

PAMIR ENERGY:
LIGHT AND WARMTH TO HOUSEHOLDS IN ROSHORV –
RURAL ELECTRIFICATION OF THE UPPER BARTANG VALLEY
GORNO-BADAKHSHAN AUTONOMOUS OBLAST, TAJIKISTAN

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INTRODUCTION TO PAMIR ENERGY

Pamir Energy was formed in 2002 by the Aga Khan Development Network as a Public-Private Partnership (PPP) with a combined investment of 70 percent by the Aga Khan Fund for Economic Development (AKFED) and 30 percent by the International Finance Corporation (IFC).¹ In May 2002, the company was awarded a 25-year Concession Agreement with the Government of Tajikistan setting out the legal, regulatory, technical, operational, environmental and financial framework for the company, including the tariff schedule. Its initial focus has been on rehabilitating and operating an international standard electricity infrastructure in Gorno-Badakhshan Autonomous Oblast (GBAO) in Tajikistan.

Pamir Energy currently generates and delivers 40.47 MW of electricity (total installed capacity is 43.28MW) to 28,300 residential, commercial, and government customers across GBAO – an estimated 220,000 people. Pamir Energy also purchases an additional 5.2 MW from Barki Tojik (Tajikistan’s state utility company) and Oriyon GES (an Independent Power Producer). This total capacity represents 74 percent of total winter demand and 83 percent of total summer demand in GBAO.²

Pamir Energy’s concession will expire in 2027. At that time the company will either renegotiate an additional concession or will return all its assets to the Government of Tajikistan. If Pamir Energy returns the utility to the Government, its goal will be to return a professionally functioning, economically viable, and self-sustaining utility. To achieve this goal, many of Pamir Energy’s existing assets, which currently have problems ranging from poor quality civil works to low water flow, heavy sedimentation and excessive wear on runners and equipment, will need to be rehabilitated.

The paper outlines construction of a small hydropower plant located in the most remote and underserved areas of Gorno-Badakhshan in Roshorv village of Upper Bartang. AKDN’s experience with existing small scale hydropower plants and cross-border transmission lines suggests that this project will enable an increase in economic activity, facilitate the development of small-scale commercial enterprises, help mitigate current environmental challenges, and significantly increase quality of life in the most remote area of GBAO in Bartang, while reducing dependence on diesel and biomass for lighting and cooking. Heavily dependence on wood and biomass has been causing environmental challenges in the area, where deforestation now makes 40 km in radius.

ADKN IN TAJIKISTAN

In Tajikistan, AKDN has built a strong base of integrated social and physical infrastructure programmes. Active in the country since 1992, AKDN projects have brought both local and international investments in energy, trade, health, education and economic growth. Since 1997, community projects facilitated by AKDN have constructed or rehabilitated some over 1,200 water, sanitation and irrigation facilities, 270 rural roads and bridges, 280 health facilities, 158 schools and 28 mini-hydels. FOCUS Humanitarian has responded to 40 natural disasters. In total, AKDN has worked in 18 districts of Tajikistan with 1150 village organisations. These organisations have over 130,000 active members, 47 percent of whom

¹A consortium of partners made up of AKFED (70%), IFC (30%), the Governments of Tajikistan and Switzerland and the World Bank provided \$26.7 million in equity and debt financing, including an additional \$5 million in grant financing, which was used for rehabilitation and construction, as well as tariff subsidies and connection programmes to improve distribution and coverage in the region.

² Due to unmet demand in the cross-border areas of Afghanistan, Pamir Energy estimates an annual demand increase of up to 25 percent.

are women. Its groundbreaking public private partnership, Pamir Energy, has brought reliable energy to an estimated 220,000 people in GBAO. AKDN has also worked directly to improve over 105 state schools, benefiting 15,000 children with higher-quality education and better-trained teachers. First Microfinance Bank of Tajikistan has a loan portfolio of \$19.9 million serving some 17,000 clients.

LIGHT AND WARMTH TO HOUSEHOLDS IN UPPER BARTANG

AKDN and Pamir Energy are pleased to present this concept note, which outlines an option to improve the supply and distribution of energy in Upper Bartang, Rushan district of GBAO, reduce poverty in target district, and generate opportunities for economic and social development. The majority of the investment option described the construction and improvement of specific hydro-power plant (HPP) including upgrades of the distribution network. Together, these upgrades will improve the quality of energy supply; enhance energy efficiency, with provision of higher quality services to under-developed areas of GBAO.

Expanding energy provision to alleviate poverty is a core objective of Pamir Energy, and a key priority for the Government of Tajikistan. Pamir Energy is a Public-Private Partnership with a commercial and social mission: its mandate is to improve the quality of energy service delivery in GBAO, expand electricity services to rural and isolated areas, and create the critical infrastructure needed for poverty alleviation efforts to succeed. Numerous studies and reports have shown that the provision of energy to underserved, rural areas can provide a range of benefits and opportunities for economic development, education, governance and healthcare. As a recent UNDP report noted, Tajikistan's short-term electricity needs are central to its economic well-being.³ In 2008, for example, an 8 percent reduction in electricity access provoked a 14 percent decrease in industrial output.⁴ Other recent reports from UNDP, ADB and the World Bank have emphasized the vital role that smaller power projects can play in meeting Tajikistan's most pressing needs, and have recommend focusing on smaller investments while the region waits on mega-projects like Rogun and CASA-1000. In this regard, UNDP recognizes Pamir Energy as a model to be emulated⁵, and its story has been recognized internationally as a success and was ranked as top five PPP by UN Economic Council worldwide, and with continuing support from various partners, PamirEnergy continues to grow and serve more, remote and isolated communities, giving them access to low cost, clean and renewable energy, in many cases for the first time in their history. In addition, Tajikistan's National Development Strategy also recognizes the critical importance of investing in the energy sector, which "will make it possible, with the aid of public-private partnerships and the attraction of private investment, to lay the physical foundations for sustained strong economic growth and thereby to bring about a reduction in the poverty rate (Goal 1 of the MDGs)."⁶

Despite Pamir Energy's success to date, there are several districts of GBAO that are not fully served by Pamir Energy's main generation and distribution network. Given the remoteness and isolation of many of these underserved areas, the provision of energy services and reduction of poverty is a major focus of this given proposed investment. This financing also fits within Pamir Energy's overall strategy (Bringing Light and Warmth to each Household in GBAO) to improve energy provision in underserved areas. In the near term, Pamir Energy's plans to upgrade and construct mini-hydroelectric facilities will provide a local

³ UNDP, "Central Asia Regional Risk Assessment: Responding to Water, Energy, and Food Insecurity," January 2009, pp. 8.

⁴ Ibid.

⁵ Ibid.

⁶ "National Development Strategy of the Republic of Tajikistan for the Period to 2015," p. 19. Available on-line at: <http://www.carecinstitute.org/uploads/docs/TAJ-National-Development-Strategy-en.pdf>.

solution to the problems of rural energy provision and will lay a solid foundation for economic growth. Over the longer-term, when grid-level provision becomes possible, these mini-hydels will serve as valuable complementary assets, contributing to overall energy supply and helping to balance discrepancies between supply and demand. Over time, the combination of local energy generation and the extension of Pamir Energy’s grid services will allow Pamir Energy to provide sustainable, reliable energy services to all of GBAO.

IMPROVEMENT AND EXPANSION OF ENERGY SERVICES IN UPPER RUSHAN DISTRICT

DESCRIPTION	LOCATION	AMOUNT (MILLIONS)
Option 1: Improvement and Expansion of Energy Services in Upper Rushan		\$3.0
<i>Phase 1: Construction of Roshorv HPP (Rushan)</i>		<i>\$1.8m</i>
<i>Phase 2: Construction of Distribution Network in Rosharv HPP’s area (Rushan)</i>		<i>\$1.2m</i>
		Total \$ 3.0 m

TOTAL FINANCIAL NEEDS: \$ 3'000'000

Bartang Valley (firstly listed in October 1932) locates in the east of GBAO between Yazgulyam and Rushan mountains, stretching approximately 126 km. Total area is 4,000 km² representing 67.8% of Rushan district. 98% of Bartang Valley is covered with mountains with scarce tree cover and vegetation. There are three jamoats (Bartang, Basid and Savnob) and 20 villages in the valley most of which are located at an elevation of 2,500-3,600 meters above sea level. Population is 6,355 people (1,272 households), which is 25% of total population of Rushan district with 40 % from Savnob Jamoat.

Access to electricity is the main challenge in Bartang Valley and in some villages of other districts of GBAO. Due to the difficult terrain of GBAO, there is no unified power grid in place. Several smaller networks are connected to the local grid, which supplies power to adjacent areas. Around 14% of villages do not have access to electricity in winter while 5-10% of villages do not have access all year round (Murgab, Vanj Rusha’s Bartang Valley).

Bartang Valley started receiving electricity first time in 1980 from diesel power plants and later from small hydro power plants. There are ten small hydro power plants of total capacity of 970 kW and many of them have been out of operation for different reasons. Small population, distant placement of villages an difficult terrain make Small HPPs, solar and wind power plants a more feasible option rather than construction of costly larger hydro power plants as well as long distance transmission.

After the breakdown of the Soviet Union and ceased subsidized charcoal supplies, the valley inhabitants remained without reliable power supply. Aga Khan Foundation and Mountain Society Development Support Program (MSDSP) built 21 mini hydropower plants serving 19,000 people from 1994 to 2001. The plants had operated for more than 15 years and now are at the end of its economical lives and reqwuire repairs. Further to the Program of socio-economic development of Bartang valley of Rushan district for 2011-2015 prioritizing development of the energy sector, Pamir Energy was entrusted to investigate and find solutions to improve power supply in this area. Rehabilitation of two sHPPs Pasor and Basid (238 households) have been identified for investigation and further allocation of donor funding.

Currently, there is one small power plant, Savnob HPP, operating, but it does not meet the demand of Upper Rushan's approximately 150 households. Roshorv village in Upper Rushan, in the Bartang Valley and near to Lake Sarez, has no electricity or power supply at all. During in 1980s, a small power plant was built in Roshorv, but flooding washed it away. Later, a small diesel generator was built, but after the collapse of the Soviet Union and the end of subsidised diesel fuel, it was abandoned. A crude distribution network was partially built during Soviet times, but has been badly damaged. In addition, many new houses have been built over the last 20 years, none of which are connected to the previous distribution network. There are 4 small existing HPP's in Roshorv which has been put into operation by the local population with rated capacity of 5 kW to 12 KW on self-made design based on Roshorvd river. However, due to an insufficient level of water and maintenance issue the generated power does not exceeds 3.5 KW in summertime and 1.5 KW in winter. The given power is used only for lighting purpose.



Pamir Energy therefore proposes the construction of a new 600KW mini-hydel in Roshorv village of Rushan district (Phase 1), as well as the construction of 10 km of 10kV line and 6 km of 0.4kV line, and the installation of 11 transformers (Phase 2). Through these investments, Pamir Energy will be able to provide reliable energy services to even the most remote area of Bartang Valley (extending to Lake Sarez), and will connect 164 households, or 1,200 people to first time energy services.

Expected projects impacts

Construction of Roshorv HPPs will ensure access of households to clean, affordable energy improving their living conditions, triggering economic development and reducing deforestation and in-house smoke diseases. 164 households of seven villages (1,200 people)

will be provided with reliable electricity supply for their cooking, bathing, lighting which can improve the education for children. In winter, electricity will replace firewood for heating largely contributing to reduced deforestation and greenhouse gas emissions to the atmosphere. With developing the energy sector it has a positive impact on health problem because there will be no need to bring for many kilometers firewood, with developing this sector it can also develop some other sectors such as small businesses for production fruit, milk and for developing the tourism sector as well. It also can improve the social institution such as schools, medical point and etc.

The significant part of the project costs associates with construction/rehabilitation of the distribution network, which is historically undermined; however, the PE's experiences show that the proper distribution network is critical in sustainability of the small HPPs.