, tributaries, over the ungated overflow spillway, and periodically from flushing the desander.	Reservoir plans are based on dialogue with local community and government representatives	✓	Communities and government representatives have been given the opportunity to provide suggestions on the usage of the reservoir.
Downstream flow plans include:					
• flow objectives	✓	Flow objectives are focused on fish habitat.			Adaptive management of environmental flows is envisaged for the operations stage, to find the optimal fit between the needs of fish and of energy generation.
• magnitude, range and variability of the flow regimes	✓	The magnitude of the minimum flow is being finalized during detailed design. There will be a significant range of operational conditions, with spilling (when inflows into the reservoir higher than the design discharge of the HPP plus minimum releases) for approximately half of the time, and high short-term, seasonal, inter-annual and potentially long-term variability.	Processes are in place to anticipate and respond to emerging risks and opportunities	✓	

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• locations at which flows will be verified	✓	Planned to be measured within 100 m downstream of weir.	Commitments in plans are public, formal and legally enforceable	✓	Commitments in the ESIA are the prerequisite for project approvals from government, thus making the commitments legally enforceable.
• ongoing monitoring	✓	According to the ESIA, fish populations will be monitored to establish the effectiveness of environmental flow releases.			
Downstream flow plans, where formal commitments have been made, are publicly disclosed	✓	Plans for minimum flow releases are included in the publicly available ESIA.			
Outcomes					
Plans for downstream flows take into account environmental, social and economic objectives	✓	A range of potential objectives have been scoped during the preparation phase, a preliminary plan has been developed, and a final determination is underway taking into account fish habitat and power generation.	Plans for downstream flow regimes represent an optimal fit amongst environmental, social and economic objectives	✓	The maintenance of fish habitat is the only relevant priority for environmental flows. Adaptive management will be introduced to find the optimal fit between fish habitat and energy generation.
Where relevant, downstream flows take into account agreed transboundary objectives		Not relevant. Flow alterations in the short bypass reach do not affect downstream countries.			

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	9

Summary of findings and other notable issues
The conservative design of the Sebzor HPP, with a high capacity utilization, makes reliance on historical flow data (without a hydrological model for short- and long-term inflow forecasting) acceptable, but leaves some uncertainties. The reservoir will be small and not used for active storage operations. The flow releases through the 3km bypass reach are determined based on a single objective (maintenance of winter fish habitat).

Relevant Evidence	
Interviews:	B1, B4, B5, B7, B28, B32
Documents:	1, 2, 3, 6, 7, 8, 10, 28, 29, 30, 31, 81, 87, 88, 104, 106
Photos:	28, 30, 55, 124

12 Climate Change Mitigation and Resilience



Scope and Principle	
This section addresses the estimation and management of the project's greenhouse gas (GHG) emissions, analysis and management of the risks of climate change for the project, and the project's role in climate change adaptation. The principle is that the project's GHG emissions are consistent with low carbon power generation, the project is resilient to the effects of climate change, and the project contributes to wider adaptation to climate change.	

Background	
Climate Change Mitigation	
Capacity (MW)	11 MW
Average reservoir area (representing area of flooded land, net of pre-impoundment water body)	5 ha, most of which (4.5 ha) previously covered by Shokhdara River
Power density (W / m ²)	2,200
Emissions intensity (gCO ₂ e / kWh)	Not relevant
National and regional policies, plans and commitments relevant to mitigation	Tajikistan has very low per capita CO ₂ e emissions of approximately 0.62 tons/capita/a, 2016 (https://ourworldindata.org/greenhouse-gas-emissions). The country's 2017 NDC document shows an intent to reduce emissions to 65-90% of 1990 levels, depending on international support.
Climate Change Resilience	
Hydrological data available for the project site and the basin, and observed climate trends	Daily flow data at Khabost gauge downstream 1938-1986 and at bridge gauge upstream 2016-present; analysed through a series of hydrological studies. Khabost data may have some reliability problems e.g. related to rating curves. There are some meteorological data from Khorog and other stations. No statistically significant trends for runoff but possibly a moderate increase in precipitation.
Regional and basin-level climate models relevant to the project location, if any	Historical data and predictions from various climate models and emissions scenarios available e.g. through https://climateknowledgeportal.worldbank.org/
Any climate change predictions for the project location, and degree of consistency	There is a general understanding that glacial melting and increased precipitation may result in average flow increases combined with seasonal shifts (earlier onset of spring snowmelt) over the coming decades. However, climate change in high mountain environments is particularly difficult to predict, and even nearby glaciers may exhibit very different behaviour. The project location is also close to regions for which lower water availability is predicted (Afghanistan, Pakistan, Iran), so there is significant uncertainty.
National policies, plans and commitments relevant to adaptation and resilience	Tajikistan is highly sensitive to climate change, due to the key roles of agriculture in the national economy and of hydropower in the energy supply, exposure to natural disasters, and its relatively low level of income and adaptive capacity. Climate change will affect water resources and natural disaster risks. A National Adaptation Strategy, with a focus on energy, water resources, transportation and agriculture, has been formulated but has yet to be operationalized.

Other relevant information	<p>Historically, energy in the GBAO region for electricity and heating was provided from a combination of hydropower, coal, diesel and biomass. An increased use of electricity is key to reducing emissions and allowing vegetation to recover. Growing vegetation absorbs more carbon, protects soils from erosion, and reduces some natural disaster risks.</p> <p>PEC is generally well aware of hydrological risks, and has experienced both damage from floods (e.g. in 2015) and the effects of low flows (reduced power generation, outages and sales, e.g. in the winter 2020/2021).</p>
----------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
Assessment					
Climate Change Mitigation					
For projects with a power density below 5 W/m ² , net GHG emissions (gCO ₂ e) of electricity generation have been estimated and independently verified	✓	Not applicable	If a site-specific assessment is required, it incorporates a broad range of scenarios, uncertainties and risks	✓	With a very high power density of 2,200 W/m ² , the Sebzor HPP project does not require a site-specific assessment of GHG emissions.
For projects with a power density below 5 W/m ² and estimated emissions are above 100 gCO ₂ e/kWh, a site-specific assessment of GHG emissions has been undertaken	✓	Not applicable			
An assessment of the project's fit with national and/or regional policies and plans on mitigation has been undertaken	✓	There is only a cursory mention of mitigation implications in the ESIA, but this is not a gap given the negligible direct contribution of the Sebzor project to GHG emissions, and the significant positive contribution through displacing more GHG-intensive sources of energy. There has already been a notable reduction in			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		fossil fuel and firewood consumption for heating, and an increase in biomass, since PEC has improved power supply in the region.			
Climate Change Resilience					
An assessment of the project's resilience to climate change has been undertaken	✓	Both the draft feasibility study and the ESIA contain general discussions of potential climate change and resilience of hydropower projects. There is no specific application to the project. While this is a gap, it is not significant because of the same reasons mentioned under section 11 (why the absence of a hydrological model is not significant). Climate models for the central Asian mountain ranges with their extreme topography are particularly difficult to build and provide limited reliable insights. In the absence of such downscaled models, it is reasonable for the project to be designed with a high capacity factor and few components (essentially only the weir/spillway) exposed to extreme floods. The safety implications of extreme floods and/or geohazards triggered by climate change, are covered in section 4 and are not repeated here.	Assessment of resilience incorporates sensitivity analysis and project-specific hydrological modelling using recognised climate models	✗	While the project preparation made reasonable estimates regarding water availability at the scheme for power generation, no detailed hydrological model has been developed (see section 11). This precludes the integration of climate models to undertake an analysis of sensitivity to climatic change. This is a significant gap against advanced requirements.
The assessment:					

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
• incorporates an assessment of plausible climate change at the project site	✓	While some contextual information on plausible scenarios for the region is available, there was no project-specific assessment for the Skokhdara valley. As noted above this is not seen as a significant gap.			
• identifies a range of climatological and hydrological conditions at the project site	✓	There has been no documented effort to describe and quantify the potential range of climate conditions, especially for flows. As noted above this is not seen as a significant gap.			
• applies these conditions in a documented risk assessment or stress test	✓	There has been no documented effort to systematically consider the consequences of changing climate conditions for the feasibility of the Sebzor HPP. As noted above this is not seen as a significant gap.			
The risk assessment or stress test encompasses:					
• dam safety	✓	Not assessed. Climate change could increase peak flows and the probability of floods that lead to failure of the weir and release of the reservoir. This gap is not considered significant because of the low risks of failure (with releases within the 2-year flood) and the fact that an additional safety margin has been included in the design of the weir, to account for GLOF floods.			
• other infrastructural resilience	✓	Not assessed. Climate change could increase risks e.g. related to geohazards, contributing			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
		to public safety risks. This gap is an aspect of the significant gap identified in section 4 and is not seen as significant in this section because only small parts of the catchment are glaciated and thus would see significant changes in geohazards.			
• environmental and social risks	✓	Not assessed. Climate change could modify E&S impacts, e.g. as the range of species shifts to higher elevations. This gap is not seen as significant because 1) the project does not lead to significant terrestrial or aquatic fragmentation that could impede range shifts, and 2) from a social perspective, climate change is likely to lead to a longer growing season and shorter heating season, thus improving living conditions in the Shokhdara valley in some important aspects.			
• power generation availability	✓	Not assessed. Climate change could increase flow variability and reduce the load factor, generation, supply reliability and revenue from the project. However, the project is designed very conservatively with a high a load factor, which makes it inherently resilient to increased variability, and climate change is also likely to shorten the low-flow winter season. The absence of sensitivity tests in power & energy and financial			

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)	Findings and Observations		Requirement is met: yes (✓) or no (✗)	Findings and Observations	
		models is a gap but not seen as significant because they would likely have no substantial impact on project design and operations.			
An assessment of the project's potential adaptation services and fit with national and/or regional policies and plans for adaptation has been undertaken	✓	The project does not provide energy storage or diversification of energy supply technologies and is not intended to provide adaptation services. Existing adaptation policies and plans in Tajikistan are also fairly generic, and it would not be useful to try to identify specifically whether the project fits or does not fit well with these policies and plans. Hence, the absence of an assessment is not seen as a gap.			
Management					
Climate Change Mitigation					
If GHG emissions estimates assume design and management measures, there are plans to put these measures in place	✓	Not applicable.	Design and management measures have been developed for implementation and operation phases of the project to respond to risks and opportunities including offsetting emissions	✓	Not applicable.
			Plans have been developed to monitor parameters used in GHG emissions estimates or to monitor GHG stocks	✓	Not applicable.
Climate Change Resilience					

Minimum Requirements		Advanced Requirements	
Requirement is met: yes (✓) or no (✗)	Findings and Observations	Requirement is met: yes (✓) or no (✗)	Findings and Observations
The project design is based on plausible climate change scenarios	✓ The project design is based on historic flow data. No significant trends were detected in those data, and the project is designed so that it will be able to handle a range of plausible climate change scenarios. The increased probability of GLFOs has been taken into account through a safety factor.	Resilience measures take account of a broad range of risks and inter-relationships	✓ As described in section 1 and 4, geohazards are considered the most critical risk for the project, and their likelihood could be increased by climate change. The DDR unit of PEC has developed a comprehensive risk identification system to identify areas prone to various natural phenomena such as avalanches, rockfalls and landslides. There are ongoing monitoring, early warning and protection programs.
		Processes are in place to respond to unanticipated climate change	✓ While there is, by definition, limited information on potential impacts and their probabilities, one of the scenarios that has been investigated is a glacier lake outburst flood (GLOF). Modelling by the AKAH indicates that a 1,000-year return GLOF would result in a flow of 450 m ³ /s along the Shokhdara River, which would have a limited impact on the integrity of the weir and the reservoir. Other potential climate change impacts such as increased or reduced flows, outside the range expected by current climate models, would be detected through the monitoring of flows and generation. While its run-of-river design limits the project's ability to respond, its high capacity factor would allow it to continue operations.

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
Structural and operational measures are planned for design, implementation and operation phases to avoid or reduce the identified climate risks	✓	No specific climate risks have been identified, and hence no measures are planned.	Plans have been developed to provide adaptation services if necessary	✓	As a small-scale run-of-river project, Sebzor has limited capacity to provide adaptation services, e.g. flow regulations during high-flow (flood) or low-flow (drought) conditions. Therefore such plans are not useful or necessary.
Outcomes					
Climate Change Mitigation					
The project's GHG emissions are demonstrated to be consistent with low carbon power generation	✓	Reservoir emissions will be negligible and the quantities of carbon emitted during the construction stage will be very small when compared to power generated over the lifetime of the project. PEC intends to continue calculating the GHG emissions embedded in construction materials and fuels.	Project net emissions are minimised or project operations facilitate system emissions reductions	✓	The net emissions from this RoR scheme will be negligible, and therefore, no additional emission reduction measures are not required. However, as a renewable energy source, the Sebzor project provides opportunities to reduce the consumption of firewood (used for cooking and heating) which will contribute to the reduction of emissions and preservation of the native forest. Depending on PEC's integration into the Tajikistan and Afghanistan grid, the project may also displace some fossil fuel power generation. Other opportunities, e.g. use of electric vehicles and increased use of electricity by industries, can also be explored.
The fit of the project with national and regional policies and plans for mitigation can be demonstrated	✓	The project will make a significant contribution to limiting Tajikistan's GHG emissions.			
Climate Change Resilience					
Plans will deliver a project that is resilient to climate	✓	The project design with a high load factor and low safety risks leaves a	The project is resilient under a broad range of scenarios	✗	In the absence of well-defined climate scenarios and hydrological modelling,

Minimum Requirements			Advanced Requirements		
Requirement is met: yes (✓) or no (✗)		Findings and Observations	Requirement is met: yes (✓) or no (✗)		Findings and Observations
change under a range of scenarios		considerable margin for adaptation to changing climate and hydrological conditions.			the project's resilience cannot be quantified with any degree of certainty. This is a significant gap against advanced requirements.
The fit of the project with national and regional policies and plans for adaptation can be demonstrated	✓	The project makes no specific contributions to adaptation except through geographic diversification, by providing PEC with a generation asset in a different valley.	The project will contribute to climate change adaptation at local, regional or national levels	✓	In a very general sense, the project will also support livelihood improvements for the remote communities of GBAO, enabling them to better adapt to a changing climate.

List of significant gaps against Minimum Requirements	Number of Advanced Requirements met
None	8

Summary of findings and other notable issues
The Sebzor HPP will make a significant positive impact to climate change mitigation by providing a very low-carbon source of power and displacing high-carbon energy sources such as firewood, diesel and coal. There has been no systematic attempt to understand the exposure, vulnerability and resilience of the project to future climate change, but the design of the project makes it fairly robust.

Relevant Evidence	
Interviews:	B4, B5, B6, B7, B24
Documents:	1, 3-7, 37, 38, 40, 41, 50, 51, 55, 56, 63, 65, 75, B78- B82
Photos:	93, 94, 100, 111, 126

Appendix 1 – Interviews

These interviews were held during the HESG assessment in August 2021:

Ref	Interviewee/s, Position	Organisation	Date	Location
A1	Daler Jumaev, Minister	Ministry of Energy and Water Resources; formerly General Director of PEC	Aug 9, 4pm	Dushanbe office
A2	Raul Khubunov, Sebzor Civil Works Supervisor	PEC	Aug 10	drive Dushanbe-Khorog
A3	Odilbekov Rashidbek, Head	Chagev and Rivarkhur Villages; PAP (owner of disused shop building)	Aug 11, 10:40am	On his property
A4	Abdulamidov Davlat	PAP (owner of property at powerhouse)	Aug 11, 11:00am	On his property
A5	Abdolov Niyatbek	PAP (owner of property at powerhouse)	Aug 11, 11:30am	On his property
A6	Qishqorov Qishqorbek	PAP (co-owner of affected tire business); employee of security company	Aug 11, 11:30am	At powerhouse (work location)
A7	Bodurov Aydarmamad	PAP (owner of property at intake)	Aug 11, 2:20pm	On his property
A8	Farkhod Chakaboev, Manager	Dehkan Farm	Aug 11, 1:30pm	Near his house
A9	Mavlonazarov Imumnazar	PAP (owner of property at intake)	Aug 11, 2:45pm	On his property
A10	Azizmamadov Olimbek, Head	“Mirsaid Mirshakar” Jamoat (sub-district of Roshtkala District)	Aug 11, 3:00pm	Jamoat office
A11	Ivan Aydarmamadov, Director	LLC “Madad” (local contractor)	Aug 11, 4:00pm	PEC Sebzor administrative building
A12	Amirshoev Khurshed, Director	Labour and Employment Centre, Roshtkala District	Aug 12, 10:30am	District Offices
A13	Yorbekov Odil, Head	Environment Protection Unit, Roshtkala District	Aug 12, 12:00am	District Offices
A14	Loiq Nazarshozoda, Head	Roshtkala District Administration	Aug 12, 1:00pm	District Offices
A15	Dominique Fabio, Resident Engineer	Fichtner Consultants	Aug 12, 3:30pm	PEC Sebzor administrative building
A16	Mavluda Mamadatoeva, Sebzor Social Impact Expert	PEC	Aug 12, 4:00pm	PEC Sebzor administrative building
A17	Malika Mirzobekzoda, Sebzor Environmental Impact Officer	PEC	Aug 12, 5:00pm	PEC Sebzor administrative building
A18	Ramziya Muborakshoeva, Head of Strategic Department	PEC	Aug 13, 9:30am	PEC main office
A19	Anoibsho Sodatshoev, Head of HR Department	PEC	Aug 13, 10:30am	PEC main office
A20	Abdulnazar Abdulnazarov, Director	Pamir Biological Institute of Academy of Sciences, Tajikistan; consultant to PEC	Aug 13, 2:30pm	Khorog botanical garden

A21	Daler Qubotbekov, Procurement Manager	PEC	Aug 13, 4:00pm	PEC main office
A22	Parviz Mamadziyoev, Procurement and Contract Manager	PEC	Aug 13, 4:30pm	site visit to Khorog HPP
A23	Lutfiya Aynalishoeva, Sebzor Finance and Administration Manager	PEC	Aug 13, 5:00pm	PEC Sebzor administrative building
A24	Fokhir Yusufbekov, Sebzor HPP Project Manager	PEC	Aug 14 and 15, 2021	full-day site visits to Sebzor and Pamir-I HPPs
A25	various PAPs	Resettled families building new homes at bridge, intake area and in Upper Chagev	Aug 14	On their properties
A26	Amrikhon Raimov, General Director	PEC	Aug 14, 1:00pm	Lunch
A27	Ofarid Amidkhonov, Head of Regional Project Implementation Unit	PEC	Aug 14, 1:00pm	Lunch
A28	Yodgor Fayzov, Governor	Regional Administration of GBAO	Aug 14, 2:30pm	GBAO offices
A29	Anoibsho Sodatshoev, Head of HR Department	PEC	Aug 16	drive Khorog-Dushanbe
A30	Olena Marushevskaya, Biodiversity Consultant	Blue Rivers	Aug 17, 12:00pm	Video call
A31	Jelena Oplanic and Branko Radovanovic, Resettlement Consultants	Link 011	Aug 17, 1:00pm	Video call
A32	Ruslan Sadyakov, Senior National Program Officer for Infrastructure	SECO Office Dushanbe	Aug 17, 2:00pm	Video call
A33	Jack Mazingo, ESIA Consultant	Independent Consultant	Aug 23, 12:00pm	Video call
A34	Boris Schinke, Environmental and Social Specialist (KfW) Marco Leidel, Environmental and Social Specialist (KfW) Robert Rossner, Portfolio Manager (KfW) Thomas Mohringer, Senior Project Manager (Fichtner) Hans Back, Environmental Specialist (Fichtner)	KfW & Fichtner	Sept 2, 8:00am	Video call
A35	Marco Leidel, Environmental and Social Specialist Thilo Heiberger, Technical Specialist	KfW	Sept 6, 9:00am	Video call
A36	Farida Mamadaslamova, Energy Specialist	World Bank Office Dushanbe	Sept 7, 7:00am	Video call

These interviews were held during the certification assessment in October 2022:

Ref	Interviewee/s, Position	Organisation	Date	Location
B1	Donayor Javariev, Design and Document Controller	PEC	Oct 1, 10:30 am	Project Site

B2	Marziya Navbahorova, Project Secretary & Translator	PEC	Oct 1, 10:30 am	Project Site
B3	Azam Shomirzozoda, Head of Roshtkala District	Roshtkala District Administration	Oct 2, 10:30 am	PEC Sebzor administrative building
B4	Fokhir Yusufbekhov, Project Manager	PEC	Oct 2, 10:30 am, Oct 3, 10 am & 2.30 pm, Oct 4, 2 pm	PEC Sebzor administrative building
B5	Asligul (Mavluda) Mamadatoeva, Sebzor Social Impact Expert	PEC	Oct 2, 2 pm, Oct 3, 10 am & 2pm, Oct 4, 10 am	PEC Sebzor administrative building
B6	Robert Zwahlen, Environmental Consultant	Independent Consultant, Head of Sebzor E&S Team	Oct 2, 2 pm & Oct4, 1:30pm	PEC Main Office
B7	Malika Mirzobekzoda, Sebzor Environmental Impact Officer	PEC	Oct 2, 2 pm	PEC Sebzor administrative building
B8	Riza Haidari, Site Engineer	Contractor (TGEM)	Oct 2, 4 pm	Zoom Meeting
B9	Amirhamza Hukumatov, Health and Safety Officer	Contractor (TGEM)	Oct 2, 4 pm	Project Site
B10	Shirin Aynulloev, Environmental Officer	Contractor (TGEM)	Oct 2, 4 pm	Project Site
B11	Gulnoz Mamadzamirova, HR and Social Impact Officer	Contractor (TGEM)	Oct 2, 4 pm	Project Site
B12	Olimbek Azizmamadov, Head of Mirsaid Mirshakar Community	Mirsaid Mirshakar Community	Oct 3, 10 am	Project Site
B13	Mashrab Alinazarov, Health and Safety Officer	PEC	Oct 3, 10 am	Mirsaid Mirshakar Community Office
B14	Rayhon Jonbekova, Senior Partnership Officer	PEC	Oct 3, 1:30 pm	PEC Sebzor administrative building
B15	Shirinbek Mazambekov, Manager of Disaster Risk Reduction Unit	PEC	Oct 3, 2 pm	PEC Main Office
B16	Abdulhamid Gayosov, Head of Preparedness and Response Unit	Aga Khan Agency for Habitat (AKAH)	Oct 3, 4pm	AKAH Office
B17	Yusuf Raimbekov , Senior Geologist	AKAH	Oct 3, 4pm	AKAH Office
B18	Khubon Oliftaeva , Senior Analyst and Social Research	AKAH	Oct 3, 4pm	AKAH Office
B19	Dilovar Qurbonmamadov, GIS Unit Supervisor	AKAH	Oct 3, 4pm	AKAH Office
B20	Jumaev Gulkhand, Volunteer Leader of Sebzor community	AKAH	Oct 3, 4pm	AKAH Office
B21	Tolibova Gulru, Volunteer at Sebzor community	AKAH	Oct 3, 4pm	AKAH Office
B22	Dodalishoeva Mobegim, Volunteer at Sebzor community	AKAH	Oct 3, 4pm	AKAH Office

B23	Bakhdavlatov Olucha, Volunteer at Sebzor community	AKAH	Oct 3, 4pm	AKAH Office
B24	Saidasad Saidmamadov, Generation Projects Manager	PEC	Oct 4, 8am	AKAH Office
B25	Gabriela Abur, Health and Safety Consultant	Independent Consultant, Sebzor H&S Advisor	Oct 4, 11:30am	PEC Main Office
B26	Ramziya Muborakshoeva, Deputy Director on Governance	PEC	Oct 4, 4pm	Zoom Meeting
B27	Afsona Atobekova, Monitoring and Evaluation Officer	PEC	Oct 4, 10 am	PEC Main Office
B28	Raul Khubunov, Sebzor Civil Works Supervisor	PEC	Oct 4, 11 am	PEC Sebzor administrative building
B29	Parviz Mamadziyoev, Procurement and Contract Manager	PEC	Oct 4, 11 am	Project Site
B30	Aydibekov Mirgarib, Resettlee	Upper Chagev Communities	Oct 4, 11.30 am	PEC Sebzor administrative building
B31	Gulsha Jumakhonov, LRP Project Contractor	Khorog Center for Entrepreneurship	Oct 4, 1 pm	Upper Chagev Village
B32	Faromuz Khonchonov, Generation Projects team leader	Pamir Energy	Oct 4, 2 pm	PEC Sebzor administrative building

Appendix 2 – Documents

Documents 1-106 were used during the 2022 Certification Assessment; documents 107-116 during the 2023 Validation of Gap Closures.

Ref	Author	Year	Title	Notes / links / language
1	Fichtner	2021	Update of Feasibility Study for Sebzor Hydropower Project: Partial FS Report	with drawings and annexes
2	Sweco	2016	Feasibility Study for Sebzor Hydro Power Plant	
3	World Bank	2002	Tajikistan: Pamir Private Power Project. Environment and Social Impact Assessment. Executive Summary.	https://documents1.worldbank.org/curated/en/220691468117870482/pdf/multi0page.pdf
4	World Bank	2019	Project Appraisal Document on a Proposed Grant in the Amount of SDR 22.9 million (US\$31.7 million equivalent) to the Republic of Tajikistan for a Rural Electrification Project (P170132)	https://documents1.worldbank.org/curated/en/179751563156091590/pdf/Tajikistan-Rural-Electrification-Project.pdf
5	World Bank	2019	Support for Preparation of Rural Electrification, Sebzor HPP, and Khorog-Qozideh Transmission Line Projects (P171248): Project Identification Document, Environmental and Social Commitment Plan	https://projects.worldbank.org/en/projects-operations/document-detail/P171248?type=projects
6	Pamir Energy	2019	Environmental and Social Impact Assessment (Final) Sebzor Hydropower Plant, Tajikistan	https://documents1.worldbank.org/curated/en/361291606710879044/pdf/Environmental-and-Social-Impact-Assessment-Rural-Electrification-Project-P170132.pdf
7	Pamir Energy	2019	Environmental and Social Impact Assessment (Final) Sebzor – Khorog 18km 110kV Transmission Line, Tajikistan	
8	Pamir Energy	2019	Stakeholder Engagement Plan Sebzor Hydropower Plant, Associated 110kV transmission lines and Substations	https://documents1.worldbank.org/curated/en/817421569768404590/pdf/Stakeholder-Engagement-Plan-SEP-Support-for-Preparation-of-the-Rural-Electrification-Sebzor-HPP-and-Khorog-Qozideh-Power-Transmission-Line-Projects-P171248.pdf
9	Pamir Energy	2019	Labour Management Procedures for Tajikistan Rural Electrification Project	https://documents1.worldbank.org/curated/en/189401605667013873/pdf/Labor-Management-Procedures-Rural-Electrification-Project-P170132.pdf
10	Pamir Energy	2022	Grievance Log	Excel file
11	Pamir Energy	2021	List of PAPs who want to be involved in the Sebzor HPP project	Word file
12	Pamir Energy	2020	Bidding Document for Procurement of Works: Lot 1: Construction of access road and	

			Lot 2: Construction of Sebzor HPP main operation facility In Construction of Sebzor Hydropower Plant Project in Roshtkala District of VMKB, with Financing from KfW	
13	Pamir Energy	2020	Tender Evaluation Report. Evaluation of Bidders' Offers. Sebzor HPP: Enabling Works Lot 1: Construction of Access Roads Lot 2: Construction of Sebzor HPP Main Operation Facility	with annexes
14	Pamir Energy and LLC Madad	2020	Contract Agreement for Enabling works: Construction of access roads and Construction of Sebzor HPP main operation facility	with annexes
15	Pamir Energy	2020	ESHS Checklist, Camp Construction, 13 Oct 2020	
16	LLC Madad	2021	Sample of periodic reports	In Russian
17	Pamir Energy	2020	Monthly ESHS Compliance Monitoring Report (Nov-Dec 2020) Enabling Works-Base Camp	
18	Pamir Energy	2021	Monthly ESHS Compliance Monitoring Report (March/May 2021) Enabling Works-Base Camp	
19	LLC Madad	2020	Contractor Plans: Material & Waste Management; Traffic Management; Land Management and Erosion Control; Occupational Health & Safety (OHS)	
20	Pamir Energy	2019	Resettlement Policy Framework for Khatlon Last Mile Connections, GBAO Off Grid Solutions and Last Mile Connections, Sebzor Hydropower Project, 110kV Transmission Line from Sebzor to Khorog, 110kV Transmission Line from Khorog to Qozideh	https://documents1.worldbank.org/curated/en/733831605666726759/pdf/Resettlement-Framework-Rural-Electrification-Project-P170132.pdf
21	Pamir Energy	2022	Compensation Payment Mechanism (2 nd Edition)	
22	Pamir Energy	2021	Resettlement Action Plan for Sebzor HPP and 18km 110kV Transmission Line	Final for disclosure
23	Pamir Energy and LINK 011	2020	Sebzor HPP - Land Acquisition for Enabling Works Report; updated 28.07.2020	
24	Pamir Energy and Abdolbekov family	2021	Signed Compensation Agreement Signed Compensation Agreement for Additional Land	
25	BDO Consulting LLC	2020	Draft Valuation Report of Market Value form Land Acquisition as of 15.08.2020. Valuation Object – Land Plot for Agricultural Purposes. Land User – Abdolbekov Abdolbek	
26	BDO Consulting LLC	2020	Draft Valuation Report of the Market Value of Damage from Land Seizure. Valuation Object – Residential Building. Owner - Abdolbekov Abdolbek	
27	Pamir Energy	2020	Database of Socio-Economic Survey of 79 directly affected households	Excel file
28	Blue Rivers Environmental Consulting	2020	SEBZOR HYDROPOWER PROJECT, TAJIKISTAN. Biodiversity Field Surveys - Autumn 2019 Final report	

29	Blue Rivers Environmental Consulting	2020	Sebzor Hydropower Project, Tajikistan. Biodiversity Field Surveys - Spring 2020 Final report	
30	Blue Rivers Environmental Consulting	n.d.	Report on cross-sections	In Russian
31	BWWU	2020	Cross section survey for EFlow calculation – general methodological notes	
32	Aga Khan Foundation, Tajikistan	2021	Annual Report 2020	https://www.akdn.org/publication/aga-khan-foundation-tajikistan-annual-report-2020
33	Ziyodullo Parpiev, Asian Development Bank Institute	2020	Are Public–Private Partnerships a Solution to the Infrastructure Backwardness of Tajikistan? ADBI Working Paper 1192.	https://www.adb.org/sites/default/files/publication/648676/adbi-wp1192.pdf
34	ADB	2017	Tajikistan Power Sector Development Master Plan - Final Report, Vol. 1 and Vol. 2	https://mewr.tj/wp-content/uploads/files/Power_Sector_Master_Plan-Vol1.pdf
35	Fields et al	2013	Tajikistan’s Winter Energy Crisis: Electricity Supply and Demand Alternatives. A World Bank Study.	https://openknowledge.worldbank.org/handle/10986/15795
36	Critical Ecosystems Partnership Fund	2017	Mountains of Central Asia Biodiversity Hotspot	https://www.cepf.net/our-work/biodiversity-hotspots/mountains-central-asia
37	Förster et al	2011	Energy and Land Use in the Pamir-Alai Mountains	Mountain Research and Development, 31(4): 305-314
38	OSCE	n.d.	Natural Hazards in Tajikistan	https://www.osce.org/files/f/documents/1/7/408008.pdf
39	Price and Hakimi	2019	Reconnecting Afghanistan: Lessons from Cross-border Engagement. Chatham House Research Paper	https://www.chathamhouse.org/sites/default/files/CHHJ7132-Afghanistan-Regional-Engagement-RP-WEB.pdf
40	Oxfam	2021	Bringing clean energy and co-benefits to remote communities in Tajikistan and Afghanistan: Pamir Energy	https://policy-practice.oxfam.org/resources/bringing-clean-energy-and-co-benefits-to-remote-communities-in-tajikistan-and-a-621116/
41	ICED	2017	ICED Case Study: Sebzor Hydro Power Project. Bringing energy to rural communities in Afghanistan	https://medium.com/iced-facility/iced-case-study-sebzor-hydro-power-project-29d81fb5edaa

42	OECD	n.d.	Trends in Tajikistan’s sustainable infrastructure investments. In: Sustainable Infrastructure for Low-Carbon Development in Central Asia and the Caucasus - Hotspot Analysis and Needs Assessment	OECD iLibrary
43	World Bank	2021	Worldwide Governance Indicators - Tajikistan	https://info.worldbank.org/governance/wgi/
44	Vanselow et al	2016	Preserving a Comprehensive Vegetation Knowledge Base – An Evaluation of Four Historical Soviet Vegetation Maps of the Western Pamirs (Tajikistan)	PLoS ONE 11(2): e0148930. doi:10.1371/journal.pone.0148930
45	UNDP	2020	Human Development Report 2020. The Next Frontier: Human Development and the Anthropocene. Briefing note for countries on the 2020 Human Development Report: Tajikistan	http://hdr.undp.org/sites/default/files/Country-Profiles/TJK.pdf
46	Wikipedia	2021	Roshtqal'a District; Khorugh; Panj (river)	
47	UNEP et al	2011	Environment and Security in the Amu Darya Basin	https://wedocs.unep.org/handle/20.500.11822/7517
48	ZOI and UNECE	2013	Visual Atlas of Cooperation. Afghanistan and Tajikistan. Environment and Hydrology in the Upper Amu Darya Basin	http://archive.zoinet.org/web/AFG-TJK-Atlas
49	FAO	2012	AQUASTAT Country Profile – Tajikistan	https://www.fao.org/aquastat/en/countries-and-basins/country-profiles/country/TJK
50	Rapid Emergency Assessment & Coordination Team Tajikistan	2015	Mudflow in Shughnan District, Gorno-Badakhshan Autonomous Oblast (GBAO), Tajikistan. Situation Report # 2, 8 July 2015	https://reliefweb.int/report/tajikistan/mudflow-shughnan-district-gorno-badakhshan-autonomous-oblast-gbao-tajikistan-0
51	Aga Khan Agency for Habitat (Republic of Tajikistan)	2020	Report On the Outcomes of Landslide Slopes assessment of Sebzor HPP, Roshtkala District	
52	BDO	2020	Open Joint Stock Company “Pamir Energy Company” Financial Statements and Independent Auditor’s Report for the year ended 31 December 2019	
53	Aga Khan Development Network	2021	Lighting the Roof of the World	PPT presentation
54	Pamir Energy	2021	Sebzor HPP Implementation Unit Structure	
55	Barbone et al	2010	Tajikistan: Key Priorities for Climate Change Adaptation. World Bank Policy Research Working Paper 5487.	https://openknowledge.worldbank.org/handle/10986/3969?show=full
56	Pamir Energy	n.d.	Sebzor HPP Environmental Social Impact Assessment	2-page leaflet in Russian
57	Pamir Energy	2020	Environmental and Social Policy of Pamir Energy Company	
58	GBAO Government	2017	Resolution of RT on allocating land for construction of HPP Sebzor	In Tajik

59	Environmental Protection Committee	2016	Summary: State Ecological Expertise	In Tajik
60	Pamir Energy	2021	Grievance Resolution Report (Mirzobekov Mirzobek and Qarachabekov Yormamad)	
61	UNDP		Mapping registered extreme poverty in rural Tajikistan. Analytical Brief	http://untj.org/jambi-project/images/Extreme-Poverty_ENG.pdf
62	Ministry of Economics	2021	Tajikistan Midterm Development Program for 2021-2025 (draft)	In Russian
63	GIZ	2020	Climate Change Profile: Tajikistan	https://www.landuse-ca.org/wp-content/uploads/2019/04/2020_GIZ-Climate-Profile-Tajikistan_EN.pdf
64	World Bank	2019	Project Information Document/Identification/Concept Stage (PID)	https://documents1.worldbank.org/curated/en/641441566910988408/pdf/Project-Information-Document-PID-Support-for-Preparation-of-Rural-Electrification-Sebzor-HPP-and-Khorog-Qozideh-Transmission-Line-Projects-in-GBAO-P171248.pdf
65	UNFCCC		Intended Nationally Determined Contribution (INDC) towards the achievement of the global goal of the UN Framework Convention on Climate Change (UNFCCC) by the Republic of Tajikistan	https://unfccc.int/sites/default/files/NDC/2022-06/INDC-TJK%20final%20ENG.pdf
66	Pamir Energy	2021	Sebzor HPP Resettlement Action Plan Budget (Draft 15.02.2021). Revised in line with KfW's Comments	Excel file
67	Daler Jumaev	n.d.	Tajikistan. Energy Sector. Pamir Private Power Project (PPPP)	PPT presentation
68	UNDP and Ministry for Industry and Energy of the Republic of Tajikistan	2007	Strategy for Development of Small Scale Hydropower of the Republic of Tajikistan	https://policy.asiapacificenergy.org/sites/default/files/Strategy%20for%20the%20Development%20of%20Small%20Scale%20Hydropower%20of%20the%20Republic%20of%20Tajikistan%20%28EN%29.pdf
69	European Union	2020	Action Document for the Electrification of Badakhshan Province	
70	Pamir Energy	2017	VMKB Power Supply Area Coverage	Map
71	ADB	2016	Country Partnership Strategy: Tajikistan (2016-2020). Sector Assessment (Summary): Energy	https://www.adb.org/sites/default/files/link-ed-documents/cps-taj-2016-2020-ssa-02.pdf
72	Critical Ecosystem Partnership Fund	2017	Mountains of Central Asia Ecosystem Profile. Visual Summary	
73	UNDP	n.d.	Project Document: Conservation and sustainable use of Pamir Alay and Tien Shan ecosystems for snow leopard protection and sustainable community livelihoods	http://www.thegef.org/projects-operations/projects/6949

74	Bertelsmann Stiftung	2020	Bertelsmann Stiftung's Transformation Index (BTI) 2020 Country Report. Tajikistan	https://bti-project.org/fileadmin/api/content/en/downloads/reports/country_report_2020_TJK.pdf
75	Oxfam	n.d.	Reaching Tipping Point? Climate Change and Poverty in Tajikistan	https://www.oxfam.org/en/research/reaching-tipping-point-climate-change-and-poverty-tajikistan
76	Agency of Standardization, Metrology, Certification and Trade Inspection		Certificate of Conformity of Quality Management System Certification (ISO 9001:2015) – valid until 14.05.2023	
77	Pamir Energy	2022	Sebzor Hydropower Project Gap Resolution Report	Word file with annex
78	LLC "Sajar" Construction Company	2021	Annex 1: Environmental and Social Management Plans. Construction of Sebzor – Khorog 18km 110kV Transmission Line	
79	Pamir Energy	2019	Environmental and Social Impact Assessment. Khorog – Qozideh 63km 100kV Transmission Line	
80	Pamir Energy	2021	Environmental and Social Management Plan (ESMP) for Sebzor HPP Acceleration Measures. Updated on 10.12.2021	
81	Pamir Energy	2022	Environmental and Social Management Plan (ESMP) (Updated Version). Sebzor Hydropower Plant	
82	Pamir Energy	2022	Construction Phase Environmental and Social Management Plan (C-ESMP) (1 st Draft). Construction of 110kV Sebzor Substation	
83	Pamir Energy	2021	Resettlement Action Plan for Sebzor HPP Project and 18 km 110 kV Transmission Line. Annex B – Implementation of Livelihood Restoration Assistance Packages (Final)	Word file. In English and Russian
84	Pamir Energy	2022	Resettlement Action Plan for Sebzor HPP Project and 18 km 110 kV Transmission Line. Annex C – Community Development Plan (Final) - with raw data	Word file. In English and Russian
85	Pamir Energy	2022	Samples of newsletters	In Tajik
86	Pamir Energy	2021	Samples of Minutes of Meeting. Update on RAP and Implementation Schedule.	Word file
87	Pamir Energy	2022	Sliddeck on Disaster Risk Reduction	PPT presentation
88	Pamir Energy	2022	Latest Hydrological Information Sebzor's Gauging Station	Word file with a graph and Excel file
89	Pamir Energy	n.d.	List of Employees of Sebzor NPO Construction Project	
90	Pamir Energy	n.d.	Monthly Report to the Government	Word file, in Tajik

91	Pamir Energy	2021	Pamir Energy Safeguarding Policy	Word file
92	Fichtner	2022	Progress Report No. 4. Quarterly Report April 2022 to June 2022	
93	Pamir Energy	2022	Sebzor HPP. RAP Progress Report (Reporting Period: 26 th of September – 7 th of October, 2022)	
94	Pamir Energy	2022	Resettlement Stories of Azizov Tulforbek, Nodira Azizkhonova and Mavlonazarov Imomnizat (Approved for Publication)	Word file
95	Pamir Energy	2019	Sample of Accident Report	In Tajik
96	Pamir Energy	2019	Sample of Insurance Payment	In Tajik
97	Pamir Energy and UCA	2022	Consulting Contract between OJSC Pamir Energy and School of Professional and Continuing Education (SPCE) of the University of Central Asia (UCA). Relating to Consultant Services for Realization of the Livelihood Restoration Program under Sebzor HPP Construction Project	
98	Pamir Energy and HF Consulting Engineers	2021	PQ Evaluation Report. Procurement of Goods and Services for the Civil Works and Hydraulic Steel Structures	
99		n.d.	Gender Violence. Within the Environmental and Social Framework	PPT presentation, in Tajik
100	Pamir Energy and HF Consulting Engineers		Annex 1 – 6 for Sebzor HPP Evaluation PQ Civil Works	
101	Fichtner	2022	Bid Evaluation Report. Procurement of Works: Civil Works and Hydraulic Steel Structures	
102	Pamir Energy	2022	E&M Tender Package	
103	Pamir Energy	2008	Health and Safety Policy	In Russian
104	USAID		Battery Energy Storage System Feasibility Study Report for Evaluation II Seasonality Impact Evaluation (Draft)	
105	Pamir Energy	2021	Prequalification Document for Procurement of Goods and Services for the Civil Works and Hydraulic Steel Structures	
106	Pamir Energy	2021	Tender Package. Construction of 11 MW (run-of-river) Sebzor Hydropower Plant Project Civil Works and Hydraulic Steel Structures	
107	Pamir Energy	2023	Certification of the Sebzor Hydropower Project against the Hydropower Sustainability Standard: Gap Resolution Report (March)	
108	Pamir Energy	2023	Attachment 1: Environmental and Social Management Plan (ESMP) (Updated Version) Sebzor Hydropower Plant, Tajikistan. Update of 2023-04-10	
109	Pamir Energy / TGEM	2023	Attachment 2: Construction of 11 MW (run-of-river) Sebzor Hydropower Plant Project. Civil Works and Hydraulic Steel Structures. Site Specific Environmental and Social Management Plan	
110	Pamir Energy	2023	Attachment 3: Pamir Energy Company Corporate Social Responsibility (CSR) Activities in Roshtqala District	

111	Pamir Energy	2023	Attachment 4: Updated Community Health & Safety Monitoring Plan (ESMP)	
112	Pamir Energy	2023	Attachment 5: Roundtable Discussion on Probability of Transmission of Infectious Diseases due to Labor Influx to Sebzor Project Area and Identifying Preventative Measures. February 24th, 2023	
113	TGEM	2023	Contractor Contracts with Central Hospital in Khorog, and with First Aid Station in Khorog regarding Ambulance	
114	Pamir Energy	2023	Maps of Upstream and Downstream Water Quality Sampling Locations	
115	Pamir Energy	2023	Presentation to Assessors: Project Update and Gap Closures. June 3 2023	
116	Agency of standardization, metrology, certification and trade inspection under the Government of the Republic of Tajikistan	2023	Certificate of Conformity of Environmental Management System with international standard ISO 14001:2015 N°T J762.37100.01-002-2021.059 Issued to OJSC «Pamir Energy» Valid from 31. 05. 2023 until 31. 05. 2026	

Appendix 3 – Photographs

Photos 1-81 were taken during the HESG assessment in August 2021.

		
<p>Photo 1: Downstream view from Botanical Garden: Khorog with Khorog HPP and confluence of Gund and Shokhdara rivers</p>	<p>Photo 2: Upstream view from Botanical Garden: Khorog with University of Central Asia campus and Gund River</p>	<p>Photo 3: Bartang River, major downstream tributary to Panj River</p>
		
<p>Photo 4: Downstream border crossing into Afghanistan over Panj River</p>	<p>Photo 5: Border crossing into Afghanistan over Panj River, near Khorog</p>	<p>Photo 6: Panj River with PEC transmission line on Afghan side</p>



Photo 7: Galleries to protect Pamir Highway in Gund valley from rockfall



Photo 8: Pamir-1 HPP powerhouse



Photo 9: Barsem debris flow partially blocking Gund River



Photo 10: Intake for Khorog HPP on Gund River



Photo 11: Khorog HPP



Photo 12: Interview with Governor of GBAO



Photo 13: Ministry of Energy and Water Resources, Dushanbe

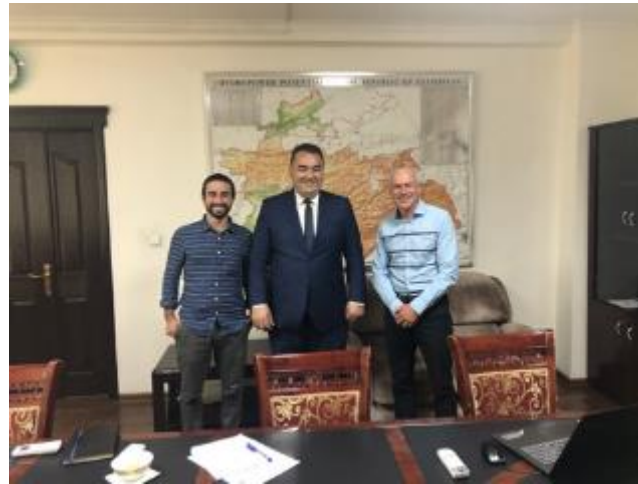


Photo 14: Interview with Minister of Energy and Water Resources



Photo 15: Gate to PEC main office and Khorog HPP



Photo 16: Roshtkala district gate



Photo 17: Roshtkala PEC customer service building



Photo 18: Sewing factory in Roshtkala town



Photo 19: Debris fan in upper Shokhdara valley



Photo 20: Fish ponds in upper Shokhdara valley



Photo 21: Interview with head of Jamoat (sub-district) administration



Photo 22: Mental hospital in Roshtkala district, upstream of reservoir



Photo 23: New home for family resettled from flood zone



Photo 24: Solid waste dump for Roshtkala district



Photo 25: Spoil disposal area 1



Photo 26: Spoil disposal area 2



Photo 27: Old bridge upstream of intake



Photo 28: Flow gauge at old bridge



Photo 29: Old school on riverbank at reservoir



Photo 30: Upstream view at weir site



Photo 31: Refilled test pit at school



Photo 32: Test drilling at bridge upstream of intake



Photo 33: Ground-breaking ceremony at intake



Photo 34: Affected people at intake



Photo 35: Construction traffic dust at intake



Photo 36: Harvesting of hay before excavation at intake



Photo 37: Roadside tire business at intake



Photo 38: Trees felled by resettled family



Photo 39: Intake area from downstream



Photo 40: Steep riverbank at intake



Photo 41: Outhouse of resettled family



Photo 42: Disused water mill in bypass stretch



Photo 43: Construction traffic



Photo 44: Children on road



Photo 45: Steep roadside slopes



Photo 46: PEC Sebzor administrative building



Photo 47: Finishing works at PEC Sebzor building



Photo 48: Vehicle for workers of Sebzor administrative building contractor



Photo 49: Topsoil excavation at intake



Photo 50: Contractor camp area next to PEC Sebzor administrative building



Photo 51: Pedestrian bridge to 8 homes on left bank



Photo 52: Security office at intake



Photo 53: Bridge to Sebzor village on left bank near powerhouse



Photo 54: Sebzor village school



Photo 55: Plaque for Russian kayaker's fatal accident

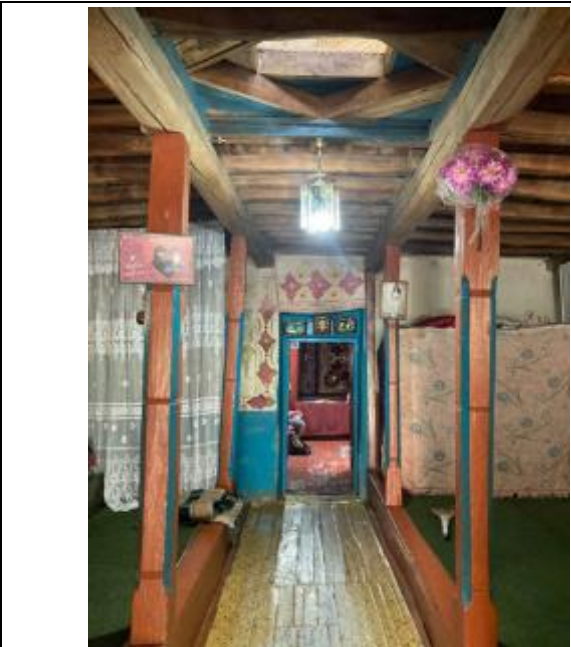


Photo 56: Traditional home of resettleses



Photo 57: Drill cores at powerhouse



Photo 58: Demolishing of resettled family home at powerhouse



Photo 59: Drilling contractor workers' accommodation in tent



Photo 60: Project-affected people and PEC E&S staff at powerhouse



Photo 61: Ownership certificates for resettles



Photo 62: Family to be resettled from powerhouse area



Photo 63: Washing machine purchased from compensation payment



Photo 64: Typical gravesite, close to new substation



Photo 65: Project-affected person employed as security guard



Photo 66: Signage in front of drill rig at powerhouse



Photo 67: Tailrace site



Photo 68: Lower Chagev and Upper Chagev villages



Photo 69: New home site preparation in Upper Chagev



Photo 70: New home for resettled family in Upper Chagev / 1



Photo 71: New home for resettled family in Upper Chagev / 2



Photo 72: New home for resettled family in Upper Chagev / 3



Photo 73: Terraces to protect Upper Chagev from rockfall



Photo 74: Transmission line tower foundations in Upper Chagev



Photo 75: PEC quarry



Photo 76: Interview with head of Pamir Biological Institute in Khorog botanical garden



Photo 77: New 110kv substation at Khorog HPP

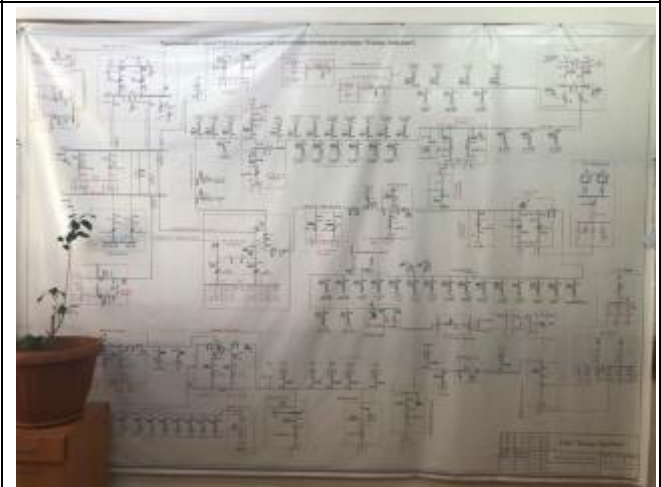


Photo 78: PEC network diagram



Photo 79: PEC emergency action plans



Photo 80: PEC control centre

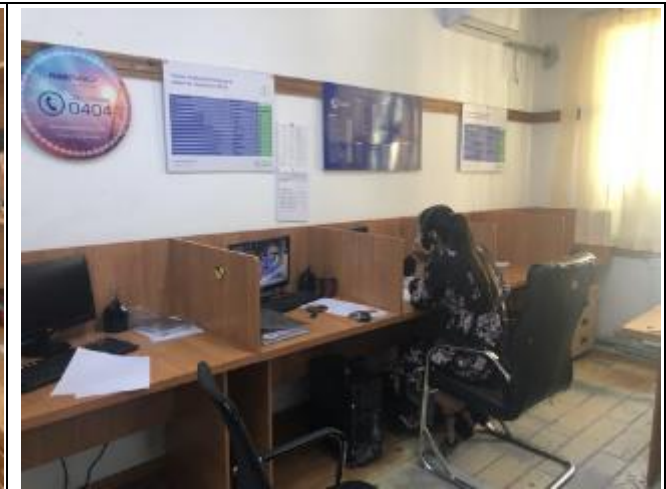


Photo 81: PEC customer call centre

Photos 82-126 were taken during the certification assessment in October 2022.



Photo 82: Concrete batching plant below Sebzor base camp (administration office)



Photo 83: Excavation for Sebzor powerhouse



Photo 84: Sebzor substation under construction



Photo 85: River diversion channel under construction



Photo 86: River diversion channel with bridge under construction



Photo 87: Proposed sand quarry site upstream of the reservoir



Photo 88: Safety signs at the intake construction site



Photo 89: Fire safety equipment at the intake construction site



Photo 90: Speed restriction sign at the intake construction site



Photo 91: Safety signs and suggestion box at switchyard area



Photo 92: Fencing and safety signage at intake construction site



Photo 93: Loose rocks observed at slopes above the project site



Photo 94: Unstable riverbank immediately downstream of the intake



Photo 95: Dust plume generated by soil excavation near the base camp



Photo 96: Dust control at site



Photo 97: Site office and medical post at intake construction site



Photo 98: Interview with TEGM (contractor) staff



Photo 99: Traffic blockage due to project-related transport mishap



Photo 100: Replacement homes for homes destroyed in avalanche, funded by PEC and Ministry of Energy and Water Resources



Photo 101: Local community member at construction site, waiting to hitchhike



Photo 102: Staff accommodation at base camp



Photo 103: Comments box at base camp



Photo 104: Project information and comment box at the old school



Photo 105: Sebzor information corner and comment box at Jamoat Administration Office



Photo 106: Comment box at substation construction site



Photo 107: Existing road, requiring rebuilding due to impoundment



Photo 108: Business buildings in Barjingal village that will be relocated



Photo 109: One of the newly built houses for resettlers near the intake



Photo 110: Newly built houses for resettlers near the intake



Photo 111: One of the old school buildings located above the reservoir and to be rebuilt at higher elevation



Photo 112: Classroom of existing school building



Photo 113: Traditional heating system used in existing school classroom



Photo 114: Refurbished education and cultural centre, to serve as temporary school



Photo 115: Newly completed home at Upper Chagev



Photo 116: New home at Upper Chagev with typical Pamiri architecture



Photo 117: Interior of newly built home



Photo 118: Nearly completed home at Upper Chagev



Photo 119: Temporary spoil and material storage area



Photo 120: Upper Chagev in October 2022



Photo 121: Project-affected people attending Business Planning Program as part of the LRP



Photo 122: Interview with head of Jamoat administration



Photo 123: Interview with resettled household



Photo 124: Interview with community member on usage of river water



Photo 125: Meeting with PEC Director Mr. Amrikhon Raimov



Photo 126: Meeting with Mr. Saidasad Saidmamadov, Generation Projects Manager, PEC