



Project Information Document (PID)

Appraisal Stage | Date Prepared/Updated: 14-May-2019 | Report No: PIDA26700



BASIC INFORMATION

A. Basic Project Data

Country Tajikistan	Project ID P170132	Project Name Rural Electrification Project	Parent Project ID (if any)
Region EUROPE AND CENTRAL ASIA	Estimated Appraisal Date 10-May-2019	Estimated Board Date 20-Jun-2019	Practice Area (Lead) Energy & Extractives
Financing Instrument Investment Project Financing	Borrower(s) Ministry of Energy and Water Resources, Ministry of Finance	Implementing Agency Pamir Energy Company, Barqi Tojik	

Proposed Development Objective(s)

The project development objective is to provide electricity access to target settlements in GBAO and Khatlon regions of Tajikistan.

Components

Component 1: Provision of electricity access to target settlements in GBAO region
Component 2: Provision of electricity access to target settlements in Khatlon region

PROJECT FINANCING DATA (US\$, Millions)

SUMMARY

Total Project Cost	31.60
Total Financing	31.60
of which IBRD/IDA	31.60
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Development Association (IDA)	31.60
IDA Grant	31.60



Environmental and Social Risk Classification

Substantial

Decision

The review did authorize the team to appraise and negotiate

B. Introduction and Context

Country Context

Tajikistan, a transition country with a per-capita gross national income (GNI) oscillating between *low and lower middle income*, has yet to fulfill its potential for sustainable and inclusive development. The country's economic outcome reflects: (i) the legacy of the 1992–97 civil war; (ii) a centralized, state-led approach to economic management; (iii) low domestic productivity, with wages at levels that leave most households exposed to (seasonal) poverty (risks); and (iv) a “low level equilibrium” of a remittance-financed, import-reliant, indirect tax-based economic model that has provided little space and support to the private sector. Its economy has remained largely unsophisticated, with limited employment opportunities and a human-capital base that is not yet ready for the challenges of an innovative, export-oriented economy. The main drivers of Tajikistan's economy are remittance inflows (fluctuating between one-third and one-half of GDP), cotton and aluminum exports, official development assistance (ODA) inflows, and in recent years, substantial levels of public investment. Structural economic challenges include a persistent trade deficit, reliance on remittances, a small and fragile financial sector, and limited internal labor mobility and employment.

Tajikistan remains one of the poorest countries in Central Asia, with a large share of its population dependent on remittances and low-productivity sectors. The post-conflict decline in poverty rates has been impressive, albeit at declining rates in recent years. Extreme poverty, measured by the international poverty line of US\$1.90 per day, fell markedly - from 54 percent in 1999 to five percent in 2015. According to the Government's own calculations, using a national poverty line, poverty declined, over the same time horizon, from 82 to 31 percent and further to 29.5 percent in 2017. There is substantial spatial and seasonal variation in poverty - with rural areas remaining typically significant poorer than urban ones¹; and poverty and income insecurity significantly higher during winter and spring months. Non-monetary aspects of poverty remain important contributing factors to Tajik's hardship and lack of opportunity.

Risks related to fragility, conflict, and violence (FCV) constrain Tajikistan's development progress. Most cross-national indicators of fragility and conflict categorize Tajikistan's risk as elevated.² Risk include the following: (i) *Economic risks*, including (a) high rates of un(der)employment, (b) the predominance of insecure, low-quality, low- wage jobs in the informal sector, and (c) numerous barriers to private-sector development; (ii) *Socio-economic exclusion of youth and women* (see para 6 and below; (iii) *Regional and cross-border*

¹ According to the official poverty estimates for 2015, Dushanbe has the lowest poverty rate in Tajikistan (20.4 percent) followed by Sughd (22.3 percent). In other regions, the share of the poor population is much higher—35.8 percent in Khatlon, 37.3 percent in the Districts of Republican Subordination (DRS), and 39.4 percent in the Gorno-Badakhshan Autonomous Oblast (GBAO).

² Tajikistan is one of 56 countries classified as “fragile” or “extremely fragile” in the Organization for Economic Co-operation and Development's *States of Fragility 2018* (Paris: OECD Publishing, 2018), <https://doi.org/10.1787/9789264302075-en>.



challenges, including (a) the existence of lagging regions, (b) heightened vulnerability in certain regions (reflecting the legacy of conflict and/or the proximity to zones of insecurity), and (c) the exposure to international, high-volume illicit drug-trafficking routes, and (iv) *Cross-cutting political and governance challenges*, including a centralized system of governance, with limited scope for citizens' participation, reducing the effectiveness of service delivery and potentially reinforcing inequities in public-resource allocation.

Natural disasters and climate change threaten Tajikistan's economic and social development.³ The country's varied geological, climatologic, and topographic features exacerbate its vulnerability and make it highly susceptible to many natural hazards, including earthquakes, floods, landslides, and avalanches. From 1992 to 2016, natural disasters affected 7 million people in Tajikistan—more than 80 percent of the total population—and caused economic losses worth US\$1.8 billion. In response to these risks, the Government of Tajikistan is gradually moving from disaster response to risk mitigation and has taken steps to mainstream disaster risk mitigation into development planning, including the adoption of the Sendai Framework for Disaster Risk Reduction in 2015.

Tajikistan has the highest proportion of youth population among all post-Soviet republics and a high percentage of female headed-households. Official 2018 figures show that the proportion of the population under 30 years old is 63 percent of the overall country population, with the age group 15-29 years constituting 29 percent of the total. Young men and women face limited economic opportunities with an estimated 4 percent of youth not being in employment, education or training (NEET).⁴

Labour migration of young Tajik men, mostly to Russia, is an important coping strategy in a situation of limited domestic economic opportunities but entails also risks for the cohesion of families: As many as 1.5 million Tajik citizens, 90 percent of whom are young men, emigrate to find work opportunities abroad. Most of these migrants are married with children and support households that have on average 7.5 persons.⁵ Approximately one in three migrants' wives, over 300,000 young women, find themselves left alone and impoverished, entirely dependent on help from family, relatives and friends. The high percentage of female-headed households (23 percent) in Tajikistan is to a significant part due to the emigration of young men. Seventy percent of abandoned wives have children and are left to provide for their households, despite limited access to finance, social protection, education, or possibilities for employment.

A critical source of resilience against the described risks in Tajikistan is the strength of local institutions, including community organizations such as *mahalla* committees. Other sources of resilience are (a) strong popular interest in stability based on the collective memory of the severe costs of the civil war of the 1990s, and (b) labor migration, which – despite inherent risks to social cohesion – is also a driver of positive change entailing a range of very positive economic benefits such as remittances transfers, skill development and changing gender roles. Many migrants in Russia have expressed a desire to help the Tajik economy through skills-transfer programs and appear to be ready to contribute, and the absence of men because of labor migration has also created opportunities for women to take on leadership positions in rural areas and to play an increasingly important role in rural economies.

³ World Bank, *Reducing Multi-Hazard Risks Across Tajikistan: Protecting Communities Through Quality Infrastructure* (Washington, DC: World Bank, 2017).

⁴ *Jobs Diagnostic Tajikistan*, World Bank, Washington, DC, 2017.

⁵ Most migrants have completed general secondary education, but are unskilled and not employed in Tajikistan prior to migrating abroad. *Job Diagnostics Tajikistan, Series 1*, World Bank, Washington, DC, 2017.



Sectoral and Institutional Context

Access to electricity is among the most important factors of citizens' grievance factoring into the high risk of fragility. Particularly vulnerable groups, residing in the border areas of Afghanistan, are exposed to fragility risks inherent in illegal activities, regionalism, and extremism. Moreover, electricity shortages in remote, generally mountainous rural areas affect the availability and quality of social-service delivery. Poor electricity governance, coupled with inadequate services, is a critical source of citizens' dissatisfaction that factors into labor migration, radicalization, and/or criminal activities. Within the fragility context, it is also important to ensure adequate electricity supply to consumers in GBAO, which are already connected to Pamir Energy Company's (PEC) electricity distribution grid, and provide electricity service to settlements without access. Therefore, the following electricity access challenges need to be addressed to reduce the fragility risks and promote economic opportunities in GBAO and Khatlon regions of Tajikistan.

Challenge #1: Ensuring adequate and reliable electricity access to grid-connected consumers in GBAO. The electricity demand in GBAO for grid-connected consumers has been growing at an average annual rate of 3 percent since 2002. Additionally, new settlements are planned to be connected to the grid (detailed in subsequent sections of the document). To meet the demand, PEC constructed several small HPPs and expanded the grid to bring electricity service to around 210,000 people. Within the described context of fragility, it is important to ensure that grid-connected customers receive adequate electricity supply. Therefore, PEC will need to construct new generation capacity to meet the increase of electricity demand. The least-cost analysis conducted by PEC identified Sebzor HPP, with estimated construction cost⁶ of US\$33.7 million, as the least economic cost option for meeting the projected domestic until 2040 and export demand from Badakhshan province of Afghanistan.

Sebzor HPP will generate significant social and economic benefits for both Tajikistan and Afghanistan. It will create improved opportunities for economic activities, improve the quality of public services, and generate additional revenues for PEC from exports of electricity further strengthening the financial standing of PEC and, thus, ensuring long-term reliable electricity supply in GBAO. The same benefits would accrue to conflict-affected areas of Afghanistan given that bordering communities currently do not have access to electricity. About 47,000 customers (370,000 people) in Badakhshan province of Afghanistan are expected to directly benefit from exports of electricity from Sebzor HPP.

PEC, with support from reputable international consulting firm (SWECO), carried out detailed feasibility study and geotechnical site investigation works for Sebzor HPP. There are some additional site investigation works that need to be carried before the detailed design and the bidding documents for supply of equipment and civil works can be finalized, and the project construction can be tendered.

Challenge #2: 43,126 people (0.5 percent of population) in GBAO and Khatlon regions do not have access to electricity service. In parts of Khatlon, bordering Afghanistan, there are 74 settlements with total population of 31,460 without access to electricity. Those settlements could not be connected to the grid due to severe financial difficulties of Barqi Tojik (BT). Specifically, BT collects in cash only 18 percent⁷ of its total required revenues due to below cost-recovery tariffs and other inefficiencies. This cash shortage does not allow to fully finance the required connection expenditures.

In GBAO, the 61 settlements with total population of 11,666, are not connected to electricity service. Those are in remote mountainous areas in GBAO, which is the service area of PEC, where access has historically been

⁶ Base capital cost + 10 percent physical and price contingency + cost of project management consultant.

⁷ Corporate Financial Model of BT. Part of the Government Program for Financial Recovery of BT in 2019-2025.



a challenge. Most of the settlements is scattered over vast territory in eastern part of GBAO, and few of the settlements are in the western part close to existing PEC grid. Before Tajikistan's independence, those areas were primarily supplied with diesel-based portable generator sets. This approach became prohibitively expensive given the increase in unit costs of diesel-based electricity generation once the generous fuel subsidies provided under the Soviet Union disappeared.

Access to affordable and sustainable heating in GBAO is a challenge. In addition to use of electricity for basic household needs, the target settlements also need safe, clean, and affordable source of heating. Climate conditions in the Murghab and Rushan regions of GBAO are particularly more challenging than other parts of the country due to higher number of heating months and lower average temperatures, which considerably affects the heating needs. In addition, due to the remoteness of these locations and the limited availability of natural resources (e.g. firewood), there are very limited energy supply options that tend to be higher cost than in other areas of the country. Murghob has the lowest average temperature (-6°C) for the heating period in the country, compared to (-0.3 °C) in Khorog and 5.7 °C in Dushanbe. Currently, the most common form of heating is a mixture of dung (dung cakes) and locally sourced shrub called teresken, which is also used as livestock feed and is mostly depleted, leading to widespread soil degradation. This mixture is commonly used in combination with coal, which is brought from other regions of Tajikistan, and which is relatively expensive due to the transportation costs.

In the medium-term, electricity-based heating will remain the least economic cost option for heating in GBAO. Once target settlements in GBAO are electrified, it is expected that most of households will switch to electric appliances for space heating. Specifically, based on the assessment of technically feasible heating options, the electric heaters, individual oil-based radiators and electrical boilers have the lowest levelized cost of heating (LCOH)⁸ for most of the districts in GBAO. Therefore, most of the households that will be switching to electric heating will likely using one individual oil-based electric heaters. This was also observed by PEC in previous electrification projects in other parts of GBAO. While the current heating and cooking practices using the dung and teresken mixture will remain lowest cost option by a small margin, electric options will be more favorable in the Murghab district due to the depleting teresken and other environmental and social aspects.

C. Proposed Development Objective(s)

The project development objectives are to support PEC in closing geological and technical gaps in construction preparedness of Sebzor hydropower plant and provide electricity access to target settlements in GBAO and Khatlon regions of Tajikistan

Key Results

The achievement of the PDO will be measured using the following indicators:

- Result Indicator 1 (CRI): People provided with new or improved electricity service (Number);
- Result Indicator 2 (CRI): Generation capacity of energy constructed or rehabilitated (MW);
- Result Indicator 3 (Custom): Average annual daily duration of electricity supply for target settlements in GBAO connected to micro-grids (hours);

⁸ LCOH = Discounted cost of the unit of heating (kWh equivalent) considering the capital cost and variable O&M expenses of a heating technology over its useful economic lifetime.



D. Project Description

Component 1: Provision of electricity access to target settlements in GBAO region (US\$25.2 million IDA grant). This component will have the following sub-components.

Sub-component 1.1: Construction of micro-grids, and connection of consumers to micro-grids and centralized distribution network of PEC. This sub-component will finance provision of electricity supply to 61 settlements in GBAO region with total population of about 11,666. The investments will cover: (a) construction of electricity generation infrastructure, which will include micro-grids comprised of Solar PV, small hydro, wind, and battery energy storage systems (BESS); (b) distribution infrastructure, including expansion of 10 and 0.4 kV distribution lines and distribution transformers; and (c) connections and internal wiring for households and public facilities (e.g. hospitals, schools, kindergartens) to alleviate consumer affordability barriers.

The proposed RE-based micro-grids will allow target settlements to have at least an average of 14 hours of electricity service per day until 2027. Further increase to 24-hour supply would require significant additional investments in power generation capacity, which currently cannot be secured. PEC will plan to build additional generation capacity using its own resources to add new capacity to meet the additional electricity demand of those consumers.

The identification of the least-cost electrification solution for each settlement was based on the geospatial analysis with detailed evaluation of hourly demand profiles of consumers, potential of renewable energy (RE) resources, and the capital and O&M costs of relevant technologies. For RE based micro-grid solutions, the exact locations will be determined at the detailed design stage, during the early phases of project implementation.

Provision of electricity access is expected to generate significant social and economic benefits in the form of expanded opportunities for economic activities, improved healthcare and social services, etc. Moreover, all target communities are considered fragile given their socio-economic conditions; therefore, electricity access would significantly reduce the fragility risks in this region.

Sub-component 1.2: Project implementation support to PEC, technical assistance for additional geological site investigation works for Sebzor HPP, and promotion of energy efficiency. This will include financing of: (a) Project Management Consultant (PMC) costs to support PEC with preparation of bidding documents for procurement of goods and works required for micro-grids and connection of settlements to PEC distribution network; carrying of tenders for procurement of contractors to construct the micro-grids and connect the settlements to the distribution grid; supervision of construction works for micro-grids; and compliance with environmental and social requirements; (b) geological site investigation works for Sebzor HPP, including geological mapping, Spaceborne Synthetic Aperture Radar (SAR) Interferometry Analysis, horizontal and vertical core recovery boreholes, exploratory trenches, seismic refraction survey, testing of physical and mechanical properties of soils and rock samples (the details are presented in Annex 2); (c) awareness raising program to promote the use of cleaner and efficient electric appliances as well as to educate the local communities about the benefits of energy efficiency renovation in buildings (i.e. building envelope insulation, EE windows, etc.); (d) technical assistance to PEC for the development of a financing mechanisms to support the local communities to purchase efficient appliances; (e) piloting EE measures in selected public buildings, especially elementary schools, boarding schools and health centers in order to demonstrate the cost-efficiency benefits of EE investments as well as improved comfort and well-being of building occupants; (f) monitoring and evaluation costs related to efficiency of citizen engagement and addressing gender gaps under the Project; and (g) incremental operating costs of PEC.

Component 2: Provision of electricity access to target settlements in Khatlon region. This component will have the following sub-components.

Sub-component 2.1: Connection of target settlements to the centralized distribution network of BT. This sub-



component will finance connection to the electricity distribution network of 74 settlements, bordering Afghanistan, in the Khatlon region. The total population of the target settlements is about 31,460 people. The investments will cover the cost of distribution infrastructure, including construction of 35/10/0.4 kV distribution lines, installation of additional distribution transformers in existing substations; as well as connections and internal wiring costs for households and public facilities (e.g. hospitals, schools, kindergartens) to alleviate consumer affordability barriers. For all target settlements, access to energy services will be ensured by connecting the settlements to BT’s centralized network because this is the least economic cost solution considering the proximity of the target settlements to the power distribution network. Most of the settlements are located within 0.5-2 km range from the distribution system.

Sub-component 2.2: Project implementation support to BT. This sub-component will finance the cost of: (a) PMC to help BT with preparation of bidding documents for works to connect target settlements to its distribution grid; carrying of tenders for procurement of contractors to connect the settlements to the distribution grid of BT; technical supervision of grid-connection activities; and compliance with environmental and social requirement; and (b) monitoring and evaluation costs related to measuring availability of electricity service, efficiency of citizen engagement and addressing gender gaps under the Project.

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

Summary of Assessment of Environmental and Social Risks and Impacts

The social and environmental risks are both rated as Substantial. On the social front, the project is expected to result in positive impacts due to increasing the number of people with access to power resulting in enhanced employment and livelihood opportunities. However, a variety of risks are evident, most of which are rather contextual and external to the project. But these do will have a bearing on the project as it manifests in risks related to security and safety. Apart from this, involuntary resettlement issues too compounds the situation. On securing lands, the implementation of the RPF and RAPs will need to be monitored closely to ensure full compliance with the standard in the remote areas being targeted by the project. Reaching out to remote and poorer households will depend upon the provision of appropriate technologies and out reach capacity of the client which currently is quite inadequate.

The project environmental risk is rated Substantial because of the greenfield nature of Component 1 for both the Sebzor HPP and transmission lines as well as Component 2’s large number of rural electrification activities in remote and potentially fragile areas. The limited capacity of the implementing agencies in the understanding and application of Bank’s ESF and relevant Standards was also considered. During preparation and implementation, planned activities in and around protected areas such as the Tajik National Park (UNESCO World Heritage Site) and other critical habitats or cultural landmarks will be carefully reviewed.

Note: To view the Environmental and Social Risks and Impacts, please refer to the Appraisal Stage ESRS Document.



E. Implementation

Institutional and Implementation Arrangements

The Project will have two implementing entities – PEC and BT. PEC will be responsible for implementing the electrification of settlements in the GBAO (Component 1), while BT will be responsible for implementation of electrification of target settlements in Khatlon (Component 2).

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