



# Hydropower Sustainability Environmental, Social and Governance Gap Analysis Tool

Version May 2020

## Preparation Stage



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# Hydropower Sustainability Environmental, Social and Governance Gap Analysis Tool



About the HESG	The Hydropower Sustainability Environmental, Social and Governance Gap Analysis Tool (HESG) enables hydropower project proponents and investors to identify and address gaps against good international industry practice. The HESG is based on the assessment framework of the Hydropower Sustainability Assessment Protocol (HSAP) and draws from the definitions of good international industry practice of the Hydropower Sustainability Guidelines on Good International Industry Practice (HGIIP).
Intended users and uses	<p>The HESG includes three separate stage tools: Preparation, Implementation and Operation. These reflect the different stages of hydropower development and have been designed to be used as standalone documents. Each tool provides an action plan to help project teams address any gaps against good practice.</p> <p>Official HESG assessments are carried out by accredited assessors, who take an evidence-based approach. All findings are supported by objective evidence, which is factual, reproducible, objective and verifiable. The HESG is most effective when operators and developers commit to implement the recommendations provided and resolve identified significant gaps. In addition, the tool is aligned with the safeguards and standards of international financial institutions and can be used to attract climate-aligned investment.</p> <p>Hydropower development and operation may involve public entities, private companies or combined partnerships, and responsibilities may change as the project progresses through its life cycle. It is intended that the organisation with the primary responsibility for a project at its particular life-cycle stage will have a central role in any HESG assessment.</p>
Structure of the tool	The HESG comprises 12 sections that cover the environmental, social, governance and climate change topics of the HSAP and HGIIP. A summary at the beginning of the report presents any significant gaps against basic good practice and outlines an action plan for improved performance. Within each section, requirements for good international industry practice are presented and project findings are provided. For each finding, a key indicates whether the requirement is met. A summary section analyses significant gaps and identifies each one with the symbol ●.
Supporting resources	Additional guidance on the structure, content and history of the HESG can be found online at: <a href="http://www.hydrosustainability.org">www.hydrosustainability.org</a>
Version date	May 2020

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## A. Assessment Details

Project sponsor	Pamir Energy Co. (PEC), majority owned by the Aga Khan Fund for Economic Development (AKFED)
Assessor(s)	Joerg Hartmann PhD, Accredited Lead Assessor, Sustainable Water & Energy LLC
Observer(s)	Alain Kilajian, Senior Sustainability Specialist, International Hydropower Association (IHA)
Assessment objective	<ul style="list-style-type: none"> <li>● Identify any gaps, build capacity within PEC, and improve the Sebzor HPP’s socio-environmental management system before the inception of the project construction, to minimize negative impacts and realize positive opportunities</li> <li>● Enhance PEC’s relationship and communication with regional governments, communities, development partners and other stakeholders</li> <li>● Increase transparency and sustainability of hydropower project development at the national level</li> <li>● Promote international best practices in hydropower sustainability regionally</li> <li>● Broaden the sources of funding for PEC</li> </ul>
Assessment dates	August 9-18, 2021
Assessment report date	Final draft for publication – October 12, 2021
Prepared for	PEC
Limitations of the assessment	<p>A share of the power to be produced by the Sebzor HPP is intended for sale to and distribution by Badakhshan Energy, the concessionaire for the power system in Afghanistan’s Badakhshan Province. Badakhshan Energy is a recently formed sister company of PEC, also owned by AKFED. Due to the security situation in Afghanistan, with a change in government during the on-site assessment, it was not possible to visit any facilities or interview beneficiaries in Badakhshan. However, the assessor was able to interview PEC staff with responsibility for supporting Badakhshan Energy with resource mobilization, infrastructure investments, and operations.</p> <p>There were also some logistical constraints on the on-site assessment due to the Covid-19 pandemic. These limitations do not affect the results of this assessment.</p>

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## B. Project Details

Project name	Sebzor Hydropower Project (HPP)
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 detailed design underway; preparatory works started in 2020
Commercial operations date (planned or actual)	Planned for 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)	18km 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)
Levelized 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 <sup>2</sup> )	5 ha (~0.5 ha more than original water surface)
Average net head at FSL (m)	110.2 m

Average flow (m <sup>3</sup> / s)	27.2 m <sup>3</sup> /s
Design flow (m <sup>3</sup> / s)	12.0 m <sup>3</sup> /s
Load factor	80%
Number of physically displaced households	18 households due to HPP; none due to TL
Power density (W / m <sup>2</sup> )	11 MW / 0.5 ha = 11,000,000 / 5,000 m <sup>2</sup> = 2,200
Emissions intensity (gCO <sub>2</sub> e / kWh)	Not relevant
Contacts / website	<a href="http://www.pamirenergy.com">www.pamirenergy.com</a>



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 (GBAO). The GBAO has an area of 64,200 km<sup>2</sup> with approximately 230,000 inhabitants, resulting in a very low population density of 3.6/km<sup>2</sup>. Khorog is the administrative center of GBAO with approximately 30,000 inhabitants. The Pamir Highway as the only major road in GBAO connects Tajikistan’s capital Dushanbe to Khorog, Murghab, and Osh in Kyrgyzstan. The Afghan province to the west of GBAO is Badakhshan, with the capital of Fayzabad.

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Sebzor Hydropower Project



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.

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Figure 3 – Overview of Shokhdara Valley in Roshtkala District with future Sebzor powerhouse site located in Lower Chagev village in foreground (right bank), and Sebzor village on left bank



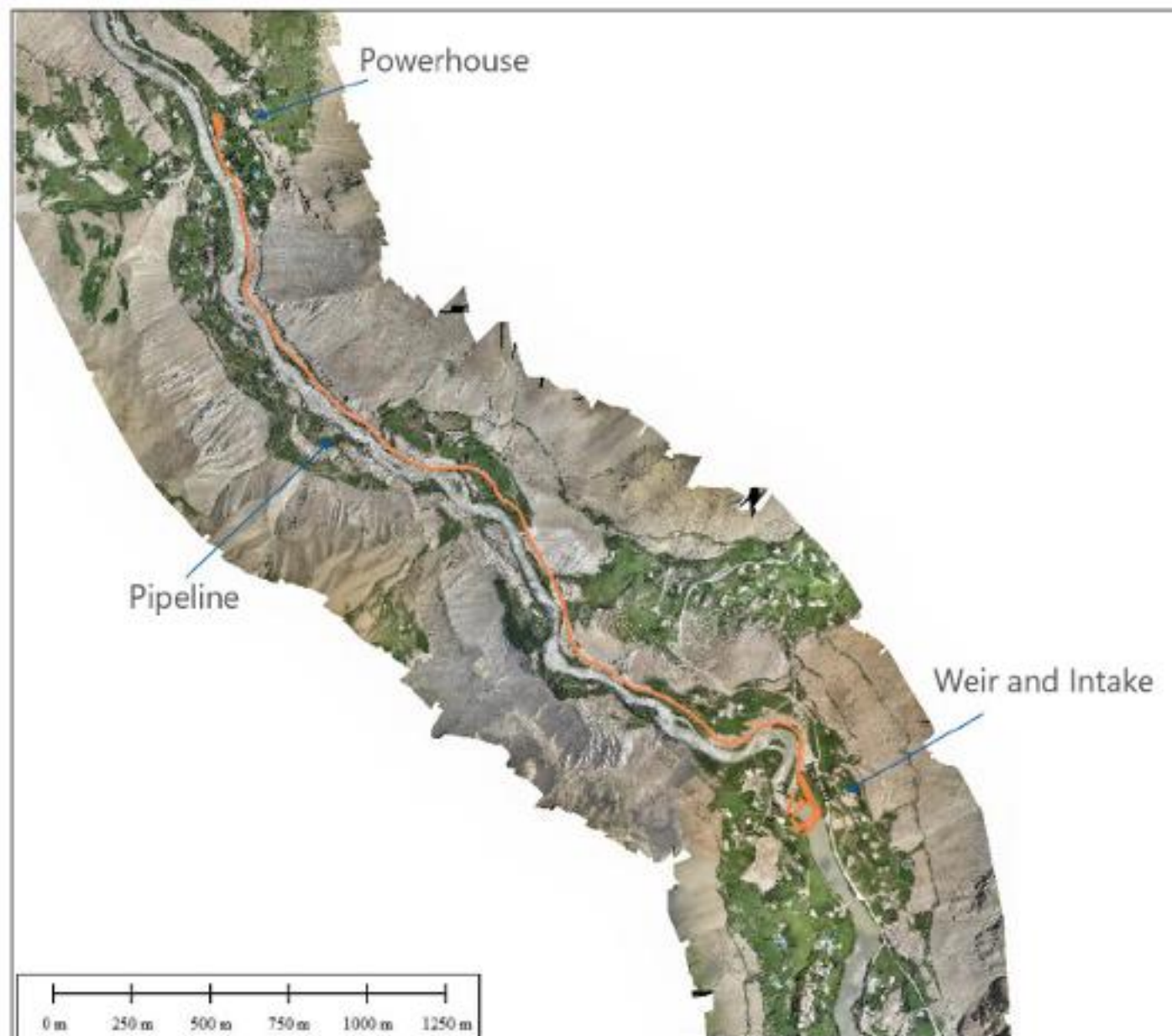
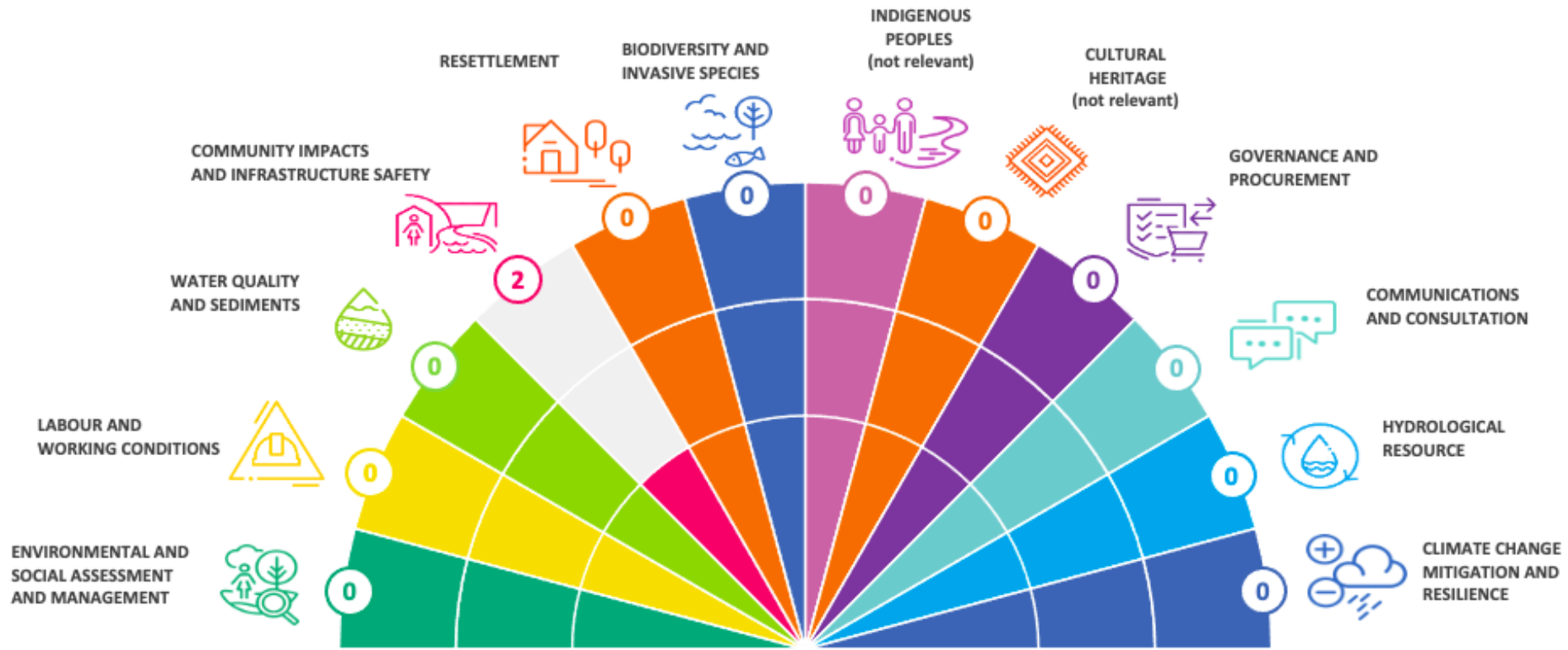


Figure 4 – Sebzor project layout according to updated draft feasibility study (Fichtner 2021). The 3 km pipeline between the intake and the powerhouse will be laid into the road on the right bank of the Shokhdara River. From the substation next to the powerhouse, an 18 km 110 kV transmission line will run to a new substation at Pamir Energy’s main operational centre in Khorog, next to the Khorog HPP.

### C. HESG Gap Analysis Diagram

(Note that gaps are counted only under one section, although they may affect various sections as mentioned in the body of the report, and as listed in Section E.)



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## D. Significant gaps

(Note that gaps are counted only under one section, although they may affect various sections as mentioned in the body of the report, and as listed in Section E.)

List of significant gaps:		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
1.	Some social impacts have not yet been fully assessed and as a consequence, insufficient baseline information has been collected and no specific management or compensation plans have been developed for these impacts.				x							
2.	There has been only a cursory assessment of dam safety risks, only a generic assessment of road safety risks, and no assessment of the contribution of geohazards to dam and road safety risks. As a consequence, only partial safety management plans have been developed and a number of uncertainties remain regarding outcomes for public safety.				x							
<b>NUMBER OF SIGNIFICANT GAPS BY SECTION:</b>					2							
<b>TOTAL NUMBER OF SIGNIFICANT GAPS:</b>		<b>2</b>										

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## E. Environmental and Social Action Plan (ESAP)

The following actions are recommended to address and resolve the significant gaps.							
Section	Significant gaps	Action(s)	Responsibility	Indicator of achievement	Timeframe		
					<12 months	12-24 months	>24 months
1, 4	Some social impacts have not been fully assessed and as a consequence, insufficient baseline information has been collected and no specific management or compensation plans have been developed for these impacts.	<ol style="list-style-type: none"> <li>1) Detailed baseline study of current traffic along the road between weir and powerhouse</li> <li>2) Traffic management plan including measures for mitigation and compensation of traffic disruptions; integrated with construction plan for pipeline</li> <li>3) Ensure social monitoring, grievance mechanism and social management budget are adequate to address all indirect and unforeseen impacts</li> </ol>	PEC, with support from specialized consultants and in cooperation with roads authority and local governments, as required	<ol style="list-style-type: none"> <li>1) Baseline study</li> <li>2) Traffic management plan</li> <li>3) Social management framework</li> </ol>	< 6 months		
4, 12	There has been only a cursory assessment of dam safety risks, only a generic assessment of road safety risks, and no assessment of the contribution of geohazards to dam and road safety risks. As a consequence, safety management plans have been only partially developed and a number of uncertainties remain regarding outcomes for public safety.	<ol style="list-style-type: none"> <li>1) Cover dam safety in final feasibility study, including risks from geohazards</li> <li>2) Cover road safety in final feasibility study and Traffic Management Plan, including risks from geohazards</li> <li>3) Develop and implement adequate early warning, emergency preparedness and response plans for construction and operation, jointly with relevant public authorities</li> </ol>	PEC, with support from specialized consultants and in cooperation with public authorities	<ol style="list-style-type: none"> <li>1, 2) Final feasibility study</li> <li>3) Report on early warning, emergency preparedness and response measures</li> </ol>	< 6 months		

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# 1 Environmental and Social Assessment and Management

Scope and Intent	
<p>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 intent is that environmental and social impacts are identified and assessed, and that avoidance, minimisation and mitigation measures are designed and implemented.</p>	

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 UScents 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)

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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	Tajikistan’s Human Development Index value for 2019 is 0.668, which ranks the country at 125 out of 189 countries and territories. 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.

Requirement	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<b>1.1 Assessment</b>		
Assessments of project environmental and social impacts	✓	After preliminary reviews of impacts in the pre-feasibility and initial feasibility stages, full ESIA’s 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 and aquatic biodiversity were agreed and are ongoing.
Assessments address:		
● project implementation	✓	The ESIA’s address potential impacts and mitigation measures during the construction stage.
● project operation	✓	The ESIA’s address potential impacts and mitigation measures during the operation stage.
● associated facilities	✓	Separate ESIA’s have been prepared for the Sebzor-Khorog TL and for other PEC infrastructure.
● cumulative impacts	✓	The sections of the ESIA’s dealing with cumulative impacts are very short and only deal with cumulative impacts within the Shokhdara valley. The impacts of multiple HPPs on the 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.
● 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

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		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 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. Some additional studies on specific concerns have already been commissioned.
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 but have 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). On some of these, additional studies are being undertaken (e.g. priority needs of local communities, which will be established for the Community Development Plan (CDP)).  For others, there are no specific plans. This is a particular concern for people affected not by land acquisition, but through other impact pathways, as described in section 4. Without baseline studies it will be difficult to design mitigation approaches and track how their livelihoods and quality of life has changed, as a result of the project. This is considered a <b>significant gap</b> against basic good practice, and is counted under section 4, Project-Affected Communities.
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 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.
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

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		<p>to geohazards and diversification of supply. The project is also a part of the draft Tajikistan Midterm Development Program for 2021-2025.</p> <p>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 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.</p>
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 considerations (particularly land acquisition) into account.
<b>1.2 Management</b>		
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 a range of specific processes for the Sebzor project have been developed e.g. for compensation payments, grievance mechanisms, and waste disposal. Because most of PEC’s investment projects are donor-funded, with different requirements for each donor, there is potential to further harmonize and consolidate processes into one E&S Management System with clear responsibilities.
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.

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Plans address project operation	✓	Some components of the ESMPs – such as environmental flows - also address the operations stage, some can be continued from the implementation stage, and for others which are still missing, there is sufficient time until project commissioning.
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 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. However, section 4 describes some social impacts in more detail that are not yet addressed, such as lengthy traffic disruptions along the main road in the Shokhdara valley; this is the same <b>significant gap</b> against basic good practice as in section 4.
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 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.
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.
<b>1.3 Outcomes</b>		
Environmental and social plans avoid, minimise and mitigate negative impacts with no significant gaps	✓	The ESMP sections in the ESIA are comprehensive but quite general. The more detailed action plans submitted by contractors to date are generally adequate, for the type of construction included in the preparatory or enabling works, if enforced consistently. For the major upcoming contracts, more detailed plans for traffic management and other issues still need to be developed (see section 4).

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The strategic fit of the project with needs for water and energy services, and relevant policies and plans can be demonstrated	✓	The Sebzor HPP fits well into PEC’s strategic expansion plans, which aim for a stepwise increase in both generation capacity and supply area.
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 can pay for social and environmental plans and commitments	✓	The project budget as planned in the draft feasibility study has reserved approximately 5% for environmental and social measures; and both PEC and donors would be highly 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.

### Summary of Findings

Summary and other notable issues	List of significant gaps
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 by 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.	<ul style="list-style-type: none"> <li>Some social impacts have not yet been adequately assessed and as a consequence, insufficient baseline information has been collected and no specific management or compensation plans have been developed.</li> </ul> <p>(This gap is counted under section 4, to avoid double-counting).</p>

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## 2 Labour and Working Conditions

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

Background	
Labour requirements during implementation (full-time equivalent)	<p>For HPP:</p> <ul style="list-style-type: none"> <li>• According to ESIA, 250-300 workers employed by contractors, with 150-200 local and 75-150 nonlocal workers</li> <li>• According to PEC Labour Management Procedures, 475 workers employed by contractors (including road and bridge works), plus 5 PEC staff</li> </ul> <p>For TL:</p> <ul style="list-style-type: none"> <li>• ~40 workers employed by contractors, many or most local, plus 4 PEC staff</li> </ul>
Labour requirements during operation (full-time equivalent)	~ 20 permanent PEC 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>

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Requirement	Requirement is met:	Findings and Observations
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	yes (✓) or no (✗)	
<b>2.1 Assessment</b>		
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. All staff are Tajik, with no expatriates. Most workers during project implementation will also be locals. Labour requirements for the project are also addressed in the ESIA's and in PEC's Labour Management Procedures.
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 partially assessed (see section 3). The assessments have not yet included risks related to the Covid-19 pandemic. This is acceptable 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.
<b>2.2 Management</b>		
Human resource and labour management policies, plans and processes have been developed for project implementation	✓	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.  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, contracts, monitoring and reporting include labour issues. 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

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		relevant for local contractor). 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).
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 enforce labour protection for contractor and subcontractor workers.
<b>2.3 Outcomes</b>		
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.

Preparation

**Summary of Findings**

Summary and other notable issues	List of significant gaps
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	There are no significant gaps against basic good practice.

for labour management and OH&S. PEC is one of the most important and attractive employers in the GBAO.	
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### 3 Water Quality and Sediments

<b>Scope and Intent</b>	
<p>This section addresses the management of water quality, erosion and sedimentation issues associated with the project. The intent 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.</p>	
<b>Background</b>	
<b>Sedimentology</b>	
Key sediment issues	<p>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.</p> <p>Sand for construction purposes will be extracted from the Shokhdara River; probably from 3km upstream of weir. Aggregates for concrete will be extracted from PEC’s own quarry, downstream from the Sebzor HPP on the right bank.</p>
Sediment load (tonnes/year)	No measurements; estimated at 445 t/km <sup>2</sup> /a or 1.69 million t/a plus ~10% bedload
Catchment area at the dam	Mountainous catchment of 3,794 km <sup>2</sup> between 2,100 masl and 4,500 masl
<b>Water Quality</b>	
Description of water quality	High
Key water quality issues	<p>Significant bacterial pollution in Shokhdara River, especially in warm weather, primarily from return flows from irrigation channels.</p> <p>Settlements primarily use springs/groundwater as source for domestic and irrigation purposes, and river water is used only in exceptional cases.</p>
Main influences on water quality	Mountain river with human and animal waste as only significant sources of pollution
<b>Other information</b>	
<p>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.</p>	

Preparation

Requirement	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<b>3.1 Assessment</b>		
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 flows and other geohazards have caused significant damages to PEC’s infrastructure and supply interruptions on several occasions.)
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. The draft feasibility study does not yet provide the reservoir volume and 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.
Identification of erosion/ sedimentation impacts that may be caused by the project	✓	Compared to the natural erosion and sedimentation processes, only minor erosion and sedimentation 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 taken into account 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/ sedimentation issues that may impact on the project	✓	The draft 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 in 2020, 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.
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 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.
<b>3.2 Management</b>		
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 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 taken, such as ditches/terraces above the Upper Chagev resettlement village.
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). There may also be a role for national emergency services to monitor and address geohazards in the upstream catchment, but this has not yet been defined through a specific plan (see also section 4).
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.

Preparation

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.
<b>3.3 Outcomes</b>		
Plans avoid, minimise and mitigate erosion and sedimentation issues arising from project activities with no significant gaps	✓	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 and mitigate erosion and sedimentation issues that may impact on the project with no significant gaps	✓	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 avoid, minimise and mitigate negative water quality impacts arising from project activities with no significant gaps	✓	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.

**Summary of Findings**

Summary and other notable issues	List of significant gaps
Sebzor HPP and transmission line impacts on erosion, sedimentation and water quality will be minor. However, the project will be built in a valley with intensive natural erosion and sediment transport processes as well as geohazards. The design of the project has aimed to minimize the exposure of the project to these issues, but there will be some remaining uncertainty, and the understanding of the sediment loads and geohazards needs to be improved over time.	There are no significant gaps against basic good practice.



## 4 Community Impacts and Infrastructure Safety

Scope and Intent
<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 intent 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 particular subsets of the community, which are addressed in sections 5 and 7. Other interested parties and groups are addressed in section 10.</p>

Background	
Project-affected communities	
<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>Directly affected 78 physically and economically displaced households with a total of 553 individuals (not counting 3 households residing abroad), according to 3<sup>rd</sup> draft RAP</p> <ul style="list-style-type: none"> <li>● 18 physically displaced (see section 5)</li> <li>● 7 will lose businesses or structures other than dwellings</li> <li>● 53 will lose land, crops, and/or trees</li> <li>● 10 of these households are considered vulnerable</li> <li>● Total land acquisition 18 ha</li> <li>● 1 school in flood zone to be relocated to higher ground</li> </ul> <p>Indirectly affected:</p> <ul style="list-style-type: none"> <li>● 60 houses within 100 m of project infrastructure</li> <li>● Several villages (Dashtak, Barjingal, Chagev, Midensharv, Sebzor) near project area, with a total of 268 households and 1,517 individuals</li> <li>● School near reservoir needs to be moved to higher ground</li> <li>● 25 villages along the Shokhdara River between reservoir and Khorog, that could be affected by increased traffic</li> <li>● 29 villages with a total of 9,943 individuals along the transmission line</li> <li>● Households near the new substation in Khorog, adjacent to the existing Khorog HPP</li> </ul> <p>Population planned to be served by electricity from Sebzor HPP:</p> <ul style="list-style-type: none"> <li>● 227,000 people in Tajikistan</li> </ul>

Preparation

	<ul style="list-style-type: none"> <li>• 468,000 people in Afghanistan</li> </ul>
Description of key public health issues	Demand on public health services, infectious diseases, noise, dust, EMF
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.
Agencies relevant to public health	District and regional government
<b>Infrastructure safety</b>	
Type of dam	Concrete diversion weir
Dam height (m)	8.5 m from lowest point of foundation
Probable maximum flood (m <sup>3</sup> /s)	Has not been calculated; the ‘safety check flood’ is 515 m <sup>3</sup> /s (1-in-1,000-years)
Design flood (expressed as estimated flood with return period)	400 m <sup>3</sup> /s (1-in-100-years)
Spillway capacity (m <sup>3</sup> /s)	The maximum flood that can be diverted over the spillway and through the flushing gates without freeboard is approx. 790 m <sup>3</sup> /s.
Spillway height (masl)	2,529
Headrace length (m)	Penstock length 3,110
Headrace width (m)	Penstock diameter 2.3
Headrace capacity (m <sup>3</sup> /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

Preparation

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

Requirement	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<b>4.1 Assessment</b>		
An assessment of issues relating to project-affected communities	✗	<p>Social issues in the ESIA's 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 are mentioned but not explored in detail in the project documentation, especially the following:</p> <ul style="list-style-type: none"> <li>Traffic disruptions during the laying of the pipeline in the roadway and other construction works will 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. 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.</li> </ul> <p>These omissions in the impact assessments are a <b>significant gap</b> against basic good practice, because traffic along the only road linking Roshtkala and Khorog is key to livelihoods and the quality of life in the project area, and missing information may be time-critical (see below under Management).</p> <p>A number of other minor or indirect social impacts have also not been assessed, as parts of the ESIA's 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).</p>
This assessment utilised local knowledge	✓	There has been a strong contribution of local knowledge.

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 given the low level of health risks.
This assessment includes public health system capacities and access to health services	✓	While these were not covered in the ESIA this is acceptable 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.
This assessment has considered health needs, issues and risks for different community groups	✓	Not assessed but this is acceptable given the low level of health risks.
An assessment of opportunities to increase the development contribution of the project through additional benefits and/or benefit sharing strategies	✓	<p>No systematic opportunity assessment yet 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 new school, PEC CSR program) and the intention to develop a Community Development Plan (CDP). The PEC CSR program is for the entire GBAO and has also been extended to Badakhshan Province in Afghanistan (for example, scholarships for women in technical colleges).</p> <p>An analysis of community development priorities will be done once the available budget for the CDP is known (which will be determined by deducting the costs of school replacement from the overall RAP budget). 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, it will be advisable to refer to existing local government plans and projects that have not yet been able to access funding (e.g. water supply Barjingal).</p>
The pre-project baseline against which delivery of benefits can be evaluated post-project is well-documented	✗	There is a very detailed baseline for people directly affected by land acquisition. However, there is insufficient baseline information on other local people who are not affected by land acquisition, but through other impact pathways (such as construction traffic, improved employment and power supply, and other impacts). The lack of more general baseline information means that for most local residents, neither improvements in living standards can be demonstrated, nor a deterioration detected which might require mitigation measures. This is a <b>significant gap</b> against basic good practice, related to the omissions in the impact assessment. During the development of the CDP, more baseline information on affected villages is planned to be collected. Additionally, baseline information is planned to be collected from local authorities at the village, sub-district and district levels.

<p>An assessment of dam and other infrastructure safety risks during project preparation, construction, and operation</p>	<p>✘</p>	<p>In the draft feasibility study and ESIA, other than a stability analysis of the headworks there was only a cursory assessment of dam safety risks (e.g. no discussion of failure modes or consequences, e.g. through inundation mapping, no description of cofferdam), only a generic assessment of road safety risks, and no assessment of the contribution of geohazards to dam and road safety risks. This is a <b>significant gap</b> against basic good practice. The inception report for the feasibility study update indicates a 'low' dam safety risk rating according to ICOLD criteria, based on dam height/reservoir volume and people at risk; however even for low risks a basic safety analysis is required.</p>
<p>This assessment was conducted using appropriate expertise</p>	<p>✔</p>	<p>The feasibility study, ESIA and geohazards consultants generally provided appropriate expertise, although the assessment has some gaps (as described above).</p>
<p><b>4.2 Management</b></p>		
<p>Management plans and processes for issues that affect project-affected communities have been developed</p>	<p>✘</p>	<p>PEC has a comprehensive E&amp;S Policy and experience with the management of social impacts. A number of relevant plans and processes are already in place, including the RAP and grievance mechanism. Others still need to be developed such as the CDP. Originally (according to the ESIA) contractors were expected to develop plans for Traffic Management and Community Health &amp; Safety, but current plans are to have at least the Traffic Management Plan developed by the project implementation consultant, and adapted and implemented by contractors. There are also plans to further increase the number of E&amp;S staff dedicated to the Sebzor project. A budget for E&amp;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>As mentioned above under Assessment, not all potential impacts have been assessed in sufficient detail and management or compensation measures established. In particular, with the traffic from several contractors, PEC and the general public overlapping, a master traffic management plan developed in conjunction with the roads authority is necessary. This is time-critical because decisions on road construction methods need to be taken soon to avoid overall delays.</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 PEC and from the Ministry of Energy and Water Resources, which has taken on a supporting role for Roshtqala District.</p>

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	✓	Except for agreements on processes (such as the Compensation Payments Mechanism) there are no formal agreements with communities yet, as the CDP still has to be developed. There are agreements with individual households (which all adult members have to agree to), but these are private.
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.
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.
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. 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. The CDP still has to be 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	✓	Some categories of benefits have been publicly discussed (e.g. the employment approach) but most commitments have been unspecific or not finalized and disclosed yet. There is currently no easy way for communities to access a summary of expected benefits, e.g. through a public community development agreement. There is an intention to disclose the RAP budget once finalized, without private and sensitive information. Good practice will be met by disclosing this budget summary and the CDP.
Dam and other infrastructure safety management plans and processes have been developed for project implementation	✓	Safety-relevant plans and processes are either under preparation or will be assigned to contractors.

Preparation



<p>Dam and other infrastructure safety management plans and processes have been developed for project operation</p>	<p>✘</p>	<p>The weir/spillway has been designed for a 1-in-1,000-year safety check flood with a safety margin of 1m 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). However, at this stage there are no early warning, emergency preparedness and emergency response plans for the project. Given the level of natural hazards in the area and the need to integrate some safety considerations into the project design, the fact that there are no comprehensive safety plans and processes in place is a <b>significant gap</b> against basic good practice, related to the lack of comprehensive safety assessment. The project implementation consultant is tasked with developing plans, for example regarding early warning equipment upstream that would give operators a chance to lower the water level in the reservoir in anticipation of a flood event. These will also need to be consistent and coordinated with the Hazard and Vulnerability Risk Assessments and Disaster Management Plans, that the Aga Khan Agency for Habitat (AKAH) has developed for every village.</p>
<p>These plans have been developed in conjunction with relevant regulatory and local authorities</p>	<p>✘</p>	<p>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.</p>
<p>Plans provide for communication of public safety measures</p>	<p>✓</p>	<p>There are plans to publicly communicate some relevant elements of the plans (such as road safety measures).</p>
<p>Emergency response plans include awareness and training programs and emergency response simulations</p>	<p>✘</p>	<p>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.</p>
<p>Dam safety is independently reviewed</p>	<p>✓</p>	<p>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.</p>
<p><b>4.3 Outcomes</b></p>		
<p>Plans provide for livelihoods and living standards impacted by the project to be improved</p>	<p>✓</p>	<p>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</p>

		their performance. 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.
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 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 avoid, minimise and mitigate negative public health impacts arising from project activities with no significant gaps	✓	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 deliver benefits for communities affected by the project	✓	There will be significant short-term and long-term benefits for local communities. Increased power supply will also support local businesses, in some cases with additional support from other AKFED initiatives (such as micro-finance).
Plans avoid, minimise and mitigate safety risks with no significant gaps	✗	There are a number of uncertainties regarding community safety outcomes, related to the significant gaps in the assessment and management of safety risks.

Preparation

### Summary of Findings

Summary and other notable issues	List of significant gaps
The Sebzor HPP and the associated transmission line will have significant social impacts in the project area, during construction and operation. There will be net benefits for almost all households, although a number of disruptions e.g. for agricultural land allocation and for traffic during construction still have to be managed. There is also potential to improve planning for public safety.	<ul style="list-style-type: none"> <li>Some social impacts have not yet been fully assessed and as a consequence, insufficient baseline information has been collected and no specific management or compensation plans have been developed for these impacts.</li> <li>There has been only a cursory assessment of dam safety risks, only a generic assessment of road safety risks, and no assessment of the contribution of geohazards to dam and road safety risks. As a consequence, safety management plans have been only partially developed and a number of uncertainties remain regarding outcomes for public safety.</li> </ul>



## 5 Resettlement

<b>Scope and Intent</b>
This section addresses physical displacement arising from the hydropower project development. The intent 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.

<b>Background</b>	
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)	18 households with 126 individuals are permanently physically displaced. 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, Dashtak, Rivarkhur, Zarf and Sebzor
Agencies relevant to land acquisition	See section 4
Agencies relevant to livelihood restoration	See section 4
Other relevant information	Several households have been offered inclusion in the resettlement program although their plots will only be temporarily affected (close to construction sites) or may be affected by an increased probability of flooding.

Requirement	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<b>5.1 Assessment</b>		
An assessment of the resettlement implications of the project has been	✓	Resettlement implications have been well understood from the earliest project studies, and minimization of physical displacement has been an important consideration in the design of the project.

undertaken early in the project preparation stage		
This has established the socio-economic baseline for resettlement for potential resettles and host communities	✓	Detailed baseline surveys have been undertaken. Since all displaced households are moving to new or existing homes within their own villages, or to larger cities such as Khorog and Dushanbe, the issue of host communities is not relevant.
This has included an economic assessment of required resettlement including ongoing costs for improvement in living standards	✓	The cost of the resettlement action plan 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.
<b>5.2 Management</b>		
A Resettlement Action Plan and associated processes have been developed for project implementation	✓	A detailed and modern RAP, a 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. Households close to construction activities have been included in the RAP to avoid the disruptions from temporary displacement. Resettled households also receive support through various other activities (e.g. protection of Upper Chagev village from rockfall/landslides after review of hazards by Aga Khan Agency for Habitat, detailed survey of employment interest and skills for PEC and contractor jobs, support for financial management).
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 in the process of building or acquiring new homes.
The RAP or associated processes include:		
<ul style="list-style-type: none"> <li>• up-to-date socio-economic baseline</li> </ul>	✓	A detailed socio-economic survey has been conducted, with a date of August 2020.
<ul style="list-style-type: none"> <li>• compensation framework</li> </ul>	✓	A detailed eligibility matrix is included in the RAP, and a Compensation Payment Mechanism is operational.
<ul style="list-style-type: none"> <li>• grievance mechanisms</li> </ul>	✓	The grievance mechanism is operational and at the time of the on-site assessment, the grievance log had 34 entries, several which are related to resettlement (typically concerns about official ownership titles and about land allocated for replacement homes; almost all of which have been resolved.)

Preparation

<ul style="list-style-type: none"> <li>• monitoring procedures</li> </ul>	✓	Resettled households are closely monitored, and progress is reported in PEC’s Monthly ESHS Compliance Monitoring Report.
Formal agreements with resettlees 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 resettle households are private.
<b>5.3 Stakeholder Engagement</b>		
Engagement has been culturally appropriate	✓	There has been close and culturally appropriate engagement with affected households. PEC is well integrated into the local communities, with many project staff originating and/or living in the same or neighbouring villages.
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 livelihoods restoration assistance. Some households consider their new locations to be better than their previous ones, as they are closer to their land.
<b>5.4 Stakeholder Support</b>		
Resettlees and host communities generally support or have no major on-going opposition to the Resettlement Action Plan	✓	All households have accepted the valuation reports for their homes and land, and have voluntarily signed the Compensation Agreements. 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 and to consider compensation as quite adequate.
<b>5.5 Outcomes</b>		
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 costs - are generally considered as fair and equitable.
Resettlees 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 agricultural and business income; salvaging of building materials, crops, trees (even if they have been compensated); a livelihoods restoration package (to be determined in detail once households have moved); and extra payments for vulnerable households. A number of affected households also benefit from preferential employment in the project.

Preparation

### Summary of Findings

Summary and other notable issues	List of significant gaps
<p>Physical displacement has been minimized, 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 grievances have been resolved in a timely manner. It is highly likely that their livelihoods and living standards will improve. For example, new houses will generally have more rooms and higher quality materials and appliances.</p>	<p>There are no significant gaps against basic good practice.</p>



## 6 Biodiversity and Invasive Species

<b>Scope and Intent</b>	
<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 intent 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>	
<b>Background</b>	
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

Preparation

Other relevant information	--
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Requirement	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<b>6.1 Assessment</b>		
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.
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 are being 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).
<b>6.2 Management</b>		
Plans and processes to address identified biodiversity issues have been developed for project implementation	✓	<p>Standard mitigation measures apply for biodiversity, primarily aimed at minimizing the footprint of the project. Qualified environmental specialists will be contracted during implementation, able to identify biodiversity values (such as species of concern, natural habitats, nesting trees) and these values will either be avoided or replaced in appropriate quantities. 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</p>

Preparation



		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.
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 <sup>3</sup> /s (10% of average flow), as a smaller release might be sufficient for biodiversity and highly valuable for winter power generation.
<b>6.3 Outcomes</b>		
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. There will be 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 weir, creating a deeper and larger habitat for some species.

Preparation

**Summary of Findings**

Summary and other notable issues	List of significant gaps
While the Pamir Mountains overall are a biodiversity hotspot with significant endemism, the biodiversity value of the lower Shokhdara valley in the project area is reduced by intensive human use. Increased use of electricity for heating will reduce vegetation disturbance, increase biomass and reduce air pollution. The project itself has a small footprint, and there are plans to replant trees and restore habitats after construction. Impacts on fish and other aquatic species will be limited.	There are no significant gaps against basic good practice.



## 7 Indigenous Peoples

<b>a. Scope and Intent</b>
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 marginalized and vulnerable segments of the population. The intent 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.

<b>Background</b>	
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

<b>Scope and Intent</b>
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 intent 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.

<b>Background</b>	
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.

Preparation



## 9 Governance and Procurement

<b>Scope and Intent</b>	
<p>This section addresses corporate and external governance considerations for the project, and all project-related procurement including works, goods and services. The intent is that the developer has sound corporate business structures, policies and practices, and that procurement processes are equitable, transparent and accountable.</p>	
<b>Background</b>	
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)	Four main packages: 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 finished with 5 contractors short-listed - FIDIC Red Book), and 4) electro-mechanical equipment and installation (pre-qualification ongoing - FIDIC Yellow Book).
Other relevant information	--

Preparation

Requirement	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<b>9.1 Assessment</b>		
Assessments have been undertaken of the following through the project development cycle:		
<ul style="list-style-type: none"> <li>political and public sector governance issues</li> </ul>	✓	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.
<ul style="list-style-type: none"> <li>corporate governance requirements and issues</li> </ul>	✓	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.
<ul style="list-style-type: none"> <li>major supply needs, supply sources, relevant legislation and guidelines, supply chain risks and corruption risks</li> </ul>	✓	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 procurement plans. PEC is familiar with procurement issues for small hydropower plants. For the Sebzor HPP, 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.
<b>9.2 Management</b>		
Processes are in place to manage the following:		
<ul style="list-style-type: none"> <li>corporate, political and public sector risks</li> </ul>	✓	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. PEC maintains good relations at all government levels. The former PEC General Director became Minister of Energy and Water Resources in 2020.
<ul style="list-style-type: none"> <li>compliance</li> </ul>	✓	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.

● 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.
● 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 restored, the PEC website. The audited financial reports will also be published on PEC’s website.
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 HPP 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 the Sebzor HPP, 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 own capabilities for some supplies and services, e.g. owns its own quarry.
Procurement plans and processes have been developed for project operation	✓	There are no procurement needs for operations at this stage.
<b>9.3 Conformance and Compliance</b>		
The project has no major non-compliances	✓	There are no indications for any major 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.
● 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 that any procurement-related commitments have not been met.
<b>9.4 Outcomes</b>		

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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.
Procurement of works, goods and services across major project components is:		
<ul style="list-style-type: none"> <li>equitable</li> </ul>	✓	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 the procurement processes. Contracting and contractor performance is also supervised by donor agencies.
<ul style="list-style-type: none"> <li>efficient</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>transparent</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>accountable</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>ethical</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>timely</li> </ul>	✓	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.

### Summary of Findings

Summary and other notable issues	List of significant gaps
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).	There are no significant gaps against basic good practice.



## 10 Communications and Consultation

Scope and Intent
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 intent 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 physically displaced communities and Indigenous Peoples are found in sections 5 and 7, respectively.

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
Other relevant information	--

Requirement	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<b>10.1 Assessment</b>		
Stakeholder mapping has been undertaken to identify and analyse stakeholders	✓	The ESIA's and the Stakeholder Engagement Plan provide good overviews of stakeholders.
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	✓	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.
<b>10.2 Management</b>		
Communications and consultation plans and processes have been developed at an early stage	✓	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.

Preparation



They outline communication and consultation needs and approaches for various stakeholder groups and topics	✓	The Stakeholder Engagement Plan outlines various communication channels that are being used for different stakeholder groups.
They are applicable to project preparation, implementation and operation	✓	Communication and consultation has been and will continue to be a permanent task for PEC staff.
They include an appropriate grievance mechanism	✓	As described in sections 4 and 9
<b>10.3 Stakeholder Engagement</b>		
There has been engagement with the following groups, or on the following topics, or through the following processes, with directly affected stakeholders:		
<ul style="list-style-type: none"> <li>Project preparation, on topics of interest and relevance to directly affected stakeholders</li> </ul>	✓	Local stakeholders have been engaged on issues such as siting and design, and employment and procurement opportunities.
<ul style="list-style-type: none"> <li>The business interacts with a range of directly affected stakeholders to understand issues of interest to them</li> </ul>	✓	Interaction is ongoing, and most intensive with resettles. During the development of the CDP, the priorities of other local people will also be analysed. The development of the traffic management plan will need engagement with different groups of road users.
<ul style="list-style-type: none"> <li>Environmental and social impact assessment and management planning</li> </ul>	✓	Stakeholders were engaged during scoping consultations, and presentation of results.
<ul style="list-style-type: none"> <li>Siting and design optimisation</li> </ul>	✓	Some discussions have been held with local stakeholders about design and siting alternatives.
<ul style="list-style-type: none"> <li>Project benefits</li> </ul>	✓	The socio-economic surveys on households affected by land acquisition were also used to promote employment for affected people. More engagement on project benefits will occur during the development of the CDP.
<ul style="list-style-type: none"> <li>Project-affected communities</li> </ul>	✓	Communities affected by land acquisition are being engaged intensively. There has also been some engagement with government officials representing indirectly affected people (e.g. those who will be affected by road closures), but less direct engagement.
<ul style="list-style-type: none"> <li>Resettles and host communities</li> </ul>	✓	Communities affected by land acquisition are being engaged intensively.
<ul style="list-style-type: none"> <li>Assessment and planning for cultural heritage issues</li> </ul>		Not relevant
<ul style="list-style-type: none"> <li>Assessment and planning for public health, including health officials</li> </ul>	✓	Not apparent from documentation, except for scoping meeting with central Ministry of Health. This is acceptable, given the low level of public health impacts.
<ul style="list-style-type: none"> <li>Downstream flow regimes</li> </ul>	✓	Only with 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.

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<ul style="list-style-type: none"> <li>Plans for the management of climate risks</li> </ul>	✓	Not apparent from documentation. This is acceptable as it is uncertain who the relevant stakeholders would be, beyond government officials (see section 12). The need for engagement of public authorities on public safety risks is discussed in section 4.
Engagement with directly affected stakeholders has been appropriately timed:		
<ul style="list-style-type: none"> <li>Project preparation, on topics of interest and relevance to them</li> </ul>	✓	There are no indications for any delayed engagement activities.
<ul style="list-style-type: none"> <li>Environmental and social impact assessment and management planning</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Siting and design optimisation</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Project benefits</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Project-affected communities</li> </ul>	✓	See section 4; there will be further need for engagement on a number of issues such as traffic management.
<ul style="list-style-type: none"> <li>Resettlees and host communities</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Assessment and planning for cultural heritage issues</li> </ul>		Not relevant
<ul style="list-style-type: none"> <li>Assessment and planning for public health</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Downstream flow regimes</li> </ul>	✓	See above
Engagement with directly affected stakeholders has often been two-way:		
<ul style="list-style-type: none"> <li>Project preparation, on topics of interest and relevance to them</li> </ul>	✓	There are no indications for any one-sided engagements. PEC has been described as open and accessible.
<ul style="list-style-type: none"> <li>Environmental and social impact assessment and management planning</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Siting and design optimisation</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Project benefits</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Project-affected communities</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Resettlees and host communities</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Assessment and planning for cultural heritage issues</li> </ul>		Not relevant
<ul style="list-style-type: none"> <li>Assessment and planning for public health</li> </ul>	✓	See above
<ul style="list-style-type: none"> <li>Downstream flow regimes</li> </ul>	✓	See above
Engagement is undertaken in good faith:		
<ul style="list-style-type: none"> <li>In general</li> </ul>	✓	There are no indications for any engagements not undertaken in good faith.
Ongoing processes are in place for stakeholders to raise issues and get feedback:		
<ul style="list-style-type: none"> <li>In general</li> </ul>	✓	Stakeholders have confirmed that it is easy to reach PEC representatives and that they are responsive.

● 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
● Indigenous Peoples		Not relevant
● Employees and contractors on human resources and labour management issues	✓	See above
● Assessment and planning for cultural heritage issues		Not relevant
● Assessment and planning for public health	✓	See above
● Downstream flow regimes	✓	See above
Public disclosure:		
● the business makes significant project reports publicly available	✓	Some project reports have been made publicly available or are planned to be made available. There is potential to further increase disclosure through additional materials (e.g. annual reports) and channels (e.g. restoring PEC website functionality).
● the business publicly reports on project performance, in some sustainability areas	✓	Most of the publicly available materials address plans and not actual implementation progress or operational performance; this could be enhanced by annual or sustainability reports.
● 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 and 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 the very high power density / low emissions (see section 12).
<b>10.4 Stakeholder Support</b>		
Affected communities generally support or have no major ongoing opposition to the plans for the issues that specifically affect their community	✓	Communities generally have a positive view 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, with no 'exit strategy'). So far, communities have supported the specific plans for the Sebzor project (although the main works are yet to begin). Reportedly, other communities outside the project area want 'their own' HPPs.

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Directly affected stakeholder groups generally support or have no major ongoing opposition to the cultural heritage assessment, planning or implementation measures		Not relevant
<b>10.5 Conformance and Compliance</b>		
Processes and objectives relating to communications and consultation have been and are on track to be met with:		
• 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 been followed.
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.

**Summary of Findings**

Summary and other notable issues	List of significant gaps
Information on PEC and the Sebzor HPP is publicly available. There is generally good engagement of stakeholders, including opportunities for directly affected stakeholders to influence project decisions, and broad support from stakeholders.	There are no significant gaps against basic good practice.

Preparation



## 11 Hydrological Resource

Scope and Intent	
<p>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 intent 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.</p>	

Background	
<b>Hydrology and flows</b>	
Average flow at dam (m <sup>3</sup> /s)	27.2 m <sup>3</sup> /s
Minimum monthly average flow (m <sup>3</sup> /s)	9.8 m <sup>3</sup> /s (February)
Maximum monthly average flow (m <sup>3</sup> /s)	75.0 m <sup>3</sup> /s (July)
Lowest observed flow (m <sup>3</sup> /s)	7.4 m <sup>3</sup> /s
Highest observed flow (m <sup>3</sup> /s)	298.5 m <sup>3</sup> /s
Design flow (m <sup>3</sup> /s)	12 m <sup>3</sup> /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.
<b>Reservoir</b>	
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 <sup>2</sup> )	5 ha

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Reservoir area at MOL (km <sup>2</sup> )	Not provided in documentation; needs to be included in final feasibility study
Volume at FSL (million m <sup>3</sup> )	Not provided in documentation; needs to be included in final feasibility study
Volume at MOL (million m <sup>3</sup> )	Not provided in documentation; needs to be included in final feasibility study
Average retention time in days	Not provided in documentation (if assuming average depth of 1.5m over 5 ha, volume is ~75,000 m <sup>3</sup> , equivalent to 45 minutes of average inflows)
Number of days for filling	Not provided in documentation, but see above rough estimate
Other relevant information	--

Requirement	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<b>11.1 Assessment</b>		
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.
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. A minimum flow of 3 m <sup>3</sup> /s has been established preliminarily.
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 environmental, social and economic objectives	✓	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 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 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.
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. Bathymetry has been established with representative cross-sections and hydraulic conditions have been modelled. Estimated

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		water depths and presence of fish will be verified once the project is operational, for potential adjustments in releases.
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. However, there has been limited analysis of potential future hydrological conditions (see section 12).
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 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 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. 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 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.
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. 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. 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 as part of the feasibility study.

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11.2 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:		
<ul style="list-style-type: none"> <li>analysis of the hydrological resource availability</li> </ul>	✓	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.
<ul style="list-style-type: none"> <li>a range of technical considerations</li> </ul>	✓	Keeping the reservoir at a stable level reduces the technical complexity of operations.
<ul style="list-style-type: none"> <li>an understanding of power system opportunities and constraints</li> </ul>	✓	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.
<ul style="list-style-type: none"> <li>social and environmental considerations including downstream flow regimes</li> </ul>	✓	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 where some land is being acquired, banks may have to be stabilised, and trees felled. The first filling will be conducted under supervision.
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.
Downstream flow plans include:		
<ul style="list-style-type: none"> <li>flow objectives</li> </ul>	✓	Flow objectives are focused on fish habitat.
<ul style="list-style-type: none"> <li>magnitude, range and variability of the flow regimes</li> </ul>	✓	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.
<ul style="list-style-type: none"> <li>locations at which flows will be verified</li> </ul>	✓	Planned to be measured within 100 m downstream of weir.

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<ul style="list-style-type: none"> <li>ongoing monitoring</li> </ul>	✓	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.
<b>11.3 Outcomes</b>		
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.
Where relevant, downstream flows take into account agreed transboundary objectives	✓	Not relevant. Flow alterations in the short bypass reach do not affect downstream countries.

**Summary of Findings**

Summary and other notable issues	List of significant gaps
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. 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).	There are no significant gaps against basic good practice.



## 12 Climate Change Mitigation and Resilience

Scope and Intent	
<p>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 intent 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.</p>	
Background	
Climate Change Mitigation	
Capacity (MW) (or additional capacity in case of expansion/rehabilitation projects)	11 MW
Average reservoir area (representing area of flooded land, net of pre-impoundment water body) (km <sup>2</sup> ) (or additional reservoir area if any, for expansion/rehabilitation projects)	5 ha, most of which (4.5 ha) previously covered by Shokhdara River
Power density (W / m <sup>2</sup> )	2,200
Emissions intensity (gCO <sub>2</sub> e / kWh)	Not relevant
National and regional policies, plans and commitments relevant to mitigation	Tajikistan has very low per capita CO <sub>2</sub> e emissions of approximately 0.62 tons/capita/a, 2016 ( <a href="https://ourworldindata.org/greenhouse-gas-emissions">https://ourworldindata.org/greenhouse-gas-emissions</a> ). 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 <a href="https://climateknowledgeportal.worldbank.org/">https://climateknowledgeportal.worldbank.org/</a>
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

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	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	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.  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 last winter).

Requirement	Requirement is met: yes (✓) or no (✗)	Findings and Observations
<b>12.1 Assessment</b>		
<b>Climate Change Mitigation</b>		
For projects with a power density below 5 W/m <sup>2</sup> , net GHG emissions (gCO <sub>2</sub> e) of electricity generation have been estimated and independently verified	✓	Not applicable
For projects with a power density below 5 W/m <sup>2</sup> and estimated emissions are above 100 gCO <sub>2</sub> 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 HPP to GHG emissions, and the significant positive contribution through displacing more GHG-intensive sources of energy.

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		There has already been a notable reduction in fossil fuel and firewood consumption for heating, and an increase in biomass, since PEC has improved power supply in the region.
<b>Climate Change Resilience</b>		
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 geohazards triggered by climate change, are covered in section 4 and are not repeated here.
The assessment:		
<ul style="list-style-type: none"> <li>incorporates an assessment of plausible climate change at the project site</li> </ul>	✓	While some contextual information on plausible scenarios for the region, there was no project-specific assessment for the Skokhdara valley. As noted above this is not seen as a significant gap.
<ul style="list-style-type: none"> <li>identifies a range of climatological and hydrological conditions at the project site</li> </ul>	✓	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.
<ul style="list-style-type: none"> <li>applies these conditions in a documented risk assessment or stress test</li> </ul>	✓	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:		
<ul style="list-style-type: none"> <li>dam safety</li> </ul>	✗	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. While dam safety risks are low, the absence of even a basic dam safety assessment is not in line with basic good practices. This is an aspect of the <b>significant gap</b> identified in section 4.
<ul style="list-style-type: none"> <li>other infrastructural resilience</li> </ul>	✗	Not assessed. Climate change could increase risks e.g. related to geohazards, contributing to public safety risks. This is an aspect of the <b>significant gap</b> identified in section 4.
<ul style="list-style-type: none"> <li>environmental and social risks</li> </ul>	✓	Not assessed. Climate change could modify E&S impacts, e.g. as the range of species shifts to higher elevations. The absence of an assessment is not seen as a gap 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.

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<ul style="list-style-type: none"> <li>power generation availability</li> </ul>	✓	Not assessed. Climate change could increase flow variability and reduce the load factor, generation, supply reliability and revenue from the project; but it could also shorten the low-flow winter season. It is recommended to analyse the impact of such changes through sensitivity tests in power & energy and financial models, but the absence of such sensitivity tests is not seen as a significant gap 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.
<b>12.2 Management</b>		
<b>Climate Change Mitigation</b>		
If GHG emissions estimates assume design and management measures, there are plans to put these measures in place	✓	Not applicable
<b>Climate Change Resilience</b>		
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 remaining concern regarding public safety, is addressed in section 4.
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 (see gap above), and hence no measures are planned.
<b>12.3 Outcomes</b>		
<b>Climate Change Mitigation</b>		
The project’s GHG emissions are demonstrated to be consistent with low carbon power generation	✓	Reservoir emissions will be negligible and 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.

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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.
<b>Climate Change Resilience</b>		
Plans will deliver a project that is resilient to climate change under a range of scenarios	✓	The project design with a high load factor and low safety risks leaves a considerable margin for adaptation to changing climate and hydrological conditions. In the absence of well-defined climate scenarios, resilience cannot be confirmed.
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.

**Summary of Findings**

Summary and other notable issues	List of significant gaps
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.	<ul style="list-style-type: none"> <li>● The potential contribution of climate change to public safety risks has not been adequately addressed.</li> </ul> <p>(This gap is counted under section 4, to avoid double-counting.)</p>

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## Appendix 1 – Interviews

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

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22	Parviz Mamadziyoev, Procurement and Contract Manager	PEC	Aug 13, 4:30pm	site visit to Khorog HPP
23	Lutfiya Aynalishoeva, Sebzor Finance and Administration Manager	PEC	Aug 13, 5:00pm	PEC Sebzor administrative building
24	Fokhir Yusufbekov, Sebzor HPP Project Manager	PEC	Aug 14 and 15, 2021	full-day site visits to Sebzor and Pamir-I HPPs
25	various PAPs	Resettled families building new homes at bridge, intake area and in Upper Chagev	Aug 14	On their properties
26	Amrikhon Raimov, General Director	PEC	Aug 14, 1:00pm	Lunch
27	Ofarid Amidkhonov, Head of Regional Project Implementation Unit	PEC	Aug 14, 1:00pm	Lunch
28	Yodgor Fayzov, Governor	Regional Administration of GBAO	Aug 14, 2:30pm	GBAO offices
29	Anoibsho Sodatshoev, Head of HR Department	PEC	Aug 16	drive Khorog-Dushanbe
30	Olena Marushevskaya, Biodiversity Consultant	Blue Rivers	Aug 17, 12:00pm	Video call
31	Jelena Oplanic and Branko Radovanovic, Resettlement Consultants	Link 011	Aug 17, 1:00pm	Video call
32	Ruslan Sadyakov, Senior National Program Officer for Infrastructure	SECO Office Dushanbe	Aug 17, 2:00pm	Video call
33	Jack Mozingo, ESIA Consultant	Independent Consultant	Aug 23, 12:00pm	Video call
34	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
35	Marco Leidel, Environmental and Social Specialist Thilo Heiberger, Technical Specialist	KfW	Sept 6, 9:00am	Video call
36	Farida Mamadaslamova, Energy Specialist	World Bank Office Dushanbe	Sept 7, 7:00am	Video call

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## Appendix 2 – Documents

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.	<a href="https://documents1.worldbank.org/curated/en/220691468117870482/pdf/multi0page.pdf">https://documents1.worldbank.org/curated/en/220691468117870482/pdf/multi0page.pdf</a>
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)	<a href="https://documents1.worldbank.org/curated/en/179751563156091590/pdf/Tajikistan-Rural-Electrification-Project.pdf">https://documents1.worldbank.org/curated/en/179751563156091590/pdf/Tajikistan-Rural-Electrification-Project.pdf</a>
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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	

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			Lot 2: Construction of Sebzor HPP main operation facility In Construction of Sebzor Hydropower Plant Project in Roshtqala District of VMKB, with Financing from KfW	
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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	
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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	<a href="https://documents1.worldbank.org/curated/en/733831605666726759/pdf/Resettlement-Framework-Rural-Electrification-Project-P170132.pdf">https://documents1.worldbank.org/curated/en/733831605666726759/pdf/Resettlement-Framework-Rural-Electrification-Project-P170132.pdf</a>
21	Pamir Energy	n.d.	Compensation Payment Mechanism	
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23	Pamir Energy and LINK 011	2020	Sebzor HPP - Land Acquisition for Enabling Works Report; updated 28.07.2020	
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30	Blue Rivers Environmental Consulting	n.d.	Report on cross-sections	In Russian
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## Appendix 3 – Photographs



Photo 1: Downstream view from Botanical Garden: Khorog with Khorog HPP and confluence of Gund and Shokhdara rivers



Photo 2: Upstream view from Botanical Garden: Khorog with University of Central Asia campus and Gund River



Photo 3: Bartang River, major downstream tributary to Panj River



Photo 3: Downstream border crossing into Afghanistan over Panj River



Photo 5: Border crossing into Afghanistan over Panj River, near Khorog



Photo 6: Panj River with PEC transmission line on Afghan side



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



Photo 8: Pamir-1 HPP powerhouse



Photo 9: Barsem debris flow partially blocking Gund River

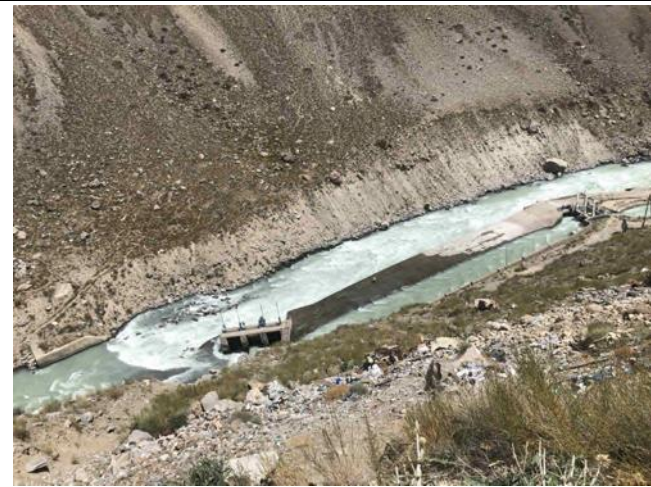


Photo 10: Intake for Khorog HPP on Gund River



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

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Photo 19: Debris fan in upper Shokhdara valley



Photo 20: Fish ponds in upper Shokhdara valley

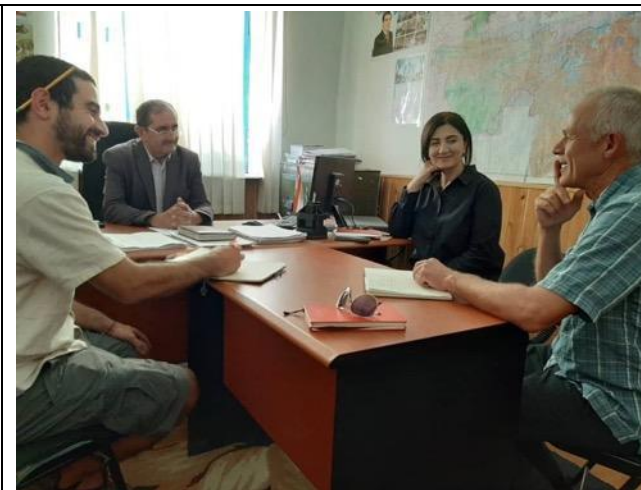


Photo 21: Interview with head of Jamoat (sub-district) administration



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

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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

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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

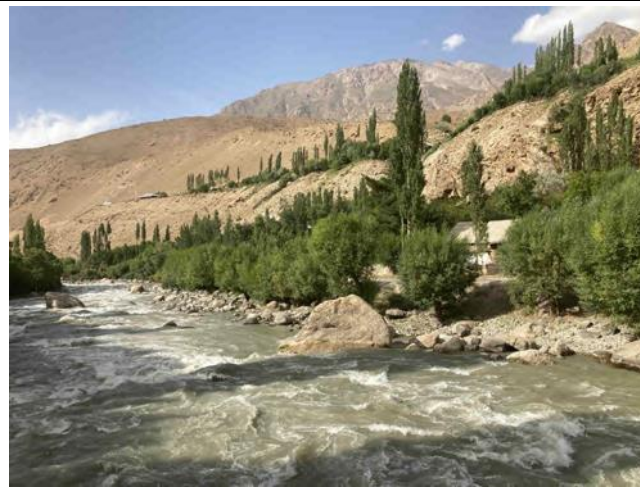


Photo 68: Lower Chagev and Upper Chagev villages



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

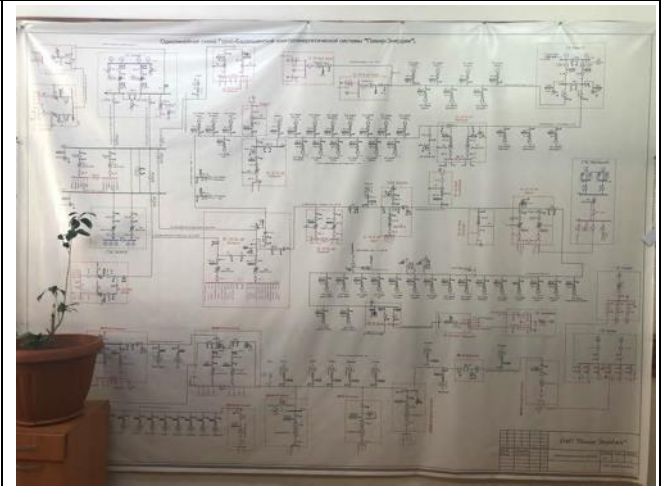


Photo 78: PEC network diagram



Photo 79: PEC emergency action plans



Photo 80: PEC control centre



Photo 81: PEC customer call centre