



United Nations Development Programme
Country: Tajikistan
UNDP-GEF Full Size Project (FSP)
PROJECT DOCUMENT

Project Title: Technology Transfer and Market Development for Small-Hydropower in Tajikistan

UNDAF Outcome(s): Water, sustainable environment and energy.

Expected CP Outcome(s): Outcome 6: Improved environmental protection, sustainable natural resources management, and increased access to alternative renewable energy.

Expected CPAP Output (s): Output 6.2: Alternative renewable technologies including biogas, hydro, and solar power are demonstrated, understood, and widely used. Favorable policy and legal framework are established and contribute to private sector development.

- assist in the implementation of policies, legislation and regulations that improve market conditions for renewable energy development;
- demonstrate sustainable delivery models and financing mechanisms to encourage small-scale renewable energy projects (and improve social infrastructure) and support project implementation;
- develop viable end-use applications of renewable energy; and
- Conduct training on proper management of renewable energy systems (e.g. tariff collection) to strengthen local ownership and sustainability.

Executing Entity/Implementing Partner: UNDP Tajikistan

Implementing Entity/Responsible Partners: Ministry of Industry and Energy

Brief Description: The objective of this project is to significantly accelerate the development of small-scale hydropower (SHP) generation in Tajikistan by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs. The project is expected to generate global benefits in directly avoiding greenhouse gas (GHG) emissions of almost 273 kilotons of CO₂ due to preparation of SHP plants (over the lifetime of a SHP of 20 years) and almost 819-4,952 ktCO₂ in indirect emission reductions. The project will do this by introducing a regulatory framework to supply the grid with electricity generated SHP through sustainable delivery models and financing mechanisms and assist the Government in attracting funding for SHP investments.

Programme Period:	2012-2016
Atlas Award ID:	00061194
Project ID:	00077414
PIMS #	4324
Start date:	Mar. 2011
End Date	Dec 2015
Management Arrangements	DIM
PAC Meeting Date	TBA

Total resources required:	\$ 8,450,000
Total allocated resources:	
• Regular (TRAC)	\$ 500,000
• Other:	
o GEF	\$ 2,000,000
o UNDP (projects)	\$ 4,250,000
o Govt	\$ 1,090,000
In-kind contribution:	
• Govt / others	\$ 610,000

NAME

SIGNATURE

Agreed by Government of Tajikistan:

Date/Month/Year

Agreed by UNDP:

Date/Month/Year

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ACRONYMS

ADB	Asian Development Bank
CAIR	Community Action Investment Project
CDP	Community Development Programme
CP	Country Programme
CP	Communities Programme (UNDP project)
CPAP	Country Programme Action Plan
CO ₂	carbon dioxide
EE	energy efficiency
FSP	Full-Size Project
GBAO	Gorniy Badakshan Autonomous Oblast
GEF	Global Environment Facility
GHG	Greenhouse gas emissions
GDP	Gross Domestic Product
GoRT	Government of the Republic of Tajikistan
HPP	hydropower plant
JCPS	Joint Country Partnership Strategy
kW	kilowatt
IPP	Independent Power Producer
MDG	Millennium Development Goals
SHP	mini (and micro) hydropower
MSDSP	Mountain Society Development and Support Programme
MoIE	Ministry of Industry and Energy
MoU	Memorandum of Understanding
MW	megawatt
O&M	operation and maintenance
O&M&M	operation, maintenance and management
PMU	Project Management Unit
PPA	Power Purchase Agreement
RE	renewable energy
RES	renewable energy sources
SCF	Swiss Cooperation Fund
SDC	Swiss Agency for Development and Cooperation
SME	small and medium enterprises
SIDA	Swedish International Development Agency
SHP	small hydropower
CO ₂	tonne of carbon dioxide
ktCO ₂	kiloton of carbon dioxide
UNFCCC	United Nations Framework Convention on Climate Change
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
USD	United States dollar

Part 1. SITUATION ANALYSIS

1. CONTEXT AND GLOBAL SIGNIFICANCE: ENVIRONMENTAL, POLICY AND INSTITUTIONAL

Energy and electricity situation

After the breakdown of the Soviet Union and subsequent civil war in Tajikistan in the early 1990s, grid extension has come to a virtual standstill. Moreover, in the absence of proper maintenance and repair works on the generation, transmission and distribution facilities, the condition of the existing grid has in many rural areas deteriorated to the point where electricity supply is either not possible at all, or only with low quality and frequent outages. At the same time rural dwellers (over 70% of the population) have moved to more remote locations and previously uninhabited valleys without grid supply in the search for additional farmland.

Tajikistan has great hydropower potential, and has focused on attracting investment for large-scale hydropower projects, such as the Nurek and Sangtuda-1 (670 MW) hydroelectric power stations. More hydropower projects are at the development stage, such as the Rogun power plant (3,400 MW). However, as these large power plants are oriented to power exports and large industrial estates, these form only a partial solution for rural energy supply. Today over 95% of Tajikistan's power generation capacity is based on large hydro power plants, with strong seasonal variations in power production, the lowest occurring during the winter (October – April/May) season when the demand is at the highest.

The electricity grid of Tajikistan is currently divided into a northern and southern network, with both networks connected to Central Asian Network. This divided system has led to inconsistent power supply especially to remote areas. During the winter period, the problem is linked with the seasonal disruption of the electricity supply (due to deficits in the electricity production of large hydropower plants). Furthermore, the problem is exacerbated by the condition of the power supply systems in Tajikistan, characterized by voltage instability, service interruptions, poor dispatch and communication systems, low cost recovery and high losses. As a result, while the vast majority of the villages are connected to the grid, electricity is only supplied for 2 to 6 hours per day during the winter months (1 to 3 hours in the morning and evening each). In summer, power supply is generally more reliable. However, a significant number of remote, non-connected rural communities remain without any electricity supply throughout the year.

Fossil fuel resources are relatively limited and poorly developed in Tajikistan. Although coal reserves are abundant in certain mountainous areas, they are hardly utilized due to a lack of access roads and high development costs. As such, the country relies on imported fossil fuels, and this reliance on importations has a negative bearing on the energy security of Tajikistan. Besides bad roads, a limiting factor is the high costs of imported fuels, which rural residents and public institutions in most cases are unable to afford.

Access to reliable energy continues to be one of the critical development issues facing Tajikistan. Almost every winter, as a result of Tajikistan's dependence on unreliable electricity imports, the country is faced with an energy crisis, where rural areas have access to only a few hours of electricity per day. LPG (liquefied petroleum gas) stoves and diesel generators serve the energy needs of a tiny minority of the rural rich. It is estimated that over 1 million people, out of Tajikistan's population of 7.1 million, live primarily in rural areas, and have little or no access to an adequate energy supply.

An unreliable electricity supply constrains income-generating activities and has severe environmental consequences. The situation described above has forced the rural population to at least partially substitute for the lack of access to modern electricity by exploiting alternative local energy resources for cooking, lighting, and commercial use (i.e. to meet its basic energy needs, including deriving a livelihood). These

energy sources include primarily traditional biomass (fuel wood, dung, cotton-plant seeds, and shrubs) and occasionally - fossil fuels (diesel oil and coal) as illustrated in Figure 1.

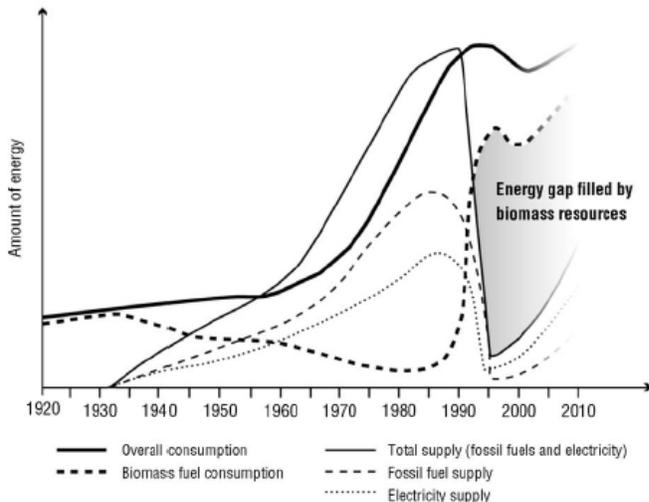


Figure 1 Model of energy supply and demand in Tajikistan since 1920s¹

From the environmental perspective, this situation has been disastrous since the unsustainable felling of highly valuable mountain forests has contributed to a loss of forest cover, biodiversity and of GHG emissions. According to recent studies in selected location 70 to 80% of the forest cover has been lost during the last 20 years mainly due to the high demand for energy². The deforestation and forest degradation has also resulted in soil erosion leading to a deterioration of natural resources and an increase in vulnerability of the rural population to natural disasters such as landslides during heavy rainfall. The situation has been worsened by the use of primitive and inefficient cook stoves with an efficiency estimated at no more than 10-30%. Moreover, the burning of fuel wood, compressed dung and, when available, hard coal in low-efficiency stoves has contributed to the deterioration of indoor air quality leading to a higher incidence of health risks. The lack of heating in social institutions such as schools and hospitals has created additional health risks for children and other vulnerable groups, especially during winter. Finally, the opportunities for the development of new sources of income (e.g. processing of agricultural products) and the improvement of living conditions have remained practically non-existent in the absence of a reliable and secure energy supply.

The socio-economic and environmental impacts described earlier are most severe for rural communities in Tajikistan, because they are already among the poorest in the world. A pre-condition for lifting these communities out of poverty is therefore the access to a reliable and secure supply of electricity. This context has been recognized by the Government of Tajikistan, which is currently addressing these issues within the framework of the national poverty reduction strategy. Moreover, the government is exerting efforts to mitigate negative local and global environmental impacts arising from the current situation. Consequently, a number of prioritized measures and projects have been proposed for implementation to promote the use of renewable sources of energy, including sustainable use of fuel wood, small-scale hydro power, biogas and solar technologies. In the past, a number of renewable energy projects have been realized in Tajikistan. However, a common feature of all these projects has been the lack a comprehensive approach to remove underlying barriers to sustainable development and utilization of renewable sources of energy. Consequently, to date none of the past initiatives have resulted in any replication on a larger scale.

¹ T. Hoeck, R. Droux, T. Breu, H. Hurni, and D. Maselli, "Rural energy consumption and land degradation in a post-Soviet setting - an example from the west Pamir mountains in Tajikistan," *Energy for Sustainable Development*, vol. XI, 2007.

² Same as above

Institutions

The Ministry of Energy and Industry is responsible for the formulation and implementation of policies and measures in the energy and industry sector and will be a leading partner agency for the implementation of this proposed project. The Ministry is also entrusted with the implementation of the Long-Term Program for Small Electric Power Station Construction for 2009 – 2020 which is further discussed below. Barki Tojik is the state-owned company controlling all generation, transmission and distribution in the country, of both electricity and thermal energy, and responsible for the practical implementation of all stated-funded projects and programmes in the energy sector, including those aimed at promotion of renewable energy sources. It has experience with hydro-electric power generation and

Box 1 Classification of hydro power schemes

Usually hydropower plants can be classified according to installed capacity, into large, medium, small, mini and micro. Small-scale hydropower encompasses to categories of small, mini and micro hydropower. The exact definition differs per country. The Strategy for the Development of Hydropower, defines small-scale as follows:

- micro: smaller than 10 kilowatt (kW)
- mini: between 10 and 500 kW
- small: between 500 kW and 10 megawatt (MW)

In the report we will use the abbreviation SHP (small-scale hydropower) with the understanding that the focus of the project is on mini and micro hydropower (< 500 kW), for which in literature often the abbreviation MHP is used.

transmission, and will play a key role in the implementation of pilot SHPs under this proposed project. Importantly, it has the obligation under resolution # 267 “On small power engineering development of the Republic of Tajikistan” of June 1997 to purchase surplus energy generated by SHPs that are owned and operated by non-governmental entities according to the published electricity tariffs in the Republic of Tajikistan.

At the state level, other important stakeholders regarding SHP and community development are:

- Committee for Environmental Protection, which takes the lead in environmental policymaking;
- Agency on Hydrometeorology under the Committee of Environmental Protection as the national UNFCCC focal point;
- The Ministries of Economic Development

and Trade and of Labor and Social Protection (which are responsible for poverty alleviation).

Policy and regulations

The Government of Tajikistan is planning to rehabilitate the existing energy system so that it can satisfy both the domestic energy needs and the external market, followed by a next phase of market reforms that will facilitate increased interest from domestic and foreign investors. Part of the reforms includes financial rehabilitation by means of introducing payment discipline and increasing the power tariffs to about USD 0.02-0.025 per kilowatt-hour (kWh) in the short term. A next phase of stabilization and development sees the modernization and construction of all energy installations, including power distribution and raising tariffs to USD 0.05 per kWh to alleviate the poor financing that has hampered power sector development in the past. As part of the reforms, the Government is also putting larger emphasis on the development of renewable energy resources (RES), in particular SHP.

The use of RES for electricity generation in Tajikistan is recognized as a national interest and a means to achieve poverty reduction and economic development goals by ensuring reliable access to electricity for all citizens. This is confirmed in several policy documents adopted by the Government:

- ⇒ "Comprehensive target program for widespread use of RES, such as the energy of small rivers, sun, wind, biomass, energy, underground water sources" (approved by the Government of Tajikistan on Feb. 2, 2007 № 41);

- ⇒ "Long-term program for building small hydro power plants for the period 2009-2020 years "(approved by the Government of Tajikistan on February 2, 2009 № 73),
- ⇒ "National Environmental Program of the Republic of Tajikistan for 2009-2010 "(approved by the Government of RT from October 31, 2009 № 602).

Amendments to the Law on Energy were made in 2007, stating that electricity from small RES power plants should be taken over by natural monopolies (electric power utilities) at the price determined by the authorized organization for the regulation of natural monopoly activities.

The *Law of the Republic of Tajikistan on the Use of Renewable Energy Resources (RES)* of 2010 (hereinafter referred to as Law on RES), is envisaged to regulate the legal relations that occur between the public authorities, individuals and legal persons in the area of priority and effective use of renewable sources of energy, and shall define legal and economic grounds for improving power saving level, reduction of manmade impact on environment and climate, conservation and preservation of non-renewable sources of energy for future generations. The proposed GEF project squarely complements *the Law on the use of Renewable Energy Resources*.

After the preparation and submission of the country's First National Communication to the UNFCCC, a *Technology Needs Assessment (TNA)* was performed. The report, *First National Communications, Phase 2* (2003) refers to the fact that hydropower is the main energy source. The potential of small hydropower electricity production in Tajikistan is over 18 billion kWh a year. A construction of 20 small hydropower plants (HPPs) is possible in the Kalai-Humb, Vanch, and Rushan districts (Western Pamir). There are also significant potentials for small hydropower development in Central Tajikistan, where over 100 small and mini hydropower plants can be constructed. It further mentioned that 'To apply technologies of constructing small and mini-HPPs, the necessary production and scientific base is available in Tajikistan. Also, there is an experience of constructing and mounting these installations. However, new effective technologies, the production base development, specialists training, and service infrastructure are still needed. The cost of power generation by small and mini-HPPs can vary greatly and the recently developed models are based on technologies and equipment provided by neighboring and far-away foreign countries. TNA emphasizes that "when local small HPP production is developed, the specific expenditure for their installation and exploitation will be reduced by 20-30%" which will make small hydro power more affordable. Demonstrating the experience and providing the population with information on small HPPs is of great importance for small hydropower development. TNA further concludes that the construction of small HPPs (500-2500 kW) and mini-HPPs (up to 100 kW) is among most urgent governmental objectives as far as renewable energy development is concerned.

Furthermore, the *Second National Communication of the Republic of Tajikistan under the United Nations Framework Convention on Climate Change* (2008) mentions that "since Tajikistan has a huge potential for development of small hydropower, there is a possibility to attract investments for development of renewable energy. It is estimated that if existing technical potential for small hydropower, i.e., 18 billion kWh/yr (representing roughly 2,000 MW of capacity), would be utilized in Tajikistan, it can lead to reduction of 5-6 million tons of CO₂ emissions per year. Additional socio-economic benefits are increased employment opportunities for local population and better access to energy, especially in rural areas".

2. ENERGY SOLUTIONS AND BARRIER ANALYSIS

For Tajikistan, which import fossil fuels and incur high-transportation costs due their land-locked position and mountainous terrain, scaling up centralized heating systems based on fossil fuels or reliance on grid power is costly. Given the country's vast small water resources, development of small-scale hydropower (SHP) is a favorable and least cost solution, particularly for remote settlements (where the cost of

conventional power supplies is particularly high). Experience with SHP construction in Tajikistan shows that the real specific cost of SHP construction does not presently exceed 1100-1200 US\$/kW.³ Additional benefits of SHP development include improving the security of power supply and stimulating local economic and job creation. In community-owned and managed SHP projects local population has a greater control over energy use and distribution. Local governments, entrepreneurs and community members can pool resources to implement locally-relevant projects without having to depend on support from central governments. All in all, a number of recent academic and policy studies⁴ conclude that SHP currently represents the fastest, most economical and environmentally benign option to provide modern energy services to rural and remote communities in Tajikistan.

Traditionally, there has been quite some experience in using small-scale hydro power in Tajikistan during the Soviet period: a total of 69 small hydro plants (with a total capacity of 32 MW) were built between 1940 and 1978. Interest in SHP since then declined, no provisions were made for plants maintenance and repair, and as a result most of these plants have been decommissioned, leaving only five in operation (with a total capacity of 13.87 MW), all in the mountainous Badahsan region of Pamir. In the recent past a number of SHP projects have been realized in Tajikistan:

- From 1994 to 1999, Barki Tajik installed 7 small-scale hydropower stations with capacities of between 70 to 630 kW.
- Over the same period, 12 SHPs plants with capacities of between 30 to 100 kW were constructed in GBAO with financial support of Aga Khan Foundation. Reportedly, most of these plants are not operational anymore due to technical failures.
- In 2003-2006, under the USAID funded Community Action Investment Project (CAIP) four SHP plants with capacities of between 15 to 20 kW have been constructed.
- Under the SIDA funded Poverty Reduction Program 3 SHP plants with capacities of between 20 to 30 kW have been installed in 2004.
- Within the scope of the ADB project Development of Community Based Micro-Hydropower Supply in Rural Areas, 2 SHP plants with capacities of between 100 to 200 kW have been installed in 2007.

Nonetheless, all these projects have lacked a comprehensive approach to remove underlying barriers to sustainable development of renewable sources of energy such as hydro. Most of hydro power technology transferred to Tajikistan has been in the form of turnkey plants to the state sector, financed through international aid and/or loans.

Due to lack of technical maintenance most of these SHPs are sadly enough no longer operational or in a state of disrepair in many cases. This has put into question the relevance of centrally planned investments and/or turnkey technology transfer, and to look for better technology delivery models.

One option is that as much as possible rural communities try to operate and manage the SHP facilities themselves. Rural communities have expressed their interest to revitalize the use of small-scale hydro power as well as other local renewable energy resources, but are lacking both technical capacity and access to suitable financing mechanisms. In general, there are only one or two companies in Tajikistan that are able to provide full support services, from construction, commissioning to servicing and maintenance support. However, these are currently not even providing such services due to lack of a real market for SHP in Tajikistan.

³ “Long-term program for small electric power station construction for 2009 – 2020” as approved by the Government Regulations #73 of the Republic of Tajikistan, February 2, 2009.

⁴ See for instance: T. Hoeck, R. Droux, T. Brey, H. Hurni, and D. Maselli, "Rural energy consumption and land degradation in a post-Soviet setting - an example from the west Pamir mountains in Tajikistan," Energy for Sustainable Development, vol. XI, 2007; [“Concept for Fuel and Energy Sector Development of the Republic of Tajikistan in 2003-2015”](#) approved by the Resolution Government of Tajikistan #318 dated 3 August 2002; or “Sustainable Energy Model for Rural Communities. Best Practice Model for Central Asia” World Bank 2010.

Consequently, to date none of the above initiatives has resulted in any replication of the individual SHP projects implemented. It can thus be concluded that a number of **key barriers** to small hydro power development in Tajikistan will remain in the future without GEF intervention. These barriers, as illustrated below in Table 1 are interrelated. The removal of only some, but not all of them, will not lead to sustainable development and application of the SHP sector in Tajikistan. GEF support is sought to address and overcome the above mentioned barriers in a holistic approach by promoting the supply of and ensuring effective demand for SHP in Tajikistan as summarized in the following chapter and illustrated in Table 1.

Table 1 Barriers to and options in SHP development

Barriers	Proposed Activities to remove barriers
Barrier 1: Institutional and regulatory barriers: The legislative, institutional and regulatory framework and mechanisms in the energy sector in place do not effectively promote the utilization of renewable sources of energy and does not attract investments in this sector. Specifically:	Outcome 1: Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country
Barrier 1.1: Absence of regulations to operationalize the RES Law	Output 1.1: Adopted and enforced regulation operationalizing RES Law
Barrier 1.1.1: Excessive administrative regulations that distort business and increase burdens related to permits and an unclear licensing and inspection systems imposed on consumers. New RES Law call for simplification of procedures, but they need to be operationalized	Activity 1.1.1: Development, adoption and enforcement of simplified procedures and principles for the licensing and construction of SHP facilities, including the establishment of a cadastre of SHP projects and facilities in Tajikistan to enable monitoring.
Barrier 1.1.2: A new Law on RES (renewable energy sources) was approved in 2010, but the implementing rules and regulations still need to be properly defined to operationalize Law's provisions regarding SHP plants connection and integration in the national grid.	Activity 1.1.2: Development, adoption and enforcement of technical regulation to enabler connection of SHP plants to the electric power grid with all relevant technical conditions for their integration in the electric power system
Barrier 1.1.3: A new Law on RES (renewable energy sources) was approved in 2010, but the implementing rules still need to be properly defined to operationalize Law's provisions regarding payment of preferential tariffs to qualified power producers, i.e. from SHP and other RES.	Activity 1.1.3: Development, adoption and enforcement of procedures on monitoring and verifying electricity production from SHP and other RES (system to guarantee the origin of electricity)
Barrier 1.1.4.: New RES Law set up a RE and EE Fund to channel national and donor funding for construction of SHP and administer the scheme for electricity buy-back as a support to community based projects, but the fund is not yet operational	Activity 1.1.4: Establishment of a dedicated National Fund for RES and EE to manage and administer the scheme for electricity buy-back as a support to community based projects.
Barrier 1.1.5: Absence of tariff methodology for RES electricity, as envisaged by RES Law	Activity 1.1.5: standard methodology for economic-financial evaluation of SHPs and tariffs to be paid to IPPs and charged to consumers by IPP; as well as a standard PPA format/template

Barrier 1.1: Weak institutional capacities at central and local level to enforce RES policies	Output 1.2: Institutional capacities in place at central and local level to implement and coordinate RES policies
Barrier 1.2.1: Low institutional capacities of the central government bodies to implement RES policies, new Law and by-laws	Activity 1.2.1: Training programme for central and local government officials on RES policy development and implementation
Barrier 1.2.2: Absence of institutional arrangements to provide for inter-agency coordination of RES policies development and implementation	Activity 1.2.2: Establishment and strengthening of the role of the Inter-Ministerial Task Force to provide for inter-agency coordination, monitor progress, and report to the Parliament and President on the results of RES policy implementation
2. Capacity and technological barriers: There are no well-established or functioning supply chains for SHP system in place which would ensure broad availability of such systems and better service support for end-users.	Outcome 2: Enhanced technical and planning know-how and developed market chain for SHP
Barrier 2.1: Lack of technical information on SHP project development	Output 2.1: Guidebook on technical and policy aspects of SHP project development (to be used in all trainings to be delivered by the project)
Barrier 2.1.1: Lack of technical information, specifically on SHP design available to local manufacturers	Activity 2.1.1: Preparation, dissemination of a Guidebook on SHP project development summarizing regulatory framework, and providing guidelines, methodologies and description of recommended standardized technical solutions (i.e. 3 designs of common SHPs in the rated capacities range of 33 - 500 kW adopted based on available international standards and designs for application in Tajik rural communities)
Barrier 2.2: Existing manufactures are too narrowly specialized and have insufficient technological and human capacities to provide turnkey integrated RES solutions and O&M services	Output 2.2: Local SHP manufacturers capable of providing turn-key integrated RES solutions and O&M services
Barrier 2.2.1: Lack of information about local SHP supply chain	Activity 2.2.1: Competitive selection of local manufacturers and elaboration of their capacity and technology development plans
Barrier 2.2.2: Insufficient human and technical capacities of local SHP manufacturing companies to deliver turn-key solutions	Activity 2.2.2: On-the-job capacity building program for selected manufacturers to be delivered by international SHP design/manufacturing company and include: joint SHP design, construction and O&M for pilot projects (under Component 3), quality assurance, personnel training, other business and technical advisory services
Barrier 2.2.3: Outdated technological base for SHP design and construction	Activity 2.2.3: Improvement of technological base of the selected companies via provision of required soft- and hard-ware (on a 50% cost-sharing basis)
Barrier 2.3: Shortage of qualified technicians, engineers and designers experienced with SHP projects	Output 2.3: Vocational training program for technicians involved in SHP design/construction and O&M
Barrier 2.3.1: Shortage of qualified technicians, engineers and designers experienced with SHP projects	Activity 2.3.1: Introduction in partnerships with national technical schools vocational training for SHP specialists

Barrier 2.4: Absence of alternatives to traditional very inefficient wood-fired heating and cooking devices	Output 2.4: Local manufacturers capable of producing combined electric and biomass-fired heating and cooking devices for rural households
Barrier 2.4.1: Inadequate quality of locally manufactured electrical heating and cooking appliances	Activity 2.4.1: On-the-job capacity building program for selected manufacturers: joint identification of products range, joint design (adaptation of international products to suit local needs), assembling, marketing, quality assurance, personnel training, other business and technical advisory services
3. Lack of practical experience in designing and implementing integrated renewable energy-based projects in targeting rural communities	Outcome 3: Demonstrated technical and economic viability of SHP technology in supporting socio-economic development
Barrier 3.1: Lack of information and political buy-in to support decision about community-based SHP projects	Output 3.1: Technical studies, political commitments and institutional framework secured for pilot SHP projects
Barrier 3.1.1: Some research activities are being conducted in Tajikistan, to study/update hydrological potential and parameters of small rivers. Consequently, most of the studies apply outdated methods and so are the existing equipment and modeling software used.	Activity 3.1.1: Updating data on hydrological resources
Barrier 3.1.2: Lack of quality feasibility studies and assessment of risks and benefits of specific SHP projects, including potential climate change risks	Activity 3.1.2: Conduct of feasibility analyses of SHP sites
Barrier 3.1.3: There are no provisions for sustainable energy supply in district development plans. The plans do not recognize SHP as a viable alternative to unreliable central grid. Local communities continue relying on central authorities to provide a solution to power deficit. Without local support and buy-in realization of community-based SHP project is not possible	Activity 3.1.3: Preparation of district development plans in pilot communities to a) prioritize investment in SHP as a viable alternative to centralized power provision and b) link local development with sustainable power supply
Barrier 3.1.4 Low awareness of local communities about the benefits of and potential of RE application	Activity 3.1.4: Raising awareness of local beneficiaries in selected localities on RE applications (SHP) and EE (e.g., efficient use of lighting, heating and proper building insulation)
Barrier 3.1.5 Absence and/or weakness of community-based organizations to own/operate local SHP plants	Activity 3.1.5: Facilitation of the establishment of new and/or strengthening of existing entities to own and operate pilot SHP plants (including staff training and legal and business advisory support)
Barrier 3.1.6 Insufficient capacities to deliver quality technical design	Activity 3.1.6: Preparation of engineering design and securing required permissions and approvals
Barrier 3.1.7 Weak local capacities to plan community-based SHP projects, including technical design, structuring financing and provision of sustainable O&M model	Activity 3.1.7: Supporting identification and preparation of additional SHP projects (site identification, community mobilization, technical feasibility, permissions and approvals, quality assurance, etc)
Barrier 3.2: Lack of practical experience with implementing community-based SHP projects	Output 3.2: Fully operational community-based SHP
Barrier 3.2.1 Lack of experience and capacities to oversee construction of community-based SHP projects and provide for adequate quality assurance	Activity 3.2.1: Construction/installation and commissioning of 10 SHP pilots.

Barrier 3.2.2 Lack of experience and capacities to provide for adequate O&M of community-based SHP pilots	Activity 3.2.2: Operation and maintenance of SHP pilots (via on-the job training for SHP staff) and monitoring of SHPs operational performance
Barrier 3.3: Lack of environmental and economic sustainability of community-based SHP projects	Output 3.3: Pilot SHP sustained
Barrier 3.3.1 Insufficient “effective” demand for SHP-based power	Activity 3.3.1: Facilitating signature of Power Purchase Agreement with Barqi Tajik and local consumers at
Barrier 3.3.2 Inefficient energy use in rural communities: appliances and buildings	Activity 3.3.2: Energy efficient measures in rural communities
Barrier 3.3.3 Widespread poverty and resulting low ability to pay for SHP-based electricity by local consumers	Activity 3.3.3: Provision of grants and micro-loans to support creation of income-generating activities and energy efficiency measures in local SMEs and public buildings to minimize their power demand
Barrier 3.3.4: Need for sustainable management of watersheds to avoid potential conflict over water use with agricultural users	Activity 3.3.4: Management plans for pilot watersheds to avoid conflict over water use
Barrier 4: Lack of analysis and strategies for nation-wide replication and scaling up of integrated renewable energy-based rural development model	Outcome 4: National Scaling-up Programme of Renewable Energy-based Integrated Rural Development
<i>Barrier 4.1. Lack of analysis and evidence to support national scaling-up programme</i>	<i>Output 4.1 Project results assessed, analyzed and compiled into comprehensive national report</i>
Barrier 4.1.1 Lack of analysis to promote and justify nation-wide efforts to promote SHP	Activity 4.1.1: Assessment and compilation of project results and lessons learnt from Components 1-3, including GHG emission impact
Barrier 4.1.2 Absence of methodology and data to estimate global GHG mitigation benefits of integrated renewable-energy based rural development model	Activity 4.1.2: Development and application of methodology for and estimation of the greenhouse gas (GHG) emission reduction impact of the National Scaling-up Program
<i>Barrier 4.2. Low awareness of national decision-makers about the potential and benefits of SHP for rural economic development</i>	<i>Output 4.2 Conference on integrated renewable-energy based rural development</i>
Barrier 4.1.2 Low awareness of national decision-makers about the potential and benefits of SHP for rural economic development	Activity 4.2.1: Organization of national conference to present the results and mobilize high-level political support and commitments for National Scale-up strategy
<i>Barrier 4.3. Absence of national strategy in support of renewable energy-based integrated rural development</i>	<i>Output 4.3. National Scaling-up Programme developed and adopted</i>
Barrier 4.2.1 Absence of national strategy in support of renewable energy-based integrated rural development	Activity 4.2.1: Development of National Scaling-Up Program and scenarios for renewable energy-based integrated rural development

Part 2. PROJECT STRATEGY

3. PROJECT DESIGN PRINCIPLES AND STRATEGIC CONSIDERATIONS

Design principles and strategic considerations

Improving living standards and quality of life in Tajikistan requires a concerted effort of government and communities. UNDP and other UN agencies support these efforts. In 2010, UNDP has consolidated and streamlined its projects within energy and environment portfolio into one Environment and Energy Programme, which is aligned with the United Nations Development Assistance Framework (UNDAF) and the Country Programme Action Plan (CPAP). The Programme is implemented in the framework of the Joint Country Partnership Strategy (JCPS), elaborated by the main development agencies active in Tajikistan. The Programme is coordinating most of the UNDP's efforts in the area of environment and energy and serves as an umbrella for the several projects implemented by UNDP in collaboration with the Government. UNDP also implements the Communities Programme (CP) that coordinates all its efforts on the local level.

Under the local governance component, the principle strengths of UNDP include: self-organization of local communities, district participatory planning; ability to attract contributions from various actors and the ability to link local experiences with national level institutions and policy dialogue. By 2010, seven district development plans had been formulated (in targeted 11 district governments), engaging NGOs and CBOs and private sector in the planning process.

UNDP has supported rural infrastructure rehabilitation, including access to safe drinking water, sanitation, power supply facilities, schools and health-related infrastructure. Rural organizational capacity has been strengthened to ensure sustainable operation, maintenance and management of public infrastructure. On rural economic development, UNDP has assisted in the realization of significant agricultural development impacts, including the establishment of six micro-credit finance organizations across Tajikistan, capacity building support to business advisory and information services, mainly for farmers.

In 2010 started a new phase of the Country Programme which will build on its previous achievements. UNDP is implementing the Programme, which will focus on (within upcoming few years):

- Strengthening sub-national government capacity to plan, budget and implement activities and improved provision of public services;
- Enhancing the capacity of the private sector and civil society to develop, participate in decision-making, partner with government;
- Improving policies, reforms and regulatory frameworks in the areas of poverty reduction, local governance, rural economic development, environment and energy and health.

Through its rural infrastructure and agricultural activities, UNDP has built awareness on climate-friendly approaches, including sustainable energy, i.e. energy efficiency and renewable sources of energy. As mentioned in Part 1, many citizens in rural have limited or no reliable access to electricity. Unreliable electricity supply has a direct impact and constraints on rural economic development and environmental

sustainability. As explained, the country has a vast potential for small hydropower (and other renewable energy resources, such as solar energy) and have not been fully explored. The scope and scale of the socio-economic and environmental challenges that the rural parts of Tajikistan face because of the lack of access to reliable and secure sources of energy mean that existing initiatives are not sufficient.

As a step to addressing this adverse situation, the Government of Tajikistan signed an agreement with the UNDP in 2006 for promoting the use of renewable energy sources to support rural development. There are many large and small rivers in Tajikistan, proving a good basis for the use of hydropower particularly in the mountainous regions of the country. Various rural communities have expressed interest in revitalizing the use of small-scale hydro power as well as other local renewable energy resources but are lacking technical capacity, access to suitable financing mechanisms and high life-cycle costs of developing new energy sources. The UNDP has implemented a few mini-hydro projects that have benefited rural communities. Its success suggests implementation of renewable energy projects can be sustainable, provided that capacity for a renewable energy supply sector is supported. Based on this a programme was developed to promote renewable and sustainable use of energy in rural areas. The Ministry of Industry and Energy requested GEF support with implementing the proposed project. The implementation of the UNDP project entitled “Promotion of Renewable and Sustainable Energy Use for Development of Rural Communities in Tajikistan” started in 2010.⁵ This is not a separate initiative, but both UNDP and GEF funded activities have to be seen as two stream of funding (with additional co-financing support from Government and other donors) for implementation of a UNDP-led programme of promotion of SHP and renewable energy. This explained in more detail in section 8.

4. PROJECT OBJECTIVE, OUTCOMES AND OUTPUTS

Project objective:

To significantly accelerate the development of small-scale hydropower (SHP) by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs.

Project outcomes and outputs:

Component 1: This component is aimed at addressing the institutional and regulatory barriers to the accelerated development of SHP in Tajikistan. The expected outcome from the delivery of the envisioned outputs from this component is an **adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country**. To realize this outcome, the following outputs/deliverables are expected from the activities that will be carried out under this project component.

Output 1.1: Formulated, approved and enforced implementing rules and regulations (IRRs) of the new Law for RES that will facilitate actions geared towards the enhancement of the market environment for SHP. Please see Annex D for the list of envisaged IRRs as provided by the Law.

⁵ The project has the following main components: (1) Enhanced legislative, institutional and regulatory framework and enhanced stakeholder's know-how and institutional strengthening, (2) Increased awareness and information uptake on renewable energy (RE) opportunities, (3) Implemented pilot RE projects in prioritized areas. Total budget is USD 1.2 million, as indicated in the co-financing table.

Context: A Law on RES has been approved and was signed in 2010. With the enactment of the Law, the establishment of a Renewable Energy and Energy Efficiency Fund is foreseen. Hence, the emphasis of the project will be on the development of supporting regulations for the RE Law, especially for Fund establishment and operation, on developing supporting regulations for connection to the grid of small-scale hydropower plants SHPs (to sell electricity to Barki Tajik) as well as other incentives within the framework of the new Law on RES. Also, an assessment of the performance of past and existing SHPs will be carried out (so that lessons learned can be taken into account in the formulation and fine-tuning of the supporting regulations) together with an updated assessment of hydrological data. The project will assist in identifying potential sources of finance for the RE and EE Fund.

Activity 1.1.1: Development, adoption and enforcement of simplified procedures and principles for the licensing and construction of SHP facilities, including the establishment of a cadastre of SHP projects and facilities in Tajikistan to enable monitoring. GEF support is not required for this activity.

Activity 1.1.2: Development, adoption and enforcement of technical regulation to enable connection of SHP plants to the electric power grid with all relevant technical conditions for their integration in the electric power system. GEF support is not required for this activity.

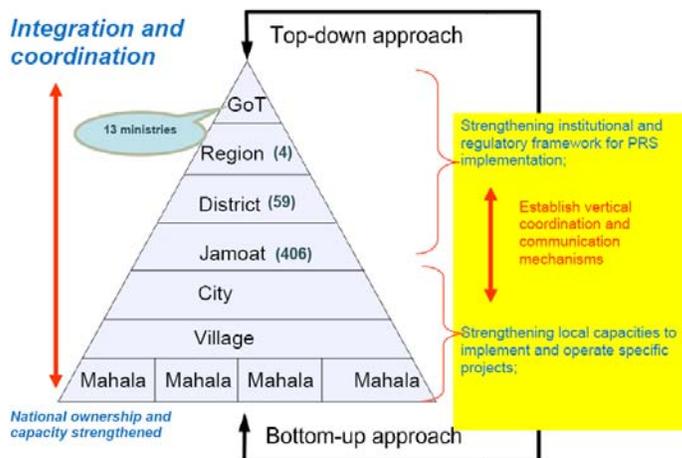
Activity 1.1.3: Development, adoption and enforcement of procedures on monitoring and verifying electricity production from SHP and other RES (system to guarantee the origin of electricity). GEF support is not required for this activity.

Activity 1.1.4: Establishment of a dedicated National Fund for RES and EE to manage and administer the scheme for electricity buy-back as a support to community based projects. Under this activity assistance will be provided to develop organizational structure of the Fund and its rules of operation, as well as to identify the most suitable options and sources for fund's capitalization. More details about proposed financial framework are provided in Annex E. GEF support is not required for this activity. GEF support is not required for this activity.

Activity 1.1.5: Development and implementation of the financial framework for RES, particularly where it concerns a tariff system methodology. GEF support is required to cover the development of standard methodology for economic-financial evaluation of SHPs and tariffs to be paid to IPPs and charged to consumers by IPP; as well as a standard PPA format/template.

Output 1.2: Central and local government institutions with enhanced capacities to develop and coordinate SHP (and other RES) projects as illustrated at **Error! Reference source not found.****Error! Reference source not found.**Figure 2 below.

Context: The Ministry of Energy and Industry already functions as a one-stop-shop for new power generating capacity development. There is also a State Committee on Investments Promotion and State Property that also promotes investments opportunities in the power sector. Both focus on larger investors



(small hydropower) that are aiming to be an independent power producer (IPP).). On the other hand, this project will focus in particular on community-based SHPs (i.e., mini hydropower with a capacity < 500 kilowatt); in particular by clarifying the rules and the roles of different authorities in SHP development by rural community and community based private investors (as well as private investors (domestic or foreign)). In this respect, training will be provided to staff of the Ministry of Energy and Industry and other government agencies. In total, about 5 training events are envisaged to be carried out under this component.

Activity 1.2.1: Training programme for central and local government officials on RES policy development and implementation, including but not limited to the following topics: (i) Technology for SHP; (ii) Building SHP; (iii) Environmental issue related to SHP use and hydrological studies/data for SHP; (iv) Investment and O&M costs for SHP; (v) Tariff methodologies and calculation of feed-in tariffs; (vi) Incentives for the building of SHP plants; (vi) Registration of SHP plants; (vii) Management of the incentive fund for RES; (vii) Procedure to grant the eligible status for RES electricity producers; and, (ix) Technical requirements to connect SHP plant to the distribution network. GEF support is required for this activity.

Activity 1.2.2: Establishment and strengthening of the role of the Inter-Ministerial Task Force to provide for inter-agency coordination, monitor progress, and report to the Parliament and President on the results of RES policy implementation. Modest GEF support (2,500 US\$) is required for this activity.

Component 2: This component will address the technical barriers to the widespread implementation of SHP technology. An **enhanced technical and planning know-how and developed market chain for SHP** in Tajikistan is the expected outcome from this component. The expected outputs are:

Context: Lack of training for local technicians on the operation and maintenance of SHP systems from SHP turbine manufacturers is one of the causes for the inadequate local expertise in handling and maintaining the imported SHP technology. This has led to dependency on foreign experts even to run and maintain the machineries involved, which is not practical and sustainable and thus resulted in the fact that even those few pilot SHPs installed in recent years are not operational. Therefore, a key intervention of the project will be capacity strengthening of local organizations, primarily private firms to participate in a functioning supply chain for renewable energy systems. This includes the capacity to plan, design,

deliver, install, service and repair renewable energy systems, as well as the capacity for planning, lifecycle costing, quality assurance, procurement, marketing, etc. A special focus will be given on strengthening capacity of local workshops and equipment manufacturers to manufacture and repair selected parts of SHP systems.

Currently, two domestic companies are identified as having the necessary technical capacity and competence building - Energoremont and Tajiktekstilmash. Energoremont is a private company with approximately 100 employees and can deliver HPP up to 1 MW on a turnkey basis. Tajiktekstilmash, a state owned company with 500 employees, manufactures pelton turbine with an installed power of 33, 75 and 100 kW. These companies have in place expertise in the field of sHPP; however, they should be provided with additional training and knowledge to improve the quality of their work. Apart from strengthening the capacities of existing companies, a start-up of new small craft workshops in local communities will be promoted and local persons appropriately trained. In these endeavours there are no universal solutions, i.e. the solutions shall be customized according to the conditions and possibilities of each local community as well as the preferences and base skills of the people.

Under this component the aim is to mobilise local manufactures and service providers and to upgrade their capacity for delivering turnkey solutions for sHPPs with at least 50% of the value provided by locally made goods and services. Technical assistance will be provided to a number of competitively selected local companies through an open Call for Expression of Interest whereby one of the key criteria for companies' selection will be their commitment and financial ability to provide co-financing in a ration of 1:1 for implementation of the proposed technology transfer activities and cover the cost of the upgrade in their production facilities.

Output 2.1: Guidebook on technical and policy aspects of SHP project development (to be used in all trainings to be delivered by the project)

Activity 2.1.1: Preparation, dissemination of a Guidebook on SHP project development summarizing regulatory framework, and providing guidelines, methodologies and description of recommended standardized technical solutions. As part of Guidebook preparation, the development of several standardised designs of common SHPs in the rated capacities range of 33 - 500 kW will be supported in order to reduce transaction costs associated with individual SHP project development, as well as to facilitate domestic manufacturing of SHP components and spare parts. GEF support is required for preparation and publication of the Guidebook.

Output 2.2: Local SHP manufacturers capable of providing turn-key integrated RES solutions and O&M services

Activity 2.2.1: Competitive selection of local manufacturers and elaboration of their capacity and technology development plans. The selection will be conducted via the open Call for Expression of Interests among local manufacturing companies. **Among the key criteria for selection companies as beneficiaries of the UNDP-GEF technical assistance and technology transfer (under Activities 2.2.2-2.2.3) will be the companies' commitment and ability to provide co-financing on at least 50%-50% basis.**

Activity 2.2.2: On-the-job capacity building program for selected manufacturers to be delivered by international SHP design/manufacturing company and include: joint SHP design, construction and O&M for pilot projects (under Component 3), set-up adequate QA/QC procedures, personnel training, other business and technical advisory services.

Activity 2.2.3: Improvement of technological base of the selected companies via provision of required soft- and hard-ware (**on a 50% cost-sharing basis as described above**)

Output 2.3: Vocational training program for technicians involved in SHP design/construction and O&M

Activity 2.3.1: Introduction in partnerships with national technical schools a program of vocational training for technicians on SHP systems installation and maintenance. GEF support is required to develop such curricula and organize training for trainers.

Output 2.4: Local manufacturers capable of producing combined electric and biomass-fired heating and cooking devices for rural households

Activity 2.4.1: Supporting local manufacturing and assemblage of simple electric heating and cooking devices for rural households, including on-the-job capacity building program for selected manufacturers, identification of products range design (adoption of international products to suit local needs), assembling, marketing, quality assurance, personnel training, other business and technical advisory services. **Local manufacturers will be selected via similar open Call for Expression of Interests and will be required to secure at least 50% co-financing to complement GEF TA resources.**

Component 3: SHP Demonstrations -. This component will address capacity, technology, institutional and informational barriers to SHP development as they manifest at local/community-based level. The expected outcome from this component is the **improved confidence of communities in the technical and economic viability of SHP technology in supporting socio-economic development.**

Context: Through the implementation of the demos/pilots, useful inputs for the formulation and adoption of appropriate legal and regulatory framework and market conditions for SHP systems will be obtained (see Component 1). The demos/pilots will also be used for the implementation of local and national-level capacity building, technology transfer and awareness-raising measures (Component 2). Furthermore, these demos/pilots are expected to generate valuable information on the suitability of, and the practical implementation of, the local delivery models that will be developed under the project. While traditionally, investments in hydropower were centrally planned; other forms or models of ownership models will be developed and tested. This includes ownership by community-based organizations (CBOs) (e.g. SHPs owned by local stakeholders or an association of energy users), as well as private ownership (local companies and/or investors) or local government.

For implementation of pilot projects those local communities will be selected which are located in the areas most afflicted by the lack of a reliable electricity supply, which subsequently obstructs economic and social development, endangers living conditions, and destroys the natural environment. Every local community will be approached individually to identify its needs and possibilities for integrated development. The components of an integrated development concept to be demonstrated are as follows:

- Existing SHP potential to provide electricity to local communities;
- Use of standardized SHP designs
- Community-based model for SHP management
- Implementation of basic energy efficiency and fuel-switch measures to reduce the need for electricity, consumption of fuel wood and dung, improving living, health, and environment conditions;
- Grid connection of SHP to benefit from the sales of electricity surpluses at the incentive price determined by regulation;

- Education of local people and companies to manufacture SHP-related equipment and provide construction, instalment, operation and maintenance services;
- Establishment of small processing factories related to agricultural activities in rural areas to create new work places and ensure effective power demand.

The expected outputs from this project component are:

Output 3.1: Technical studies, political commitments and institutional framework secured for pilot SHP projects based on the list of 27 potential SHP sites that have been identified by the Ministry of Industry and Energy (see Annex A)

Activity 3.1.1: Updating data on hydrological resources

Activity 3.1.2: Conduct of feasibility analyses of SHP sites. Based on updated hydrological data, most promising locations for SHP projects will be selected and their technical and economic feasibility will be assessed⁶, including technical design and capacity, project cost, tariffs, institutional/ownership model. GEF support is required for this activity to conduct feasibility studies.

Activity 3.1.3: Preparation of district development plans in communities selected for SHP demonstration. The aim here is to a) ensure full integration of proposed SHPs in local socio-economic development plans and their approval by district authorities (a prerequisite for local co-financing); b) ensure economic sustainability of pilot SHPs by identifying productive end-users; c) define and prioritize most vulnerable groups of population to be supplied with power from pilot SHPs; d) envisage local O&M support to pilot SHPs; and e) identify and envisage provisions for addressing other local needs for smooth operation of pilot SHPs. GEF support is not required for this activity.

Activity 3.1.4: Raising awareness of local beneficiaries in selected localities on RE applications (SHP) and EE (e.g., efficient use of lighting, heating and proper building insulation)

Activity 3.1.5: Facilitation of the establishment of new and/or strengthening of existing entities to own and operate pilot SHP plants (including staff training and legal and business advisory support)

Activity 3.1.6: Preparation of engineering design and securing required permissions and approvals

Activity 3.1.7: Supporting identification and preparation of additional SHP projects (site identification, community mobilization, technical feasibility, permissions and approvals, quality assurance, etc)

Output 3.2: Fully operational community-based SHP

Activity 3.2.1: Construction/installation and commissioning of 10 SHP pilots (estimation of capital costs is provided in Annex A). It is expected that at least 10 pilot SHPs should be in operation or at the verge of being in operation by the end of the GEF-support (after 4 years), demonstrating the viability of different technologies, delivery models, financing mechanisms, operation models, etc., in selected communities. In the course of pilot project operations, assistance will be provided to local stakeholders on O&M and administration of SHPs. This activity will be co-financed by UNDP.

⁶ At GEF project development stage such feasibility assessment has been implemented (UNDP financed) for one pilot project involving rehabilitation of one 500 kW and installation of new 500kW SHP at Vachdat municipality to test the proposed approach and model. However, without prior refining of hydro data, it was deemed premature to proceed with further site selection at PPG stage.

Activity 3.2.2: Operation and maintenance of SHP pilots (via on-the job training for SHP staff) and monitoring of SHPs operational performance

Output 3.3: Pilot SHP sustained

Activity 3.3.1: Facilitating signature of Power Purchase Agreement with Barqi Tajik and local consumers

Activity 3.3.2: Energy efficient measures in rural communities

Activity 3.3.3: Provision of grants and micro-loans to support creation of income-generating activities and energy efficiency measures in local SMEs and public buildings to minimize their power demand

Activity 3.3.4: Development of management plans for pilot watersheds to avoid conflict over water use

Component 4: This project component will systematically capture, analyze, assess, and report on project achievements and thus prepare foundation for National Scaling-up Programme of Renewable Energy-based Integrated Rural Development. The expected outcome from this component is a **adopted and funded National Scaling-up Programme of Renewable Energy-based Integrated Rural Development**. The expected outputs from this project component are:

Output 4.1 Project results assessed, analyzed and compiled into comprehensive national report

Activity 4.1.1: Assessment and compilation of project results and lessons learnt from Components 1-3, including GHG emission impact

Activity 4.1.2: Development and application of methodology for and estimation of the greenhouse gas (GHG) emission reduction impact of the National Scaling-up Program, as well as recommendations for the Government of Tajikistan on how envisaged GHG benefits can be monetized in the framework of global climate change (CC) financing framework. GEF assistance is required for this activity to develop methodology and investigate global CC financing options.

Output 4.2 Conference on integrated renewable-energy based rural development

Activity 4.2.1: Organization of national conference to present the results and mobilize high-level political support and commitments for National Scale-up strategy

Output 4.3. National Scaling-up Programme developed and adopted

Table 2 Scaling-up of integrated rural development through provision of electricity from SHPs

	Energy provided [kW/household]		
	1	2	3
Total energy production required [MW]	100	200	300
Total number of sHPPs needed	1.000	2.000	3.000
Total investment required [million US\$]	100	200	300
Financial return to the local economy [million US\$]	50	100	150
Total jobs created	4.000	8.000	12.000
Annual amount of for incentives [million US\$]	1.750	3.500	5.250
Annual decrease of fuel wood consumption [m3]	n/a	500.000	1.000.000
Emissions saved [tCO2]	n/a	800.000	1.600.000

Activity 4.2.1: Development of National Scaling-Up Program and scenarios for renewable energy-based integrated rural development based on the legal, institutional, and technical frameworks and capacities

established (under Components 1 and 2), the experience amassed from the 10 demonstration SHP projects (Component 3). The program shall define a) target groups (beginning with most vulnerable 1 million of citizens in Tajikistan and expanding to cover all rural population of around 5 million people); b) methodology for defining the scaling-up scope (starting with the 1 million most vulnerable and increasing) and measures used (starting with the provision of 1 kW per household and increasing); c) assessment of the financial costs and benefits; d) technology recommendations (with a focus on the use of intermediate technologies rather than the state of the art; the use of intermediate technologies enables local production and maintenance rather than imports); e) assessment of the societal benefits in terms of finances and new workplaces, health and quality of life, and environmental aspects; recommendations for the implementation timeframe; f) assessment of the program GHG emission reduction impact (as schematically illustrated in the Table 2). GEF assistance is not required for this activity.

5. POLICY CONFORMITY AND COUNTRY OWNERSHIP

Policy conformity and country eligibility

The project will result in partial substitution of the current unsustainable use of conventional biomass (fuel wood) in the watershed areas of the small-scale hydropower (SHP) sites and of fossil fuels (diesel and coal) in grid-connected electricity generators by facilitating the implementation of SHPs with their operation and maintenance on a cost recovery basis. The project thus is consistent with GEF-4 Strategic Priority “To promote on-grid renewable energy”, as it will directly contribute to the wider use of small hydro resources for power generation by relieving the pressure on the main grid during winter months when grid power supply is constrained. Tajikistan ratified the UN Framework Convention on Climate Change in January 1998. GEF Operational Focal Point is the State Committee on Environmental Protection.

Country ownership and country drivenness

The project will accelerate the development of SHP generation in Tajikistan by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs. In line with GEF requirements, “the emphasis will be upon developing policies and regulatory frameworks that provide limited incremental support to strategically important investments”, such as investment in new power generation capacity in Tajikistan allowing the rural communities of the country to cope with its acute energy crisis in an environmentally and climate-friendly way. Further, the “host country willingness to adopt favorable policies and to follow through on the initiatives” was demonstrated by the Government of Tajikistan when Regulation #73 on the Long-term Program for Small Electric Power Station Construction for 2009 – 2020 was approved in 2009. A detailed list of planned SHPs is summarized in Annex A of this project document. The proposed project will assist the Government to realize the provisions of the Regulation, as well as supporting the objectives of the new Law on the use of Renewable Energy Resources in the Republic of Tajikistan.

The project objective is in line with the priorities of the Government of Tajikistan and UNDP’s existing programming goals. The project is also consistent with Tajikistan’s national priorities as defined in the following action plans and reports:

- Programme on the Small Renewable Energy Development (1997);
- State Ecological Program for 1998-2008 (1997);
- National Action Plan for Climate Change Mitigation (2003);
- The Report and Action Plan on Building National Capacity to Implement Commitments of the Republic of Tajikistan on Global Environmental Conventions (2005);

- Third Poverty Reduction Strategy (PRS-3) of the Government of the Republic of Tajikistan (2010);
- Report “Investing in Sustainable Development: Millennium Development Goals (MDG) Needs Assessment” (2005).

In all of these documents the highest priority is given to projects that promote the improvement of living standards, particularly of poor people, and an introduction of new environmentally safe technologies to increase energy efficiency. The **Poverty Reduction Strategy (PRS)** identifies as a priority the establishment of small hydropower stations and development of non-traditional energy sources for rural energy supply.

6. KEY INDICATORS, RISKS AND ASSUMPTIONS

Indicators

Key indicators of the project’s success will include:

- CO₂ emissions from the power sector are reduced by 273 ktCO₂ (including project direct and post-project direct emissions reduction) through the operation of 27 SHPs (total cumulative installed capacity = 2.49 MW) facilities that are planned, designed and engineered, constructed and operational through the technical assistance that will be carried out under the project.
- At least **two local manufactures** related to SHP are capable to deliver turnkey solutions for SHP design, construction and maintenance with **at least 50% of the value provided by locally made goods and services**
- **Ten MIE staff members** actively involved in the provision of one-stop-services to SHP project developers
- **10 SHP plants constructed, installed and commissioned** by 2014 and implementation and financing plans agreed upon for **further 17 SHPs** (to be constructed and put into operation within 5 years after project completion);

Detailed indicators are provided for each outcome and output stated in the Project Results Framework (see Section 9).

Assumptions

The assumptions are presented in the Project Results Framework.

Risks

The project presents some risks which are discussed in the Table 3.

Table 3 Project risks and their mitigation measures

Risk	Risk Rating	Mitigation Measures
Widespread poverty and lack of sustainable source of income resulting in low ability to pay for energy supply services	Moderate	<ul style="list-style-type: none"> - UNDP co-financed activities (see Output 3.4) will support establishment of income-generating businesses in the areas where pilot projects are to be located in order to ensure solid client base for pilot SHPs and maximize consumers' ability to pay - Optimization and standardization of system design to lower down SHPs costs will be conducted under Activity 1.3.2 - Provision of grant funding to co-finance the implementation of SHP pilot projects until life-cycle cost of the systems have decreased to a level affordable for rural communities or incomes have increased. After this project completion, National RES-EE Fund is envisaged to support investments in community-owned SHPs via provision of dedicated subsidies and incentive-based tariff (see Annex E for details)
Investors (community-owned, public or private sector) do not get sufficient return on investments, while Government support is not forthcoming	Moderate	<ul style="list-style-type: none"> - Work with four UNDP-supported micro-loan funds to include support for SHP investment in their scope of operation (see Activity 3.2.5) - Proper incentives for investors as envisaged to be delivered under Output 1.1.)
Slower than expected implementation of the pilot SHP projects	Moderate	<ul style="list-style-type: none"> - Involvement of suitable experts to ensure sound design for the pilot SHP projects - Close supervision of the implementation of the SHP plants (see Activity 3.3.2) - Incentives for timely (or penalties for late) provision of previously committed local (in-kind) contributions to project implementation
Slower than expected development of a national market for SHP systems and thus higher than expected costs of such systems	Substantial	<ul style="list-style-type: none"> - Capacity building and technical assistance to facilitate development of supply chains (all activities under Component 2, the key component of this project, are designed to mitigate this risk)
Slower than expected improvement of the institutional framework for SHP development	Low	<ul style="list-style-type: none"> - The Project Board will closely coordinate with relevant Government institutions to support timely implementation of commitments. RES Law has been signed and Regulations are being developed. Establishment of RES-EE Fund, in particular, has been supported by all line Ministers and the President
Insufficient quality of locally produced equipment leading to early break-down of the renewable energy systems and dwindling consumer confidence in the technology	Moderate	<ul style="list-style-type: none"> - Capacity building measures for local equipment manufacturers and service providers under Component 2 - Regulatory measures to set and enforce quality standards under Component 1
Lack of interest in renewable energy systems on the part of local stakeholders (communities, beneficiaries) due to perceived inferiority compared to grid supply	Low	<ul style="list-style-type: none"> - Awareness campaigns on the potentials and limitations of SHP systems (Activity 4.1.2) - Information campaigns on the Government's plan to improve grid energy supply in rural areas

The overall project risk is rated moderate. In particular the affordability of off-grid/grid-connected systems for local communities as well as investment in grid-connected systems by public and private sector investors will be a critical success factor for the project. It is clear that initially investors will not be able to pay the full cost of investment in SHP systems, unless offered some form of incentives/grant support as envisaged by the project under Activities 1.1.1-1.1.5. Only when the market starts to develop and the sales of such systems increase, SHP system costs (e.g., US\$ per kW) can be expected to decrease and become more affordable.

The grant components of the pilot projects implemented during the project's lifetime will be assessed regarding the expected trend and the future requirement for grant funding. Should the requirement for substantial grant funding beyond the project's duration become evident, the project will work together with the Government and donor organizations to explore future sources of grant funding for SHP systems. This will be an integral part of Outcome 3 of the project (see Activity 3.2.5).

7. GEF INCREMENTAL REASONING; COST-EFFECTIVENESS;

Baseline

Despite the high electrification rate (90%), actual access to electricity (and energy) is considerably low and unreliable. The situation is exacerbated by unpredictable climatic conditions, such as those that occurred in 2008 when the extremely harsh winter hastened further damage to the power system, which resulted in the increased number of planned and unplanned electricity cut-offs. **It is important to note that the rural population, accounting for 73% of the total population, used only 8.58% of the total electricity consumed in Tajikistan in 2008** (see Table 4).

Table 4 Consumption of electricity in Tajikistan in urban and rural areas*

Year	2006		2007		2008	
	kWh	%	kWh	%	kWh	%
Urban	1,841,137,710	13.49	1,786,097,913	12.79	1,744,547,432	13.94
Rural	1,473,058,684	10.79	1,258,152,836	9.01	1,073,692,712	8.58
Total population	3,314,196,394	24.28	3,044,250,749	21.80	2,818,240,144	22.52
Total consumed	13,651,676,973		13,966,707,650		12,514,921,593	

*Source: Barki Tojik sales department

It is estimated that over 1 million Tajikistanis, primarily those in rural areas, have little or no access to grid power, particularly during the winter, when it is common to have spells of more than 6 weeks without any electricity, while the rest of Tajik rural residents (around 4.5 million) have on average only 2-6 hours of power supply a day in winter period, which is insufficient to meet even basic energy needs, such as heating, cooking and lighting (let alone provide for any productive activities). Consequently, local population has switched *en mass* to consumption of biomass and other locally available resources to satisfy their basic energy needs, which leads to increasing CO2 emissions and loss of valuable carbon stock.

Tajikistan has predominantly semi-arid mountainous landscape. Forests occupy only 410 thousand ha, i.e. less than 3% of the country's territory, and all forested areas fall in category I, in which *all commercial logging is strongly prohibited*. Logging is only permitted as a forest improvement measure or for environmental enhancement, however due to the pressing energy demand and lack of alternative some 500-600 reports of logging violations are filed every year. Due to the extensive use of wood for fuel (as

well as overgrazing and the increased cultivation of land for agricultural purposes), Tajikistan's mountainous regions have lost up to 70 percent of their wood covering since the late 1990s⁷.

Although official statistics on the rural energy use is lacking, there are many indications that suggest that *Tajikistan forestry sector is on a highly unsustainable path*. According to FAO⁸, the total available volume of biomass stock in TAJ is cca 6.6 mln m³. On the other hand, recent household living standard survey revealed that fuel wood consumption is on average 1m³/capita/year and 78% of rural households use wood as a primary source for heating and cooking. With continuation of such trend unchecked (i.e. without alternative energy provision), it is matter of years, not decades, when forest cover will be totally lost in Tajikistan.

One limited solution to the unreliable and often nonexistent access to the grid is presented in the form of small, micro and mini hydropower plants (SHP plants). Despite the growing support for SHP as evidenced by recent relevant legislation, there remain several barriers to the actual implementation of SHP plants. Barriers for the utilisation of SHP in Tajikistan can be divided into three groups:

- Legal and institutional barriers:
 - Incomplete legislative and regulatory framework to support SHP use;
 - Incompatibility of energy and environmental policies, i.e. environmental protection legislation does not promote development of cleaner energy supply options;
 - Unclear division of the roles and responsibilities of national authorities in the promotion of SHP, and poor coordination between the main stakeholders; and,
 - Dearth of governing capacities at all levels (national and local).

- Financial barriers:
 - Lack of domestic and foreign investment capital: Tajik companies that are interested in the development of SHP have limited financial resources and insufficient access to finance SHP investment projects. The participation of foreign capital is constrained due to the unstable business climate and unfavourable economic conditions, as well as the lack of appropriate legal and regulatory frameworks and effective enforcement of legislation requirements;
 - Lack of long-term credits on favourable terms: Commercial banks are reluctant to lend because the return of long-term investments is risky, especially when there are no state guarantees (a tariff system) that all electricity produced will be sold at the appropriate price, which assures the reasonable pay back of investments. In addition, financial institutions have no experience in financial analysis for investments in SHP. Foreign long-term loans are expensive due to the high risk perception held by foreign commercial banks;
 - Costs for preparing investment projects must be incurred before funding for the project to be assured, without a guarantee of actually obtaining the necessary funds for a particular project. The lack of projects with proven feasibility and profitability increases the costs associated with their preparation;
 - Special equipment for SHP utilisation is costly and mostly imported – high costs remain due to an absence of sufficient demand;
 - Lack of state support financing mechanisms that are necessary to mitigate commercial risks related to SHP; and,

⁷ This figure, which appears in a number of sources, is not reflected in the official statistics on forest cover— which show no significant changes in the last two decades. For more on this, see GTZ (2010): “Forest Sector Analysis of the Republic of Tajikistan”

⁸ FAO Forestry Report 2010

- SHP electricity production is still uncompetitive in the electricity market and requires state support in the form of guaranteed electricity buy-back prices determined by regulation (tariff system).
- Information/knowledge/expertise barriers:
 - Lack of information to the general public on SHP technologies and their potential use;
 - Lack of information to the general public on the benefits of SHP (financial, social and environmental);
 - Lack of reliable information that would be useful for potential investors regarding the locations with high and exploitable SHP potentials;
 - Insufficient number of specialists to implement SHP projects, especially in remote rural areas;
 - Inadequate capacities and capabilities of domestic industries to provide equipment and services related to SHP; and,
 - Existing manufactures and service providers are fragmented and narrowly specialized and unable to provide turnkey integrated RES solutions.

More details on barriers and project activities to address these options are provided in Section 2.

Under a business-as-usual (BAU) scenario, wherein the identified barriers will persist, the following can be expected with regard to rural energy consumption and associated CO₂ emissions Tajikistan by 2025 (i.e. end of 10 years post-project period)

Population with insufficient access to grid power to meet basic energy needs (lighting, cooking and heating)	5,000,000
Annual consumption of fuel wood ⁹ [m ³ /capita]	1,0
Total estimated consumption of fuel wood [m ³]	5,000,000
CO ₂ emissions from fuel wood consumption [tCO ₂]*	7,850,000

*Following conversion factor is used 1.57tCO₂/m³ calculated based on the following:

- 1.0 metric tonne wood = 1.4 cubic meters (solid wood, not stacked). Source: [Bioenergy Conversion Factors](#)
- Fuel wood CO₂ conversion factor: 112 tCO₂ / TJ. Source: 2006 IPCC Guidelines for National Greenhouse Gas Inventories, p. 16
- Fuel wood Heating value: 0.02 TJ / tonne of fuel. Source: IPCC

GEF alternative

As a consequence of the abovementioned barriers, the local SHP market and the supply chain are not developed. GEF-supported intervention is needed on both sides:

- Supply side, i.e. upgrading capacity of SHP manufactures and service providers;
- Demand side, i.e. enabling communities to implement and operate cost effective SHP projects;

⁹ Fuel wood is regarded as non-renewable biomass in the context of Tajikistan. It is estimated that, in the past 120 years, Tajikistan's forests have been reduced by 75 percent—from 150,000 km² to 37,000 km². Officials believe that the rate of deforestation has accelerated dramatically in the past 10 years due to shortage of energy supplies in rural and remote areas. In some areas of Tajikistan

One of the main impeding factors for penetration of SHP solutions is immature state of the market for SHP energy in Tajikistan and under-developed supply chain. The project will address these in Components 2 and 3 as and a critical factor towards a successful market transformation. In order to transform the SHP market, project will need to act continuously across all the major groups of market participants dynamically adjusting mix of tools necessary to overcome specific barriers as they emerge. Therefore, an integrated, cyclic and dynamic approach will be adopted (see Figure 2) where the project will aim to achieve early successful implementation of selected pilot projects that will be used to promote the SHP, the concept of energy turnkey services and to provide impulses for market transformation.

The foundations on which the implementation strategy will be built are the newly adopted Law on RES, and an amendment on the Law of energy from 2007, which stipulates that excess electricity from RES sources has to be bought by Barki Tajik. The cornerstones of the implementation strategy are as follows:

- Developing adequate regulatory framework which will provide:
 - Technical regulations and conditions for connection to the grid of SHP
 - Methodology for calculating costs for electricity from SHP
 - Contracting modalities for buying back electricity from SHP (on-grid) and providing electricity to rural customers (off-grid)
 - Establishment of a RES and EE fund for support of development of community based SHP and covering price difference for electricity from these SHPs
- Developing local manufacturing, engineering, operation and maintenance capabilities related to RES and EE;
- Standardizing several typical SHP designs and developing capacity of local manufacturing and

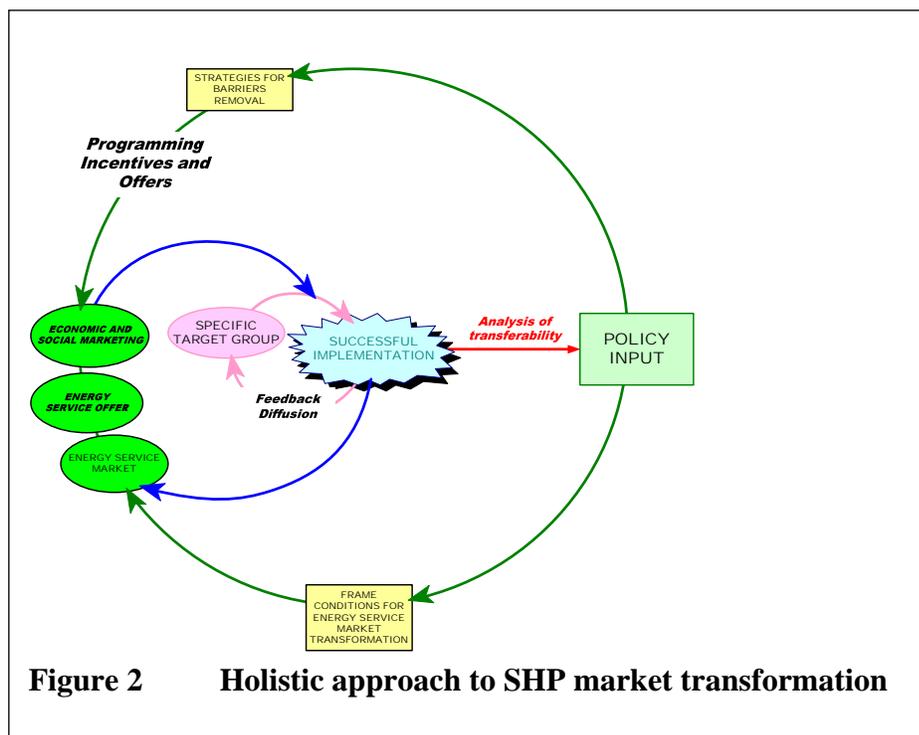


Figure 2 Holistic approach to SHP market transformation

service companies with an aim to deliver at least 50% of the value of a SHP as local goods and services, and the remaining 50% being from import; and,

- Strengthening capacity of national and local government to implement, coordinate specific actions and monitor results RES and related policies (poverty reduction for instance)

- Development and piloting an integrated rural development model with provision of electricity from mini hydro as the driver, and integrating clean water, irrigation, food, employment, education and health issues. The project will demonstrate model effectiveness through identification and implementation of a number of pilot projects within selected communities, and with full community participation. Upon verification of the model, the project will support development of a scaled-up approach from a pilot community to a national program that will address issues of rural poverty reduction and national economic development as detailed under Activity 4.2.1.

Under an Alternative scenario, wherein the identified barriers are removed, the following can be expected with regard to rural energy consumption and associated CO₂ emissions Tajikistan by 2025:

Population with insufficient access to grid power to meet basic energy needs (lighting, cooking and heating)	4,000,000
Annual consumption of fuel wood ¹⁰ [m ³ /capita]	1,0
Total estimated consumption of fuel wood [m ³]	4,000,000
CO ₂ emissions from fuel wood consumption [tCO ₂]*	6,280,000

It can be concluded that in the absence of the proposed project, only limited, scattered and largely uncoordinated activities related to SHP development would be undertaken, thereby causing unnecessary wastage of scarce financial resources. Also, it is likely that without support, SHP development will be left to bilateral donor agencies, which will remain limited in scope of their activities, as was explained in Part A. Therefore, in order to develop a sustainable SHP model, including a functioning equipment supply chain, support for overcoming barriers describe above is essential

Cost-effectiveness

About 10 SHP plants will be in operation by the end of the project and another 17 will be in advance stage of preparation, supported by the project in the component 3. Together this will imply direct CO₂ emission reduction of 244 kilo tons of CO₂ (ktCO₂) over the 20-year lifetime of a SHP (including both direct and post-project direct emission reductions). Indirect emission reduction as a longer-term impact of the project's capacity is estimated to range between 733,000 t CO₂ and 2.48 million tCO₂. As a measure of the project's cost-effectiveness, with the expected direct and direct post project CO₂ emission reductions, the unit abatement cost is US\$ 8.19/ton CO₂, which is cost-effective as compared with observed carbon market prices (i.e. cca 10-14 €/tCO₂). This is fully consistent with the findings of the Tajikistan National Communication to UNFCCC and Technology Needs Assessment (TNA) which identified investment in SHP as the least cost option to reduce GHG emissions in the country as compared with other alternatives as promoting other RES options (solar, wind) or GHG reduction measures in industrial sector (cement, aluminum and chemical industry).

Figure 3 Project GHG emission reductions and cost-effectiveness

¹⁰ Fuel wood is regarded as non-renewable biomass in the context of Tajikistan. According to Tajikistan Forestry Agency (2006) community cutting of forest (both for energy and construction use) is considered among the main threats to Tajikistan's forest ecosystems. Valuable juniper, walnut, birch and pistachio forests have shrunk by 20 to 25%, and tree cutting has led to an outbreak of weeds, alien and quarantine plant species, erosion, landslides and the impoverishment of winter pastures. Altogether, annual forest destruction is estimated to be 1.5-3 times more than the natural increment and forests renewal in particular regions of Tajikistan.

	Emission reduction (ktCO ₂)	Cost-effectiveness (in USD/tCO ₂)
Direct (project)	90	8.19
Direct (post-project)	154	8.19
Indirect (bottom-up)	733	2.73
Indirect (top-down)	2217	0.90

Note: The table above indicates that for direct and direct post CO₂ emission reduction the UACs are the same (i.e., US\$ 8.19/ton). Actually the combination of direct and direct post CO₂ emission reduction results in an UAC of US\$ 8.19/ton.

8. SUSTAINABILITY AND REPLICABILITY

Sustainability

From a technical point of view, the viability of grid-connected and off-grid SHP electricity generation has been proven in the international market, both in the context of developed and developing countries. By addressing barriers that impede the development of SHP electricity generation in Tajikistan, the creation of a sustainable niche for SHP systems can be realized. This can be facilitated through the strengthening of the policy, institutional, legal, regulatory and operational capabilities of the key national institutions, supporting the development of SHP through a market-driven approach, developing national capabilities and disseminating information. These efforts should ensure the long-term sustainability of SHP electricity generation in the country.

With regard to the financial sustainability, the following options are being considered.

- a) Sustainability of pilot SHPs will be ensured via a number of activities under Output 3.3:
 - Identifying a range of productive end-users for each pilot SHPs and facilitating signature of Power Purchase Agreement
 - Provision of grants and micro-loans to support creation of income-generating activities in the areas where pilot projects are to be located in order to ensure solid client base and maximize consumers’ ability to pay, thus sustaining operations of pilot SHP plants;

- b) For the long-term sustainability of all project outcomes the following activities are foreseen:
 - Development and implementation of the financial framework for RES, particularly where it concerns a tariff system methodology and the establishment of a dedicated National Fund for RES and EE to manage and administer the scheme for electricity buy-back as a support to community based projects.
 - Development of National Scaling-Up Program and scenarios for renewable energy-based integrated rural development as a justification for continued state- and donor-support

The two approaches will ensure that the project activities will continue beyond the life cycle of the project.

In addition, the project will support the integration of local industries into the SHP sector by addressing all the capacity needs of the actors across the SHP value chain. This will be achieved through the provision of focused support to local engineering firms/specialized engineering workshops for installation, maintenance and repair of electro-mechanical equipment at the SHPs. With the increase over time in SHP installations, it is envisaged that such efforts will intensify with opportunities being created for additional players to provide such services.

Replicability

A number of pilot/demo SHP plants will be implemented as part of the overall project with the purpose to demonstrate the viability SHP in the context of rural electrification, as well as to pilot different delivery models and associated financing mechanisms for such systems. During implementation of these pilots/demos special emphasis will be put on their design to make sure that they will be helpful in achieving maximum replication and thus to ensure sustainable and long-term reductions in GHG emissions. During implementation of the overall project the delivery models and financial mechanisms can be further refined. Such an approach is expected to help deepen the market aggregation of SHP technology and assist in creating a sustainable market.

An integral component of the project is further the dissemination of lessons learnt and best practices for the implementation of renewable energy systems. Special brochures will be developed and information seminars will be conducted. Considering the similarity of the conditions for renewable energy development in other countries in the region, in particular in Kyrgyzstan, Uzbekistan and Kazakhstan, the experience gained from the implementation of the pilot projects will also be disseminated on the occasion of regional workshops on energy issues organized by others, or other suitable information exchange forums. These measures will help to promote replication of the project's achievements all over the country, as well as in other countries in the region.

Technical assistance for barrier removal and institutional strengthening to be provided under the full-size GEF project will facilitate such replicability, since it will create the required institutional, policy, and technical conditions to enable the mobilization of additional investor interest for the development of new small hydropower sites. Moreover, the lessons learned will be of great value to the neighboring countries sharing similar resource base should they decide to tap their respective small hydropower potential for electricity generation.

9. STAKEHOLDER ANALYSIS AND COORDINATION

Stakeholders

The Ministry of Energy and Industry (MEI) and the Ministry of Economic Development and Trade (MEDT) are responsible for most facets of the energy sector in Tajikistan. While the MEI is responsible for renewable energy, including small hydro power, an energy department exists within the MEDT which handles issues related to planning and statistics (e.g. statistics are also covered by the Office for Statistics under the Presidential Office). In addition, other ministries and institutions hold key jurisdictions for the energy sector. These include the Tajik Geological Survey and the Ministry for Natural Resources. These institutions manage mineral resources; determine the terms and technological parameters of mining; issue mining lease documents and supervise deposit conservation; and monitor all terms of natural resource management. The Committee for Environmental Protection regulates the sustainable management of energy resources and monitors the observance of nature-use regulations (emissions, pollution, and waste management). On the question of financial aid provision for SHP projects, the Ministry of Finance, which plays the pivotal role in providing financial aid for RES and EE projects, is another key institution involved in the decision-making process. The State Committee for Investments is tasked with creating a favourable climate for and attracting investments, *inter alia* in the energy sector. The issue of energy pricings and tariff establishment falls within the jurisdiction of the Antimonopoly Commission. Barki Tajik, state-owned energy producing and selling company, is responsible for the practical implementation of all activities in the energy sector. It is evident that renewable energy is an acutely interdisciplinary area of labour and will include other institutions as well, especially those responsible for construction,

transport, and standardisation. Therefore, competent capacities and coordination of activities will only become more important over time.

The following table lists the main project stakeholders and their role in implementation of the proposed project:

Table 5 Overview of stakeholders related to SHP)

Organization/Programme	Scope of work and areas for collaboration with proposed UNDP-GEF project
Ministry of Energy and Industry (MEI)	The Ministry is responsible for the formulation and implementation of policies and measures in the energy and industry sector and will be a leading partner agency for the project implementation.
Agency for Hydrometeorology under the Committee for Environmental Protection	The Agency, under the Committee for Environmental Protection, is responsible for hydro-meteorological observations and forecasting, observations over water-related phenomena with regard to hydrological change and glacier studies, and in charge of the implementation of climate change policy and programs.
Open Holding Joint Stock Company “Barki Tojik”	Barki Tajik is the state-owned company controlling all power generation, transmission and distribution in the country, including electricity and thermal heat.
Ministry of Economic Development and Trade (MEDT)	The Ministry is responsible for investment regulation and promotion policy. The Ministry is also responsible for coordinating state agencies in their activities in this area as well as for determining the tariffs in energy sector
Local levels of government (district, jamoat)	Responsible for district development plans and integrated area-based development (energy, water, roads, social services, etc.)
Local production facilities and service providers	Apart from the utility Barki Tajik, organizations that can be involved in the construction and implementation of SHP are, for example, TadAZ, Chkalovsk Engineering Plant and Energoremont, Tajiktekstil mash (construction and production) and Central Electric Networks (operation and connection). Different contractors can do the civil works construction.
Local research and educational institutes	These carry out research and development activities and are responsible for education and technical training, such as the TajikGidroenergoProekt Research Institute; Institute of Physics, Technical University, Academy of Science. The institutes can be involved in setting up SHP curricula as well as in the design of SHP.
Communities Programme of UNDP Tajikistan	UNDP Communities Programme (CP) is a multi-year and multi-million US\$ initiative, on-going since 1996. The programme has 5 area offices in Sughd, Khatlon, and the Rasht and Zeravshan Valleys. The major aim of the Communities Programme (CP) is to help local communities in different regions to formulate and address their needs and priorities through making decisions, building civic awareness, mobilizing local resources, establishing local capacities, and fostering sense of ownership. UNDP CP supports a wide network of community based organizations, such as the 116 Jamoat Resource and Advocacy Centers (JRCs), 19 District Development Councils (DDCs), 59 Business Advisory Centers (BACs), 21 Dehkan Farm Associations (DFAs), and 6 Micro Loan Funds (MLFs) that function in Khatlon, Districts of Republican Subordination (DRS), and Sughd that help the Communities Programme with over 4 million USD to achieve the aforementioned results.
Tajikistan Afghanistan Poverty Reduction Initiative (TAPRI)	TAPRI is implemented under the umbrella of the UNDP Communities Programme, with support from the Government of Japan. The main objective of this project is to alleviate poverty through improvement of cross-border cooperation and promotion of sustainable economic and social development and improved livelihoods in specifically targeted Tajik and Afghan borderlands communities. Part of the project will be targeted at the installation of SHP-based power plants as a tool for poverty alleviation and development of business and social infrastructure in the selected border areas.

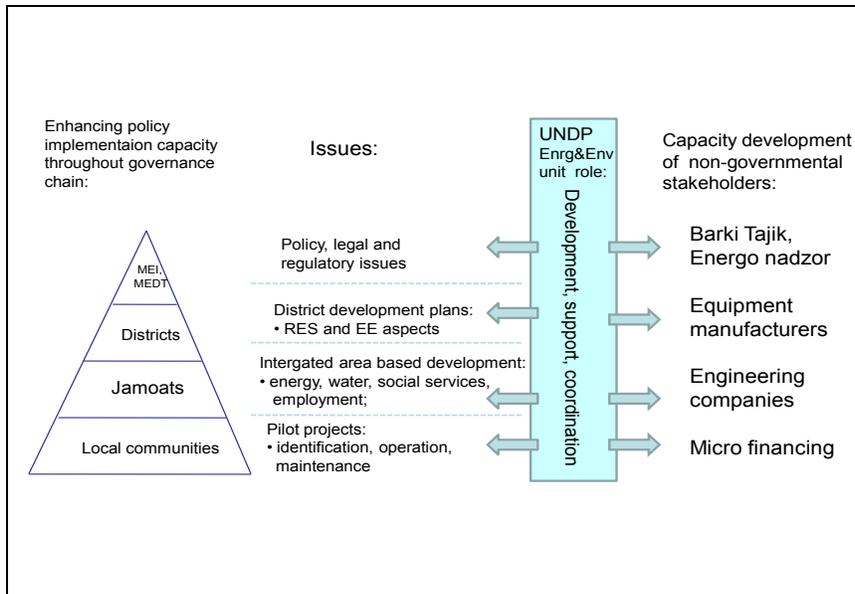


Figure 4 Relations of the GEF project with various stakeholders

Coordination with other related initiatives

Currently there is no project in the country addressing the root causes for and barriers to the development of SHP and local development in an integral and comprehensive approach as envisaged for the proposed project. In 2010, UNDP and the Government agreed to launch an initiative to promote community-based SHPs. UNDP has made funding available through its regular (TRAC) resources, while also funding support from GEF was applied for. A project document was formulated *Promotion of Renewable and Sustainable Energy Use for Development of Rural Communities in Tajikistan*¹¹ with available budget of USD 1.2 million. Although due to internal procedures a separate project document needs to be formulated for GEF (which is this one), it has to be understood that both projects form basically *one* SHP promotion initiative with two main streams of donor financing, one from UNDP through GEF and one from UNDP itself, with co-financing from Government and beneficiary communities. In addition, the on-going UNDP *Communities Program* and *TAPRI* will provide co-financing support and assist in implementation services on the ground in communities where the SHPs are planned. UNDP's contribution to the proposed GEF-financed project is further detailed in Section 11.

¹¹The project has the following main components: (1) Enhanced legislative, institutional and regulatory framework and enhanced stakeholder's know-how and institutional strengthening, (2) Increased awareness and information uptake on renewable energy (RE) opportunities, (3) Implemented pilot RE projects in prioritized areas. Total available budget is USD 1.2 million, which part of the UNDP co-financing, as detailed in Section 11

10. PROJECT RESULTS FRAMEWORK

This project will contribute to achieving the following Country Programme Outcome as defined in CPD: Outcome 6: Improved environmental protection, sustainable natural resources management, and increased access to alternative renewable energy.					
Country Programme Outcome Indicators:					
Key Indicator (1): Number of alternative renewable technologies demonstrated.					
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): Mainstreaming Environment and Energy					
Applicable GEF Strategic Objective and Program: To promote on-grid renewable energy - CC-SP3-RE					
Applicable GEF Expected Outcomes: Total avoided GHG emissions from hydropower generation.					
Applicable GEF Outcome Indicators: Avoided GHG emissions from hydropower generation (tons CO ₂ /kWh); and \$/t CO ₂ .					
Strategy	Indicator	Baseline	Targets	Means of Verification	Risks and Assumptions
Goal: Reduction of GHG emissions from energy use by rural and remote communities	Avoided GHG emissions from rural communities' energy use by end of project (EOP), ktCO ₂	0	90 ktCO ₂	Project Annual reports; GHG emissions monitoring and verification reports, final evaluation	No change in positive Government policies concerning SHP development and utilization
	Avoided GHG emissions from rural communities' energy use by end of project influence period, 10 years (EOPIP), ktCO ₂	0	244 ktCO ₂		
Objective: Significantly accelerate the development of small-scale hydropower (SHP) by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery	<ul style="list-style-type: none"> No. of new small hydropower projects under implementation by EOP Minimum No. of fully operational SHPs by EOP Cumulative electricity generation from newly installed SHPs by EOP, MWh/yr Cumulative electricity generation from newly installed SHPs by EOPIP, MWh/yr Adoption of policy frameworks, allowing 	<ul style="list-style-type: none"> 1 013 0 	<ul style="list-style-type: none"> 2714 10 4,860 	Individual SHP project reports, Performance reports of operational SHPs; Project's annual reports, GHG monitoring and verification reports. Project final evaluation report.	Continued commitment of project partners, including Government agencies and investors/developers

models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs.	SHP-based generators preferable access to the grid and tariff 12	<ul style="list-style-type: none"> • 0 • 1 	<ul style="list-style-type: none"> • 13,118 • 4 		
Outcomes					
Outcome 1: Adapted and enhanced legislative and regulatory framework for small-scale hydropower development in the country.	<ul style="list-style-type: none"> • Adopted and enforced regulation operationalizing RES Law 	No regulations in support of RES Law	Rules and regulations adopted by end of Year 1	Published documents. Government decrees/laws. Project progress reports	Commitment of the various Government institutions to adopt and capacities to enforce required bylaws are in place; Low turn-over of trained government staff
Output 1.1: Formulated, approved and enforced implementing rules and regulations (IRRs) of the new Law for RES that will facilitate actions geared towards the enhancement of the market environment for SHP	<ul style="list-style-type: none"> • Simplified procedures and principles for the licensing and construction of SHP facilities • Technical regulation to enable connection of SHP plants to the electric power grid • Procedures on monitoring and verifying electricity production from SHP • National RE/EE Fund • Tariff methodology for RES electricity and standard PPA 	<ul style="list-style-type: none"> • RES Law includes a number of provisions to facilitate investment in grid- 	<ul style="list-style-type: none"> • Procedures adopted and enforced by end of Year 1 • Technical regulation adopted and enforced by end of Year 1 • Procedures adopted and applied by 	<ul style="list-style-type: none"> • Published IRRs • Project report documenting the status of IRRs enforcement • Project report on the status of operations of RE and EE Fund • Same as above 	Commitment of the various Government institutions to adopt and capacities to enforce required bylaws are in place

¹³ Many SHP constructed in the past are malfunctioning; none connected to the grid and few investments in SHP take place, except for by isolated donor-funded projects

¹⁴ The projects are in various stages of development (assessment, feasibility, construction, operation)

¹² Indicator will be assessed based on the following ranking:

0 = No regulations are in place – may have been discussed;

1 = Bylaws and IRRs have been discussed and formally proposed;

2 = Bylaws and IRRs have been formally proposed but not adopted;

3 = Bylaws and IRRs have been formally adopted, but have no enforcement mechanism; and

4 = Bylaws and IRRs are adopted, have enforcement mechanism

		connecte d RE projects, but they are not operatio nalized	end of Year 1 <ul style="list-style-type: none"> National RE/EE Fund set-up and is operational by end of Year 1 Methodology for RES electricity and standard PPA developed and adopted by end of Year 1 	<ul style="list-style-type: none"> Same as above 	
Output 1.2: Central and local government institutions with enhanced capacities to develop and coordinate SHP projects.	<ul style="list-style-type: none"> # staff members from relevant central and local government institutions trained in developing and coordinating SHP projects Inter-ministerial Task Force to coordinate SHP policies development and implementation at central level 	<ul style="list-style-type: none"> 0 0 	<ul style="list-style-type: none"> 30 staff members trained by the end of Year 2 Inter-ministerial Task Force to coordinate SHP policies development and implementation at central level established and is operational by the end of Year 2 	<ul style="list-style-type: none"> Training reports Official documents establishing Task Force and minutes of its regular meetings 	Low turn-over of trained central and municipal staff is ensured
Outcome 2: Enhanced technical and	<ul style="list-style-type: none"> % of the total SHP installed cost provided by locally made goods and services 	<ul style="list-style-type: none"> 5-10% 	<ul style="list-style-type: none"> 50% by the end of Year 3 	<ul style="list-style-type: none"> Project report on SHP market chain 	Potential market chain actors are

planning know-how and developed market chain for SHP in Tajikistan				development	interested in SHP projects Demand for SHP is on the rise as a result of establishing favorable policy framework
Output 2.1: Guidebook on technical and policy aspects of SHP project development (to be used in all trainings to be delivered by the project)	<ul style="list-style-type: none"> • Guidebook on SHP project development 	<ul style="list-style-type: none"> • 0 	<ul style="list-style-type: none"> • Guidebook on SHP project development prepared and disseminated by the end of Year 1 	<ul style="list-style-type: none"> • Published capacity needs assessment • Training reports • Same as above • Same as above • Same as above 	<ul style="list-style-type: none"> • Commitment of partners to release staff for training program is in place • Commitment of universities and technical school to introduce new curricula is in place
Output 2.2: Local workshops and manufacturers with enhanced capacities to install, construct, manufacture and repair SHP system equipment and components	<ul style="list-style-type: none"> • Technology transfer and capacity development plan prepared for selected local manufacturers • Number of local SHP manufacturers capable of providing turn-key integrated RES solutions and O&M services 	<ul style="list-style-type: none"> • 0 • 0 	<ul style="list-style-type: none"> • 2 technology transfer and capacity development plan prepared by the end of Year 1 • At least 2 by the end of Year 2 	<ul style="list-style-type: none"> • Project report on SHP market chain development 	<ul style="list-style-type: none"> • Interest of potential SHP market chain actors in provided capacity building and technology transfer is insured

Output 2.3: Vocational training program for technicians involved in SHP design/construction and O&M	<ul style="list-style-type: none"> # of technicians annually undertaking vocational training on SHP 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> 20 technicians annually undertaking vocational training on SHP starting from Year 2 	<ul style="list-style-type: none"> Training report 	<ul style="list-style-type: none"> Interest of local education institutions
Output 2.4: Local manufacturers capable of producing combined electric and biomass-fired heating and cooking devices for rural households	<ul style="list-style-type: none"> # of local craft workshops capable of manufacturing and assemblage of simple electric heating and cooking devices 	<ul style="list-style-type: none"> 0 	<ul style="list-style-type: none"> At least 5 local craft workshops by the end of Year 3 	<ul style="list-style-type: none"> Project report 	<ul style="list-style-type: none">
Outcome 3: Improved confidence on the technical and economic viability of integrated SHP-based rural development model	<ul style="list-style-type: none"> No. of SHP demos/pilots incorporating aspects of productive uses and livelihood support for host communities Cumulative electricity generation from newly installed SHPs by EOP, MWh/yr Cumulative electricity generation from newly installed SHPs by EOPIP, MWh/yr 	<ul style="list-style-type: none"> 0 0 0 	<ul style="list-style-type: none"> At least 10 community-owned SHP projects operate on a sustainable basis and at least 17 additional are under construction by the end of Year 4 4,860 13,118 	<ul style="list-style-type: none"> Reports on pilot SHPs operations 	<ul style="list-style-type: none"> Availability of local people with sufficient technical education and managerial experience Participation of local level government
Output 3.1: Technical studies, political commitments and institutional framework secured for pilot SHP projects	<ul style="list-style-type: none"> Update hydrological data Feasibility studies 	<ul style="list-style-type: none"> 0 0 	<ul style="list-style-type: none"> Updated data for 2 sites by end of Year 1, 3 sites - by end of Year 2, 5 sites - by end of Year 3 	<ul style="list-style-type: none"> Report on implementation of pilot SHP projects Integrated District Development Plans 	<ul style="list-style-type: none"> Same as above

	<ul style="list-style-type: none"> • No. of integrated district development plans (IDDPs) • No. of local entities capable to manage SHP plants • No. of engineering designs and all permissions • No. of SHP projects in the pipe-line 	<ul style="list-style-type: none"> • 0 • 0 • 0 • 0 	<ul style="list-style-type: none"> • FS for 2 sites by end of Year 1, 3 sites - by end of Year 2, 5 sites - by end of Year 3 • IDDP for 2 districts by end of Year 1, 3 districts - by end of Year 2, 5 districts - by end of Year 3 • 2 local entities by end of Year 1, 3 local entities - by end of Year 2, 5 local entities - by end of Year 3 • Designs ready and permissions secured for 2 projects by end of Year 1, for extra 3 projects - by end of Year 2, and for 5 more projects - by end of Year 3 • At least 17 further SHP projects identified and 		
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			construction started (without direct project support)		
Output 3.2: Operational SHP demos/pilots in selected communities, demonstrating the viability of the technology and O&M&M models	<ul style="list-style-type: none"> No. of commissioned demo/pilot SHP plants by EOP No. of operational demo/pilot SHP plants by EOP Average annual operating performance of operational demo/pilot SHP plants by EOP <ul style="list-style-type: none"> Capacity, kW Load factor, % Net annual electricity production, MWh/yr On-grid price, US\$ 	<ul style="list-style-type: none"> 0 0 0 	<ul style="list-style-type: none"> 10 10 92 60% 486 0.03 	Report on implementation of pilot SHP projects	Same as above
Output 3.3: Pilot SHP operations sustained	<ul style="list-style-type: none"> No. of PPAs signed for purchase of power from pilot SHP plants by EOP No. of energy efficient appliances supplied and EE upgrades conducted No. of local business supported in pilot localities No. of integrated river-basin management plans developed and adopted by authorities 	<ul style="list-style-type: none"> 0 0 0 0 	<ul style="list-style-type: none"> At least 200 by the end of Year 3 At least 200 EE appliances and 10 EE upgrades by end of Year 4 100 by the end of Year 4 10 	Report on implementation of pilot SHP projects	Same as above
Outcome 4: National Scaling-up Programme of Renewable Energy-based Integrated Rural Development	<ul style="list-style-type: none"> Adopted and financed National Scaling-up Program 	N/a	<ul style="list-style-type: none"> Adopted and financed National Scaling-up Program by the end of 	<ul style="list-style-type: none"> Officially approved and published national scaling up plan 	<ul style="list-style-type: none"> Data on project impacts and results properly documented and made available to consultants

			Year 4		
Output 4.1: Project results assessed, analyzed and compiled into comprehensive national report	<ul style="list-style-type: none"> • Project results and Lessons learnt report • No. of recipients of lessons learnt report by EOP • Total GHG emission reductions achieved by EOP, ktCO2 • Total GHG emission reductions achieved by EOPIP, ktCO2 	<ul style="list-style-type: none"> • N/a 	<ul style="list-style-type: none"> • Project results and Lessons learnt report prepared by end of Year 4 • 300 • 90 • 244 	<ul style="list-style-type: none"> • Project results and Lessons learnt report • Project report on GHG emission reduction monitoring 	
Output 4.2: Conference on integrated renewable-energy based rural development organized	<ul style="list-style-type: none"> • Conference on integrated renewable-energy based rural development 	<ul style="list-style-type: none"> • N/a 	<ul style="list-style-type: none"> • Conference on integrated renewable-energy based rural development organized by the end of Year 4 	<ul style="list-style-type: none"> • Conference report 	Data on project impacts and results properly documented and made available to consultants
Output 4.3 Approved and funded proposal for national scaling up of the SHP demos/pilots	<ul style="list-style-type: none"> • Annual amount of governmental incentives allocated to support investment in new SHP plants under the scale-up plan by EOP, US\$ 		<ul style="list-style-type: none"> • 3,500,000 US\$ 	<ul style="list-style-type: none"> • Officially approved and published national scaling up plan 	Government commitment to promote SHP development and utilization is sustained

11. BUDGET AND CO-FINANCING

Annual Work and Budget Plan (AWBP)

Award ID:				61194						
Project ID:				77414						
Award Title:				PIMS 4324 Small hydropower in Tajikistan						
Business Unit:				TJK 10						
Project Title:				Technology Transfer and Market development for Small Hydropower in Tajikistan						
Implementing Partner (Exec. Agency):				Ministry of Industry and Energy						
GEF Outcome / Atlas Activity	Resp. Party (Impl. Agency)	Fund ID / donor name	Atlas Budget Account Code	ERP/ATLAS Budget Description/Input	Year 1	Year 2	Year 3	Year 4	Total (USD)	
Output 1.1	UNDP	GEF 62000	72100	Subcontracts	20,000				20,000	1
			sub-total GEF		20,000	-	-	-	20,000	
Output 1.2	UNDP	GEF 62000	71300	Local Consultants	5,000	5,000	5,000	1,000	16,000	2
			71600	Travel	2,000	2,000	2,000	500	6,500	2
			72200	Equipment and software		5,000			5,000	2
			72500	Supplies	250	250	250	250	1,000	3
			73400	Rental and Main Equip	250		250		500	3
			74500	Miscellaneous	250	250	250	250	1,000	3
			sub-total GEF		7,750	12,500	7,750	2,000	30,000	
Outcome 1 TOTAL	UNDP	GEF 62000	72100	Subcontracts	20,000				20,000	
			71300	Local Consultants	5,000	5,000	5,000	1,000	16,000	
			71600	Travel	2,000	2,000	2,000	500	6,500	
			72200	Equipment and software	-	5,000	-	-	5,000	
			72500	Supplies	250	250	250	250	1,000	

			73400	Rental and Main Equip	250	-	250	-	500	
			74500	Miscellaneous	250	250	250	250	1,000	
			sub-total GEF		27,750	12,500	7,750	2,000	50,000	
Output 2.1	<u>UNDP</u>	<u>GEF</u> <u>62000</u>	72100	Subcontracts	50,000				50,000	4
			sub-total GEF		50,000	-	-	-	50,000	
Output 2.2	<u>UNDP</u>	<u>GEF</u> <u>62000</u>	71300	Local Consultants	10,000	10,000			20,000	5
			72100	Subcontracts		50,000	50,000	40,000	140,000	6
			72200	Equipment and furniture		320,000			320,000	7
			72500	Supplies		30,000			30,000	7
			sub-total GEF		10,000	410,000	50,000	40,000	510,000	
Output 2.3	<u>UNDP</u>	<u>GEF</u> <u>62000</u>	72100	Subcontracts			50,000		50,000	7
			sub-total GEF		-	-	50,000	-	50,000	
Output 2.4	<u>UNDP</u>	<u>GEF</u> <u>62000</u>	72100	Subcontracts	15,000	35,000	35,000	35,000	120,000	8
			72500	Supplies	5,000	5,000	5,000	5,000	20,000	8
			sub-total GEF		20,000	40,000	40,000	40,000	140,000	
Outcome 2 TOTAL	<u>UNDP</u>	<u>GEF</u> <u>62000</u>	71300	Local Consultants	10,000	10,000	-	-	20,000	
			72100	Subcontracts	65,000	85,000	135,000	75,000	360,000	
			72200	Equipment and furniture		320,000			320,000	
			72500	Supplies	5,000	35,000	5,000	5,000	50,000	
			sub-total GEF		80,000	450,000	140,000	80,000	750,000	
Output 3.1	<u>UNDP</u>	<u>GEF</u> <u>62000</u>	71300	Local Consultants: establishment of SHP operators	5,000	5,000			10,000	9
			71300	Local Consultants: pipeline development	5,000	5,000	5,000	5,000	20,000	10

			71600	Travel	1,000	1,500	1,500	1,000	5,000	10
			72100	Subcontract 1 Hydro study	100,000				100,000	11
			72100	Subcontract 2 feasibility study		20,000	30,000		50,000	12
			72100	Subcontract 3 Ingeeneering design		40,000	60,000		100,000	13
			sub-total GEF		111,000	71,500	96,500	6,000	285,000	
Output 3.2	UNDP	GEF 62000	71300	Local Consultants: O&M support		8,000	8,000	8,000	24,000	14
			71600	Travel		2,000	2,000	2,000	6,000	14
			72100	Subcontracts			350,000	350,000	700,000	15
			sub-total GEF		-	10,000	360,000	360,000	730,000	
		UNDP 04000	72100	Subcontracts		210,000			210,000	15
sub-total UNDP		-	210,000	-	-	210,000				
Outcome 3: TOTAL	UNDP	GEF 62000	71300	Local Consultants	10,000	18,000	13,000	13,000	54,000	
			71600	Travel	1,000	3,500	3,500	3,000	11,000	
			72100	Subcontracts	100,000	60,000	440,000	350,000	950,000	
			sub-total GEF		111,000	81,500	456,500	366,000	1,015,000	
		UNDP 04000	72100	Subcontracts		210,000			210,000	
		sub-total UNDP		-	210,000	-	-	210,000		
Output 4.1	UNDP	GEF 62000	71300	Local Consultants: Lessons learnt				5,000	5,000	16
			71200	International Consultants: GHG assessment				20,000	20,000	17
			sub-total GEF		-	-	-	25,000	25,000	
Output 4.2	UNDP	GEF 62000	71600	Travel				6,000	6,000	18
			74200	Audio visual & Printing Prod.costs				3,500	3,500	18
			74500	Miscellaneous				500	500	18

			sub-total GEF		-	-	-	10,000	10,000	
Outcome 4: TOTAL	UNDP	GEF 62000	71200	International Consultants	-	-	-	20,000	20,000	
			71300	Local Consultants	-	-	-	5,000	5,000	
			71600	Travel	-	-	-	6,000	6,000	
			74200	Audio visual & Printing Prod.costs	-	-	-	3,500	3,500	
			74500	Miscellaneous	-	-	-	500	500	
			sub-total GEF		-	-	-	35,000	35,000	
Project Management Unit	UNDP	GEF 62000	71400	Contractual Services-Indv	30,000	30,300	30,300	30,600	121,200	19
			71600	Travel	2,500	2,500	2,500	2,500	10,000	
			72200	Equipment and furniture	5,500		2,000		7,500	
			72500	Supplies	1,000	1,000	1,000	1,000	4,000	
			74200	Printing and audiovisuals	1,400	1,400	1,400	1,400	5,600	
			74500	Miscellaneous	500	500	500	200	1,700	
			sub-total GEF		40,900	35,700	37,700	35,700	150,000	
		UNDP 04000	71400	Contractual Services-Indv	49,200	49,200	49,200	49,200	196,800	
			71600	Travel	1,500	1,500	1,500	1,500	6,000	
			72400	Communication costs	3,600	3,600	3,600	3,600	14,400	
			73100	Rental and Main Equip	4,800	4,800	4,800	4,800	19,200	
			73120	Office running costs	3,160	3,160	3,160	3,160	12,640	
			73400	Vehicle running costs	2,400	2,400	2,400	2,400	9,600	
			72500	Supplies	1,440	1,440	1,440	1,440	5,760	
74200	Printing and translations	4,800	4,800	4,800	4,800	19,200				
74500	Miscellaneous	1,580	1,580	1,620	1,620	6,400				
Sub-total		72,480	72,480	72,520	72,520	290,000				

<u>TOTAL GEF</u>	259,650	579,700	641,950	518,700	2,000,000	
<u>TOTAL UNDP TRAC</u>	72,480	282,480	72,520	72,520	500,000	
TOTAL	332,130	862,180	714,470	591,220	2,500,000	

General notes to the budget:

- International consultants (IC) are budgeted at \$ 3000 per week and short-term national consultants (NC) are budgeted at \$ 600 per week.
- Travel has been calculated as 25% of travel budget for international consultants and 8% for national consultants
- The cost of workshops has been divided of various budget lines as per UNDP ATLAS budget which does not have a separate budget line for training or workshops. For example, budget line 'international consultant' will have a % allocation for international experts to support workshops. The number of workshops for each output is given in the 'results framework'. A workshop will cost about USD 2,500 per 1-2 days.
- The role of the CTA (40 p/w) is to provide technical advice in all components. The time has been pro rate divided over the budget line 'international consultants'.

Budget notes:

- 1) Standard methodology for economic-financial evaluation of SHPs and tariffs to be paid to IPPs and charged to consumers by IPP; as well as a standard PPA format/template
- 2) Training programme for central and local government officials on RES policy development and implementation
- 3) Establishment and strengthening of the role of the Inter-Ministerial Task Force to provide for inter-agency coordination, monitor progress, and report to the Parliament and President on the results of RES policy implementation
- 4) Preparation, dissemination of a Guidebook on SHP project development summarizing regulatory framework, and providing guidelines, methodologies and description of recommended standardized technical solutions (i.e. 3 designs of common SHPs in the rated capacities range of 33 - 500 kW adopted based on available international standards and designs for application in Tajik rural communities)
- 5) Competitive selection of local manufacturers and elaboration of their capacity and technology development plans
- 6) On-the-job capacity building program for selected manufacturers to be delivered by international SHP design/manufacturing company and include: joint SHP design, construction and O&M for pilot projects (under Component 3), quality assurance, personnel training, other business and technical advisory services
- 7) Improvement of technological base of the selected companies via provision of required soft- and hard-ware (on a 50% cost-sharing basis). Introduction in partnerships with national technical schools vocational training for SHP specialists,
- 8) On-the-job capacity building program for selected manufacturers: joint identification of products range, joint design (adaptation of international products to suit local needs), assembling, marketing, quality assurance, personnel training, other business and technical advisory services
- 9) Facilitation of the establishment of new and/or strengthening of existing entities to own and operate pilot SHP plants (including staff training and legal and business advisory support)
- 10) Supporting identification and preparation of additional SHP projects (site identification, community mobilization, technical feasibility, permissions and approvals, quality assurance, etc)
- 11) Updating data on hydrological resources
- 12) Conduct of feasibility analyses of SHP sites
- 13) Preparation of engineering design and securing required permissions and approvals
- 14) Operation and maintenance of SHP pilots (via on-the job training for SHP staff) and monitoring of SHPs operational performance
- 15) Construction/installation and commissioning of 10 SHP pilots.
- 16) Assessment and compilation of project results and lessons learnt from Components 1-3, including GHG emission impact
- 17) Development and application of methodology for and estimation of the greenhouse gas (GHG) emission reduction impact of the National Scaling-up Program
- 18) Organization of national conference to present the results and mobilize high-level political support and commitments for National Scale-up strategy
- 19) 50% - Project Manager's cost + Project Assistant

Summary of funds

DONOR	Year 1	Year 2	Year 3	Year 4	TOTAL
GEF	259,650	579,700	641,950	518,700	2,000,000
UNDP (TRAC)	72,480	282,480	72,520	72,520	500,000
UNDP (other)	1,500,000	1,500,000	1,000,000	250,000	4,250,000
Government (cash & in-kind)		410,000	1,090,000		1,500,000
Communities	10,000	45,000	45,000		100,000
LLC Energoremont		100,000			100,000
TOTAL	1,842,130	2,917,180	2,849,470	841,220	8,450,000

Note on Co-financing

UNDP’s contribution to the proposed GEF-co-financed project will total 4,750,000 US\$ comprising of UNDP’s core resources (TRAC) and those of other donors channeled via UNDP-implemented projects as described below. This means that the activities of the UNDP projects being referred to, are included in this proposed project; i.e., outputs of the UNDP project are also considered as outputs of this proposed GEF project.

- 1) The UNDP project “Promotion of Renewable and Sustainable Energy Use for Development of Rural Communities in Tajikistan (2009-2013)” has been conceptualized as an initial phase of a larger multi-year programme, with an overall goal to initiate the scaling up of activities in support of the MDGs with a particular focus on improving access to energy in rural regions. Its conceptualization and implementation falls within the frame of the Poverty Reduction Strategy (PRS) and National Development Strategy (NDS) for Tajikistan. The project aims to achieve the following:
 - a) To develop an integrated rural development model with provision of electricity from mini hydro (possible other renewable) as the driver, and then to integrate clean water, irrigation, food, employment, education and health issues;
 - b) To strengthen governance capacity to implement poverty reduction policies;
 - c) To test and demonstrate the model effectiveness through identification and implementation of a number of pilot projects within a selected community, and with full community participation;
 - d) Upon verification of the model, to propose a scaled-up approach from a pilot community to a national program that will address issues of rural poverty reduction and national economic development.

2) Second, it is envisaged that the GEF-supported project will be closely coordinated with UNDP’s Communities Programme (CP) in Tajikistan. The CP is a multi-year and multi-million US\$ initiative, ongoing since 1996. The programme has 5 area offices in Sughd, Khatlon, and the Rasht and Zeravshan Valleys. The major aim of the Communities Programme (CP) is to help local communities in different regions to formulate and address their needs and priorities through making decisions, building civic awareness, mobilizing local resources, establishing local capacities, and fostering sense of ownership. UNDP’s CP supports a wide network of community based organizations, such as the 116 Jamoat Resource and Advocacy Centers (JRCs), 19 District Development Councils (DDCs), 59 Business Advisory Centers (BACs), 21 Dehkan Farm Associations (DFAs), and 6 Micro Loan Funds (MLFs). CP and all the supporting infrastructure that goes with it will be utilized by UNDP to develop, test and then up-scale the proposed integrated rural development models based on provision of SHP-based energy.

3) Co-financing will be also provided through the Rural Growth Programme (RGP), implemented by UNDP's Communities Programme. Its aim is to enhance more inclusive economic development in rural areas of Tajikistan in support of NDS and PRS. The purpose of the RGP is to improve the local environment for economic growth, income generation and employment creation in Sughd region, northern Tajikistan. The Programme aims to foster an environment for rural economic development through the following components:

- a) Improving capacities of local governance actors (government, private sector and civil society) for local development planning with an emphasis on rural economic growth, including the implementation and monitoring of local development plans in line with NDS and PRS;
- b) Facilitating access for producers/farmers and MSMEs to appropriate, professional, and sustainable business and technical advisory/extension services, including inter alia, on sustainable energy access options;
- c) Supporting organized member focused business associations and their apex institutions in developing adequate and responsive services and advocacy support for its members;
- d) Strengthening selected district vocational training institutions to meet regional and international market demands for better qualified labor and safe migration;
- e) Facilitating access for producers/farmers, poor, women, and MSMEs to a variety of financial products and services available from Micro Finance Institutions.

4) Another UNDP project which will serve as a source of co-financing is the "Tajikistan Afghanistan Poverty Reduction Initiative" (TAPRI), also implemented under the umbrella of the Communities Programme, with support from the Government of Japan. The main objective of this project is to alleviate poverty through improvement of cross-border cooperation and promotion of sustainable economic and social development and improved livelihoods in specifically targeted Tajik and Afghan borderlands communities. Part of the project will be targeted at the installation of SHP-based power plants as a tool for poverty alleviation and development of business and social infrastructure in the selected border areas. Estimated costs of TAPRI financing for pilot SHPs are 1,100,000 US\$ in Year 1. This contribution will serve as co-financing for Output 3.2 and Output 3.3.

5) Finally, UNDP will allocate additional 500,000 US\$ from its core resources to co-finance Project Management costs of the proposed project.

12. MANAGEMENT ARRANGEMENTS

The SHP initiative will have two main sources of funding, from UNDP (TRAC) and GEF (through UNDP), apart from government and third-party co-financing. These are two funding streams, but are essentially part of the same set of activities, that are laid down in a UNDP project document (to access the USD 1.2 million TRAC funds) and UNDP-GEF project document (to access the GEF funds of USD 2 million). The projects are complementary and the activities of both projects will be implemented by the same project team, which will be financed with GEF and UNDP TRAC resources.

The project will be implemented through the Direct Implementation Modality under the umbrella of UNDP's Energy and Environment Programme in close coordination with the Ministry of Energy and Industry and other government entities. The Ministry will appoint a National Project Director who will be the main Focal Point of the government contact with the project. A Project Manager (PM) will be hired to manage the activities on a day-to-day basis. The PM will be responsible for overall project coordination and implementation, consolidation of work plans and project papers, preparation of quarterly progress reports, reporting to the project supervisory bodies, and supervising the work of the project experts and other project staff. The PM will also closely coordinate project activities with relevant Government and other institutions and hold regular consultations with project stakeholders.

The PM will benefit from the focused inputs of a part-time non-resident Chief Technical Adviser (CTA) whose main task will be to provide expert advisory services and technical assistance to the PM and other project experts, as and when required. In addition:

- Financial and Administrative Officer of the E&E Programme will devote some of its time to manage project's administrative and financial resources as well as provide administrative support to PM.
- National and international consultancy services will be called in for specific tasks under the various project components. These services, either of individual consultants or under sub-contacts with consulting companies, will be procured in accordance with applicable UNDP guidelines.
- Finally, the UNDP CO will provide specific support services for proper project implementation, as required, through its Administrative, Programme and Finance Units.

A Project Board will be established to provide strategic directions and management guidance to project implementation. It will consist of representatives of the relevant ministries and state committees/departments participating in the project, the UNDP Country Office (CO), as well as representatives of the NGO community/Civil Society Groups. Representatives of the private sector may be invited to participate.

The Project Board (PB) is responsible for providing strategic guidance and making management decisions for the project, in particular when guidance is required by the Project Manager. The PB plays a critical role in project monitoring and evaluations by quality assuring these processes and products, and using evaluations for performance improvement, accountability and learning. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems with external bodies. In addition, it approves the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual Work Plan, the PB can also consider and approve the quarterly plans (if applicable) and also approve any essential deviations from the original plans.

In order to ensure UNDP's ultimate accountability for the project results, PB decisions will be made in accordance to standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the PB, the final decision shall rest with the UNDP Project Manager. Potential members of the PB are reviewed and recommended for approval during the PAC meeting. Provisional list of potential PB members include: Ministry of Energy and Industry, Ministry of Economic Development and Trade, Barqi Tajik, and Ministry of Environmental Protection. Representatives of local stakeholders can be included in the Board as appropriate.

13. MONITORING AND EVALUATION

The project will be monitored through the following M& E activities. The M& E budget is provided in the table below.

Project start:

A Project Inception Workshop will be held *within the first 3 months* of project start with those with assigned roles in the project organization structure, UNDP Country Office and where appropriate/feasible regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to building ownership for the project results and to plan the first year annual work plan.

The *Inception Workshop* should address a number of key issues including:

- Assist all partners to fully understand and take ownership of the project. Detail the roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team.

Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms. The Terms of Reference for project staff will be discussed again as needed.

- Based on the project results framework, finalize the first annual work plan. Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audit.
- Plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first PB meeting should be held within the first 12 months following the inception workshop.

An *Inception Workshop Report* is a key reference document and must be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Monitoring

Quarterly

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted (Annex 2), the risk log shall be regularly updated in ATLAS. Risks become critical when the impact and probability are high.
- Based on the information recorded in Atlas, a Project Progress Reports (PPR) can be generated in the Executive Snapshot.

Annually:

- *Annual Project Review/Project Implementation Reports (APR/PIR):* This key report is prepared to monitor progress made since project start and in particular for the previous reporting period (30 June to 1 July). The APR/PIR combines both UNDP and GEF reporting requirements.

The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual).
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools).

Periodic monitoring through site visits:

UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the PB may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

Evaluation

Mid-term of project cycle:

The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation (December 2012/January 2013). The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will focus on the effectiveness, efficiency and timeliness of project implementation; will highlight issues requiring decisions and actions; and will present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the [UNDP Evaluation Office Evaluation Resource Center \(ERC\)](#).

End of Project:

An independent *Terminal Evaluation* will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The final evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The final evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the [UNDP Evaluation Office Evaluation Resource Center \(ERC\)](#).

During the last three months, the project team will prepare the *Project Terminal Report*. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may need to be taken to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums.

The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation through lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects.

Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements:

Full compliance is required with UNDP's Branding Guidelines. These can be accessed at <http://intra.undp.org/coa/branding.shtml>, and specific guidelines on UNDP logo use can be accessed at: <http://intra.undp.org/branding/useOfLogo.html>. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used

alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at <http://intra.undp.org/coa/branding.shtml>.

Full compliance is also required with the GEF’s Communication and Visibility Guidelines (the “GEF Guidelines”). The GEF Guidelines can be accessed at:

http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf.

Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied

Audit arrangements

The Audit will be conducted in accordance with UNDP Financial Regulations and Rules and applicable audit policies on UNDP projects.

Table 6 M&E work plan and budget

Type of M&E activity	Responsible Party(ies)	Estimated Budget (\$) (Excluding Project Team staff time)	Time-frame
Inception Workshop (IW); end-of-project workshop	- Project Manager - Chief Technical Adviser - UNDP Country Office (CO) - UNDP/GEF RCU	USD 10,000	Within first two months of project start-up.
Inception Report	- Project Team - UNDP CO	None	Immediately following IW.
Measurement of Means of Verification for Project Purpose Indicators	- Project Manager will oversee the commissioning of specific studies and institutions, and delegate responsibilities to relevant team members	USD 4,000 (Note: To be finalized during inception phase and at Inception Workshop).	Start, mid and end of project
Measurement of Means of Verification for Project Progress and Performance (measured on an annual basis)	- Oversight by part-time Chief Technical Adviser and Project Manager - Measurements by regional field officers and local IAs	USD 4,000 (Note: To be determined as part of the Annual Work Plan's preparation).	Annually prior to APR/PIR and to the definition of annual work plans
Annual Project Report / Project Implementation Review (APR/PIR)	- Project Team - UNDP CO - UNDP/GEF RCU	None	Annually
Periodic progress reports	- Project Team	None	To be determined by Project Team and UNDP CO
Technical reports, as per project activities	- Project team - Consultants, as needed	Cost to be covered by consultancy budget	To be determined by Project Team and UNDP CO
Mid-term Evaluation	- Project team - UNDP CO	USD 16,000	At the mid-point of project implementation.

Type of M&E activity	Responsible Party(ies)	Estimated Budget (\$) (Excluding Project Team staff time)	Time-frame
	- UNDP/GEF RCU - External Consultants		
Project Terminal Report	- Project Team - UNDP CO	None	At least one month before the end of the project
Independent Final Evaluation	- Project Team, - UNDP CO - UNDP/GEF RCU - External Consultants (i.e. evaluation team)	USD 16,000	At the end of project implementation
Project results and impact study	- Project Team - UNDP/GEF RCU	USD 20,000	Yearly
Audit	- UNDP CO - Project team	USD 5,000	Yearly
TOTAL COST of M&E (output 4.1) Excluding project team staff time and UNDP staff and travel expenses.		USD 75,000	

14. LEGAL CONTEXT

This document together with the CPAP signed by the Government and UNDP which is incorporated by reference constitute together a Project Document as referred to in the SBAA [or other appropriate governing agreement] and all CPAP provisions apply to this document.

Consistent with the Article III of the Standard Basic Assistance Agreement, the responsibility for the safety and security of the implementing partner and its personnel and property, and of UNDP's property in the implementing partner's custody, rests with the implementing partner.

The implementing partner shall:

- a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- b) Assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The implementing partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via <http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm>. This

provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

Part 3. ANNEXES

ANNEX A. EMISSION REDUCTION CALCULATION

Direct emission reduction

UNDP will support the Government in development and of about 27 SHP plants. The Government has identified the following sites, which are given in Table 7 below, together with the expected installed capacity and energy savings*. About 10 SHP plants will be in operation by the end of the project and another 17 will be in advance stage of preparation, supported by the project in the component 3.

Table 7 Potential SHP sites

SHP	Installed capacity (in kW)	Annual energy production (in MWh)	Location	Load utilization (%)	Investment costs, US\$
SOGD OBLAST					
1 "Zerobod"	70	307	Aini district	50%	70,000
2 "Shavatki Bolo"	50	307	Aini district	70%	50,000
3 "Arnokhun"	200	1,226	Gorno-Matcha district	70%	200,000
4 "Ghuzn"	80	491	Gorno-Matcha district	70%	80,000
5 "Basmanda"	70	153	Ganchi district	25%	70,000
6 "Sharora-2"	30	66	Asht district	25%	30,000
7 "Shahriston-1"	210	460	Shahristan district	25%	210,000
8 "Negnot"	80	175	Pendjikent town	25%	80,000
KHATLON OBLAST					
9 "Obi Rushan"	15	92	Khovaling district	70%	15,000
10 "Surhob"	60	368	Parkhar district	70%	60,000
11 "Michurin"	30	184	Vose district	70%	30,000
12 "Armughon"	165	1,012	Dangara district	70%	165,000
13 "Peshtova-1"	55	337	Baldjuvon district	70%	55,000
14 "Tole"	65	399	Muminabad district	70%	65,000
15 "Lulikutal"	80	491	Kulyab town	70%	80,000
16 "Yakkatut"	280	1,717	A. Djomi district	70%	280,000
DISTRICTS (RAYONS)					
17 "Khakimi-2"	60	184	Nurabad district	35%	60,000
18 "Kabutiyon"	30	184	Nurabad district	70%	30,000
19 "Ulfatobod"	30	92	Nurabad district	35%	30,000
20 "Djafir"	100	613	Rasht district	70%	100,000
21 "Djilondi"	70	215	Djirgital district	35%	70,000
22 "Almosi"	100	613	Gissar district	70%	100,000
23 "Aini"	80	491	Varzob district	70%	80,000
24 "Fucherch"	80	491	Varzob district	70%	80,000
25 "Sorvo"	150	920	Vahdat town	70%	150,000
26 "Lodjurgh"	80	491	Tavildara district	70%	80,000
27 "Djavoni"	170	1,042	Rogun town	70%	170,000
Total	2,490	13,118			2,490,000
Average	92	486		59%	

*) As approved by Government regulation No. 73 of 2 February 2009.

The GEF Manual on CO₂ emission reduction suggest than that the **direct emission reduction** can be calculated as follows:

CO₂ direct = E * L * C; where

- C – CO₂ emission factor:
- L – average useful lifetime of equipment, which for SHP is taken as 20 years
- E – annual energy of fossil or wood fuels replaced by SHP

However, estimating the expected emission reduction is less straightforward as the formula may suggest:

- SHPs work on-grid during summer time. In this case, the grid could have provided the power to the communities connected, but there is no shortage. In fact, the SHP may sell its power to the grid. In this case, one hydropower source replaces another (most power generated in the grid is based on large-scale hydro), so we have assumed that net emission reduction is zero in this case;
- SHPs work off-grid during the winter time, when grid supply is absent or unreliable and the SHP has to provide the community. In this case the SHP provides for lighting and appliances in households, some productive uses and social services (e.g., schools and clinics) as well as replacing part of wood fuels for cooking.

The average operation mode of an SHP (on-grid or off-grid) would be as follows:

	Load utilization	Operation (hours p.a.)	Days of operation
off-peak	35%	1226	146
on-peak	75%	3942	219
average	59%		

In the off-grid mode, one can assume that SHPs replace unsustainably harvested wood fuels, which is used for cooking and heating. On the other hand, one can argue that if power would not be provided by a new SHP, then to reach a required level of *sustainable demand*, this would either have to be provided by a diesel-fuelled mini-grid or by boosting the production capacity of the national grid by adding fossil fuel based generation capacity (diesel or fuel oil). In the calculation we have assumed that replacement of diesel would take place in 50% of the energy production cases (with emission factor of diesel-based generation of about 0.8 kgCO₂ per kWh¹⁵) and replacement of wood¹⁶ in the remaining 50% (with emission absorption of growing trees of 1.57 tCO₂ per m³).

The direct project and post-project emission reduction (due to the installation of 27 SHPs (with an average capacity of 92 kW) can then be calculated as follows:

¹⁵ 0.8 tCO₂ per MWh (tonne of CO₂ per thousand kWh)

¹⁶ The assumption is that 0.5 m³ of wood per person per year (or 2.1 kg per person per day) can be saved (from deforestation) by using electric cooking stoves. It is assumed also that wood would still be used for space heating.

Annual off-grid energy production: 3,053,736 kWh (during 146 days)		Emission reduction (tCO ₂ /yr)
	Factor used	
50% diesel	0.8 kgCO ₂ /kWh	2,443
50% wood	1.57 tCO ₂ /m ³	6,516
TOTAL		8,958

Assuming a lifetime of the SHP plants of 20 years, the cumulative emission reduction is 244,325 tCO₂.

Indirect emission reduction – bottom-up

Using the GEF bottom-up methodology¹⁷, indirect emission reductions attributable to the project are estimated at 732,974 tCO₂ equivalent over the average lifetime of the SHP of 20 years. The GEF bottom-up approach implies a further replication of the investments in SHP to other communities in Tajikistan and is calculated per following formula:

$$\text{CO}_2 \text{ indirect BU} = \text{CO}_2 \text{ direct} * \text{RF}, \text{ where}$$

CO₂ direct = estimate for total direct emission reductions
RF = replication factor

For RF the value of ‘3’ has been chosen, which seems reasonable given the importance of the GEF project in setting up a national technology delivery and support structure, something other projects have failed to support.

Indirect emission reduction – top down

An upper limit of indirect emission reduction can be estimated by looking at the technical and economic market potential for small hydropower. The Government has established a Long-term Program for Small Hydro-power stations construction for the period 2009- 2020 with a tentative list of possible SHP sites.

If all SHP would have been implemented by 2024, the annual energy production due to the total installed capacity in mini and small-sized SHP would be 102 MW that would generate 595,034 MWh annually. Assuming the same methodology for emission reduction calculation as in the case of the ‘direct emission reduction’, annual CO₂ emission avoided would be 554,126 tCO₂ annually and 5.5 million tCO₂ over the 10-year post-project influence period.

$$\text{CO}_2 \text{ indirect TD} = \text{CO}_2 \text{ direct} * \text{CF}, \text{ where}$$

CO₂ indirect = estimate for total indirect emission reductions
CF = causality factor

Of course, this potential cannot be fully attributed to the GEF intervention. Uptake of SHP technologies will take place due to ongoing (and future) national efforts and other donor-funded initiatives. We propose to apply conservatively a ‘causality factor’ of 40%.

Thus, an upper limit to indirect emission reduction impacts can be calculated as 2.2 million tCO₂

¹⁷ The reader is referred to the *Manual for Calculating GHG Benefits of GEF projects: Energy Efficiency and Renewable Energy Projects*, GEF/C.33/Inf.18, April 2008

	Emission reduction (ktCO ₂)	Cost-effectiveness (in USD/tCO ₂)
Direct (project)	90	8.19
Direct (post-project)	154	8.19
Indirect (bottom-up)	733	2.73
Indirect (top-down)	2217	0.90

	SHP	Installed capacity (in kW)	Annual energy production (in MWh)	Location
Medium-sized SHP, Short-term construction program				
1	"Marzich"	4,305	26,398	Aini
2	"Shash-boloi"	185	1,134	Nurabad
3	"Sangikar"	1,006	6,169	Rasht
4	"Fathobod"	283	1,735	Tajikabad
5	"Pitovkul"	1,106	6,782	Jirgital
6	"Horma"	334	2,048	Baljuvan
7	"Toch"	305	1,870	Shahrinav
8	"Shirkent-3"	576	3,532	Tursun-zade
9	"Kuhiston"	500	3,066	Матча
10	"Cheptura"	500	3,066	Shahrinav
11	"Tutak"	650	3,986	Rasht
12	"Pushti bog"	200	1,226	Baljuvan
13	"Dijik"	260	797	Aini
14	"Khovaling"	100	613	Khovaling
15	"Bohtar"	1,280	7,849	Bohtar
16	"Kulyab"	220	482	Kulyab
17	"Surhteppa-1"	330	2,024	Jalolidin Rumi
18	"Darg"	250	986	Aini
19	"Arnohun"	200	1,226	Kuhistoni Mastchoh
20	"Sabzazor"	250	1,533	Ismoili Somoni
22	"Pastrud"	1,500	9,198	Aini
23	"Nushori bolo"	710	4,354	Tajikabad
24	"Gulomon"	650	3,986	Tajikabad
25	"Yazgulom-1"	1,900	11,651	Vanch
26	"Yazgulom-2"	1,900	11,651	Vanch
27	"Ok-su-1"	1,200	7,358	Murgab
28	"Ok-su-2"	1,300	7,972	Murgab
29	"Lakon"	2,500	15,330	Isfara
30	"Takob"	750	4,599	Varzob
31	"Mehnatobod"	100	613	Vose
32	"10-solagii istiklol"	545	3,342	Vahdat
33	"Sitorai surh-1"	150	920	Vahdat
34	"Sitorai surh-2"	100	613	Vahdat
35	"Hitoi"	3,000	18,396	Jabbor Rasulov
36	"Argumon"	165	1,012	Dangara
37	"Peshtova-2"	320	1,962	Baljuvan
38	"Surhak-1"	150	920	Muminabad
39	"Shohon"	235	1,441	Shurobod
40	"Dashtijum"	280	1,717	Shurobod
41	"Shabboda"	200	1,226	Farhor
42	"Kamolobod"	190	1,165	Vose
43	"Pahtakor"	330	2,024	Jilikul
44	"Yakkatut"	280	1,717	Abdurahman Jami
45	"Sebzor"	10,000	61,320	Roshkala
46	"Chuyangaron-1"	1,000	6,132	Vahdat
Medium-term construction programme				
<i>Medium-sized SHPs</i>				
1	"Nurobahsh"	5,000	30,660	Dangara
2	"Sari pul"	200	1,226	Rasht
3	"Muchi harf"	500	3,066	Nurabad
4	"Hakimi-1"	500	1,533	Nurabad
5	"Chilikul"	1,360	8,340	Baxw
6	"Nurofar"	100	613	Vahdat
7	"Andigon"	200	1,226	Vahdat
8	"Gurumbok"	300	1,840	Tavildara
9	"Keles"	1,000	6,132	Jirgital
10	"Karagushhona"	1,000	6,132	Rasht

11	"Nazate-Ailok"	2,400	14,717	Rasht
12	"Hoit"	125	767	Rasht
13	"Begi-Siyoh"	350	1,073	Rasht
14	"Katasoi"	3,000	6,570	Istravshan
15	"Sharora"	350	767	Asht
16	"Chonbaht"	320	1,962	Khovaling
17	"Piyon"	300	1,840	Aini
18	"Nozdrobod"	150	920	Vahdat
19	"Almosi"	100	613	Gissar
20	"Chuyangaron"	1,360	8,340	Vahdat
21	"Shirgovad"	500	3,066	Vanch
22	"Vanch"	1,000	6,132	Vanch
23	"Shahriston-1"	210	460	Shahristan
24	"Yasman"	100	307	Rasht
25	"Duoba"	200	613	Rasht
26	"Potibed"	250	1,533	Aini
27	"Fatmovud"	200	701	Aini
28	"Anzob"	2,000	12,264	Aini
29	"Nur-2"	100	613	Gissar
30	"Hichborak"	100	307	Rasht
31	"Miyonadu"	100	613	Tavildara
32	"Sarhad"	100	613	Farhor
33	"Shirkent-2"	520	3,189	Tursun-zade
34	"Temurmaliq"	100	613	Temurmaliq
35	"Vorukh"	500	3,066	Isfara
36	"Dashtak"	150	920	Kuhistoni Mastchoh
37	"Gukat"	200	876	Kuhistoni Mastchoh
38	"Chilgazi"	1,080	2,365	Isfara
39	"Lohuti"	280	1,717	Jilikul
40	"Gulbulok"	100	613	Dangara
41	"Surhak-2"	150	920	Muminabad
42	"Dahana 1-5"	1,600	9,811	Kulyab
43	"Tokappa"	125	767	Kulyab
44	"Toskala"	165	1,012	Vose
45	"Shobika 1-2"	320	1,962	Vose
46	"Sitorai Surh"	760	4,660	Jalolidin Rumi
47	"Surhteppa-2"	1,250	7,665	Jalolidin Rumi
48	"Shurobod-1"	375	2,300	Abdurahman Jami
49	"Shurobod-2"	120	736	Abdurahman Jami
<i>Mini SHP</i>				
50	"Arbobi-2"	60	368	Vahdat
51	"Lichak"	80	491	Vahdat
52	"Shavatki-bolo"	50	307	Aini
53	"humdon"	70	215	Nurabad
54	"Hakimi-2"	60	184	Nurabad
55	"Yahak Yust"	40	123	Nurabad
56	"Layron"	50	307	Tavildara
57	"Lochurg"	80	491	Tavildara
58	"Bomgura"	75	460	Vahdat
59	"Chilondi"	70	215	Jirgital
60	"Chashmasor"	70	429	Faizabad
61	"Shariston-2"	40	88	Shahristan
62	"Tutkul"	65	399	Jalolidin Rumi
63	"Pingon"	50	307	Rasht
64	"Duoba"	70	153	Aini
65	"Guzn"	80	491	Kuhistoni Mastchoh

66	"Hujaho-2"	70	153	Ganch
67	"Chui nav"	60	131	Ganch
68	"Asht"	50	110	Asht
69	"Mulokoni"	60	368	Baljuvan
70	"Sulton-Uvays"	80	491	Khovaling
Long-term construction program				
<i>Medium-sized SHP</i>				
1	"Yazgulom 3"	1,900	11,651	Vanch
2	"Yazgulom 4"	1,900	11,651	Vanch
3	"Yazgulom 5"	1,900	11,651	Vanch
4	"Sorvo"	150	920	Vahdat
5	"Paldorak-1"	250	1,533	Kuhistoni Mastchoh
6	"Rukshif-1"	200	1,226	Kuhistoni Mastchoh
7	"Samchon"	500	3,066	Kuhistoni Mastchoh
8	"Padask"	880	5,396	Kuhistoni Mastchoh
9	"Iskich"	500	3,066	Gissar
10	"Faizobod"	465	2,851	Abdurahman Jami
11	"Javoni"	170	1,042	Rogun
12	"Guli surh"	100	613	Rogun
13	"Lugur"	350	2,146	Rogun
14	"Shingilich"	130	399	Rasht
15	"Runob"	250	767	Rasht
16	"Hidiriyon"	250	1,533	Rasht
17	"Chafr"	100	613	Rasht
18	"Kalanak"	120	736	Rasht
19	"Sipoling"	120	368	Rasht
20	"Voidara"	100	307	Nurobod
21	"Sangvor"	100	613	Tavildara
22	"Charsem"	10,000	61,320	Shugnan
23	"Namasgut"	1,500	9,198	Ishkashim
24	"Roshorv"	600	3,679	Rushan
25	"Yamchun"	140	858	Ishkashim
26	"Bichharv"	140	858	Vanch
27	"Kishtaki nav"	196	429	Penjikent
28	"Padrud"	1,134	6,954	Penjikent
29	"Kurgovad"	1,500	9,198	Darvaz
30	"Leninobod"	145	889	Jilikul
31	"Dukak"	300	1,840	Nurabad
32	"Lairun"	150	460	Nurabad
<i>Mini SHPS</i>				
33	"Shodmoni"	60	368	Nurabad
34	"Langar"	30	184	Nurabad
35	"Saidon"	30	184	Nurabad
36	"Kabutiyon"	30	184	Nurabad
37	"Ulfatobod"	30	184	Nurabad
38	"Hasandara"	60	368	Nurabad
39	"Sari pulak"	30	184	Nurabad
40	"Chavchi"	60	368	Nurabad
41	"Girdob"	40	245	Nurabad
42	"Langar"	60	368	Tavildara
43	"Roga"	30	184	Tavildara
44	"Margzor"	40	245	Rogun
45	"Neknot"	80	491	Penjikent
46	"Puli Girdob"	45	276	Penjikent
47	"Huchaho-2"	60	263	Ganch
48	"Obch-1"	40	88	Ganch
49	"Basmanda-2"	80	175	Ganch
50	"Guliston"	50	175	Muminabad
51	"Shahrinav"	30	105	Muminabad
52	"Kaskun"	50	153	Nurabad
53	"Valgon"	40	245	Kuhistoni Mastchoh
TOTAL		102,110	595,034	

ANNEX B. TERMS OF REFERENCE

1. Project Manager (Draft)

I. POSITION INFORMATION	
Project title: Project Number: Job Code Title: Duration of Employment: Working nature: Working hours: Duty station: Pre-classified Grade: Supervisor:	Project Manager One year with further prolongation Full-time assignment 40 hours a week (08:30-17:30; 12:00-13:00 lunch time) Dushanbe, Tajikistan SC-9 UNDP CO Programme Officer
II. BACKGROUND INFORMATION/OBJECTIVES	
<p>Under the overall supervision of UNDP Programme Officer and in close cooperation with the National Programme Director, the Programme Manager is responsible for the day-to-day management and implementation of the Programme, including all programme and administrative matters. Manager is responsible for protection and consultation of the programme in front of state agencies for increasing capacity of the programme and project cycle.</p>	
III. FUNCTIONS	
<ul style="list-style-type: none"> • Manage and coordinate programme activities, from substantive, administrative and financial points of view, applying strategic planning and systematic coordination of programme activities. • Manage day-to-day programme implementation and overall coordination of programme outcomes. • Ensure supervision of the Programme personnel and ensure effective communication and coordination between the Programme offices and the UNDP Country office in Bishkek. • Provide direction and leadership to programme teams and responsible parties in advocating programme objectives and in ensuring that all interested parties are well informed about the programme activities and goals. • Identify any support and advice required for the management, planning and control of the Programme. • Ensure timely preparation and compilation of the Programme Annual/Quarterly Work Plans and Progress/Final substantial and financial reports and its submission to UNDP CO and NPD as appropriate. • Oversee and direct the Programme staff in implementation of sub-components, including in the development of detailed work plans and action plans for each sub-component, implementation, monitoring and reporting of each sub-component. • Prepare monthly reports for the CO on key programme activities, issues and required action points. Prepare the programme semi-annual progress reports (progress against planned activities, update on risks and issues, expenditures), annual review report and final review reports, and submit them to UNDP CO and NPD as appropriate. • Plan, organize and participate in the transparent tender bidding or request for proposal processes 	

- for the selection of implementing partners for sub-projects and ensure the preparation of clear tender bidding evaluation reports.
- Undertake regular monitoring visits to the sub-projects' sites and report to UNDP CO on the status of activities including suggestions for improvements.
 - Implement monitoring procedures for sub-projects, linked to progress payments, and ensure that all on-going sub-projects are visited regularly and that the Programme personnel certify that sub-projects implemented under their responsibility are proceeding as planned.
 - Together with the Country Office, prepare funding proposals and progress reports to donor organizations, monitoring, evaluation and lessons learned reports and other relevant programme-related documents, including substantive correspondence for a) resource mobilization, b) partnership building, c) reporting.
 - Guide and orient efforts and contributions of consultants, staff and government counterparts towards achievement of programme objectives. Mobilize goods and services to initiate activities, including drafting TORs and work specifications.
 - Assist in development of the gender mainstreaming strategy and ensure the mainstreaming of gender into all programme activities.
 - Manage programme administrative and security related activities, monitor financial resources and accounting to ensure accuracy and reliability of financial reports.
 - Participate in transparent and competitive selection, recruitment, supervision and mentoring of respective programme staff. Ensure efficient HR management, conduct regular performance appraisal exercises for programme staff.
 - Represent the Programme, as required, vis-à-vis other UN organizations in Tajikistan, donor organizations, other international organizations, as well as national Government and non-governmental institutions and endeavor to build professional relationships with local, district and regional authorities in order to ensure the full participation of a broad spectrum of national leadership in the identification, planning and execution of programme activities
 - Ensure proper professional relationships with community leaders, local NGOs and other Community Based Organizations (as Women associations, Youth associations, etc).
 - Establish and maintain relationships and act as the key focal point with UNDP CO to ensure that all programming, financial and administrative matters related to the Programme are transparently, expediently and effectively managed, in line with established UNDP Rules and Regulations.
 - Verify and channel all requests for programme, administrative, logistical and other support and report all incidents related to security and issues of general concern to UNDP CO.
 - Manage the transfer of programme deliverables, documents, files, equipment and materials as per the standards UNDP procedures.
 - Ensure establishment and maintenance of proper electronic and paper filing systems.
 - Perform other duties that may be required by the PDA or UNDP Senior Management.

IV. RECRUITMENT QUALIFICATIONS/COMPETENCIES

Education:	<ul style="list-style-type: none"> ○ Master degree or equivalent in international development, social sciences, public administration or other relevant field
Experience:	<ul style="list-style-type: none"> ○ 10 years of relevant experience ○ 5 years of managerial experience is required ○ in the field of development cooperation including in grant management ○ Proven ability to draft, edit and produce written proposals and results-focused reports ○ Proven experience working with Government, civil society, international organizations and donors ○ Experience in the usage of computers and office software packages (MS Word, Excel, etc.)
Language Requirements:	<ul style="list-style-type: none"> ○ Fluency in English and Russian. Knowledge of Tajik is an asset

2. Chief Technical Adviser (Non-resident) - Draft

Post Title: Chief Technical Adviser
Office: Project Management Unit
Organization: Ministry of Industry and Energy
Duration: 48 weeks (over a 4-year period)
Duty Station: Home Office and Dushanbe, Tajikistan

Duties: Under the overall supervision of the National Project Director, the non-resident Chief Technical Adviser will:

- Work closely with the PM in coordinating and facilitating inputs of government agencies, partner organizations, scientific and research institutions, subcontractors, and national and international experts in a timely and effective manner;
- Provide guidance and assistance to the PM and project staff to ensure that the project activities conform to the approved project document;
- Assist the PM during the initial 2 months of the project, in the preparation of an “inception report” which will elaborate on the project Logical Framework Matrix and planned project activities, the 1st year Annual Work Plan and Budget, TORs for key project staff, and an M&E plan;
- Assist the PMU in development of relevant TORs and recruitment/mobilization of qualified national and international experts and organizations as needed to provide specific consultancy and engineering services;
- In close cooperation with the PMU and UNDP’s Focal Point on Energy and Environment, and in consultation with the project partner organizations and stakeholders, prepare Annual Project Work Plans to be agreed upon by the Project Board (PB);
- Provide “on-the-job” technical guidance and mentoring to the PMU in order to strengthen their capacity to effectively implement the technical aspects of the project;
- Support the PM in reporting to the PB on the progress of project implementation and achievement of project results in accordance with the project’s logical framework matrix;
- Support the PMU in project-related meetings, as required;
- Review reports of national and international consultants, project budget revisions, and administrative arrangements as required by UNDP/GEF procedures;
- Assist the PM in the development of a concrete Monitoring and Evaluation Plan at the outset of the project (within inception report);
- Support the PM in preparing project progress reports, information releases, as well as monitoring and review reports in accordance with UNDP/GEF monitoring and evaluation rules and procedures;
- Support the PM in the preparation and implementation of mid-term and final Independent Evaluation Missions (TOR’s, identification and recruitment of appropriate candidates, organization of missions, joint field missions and discussion with evaluators, etc);
- Support UNDP CO staff on their annual monitoring visits to project sites.

Qualifications and Experience:

- Postgraduate degree in energy/renewable energy development;
- Minimum ten years of experience in implementing renewable energy projects in combination with knowledge of economic and financial analysis, institutional, regulatory and policy frameworks;
- Good knowledge of and experience with GEF Climate Change issues, operational modalities and familiarity with UNDP-GEF procedures;
- Familiarity with UNDP rules, regulations and administrative procedures;
- Prior knowledge and experience of the political, social and environmental factors and issues related to energy development and climate change mitigation in Central Asia, preferably in Tajikistan;
- Computer proficiency, especially related to professional office software packages;
- Excellent drafting and communication skills.

Languages: Excellent Tajik/Russian and English, both oral and written.

3. Project Administrative and Finance Assistant - Draft

I. Position Information	
Project title:	Administrative/Finance Assistant
Project Number:	
Job Code Title:	
Duration of Employment:	One year with further prolongation
Working nature:	Full-time assignment
Working hours:	40 hours a week (08:30-17:30; 12:00-13:00 lunch time)
Duty station:	Dushanbe, Tajikistan
Pre-classified Grade:	SC-5
Supervisor:	Project Manager
II. Organizational Context	
<p>Under the guidance and supervision of the Programme/Project Manager, the Administrative/Finance Assistant provides administrative/finance services ensuring high quality of work, ensures accurate, timely and properly recorded/documented service delivery. The Administrative/Finance Assistant promotes a client, quality and results-oriented approach.</p> <p>The Administrative/Finance Assistant works in close collaboration with the Operations and Programme Units in the CO and project personnel to ensure consistent service delivery.</p>	
III. Functions / Key Results Expected	
Summary of Key Functions:	
<ul style="list-style-type: none">• Implementation of operational strategies• Provision of accounting, administrative, procurement, HR and logistical support• Provision of support to office maintenance and assets management• Support to knowledge building and knowledge sharing	
<p>1. Ensures implementation of operational strategies, focusing on achievement of the following results:</p> <ul style="list-style-type: none">• Full compliance of administrative, procurement and HR activities with UNDP rules, regulations, policies and strategies.• Full compliance of financial processes and financial records with UN/UNDP rules, regulations, policies and strategies• Provision of inputs to preparation of work plans.	

2. Provides **administrative, finance, procurement, HR and logistical support**, focusing on achievement of the following results:

- Interpretation and implementation of procedures and rules related to administrative, procurement, financial and personnel matters and ensure their compliance.
- Administrative support to organization of conferences, workshops, retreats, study tours, etc.
- Arrangement of travel and hotel reservations, preparation of travel authorizations.
- Provision of all necessary support in organization of the above, as well as report to submission to UNDP office.
- Full compliance of procurement activities with UNDP rules, regulations, policies and strategies.
- Timely preparation and updating of procurement plans for the Programme.
- Support to organization of procurement processes including preparation of RFQs, ITBs or RFPs documents, receipt of quotations, bids or proposals, their preliminary evaluation.
- Preparation of requests with all supporting documents for issuance of Purchase orders, contracts, subcontracts and other documents related to procurement of goods and services.
- Creation of requisitions in Atlas, registration of goods receipt in Atlas, budget check for requisitions.
- Serving as a focal point in procurement processing for the Programme/Project
- Undertaking joint procurement activities under combined Purchase Orders for stationery, computer hardware, photocopiers; joint contracts for computer maintenance, air-conditioning maintenance, shipping services, etc.
- Certifying availability of funds and ensuring that the activities are in line with the approved work plan and budget levels.
- Monitoring regularly the Programme budget, provision of timely advice to the Programme Coordinator on fund limitations and obtaining approval of budget revision(s) from UNDP.
- Provision of information for reports on financial status, procedures, exchange rates, costs and expenditures and potential funding problems.
- Assistance in proper control of the supporting documents for payments and financial reports for the Programme/Project; payment execution and monitoring payment status.
- Preparation of budget revisions per established rules.
- Ensuring the accurate book-keeping of advance funds received and preparation of reports, where relevant.
- Processing of financial documentation (vouchers, supporting documents, etc.) and maintaining internal expenditures control system by ensuring that vouchers processed are matched and completed, transactions are correctly recorded and posted in Atlas; travel claims, monthly payment orders (MPOs) and other entitlements are duly processed.
- Maintenance of Petty Cash
- Preparation and handling the routine correspondence related to general administration, procurement, financial and personnel matters; faxes; memoranda and reports in accordance with UNDP rules and procedures.
- Maintenance of files related to personnel, finance, procurement, administrative, logistical, programme/project matters.
- Checking vehicle logs and preparation of the draft vehicle history reports and maintenance plans.
- Assistance to the Audit and prepare necessary documents
- Performance of other duties as and when required
- Ensure timely extension of personnel contracts.

4. Provides **support to office maintenance and assets management**, focusing on achievement of the following results:

- Monitoring the Inventory Records, maintain the records and files on assets management, distribute the stationery to personnel and provide advice on procurement of goods to avoid unnecessary purchase.
- Maintenance of files and records relevant to office maintenance.

5. Provides **support to knowledge building and knowledge sharing** in the CO, focusing on achievement of the following results:

- Participation in the training for the operations/projects staff on administration, procurement, finance and HR.
- Briefing personnel on general administrative, financial and personnel matters.

IV. Recruitment Qualifications

Education:	<ul style="list-style-type: none"> ○ Higher education in economics, management, accounting, finance or other relative fields ○ Specialized training in finance is desirable.
Experience:	<ul style="list-style-type: none"> ○ 3 years of relevant administrative, accounting and financial experience at national and/or international level is required. ○ Experience in the usage of computers and office software packages (MS Word, Excel, etc.). ○ Previous experience of working for nationally executed programme (s) funded by UNDP is an asset. ○ Practical experience in procurement is an asset
Language Requirements:	<ul style="list-style-type: none"> ○ Fluency in English and Russian. Knowledge of Tajik is an asset

ANNEX C. CO-FINANCING LETTERS



UNDP/NU/PU/11/029

24 January 2011

Subject: Letter of Commitment for UNDP/GEF Full-Sized Project "Technology Transfer and Market Development for Small-Hydropower in Tajikistan"

On behalf of the United Nations Development Programme in Tajikistan, I would like to inform you about our support of the afore-mentioned UNDP/GEF Full-Sized Project "Technology Transfer and Market Development for Small-Hydropower in Tajikistan" and confirm UNDP's co-financing in the amount of US\$ 4,750,000 (four million seven hundred and fifty thousand US dollars only) for the period of 2010-2014 to cover the following project components:

Project Component	Amount, US\$	Type
Component 1: Policy and regulatory framework for SSHP	200,000	Grant (cash)
Component 3: SHP Demonstration	4,250,000	Grant (cash)*
Project Management	300,000	Grant (cash)

*Funding will be managed by UNDP and delivered via UNDP Communities Programme, Tajik Afghan Poverty Reduction Initiative and Renewable Energy Project

Please do not hesitate to contact us, if you have any questions in this regard.

Sincerely,

A handwritten signature in blue ink, appearing to read 'R. Vrhensky', is written over a light blue background.

Rastislav Vrhensky
Country Director

To: Global Environment Facility

ВАЗОРАТИ ЭНЕРГЕТИКА
ВА САНОАТИ
ҶУМҲУРИИ ТОҶИКИСТОН



МИНИСТЕРСТВО ЭНЕРГЕТИКИ
И ПРОМЫШЛЕННОСТИ
РЕСПУБЛИКИ ТАДЖИКИСТАН

734012, г. Душанба, ул. Рудакӣ, 22
Тел.: (810992 37) 221-66-97/221-66-19
Факс: (810992 37) 221-82-81
E-mail: minenergetika.tj

734012, г. Душанба, ул. Рудакӣ, 22
Тел.: (810992 37) 221-66-97/221-66-19
Факс: (810992 37) 221-82-81
E-mail: minenergetika.tj

№ 412-4134 от 23.11.2010 г.
Ба № 81 " " " 2010 г.
На 02 " " " " " "

Глобальный Экологический Фонд
Копия: Программа Развития ООН в Таджикистане

Тема: Со-финансирование проекта «Передача технологий и развитие рынка малых ГЭС».

Министерство энергетики и промышленности Республики Таджикистан, выражает своё уважение и данным письмом подтверждает своё обязательство о со-финансировании проекта ПРООН ГЭФ «Передача технологий и развитие рынка для малых ГЭС в размере 1.500.000 долл. США (один миллион пятьсот тысяч долларов США).

Со-финансирование вышеупомянутого проекта будет осуществляться через натуральный вклад в проект и параллельную реализацию проектов по строительству малых гидроэлектростанций Министерстве энергетики и промышленности Республики Таджикистан на период 2011- 2015 гг.

С уважением,

Министр

Гул Шерати

Изн. У93,
Тел. 3314573.

Ministry of Energy and Industry of the Republic of Tajikistan

Address: 22 Rudaki Str. 734012 Dushanbe Tajikistan
Telephone: (992 37) 221 69 97 / 221 88 89
Fax: (992 37) 221 82 81
E-mail: minenergoprom@mail.tj

№7/2-4137 as of 23.11.2010

To: Global Environment Facility
CC: United Nations Development Programme in Tajikistan

Co-financing of the project “Technology Transfer and Market Development for Small Hydropower”

The Ministry of Energy and Industry of the Republic of Tajikistan avails itself of this opportunity to express to the UNDP in Tajikistan the assurances of its highest consideration, and would like to confirm its co-financing commitment of the UNDP/GEF project “Technology Transfer and Market Development for Small Hydropower” in the amount of 1,500,000 USD (one million five hundred thousand US dollars).

The co-financing of the above-mentioned project will be done through in-kind contribution into the project, as well as parallel implementation of projects on construction of small hydropower stations of the Ministry of Energy and Industry of the Republic of Tajikistan during the period of 2011-2015.

Sincerely,
Mr. Gul Sherali
Minister

ЧУМХУРИИ
ТОЧИКИСТОН
ЧСП
«ЭНЕРГОРЕМОНТ»



РЕСПУБЛИКА
ТАДЖИКИСТАН
ЗАО
«ЭНЕРГОРЕМОНТ»

734042 1-й проезд проспекта Сядаш Шерзод -26. Расчетный счет 20202972813600001281
ОАО «Орени-банк» г. Душанбе. МФО 350101369 код банка 734001. ИНН 030001422 тел. 227-37-09, 223-21-43

№ 13/109 «21» 12 2010г.

Кому: Глобальный Экологический Фонд
Копия: Программа Развития ООН в Таджикистане
Тема: Софинансирование проекта «Передача технологий и развитие рынка для малых ГЭС»

ЗАО «Энергоремонт» выражает своё уважение и данным письмом подтверждает своё обязательство о софинансировании проекта ПРООН/ГЭФ «Передача технологий и развитие рынка для малых ГЭС» в размере \$100,000 долл. США (сто тысяч долларов США).

Софинансирование вышеупомянутого проекта будет осуществляться через параллельную реализацию проектов в области энергетики и связанных со строительством малых гидроэлектростанций.



С уважением,
Нервиз заместитель
Генерального директора

Ш.С. Хушов

UNOFFICIAL TRANSLATION

**Republic of Tajikistan
CJSC “Energoremont”**

Address: 26 Saadi Sherozi Str. 734042 Dushanbe Tajikistan
Bank account: 20202972813600001281, OrienBank
Telephone: 227-37-09; 223-21-43

№13/109 as of 21.12.2010

To: Global Environment Facility
CC: United Nations Development Programme in Tajikistan

**Co-financing of the project “Technology Transfer and Market Development for Small
Hydropower”**

CJSC “Energoremont” avails itself of this opportunity to express to the UNDP in Tajikistan the assurances of its highest consideration, and would like to confirm its co-financing commitment of the UNDP/GEF project “Technology Transfer and Market Development for Small Hydropower” in the amount of 100,000 USD (one hundred thousand US dollars).

The co-financing of the above-mentioned project will be done through parallel implementation of projects in energy sector, namely through construction of small hydropower stations.

Sincerely,
Mr. Sh. Khushov
First Deputy Director-General

ANNEX D. LIST OF BY-LAWS AS ENVISAGED BY THE LAW ON THE USE OF RENEWABLE ENERGY SOURCES

№	List of regulatory acts	Type of act
1.	Small hydro power. Terms and definitions	National standards of RT (category of alternative energy):
2.	The rules of conducting inspection certification of electrical equipment and electric power	Statutory act
3.	Instructions on connection order (connection) of facilities for using of renewable sources of energy to general power network.	Board resolution of the Ministry of energy and industry of RT
4.	Instruction on communication with the system operator and energy RES producer	Board resolution of the Ministry of energy and industry of RT
5.	Power and capacity purchase agreement	«Model contract», by Order of Antimonopoly agency of RT under the Government of RT
6.	Regulations on tariff calculation for electricity produced by RES	By Act of Antimonopoly agency of RT under the Government of RT
7.	Regulations on the rules of safety engineering and operation of renewable sources of energy on a territory of RT	Board resolution of the Ministry of energy and industry of RT
8.	Regulation on the order of definition of economic effect and amount of incentives for using of renewable recourses of energy and releasing them to environment	Board resolution of the Ministry of energy and industry of RT
9.	Regulation on Cadastres of renewable recourses of energy on a territory of RT	Board resolution of the Ministry of energy and industry of RT
10.	Regulation on Catalogues of renewable recourses of energy on a territory of RT (p.9)	Board resolution of the Ministry of energy and industry of RT
11.	Draft «Decreets of Government of RT «About introduction of amendments and additions to the Regulation of the Ministry of Energy and Industry of RT»	Draft Resolution of Government of RT
12.	An order of obtaining a permit for facilities and installation of RES (hydro power facilities, solar equipment).	Board resolution of the Ministry of energy and industry of RT
13.	A draft Decree of the Government of RT «On introduction of amendments and additions to the Law of RT “About power system”	Draft Resolution of Government of RT
14.	A draft decree of the Government of RT «On introduction of amendments and additions to Water Code of RT»	Draft Resolution of Government of RT
15.	Studying of existing legal acts on the matter of establishment of Foundation for support of development of RES and preparation of appropriate proposals	Proposals on the matter of establishment of Foundation for support of development of RES

ANNEX E. THE ROLE OF THE NATIONAL TRUST FUND FOR RES AND EE

1. New Law on Renewable Energy Sources (2010) provides for establishment of the National Trust Fund for renewable energy and energy efficiency (“the Fund”).
2. The Fund should be governed by the Administrative Council, and composed of representatives of relevant state institutions as well as representatives of the civil society sector, as follows:
 - One representative of the Ministry of Energy and Industry (MEI),
 - One representative of the Ministry of Economic Development and Trade (MEDT),
 - One representative of the Ministry of Finance (MF),
 - One representative of the State Committee on Investment (SCI)
 - One representative of the State Environment Agency
 - One representative of the Majlisi Oli of RT;
 - One representative of the OJSHC “Barki Tojik”
 - Two representatives of an NGO.
3. The Fund shall have the crucial role of creating incentives for community-based RES electricity production—it shall act as an intermediary institution between producers and the utility company (Barki Tojik) – and with competence given by regulation, it should ensure the regular payments and transfers of money. The employees of the Fund shall be technical experts, with knowledge of RES and EE to be used in the evaluation of projects and operation of the RES electricity incentive system. An administrative staff made up of persons holding a financial background will be in charge of managing capital flows and accounting procedures.
4. The Fund will act as a body with the following responsibilities:
 - ⇒ Collecting fees for incentivizing RES and EE from sources defined in the legislation of RT;
 - ⇒ Managing the mechanisms that control the incentive electricity buy-back price for grid connected RES power plants (entering into contracts for the purchase of electricity with Barki Tojik on behalf of the independent power producer (community based, but if required, this service shall be provided to private investors as well. This will be based on the special agreement signed previously between the Fund and independent power producer). Managing the scheme includes the following responsibilities:
 - finalize contracts on obligatory purchases with eligible electricity producers;
 - manage the accounting and execute the fee payment to the eligible electricity producers;
 - manage the accounting of the planned and actual generation, by means of invoicing and charging Barki Tojik for the electric power produced by the eligible producers;
 - Compile and process the data on electric power from the IPPs submitted by Barki Tojik.
 - ⇒ Allocation of financing to RES and EE projects not covered by the mechanism of the electricity incentive buy-back price - the following activities shall also be eligible for co-financing from the Fund:
 - Research and development studies on RES and EE (in full amount);
 - Promotional campaigns for the use of RES and the more efficient use of energy (in full amount);
 - Education programmes for professionals performing tasks related to RES installations and EE improvements (in full amount);

- Financial aid for the preparation of RES/EE project documentation, including investment studies (up to 40% of the total costs);
 - Financial aid for thermal and off-grid RES installations, e.g. solar thermal collectors as well as for EE improvement projects (up to 40% of the total investment; in remote rural areas and in the public sector, up to 100%)
- ⇒ Fund raising for RES and EE projects in Tajikistan and mediation related to the funding of RES and EE projects from monetary contributions provided by other states, international financial institutions and bodies, and domestic and foreign legal and physical persons;
- ⇒ Cooperation with national and international financial institutions (banks) to ensure funding for RES and EE projects in Tajikistan;
- ⇒ Initiation for and support from international cooperation in the field of RES and EE;
- ⇒ Establishment and maintenance of a database on all RES and EE projects in Tajikistan, financed by the Fund, including the supervision of the financial means spent for this purpose.

5. The payment principle and relations between stakeholders is shown in Figure 1. It must be noted that the difference between the incentive price, as stated in the tariff system, and the average electricity price in the system will be compensated by the Fund (i.e. the State, as this is a national interest), since electricity suppliers shall pay to the Fund the average system price for all electricity taken over. A detailed explanation of the scheme is provided in Box 1.

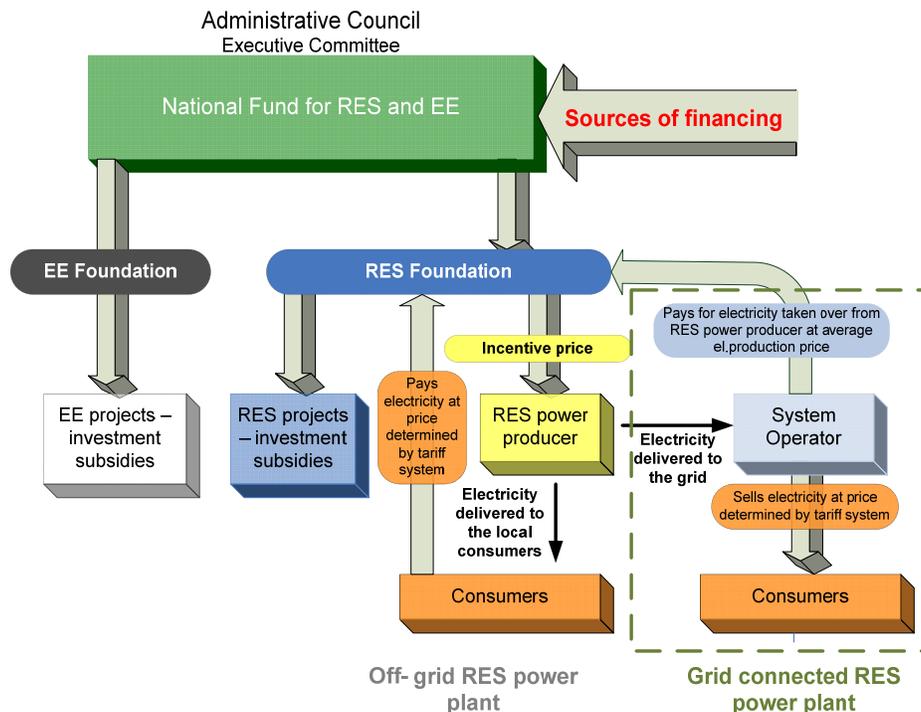


Figure 1 THE SYSTEM OF GUARANTEED POWER PURCHASE PRICE FOR RES ELECTRICITY PRODUCERS

BOX 1. EXPLANATION OF THE FUND'S ROLE IN THE INCENTIVE SCHEME FOR RES POWER PRODUCTION

The scheme of incentive electricity buy-back price for grid connected RES power plants – how does it work?

Due to the lack of capacities (a common situation with local community based SHP projects) or due to the desire to mitigate risk as much as possible, an RES power producer acquires assistance from the Fund to act as an intermediary between them and the system operator. A contract between an RES power producer and the Fund is then concluded which defines the terms and conditions on which the Fund will pay the incentive price to the RES power producer. The incentive price shall be in accordance with the regulation of RT.

The Fund will then conclude the Energy Purchase Agreement with the System Operator in accordance with the regulation of RT. Based on the amount of electricity that RES power producer delivers to the System Operator; the System Operator pays the amount to the Fund. The price the System Operator pays should be the average electricity generation price determined by the State Department of Power System Control. This price is lower than the retail price at which electricity is sold to the final consumers, hence the System Operator is guaranteed to cover their operation costs and participate in the system without any losses.

On the other hand, the Fund pays the incentive-guaranteed price to the RES power producer as specified in the contract and in line with the price for that type of RES power plant determined in the regulation. As this price is higher than the average electricity generation price, the difference shall be covered by the sources of the Fund.

Vision

The overall concept presented above is based on the assumption that all RES power plants shall be grid connected. This is by all means the desired situation. The grid connection of RES power plants, especially community based ones, is extremely important since local communities could benefit from the sales of electricity to the grid and use the collected money for local economic development. Moreover, the constant and secure supply of electricity is the main precondition for enabling new business opportunities (e.g. small processing factories) in rural areas. Therefore, the stable and reliable electricity supply from the grid is the main postulate in the paradigm "RES for poverty reduction".

Problem issues

The current situation is far from desired. There are a multitude of sHPPs in Tajikistan operating only during the winter months that provide electricity during shortages from the grid. They are not operational in the summer when there are surpluses of electricity in the system due to the current inability to transfer electricity to neighbouring power systems.

As sHPPs and other RES power plants are the primarily tool for poverty reduction in Tajikistan, it shall be required that all existing sHPPs are connected to the grid, operational throughout the year, and included in the incentive scheme led by the Fund.

During the period of transition many applications will be operating only in the off-grid mode and only during winters. In such cases, the Fund shall be included as an intermediary between the RES producer and final customers. The consumers should again pay the price as defined in the

tariff system (consumers shall always pay the same price) to the Fund, while the RES producer will obtain the incentive price for electricity delivered as stated in the contract with the Fund and in line with the regulation.

6. Where it regards the Fund, special attention shall be given to the community based RES plants. The Fund shall develop a framework “takeoff” agreement that will address the following issues:
 - Community based RES plants when working in both “on-grid” and "off-grid" mode will sell their electricity at the guaranteed price which will be paid by the Fund ;
 - Local customers will always pay the same price regardless of the working mode of an RES plant; the price will be equal to the regulated tariff established by the regulation;
 - The price difference between the regulated tariffs and the incentive price shall be covered by the Fund;
 - The methods of measurement, billing, and payment will be determined in the framework arrangement;
 - The obligation of all involved parties will be clearly determined in the document.
7. All these matters will be specified in the Regulation establishing the Fund, specifically:
 - Statutes of the Fund;
 - A work programme for the first four years of operation;
 - A financial plan for the four three years of operation.
8. The organization of the Fund and the rules of its operation shall be determined by a special legislation/regulation. In the short to medium term, however, the Fund will focus on providing financial support to electricity produced from community-based sHPPs, i.e. the Fund will act as an intermediary between utility and RES producer to ensure that in on-grid mode of work, the producer is paid for electricity delivered into the grid (see Box 1.). As well, the Fund, as a state body with legally prescribed competences, should be able to ensure payments of utilities for electricity taken over from RES producers.
9. **The crucial issue for the Fund's operation is how to ensure a continuous inflow of financial means, while respecting the country's meagre economic situation, and without burdening citizens or the industrial sector.** Various examples of funding sources for RES and EE purposes can be found worldwide; within the framework of proposed project detailed assessment will be carried out to identify the most suitable options and sources for fund's capitalization from the below range of the most widely applied:
 - Environmental charges for large polluters charged per tonne of pollutant (e.g. CO₂) emission;
 - Special charges for motor vehicles, paid yearly by vehicle owners according to the type and age of vehicle;
 - Special charge for imported vehicles. Though it is not a wide spread mechanism, it is identified as a potentially suitable solution for Tajikistan;
 - Petroleum products levy, paid by all consumers per litre of product bought;
 - Electricity fee, paid by all consumers per kWh of consumed electricity;
 - Direct state budget allocations.

SIGNATURE PAGE

Project Title: Technology Transfer and Market Development for Small-Hydropower in Tajikistan

UNDAF Outcome(s): Water, sustainable environment and energy.

Expected CP Outcome(s): Outcome 6: Improved environmental protection, sustainable natural resources management, and increased access to alternative renewable energy.

Expected CPAP Output (s): Output 6.2: Alternative renewable technologies including biogas, hydro, and solar power are demonstrated, understood, and widely used. Favorable policy and legal framework are established and contribute to private sector development.

- assist in the implementation of policies, legislation and regulations that improve market conditions for renewable energy development;
- demonstrate sustainable delivery models and financing mechanisms to encourage small-scale renewable energy projects (and improve social infrastructure) and support project implementation
- develop viable end-use applications of renewable energy; and
- conduct training on proper management of renewable energy systems (e.g. tariff collection) to strengthen local ownership and sustainability

Executing Entity/Implementing Partner: UNDP in Tajikistan

Implementing Entity/Responsible Partners: Ministry of Industry and Energy

Brief Description: The objective of this project is to significantly accelerate the development of small-scale hydropower (SHP) generation in Tajikistan by removing barriers through enabling legal and regulatory framework, capacity building and developing sustainable delivery models, thus substantially avoiding the use of conventional biomass and fossil fuels for power and other energy needs. The project is expected to generate global benefits in directly avoiding greenhouse gas (GHG) emissions of almost 273 kilotons of CO₂ due to preparation of SHP plants (over the lifetime of a SHP of 20 years) and almost 819-4,952 ktCO₂ in indirect emission reductions. The project will do this by introducing a regulatory framework to supply the grid with electricity generated SHP through sustainable delivery models and financing mechanisms and assist the Government in attracting funding for SHP investments.

Programme Period:	2012-2016
Atlas Award ID:	00061194
Project ID:	00077414
PIMS #	4324
Start date:	Mar. 2012
End Date	Dec 2016
Management Arrangements	DIM
PAC Meeting Date	

Total resources required:	\$ 8,450,000
Total allocated resources:	
• Regular	\$ 500,000
• Other:	
○ GEF	\$ 2,000,000
○ UNDP (projects)	\$ 4,250,000
○ Govt	\$ 1,090,000
In-kind contribution:	
• Govt / others	\$ 610,000

Agreed by Government of Tajikistan:

Date/Month/Year

Agreed by UNDP:

